THE WESTERN ASSOCIATION OF GYNECOLOGIC ONCOLOGISTS

W A G O

Fortieth
Annual Meeting

JUNE 16-18, 2011

STEIN ERIKSEN LODGE
PARK CITY, UTAH
2011 Program Committee

D. Scott McMeekin, MD, Program Chair
    John Chan, MD
    Levi Downs, MD
    Randall Gibb, MD
    Lisa Landrum, MD
    Kathryn McGonigle, MD
    Andrew Soisson, MD
    Christine Walsh, MD

WAGO Officers

President                     Barbara Goff, MD
President-Elect              D. Scott McMeekin, MD
Vice President               Lee-may Chen, MD
Secretary-Treasurer           Susan Davidson, MD
Past President               William R. Robinson, MD
Member-at-Large               Janice Ryu, MD
Member-at-Large               Andrew Li, MD
WAGO PAST PRESIDENTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
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<tbody>
<tr>
<td>James F. Nolan, MD</td>
<td>1970 - 1971</td>
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<tr>
<td>J. George Moore, MD</td>
<td>1972 - 1973</td>
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<tr>
<td>Duane E. Townsend, MD</td>
<td>1973 - 1974</td>
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<td>William E. Lucas, MD</td>
<td>1974 - 1975</td>
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<td>Leo D. Lagasse, MD</td>
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<td>David C. Figge, MD</td>
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<td>C. Paul Morrow, MD</td>
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<td>Philip J. DiSaia, MD</td>
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<td>Gary H. Johnson, MD</td>
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<tr>
<td>Edward W. Savage, MD</td>
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<td>McClure L. Smith, MD</td>
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<td>Samuel Ballon, MD</td>
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<td>Robert Hilgers, MD</td>
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<td>Francis J. Major, MD</td>
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<td>Watson G. Watring</td>
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<td>Leo B. Twiggs, MD</td>
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<td>Michael L. Berman, MD</td>
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<td>Earl Surwit, MD</td>
<td>1988 - 1989</td>
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<td>Conley Lacey, MD</td>
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<td>Karl Podratz, MD, PhD</td>
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<td>Jonathan S. Berek, MD</td>
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<td>James A. Roberts, MD</td>
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<td>A. Dennis DePetrillo, MD</td>
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<td>Benjamin E. Greer, MD</td>
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<td>Patricia S. Braly, MD</td>
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<td>Alberto Manetta, MD</td>
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<td>Christopher J. Jolles, MD</td>
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<td>Anthony (Tim) Russell, MD</td>
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<td>Richard E. Buller, MD, PhD</td>
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<td>Nelson Teng, MD, PhD</td>
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<td>Barrie Anderson, MD</td>
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<td>Hisham K. Tamimi, MD</td>
<td>2002 – 2003</td>
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<td>Beth Y. Karlan, MD</td>
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<td>Joan Walker, MD</td>
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<td>Sidney Scudder, MD</td>
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<td>David Miller, MD</td>
<td>2006 – 2007</td>
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<td>Wui-Jin Koh, MD</td>
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<td>Gary Leiserowitz, MD</td>
<td>2008 - 2009</td>
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<tr>
<td>William R. Robinson, MD</td>
<td>2009 - 2010</td>
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2010 Award Winners for Outstanding Papers

J. G. MOORE AWARD
Best Basic Science Presentation by a Resident/Fellow

*Biologic Activity of NVP-BEZ235, an Orally Available Dual P13K/mTOR inhibitor compared to the mTOR inhibitor RAD001, in Human Endometrial Cancer Cell Lines*

Boris J. N. Winterhoff, MD
Mayo Clinic, Rochester, MN

LEO D. LAGASSE AWARD
Best Clinical Presentation by a Resident/Fellow

*The Impact of Breast Cancer History on Occult Neoplasia in Women with BRCA1 and BRCA2 Mutations*

Barbara M. Norquist, MD
University of Washington, Seattle, WA

JAMES F. NOLAN AWARD
Best Presentation by a WAGO Member

*Frequency of Candidate Precursors in Serous Carcinoma in the Tubes of BRCA Mutation Carriers*

Ilana Cass, MD
Cedars-Sinai Medical Center, Los Angeles, CA
## SCHEDULE OF EVENTS

<table>
<thead>
<tr>
<th>TIME</th>
<th>FUNCTION</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td><strong>Wednesday, June 15</strong></td>
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<tr>
<td>4:00pm - 6:00pm</td>
<td>Exhibits/Poster Set up</td>
<td>Alpine &amp; Bronze</td>
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<tr>
<td>4:00pm - 7:00pm</td>
<td>Conference Registration</td>
<td>Silver Alcove</td>
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<tr>
<td>6:30pm - 8:00pm</td>
<td>Welcome Reception</td>
<td>Plaza Terrace</td>
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<tr>
<td><strong>Thursday, June 16</strong></td>
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<tr>
<td>6:45am - 7:45am</td>
<td>WAGO Executive Board Meeting</td>
<td>Viking Boardroom</td>
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<tr>
<td>7:00am - 1:00pm</td>
<td>Conference Registration</td>
<td>Silver Alcove</td>
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<tr>
<td>7:00am - 8:00am</td>
<td>Continental Breakfast</td>
<td>Alpine &amp; Bronze</td>
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<tr>
<td>7:00am - 1:00pm</td>
<td>Exhibits/Posters</td>
<td>Alpine &amp; Bronze</td>
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<tr>
<td>8:00am - 8:10am</td>
<td>Opening Remarks: Presidential &amp; Program Chair Welcome</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>8:10am - 9:55am</td>
<td>Scientific Session I: HPV and cervical cancer- Pat Soisson</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>8:10am - 8:20am</td>
<td><strong>Abstract 1:</strong> Disparities in HPV vaccine completion among vaccine initiators, Lauren Krill, MD</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>8:20am - 8:25am</td>
<td>Question &amp; Answer</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>8:25am - 8:35am</td>
<td><strong>Abstract 2:</strong> Association of cervical intraepithelial neoplasia 2 and 3 regression by Human Papilloma Virus serotype, Katherine Harris, MD</td>
<td>Silver &amp; Gold</td>
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<td>8:35am - 8:40am</td>
<td>Question &amp; Answer</td>
<td>Silver &amp; Gold</td>
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<td>8:40am - 8:50am</td>
<td><strong>Abstract 3:</strong> Potential economic impact of following ACOG guidelines for PAP smear and HPV testing, Mark Dodson, MD</td>
<td>Silver &amp; Gold</td>
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<td>8:50am - 8:55am</td>
<td>Question &amp; Answer</td>
<td>Silver &amp; Gold</td>
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<td>8:55am - 9:05am</td>
<td><strong>Abstract 4:</strong> Changing demographics of cervical cancer in the United States (1973-2007), Kristy Ward, MD</td>
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<td>9:05am - 9:10am</td>
<td>Question &amp; Answer</td>
<td>Silver &amp; Gold</td>
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<td>9:10am - 9:20am</td>
<td><strong>Abstract 5:</strong> Cervical conization of adenocarcinoma in-situ: a predicting model of residual disease, Katherine E. Tierney, MD</td>
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<td>9:25am - 9:35am</td>
<td><strong>Abstract 6:</strong> Robotic versus open radical hysterectomy for invasive cervical cancer: a single institution review of the first three years of practice, Meaghan Tenney, MD</td>
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<td>9:35am - 9:40am</td>
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<td>9:40am - 9:50am</td>
<td><strong>Abstract 7:</strong> The impact of rectal distention on the maximum rectal dose delivered in 3-D planned high dose rate brachytherapy for cervical cancer, Jihoon Lim, MD</td>
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<td>9:50am - 9:55am</td>
<td>Question &amp; Answer</td>
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<td>9:55am - 10:20am</td>
<td>Break</td>
<td>Alpine &amp; Bronze</td>
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<tr>
<td>10:20am - 11:50am</td>
<td>Scientific Session II: Lisa Landrum</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>10:20am - 10:30am</td>
<td><strong>Abstract 8:</strong> Menopausal symptoms and hormone replacement use: the gynecologic cancer survivors’ perspective, Marilyn Huang, MD, MS</td>
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<td>10:30am - 10:35am</td>
<td>Question &amp; Answer</td>
<td>Silver &amp; Gold</td>
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<td>10:35am - 10:45am</td>
<td><strong>Abstract 9:</strong> Endometrial intraepithelial neoplasia vs. World health organization classification of endometrial hyperplasia does not improve reliability of diagnosis or prediction of outcome in premenopausal women with preinvasive endometrial pathology undergoing progestin treatment, Kristine Penner, MD, MPH, MS</td>
<td>Silver &amp; Gold</td>
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<td>10:45am - 10:50am</td>
<td>Question &amp; Answer</td>
<td>Silver &amp; Gold</td>
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<td>10:50am - 11:00am</td>
<td><strong>Abstract 10:</strong> The utility of sentinel lymph node biopsy in the surgical management of women with vulvar melanoma, Amanda Nickles Fader, MD</td>
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<tr>
<td>Time</td>
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<td>11:00am - 11:05am</td>
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<td>11:05am - 11:15am</td>
<td><strong>Abstract 11:</strong> Outcome comparisons of dual-console robotic and laparoscopic surgery for gynecologic cancer in a fellowship program, Ashlee Smith, MD</td>
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<td>11:15am - 11:20am</td>
<td><strong>Question &amp; Answer</strong></td>
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<td>11:20am - 11:30am</td>
<td><strong>Abstract 12:</strong> The effects of regular exercise and yoga on health-related quality of life among ovarian cancer survivors, Kimberly Lowe, MD, PhD</td>
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<td>11:35am - 11:45am</td>
<td><strong>Abstract 13:</strong> The use of retrievable inferior vena cava filters in gynecologic onology patients, Sana Kahn, MD</td>
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<td>11:50am - 12:00pm</td>
<td><strong>Abstract 14:</strong> Enhancing anti-angiogenic therapy by blocking focal adhesion kinase, Justin Bottsford-Miller, MD</td>
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<td>12:15am - 1:00pm</td>
<td><strong>Poster Session</strong></td>
<td>Afternoon activity suggestions</td>
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**Friday, June 17**

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<th>Time</th>
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<tr>
<td>7:00am - 2:00pm</td>
<td>Conference Registration</td>
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<td>7:00am - 8:00am</td>
<td>Continental Breakfast</td>
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<td>8:00am - 10:15am</td>
<td><strong>Scientific Session III:</strong> Uterine Cancer- Levi Downs</td>
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<td>8:00am - 8:10am</td>
<td><strong>Abstract 15:</strong> Risk factors for upgrading and upstaging in patients with a preoperative biopsy of Grade I endometrial endometrioid adenocarcinoma, Marie Holzapfel, MD</td>
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<td>Silver &amp; Gold</td>
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<td>8:10am - 8:15am</td>
<td><strong>Question &amp; Answer</strong></td>
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<td>8:25am - 8:30am</td>
<td><strong>Abstract 16:</strong> Depth of myometrial invasion to predict lymph node metastases in women with endometrial cancer, Jessica Pittman, MD</td>
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<td>Silver &amp; Gold</td>
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<td>8:30am - 8:40am</td>
<td><strong>Abstract 17:</strong> Visceral adipocyte glucose-regulated protein (GRP) 78 is an independent risk factor for endometrial cancer survival, Koji Matsuo, MD</td>
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<td>8:45am - 8:55am</td>
<td><strong>Abstract 18:</strong> Body mass index (BMI) and outcomes in completely staged endometrioid adenocarcinoma of the uterus, Erin A. Bishop, MD</td>
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<td>9:00am - 9:10am</td>
<td><strong>Abstract 19:</strong> Novel expression profile of the wnt inhibitor secreted frizzled-related protein 1 (SFRP1) in endometrial carcinoma - A potential role as marker of progression, Thanh Dellinger, MD</td>
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<td><strong>Abstract 20:</strong> Machine learning as a tool to predict survival outcomes for carcinosarcoma of the female genital tract, Elizabeth Dickson, MD</td>
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<td><strong>Abstract 21:</strong> TTF-1: A protective role in endometrial carcinogenesis?, Kristine Penner, MD, MPH, MS</td>
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<td>9:45am - 9:55am</td>
<td><strong>Abstract 22:</strong> Payer status is associated with surgical interventions for uterine cancer, Aimee Fleury, MD, MPH</td>
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<td><strong>Abstract 23:</strong> Molecular analysis of endometrial pathogenesis in Lynch syndrome, Marilyn Huang, MD, MS</td>
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<td><strong>Break</strong></td>
<td>Alpine &amp; Bronze</td>
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<td>10:45am - 11:30am</td>
<td><strong>Invited Lecture:</strong> ASCO Update - Tom Herzog, MD</td>
<td>Silver &amp; Gold</td>
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<td>11:30am - 12:30am</td>
<td><strong>Scientific Session IV:</strong> Hereditary Cancers and BRCA- Kathy McGonigle</td>
<td>Silver &amp; Gold</td>
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<td><strong>Abstract 24:</strong> Genetic referral of women at risk for hereditary breast and ovarian cancer, Bethan Powell, MD</td>
<td>Silver &amp; Gold</td>
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<td>11:45am - 11:55am</td>
<td><strong>Abstract 25:</strong> Factors associated with genetic testing in BRCA1 and BRCA2 mutation carriers with advanced ovarian carcinoma, Barbara Norquist, MD</td>
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<tr>
<td>12:00pm - 12:10pm</td>
<td><strong>Abstract 26:</strong> Chemotherapy response and survival in serous ovarian cancer patients with BRCA mutations, John K. Chan, MD</td>
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<td>12:15pm - 12:25pm</td>
<td><strong>Abstract 27:</strong> Germline vs. Somatic BRCA mutations and response to chemotherapy and outcomes in serous ovarian cancer, John K. Chan, MD</td>
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<td>12:30pm - 2:00pm</td>
<td><strong>WAGO Business Meeting/Luncheon</strong></td>
<td>Flagstaff</td>
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<td>12:30pm - 2:00pm</td>
<td><strong>Fellow and Resident Luncheon</strong></td>
<td>Silver &amp; Gold</td>
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<td><strong>Tumor Board</strong></td>
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<td>6:00pm - 7:00pm</td>
<td><strong>WAGO Cocktail Reception &amp; Presidential Address</strong></td>
<td>OCC Foyer</td>
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<td>7:00pm - 9:30pm</td>
<td><strong>WAGO Presidential Dinner</strong></td>
<td>Odin &amp; Valhalla</td>
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**Saturday, June 18**

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<th>Session</th>
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<tr>
<td>7:00am - 12:00pm</td>
<td><strong>Conference Registration</strong></td>
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<td><strong>Exhibits/Posters</strong></td>
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<tr>
<td>8:00am - 9:00am</td>
<td><strong>Invited Lecture:</strong> The Role of Neoadjuvant Chemotherapy in the Management of Advanced-Stage Ovarian Cancer, Robert Bristow, MD</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>9:00am - 10:00am</td>
<td><strong>Scientific Session V:</strong> Ovarian cancer- John Chan</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>9:00am - 9:10am</td>
<td><strong>Abstract 28:</strong> The use of molecular markers to predict for optimal cytoreduction in ovarian cancer, Katherine Fuh, MD</td>
<td>Silver &amp; Gold</td>
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<tr>
<td>9:10am - 9:15am</td>
<td><strong>Question &amp; Answer</strong></td>
<td>Silver &amp; Gold</td>
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<tr>
<td>9:15am - 9:25am</td>
<td><strong>Abstract 29:</strong> Lymphoid enhancing factor 1 (LEF-1) overexpression in epithelial ovarian, fallopian tube and peritoneal cancer and associations with clinical factors, Aine Clements, MD</td>
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<td>9:25am - 9:30am</td>
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<td>Silver &amp; Gold</td>
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<td>9:30am - 9:40am</td>
<td><strong>Abstract 30:</strong> 30-day mortality following primary cytoreductive surgery for advanced stage epithelial ovarian cancer in the elderly, Melissa Thrall, MD</td>
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<td><strong>Abstract 31:</strong> Significance of MicroRNAs in determining taxane resistence in ovarian cancer, Aya Sultan, MD</td>
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ACKNOWLEDGEMENTS

WAGO EXTENDS APPRECIATION TO THE FOLLOWING VALUED FRIENDS FROM INDUSTRY FOR THEIR GENEROUS SUPPORT OF THE EDUCATIONAL AND SCIENTIFIC OBJECTIVES OF THIS YEAR’S MEETING

HOLOGIC
**Exhibitors**

Table-Top exhibits will be on display during all breakfasts and scheduled breaks on Thursday, Friday and Saturday in the Alpine & Bronze Ballrooms.

AMGEN – Booth #7

BIOOTHERANOSTICS, INC – Booth #9
- bioTheranostics offers innovative molecular tests:
  - CancerTYPE ID® helps physicians determine the origin of tumors.
  - BCiSM predicts risk of distant recurrence in ER+ LN- breast cancer.

CARIS LIFE SCIENCES – Booth #8
- Caris Target Now™, evidence-based molecular profiling service, is a comprehensive tumor analysis coupled with an extensive clinical literature search to identify personalized therapy recommendations.

CENTOCOR ORTHO BIOTECH PRODUCTS, LP – Booth #10, 11
- Centocor Ortho Biotech Products, L.P. harnesses innovations in large- and small-molecule research to create important new therapeutic options.
  - 800 Ridgeview Dr.
  - Horsham, PA 19044
  - United States
  - Phone: 800-972-9063
  - URL: [www.centocororthobiotech.com](http://www.centocororthobiotech.com)

FUJI REBIO DIAGNOSTICS, INC – Booth #4
- Fujirebio Diagnostics, Inc is a premier diagnostics company and the industry leader in the development of oncology biomarkers. Our core products include CA 125II a biomarker considered the gold standard for ovarian cancer.

GENZYME BIOSURGERY – Booth #2
- Genzyme BioSurgery
  - Seprafilm Adhesion Barrier

HOLOGIC – Booth #6
- Hologic’s business areas focus on cervical cancer screening, treatment for menorrhagia, mammography, breast biopsy radiation treatment for early-stage breast cancer as well as osteoporosis assessment and preterm birth screening. [www.hologic.com](http://www.hologic.com)

KCI, INC – Booth #1
- A leading global medical technology company devoted to the discovery, development, manufacture and marketing of innovative, high-technology therapies and products for wound care.

PATHWORK DIAGNOSTICS – Booth #12

PRECISION THERAPEUTICS, INC – Booth #3

VERMILLION, INC. – Booth #5
- Vermillion, Inc. is dedicated to the discovery, development and commercialization of novel high-value diagnostic tests that help physicians diagnose, treat and improve outcomes for patients. Vermillion, along with its prestigious scientific collaborators, has diagnostic programs in oncology, hematology, cardiology and women’s health. [www.vermillion.com](http://www.vermillion.com)
ORAL PRESENTATIONS
Abstract 1:
DISPARITIES IN HPV VACCINE COMPLETION AMONG VACCINE INITIATORS

L. S. Krill, B. Horton, C. E. Barat, C. L. Trimble, B. Chou
Department of Gynecology and Obstetrics, The Johns Hopkins Medical Institutions, Baltimore, MD

Objective: Prophylactic vaccination against certain types of human papillomavirus (HPV) remains under-utilized in many populations. The objective of this study was to evaluate the patterns of completion of the three dose quadrivalent HPV vaccine series in order to identify predictors of compliance, recognize disparities in vaccine completion, and to elucidate barriers to vaccination in our community. The goal is also to determine if compliance rates are associated with the type of practice setting, payor method, or other socio-demographic variables, including age, ethnicity, or clinic location.

Methods: A single institution retrospective review identified all patients initiating HPV vaccination at one of four affiliated clinics between January 1, 2007 and June 30, 2008. Subjects who received all three vaccine doses within a 12 month period were designated as “completers.” The patient population included two urban and suburban clinic sites with gynecology, pediatric and family practice facilities. Patients were divided into two age groups: adolescents (ages 11-17) and young women (ages 18-26). Logistic regression was used to identify factors associated with vaccine completion. Variables analyzed included age, type of insurance (private versus public), practice location (urban versus suburban), practice type (pediatrics, gynecology, or family practice), and race/ethnicity (white or African American/Hispanic).

Results: A total of 1,412 patients initiated HPV vaccination during the study period. The vaccine series was completed by only 468 patients (33.2%). Of the remaining subjects, 440 (31.1%) and 504 (35.7%) received only one or two doses, respectively. Subjects who did not receive all three shots were more likely to have publically funded medical assistance (MA) (23.3% vs. 11.7%), more likely to be seen at an urban clinic as opposed to a suburban clinic (35.6% vs. 24.3%), and more likely to be African American (35.8% vs. 22.4%) than completers (p< 0.001 for all). Patients with private insurance had significantly higher vaccination completion rates than patients with public medical assistance insurance (OR 1.87; 95% CI 1.26-2.76; p = 0.002). This differential was more pronounced in suburban clinics (37.8% private vs. 13.2% MA; OR 4.02; 95% CI 1.55-10.39, p = 0.002). Pediatric patients seen in suburban sites were significantly more likely to complete vaccination than pediatric patients seen in urban sites (47.7% vs. 19.7%; OR 3.71; 95% CI 2.51-5.48; p <0.001). On multivariate analysis, the combination of younger age (11-17 years old) and urban practice locations were associated with a significantly decreased likelihood of completing HPV vaccination (OR 0.60, 95% CI 0.39-0.93, p = 0.023).

Conclusion: Overall compliance with the three vaccine regimen is low and significant disparities exist in series completion based on socio-demographic risk factors including race, insurance, and type of clinical practice. These findings suggest that adolescents seen in urban clinics face significant barriers that hamper their ability to undergo the complete preventive vaccination regimen. This is especially concerning in a cohort that is arguably at high risk for HPV disease. Strategies to improve HPV vaccine utilization should focus on young females receiving care in urban practices.
Abstract 2:
ASSOCIATION OF CERVICAL INTRAEPITHELIAL NEOPLASIA 2 AND 3 REGRESSION BY HUMAN PAPILLOMA VIRUS SEROTYPE

K. Harris¹, T.K. Kiet¹, G. Sawaya¹, S. Wilczynski², K. Smith-McCune¹, S. Ueda¹, D.S. Kapp³, M. Berman⁴, J.K. Chan¹
¹Division of Gynecology Oncology, Department of Obstetrics and Gynecology, Helen Diller Family Comprehensive Cancer Center, University of California San Francisco, San Francisco, CA; ²Department of Pathology, The City of Hope National Medical Center, Duarte, CA; ³Department of Radiation Oncology, Stanford Cancer Center, Stanford, CA; ⁴Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Chao Family Comprehensive Cancer Center, University of California, Irvine Medical Center, Orange, CA.

Objective: To determine the regression rates of untreated Cervical Intraepithelial Neoplasia (CIN) 2 and 3 based on Human Papilloma Virus (HPV) type.

Methods: Patients with biopsy proven, colposcopic persistent CIN 2 and 3 lesions were observed for 6 months in a randomized clinical trial evaluating the effect of daily β-carotene vs placebo on CIN 2 and 3 lesions. HPV types were determined by polymerase chain reaction (PCR) at enrollment and at 3 month intervals. Cytology and colposcopy were performed every 3 months with cervicography. Cervical biopsies at enrollment and 6 months. Demographic, clinical, pathologic and prognostic factors were assessed. Chi square and cox regression model were employed for statistical analyses.

Results: Of 93 patients, the median age was 29 years (range: 19-55). 48% were Caucasian, 49% Hispanic, and 2% were Asian. 28% had more than five sexual partners. HPV was detected in 84% of women. Based on PCR, HPV types included: type 16 (42%), type 33 (12%), type 18 (9%), type 31 (8%), type 52 (3%), type 53 (3%), type 35 (1%), type 39 (1%) and multiple types (14%) and other types (8%). Patients with undetectable, resolved and persistent HPV infection had CIN regression rates of 80%, 63%, 41% respectively (p=0.013). Those with negative HPV and low risk serotypes (n=27) vs. high-risk (n=66) HPV serotypes (16/18/31/33) had CIN regression rates of 67% vs 42% (p 0.017). In a subset analysis, women under 35 years with <5 sexual partners, low risk or no HPV (n=13) had a regression rate of 77% compared to 48% of older women, with more sexual partners and high risk HPV infections (n=80, p=0.049). On multivariate analysis, number of sexual partners (HR=3.27, 95%CI: 1.29-8.24; p=0.012) and HPV serotype (negative vs. low risk vs. high risk, HR=2.45, 95%CI: 1.27-4.75; p=0.008) were independent predictors of CIN regression.

Conclusion: HPV serotyping may have utility in triaging patients with CIN 2 and 3 to conservative management and subsequently prevent complications with cervical procedures.
Abstract 3:
POTENTIAL ECONOMIC IMPACT OF FOLLOWING ACOG GUIDELINES FOR PAP SMEAR AND HPV TESTING

M.K. Dosdon, T. Belnap, W. Sause, A.P. Soission; University of Utah and Intermountain Healthcare, Salt Lake City, UT.

Objective: The purpose of this study was to identify the number of yearly Pap smears and human papilloma virus (HPV) detection studies that could be safely omitted from standard screening programs, and to determine the economic impact of instituting this practice.

Methods: We identified all patients who underwent Pap (> 99,000 yearly) and HPV testing for calendar years 2004-2009 following publication of ACOG Practice Bulletin #45 guidelines in 2003. We then separated the patients into age groups (A= <30 years, B= ≥30 years) and identified those who underwent inappropriate/excessive testing based on Practice Bulletin #45 as well as Practice Bulletin #109, which replaced #45 in December 2009. In group A we identified all patients who underwent HPV testing without an ASCUS Pap. In group B we identified all patients who had negative HPV testing and normal cytology, but a repeat Pap the following year. In group B we also identified all patients who had 3 consecutive negative Paps, but underwent a Pap smear the following year. All three of these practices would be considered inappropriate per published ACOG guidelines. We then specifically evaluated years 2007, 2008 and 2009 using the above criteria as this allowed 3 consecutive years of negative Paps with another Pap the following year (2004-2006, 2005-2007, 2006-2008). In our system cytology costs $80.64 and HPV testing $77.36.

Results: In group A we identified 1,736 inappropriate HPV tests (cost $134,296 or $44,765/year). In group B we identified 582 inappropriate Paps during 2007 and 2008 (2009 data not yet available) due to repeat Pap after negative Pap and HPV the previous year (cost $46,932 or $23,466/year). Most importantly we identified 16,688 patients in group B who had 3 consecutive negative Paps with a repeat Pap the following year (cost $1,345,720 or $448,573/year). An annual savings of $516,804 could be obtained by applying three simple ACOG guidelines for Pap and HPV testing in our system.

Conclusion: In the current environment of escalating health care costs and the increased scrutiny placed on physicians to practice fiscally responsible medicine, numerous simple approaches may be taken to improve our performance. If all physicians in our system applied three simple principles to Pap and HPV testing, we would realize an annual savings of more than half a million dollars.
Abstract 4:
CHANGING DEMOGRAPHICS OF CERVICAL CANCER IN THE UNITED STATES (1973-2007)


Objective: To describe changes in the cervical cancer population.

Methods: The SEER database 9 registries from 1973-2007 were queried to perform a retrospective cohort study of women with invasive cervical cancer. Estimated annual percent change (EAPC) in incidence rates and 95% confidence intervals (CI) over the entire study period were compared according to age (< and ≥ to 50), stage (localized and advanced), race (white, black, and other), and cell type, (squamous [SCC] and adenocarcinoma [ACA]). Proportions and relative risks (RR) were calculated for patients diagnosed during the second half (1990-2007) compared to first half (1973-89) of the study period.

Results: 39,408 patients formed the study population, 50.5% were diagnosed from 1973-1989 and 49.5% were diagnosed from 1990-2007. Overall, the EAPC for age ≥ 50 is -3.1 (CI = -3.3 to -2.9), and is -1.8 (CI = -2.1 to -1.5) for age < 50. EAPC is -3.8 (CI = -4.1 to -3.6) for black women, -2.3 (CI = -2.5 to -2.1) for white women, and -2.7 (CI = -3.2 to -2.2) for women of other races. Our analysis also confirms the well known fact that the overall incidence of invasive cervical cancer has declined, EAPC = -2.5 (CI = -2.7 to -2.2), as has the incidence of SCC, EAPC = -3.1 (CI = -3.3 to -2.9). The incidence of diagnosis with ACA has risen, EAPC = 0.5 (CI = 0.0 to 0.9). During the first years of the study 47.7% of patients were < 50 while 55.6% were < 50 in the second half of the study. The "other" race category increased in frequency during the second half of the study. American Indian/Alaska Native (1.04% v. 1.14%), Asian or Pacific Islander (5.80% v. 9.38%), and unspecified (0% v. 0.12%). Patients diagnosed in 1990 or later are 18% more likely, RR 1.18 (CI = 1.15-1.20), to be less than 50 years old, 63% more likely to be Asian or Pacific Islander, RR 1.63 (CI = 1.51-1.75), and 35% more likely to have ACA, RR 1.35 (CI = 1.32-1.38). The mean age of death from cervical cancer was 59.4 in the first half of the study and 56.7 in the second half (p = 0.001).

Conclusion: In the US, the population with cervical cancer is changing. Patients are presently significantly more likely to be pre-menopausal (age < 50), be Asian or Pacific Islander, and more frequently have non-squamous histology than previously. Patients are also dying from cervical cancer at a younger age than before. These progressive, cumulative, changes could be due to disparate impact of current population based screening and prevention strategies. Understanding the implications of these and perhaps other evolving population characteristics may facilitate planning more targeted and more successful studies and interventions for cervical cancer prevention, screening and treatment in the future.
Abstract 5:
CERVICAL CONIZATION OF ADENOCARCINOMA IN-SITU: A PREDICTING MODEL OF RESIDUAL DISEASE

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Objective: The primary objective of this study was to determine factors associated with the presence of residual disease in women who have undergone cervical conization for adenocarcinoma in-situ (ACIS) of the cervix.

Methods: We identified all women who underwent a cervical conization for a diagnosis of ACIS followed by either repeat conization or hysterectomy (or both) between January, 1995 and April, 2010. Information regarding patient demographics, papanicolaou smear results, colposcopic findings, colposcopic biopsy results, methods of conization as well as conization and hysterectomy histopathology results was abstracted. Data were summarized using standard descriptive statistics.

Results: 78 patients met study criteria. The presence of ACIS at the internal conization margin (p=0.001) or in the post-conization ECC (p=0.001) correlated with residual glandular neoplasia, while conization method, presence of squamous neoplasia and age did not. A margin positive for ACIS was associated with residual glandular neoplasia in 68% of cases. An ECC positive for ACIS was associated with residual glandular neoplasia in 95% of cases (92% if cone margin was positive and 100% if cone margin was negative). If both the margins and the ECC were positive for the presence of ACIS, 8% did not have residual disease, 77% had residual ACIS and 15% had invasive adenocarcinoma. If both the internal conization margin and the post-conization ECC were negative for the presence of ACIS, only 14% of the final specimens had residual ACIS and none had invasive cancer.

Conclusion: The addition of postconization ECC to cone biopsy for ACIS of the cervix provides valuable prognostic information regarding the risk of residual glandular neoplasia. Women with ACIS who have both a negative postconization ECC and a negative conization margin have minimal risk for residual glandular neoplasia and can be treated conservatively if fertility is desired. Women with either a positive postconization ECC or positive internal margins are at significant risk of residual disease, and 12-17% will have cancer. Repeat conization is indicated in these women to assess the extent of disease.
Abstract 6:
ROBOTIC VERSUS OPEN RADICAL HYSTERECTOMY FOR INVASIVE CERVICAL CANCER: A SINGLE INSTITUTION REVIEW OF THE FIRST THREE YEARS OF PRACTICE

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Objective: Integrating robotic surgery into an active residency and fellowship program presents a unique set of challenges to both surgeons and trainees. The traditional mentor-mentee relationship found during laparotomy and laparoscopy is lost in robotics when the case must be completely turned over to the console surgeon. Questions regarding patient safety and quality of the pathologic specimen exist when first introducing any new surgical technique. The aim of this study was to compare intraoperative and postoperative characteristics, as well as pathologic data in patients undergoing robotic radical hysterectomy (RH) in the first two years of robotic surgery at a Gynecologic Oncology fellowship training program.

Methods: A retrospective review was performed of patients who underwent robotic (RRH) or abdominal (RAH) for invasive cervical cancer from 1/2009 to 2/2011. Charts were abstracted for clinicopathologic data including age, stage, BMI, specimen size and margins. Quality control and patient safety data such as surgeon of record, operative time, length of hospital stay, complications, transfusions and hospital readmissions was also collected. Data were compared in SAS version 9.1(Cary, NC) using Fisher’s exact test for categorical variables, Student’s t-test for continuous variables and linear regression for stratified analysis. Patients operated on by a surgeon who did not perform both RAH and RRH during the time period were excluded.

Results: Forty-five patients fitting the inclusion criteria were identified (29 RAH and 16 RRH). Resident and fellow trainees were involved in all cases. Median age, race, BMI, stage distribution and recurrences were similar between the groups. Compared to RAH, those undergoing RRH had significantly longer mean operative times (263 vs 407 min, p=<0.001), smaller EBL (862 vs 108cc, p=0.003), fewer blood transfusions (55% vs 0%, p=<0.001) and shorter hospital stays ( 6 vs 2 d, p=0.02). There were no statistical differences in number (#) of readmissions (4 vs 1, p=0.64) or total # of major complications (31% vs 19%, p=0.49). Complications in the RRH group included a thermal ureteral injury, a ureterovaginal fistula, and clostridium difficile colitis while complications in the RAH group included one ureteral transection, two wound infections, thromboembolism, coagulopathy, urinary retention, incisional hernia, toxic megacolon and obturator nerve injury. There were no differences in the vaginal cuff length, dimensions of parametrial tissue or mean number of para-aortic lymph nodes (LN) resected, however there were fewer pelvic LN resected in the RRH group (18 vs 12, p=0.007). There were no differences in the analysis when controlling for surgeon or the interaction between surgeon and surgical approach.

Conclusion: Introducing robotic surgery into an active residency and fellowship training program does not appear to compromise patient safety or the quality of the pathologic specimen, even in patients undergoing radical procedures. Data from our institution are similar to other published series demonstrating longer operative times and shorter hospital stays for patients undergoing robotic surgery. While overall complication rates did not differ statistically, our small series suggests a different distribution of complications in those undergoing robotic surgery. With the increasing surgeon and patient interest in robotic surgery, residency and fellowship training programs must continue to evaluate the safest and most effective strategies to incorporate this new technology.
Abstract 7:
THE IMPACT OF RECTAL DISTENTION ON THE MAXIMUM RECTAL DOSE DELIVERED IN 3-D PLANNED HIGH DOSE RATE BRACHYTHERAPY FOR CERVICAL CANCER


Objective: CT based three dimensional treatment planning for cervical cancer has allowed investigation into the volumetric radiation dose delivered to the rectum. A main goal of intracavitary brachytherapy is to maximize the tumor dose while decreasing the dose to the rectum. We investigated the effect of tandem angle and rectal distension on the rectal dose delivered in high dose rate brachytherapy for locally advanced cervical cancer.

Methods: 97 brachytherapy treatment planning CT scans from 51 patients with locally advanced cervical cancer were reviewed. The rectum was manually contoured from the ischial tuberosity to the pubic symphysis. The maximum rectal distension was determined by measuring the largest anterior-posterior diameter of the rectum at or superior to the highest radiation dose distribution. Using the Varian Eclipse Brachyvision (v8.1) treatment planning software, a volumetric measurement of the maximum, mean, dose to 2cc, dose to 1cc of the rectum was calculated. The tandem angle, ICRU rectal point was recorded, and a dose volume histogram was referenced. Linear mixed effect models were used to detect differences in means in the presence of multiple scans per patient.

Results: The mean maximum rectal distention was 3.01cm, range 1.5-4.9cm. The mean D1cc, D2cc, mean rectal dose (%), and maximum rectal dose (%), and ICRU rectum were 3.03 Gy, 2.78 Gy, 60%, 20%, and 2.99 Gy per treatment respectively. On multivariate analysis, there was a significant increase in the D1cc and D2cc rectal dose, p<0.001, ICRU rectal point dose, p=0.027, maximum rectal dose, p<0.001, and mean rectal dose, p=0.001 with increasing rectal distention. There was no significant difference of the tandem angle on rectal doses when examining the 30 degree, 45 degree, and 60 degree subgroups.

Conclusion: Rectal distention significantly impacts the rectal dose delivered in high dose rate brachytherapy. Concerted efforts to decrease rectal distention should be considered during treatment planning and delivery.
Abstract 8:
MENOPAUSAL SYMPTOMS AND HORMONE REPLACEMENT USE: THE GYNECOLOGIC CANCER SURVIVORS’ PERSPECTIVE

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Objective: As overall survival for gynecologic (gyn) cancers has increased, many gyn cancer survivors now face undesirable side effects that accompany treatment-related menopause. The objective of this study was to describe hormone-related challenges faced by gyn cancer survivors.

Methods: As part of a larger study, a stratified sample of women with gyn cancers at our institution from 1997-2007 was surveyed for health issues occurring during or after treatment. Women who had menstrual cycles at the time of the survey or were ≥ 55 years of age were excluded from analysis. Chi square and Fisher’s exact test were used for statistical analysis.

Results: There were 544 survivors evaluable for this study. Median age at diagnosis was 42 years with a median of 6 years since diagnosis. Among respondents, 42.1% had cervical cancer (CxC), 19.4% endometrial cancer (EC), 24.4% ovarian, primary peritoneal, or fallopian tube cancer (OC), 9.8% vulvar cancer (VC), and 4.3% vaginal cancer (VaC). Approximately 43.3% of all patients received radiation as part of their treatment while 37.2% had surgery alone. Women were predominantly white (77.6%) or Hispanic (14.0%). Eighty percent reported at least one menopausal symptom regardless of cancer diagnosis. Menopausal symptoms included hot flashes (HF) 54%, vaginal dryness (VD) 48%, vaginal atrophy (VA) 19%, pain with vaginal intercourse (Plnt) 33%, and mood swings (MS) 37%. Compared to women who did not report menopausal symptoms, those with menopausal symptoms were more likely to report fatigue (p= 0.04), memory difficulty (p= 0.02), sleep disturbances (p=0.04), depression (p=0.04), anxiety (p=0.04), urinary incontinence (p=0.006), and sexual problems (p<0.001). Although 128/544 (24%) survivors were prescribed some type of hormonal therapy, 79% still reported menopausal symptoms [HF 54%, VD 54%, VA 23%, Plnt 36%, and MS 38%]. CxC patients reported significantly more VD when compared to EC (p=0.002) and OC (p<0.0001) patients. CxC patients also experienced more VA compared to OC (p=0.004) and VaC (p<0.0001). VaC patients reported more VA than both EC (p=0.002) and OC (p=0.01) patients.

Conclusion: This is the first study reporting the high prevalence of menopausal symptoms among gyn cancer survivors. Menopausal symptoms were associated with other health related issues known to negatively impact quality of life. These results highlight the need to better acknowledge and define the utility of hormonal therapy in this population.
Abstract 9:
ENDOMETRIAL INTRAEPITHELIAL NEOPLASIA VS. WORLD HEALTH ORGANIZATION CLASSIFICATION OF ENDOMETRIAL HYPERPLASIA DOES NOT IMPROVE RELIABILITY OF DIAGNOSIS OR PREDICTION OF OUTCOME IN PREMENOPAUSAL WOMEN WITH PREINVASIVE ENDOMETRIAL PATHOLOGY UNDERGOING PROGESTIN TREATMENT

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Objective: Endometrial intraepithelial neoplasia (EIN) has been proposed as an alternate pathologic classification to the World Health Organization (WHO) system to more reliably identify and characterize pre-invasive endometrial pathology with increased cancer risk. We assessed the interobserver agreement of EIN compared to WHO classification for pre-invasive endometrial pathology and evaluated the ability of each classification system to predict persistent pathology following progestin treatment.

Methods: Premenopausal patients who underwent progestin therapy for WHO-defined complex atypical hyperplasia (CAH) were retrospectively identified from three institutions. Pathologic review of pre- and first post-treatment specimens was performed by two gynecologic pathologists. Pre-treatment specimens were additionally classified by EIN criteria, requiring the presence of three of three specified pathologic characteristics. Post-treatment specimens were evaluated for both WHO and EIN criteria. Interobserver agreement for EIN and WHO diagnoses was measured with the Kappa statistic. Relationship between a diagnosis of EIN or CAH and persistence of endometrial pathology was calculated with odds ratios.

Results: 26 subjects were identified; median age was 36 years (range 23-48). Of pretreatment specimens—all with CAH—65% were classified as EIN. Interobserver agreement for the three individual histopathologic criteria for EIN ranged from 50-100% (Kappa 0.16-1). Interobserver agreement for the diagnosis of EIN (presence of 3 of 3 criteria) in the pretreatment sample was 35% (Kappa -0.45, p=.95). Persistence of disease in spite of progestin treatment did not differ between subjects with and without EIN (OR 2.45, p=.34).

Post-treatment, 22 specimens were eligible for evaluation for WHO and EIN diagnoses. 11 subjects (50%) had a diagnosis of CAH according to WHO criteria. Interobserver agreement for the diagnosis of CAH was 77% (Kappa 0.64, p=.0003). A diagnosis of CAH post-treatment was associated with an increased risk of persistent disease (OR=7.9, p=.039). 7 subjects (32%) met 3 of 3 criteria for a diagnosis of EIN. Interobserver agreement for the three histopathologic criteria for EIN ranged from 50-64% (Kappa 0.38). Although pathologists eliminated the diagnosis of EIN due to different individual EIN criteria not being met, if the diagnosis of EIN was made, interobserver agreement was 83% (Kappa=0.57, p=.014). A diagnosis of EIN post-treatment showed a trend toward increased risk of persistent disease (OR=6.86, p=.11).

Conclusion: Identifying factors that predict the progression of endometrial hyperplasia would improve clinical treatment and outcome. Our data suggests that the EIN classification system is not superior to the WHO classification system in either interobserver reliability or ability to predict persistent or progressive disease in spite of progestin treatment.
Abstract 10:
THE UTILITY OF SENTINEL LYMPH NODE BIOPSY IN THE SURGICAL MANAGEMENT OF WOMEN WITH VULVAR MELANOMA


Objective: Vulvar melanoma is a rare subtype of cutaneous melanoma but the second most common type of vulvar cancer. The surgical management of this disease remains controversial, but recent reports suggest that conservative approaches decrease morbidity without adversely impacting survival. The study objective was to determine the feasibility and safety of sentinel lymph node (SLN) biopsy in women with vulvar melanoma.

Methods: A retrospective, multi-site study of women with vulvar melanoma who underwent vulvar surgery and SLN biopsy during 1999-2009. Subjects underwent SLN biopsy with either blue dye alone (BLUE) or blue dye + radiocolloid (BLUE+R). All participating surgeons were experienced with SLN techniques, performing ≥5-15 vulvar SLN procedures annually. Surgicopathologic characteristics and clinical outcomes were analyzed.

Results: 35 study subjects with vulvar melanoma underwent a SLN biopsy; median age was 63 years. 25/35 (71%) patients underwent SLN localization with lymphoscintigraphy and ≥1 SLN was detected in 95%. 80% underwent SLN biopsy with BLUE+R and 20% with BLUE only. At least one SLN was detected at surgery in 32/35 (91.4%) cases, and a median of 2 SLNs were removed/subject. 7/35 patients had metastatic disease detected in the SLN. In those subjects who underwent a completion lymphadenectomy (15/35), no false negative SLN biopsies were observed. After a median follow up of 41 months, there were no isolated groin recurrences. Median PFS was 63 months and OS was 71 months.

Conclusion: SLN biopsy of the inguinal LNs appears safe and feasible in women with vulvar melanoma. As with other cutaneous melanomas, the SLN status appears to predict the pathological status of the regional nodes. Given the morbidity associated with complete inguinal lymphadenectomy and the controversy associated with surgical management of the inguinal nodes, these results merit further investigation.
Abstract 11:
OUTCOME COMPARISONS OF DUAL-CONSOLE ROBOTIC AND LAPAROSCOPIC SURGERY FOR GYNECOLOGIC CANCER IN A FELLOWSHIP PROGRAM

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Objective: Minimally invasive laparoscopic surgical techniques can decrease the surgical morbidity and recovery time associated with gynecologic oncology procedures. Previous studies have demonstrated similar surgical outcome comparisons of robotic and laparoscopic surgery. These studies have not accounted for the incorporation of fellow education into robotic surgery. With the advent of the dual-console da Vinci Surgical System in 2009, a two surgeon approach to gynecologic cancer procedures could be implemented, with a fellow operating at the same time as an attending physician. We sought to compare surgical outcomes at a gynecologic oncology fellowship of traditional laparoscopic and robotic surgeries using the dual-console method.

Methods: We retrospectively identified patients who underwent laparoscopic or robotic surgery performed by a gynecologic oncologist from November 2009-November 2010 at a single institution. Records were reviewed for patients’ age, body mass index, pre-operative diagnosis, post-operative diagnosis, procedure, complications, estimated blood loss (EBL), number of pelvic and/or para-aortic lymph nodes retrieved, total operative room time, total surgical time, and length of hospital stay. All robotic surgeries were conducted using the dual-console da Vinci Si surgical system utilizing a two surgeon approach, and all surgeries involved a staff physician with a fellow and/or resident. Statistical analysis was performed using student t-test and chi-squared for applicable data.

Results: A total of 110 laparoscopic and 119 robotic cases were identified. The cohorts were similar with regard to BMI, age, pre and post operative diagnosis. No statistical difference was noted in total operating room time (165 vs. 168, p=0.541), number of pelvic lymph nodes removed (9.5 vs. 8.5; p=0.558), number of para-aortic lymph nodes dissected (2 vs. 2.5; p=0.988), or length of stay (both 1 day, p=0.327). There was a significant difference in total operative time (123 vs.102 minutes; p< 0.0001) and EBL (100 vs.50; p<0.0001) both favoring robotic surgery. Interestingly, although number of total para-aortic lymph nodes (PALN) sampled were similar between the two cohorts, surgeons were less likely to perform PALN dissection robotically (82.6% vs. 62%; p=0.02) Complications were similar between the two cohorts.

Conclusion: Incorporating fellow education into robotic surgery does not affect outcomes when compared to traditional laparoscopic surgery. The dual-console robotic system has allowed for fellows to broaden their robotic surgical training experience while continuing providing safe and effective patient care.
Abstract 12:  
THE EFFECTS OF REGULAR EXERCISE AND YOGA ON HEALTH-RELATED QUALITY OF LIFE AMONG OVARIAN CANCER SURVIVORS

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Objective: Exercise has long been known to have a positive effect on health-related quality of life (HRQOL) in patients with cancer and there is currently growing interest in understanding if yoga can enhance HRQOL. Several studies have shown that biweekly yoga practice can significantly reduce anxiety and fatigue in breast cancer patients while enhancing physical functioning. Our study sought to evaluate the effects of participating in regular exercise and/or yoga on HRQOL after diagnosis among 219 ovarian cancer survivors.

Methods: HRQOL was assessed using the SF-36, which is a well-validated tool for measuring mental and physical well-being. Women were categorized into three groups based on their self-reported participation in regular exercise and/or yoga: no exercise or yoga (n=93, 42.5%), regular exercise only (n=98, 44.7%), and both regular exercise and yoga (n=28, 12.8%). Using the non-exercisers as the reference group, multivariate logistic regression was used to assess the association between each exercise category on the eight SF-36 scales (physical functioning, limitations associated with physical health, limitations associated with emotional problems, vitality, emotional well-being, social functioning, pain, and general health), adjusting for factors that are known to be associated with HRQOL (i.e.: stage at diagnosis, years since diagnosis, age, and education).

Results: When comparing across the three categories of exercise (i.e.: no exercise as the reference vs. regular exercise only vs. both regular exercise and yoga), women who reported participating in both regular exercise and yoga tended to have higher scores than women who reported only participating in regular exercise on measures of physical functioning ($\beta=19.32$, $p<0.001$; $\beta=10.8$, $p<0.001$, respectively). They also reported fewer limitations associated with physical health ($\beta=28.4$, $p=0.003$; $\beta=12.61$, $p=0.05$, respectively), fewer limitations associated with emotional health ($\beta=21.4$, $p=0.006$; $\beta=14.2$, $p=0.006$, respectively), and less pain ($\beta=12.1$, $p=0.02$; $\beta=8.9$, $p=0.008$, respectively). The two exercise groups had similar scores for vitality ($\beta=11.8$, $p=0.02$; $\beta=11.5$, $p=0.001$, respectively) and social functioning ($\beta=11.0$, $p=0.02$; $\beta=12.2$, $p=0.001$, respectively).

Conclusion: Our results highlight the utility of exercise as a potential predictor of HRQOL in ovarian cancer survivors and suggest that adding yoga to an exercise program has a positive effect on quality of life beyond what can be obtained from regular exercise alone.
Abstract 13:
THE USE OF RETRIEVABLE INFERIOR VENA CAVA FILTERS IN GYNECOLOGIC ONCOLOGY PATIENTS

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Objective: The risk of developing a venous thromboembolism (VTE) is seven-fold higher in patients with malignancy and is a particular concern for patients undergoing operative procedures with cancer. retrievable IVC filter utilization is increasing in high-risk medical and particularly surgical populations. However, there is a paucity of data concerning the long-term outcome after placement of retrievable filters particularly in oncology patients and additional information about their utility is necessary before more liberal use of vena cava filters can be recommended. Our objective was to compare placement and removal complications in patients with gynecologic malignancy to those that had retrievable filters placed for other indications and did not have known malignancy. We also sought to examine frequency and type of recurrent thrombotic events in the 2 years following retrievable filter placement in patients with gynecologic malignancy.

Methods: Between 1/1999 and 12/2004 we retrospectively identified patients at our institution undergoing retrievable inferior vena cava filter placement and used a previously gathered prospectively identified patient group undergoing retrievable inferior vena cava filter placement for indications not associated with malignancy for descriptive comparison. Clinopathologic characteristics, procedure details, and outcome data were obtained from outpatient and inpatient medical records in both groups. Descriptive statistics, chi-squared analysis, student t-test, Fischer’s exact, and Cochran-Mantel-Haenszel testing were utilized for statistical analysis to examine each cohort separately and compare patient cohorts to each other.

Results: A total of 32 patients with a gynecologic cancer were identified and compared to 20 patients without malignancy. Most patients with malignancy had ovarian cancer (44%), followed by cervical cancer (22%), endometrial cancer (13%), and other (22%). Patients without malignancy were on average younger (median age 43 vs 58 p=0.0018) than patients with malignancy. The most common indication for IVC filter placement in patients with and without malignancy was peri-operative (69% of patients with gynecologic malignancy and 35% without malignancy), followed by contraindications to anticoagulation in both groups (16% of patients with malignancy and 30% without malignancy), prophylactic placement in the non-malignancy group (25%), and complications with anticoagulation (13% of patients with malignancy and 10% without). No between group differences in complications with filter tilt or filter thrombosis was noted after filter placement (p=0.72). Although all filters in both groups were placed with the intention to remove them, 60% of the filters were retrieved in patients without malignancy and statistically significantly fewer were removed in patients with gynecologic malignancy (22%, p=0.033). In those cases where attempts to remove IVC filters was made, there was no difference in complications associated with removal in either patients with malignancy or in those without (p=0.58). As expected, significantly more recurrent thrombotic events were recorded in the gynecologic malignancy group with 2 additional DVTs, 1 recurrent DVT, and 1 new PE at one month post filter placement, 1 additional recurrent DVT at one year post filter placement, and 5 additional DVTs and 1 recurrent DVTs at 2 years post filter placement in comparison no additional events in the non-malignancy group at a total of 3 months of follow-up.

Conclusion: Our results suggest complications associated with placement and removal of retrievable IVC filters are no more common in patients with malignancy when compared to those without malignancy, but overall fewer filters are removed from patients with malignancy. Although new and recurrent VTE events were common in gynecologic oncology patients in the 2 years following filter placement, only 1 filter failure was noted in the cohort and we found no evidence to suggest that prolonged use of retrievable IVC filters was associated with higher rates of complications. Overall the use of both short and long term IVC filters in patients with gynecologic malignancy appears to be a promising treatment for pulmonary embolism prevention.
Abstract 14:
ENHANCING ANTI-ANGIOGENIC THERAPY BY BLOCKING FOCAL ADHESION KINASE.

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Objective: Focal adhesion kinase (FAK) represents a central point of convergence for many signaling pathways implicated in cancer progression and metastasis. Pazopanib is a pan-VEGFR and PDGFR inhibitor. In the present study, we examined whether pazopanib treatment would result in greater anti-tumor activity in combination with the novel FAK-inhibitor, GSK2256098.

Methods: The in vitro effects of GSK2256098 on invasion and migration were examined using the HeyA8 and SKOV3-IP1 human ovarian cancer cell lines. In vivo effects of pazopanib with and without GSK2256098 were then assessed using an orthotopic mouse model of human ovarian cancer.

Results: GSK2256098 resulted in reduced levels of FAK phosphorylation at Y397 (pFAK⁰¹³⁹⁷) at 1µM concentration in SKOV3-IP1 cells. GSK2256098 resulted in reduced invasion (p<0.001) and decreased migration (p<0.001) in SKOV3-ip1 cells. Dose-finding studies performed in vivo demonstrated that a 75 mg/kg dose resulted in a significant reduction in pFAK⁰¹³⁹⁷. Monotherapy with GSK2256098 resulted in a 58% decrease in mean tumor weight compared to control (p = 0.038). The combination of GSK2256098 with pazopanib resulted in a 71% decrease in mean tumor weight compared to pazopanib monotherapy (p = 0.04). We also tested treatment combinations including traditional cytotoxic chemotherapy. The combination of GSK2256098 with docetaxel resulted in a 44% decrease in mean tumor weight compared to docetaxel monotherapy (p = 0.17). The triplet combination of GSK2256098 with pazopanib and docetaxel resulted in the greatest overall decrease mean tumor weight, 99% compared to control and 92% compared to either doublet combination alone (p = 0.001). Similar trends were noted with mean number of tumor nodules and ascites volume. On the basis of our recent findings that FAK is highly phosphorylated in platelets in cancer-bearing mice, we also examined FAK phosphorylation in the platelets of treated and untreated mice. Phosphorylation of platelet FAK (pFAK⁰¹³⁹⁷) was inhibited by 68% at 4 hours after treatment compared to control (p = 0.07). Treatment with pazopanib decreased microvessel density by 49% (p < 0.01), which was further enhanced in combination with GSK2256098 (p < 0.01).

Conclusion: In summary, FAK inhibition results in substantial anti-angiogenic and anti-tumor effects in combination with pazopanib and represents a viable strategy for further development.
Abstract 15: 
RISK FACTORS FOR UPGRADING AND UPSTAGING IN PATIENTS WITH A PREOPERATIVE BIOPSY OF GRADE I ENDOMETRIAL ENDOMETRIOID ADENOCARCINOMA

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Objective: Endometrial endometrioid adenocarcinoma (EEA) commonly presents with grade 1 disease and at an early stage. However, several studies have shown that up to 1 in 3 women with preoperative grade 1 disease will be upgraded or upstaged with features suggestive of invasive disease at final pathology. The indication for staging is controversial. Most experts agree that grade greater than 2 or stage greater than or equal to Ib (FIGO 2008) should be staged. Currently, a preoperative model which identifies patients at risk of being upgraded or having invasive disease does not exist. The purpose of this study is to identify pre-operatively which patients are at greatest risk for being upgraded or having invasive disease.

Methods: Using the Kaiser Northern California Cancer Registry from January 2000 to 2007, a retrospective chart review was conducted. All patients with preoperative grade 1 EEA biopsies who were upgraded or found to have greater than 50% myometrial invasion at the time of final pathology were compared to patients whose final pathology was not upgraded and did not have invasive disease. Only patients with a preoperative diagnosis of grade 1 EEA were included. Information collected included preoperative grade and histologic type, size of uterus, CA-125, age at diagnosis, race, BMI, use of hormones, tobacco use, and medical co-morbidities.

Results: A total of 919 patients with preoperative endometrial biopsies of grade 1 EEA were included, with 35.5% found to be upgraded or upstaged. We did not find that race/ethnicity, BMI, history of DM or HTN were risk factors for having invasive disease or a higher grade lesion. However, age > 65 increased the risk (p=0.0014) and even age > 50 increased the risk (p = 0.002). More patients in the upgraded/invasive disease groups had an endometrial stripe > 5mm (p=0.007) with a mean stripe measuring 18.2 mm versus 13.2 mm (p=0.03) in the non-upgraded/noninvasive group. Hormone usage was different between the groups, but none of the hormone combinations was predictive of upgrading or upstaging. Analysis of Ca125 and uterine size is ongoing.

Conclusion: Women over 50 years of age with a grade 1 endometrial endometrioid adenocarcinoma on preoperative biopsy and a thickened endometrial stripe are at risk for having either invasive disease or an upgraded lesion at the time of surgery. Further analysis may determine the role of other factors.
Abstract 16:
DEPTH OF MYOMETRIAL INVASION TO PREDICT LYMPH NODE METASTASES IN WOMEN WITH ENDOMETRIAL CANCER

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Objective: Endometrial adenocarcinoma affects approximately 43,000 women annually in the United States. Hysterectomy and surgical staging have superior cure rates compared to high-dose progestin therapy and radiation. Analysis of retroperitoneal lymph nodes for the presence of metastatic tumor remains controversial as to whether it should be included in the surgical management of all women with endometrial cancer. Some advocate lymph node assessment in all cases, some in only selected high-risk patients, and some advocate node sampling only when there is deep myometrial invasion at the time of hysterectomy. The objective of this study was to determine the accuracy of the surgeon to assess the depth of myometrial invasion as a predictor of lymphatic metastases.

Methods: From 1993 to December 31, 2010, 2200 women have undergone hysterectomy for endometrial cancer at one of three tertiary medical centers and eight community hospitals within our geographic and study area. Of these, 353 had their surgery performed by one of three gynecologic oncologists who analyzed the hysterectomy specimen at the time of surgery for depth of myometrial invasion (MI) using the same methodology in all cases. Eligible patients had either a grade I or II tumor, only endometrioid histology, and had at least pelvic lymph node sampling performed. The depth of invasion was quantified by the surgeon as less than or equal to 50% of the thickness of the uterine wall compared to more than 50% invasion.

Results: The surgeon was able to accurately predict the depth of invasion in 288 of 353 cases (accuracy = 82%). In cases where the surgeon was not able to predict the accurate depth of invasion (n=65), the true depth of invasion was less than expected in 28 cases (43%) and greater than expected in 37 patients (57%). In the entire group of patients, 22 had retroperitoneal lymph node metastases (6%). Eleven women had lymphatic metastases when the surgeon predicted less than 50% myometrial invasion (3%). In 81 cases the surgeon predicted greater than 50% MI, and of these 71 did not have lymphatic metastases (88%) while 10 (12%) had nodal involvement. The sensitivity, specificity, positive predictive value and negative predictive value for surgical assessment of the presence or absence of MI for the prediction of nodal metastases was 45%, 79%, 12%, and 96% respectively.

Conclusion: This research project attempts to evaluate the utility of using the presence or absence of myometrial invasion to predict lymph node metastases in women undergoing hysterectomy for endometrial cancer. If this system was utilized by the surgeon to indicate whether nodal evaluation was necessary, 3% of patients would have been missed who had nodal involvement. Therefore, based on the results of this study, the authors recommend that nodal evaluation be performed in all cases, and that pelvic and para-aortic lymph node sampling be included in the surgical evaluation of all women with endometrial adenocarcinoma.
Abstract 17:
VISCERAL ADIPOCYTE GLUCOSE-REGULATED PROTEIN (GRP) 78 IS AN INDEPENDENT RISK FACTOR FOR ENDOMETRIAL CANCER SURVIVAL

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Objective: Glucose-regulated protein (GRP) 78, a critical component of the unfolded protein response (UPR), is activated in conditions of endoplasmic reticulum (ER) stress, such as obesity. Evolving evidence also highlights the importance of ER stress in cancer progression. Given the association of endometrial carcinoma with obesity, we hypothesize that higher levels of GRP78 in visceral adipocytes in patients with endometrial carcinoma are associated with increased risk of recurrence.

Methods: A retrospective cohort study was conducted among endometrial cancer patients using paraffin-embedded specimens of endometrial tumor, normal endometrium (as a paired control), and visceral adipose tissue (e.g., omental- or peri-nodal adipocytes) for each patient from 1999-2010. Semi-quantitative GRP78 expression in all samples was determined by immunohistochemical analysis of the distribution of expression as a percentage as well as intensity of staining. Correlations with clinicopathological information and clinical outcomes were analyzed by uni- and multivariate analyses.

Results: Among the 266 patients in the study, the median age was 53 years old (range 24-80), and the median presenting body mass index was 34.6 kg/m2 (range 15.6-74.1). Endometrioid histology was seen in 83.1% of patients, and 60.9% had FIGO Stage I disease. GRP78 expression was evaluated in 244 primary endometrial tumors, 129 normal endometrium samples, and 198 visceral adipose tissues. GRP78 overexpression was seen in 66.0% and 86.8% of endometrial tumors and normal endometrium, respectively. When comparing GRP78 expression in the primary tumor paired with a section of normal endometrium in the same patient, the majority of tumor-normal endometrium pairs (68.1%) showed the same degree of GRP78 expression, while 24.1% of paired samples showed decreased expression in the tumor compared to the normal endometrium, and 7.8% of paired samples showed increased expression in the tumor compared to the normal endometrium. Increased tumoral GRP78 expression relative to the paired normal endometrium was associated with decreased progression-free survival (PFS) when compared to cases with the same or decreased expression (log-rank, p=0.02). GRP78 expression in visceral adipocytes was detected in 28.6% (range, 0-92.6%) of adipocytes. The percentage of visceral adipocyte GRP78 expression was positively correlated to the intensity of visceral adipocyte GRP78 expression (Spearman's r=0.37, p<0.001), FIGO stage (r=0.19, p=0.006), and tumor grade (r=0.21, p=0.003). The percent expression of GRP78 in visceral adipocytes was significantly associated with PFS and overall survival (OS) in multivariate analyses after adjusting for FIGO stage and grade (both, p<0.001). An optimal cut-off value for the extent of GRP78 expression in visceral adipocytes was determined to be 60.4%. Therefore, high adipocyte GRP78 expression (≥60.4%) was associated with decreased PFS compared to low expression (<60.4%, hazard ratio 5.49, 95%CI, 2.38-12.6, adjusted p-value =0.008).

Conclusion: GRP78 expression in visceral adipocytes is associated with other indicators of poor prognosis in endometrial cancer patients including tumor grade, tumor stage, time to recurrence, and early death. The results suggest a novel link between obesity and endometrial cancer via ER stress and the UPR.
Abstract 18:
BODY MASS INDEX (BMI) AND OUTCOMES IN COMPLETELY STAGED ENDOMETRIOD ADENOCARCINOMA OF THE UTERUS

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Objective: Literature suggests obesity represents a significant risk factor for the development of endometrial cancer as well as development of other health problems such diabetes mellitus and cardiovascular disease. In addition, endometrial cancer death has been associated with increasing obesity. In contrast, studies indicate obese patients with endometrial cancer have earlier stage disease and require less adjuvant treatment. Our objective was to assess the impact of obesity on multiple outcome measures in patients managed in a similar fashion with endometrioid adenocarcinoma of the endometrium..

Methods: Between 1996 and 2005 we identified 272 patients at our institution who underwent surgical staging for endometrial cancer. Progression free survival (PFS) and overall survival (OS) were evaluated for associations with Body Mass Index (BMI) as well as other clinical and pathologic factors. Kaplan-Meier and Cox proportional hazard models were utilized for statistical analyses.

Results: Median age was 64 (range 31-92) and median BMI was 31kg/m² (Q1=26, Q3=38, range 16-68). Seventy five percent of patients had stage I disease, 7% stage II disease, 14% stage III disease, and 4% stage IV disease. Grade 1 disease was represented in 37% of study population, 37% grade 2, and 26% grade 3. Median total lymph node count was 25. Twelve percent of the cohort recurred with 12% dead of disease and 8% dead of other causes. Patients were stratified into groups based on BMI ≤ or > 30kg/m². There was no difference in the distribution of patient stage, grade, age, total lymph node count, or use of adjuvant treatment based on BMI groups. Five year OS for BMI >30kg/m² was 88.7% and for BMI ≤30kg/m² was 87.1%. Five year PFS for BMI >30kg/m² was 91.5% and for BMI≤30kg/m² was 91.5%. In patients with a BMI >30kg/m² recurrence was 2.9% and in patients with a BMI ≤30kg/m² recurrence was 4.4%. Decreasing creatinine clearance was associated with poor survival (p=0.005).

Conclusion: Our results suggest obesity is not a significant factor associated with recurrence risk, PFS, or OS after endometrial cancer diagnosis in patients undergoing complete surgical staging. It is speculated that once comprehensive staging is performed, the effect of obesity on outcomes is lessened. Population studies often show obesity as a predictor of poor outcome but surgery is not controlled for in these studies. Complete surgical staging may drive outcome rather than patient BMI.
Abstract 19:
NOVEL EXPRESSION PROFILE OF THE WNT INHIBITOR SECRETED FRIZZLED-RELATED PROTEIN 1 (SFRP1) IN ENDOMETRIAL CARCINOMA - A POTENTIAL ROLE AS MARKER OF PROGRESSION

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**Objective:** To determine differential expression patterns and functional significance of Wnt inhibitors in endometrial cancer, in an effort to identify potential biomarkers and therapeutic targets.

**Methods:** Wnt-pathway-specific cDNA expression profiling was used to compare normal endometrial tissue to a matched endometrial cancer tissue. Real-time RT-PCR confirmed differential gene expression of SFRP1 in six matched normal-endometrial cancer tissue pairs. Additionally, eleven Stage I tissues and seven Stage III/IV tissues (all endometrioid) were compared, as were six Type II endometrial cancer tissues. The endometrial cancer cell line ECC1 and the normal endometrial cell line HESC were similarly compared via real-time RT-PCR. A Dual-luciferase assay using the β-catenin-responsive luciferase vector Super8XTOPFlash, measured the induction of canonical Wnt signaling in ECC-1 cells treated with exogenous SFRP1.

**Results:** In Wnt-pathway specific cDNA profiling, the Wnt inhibitor SFRP1 was significantly downregulated in our endometrial cancer sample as compared to its matched normal sample. SFRP1 expression was also decreased in five of six endometrial cancer-matched normal tissue pairs (p=0.0007). Additionally, SFRP1 expression was reduced in late stage disease compared to early stage (p=0.01). Comparison of 18 Type I and six Type II EC tissues, with six normal endometrial tissues, showed significantly reduced SFRP1 mRNA expression in EC tissues (p<0.0001). In vitro, SFRP1 gene expression was decreased in ECC-1 cells when compared to HESC (p<0.0001). In dual-luciferase assays, exogenous SFRP1 inhibited the β-catenin/TCF signaling pathway in ECC-1, but this inhibition could be abrogated by the addition of Wnt 3a.

**Conclusion:** SFRP1 expression is decreased in both Type I and Type II endometrial cancer, and appears to exhibit a stage-dependent expression pattern. Functionally, SFRP1 attenuates the transcriptional activity of β-catenin. Downregulation of the SFRP1 gene may be responsible for the activation of the Wnt/β-catenin signaling pathway that contributes to tumorigenesis in endometrial cancer. Our in vivo and in vitro studies support SFRP1 as a potential biomarker and target for a novel biologic agent in endometrial cancer.
Abstract 20:
MACHINE LEARNING AS A TOOL TO PREDICT SURVIVAL OUTCOMES FOR CARCINOSARCOMA OF THE FEMALE GENITAL TRACT

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Objective: Carcinosarcomas of the female genital tract are rare, exceptionally aggressive tumors, of which Uterine carcinosarcomas account for 2-5% of all uterine cancers, and ovarian carcinosarcomas for 1-2% of all ovarian cancers. Any mechanisms that could be used to help predict survival outcomes in these patients would provide practitioners with valuable tools to help focus treatment recommendations and therapies. Historically, cancer research has used basic biostatistical methods for data analysis to predict survival outcomes. Over the past two decades, machine learning has evolved from a discipline studied primarily by computer scientists to broader disciplines, such as biostatisticians. Our objectives were to 1) determine if machine learning could identify clinical features important in the prediction of survival and 2) determine if machine learning could be used as a predictive tool for determining a patient’s status two years after diagnosis.

Methods: In this retrospective analysis, women diagnosed with carcinosarcoma of the ovary or uterus from 1952 to the present were identified and clinical data was collected for data analysis. In total, 198 patients were identified and their clinical data collected. Our colleagues at the Department of Electrical and Computer Engineering used machine learning methodologies to analyze the data.

Results: Clinical features included age, BMI, stage, menopausal status, history of diabetes, history of hypertension, parity, prior radiation to the pelvis, prior hormone therapy, family history, residual tumor left after initial surgery, and tumor grade. After modeling was performed, the top three predictive factors were determined to be stage, prior radiation to the pelvis, and parity. The predictive model further characterized those factors, with higher stages being more likely at 2 years to be dead of disease, a history of pelvic radiation being more likely to be alive at 2 years, and those with higher parity more likely to be dead of disease at 2 years.

The predictive modeling also identified prior hormone therapy, family history, residual tumor, and tumor grade as being valuable clinical features of survival outcomes at 2 years. However, factors such as diabetes, hypertension, menopausal status and BMI were not predictive of survival outcomes at 2 years after diagnosis.

Furthermore, when using the predictive model created with machine learning, these predictive factors were able to accurately predict those patients who were alive 2 years from diagnosis 95% of the time. The model was also able to predict those dead of disease at 2 years from diagnosis 50% of the time.

Conclusion: Machine learning is a relatively new concept in the field of cancer research. Using machine learning methodologies, we were able to identify clinical features that were more likely to predict survival outcomes at 2 years from diagnosis. Our model was very good at identifying those women likely to be alive 2 years after diagnosis (95% accuracy). Further research is needed to explore the use of machine learning in the care of cancer patients.
Abstract 21:  
**TTF-1: A PROTECTIVE ROLE IN ENDOMETRIAL CARCINOGENESIS?**

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**Objective:** Thyroid transcription factor-1 (TTF-1) is a DNA-binding protein that has expression in various carcinomas, including endometrial carcinomas, ranging from 1% up to 82% of cases. TTF-1 expression has also been observed in up to 75% of normal functional endometrium. Its significance in endometrium is unknown. We sought to 1) determine the incidence and significance of TTF-1 expression in an endometrial neoplasia progression tissue microarray (TMA) and 2) evaluate the relationship between TTF-1 expression and resolution of pathology in patients with complex atypical hyperplasia (CAH) and grade 1 endometrial adenocarcinoma (Grade 1 EA) treated with progestin therapy.

**Methods:** The TMA contained 535 surgical cases from 207 patients. Of these, 457 cases from 150 patients had metachronous samples and 46 patients had disease progression to EA with >1 year follow-up. The TMA included the following histologies: benign (n=231), simple hyperplasia (n=105), complex hyperplasia (n=36), simple atypical hyperplasia (n=10); CAH (n=44); and EA (n=109). Additionally, whole section endometrial specimens of 31 patients with CAH and Grade 1 EA were obtained before and after progestin treatment. Immunohistochemistry (IHC) for TTF-1 was performed on the TMA as well as on whole endometrial sections pre- and post-progestin treatment. Any case with at least 1% nuclei stained and 1+ intensity was considered positive for TTF-1. Metachronous non-EA samples with >1 year follow-up and informative TTF-1 data were included in analysis to evaluate risk of progression to EA. Statistics utilized included the univariate Cox model, the Mann-Whitney U test, and the Fisher’s exact test.

**Results:** In the TMA, 392 cases had informative TTF-1 expression, including 216 benign cases, 45 non-atypical hyperplasia cases, 25 atypical hyperplasia cases, and 106 EA cases. Positive staining for TTF-1 was detected in 55% of benign cases, 53% of non-atypical hyperplasia cases, 52% of atypical hyperplasia cases, and 64% of EA cases. The mean nuclear positivity of TTF-1 expression increased from benign to hyperplasia to atypical hyperplasia to EA. Level of TTF-1 staining differed significantly between benign tissues and EA (p = 0.0007), and between non-atypical hyperplasia and EA (p = 0.05). In evaluating progression to EA, benign cases without TTF-1 had a significantly higher likelihood of progression to cancer (p=0.001). TTF1 expression in the hyperplasia specimens was not related to progression, although numbers were small. In the evaluation of whole endometrial sections of progestin-treated subjects, 42% of pre-treatment specimens were TTF-1 positive. 10 of 13 (77%) with positive TTF-1 expression responded to progestin therapy, compared to only 10 of 18 (56%) who lacked TTF-1 expression; however this did not reach statistical significance (p = .27). Of the progestin-responsive subjects with TTF1 expression, 83% lost TTF-1 expression after therapy.

**Conclusion:** TTF-1 expression is seen in many endometrial lesions. Its expression increases from benign and hyperplastic to malignant lesions and its expression is lost in progestin-responsive interval biopsies of CAH/EA patients. Finally, its absence in benign cases predicts cancer progression. Further studies are warranted to determine whether TTF-1 has a protective role in endometrial carcinogenesis.
Abstract 22:
PAYER STATUS IS ASSOCIATED WITH SURGICAL INTERVENTIONS FOR UTERINE CANCER.

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Objective: To evaluate the association of payer status and surgical approach for women who underwent surgical treatment for uterine cancer.

Methods: The design was a retrospective cohort study of discharge data from nonfederal acute care hospitals in Maryland from 2000-2009. Women aged 18 and older who underwent hysterectomy for uterine cancer were included in the study population. The main outcome measure was receipt of minimally-invasive surgical approach. Secondary outcomes included receipt of lymphadenectomy, and individual surgeon and individual hospital annual uterine cancer case volume. The independent variable was payer status. Medicare-insured patients were the reference group. We used multivariate logistic regression and adjusted for age, race and APR-DRG mortality risk score, to calculate odds ratios and confidence intervals for each outcome of interest.

Results: Among the 5470 women who underwent hysterectomy, 512(9.4%) underwent surgery through a minimally-invasive approach and 2,727(49.9%) underwent lymphadenectomy. There was no association between payer status and likelihood of undergoing surgery through a minimally-invasive approach. HMO-insured patients were less likely to undergo lymphadenectomy (OR=0.71, 95%CI:0.58-0.87). HMO and commercially-insured patients were less likely to be operated on by a high-volume surgeon(OR=0.81, 95%CI:0.69-0.94 and OR=0.83, 95%CI:0.79-0.95, respectively) while Medicaid patients were more likely to see a high-volume surgeon(OR=1.48, 95%CI:1.05-2.08). Commercially-insured patients were less likely to undergo surgery at a high-volume hospital(OR=0.84, 95%CI:0.72-0.99).

Conclusion: In this retrospective analysis of uterine cancer patients, both HMO and commercial insurance coverage were associated with a lower likelihood of undergoing surgery by a high-volume surgeon. HMO coverage was associated with a lower likelihood of undergoing lymphadenectomy. Commercial insurance coverage was associated with a lower likelihood of undergoing surgery at a high-volume hospital. Further analysis using prospectively collected data with more detail regarding peri-operative parameters is needed to clarify possible reasons for these disparities.
Abstract 23:
MOLECULAR ANALYSIS OF ENDOMETRIAL PATHOGENESIS IN LYNCH SYNDROME

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Objective: Women with Lynch Syndrome (LS) have a 40-60% predicted lifetime risk of developing endometrial cancer (EC). We hypothesize that in LS-associated EC, normal endometrium accumulates molecular changes in a step-wise fashion similar to sporadic EC. The objective of this study was to investigate precursor lesions and identify molecular changes contributing to endometrial carcinogenesis in LS-associated EC.

Methods: Women with a confirmed mismatch repair gene mutation for LS undergoing a prophylactic or therapeutic hysterectomy were eligible. Case controls were matched 2:1 for EC and hyperplasia based preferentially on age and histology. Molecular analysis of PIK3CA, KRAS, AKT, and CTNNB1 was performed using Sequenom MassArray. PTEN expression was assessed by immunohistochemistry. Statistical analysis was performed using Fisher’s exact test.

Results: There were 67 patients with LS (30 normal endometrium, 8 hyperplasia, 39 EC) and 84 patients (10 normal endometrium, 16 hyperplasia, 58 EC) in the case matched control group. Concurrent complex atypical hyperplasia (CAH) was found in EC in 11 (39.3%) and 21 (46.6%) of LS and sporadic cases respectively. Loss of PTEN expression did not differ between sporadic (69%) and LS EC (86.2%) (p=0.117). However, sporadic CAH demonstrated 68.8% PTEN loss compared to only 12.5% in LS CAH (p=0.056). There was no difference in KRAS frequency in sporadic EC (10.3%) compared to LS EC (3.4%) (p=0.416). PIK3CA mutations occurred more frequently in sporadic EC (39.7%) compared to LS EC (13.8%) (p=0.015). Sporadic EC (37.9%) had significantly more CTNNB1 mutations than LS EC (6.9%) (p=0.002). There was no relationship between PIK3CA, KRAS, AKT and CTNNB1 mutation and loss of PTEN expression.

Conclusion: Similar to sporadic EC, hyperplasia is part of the pre-invasive spectrum of disease in LS associated EC. While PTEN mutations are common in both LS and sporadic EC, PIK3CA and CTNNB1 mutations were more frequent in sporadic EC than LS EC. Our results indicate that loss of PTEN expression is an early event in sporadic EC and that other common mutations in sporadic EC may have a lesser role in LS EC development.
Abstract 24:
GENETIC REFERRAL OF WOMEN AT RISK FOR HEREDITARY BREAST AND OVARIAN CANCER


Objective: The purpose of this study was two-fold. The first goal was to retrospectively assess baseline referral rates of patients with newly diagnosed cancers identifiable as high risk for hereditary BRCA 1 and BRCA 2 associated malignancies. The second phase was a prospective randomized controlled pilot intervention which consisted of sending electronic notification to the managing surgeon/oncologist for each patient identified at risk. In both studies we assessed referral patterns.

Methods: Kaiser Permanente Northern California (KPNC) has guidelines for referral of women at risk for inherited breast/ovarian cancer to genetic counseling. We conducted a retrospective chart review to identify women with cancer who met KPNC guidelines according to their pathology report. The guidelines used for the study were limited to the following: invasive breast cancer ≤ age 40, nonmucinous epithelial ovarian, fallopian tube or peritoneal cancer ≤ age 60, and women with synchronous or metachronous primary cancers of the breast and ovaries. We assessed compliance with guidelines for genetic counseling referral as well as outcome of genetic counseling among those referred. Phase two was a small prospective quality project (January – June 2010) to identify patients with pathology or diagnosis codes who met study guidelines for genetics referral. This was a preliminary study with small sample size and limited power. The managing surgeon/oncologist was notified by an electronic letter of the patient’s indication for referral to genetic counseling. Compliance with guidelines and outcome of patient follow up, counseling, and testing were evaluated. A review was conducted to assess referral rates within 3-6 months of the notification.

Results: A total of 340 patients with new breast and ovarian cancer were identified between January and June 2008. Of the 105 patients identified who met the pathology specific referral guidelines, 47 (45%) were referred and of these, 27 (57%) completed their genetic visit. Of those with breast cancer, more than half (59%) were referred. In contrast, less than one-in-five of those with ovarian, peritoneal or tubal cancer were referred (18%) (P-value for difference <0.0001).

In the prospective quality project, during the first half of 2010, 78 patients at 20 facilities met study referral guidelines, 30 (38%) of whom had already been referred at the time of chart review. Because the initial rates of referral were clinically different in the control and intervention sites, (18.1±34.9 and 41.7±44.2 respectively), we used adjusted regression models to test for differences between 6 month referral rates in the two groups. Intervention group had a 30.6±12.6 percentage point higher referral rate, adjusted for initial rate of referral. (P=0.0266)

Conclusion: In 2008, 45% of KPNC patients at risk meeting pathology guidelines were referred to genetic counseling which is comparable to rates published by comprehensive cancer centers (1). It is feasible to identify patients at risk for BRCA 1 and 2 cancers by pathology report and referral rates may be improved with a letter to the oncologist. A larger randomized study is indicated to determine if this trend holds in comparable groups and if results are different for different cancer types.

(1) Meyer, LA et al, Obgyn survey 2010 (65) pp 436-437
Abstract 25: FACTORS ASSOCIATED WITH GENETIC TESTING IN BRCA1 AND BRCA2 MUTATION CARRIERS WITH ADVANCED OVARIAN CARCINOMA


Objective: Not all women with ovarian, tubal or peritoneal carcinoma undergo genetic testing for BRCA1 and BRCA2 (BRCA1/2) mutations. Our institution recently identified a group of women with advanced ovarian carcinoma found to have BRCA1/2 mutations using a next-generation sequencing approach called the BROCA test, who had not had prior clinical genetic testing. These women were compared with known BRCA1/2 mutation carriers and sporadic cases to determine factors associated with obtaining genetic testing and to determine the fraction of hereditary risk missed in routine clinical practice.

Methods: Women with advanced ovarian, tubal or peritoneal carcinoma were identified from the University of Washington gynecologic oncology tissue bank. Three groups were compared, women with BRCA1/2 mutations identified using the BROCA test who had not previously undergone standard genetic testing (BROCA), women with known BRCA1/2 mutations identified by standard clinical genetic testing (KNOWN), and women with ovarian carcinoma negative for comprehensive genetic testing using the BROCA test (sporadic). Medical records were reviewed to compare demographic and clinical data.

Results: There were 30 BROCA BRCA1/2 mutation carriers, 56 KNOWN BRCA1/2 mutation carriers, and 239 sporadic. The BROCA group had a median age of 58 (range 43-77), significantly older than the KNOWN group with a median age of 53 (range 33-76), p=0.02, (Mann-Whitney). 51/56 (91.1%) of the KNOWN group had a strong family history suggestive of a BRCA1/2 mutation, compared with 13/30 (43.3%) of the BROCA group, p<0.0001, (Fishers Exact). There was no difference in the rate of optimal debulking, proportion of BRCA1 vs. BRCA2 carriers, or the percentage with a history of breast carcinoma between the BROCA and KNOWN groups. Median overall survival was significantly worse for the BROCA group compared to the KNOWN group, 53 vs. 83 months, p=0.01, Log-rank test. Median overall survival was improved for all BRCA1/2 mutation carriers (KNOWN and BROCA) compared with sporadic cases, 69 vs. 47 months, p=0.003, (Log-rank test), however there was no difference in overall survival between the sporadic and BROCA groups. In all women in the BROCA series, 26% of the women with germline mutations had no first or second degree relatives with breast or ovarian carcinoma and the likelihood of identifying a mutation was equally high between women diagnosed in their 40s, 50s or 60s.

Conclusion: Older age, the absence of a strong family history, and poor survival are all associated with not obtaining genetic testing through standard methods. While BRCA1/2 mutation carriers in this series had improved overall survival compared with sporadic cases, this difference was driven by the group already known to have mutations. Using age and family history criteria to direct genetic testing will miss a significant percentage of mutation carriers.
Abstract 26:
CHEMOTHERAPY RESPONSE AND SURVIVAL IN SEROUS OVARIAN CANCER PATIENTS WITH BRCA MUTATIONS

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Objective: To compare the demographic, clinico-pathologic, treatment response, and survival of patients with BRCA (germline and somatic) mutations.

Methods: Genomic and clinical data were obtained from The Cancer Genome Atlas supplemented with data from Sloan-Kettering Hospital. Chi-square, Kaplan-Meier methods, and cox-proportional hazards model were used for statistical analyses.

Results: Of 315 patients (median age: 59 years; range: 34-87) with complete sequence and clinical data, 90.8%, 3.2%, 3.2%, and 2.9% were White, Black, Asian, and other, respectively. 7.8% had grade 2 and 91.2% had grade 3 serous tumors. 88.3% had primary surgery, of which 74.5% were optimally debulked (<1cm residual). Stage II, III, and IV disease comprised of 4.5%, 78.7% and 16.9%. Based on sequence data, 69 (22%) out of 315 women had BRCA1/2 mutations (16% germline and 6% somatic). 35 (11%) had BRCA1, 32 (10%) had BRCA2, 2 had both mutations. The remainder 246 had no known mutations in BRCA genes. The median age of those with BRCA1/2 mutations was 55 vs. 60 in those without BRCA1/2 mutations. 50% of Ashkenazi Jewish descent had mutations in BRCA1/2 compared to 20% of non-Ashkenazi patients (p=0.002). The rate of optimal cytoreductive surgery was 79% vs. 73% in those with BRCA vs. no mutations (p=0.35). The 5-year overall survival of those with BRCA1/2 associated cancer was 48.5% vs. 24.4% without mutations (p<0.001). There were no differences in stage and grade of disease.

Of 221 patients with complete information on chemotherapy, 81.9% received platinum/taxane combination. The median follow-up was 35.4 months (range: 1-125 months). After primary therapy, the median PFS in those with BRCA1/2 mutations was 48.1 months compared to 14.8 months in those without mutations (p=0.009). More specifically, 64.7% of BRCA1/2-mutated patients had platinum sensitive disease (>12 mos PFS) vs. only 42.4% of those without mutations (p=0.005). On multivariate analyses, young age (HR=1.02; 95%CI: 1.002-1.03; p=0.027) and BRCA mutations (HR=0.51; 95%CI: 0.35-0.75; p=0.001) portended for better survival.

Conclusion: Compared to those without mutations, women with BRCA mutations presented at a younger age and are more likely to respond to adjuvant chemotherapy with a better overall survival.
Abstract 27:
GERMLINE VS. SOMATIC BRCA MUTATIONS AND RESPONSE TO CHEMOTHERAPY AND OUTCOMES IN SEROUS OVARIAN CANCER

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Objective: To differentiate the demographic, clinico-pathologic factors and survival of serous ovarian cancer patients with germline vs. somatic BRCA mutations.

Methods: Genomic and clinical data were obtained from The Cancer Genome Atlas supplemented with data from Sloan-Kettering Hospital. Chi-square, Kaplan-Meier methods, and cox-proportional hazards model were used for statistical analyses.

Results: Of 69 women with BRCA1/2 mutations, 49 (71%) had germline and 20 (29%) somatic mutations. 35 (51%) had BRCA1; of which 26 had germline and 9 had somatic mutations. Of 32 (46%) with BRCA2, 22 were germline and 10 were somatic, 2 women had mutations in BRCA1 and 2. The median age of those with germline and somatic mutations were 54 and 65 years. Of Ashkenazi Jewish descent patients with BRCA mutations (n=10), 9 had germline and 1 had somatic mutation. Of non-Ashkenazi Jewish patients (n=59), 40 (68%) were germline and 19 (32%) had somatic mutations. The proportion of those with platinum-sensitive (>12 months progression-free survival) were 58% and 85% in germline and somatic mutated patients (p=0.08), respectively. The 5-year overall and median survival of those with germline and somatic mutations were 48% vs. 49%, and 58 vs. 59 months, respectively (p=0.75).

Overall, 18 women (34%) received no CA-125 screening. Of these, 13 reported that their physician did not recommend screening. Of the 35 patients who received CA-125 screening, 7 received yearly serum measurements and 28 received bi-annual measurement. Thirty-two patients (50%) reported receiving a dual energy X-ray absorptiometry (DXA) scan after RRSO. Of these, 16 were younger than 50 years of age. In this pre-menopausal group, 13% had been diagnosed with osteopenia. Of the 21 patients reporting no history of DXA scan, 8 had been told by their primary doctor that bone density screening was not necessary. Those receiving DXA bone density screening reported a significantly increased intake of calcium, Vitamin D and/or bisphosphonates as compared to those not receiving screening (66% vs. 24%, p<0.05). Twenty women (38%) were using HRT at the time of this survey. Of these, 6 (11%) were younger than age 50. Reasons for not using HRT included personal history of breast cancer (n=14) and physician proscription (n=12).

Half of patients reported vaginal dryness and vasomotor instability, which were the most frequently cited menopausal symptoms. Almost equally prevalent were poor memory (40%), weight gain (38%) and decreased libido (38%). Only 3 of 20 women (15%) using HRT reported no menopausal symptoms at all. A minority of women in the cohort (15%) denied all symptoms of menopause after RRSO.

Conclusion: Compared to germline BRCA mutated patients, those with somatic mutations are older but have a similar response to platinum-based chemotherapy and survival. Further studies are warranted to validate these preliminary findings.
Abstract 28:
THE USE OF MOLECULAR MARKERS TO PREDICT FOR OPTIMAL CYTOREDUCTION IN OVARIAN CANCER

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Objective: To determine the significance of specific gene markers associated with optimal cytoreductive surgery.

Methods: Demographic and clinico-pathologic characteristics, treatment, outcomes, and genomic data were obtained from The Cancer Genome Atlas (TCGA). Kaplan-Meier, independent samples t-test, and logistic regression methods were used for statistical analyses.

Results: Of 429 tumors with both clinical and gene expression data, the median age was 59 years, 91% were Whites, 5% Blacks, 3% Asians. 312 (73%) patients were optimally debulked (<1cm residual disease) and 117 (27%) were suboptimally resected. Stage I, II, III, and IV disease comprised of 3%, 4%, 78%, and 15%. The majority (86%) had grade 3 tumors, 13% grade 2, 1% had grade 1 disease. The median follow-up time was 30 months (range 0-152 months). The 5-year overall and median survival of the optimally debulked were 31% and 45 months vs. 29% and 38 months in the suboptimally debulked group (p=0.063).

Those optimally cytoreduced had a mean P-cadherin expression of 1.73 compared to 1.31 in those suboptimally resected (p=0.002). Receptor-type tyrosine-protein phosphatase F (1.13 vs. 1.29; p=0.039) was also differentially expressed in association with optimal cytoreductive surgery. CDC42, CTNNB1 (beta catenin), Rac1, fyn, RhoA, E-cadherin, N-cadherin, Receptor-type tyrosine-protein phosphatase M, Receptor-type tyrosine-protein phosphatase A and vimentin were not associated with optimal surgery. On multivariate analyses, P-cadherin remained as an independent predictor for optimal debulking surgery (HR= 0.743, 95% CI: 0.62-0.89; p=0.001).

Conclusion: Our data suggest that P-cadherin expression predicts for optimal cytoreduction. Molecular markers may play a role determining complete surgical resection toward individualizing ovarian cancer care.
Abstract 29: 
LYMPHOID ENHANCING FACTOR 1 (LEF-1) OVEREXPRESSION IN EPITHELIAL OVARIAN, FALLOPIAN TUBE AND PERITONEAL CANCER AND ASSOCIATIONS WITH CLINICAL FACTORS.

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Objective: Lymphoid enhancing factor-1 (Lef-1) is a transcription factor and downstream target of Wnt\β-catenin signaling. Dysregulation of the Wnt\β-catenin\Lef-1 signaling pathway has been implicated in cancer formation. We hypothesize that Lef-1 is overexpressed in ovarian, fallopian tube and peritoneal cancers, and is associated with adverse clinical and pathologic factors.

Methods: Using our divisional database, we identified patients diagnosed with epithelial ovarian, fallopian tube and/or primary peritoneal cancer. Lef-1 mRNA levels were determined in tumor tissue using Real Time (RT) PCR, and p53 mutations were determined by direct sequencing. Clinical data including age at diagnosis, recurrence history, platinum sensitivity, stage, grade, histology, degree of cytoreduction, additional p53 mutational status, and overall survival were collected from a retrospective chart review. Lef-1 mRNA levels were compared to clinical and pathological data using ANOVA, chi-square analysis and survival was analyzed using the log rank test.

Results: We identified 51 patients with ovarian, fallopian tube or peritoneal carcinoma. Lef-1 mRNA levels were significantly elevated in tumor samples when compared to non-cancerous controls (p=0.0001). Elevated Lef-1 mRNA levels were significantly associated with advanced stage (p=0.04), and serous histology (p=0.01). Patients with a greater than or equal to 2.5 fold increase in Lef-1 mRNA expression had an overall survival of 28% compared to a 57% five year overall survival for patients with less than a 2.5 fold increase (p=0.08).

Conclusion: Lef-1 mRNA levels were statistically elevated in cases of ovarian, fallopian tube or peritoneal cancer when compared to non-cancerous controls. Among cancer cases, levels of Lef-1 were statistically different between stage and histology. Lef-1 overexpression may be predictive of poor overall survival. These findings suggest that Lef-1 overexpression may contribute to ovarian, fallopian tube and peritoneal carcinogenesis, and that further investigation is warranted.
Abstract 30:
30-DAY MORTALITY FOLLOWING PRIMARY CYTOREDUCTIVE SURGERY FOR ADVANCED STAGE EPITHELIAL OVARIAN CANCER IN THE ELDERLY

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Objective: Treatment for advanced ovarian cancer typically includes aggressive surgical debulking. Thirty-day mortality following advanced ovarian cancer debulking among elderly women has not been well described, therefore our goal was to identify factors associated with increased 30-day mortality.

Methods: A database linking Medicare records with the Surveillance, Epidemiology and End-Results (SEER) data was used to identify a cohort of 5475 women aged 65 and above who had primary debulking surgery for stage III/IV epithelial ovarian cancer between 1995-2005. Women were stratified by acuity of hospital admission. Multivariate analysis was performed to identify patient and treatment related variables associated with 30-day mortality.

Results: 5475 women had surgery for advanced ovarian cancer and the overall 30-day mortality was 8.2%. Women admitted electively had a 30-day mortality of 5.6% (251/4517) and those admitted emergently had a 30-day mortality of 20.1% (168/835). Advancing age, increasing stage, and increasing comorbidity score were all associated with an increase in 30-day mortality (all p<0.05) among elective admissions. A high risk group of women admitted electively included those aged 75 or older with stage IV disease and women aged 75 or older with stage III disease and a comorbidity score of 1 or more. This group had an observed 30-day mortality of 12.7% (95%CI 10.7%-14.9%).

Conclusion: Age, stage and comorbidity scores can be used to stratify patients based on predicted post-operative mortality and identify women at the highest risk who may benefit from alternative treatment strategies.
Abstract 31:  
SIGNIFICANCE OF MICRORNAS IN DETERMINING TAXANE RESISTANCE IN OVARIAN CANCER

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Objective: To determine the role of miRNA expression in taxane resistance of serous ovarian cancer.

Methods: Cell lines were exposed to either docetaxel or paclitaxel in the presence of PSC, a potent inhibitor of P-glycoprotein. SRB assays were used to determine taxane resistance levels. miRNA arrays were used to identify differentially expressed miRNAs using the Wafergen platform. The data were then confirmed using human tissue specimens from The Cancer Genome Atlas. Demographics, clinicopathologic, and survival analyses were evaluated using Chi-square and Kaplan-Meier methods. Cox proportional hazard model were used to determine independent prognostic markers for taxane resistance.

Results: Using the taxane-resistant OVCAR 3 cell lines, docetaxel-exposed cells had a 13-fold increased level of resistance and the paclitaxel exposed cells had a 10-fold increased level of resistance compared to parental cell lines. In paclitaxel resistant cells, miR-1470, miR-193a-3p, miR-21, miR-25, miR-339-3p, miR-339-5p, miR-345, miR-449a, miR-646, miR-658, and miR-886-5p were overexpressed and miR-24, miR-518a-5p, miR-654-3p are underexpressed. In docetaxel resistant cells, miR-1201, miR-1225-5p, miR-1248, miR-130a, miR-1468, miR-1470, miR-27a, miR-30e, and miR-342-3p were overexpressed while miR-188-5p, miR-2110, miR-365, miR-548b-3p, miR-571, and miR-654-3p were underexpressed. miR-200a and miR-99a were found to be overexpressed in both taxane-resistant cells, while only miR-200b was found to be underexpressed in both.

We then used the human specimens from the TCGA to validate our cell line data. Of 56 patients with recurrent ovarian cancer treated by single agent taxane, the median age was 57 years. 95% underwent primary debulking surgery, of which 68% were optimally debulked. The median number of cycles of chemotherapy was 5 (range 2-28). The median treatment-free interval prior to single agent taxane therapy was 4 months. After taxane therapy, the median PFS was 4.2 months (range 1-54). Comparing the taxane resistant (<4mos PFS) with taxane sensitive patients, the differentially expressed miRNA was miR-21 (average expression was 15.1 in resistant group vs. 14.7 in sensitive group; p=0.041).

Conclusion: Our data suggest that miR-21 may play a role in taxane resistant ovarian cancer. Differential expression of miRNA can potentially be a useful tool to personalized ovarian cancer treatment.
Abstract 32:  
A CASE CONTROL STUDY OF METFORMIN IN OVARIAN CANCER

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Objective: Emerging invitro and invivo data indicate a possible anticancer effect of metformin in variety of human cancers. The present study was conducted to find any association of metformin intake to that of survival in ovarian cancer.

Methods: In this single institution retrospective case control study, ovarian cancer patients who took metformin were identified by hospital records (cases). These were randomly matched with patients having ovarian cancer but not taking metformin (controls) for age, surgical cytoreduction status and year of diagnosis (± 4 years). Prognostic variables and survival was compared with chi square, Kaplan-Meier (log rank) and Cox proportional hazards methods.

Results: 215 patients were included (72 cases, 143 controls). Duration of metformin intake was (mean 2.3, range 1-11 years). Distribution of matching variables in cases and controls was: mean age (60.5 vs 60.3 years), median year of diagnosis (2005 vs 2004) and optimal cytoreduction (89% vs 89%), respectively. Cases were more likely to have early stage (I&II combined 38% vs 17%, p=0.001), and low grade (32% vs 12%, p=0.0001) but less likely to have serous histology cancer (54% vs 74%; p=0.004). The study cohort observed 82 deaths with a median survival of 5.5 years. While the median survival for the controls was 4.1 years, the median survival for the cases was not reached (p=0.0002). On a multivariate analysis, metformin remained an independent predictor of survival (hazards ratio 1.8; 95% CI 1.1-3.3) after controlling for stage, grade and histology.

Conclusion: Although this study reports association rather than causation; metformin intake was associated with better prognosis in ovarian cancer. Metformin may be worthy of further clinical studies in ovarian cancer.
Abstract 33:
STRESS STRIKES THE STRESSOR: AUTOPHAGY MEDIATED SURVIVAL FROM CHEMOTHERAPY

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Objective: Recent studies show that chronic stress can contribute to cancer progression. However, the effects of chronic stress on response to conventional chemotherapy are not known.

Methods: We examined the effects of stress hormones (cortisol, catecholamines) in vitro on efficacy of docetaxel, cisplatin and topotecan in SKOV3ip1 ovarian cancer cells and in vivo using orthotopic mouse models of ovarian carcinoma (HeyA8 and SKOV3ip1). A well-characterized restraint system was utilized to mimic the effects of chronic behavioral stress.

Results: Chronic stress significantly increased tumor growth in both ovarian cancer models. While treatment with either docetaxel or cisplatin was effective in reducing tumor growth, exposure to chronic stress reduced the efficacy of cisplatin and docetaxel by > 2-fold without any effect on tumoral drug-levels. Glucocorticoid receptor (GR) blockade completely abrogated the stress-induced chemoresistance. To address possible contributions of the HPA-axis versus SNS to the compromised efficacy of chemotherapy, we examined the in vitro effects of either dexamethasone (DXM) or isoproterenol on tumor apoptosis. DXM significantly reduced chemotherapy induced apoptosis while isoproterenol had no significant effect. Additionally, DXM-induced reduction of apoptosis was readily reversed with either RU-486 or GR siRNA. DXM treatment in vitro increased Bcl-XL expression and reduced caspase-9 cleavage. Further studies demonstrated DXM-associated upregulation of autophagy related genes (Beclin1, LC3-II, and Atg-5), resulting in decreased efficacy of docetaxel.

Conclusion: Our data indicate that chronic stress may compromise the efficacy of conventional chemotherapy through reduction in apoptosis and modulation of autophagy. These findings may have implications for clinical management of ovarian cancer patients.
Abstract 34:
OVEREXPRESSION OF STROMAL BIGLYCAN CORRELATES WITH IMPROVED SURVIVAL IN PATIENTS WITH HIGH-GRADE SEROUS OVARIAN CANCER

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Objective: To validate overexpression of biglycan (Bgn) in ovarian cancer stroma and correlate the expression of Bgn with clinical outcomes in patients with advanced stage high-grade serous ovarian carcinoma.

Methods: Microarray analysis was performed on RNA isolated from 10 microdissected normal ovarian fibroblasts, and the epithelial and stromal component of 16 high-grade late stage serous ovarian cancers. Bgn was selected for further validation studies. Bgn mRNA copy number was determined by quantitative RT-PCR analysis from 10 samples of microdissected normal ovarian stroma, and from the stromal and epithelial components of 35 samples from patients with ovarian cancer. Bgn protein expression was determined by immunolocalization in paraffin sections prepared from 10 normal ovarian, 10 fallopian tube and 129 high-grade serous ovarian cancer specimens. Correlations between Bgn expression levels with overall and progression free survival were determined by Kaplan-Meier analyses and log-rank test. A co-culture model was established to evaluate the effect of four ovarian cancer cell lines on Bgn mRNA expression in normal ovarian fibroblasts.

Results: Microarray data revealed more than 40 secreted proteins that were overexpressed more than 5 fold by cancer-associated fibroblasts exclusively. Quantitative RT-PCR validated the overexpression of Bgn by cancer-associated fibroblasts compared to normal ovarian fibroblast and ovarian cancer cells (p<0.001). Clinical data correlated stromal Bgn overexpression with improved overall and progression free survival in patients with high-grade late stage serous ovarian cancer (p<0.001 and p=0.01, respectively). Co-culture models showed that 3 out of 4 ovarian cancer cell lines significantly increased Bgn mRNA expression levels in the presence of normal ovarian fibroblasts (p<0.001).

Conclusion: Bgn is overexpressed in cancer-associated fibroblasts and its expression may be induced by mediators produced by ovarian cancer cells. Bgn produced by stromal fibroblasts may modify the extracellular matrix to affect ovarian cancer cell growth and subsequently lead to improved patient survival. Further studies on the functional role of stromal Bgn in the progression of ovarian cancer are warranted.
Abstract 35:
THE SIGNIFICANCE OF VIMENTIN AND OTHER MARKERS OF TUMOR STROMAL MICROENVIRONMENT IN RESPONSE TO INTRA-PERITONEAL CHEMOTHERAPY

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\textsuperscript{1}Division of Gynecology Oncology, Department of Obstetrics, Gynecology & Reproductive Sciences, Helen Diller Family Comprehensive Cancer Center, University of California San Francisco, San Francisco, CA.; \textsuperscript{2}Department of Radiation Oncology, Stanford Cancer Center, Stanford, CA.; \textsuperscript{3}Division of Gynecology Oncology, Department of Obstetrics and Gynecology, Creighton University School of Medicine at St. Joseph’s Hospital and Medical Center, Phoenix, AZ.

Objective: To determine the significance of markers of tumor stromal microenvironment in response to intra-peritoneal chemotherapy.

Methods: Genomic and clinical data were obtained from The Cancer Genome Atlas (TCGA). Chi-square, Kaplan-Meier methods, and cox-proportional hazards model were used for statistical analyses. Gene expression levels were compared to patients’ own normal tissue. Expression was performed on the Agilent platform.

Results: Of 478 patients with reported data on drug therapy in TCGA, 239 had matched gene expression data, of which 29 patients underwent intra-peritoneal (IP) chemotherapy. The median age was 53 years (range: 34-83) and 90% were Whites. The majority (86%) presented with stage III disease and 10% had stage IV. 83% had grade 3 tumors and the remainder had grade 2 disease. 92% were optimally debulked (<1cm residual). The median follow-up was 11 months (range 3-60 months). The median progression-free survival (PFS) was 27 months and 5-year overall survival was 22%. Tumors with a low expression of vimentin had improved PFS after IP chemotherapy compared to those with high expression (12-month PFS 89% vs. 32%; p=0.044). However, expression of vimentin was not associated with response to intravenous chemotherapy (12-month PFS 65% vs. 53%; p=0.148). Likewise, vimentin expression was not a marker for overall survival (p=0.96). Other molecules associated with cell remodeling such as integrins (ITGA5, ITGB1), binding protein (GAB1), epithelial-mesenchymal transition molecules (MET), and mesenchymal differentiation molecules (PDGFA, B) were not associated with response to IP chemotherapy.

Conclusion: Markers of tumor stromal microenvironment may serve as predictors for intra-peritoneal chemotherapy response. The use of markers of tumor stromal microenvironment may have clinical utility towards individualizing ovarian cancer treatment.
Abstract 36: MK2206, AN ORALLY ACTIVE ALLOSTERIC AKT INHIBITOR, REVERSES PROGESTIN RESISTANCE IN ENDOMETRIAL CANCER

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Objective: Progestin resistance is a major obstacle to fertility sparing therapy in endometrial cancer. Recurrent endometrial cancer is often resistant to hormonal or chemotherapy. The mechanism behind the lack of response to progestin in some patients is not well understood, however, downregulation of the progesterone receptor (PR) is thought to play a role. The PTEN tumor suppressor gene is mutated in the majority of cases of estrogen dependent endometrial cancer and this mutation results in hyperactivation of the PI3K/AKT pathway. The AKT pathway, which is involved in promoting cell survival, is known to play a major role in a wide spectrum of solid tumors. We evaluated the effect of MK2206, a novel allosteric inhibitor of AKT currently being used in Phase I trials of solid tumors, on progestin responsiveness in different models of endometrial cancer.

Methods: Ishikawa cells, an endometrial cancer cell line carry a PTEN mutation, resulting in downstream activated AKT. For our in vitro assays, we treated Ishikawa cells stably transfected with progesterone receptor B (PRB23 cells) with MK2206 with and without R5020, a synthetic progestin. The effects on AKT activation and PR were determined by Western blot analysis. The effects on cell viability were tested with a WST assay. In order to determine if the effects were mediated by PR, small interfering RNA was used to reduce the PR level and cell viability was assayed. We tested the in vivo effects of MK2206 with and without progesterone on nude mice with subcutaneous xenograft tumors of PRB23 cells. Immunohistochemistry was used to verify the effects relative to vehicle treated mice.

Results: MK2206 was shown to effectively decrease activation of AKT in a dose dependent (10 nM to 100 uM) and time dependent manner (4 to 24 hours) in PRB23 cells. Additionally, MK2206 treatment of PRB23 cells resulted in a significant increase in progesterone receptor protein. This stabilization of PR may play a role in improved response to progestin therapy. MK2206 and R5020 were shown to have synergistic inhibitory effects on cell viability in PRB23 cells compared to each agent individually and vehicle control. When PR was knocked down, much of this synergistic growth inhibition did not occur. The combination of MK2206 and progesterone therapy was shown to significantly decrease tumor volumes in vivo compared to therapy with either agent individually. The use of MK2206 resulted in minimal toxicity to the mice.

Conclusion: These results suggest that inhibition of AKT, with MK2206, may result in augmentation of progesterone response via stabilization of the progesterone receptor and can play a role in reversing progestin resistance in endometrial cancer.
Abstract 37:
LESSONS FROM PRACTICE: CERVICAL CANCER ANTECEDENTS IN THE COTESTING ERA

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Objective: To replicate an analysis of cervical cancer antecedents in members of a large health maintenance organization published in 2000 (Sung H-Y et al, Cancer), and thereby assess changes in patterns of screening failure with the introduction of cotesting in women age 30+.

Methods: Women diagnosed with primary invasive cervical cancer from 2003 though 2009 were identified from the databases of the Regional Lab and confirmed through the Northern California Cancer Registry. The subset who were members 36 months prior to their date of diagnosis were assessed for screening participation and results in the period from 36 months to 6 months prior to their date of diagnosis, and the results compared to those published in 2000 from the same lab and population in the Pap-only era. “Pap+” is >=ASC HPV positive. “Pap-“ includes Paps with results not relevant to cervical cancer prevention (“atrophy”, “trichomonas” etc.) In the event of multiple positive screens during the 36 to 6 month period, the worst result is reported (in the descending order of positive predictive value for CIN3+ listed below with Pap+ HPV+ as “worst”). Women with multiple different types of negative screens during the study period are allotted to the test result with highest negative predictive value, as listed in descending order below.

Results: There were 612 women diagnosed with primary invasive cervical cancer from 2003 thorough 2009 in our membership, of whom 418/612 (68 %) were members 36 months prior to the date of their cancer diagnosis. Of those 418 women who met the membership criteria 230, (55%) did not undergo screening, 113 (27%) had one or more positive screens, and 75 (18 %) had one or more negative screens and no positive screens in the period 36 months to 6 months prior to their date of diagnosis. More than half (41/75) of the women who were screen failures were screened with Pap only. This compares to 455 women with cancer and similar membership histories reported by Sung et al, among whom 53% failed to screen, 16% had abnormal or missing results and 31% had one or more negative Pap results and no positive results.

<table>
<thead>
<tr>
<th>Worst Positive Screen</th>
<th>Number of Women</th>
</tr>
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<tbody>
<tr>
<td>Pap+HPV+</td>
<td>31</td>
</tr>
<tr>
<td>Pap+ No HPV</td>
<td>25</td>
</tr>
<tr>
<td>Pap-HPV+</td>
<td>28</td>
</tr>
<tr>
<td>Pap+HPV-</td>
<td>9</td>
</tr>
<tr>
<td>HPV+ No Pap</td>
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<tr>
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<table>
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<th>Negative Screen</th>
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<td>Pap- No HPV</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
</tr>
</tbody>
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Conclusion: Compared to the cancer antecedents in the Pap-only era, failure to participate in screening remains the most common antecedent of cervical cancer, but screening test failure has decreased with the addition of HPV to Pap testing. The absence of change in cancer rates signifies that even though we can recognize risk, our approaches to responding to that risk, particularly to HPV positivity with negative or low grade cytology, will need to improve if cancer rates are to improve as a consequence of more sensitive screening.
Abstract 38:
EVALUATION OF A POST-TREATMENT SURVEILLANCE STRATEGY AFTER PRIMARY CHEMORADIATION FOR CERVICAL CANCER

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Objective: The 2011 NCCN Guidelines for post-treatment surveillance for cervical cancer call for frequent evaluation for symptoms, physical examination and cytology, as well as an annual chest radiographs (CXR). The aim of this study was to evaluate the utility of an intensive surveillance strategy as such in patients treated with primary chemoradiation (chemo-XRT) for cervical cancer at a single institution.

Methods: A retrospective chart review of patients with stage IB1-IIIB cervical cancer treated at our institution with primary chemo-XRT between 1999 and 2008 was performed. During the dates analyzed, surveillance practice at our institution closely conformed to the 2011 NCCN guidelines with interval history, physical exam, and Pap test performed every 3 months for the first two years, every 4 months for the 3rd year, every 6 months for years 4-5, then annually. Under this strategy, patients had 1 additional surveillance visit compared to current NCCN guidelines. As in the NCCN guidelines, our patients also underwent annual CXR and additional imaging was reserved for cases with suspicion for recurrent disease. Pap test results, pathology, and imaging data were reviewed, as were the indications that prompted further diagnostic work-up.

Results: 62 patients were identified who completed chemo-XRT and entered routine surveillance. There were 468 surveillance visits with a median follow-up time of 41 months (range 5.4-132 months). 17 of the 62 patients were diagnosed with recurrent disease or a new genital malignancy with a median time to diagnosis of 22 months (range 5.4-76 months). Diagnostic work-up was prompted by symptoms only in 7 patients (41%), by physical examination findings in 6 patients (35%), CXR in 1 patient (6%) and “incidental imaging” in 2 patients (12%). Pap tests picked up no asymptomatic recurrences, but resulted in the diagnosis of a subsequent vaginal cancer in 1 patient (6%).

Additional work up was prompted by symptoms in 89 visits and by physical exam findings (with or without symptoms) in 34 visits. The positive predictive value (PPV) for symptoms was 0.08 and the PPV for physical exam findings was 0.18. 126 surveillance CXRs were performed. One of the 126 was suspicious for recurrence and resulted in a confirmed diagnosis of recurrent disease (PPV 1.0).

364 surveillance pap tests were collected. 63 were unsatisfactory (17%) and 86 were abnormal (24%): 22 ASCUS-HPV negative, 11 ASCUS-HPV positive, 34 ASCUS-HPV unknown, 14 LSIL, and 5 HSIL. Further workup of abnormal cytology revealed 4 cases of dysplasia and one case of vaginal carcinoma.

Conclusion: Using an intensive follow-up strategy that closely parallels the NCCN guidelines, 81% of cervical cancer recurrences were initially suspected based on the presence of symptoms or abnormal physical exam findings. Annual CXR was less useful in identifying recurrent disease. Intensive cytological surveillance did not detect any recurrences but lead to the diagnosis of one new vaginal cancer. Further studies are necessary to elucidate the most efficacious and cost-effective post-treatment surveillance strategy for cervical cancer.
POSTERS
INHIBITION OF THE WNT PATHWAY LEADS TO DECREASED ANTICANCER ACTIVITY IN OVARIAN CANCER CELL LINES

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Objective: Emerging evidence suggests that aberrant activation of the Wnt signaling pathway may play an important role in ovarian cancer tumorigenesis and progression. Thus, the exploration of Wnt inhibition as an ovarian cancer therapeutic strategy is both novel and appealing. Wnt inhibitor factor-1 (WIF1) and Dickkopf-3 (DKK3) are naturally occurring secreted Wnt inhibitors whose functional role and mechanisms of action in ovarian cancer remains largely unknown. In this study, our objective was to examine the expression levels of these Wnt inhibitors in ovarian cancer cell lines and investigate their effects on ovarian cancer cell proliferation, migration and invasion.

Methods: mRNA and protein expression levels of WIF1 and DKK3 in a panel of 9 ovarian cancer cell lines were determined by real-time reverse-transcription Polymerase Chain Reaction and by Western blotting analysis. SKOV3 cells, which showed no expression of WIF1 or DKK3, were stably transfected with expression plasmid constructs containing vector control (PcDNA3.1), WIF1 or DKK3 genes. Expression levels of WIF1 and DKK3 in transfected SKOV3 cells were confirmed by Western blotting analysis. Cell proliferation, migration and invasion of these stably transfected SKOV3 cells were examined using the MTT assay, the transwell migration assay and the matrigel chamber invasion assay, respectively. Student’s t-test was used to determine statistical significance of these measurements.

Results: WIF1 and DKK3 expression was minimal or absent in 7/9 and 4/9 of nine ovarian cancer cell lines, respectively. Ectopic WIF1 expression in SKOV3 cells resulted in significantly decreased proliferation (mean decrease in relative proliferation 51.4% +/- 6.2% at Day 4) when compared to SKOV3 vector control cells, but no significant differences in migration were seen (1.2-fold +/- 0.1, p=0.31). However, the invasive capacity of SKOV3 cells expressing WIF1 was markedly lower than control cells (0.17-fold +/- 0.10 decrease in invasive cells, p=0.003). Similarly, DKK3 expression significantly decreased the invasive capacity of SKOV3 cells (PcDNA3.1 vs. DKK3: 18.5 +/-1.8 vs. 9.9 +/- 2.4 cells/HPF, p<0.001), but unlike WIF1 transfectants showed no significant effects on cell proliferation or motility.

Conclusion: The expression of Wnt inhibitors WIF1 and DKK3 is commonly low or absent in ovarian cancer cell lines. Modulation of the Wnt pathway by Wnt inhibitors WIF1 and DKK3 effectively decreases the invasiveness of ovarian cancer cells, while their expression has differential or no effect on cell motility and proliferation. These results suggest that inhibition of the Wnt pathway by WIF1 and DKK3 may represent a novel approach for treatment of ovarian cancer metastasis. In addition, this study lays a solid foundation on further studying mechanisms of WIF1 and DKK3’s action in ovarian cancer.
Poster # 2

NUTRIENTS FOR CURE: CONJUGATED LINOLEIC ACID IMPEDES OVARIAN CANCER GROWTH

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Objective: Conjugated linoleic acid (CLA) has long been recognized to exert protective effects on carcinogenesis in breast, prostate and colon malignancies. Recent data suggests that CLA plays a key role in inhibiting several important survival pathways in breast carcinoma cell lines. However, data on effects of CLA in epithelial ovarian carcinoma are lacking and was the focus of this study.

Methods: Ovarian cancer cells (A2780 and SKOV3) were treated with increasing concentrations of two CLA isomers (cis9:trans11 and trans10:cis12) at several time points. Changes in cell viability, proliferation, apoptosis, and cell cycle were determined using 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay and flow cytometry. The molecular effects of CLA isomers were determined using quantitative real-time PCR and western blot analysis.

Results: In A2780 and SKOV3 ovarian cancer cells, treatment with trans10:cis12-CLA (7 M) resulted in substantial reduction (by ~50%) in cell viability in a time and dose dependent fashion (p<0.01). CLA isomer cis9:trans11, had no effect in all doses (0.001-50mM) and time points (24-96h) tested. Pretreatment with trans10:cis12 CLA followed by exposure to oxaliplatin (IC50), resulted in a substantial reduction (by ~50%, p<0.05) in percent live cell compared to oxaliplatin monotherapy. However, both isomers of CLA showed no increase in apoptosis from baseline and did not result in any caspase-3 cleavage at all time points tested (5 min to 72 h). Importantly, trans10:cis12 CLA significantly reduced ovarian cancer cell proliferation in a time and dose dependent fashion and resulted in cell cycle arrest (G1-phase). Additionally, exposure to only trans10:cis12 CLA (IC50) resulted in significant reduction (by >90%) in phosphorylation of Erk1/2. Trans10:12 CLA substantially increased phospho-GSK3 and resulted in significant reduction in total -catenin (by ~60%) levels at 72h.

Conclusion: Our preliminary data indicate that trans10:cis12 CLA substantially reduces proliferation of ovarian cancer cells by modulation of key survival pathway ( -catenin and MAPK). These findings support further exploration and may have therapeutic implications for ovarian cancer.
PREOPERATIVE CLUES TO GUIDE PRIMARY APPROACH IN ADVANCED OVARIAN CANCER (OC): CT FINDINGS CAN PREDICT EXTENT OF TUMOR DISSEMINATION

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Objective: We previously demonstrated that surgical complexity combined with specific patient factors are key determinants of morbidity in OC treatment. Specifically, high tumor dissemination (HTD) is an important risk factor for poor outcome after primary surgery in medically compromised patients. Thus, reliable preoperative indicators of extent of disease are necessary for considering primary surgery vs. neoadjuvant chemotherapy. We sought to determine whether CT findings could predict extent of disease or surgical complexity in patients with advanced OC.

Methods: Preoperative CT scans for patients diagnosed with advanced OC between 1997 and 2003 were retrospectively evaluated for the following rigorously defined findings: ascites; peritoneal thickening; involvement of large bowel, sigmoid colon, spleen, liver, omentum, diaphragm, and lymph nodes. These were compared to the findings at exploration and the surgical procedures performed. Fisher’s Exact test was used to assess correlations.

Results: 46 cases met inclusion criteria. Mean age was 66.4 y, mean OR time was 228 min. and 65% had residual disease (RD) 1cm or less. CT findings correlated with positive surgical findings (sensitivity/specificity) as follows: diaphragm disease (48.4%/100%); parenchymal liver (100%/93.3%); omental cake (72.4%/64.7%); sigmoid colon (53.9%/100%); ascites (44.4%/100%); large bowel (28.6%/90.9%). When both diaphragm disease and omental cake were present, this predicted HTD (specificity=100%, sensitivity=40%). Additionally, there was strong correlation between CT findings and the corresponding surgical procedures necessary to remove disease: large bowel resection (p=0.079), liver resection (0.087).

Conclusion: The findings of diaphragm disease and omental cake on CT scan are highly specific for high tumor dissemination (HTD) at surgical exploration. In addition, multiple CT findings correlate strongly with the need for corresponding high-risk surgical procedures which can be helpful in predicting surgical complexity. This pilot data suggests CT scan may be very useful in preoperative risk-prediction of primary surgical cytoreduction.
**Poster # 4**

**PERFORMANCE OF HPV TESTING AND CYTOLOGY FOR CERVICAL CANCER SCREENING IN HIV POSITIVE WOMEN IN SENEGAL**

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**Objective:** To examine the performance of stand-alone and combined screening tools for the identification of cervical intraepithelial neoplasia grades 2 or 3, carcinoma in-situ, or invasive cervical cancer (CIN2+) in HIV positive women in Senegal.

**Methods:** Since 1997, we have collected cervical cancer screening data on 3,922 women presenting to Fann University, Dantec Oncology Clinic, and Pikine Clinic in Dakar, Senegal, including 378 women who tested positive for HIV-1 or HIV-2. High risk HPV PCR testing (types 16, 18, 26, 31, 33, 35, 39, 45, 51, 52, 53, 56, 57, 58, 59, 62, 64, 66, 71, 73, 81, 83, 84, and is39) was completed on all patients, as well as cervical cytologic evaluation. Cervical biopsy was completed on 229 of the HIV-positive women. The results of the testing in those who underwent biopsy was then used to extrapolate biopsy results for the 149 HIV-positive women who did not undergo tissue analysis. Sensitivity, specificity, as well as positive and negative predictive values were then calculated for high risk HPV testing and cytologic evaluation as stand-alone tests, as well as in combination.

**Results:** Among the HIV-positive patients, 73.0% were infected with HIV-1, 18.3% were infected with HIV-2, and 8.7% were infected with both virus types. The mean patient age was 23.2 years at the time of first intercourse and 40.6 years at the time of study enrollment. The mean number of lifetime sexual partners was 1.6, the mean number of pregnancies was 4.9, and only 4.5% of patients were smokers. High risk HPV testing was positive in 73.0% of patients, and cytology was abnormal (showed atypical cells of unknown significance or worse) in 49.7% of patients. Of the 229 patients who underwent biopsy, 24.9% had a tissue diagnosis of CIN2+. After extrapolation of biopsy results to the 149 patients without biopsy, sensitivity of high risk HPV testing alone for detecting CIN2+ was estimated to be 86.5% overall, with a specificity of 31.8%, a positive predictive value (PPV) of 22.6%, and a negative predictive value (NPV) of 91.1%. A single cytologic evaluation had a sensitivity of 73.6%, a specificity of 66.0%, a PPV of 34.1% and NPV of 91.4%. When both tools were combined together as a single screening test, this had a sensitivity of 92.6%, a specificity of 25.7%, a PPV of 22.2% and NPV of 93.8%. This could be compared to triaging with high risk HPV testing, then performing cytology on those who tested positive, which would yield a sensitivity of 66.8%, a specificity of 72.5%, a PPV of 35.5%, and NPV of 90.4%.

**Conclusion:** At this time, the ideal cervical cancer screening method for HIV-positive women in low-resource settings has yet to be determined. Our data suggests that although prevalence of high risk HPV is high in this population, the combination of a single HPV/cytologic evaluation is quite sensitive for CIN2+ disease. Triage using high risk HPV testing, followed by cytology in those who are positive, may also be a promising alternative.
Poster # 5

CERVICAL ADENOCARCINOMA IN THE ELDERLY

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Objective: The increasing prevalence and incidence of cervical adenocarcinoma is unexplained, but may be related to its association with HPV 18. As compared to younger patients, elderly patients with cervical cancer are more likely to present with advanced stage disease and receive less aggressive modalities of treatment, but little is known specifically about those with adenocarcinoma. This analysis will examine the stage distribution and treatment of elderly patients with adenocarcinoma.

Methods: A retrospective chart review was performed of patients with adenocarcinoma of the cervix treated at our institution between 1990 and 2009. Demographic, pathologic, and survival data were abstracted from the medical record and Social Security death index. The cohort was divided into two age groups, defined as age greater than or less than 65 years. Chi-square, Fisher’s exact test, and the Cochran-Armitage trend test were used to measure the association between stage and age, surgicopathologic variables and age, and treatment and age.

Results: We identified 234 women with invasive adenocarcinoma of the cervix. Median age of diagnosis was 42 (range 20-86) years. The most common stage at presentation was IB1 (63%), and only 22% presented with stage II-IV disease. The majority were younger than 65 years (n=210/234). When stratified by age group, older women (n=10/23) were more likely than younger women (n=23/200) to present with stage II-IV disease (43% versus 11%; RR=3.78, CI=2.07-6.92, p<0.0001). There was no statistically significant difference between grade or lymphovascular space invasion between age groups. Of women eligible for surgical management, defined as stage IB2 or less, elderly women were more likely to receive radiation instead of surgery in comparison to younger women (38% versus 6%, RR 6.19, CI 2.53-15.14, p<0.0001).

Conclusion: Similar to previously described populations of elderly patients with cervical cancer, we found that elderly women with adenocarcinoma were more likely to present with advanced disease. Additionally, when presenting at an operable stage, elderly women were less likely to receive surgical management as compared to women less than 65 years.
Poster # 6

PAPER OR BANDWIDTH: HOW DO PHYSICIANS CONTINUE LEARNING?

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Objective: While much attention is currently placed on medical education of medical students and trainees, surprisingly sparse attention is devoted to educating physicians who have completed formal training. This study seeks to systematically characterize the information-seeking behavior among physicians in practice who are no longer in a formal training program.

Methods: A cross-sectional study was administered electronically and by mail to all the members of the Society of Gynecologic Oncologists in December 2010. Information regarding demographic data, educational background, modalities of self-education (e.g., internet usage, information-seeking practices and surgical skills, and conference attendance), and clinical practice patterns was collected and analyzed. Educational learning modalities and resource utilization were evaluated.

Results: Of the 346 members who responded (26.6%), 133 (38%) responded electronically, 192 (55%) were male, 214 (62%) were board-certified gynecologic oncologists, 258 (75%) were attending physicians, and 284 (83%) worked within an academic practice. The median age of respondents was 43 years old with 26% of respondents being older than 55 years and the median time since completing all formal training was 13 years, while 26% of respondents reported having completed training more than 20 years ago. For answers to medical queries, 31% of respondents used commercial internet sources daily. Forty-two percent utilized on-line peer-reviewed journals at least a few times a week compared to 29% who utilized print/paper peer-reviewed journals with the same frequency. In contrast, 10% of respondents utilized on-line textbooks at least a few times a week compared to 18% who utilized print textbooks with the same frequency. Compared to subjects who answered by mail, those who responded via electronically were more likely to own a smart phone or personal digital assistant (PDA) (94% vs. 78%, p<0.001). Compared to men, women tended to be younger (≤45 years old, 77% vs. 37%, p<0.001), report spending ≥15h/week on the internet (54% vs. 40%, p=0.008), use the internet at least a few times weekly to answer medicine-related questions (50% vs. 30%, p<0.010), read electronic textbooks at least few times weekly (13% vs. 7%, p=0.045), and read electronic peer-reviewed journals at least few times weekly (50% vs. 36%, p=0.010). Compared to subjects who are in subspecialty training, those who completed all training ≥20 years ago were less likely to own a smart phone/PDA (69% vs. 91%, p<0.001), spend ≥15h/week on the internet (37% vs. 64%, p<0.001), highly rate the importance of the internet to answer medicine-related questions (56% vs. 88%, p<0.001), use electronic medical records (77% vs 99%, p<0.001), and use internet tutorials to update the surgical skills (19% vs. 41%, p=0.004).

Conclusion: Among members of a medical subspecialty society, significant differences exist in information-seeking behavior and utilization of electronic resources for medicine-related questions as stratified by gender, age, and time from completion of formal medical training. These differences are critical in the design and effective implementation of medical information to encourage lifelong learning.
PREVALENCE OF THE METABOLIC SYNDROME IN NATIVE AMERICAN PATIENTS DIAGNOSED WITH ADENOCARCINOMA OF THE ENDOMETRIUM: A RETROSPECTIVE CASE REVIEW


Objective: The prevalence of obesity and metabolic derangements in the United States Native American population is higher than rates for all other races combined. At nearly 17%, Native Americans have the highest age-adjusted prevalence of diabetes among all racial and ethnic groups in the country. The high rates of obesity and metabolic derangements are known risk factors for endometrial cancer. This study evaluated the prevalence of obesity, diabetes, and hypertension in a Native American population and compared these rates to those in the general population of endometrial cancer patients.

Methods: The clinical records of endometrial cancer patients at the University of Oklahoma between 1995 and 2011 were reviewed. Clinicopathologic and patient characteristics including race, height, weight, medical history, operative management, and patient outcomes were recorded. Descriptive statistics, chi-squared analysis, student t-test, and Fischer’s exact testing were utilized for statistical analysis to examine the Native American cohort and compare it to the remaining population of endometrial cancer patients treated at the University of Oklahoma.

Results: Two-hundred and eighty-eight patients with complete records were included, 20 of whom were Native American. Cardio-vascular risk factors within the Native American population were high with diabetes in 47%, hypertension in 76% and elevated cholesterol in 18%. When compared to the remaining patients in the cohort, they had a significantly higher BMI with a median of 37 (p=0.001) and a trend towards a higher prevalence of DM (p=0.065) than non-native patients. There were no significant differences in disease characteristics, frequency of complete surgical staging, or disease recurrence between the groups.

Conclusion: A high percentage of Native American endometrial cancer patients are obese and diabetic compared to the general population and non-Native American endometrial cancer patients which puts them at high risk of complications related to metabolic syndrome such as cardiovascular disease. The majority of patients (78% in this cohort) will present with early stage disease and be cured of endometrial cancer; however, the high prevalence of obesity and medical co-morbidities within the Native American population places them at high risk of diabetic and cardiovascular morbidity and mortality.
OPERATIVE AND ANESTHESIA OUTCOMES IN ENDOMETRIAL CANCER STAGING VIA 3 MINIMALLY INVASIVE METHODS

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Objective: The purpose of this study was to compare operative and anesthesia outcomes in patients undergoing minimally invasive endometrial cancer staging, with lymphadenectomy performed via transperitoneal, extraperitoneal, or robotic-assisted methods.

Methods: Under an IRB-approved protocol, we performed a retrospective analysis of consecutive patients undergoing hysterectomy, bilateral salpingoophorectomy, and pelvic and para-aortic lymphadenectomy using minimally invasive methods from June 2008 to September 2010. Only patients undergoing both pelvic and para-aortic lymphadenectomy were included in the analysis. Patients were divided into 3 groups based on method of para-aortic lymphadenectomy performed: transperitoneal, extraperitoneal, and robotic-assisted. All pelvic lymphadenectomies were performed transperitoneally.

Results: We identified 66 patients (24 transperitoneal, 19 extraperitoneal, 23 robotic) who met inclusion criteria. Anesthesia time (p=0.002) and operative time (p=0.02) were significantly longer in the extraperitoneal group (Table 1). Estimated blood loss was similar between the groups. Patients undergoing robotics had a shorter hospital stay (p=0.001) and lower conversion rate to laparotomy (p<.001). Patients undergoing robotic lymphadenectomy had more pelvic nodes (p=0.04) and para-aortic nodes (p=0.04) removed compared to the transperitoneal method. There was no difference in number of para-aortic nodes removed in the robotic versus extraperitoneal methods. Maximum peak inflation pressures were higher in the robotic group (p=0.03) while peak end-tidal CO2 levels were higher in the extraperitoneal group (p=0.02). Patients in the extraperitoneal group received more intraoperative (p<.001) and PACU narcotics (p<.001), and had worse maximum PACU pain scores (p=0.01). There was no difference in major or minor intraoperative or postoperative complications between the groups.

Conclusion: Robotic lymphadenectomy is superior to other minimally invasive methods in most operative outcomes and equivalent to extraperitoneal lymphadenectomy in number of para-aortic nodes retrieved. With respect to anesthetic outcomes, extraperitoneal lymphadenectomy has the highest operative and post-operative narcotic requirements and highest end-tidal CO2 levels. Peak inflation pressures were highest in the robotic group, with no apparent adverse effect.
EVALUATION OF ARGON BEAM COAGULATION FOR THE TREATMENT OF VULVAR INTRAEPITHELIAL NEOPLASIA III.

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Objective: Argon beam coagulation (ABC) has unique properties which make it suitable for the local treatment of superficial epithelial disorders such as VIN III. To evaluate argon beam coagulation in treating VIN III.

Methods: Argon beam coagulation was used in twenty-nine patients. ABC was set at 80W, 7L/min. All patients were given 1% Silvadene cream to apply to vulva. Patients had follow-up appointments two weeks and six weeks postoperatively. Patients were followed every three to six months for the subsequent year.

Results: 2 of 29 (6.8%) experienced moderate pain within the first two weeks postoperatively requiring prescriptions for perocet. 2 of 29 (6.8%) had yeast infection requiring diflucan. Mean follow-up time was 34.9 months (11.7-37.4). 15 of 29 (51.7%) had no recurrence within the follow-up period. 14 of 29 (48.3%) recurred within the follow-up period. The mean time to recurrence is 23.2 months.

Conclusion: This small retrospective review is the first to evaluate argon beam coagulation in treating VIN III. This review indicates that ABC is comparable to other vulva organ conserving therapies. ABC retains cosmesis, form, and function of the vulva. This is a major advantage over surgery. Repeat treatments are also possible, which is important in a condition such as VIN, which tends to be multifocal and recurrent.
Poster # 10

ENDOMETRIAL CANCER RISK STRATIFICATION CRITERIA APPLIED IN A UNIQUE POPULATION

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**Objective:** Specific pathologic characteristics of endometrial cancer have been proposed to determine when lymphadenectomy should be performed. These factors include depth of invasion, grade, histology, and tumor size. Our aim was to examine the effect of adoption of these criteria on our population of endometrial cancer patients.

**Methods:** A retrospective chart review of endometrial cancer patients treated at our institution was performed. Surgicopathologic data was collected including operative findings and final pathology results. The number of subjects meeting low risk criteria based on a previously proposed model, the Mayo criteria, was calculated. These included patients with grade 1 or grade 2 endometrioid histology, depth of invasion less than 50%, and tumor size less than 2 cm. Chi-square and Fisher’s exact tests were used to measure the association between risk of nodal positivity and risk stratification group.

**Results:** Of 451 subjects identified with clinical stage I cancer, 166 patients (36.8%) met criteria for endometrioid histology, grade 1 or grade 2 disease, myometrial depth of invasion (DOI) less than 50%, and no suspicion of intraperitoneal disease at the time of surgery. Lymphadenectomy was performed in 97% (n=161/166) of these patients. Furthermore, tumor size was less than 2 cm in 43 subjects, representing 9.5% of all clinical stage I patients. Tumor size could not be measured (n=5) or was missing (n=7) in 12 subjects. Nodal positivity was low in subjects with DOI less than 50% and Grade 1 or 2 endometrioid histology with 6% (n=10/161) having positive nodes. When this population was stratified by tumor size, 7% (7/106) with tumor greater than 2 cm had positive nodes and 2% (n=1/43) with tumor less than 2 cm had positive nodes (RR 2.84, CI 0.36-22.39; p=0.294). Pathologic characteristics were examined among the 8 patients with positive nodes; LVSI positivity was present in 62% (n=5/8) and cervical stromal invasion was present in 12% (n=1/8).

**Conclusion:** The absolute risk of nodal positivity is low in clinical stage I endometrial cancer patients. Criteria to further stratify risk may help define a “minimal” risk group, but the absolute number of affected patients is reduced with each additional factor in the model. There appeared to be a trend towards decreased lymph node positivity in the cohort with small tumor size, but only 9.5% of subjects in our clinical stage I population met these criteria and would have been eligible for omission of lymphadenectomy.
WEIGHING THE EFFECT OF BMI IN ADVANCED OVARIAN CANCER SURVIVORS

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Objective: As obesity becomes increasingly prevalent, it threatens to overwhelm the progress made in cancer survivorship. The effect of obesity on long term survival in ovarian cancer is unknown. We undertook this preliminary study to understand the relationship between body mass index (BMI) and survival in ovarian cancer and to provide the groundwork on which to construct future investigations.

Methods: All patients in the hospital tumor registry after 1985 who had stage 3B, 3C or 4 ovarian cancer with a histologic grade of 2 or 3 and survival of 10 years or longer were eligible for inclusion as cases of long term survivors. Patients were excluded for missing or inaccessible data. These cases were matched by age, stage and grade to controls who survived 5 years or less. Height, weight and additional clinical characteristics such as family history, smoking history and co-morbid conditions were obtained from the hospital record. Means, medians and Fisher T tests were used for our analysis. An independent-samples t-test was conducted to compare means. All tests of statistical significance were two-tailed.

Results: There were 26 cases and 26 controls included in our analysis. Median age of long term survivors at diagnosis was 50 years (33-75). One case had stage 3B, 19 had stage 3C and 6 had stage 4 disease. All had epithelial tumors; half were serous tumors and 3 had grade 2 differentiation.

Long term and short term survivors were not statistically different in the following characteristics: smoking history, co-morbid conditions, use of neoadjuvant chemotherapy, optimal debulking, family history of relevant cancers, BRCA 1/2 carrier status, personal history of breast cancer and receipt of adjuvant platinum/taxane chemotherapy.

Median survival was 13 years (9.7-21.2) for the long term survivors and 2.5 years (0.08–4.9) for the short term survivors. All short term survivors died of malignancy. Mean BMI was 25.2 for long term survivors and 28.6 for controls (p=0.04). Furthermore, long term survivors were half as likely to be obese or overweight (BMI>25) compared to the control group (38% vs. 77%, OR 0.19, CI 0.06-0.6).

Conclusion: This preliminary and hypothesis generating dataset suggests that patients who are overweight or obese are half as likely to achieve long term survivorship compared to patients of normal weight. Further study should seek to confirm this relationship with a goal of improving our understanding of the association between excessive body weight and cancer survivorship.
Poster # 12

MULLERIAN INHIBITING SUBSTANCE (MIS) PATHWAY AS A THERAPEUTIC TARGET IN OVARIAN CANCER: DECIPHERING THE NECESSARY COMPONENTS

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Objective: Activation of mullerian inhibiting substance type II receptor (T2R) leads to dimerization with one of three candidate type I receptors (T1R) and growth inhibition of mullerian tissues. While T2R is commonly expressed in epithelial ovarian cancer (EOC), the prevalence of T1R is unknown; this data is vital because in vitro studies demonstrate that biologic response depends on which T1R is activated. Further, a critical obstacle to current in vitro work is the unexplained observation that the majority of immortal EOC cell lines have undetectable T2R activity. The aims of this research were to: (1) characterize the frequency of receptor expression in human EOC, (2) determine the influence of receptor combinations on clinical outcomes, and (3) investigate the mechanisms for loss of T2R in cell lines.

Methods: Tissue microarrays (TMA) were created from 311 consecutive patients with primary EOC. Expression of T1R (ALK2, ALK3, ALK6) and T2R was assessed with immunohistochemistry. Methylation-dependent T2R expression in nine EOC cell lines was quantified using real-time PCR. The Kaplan-Meier method and logrank test were used to explore the impact of receptor combinations on clinicopathologic variables and survival.

Results: The most common receptor combinations were: T2R-, Alk2,3,6 (7%); T2R-, ALK2,3 (16%); T2R+, ALK2,3 (31%); and T2R+, ALK2,3,6 (32%). The ALK6 protein was the least represented form of type I receptor. There was no difference among these receptor groups regarding survival (PFS p = 0.64; OS p = 0.89). T2R negative cases were more likely to be higher stage (p = 0.04) and less likely to be cytoreduced to no residual disease (p = 0.01). ALK6 expression was associated with worse survival in early stage disease. In vitro analysis demonstrated that T2R expression was methylation sensitive (3 to 19-fold increase after exposure to methylation inhibitor), with reversible methylation of CpG sites.

Conclusion: The downstream effect of therapy targeting the MIS pathway is dependent upon specific receptor pairing in EOC. We demonstrate for the first time that the majority of human EOC (63%) express the necessary candidate receptors for growth inhibition via the MIS pathway. We show that expression of specific receptors is associated with worse clinical outcomes. Further, DNA methylation has a role in silencing T2R expression in immortalized cell lines. These results will facilitate future in vitro and in vivo investigations.
TARGETING MIR-21 TO REVERSE PLATINUM RESISTANCE IN OVARIAN CANCER

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Objective: To investigate the role of miR-21 pathway in platinum resistance ovarian cancer.

Methods: A2780 and cisplatin-resistant A2780-cis ovarian cancer cell lines were used. Exiqon microRNA microarray was employed to identify differentially expressed microRNAs confirmed by qPCR. Hairpin inhibitors were used to knockdown miR-21. Western blot assayed were performed for protein expression. MTT assay was used to determine cell proliferation.

Results: A2780-cis cells were found to be 3.2 times more resistant than parental A2780 cells (IC50 5.74 vs. 1.80 μM; p=0.049). Microarray showed that miR-21, among others, was upregulated in the platinum-resistance cell line. qPCR confirmed that miR-21 was expressed at 2.4 times the baseline level in parental A2780. Transfection of miR-21 hairpin inhibitors enhanced the sensitivity of cancer cells by 1-fold. On western blot analysis, tumor suppressor Programmed Cell Death Protein 4 (PDCD4) was found to be a gene target of miR-21. The downstream target of miR-21 and PDCD4 is Inhibitor of Apoptosis (IAP) proteins including cIAP2.

Conclusion: Our data suggest that miR-2 is associated with the inhibition of Programmed Cell Death Protein 4 resulting in increased anti-apoptotic proteins. Targeting microRNAs may have promise in reversing platinum-resistance in ovarian cancer.
IMPACT OF BETA-BLOCKERS ON EPITHELIAL OVARIAN CANCER (EOC) SURVIVAL

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Objective: Chronic stress may promote ovarian cancer progression through autonomic nervous system mediators such as norepinephrine and epinephrine. Beta-blockers, commonly used to manage hypertension, block the production of these adrenergic hormones, and may prolong survival in breast and prostate cancers. We sought to determine the association between use of beta-blockers and EOC disease progression and survival.

Methods: After IRB approval, we performed a retrospective review of all patients with EOC treated between 1996 and 2006 at our institution. All patients underwent cytoreductive surgery followed by platinum-based chemotherapy. Women were considered beta-blocker users if these medications were documented on at least 2 records more than 6 months apart. Statistical tests included Fisher’s exact, Kaplan-Meier, and Cox regression analyses.

Results: 246 patients met criteria for inclusion. Sixty-eight patients were on anti-hypertensive medications, of which 23 (9% of the entire cohort) were on beta-blockers. Mean ages of hypertensive patients were the same for those on beta-blockers compared to those on other antihypertensive medications (67 years), but were statistically greater compared to non-hypertensive patients (58 years, p < 0.0001). We did not observe differences in the incidence of diabetes or coronary artery disease between the groups. In the entire cohort, 26 (11%) were suboptimally cytoreduced and beta-blocker use did not correlate with debulking status. Median progression-free survival for beta-blocker users was 27 months, compared to 17 months for non-users (p = 0.05). Similarly, overall disease-specific survival was longer for beta-blocker users (56 months) compared to non-users (48 months, p = 0.02; HR 0.56). Multivariate analysis identified beta-blocker use as an independent positive prognostic factor, after controlling for age, stage, grade, and cytoreduction status (p = 0.03). In a separate analysis, overall survival remained longer for patients using beta-blockers (56 months) when compared to hypertensive patients on other medications (34 months) and patients without hypertension (51 months, p = 0.007).

Conclusion: In this cohort of EOC patients, beta-blocker use reduced the chance of death by 56% compared to non-users. A potential suppressive impact of beta-blockers on tumor biology should be confirmed in larger prospective trials and correlative translational studies.
Objective: Preclinical investigation of experimental cancer therapies using cell culture or murine xenograft models are limited by expense and poor correlation with outcome. We sought to demonstrate that multiple difficult to perform experiments may be conducted simultaneously using an ex-vivo model. To demonstrate this, we selected an experiment that in humans would be expensive to conduct but where preclinical data supports a correlation (correlation of homeoprotein Six1 expression and Tumor Necrosis Factor-Related Apoptosis-Inducing Ligand (TRAIL) sensitivity in ovarian cancers), and an experiment that would be ethnically difficult to conduct (estrogen treatment of potentially estrogen receptor positive ovarian cancers).

Methods: De-identified tissue samples were obtained at surgery using our IRB-approved protocol and processed using the Krumdieck tissue dissector in an ex-vivo system. Sections of tumor were cut to 300 μm in thickness and covered with complete RPMI1640 media or steroid deprived media depending on the study arm. After 24 hours, media was changed to control (media + vehicle) or treated with one of two treatments. Specimens were treated in triplicate with TRAIL at 50 ng/ml or 10-8M 17β estradiol ± 10-6M 4-OH tamoxifen. SIX1 expression was measured by immunohistochemistry (scored as percent cells positive multiplied by intensity ranging from 1 (slight) to 3 (intense), range 0-300) and was correlated with TRAIL response by the MTS assay on day 3. Estrogen receptor expression was measured by immunohistochemistry scoring as above and was compared to proliferation in response to estrogen ± tamoxifen by measurement of percent Ki67 on formalin fixed paraffin embedded sections of the ex-vivo slices.

Results: Tumors from the omental metastases or peritoneal metastases of eleven patients were included. Histology included serous (n=6), endometrioid (n=3) and carcinosarcoma (n=2). For the TRAIL arm, 73% (8/11) were TRAIL resistant by MTS assay. Six1 homeoprotein was detected (score > 0) in 82% (9/11) of samples. As expected, the Six1 immunohistochemistry score was significantly associated with TRAIL resistance (p=.048). Specifically, the three samples that were TRAIL sensitive by MTS assay had Six1 IHC scores of 0, 0 and 15 whereas the median Six1 IHC score of the TRAIL resistant samples was 78 (range 5-210). All of the samples tested (n=8) responded to estrogen with increased Ki67, regardless of estrogen receptor status.

Conclusion: The ex-vivo tissue slice model allows preclinical investigation on fresh human epithelial ovarian cancer tumor specimens as an intermediate step between in-vitro and murine/primate studies and when the preclinical studies may be prohibitively expensive or when clinical studies may not be ethically possible. Additional studies planned include expansion of the estrogen/tamoxifen study as well as further study of novel agents.
DKK3 AS A POTENTIAL TUMOR SUPPRESSOR IN ENDOMETRIAL CANCER CELLS IN VITRO AND IN a MOUSE MODEL

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Objective: To determine the functional significance of the Wnt inhibitor Dickkopf-3 (Dkk3) in the tumorigenesis of endometrial cancer.

Methods: We stably transfected Dkk3 in the endometrial cancer cell line ECC-1, and monitored cellular proliferation, Wnt throughput activity, and metastatic behavior, as compared to empty vector; additionally, the effect of Dkk3 overexpression on tumor growth was assessed in a Xenograft mouse model. Wnt throughput activity was measured via a dual-luciferase assay using a β-catenin-responsive luciferase vector to measure induction of β-catenin/Wnt signaling in ECC1 cells. Cellular proliferation was measured via MTT assays. Anchorage-independent growth and invasiveness were assessed via colony formation assays and matrigel invasion assays, respectively. 4 week-old NCR-nu/nu mice were injected subcutaneously with ECC1-Dkk3 and ECC1-pCMV cells, and growth curves were plotted from the mean tumor volume ± SE from 10 animals in each group. Tumors were harvested and histologically evaluated via H&E slides.

Results: Wnt throughput activity was reduced in Dkk3-transfected cells (p=0.04), confirming Dkk3 as a negative regulator of the β-catenin/Wnt signaling pathway in endometrial cancer. Proliferation, invasiveness and anchorage-independent growth were all suppressed upon overexpression of Dkk3 (p<0.0001, p=0.02, and p=0.005, respectively). In the xenograft mouse model, Dkk3 overexpression did not reduce tumor volume, but led to increased lymphoid infiltration and necrosis in tumors, which may be a result of suppressed proliferation.

Conclusion: Dkk3 overexpression in vitro leads to reduced proliferation and inhibition of anchorage-dependent growth in endometrial cancer cells, but does not appear to reduce invasiveness in xenograft mouse models, though proliferation appears to be suppressed. These findings support a role for Wnt signaling in endometrial cancer, and suggest a potential role for Dkk3 as a tumor suppressor. The present findings may prove to be important in the design of biomarkers and treatment modalities for metastatic endometrial cancer.
Objective: Patients with recurrent or persistent cervical cancer are treated with palliative intent. The median length of survival after second line chemotherapy in this setting is 5 months. The effect of further chemotherapy on the natural history of cervical cancer is debatable. We describe the response rate, toxicity, progression-free survival (PFS) and overall survival (OS) in patients at our institution who received 3rd line chemotherapy for recurrent or persistent cervical cancer.

Methods: A chart review of patients at a single institution who, between January 1, 1995, and January 1, 2010, were diagnosed with recurrent or persistent cervical cancer and who received at least three unique salvage regimens was performed. Response rates were measured using RECIST criteria. Toxicities were graded using the CTCAEv4.0. PFS and OS were calculated using Kaplan Meier curves.

Results: Seventeen of 758 patients in the cervical cancer database met inclusion criteria. The median age was 43 (range 29-84). The median performance status was 0 (range 0-1). Third line salvage regimens included vinorelbine (7 patients), paclitaxel (6), etoposide (1), cisplatin/topotecan (1), pemetrexed (1) and erlotinib (1). The median number of cycles was four (range 1-11). One patient had a complete response (vinorelbine) and one had a partial response (paclitaxel) for an overall response rate of 12%. An additional patient had stable disease (for 8.9 mo., therapy ongoing) for an overall clinical benefit of 18%. Common toxicities were anemia (82%, including 24% grade 3/4) and infection (35%, including 18% grade 3/4). From the initiation of the 3rd line agent, median PFS was 3.2 months (1.4-7 months), and median OS was 7.4 months (1.7-34.7 months). Median follow-up from time of third line treatment was 7 months (range 2-34). Six patients (35%) went on to receive fourth line chemotherapy. No patients died of chemotoxicity. Sixteen patients (94%) are dead of disease.

Conclusion: Cervical cancer patients who are candidates for third line chemotherapy have modest response to cytotoxic therapy with significant toxicity. Compared to historical data, further treatment has minimal impact on overall survival. Quality of life and investigative clinical trials should be considered in this group of patients.
Poster # 18

ENDOMETRIAL CANCER AFTER ENDOMETRIAL ABLATION: SYSTEMATIC REVIEW OF THE MEDICAL LITERATURE

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Objective: The impact of endometrial ablation (EA) on the occurrence and diagnosis of endometrial cancer (EC) is unknown and inadequately explored in the literature. The objective of this study was to identify and review all ECs after EA described in the literature to date.

Methods: A systematic search of MEDLINE, EMBASE, the Cochrane Library, WoS, and SCOPUS from database inception to February 2010 was performed. All publications referring to endometrial ablation and endometrial cancer were searched. Exclusion criteria included a diagnosis of EC made before or at EA and non–English-language publications. Agreement in study selection was evaluated using k statistics.

Results: Seventeen studies out of 234 fulfilled our inclusion criteria. Mean (SD) k agreement was 0.94 (0.04). Twenty two ECs after EA were identified. EA methods were transcervical endometrial resection (n=10), rollerball EA (n=6), coagulation resectoscopy (n=2), thermal balloon EA (n=1), radiofrequency EA (n=1), and not described (n=2). Of the 22 cases, 17 had sufficient clinical information to be evaluated. Mean age (SD; 95% CI) at EC diagnosis was 55.4 (9.9; 49.7- 59.1) yrs. Eleven patients (64.7%) were obese by description, and mean BMI was 38.9 kg/ cm² in the 8 cases where BMI was described. In 10 patients (58.8%), EA was performed in the setting of postmenopausal bleeding or atypical complex endometrial hyperplasia. Fourteen patients (82.4%) had at least 1 risk factor for endometrial cancer including hypertension, diabetes, or obesity. In 13 patients (76.5%), the primary symptom after EA was irregular vaginal bleeding, and 1 patient presented with pelvic pain at 33 months after EA. One patient was asymptomatic at presentation, and EC was incidentally diagnosed during surgery for urinary incontinence. EC was diagnosed at stage I in 13 patients (76.5%). Single ECs of stage II, III, and IV were reported. In one case, the patient was treated palliatively, and EC stage was unknown. Two patients had EC at the time of EA; diagnosis was not confirmed until 2 weeks and 2 months after EA respectively. Excluding these 2 cases, the interval from EA to diagnosis of ranged from 6 months to 10 years. All 4 ECs that occurred within 12 months of EA demonstrated complex atypical or adenomatous hyperplasia at preablation assessment. Only in 2 cases (11.8%) was a preoperative diagnosis with hysteroscopy or endometrial biopsy not successful at presentation due to cervical stenosis and intrauterine adhesions, respectively.

Conclusion: Occurrence of EC after EA is low, yet it continues to be difficult to quantify through retrospective analyses. The diagnosis of EC after EA does not appear to be delayed, as the majority of ECs described after EA are early- stage, which is consistent with the general presentation of EC. EC may occur at variable intervals after EA, and investigations based on patient symptoms have been feasible. Only 3 of the 17 patients described in the literature did not have any risk factors for EC. EA should be restricted to premenopausal patients who do not have risk factors for EC, and who have normal endometrial histopathologic features at preablation evaluation. Rigorous patient selection prior to EA cannot be overemphasized.
Poster # 19

THE RELATIONSHIP BETWEEN VASCULARITY, P53 GENE MUTATIONS AND DISTANT METASTATIC DISEASE IN EPITHELIAL OVARIAN CARCINOMA.

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Objective: Angiogenesis is a critical component in the development of metastatic disease in patients with epithelial ovarian carcinoma. Mutations of the p53 gene are frequent in epithelial ovarian cancer and have been associated with an increase in angiogenesis. We hypothesize changes in tumor vascularity are associated with mutations in the p53 gene in patients with metastatic epithelial ovarian carcinoma.

Methods: Searching our divisional database, we identified patients diagnosed with stage IIIC or IV epithelial ovarian carcinoma who had undergone primary surgery and had tissue available for analysis from both primary and metastatic disease sites. Microscopic slides were cut from paraffin-embedded tissue and stained for the vascular endothelial marker CD31. Microvessel density (MVD) counts were determined by averaging three high power fields within the tumor section with the greatest concentration of tumor and were expressed as vessels/high power field (HPF). The average MVD counts for metastatic sites were determined under microscopic examination and compared to MVD counts from primary ovarian cancer sites. Clinical and pathologic factors included in the analysis were histology, grade, and p53 mutational status. Absolute differences in MVD counts between primary and distant tissue sites of > 7 vessels/HPF or ≤ 7 vessels/HPF dichotomized the tumors into two groups. Results were analyzed by chi-square testing.

Results: A total of 46 patients with primary epithelial ovarian cancer were included in our analysis. Serous histology was associated with absolute differences (>7 vessels/HPF) between MVD counts in primary vs. metastatic tumor sites (p=0.07), as was an identified p53 mutation (p=0.03). There was no association between absolute differences in MVD counts and grade (p=0.30) or stage (p=0.98). In our limited cohort there was no difference in survival between those with absolute MVD >7 vessels/HPF vs. ≤ 7 vessels/HPF. In multivariate analysis, histology and positive p53 mutation continued to be significant.

Conclusion: Mutations of the p53 tumor suppressor gene are associated with large differences (>7 vessels/HPF) in MVD counts between primary and metastatic tumor sites in patients with epithelial ovarian cancer. These data are consistent with models demonstrating p53 mutation functions directly to influence angiogenesis. This information supports continued therapy and research involving angiogenesis inhibitors in patients with ovarian cancer, especially in the setting of increased differences in MVD between primary and metastatic sites.
LYMPHATIC COMPLICATIONS ASSOCIATED WITH EXTRAPERITONEAL LYMPHADENECTOMY FOR CERVICAL CANCER

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Objective: Compromise of the lymphatic drainage system is a common, but underreported complication of pelvic lymphadenectomy for cervical cancer. Prior retrospective studies have reported an incidence between 3 and 20%, relying mostly on physical exam findings. We sought to determine the rate of lymphocyst formation using more objective criteria.

Methods: A blinded, retrospective analysis of radiotherapy planning simulations was performed to identify the incidence of radiologically detectable lymphatic abnormalities following extraperitoneal lymphadenectomy for advanced cervical cancer between December 2002 and March 2006. These findings were correlated with patient records regarding the development of clinically significant lymphatic complications and the requirement for therapeutic intervention.

Results: Twenty-six patients were evaluated using the identical protocol/scanner and subsequently were treated with radiation therapy during the study period. Twelve patients (46%) developed lymphocysts diagnosed on imaging, and 10 (38%) developed lymphedema and had clinical symptoms. Intervention such as drainage or sclerotherapy was required in 11 (42%) of patients.

Conclusion: Extraperitoneal lymphadenectomy is associated with a higher risk of lymphocyst formation requiring subsequent intervention than has previously been reported. Future studies comparing the rate of complications between extraperitoneal and the laparoscopic transperitoneal approach should be considered.
Poster # 21

TREATMENT OF STAGE IB1 CERVIX CANCER: COMPARISON OF RADICAL HISTERECTOMY AND RADIATION

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Objective: Radical hysterectomy and radiotherapy have long been mainstays of treatment for early stage cervical cancer and their equivalency established over decades of research. Two recently published studies using SEER data concluded that surgical management is superior to radiotherapy. We sought to review similar data in a retrospective, single-institution format. Our aim was to compare the recurrence rates, complications, and survival of women with stage IB1 cervical cancer treated by primary radical hysterectomy versus radiation.

Methods: Inpatient and outpatient records for all women treated for Stage IB1 cervical cancer between 1/1/1990 and 6/1/2010 were reviewed. Recurrence rates, disease-specific survival, and overall survival were examined and compared using the long-rank test. Demographic, clinical, and histopathological factors were analyzed and compared using Wilcoxon rank-sum tests and Fisher’s exact tests. Kaplan Meier curves were generated.

Results: Of 198 patients with stage IB1 cervix cancer, 169 (85%) underwent radical hysterectomy and 29 (15%) were treated primarily with radiotherapy +/- chemotherapy. Progression-free survival, overall survival, and disease-specific survival were all significantly longer in the surgery group (89%, 95%, and 96%) versus the radiation group (70%, 70%, and 78%), respectively (p<0.001). Patients in the radiation group were older (median age 47 years vs 39 years, p=0.0007), had larger tumors (mean 3.0cm vs 1.5cm, p=0.002), and were more likely to have diabetes mellitus (12.5% vs 0.6%, p=0.007) and be immunosuppressed (17.4% vs 2.4%, p=0.008) than patients in the surgery group. Within the surgical cohort, lymphvascular space invasion, outer third cervical stromal invasion, positive surgical margins, and lymph node metastasis were all significantly predictive of recurrence (p<0.002), while histopathology, smoking, diabetes, and immunosuppression were not. Complication rates were significantly higher among the 29 patients who had primary radiotherapy (27.6%) and the 37 patients who had surgery followed by radiotherapy (21.6%) compared to the 132 patients who had surgery only (9.1%) (p=0.047).

Conclusion: At our institution, primary treatment of stage IB1 cervix cancer with radical hysterectomy resulted in a significantly lower rate of recurrence and an improved survival with fewer complications compared with radiotherapy with or without chemotherapy. Because the treatment groups differed significantly by age, tumor size and co-morbid conditions, survival differences may be related in part to patient selection bias.
THE ASSOCIATION OF VEGF A, B, AND C EXPRESSION IN THE SURVIVAL OF SEROUS OVARIAN CANCER PATIENTS

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Objective: To determine the significance of VEGF expression on the survival of serous epithelial ovarian cancer patients.

Methods: VEGF expression were determined by lowess normalization and log2 transformation to give expression values, as performed by University of North Carolina, Chapel Hill on the Agilent platform. Demographic, clinico-pathologic, and outcomes data were obtained from The Cancer Genome Atlas (TCGA).

Results: Of 483 specimens diagnosed with serous ovarian cancer with matched genomic expression data, the median age was 59 years. 92%, 5%, and 3% consisted of Whites, Black, and Asian. Stage I, II, III, and IV disease were found in 3%, 5%, 77%, and 15% of patients. The majority (86%) had grade 3 tumors, 13% had grade 2 and 1% had grade 1 disease. Of patients who underwent primary surgery, 73% were optimally debulked (<1cm residual disease). The median follow-up time was 30 months (range: 0-180), and the five-year overall survival (OS) was 33% with median survival of 45 months.

Patients with high expression of VEGFC had worse OS than those with low VEGFC (median 48 months vs. 43 months, 5-year OS 40% vs. 27%, respectively; p=0.026). VEGFA and VEGFB were not significantly associated with prognosis. Earlier stage (p=0.003) and white race (p=0.028) were associated with better survival. On multivariate analyses, race (HR=1.23; 95%CI: 1.05-1.44; p=0.009) and stage (HR=1.46; 95%CI: 1.13-1.89; p=0.003) remained as important prognosticators.

Conclusion: The expression of VEGF as a prognostic biomarker for ovarian cancer survival warrants further investigation.
Poster # 23

WHAT IS THE ACCURACY OF INTRA-OPERATIVE FROZEN SECTION WHEN COMPARED WITH PERMANENT SECTION IN THE DIAGNOSIS OF EARLY-STAGE ENDOMETRIAL CANCER?

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Objective: To determine the accuracy of grade and depth in intra-operative frozen section as compared to permanent pathology for early stage endometrial cancer.

Methods: A retrospective case series of women who had frozen section at the time of their endometrial cancer hysterectomy was performed. All hysterectomies from January 2010 to December 2010 were identified using the Pathology database. Early grade (FIGO grade 1 or 2) endometrial cancer cases were identified from the frozen pathology diagnosis. Intra-operative frozen sections of the uterus were compared with the final pathology for FIGO grade and depth of invasion. Chi-squared analysis for categorical variables and t-tests for continuously measured variables were used for statistical analysis.

Results: A total of 546 frozen sections at the time of hysterectomy were reviewed. A total of 117 FIGO grade 1 and 2 cases were identified. The mean age of the sample population was 60.15 years, and the mean BMI was 31.92. 22 of 117 cases (18.83%) were discordant for grade and 5 of 117 (4.27%) were discordant for depth of invasion. At the time of frozen section, 104 /117 (88.89%) cases were identified at FIGO grade 1. Of the intra-operative FIGO Grade 1 predictions, 12 of 104 (10.52%) were FIGO grade 2 at final pathology, and 7 of 104 (6.73%) were FIGO grade 3 at final pathology. There were 13/117 FIGO grade 2 cases identified at the time of frozen section (11.11%). Of these cases, 1 of 13 (7.69%) was found to be FIGO grade 1 at final pathology and 2 of 13 (15.38%) were FIGO grade 3 at final pathology. There were a total of 5 (4.27%) cases with discordant depth. 4 cases of discordant depth were read as <50% invasion at time of frozen section and were >50% invasion on final pathology and 1 case was diagnosed as >50% at time of frozen section and was <50% invasion on final pathology.

Conclusion: Intra operative frozen sections are useful to assess the need for further surgical staging in early endometrial cancer. In this series, potentially 11% of cases could have been “under-staged”. However, in clinical practice this percentage is reduced by cases where lymph node dissection would be omitted due to medical co-morbidities.
Objective: Smooth muscle tumors are the most frequent mesenchymal tumors of the uterus, the majority of which are readily classifiable as benign or malignant. However, when unusual features are seen in some leiomyoma (fibroid) variants, the differential diagnosis with a leiomyosarcoma may become challenging. Moreover, diagnostic criteria for the different subtypes of leiomyosarcoma are not uniform. Correct diagnosis has important prognostic and therapeutic implications. We examined the transcriptomes of normal myometrium, benign uterine fibroids and uterine leiomyosarcoma in search of a molecular signature that would aid in differentiating between benign and malignant lesions of the myometrium.

Methods: We collected, with IRB approval, normal myometrium and fibroid tissue from 3 patients undergoing hysterectomies for symptomatic uterine leiomyoma. Leiomyosarcomas were obtained from 3 patients undergoing primary or secondary surgery. RNA was isolated and purified according to QIAGEN protocol. Samples were hybridized to Affimetrix Human Gene 1.0 ST microarray platforms. Data were normalized and quality control and statistical analysis performed using Genespring 10 protocols.

Results: We identified statistically significant differences in mRNA levels of 777 genes relative to normal myometrium. We focused on those genes that exhibited differential expression between benign and malignant tumors, namely 242 genes were down-regulated in fibroids and simultaneously up-regulated in sarcomas compared to normal myometrium and conversely, 49 genes were up-regulated in fibroids and down-regulated in sarcomas. Further review of those genes identified 60 that have been previously implicated in processes relevant to carcinogenesis. Examples include genes involved in cell cycle regulation (CDC20, cyclin B1, cyclin B2, CDC7, cyclin A2, CDK-1 and CDK-2), antiapoptotic genes (CHI3L1, MLLT11, MELK), proproliferative (PLK1, EZH2, STIL), genes involved in resistance to chemotherapeutic agents (CHI3L1, TOP2A, RPN2), genes involved in angiogenesis, migration and metastasis. Expression profiles were generally consistent with the benign versus malignant, invasive phenotypes of leiomyoma and leiomyosarcoma, respectively. We propose that these distinctive and characteristic changes in myometrial gene expression will permit development of a diagnostic transcriptional profile to facilitate identification and treatment of early stage uterine leiomyosarcoma.

Conclusion: The oncogenic mechanisms underlying the development of malignant mesenchymal uterine tumors remain elusive. Our gene expression profiling of normal myometrium, benign fibroids and malignant sarcomas has identified a potential molecular signature that will help differentiate between uterine fibroids and sarcomas. It has been demonstrated in prior studies that gene expression profiles can be used to classify different types of tumors and improve on the histology-based classification method. Pathway analysis of the gene expression profiles of sarcomas may provide insight into their etiology and pathophysiology, thereby yielding clues about oncogenic pathways underlying the development and progression these tumors and identifying novel potential therapeutic targets.
Poster # 25

PREDICTIVE VALUE OF CARCINOEMBRYONIC ANTIGEN AND CANCER ANTIGEN 125 IN IDENTIFYING MUCINOUS OVARIAN TUMORS

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Objective: Mucinous ovarian neoplasms are uncommon. The usual CA125 marker may not be elevated in these tumors. We sought to determine if preoperative CEA and CA125 can predict borderline and malignant mucinous ovarian tumors and potentially be used as treatment response markers.

Methods: A retrospective chart review of all patients operated on at a single institution from January 1, 1998 through August 30, 2010 with a diagnosis of a primary ovarian mucinous tumor was performed. Medical records were reviewed to obtain pathologic and laboratory data.

Results: 72 patients were identified as having primary mucinous ovarian tumors. 26 patients (36%) had benign pathology while 46 patients (64%) had non-benign tumors, either borderline or malignant neoplasm. 63 patients (88%) had at least one preoperative tumor marker drawn, most commonly a CA125. Of malignancies, there were 13 stage I, 3 stage III and 1 stage IV cases.

Using the CA125 as an isolated marker (N=63), an abnormal result correctly indentified 14 of 39 non-benign tumors (sensitivity 36%) while a normal result identified 19 of 24 benign masses (specificity 79%). Similarly, an isolated CEA (N=22) correctly identified 8 of 18 non-benign cases (sensitivity 44%) and 4 of 4 benign cases (specificity 100%).

Considering only malignant pathology (not borderline tumors), the CA125 identified 4 of 12 cancers (sensitivity 33%), and the CEA correctly predicted 4 of 7 malignancies (sensitivity 57%). The sensitivity of CEA increased with advancing stage: 20% for stage I/II disease vs. 100% for stage III/IV. The sensitivity of CA125 was constant across all stages.

When both markers were drawn (N=20), an abnormality in at least one correctly predicted non-benign pathology in 9 of 16 cases (sensitivity 56%) while identifying 3 of 4 benign cases correctly (specificity 75%).

Fisher’s Exact Test was used to compare the ability of CEA to predict non-benign pathology vs. that of CA125, resulting in a p value of 0.189. The same comparison of the dual markers vs. CA125 yielded a p value of 0.092.

Conclusion: For patients with mucinous ovarian tumors, no single tumor marker is sensitive for identifying borderline or malignant pathology. Sensitivity, but not specificity, is improved by the addition of CEA to CA125, however the differences between them are not statistically significant. Small sample size limited the evaluation, however the data suggests that using both CEA and CA125 routinely could enhance the detection rate in this type of tumor.
Objective: To determine the effect of disruption of social/healthcare services in an urban setting caused by a catastrophic natural disaster in 8/2005 on the demographics of women with cervical cancer and the stage at diagnosis. Also, to evaluate changes in pap smear utilization by subjects diagnosed with cervical cancer over that period.

Methods: 366 women with cervical cancer diagnosed between 2000-2010 in a major urban center were identified through Tumor Registry records. The data was reviewed and analyzed.

Results: From 2000-5, 226 women were diagnosed with cervical cancer and the following distribution by stage: I-101, II-60, III-37, IV-28. From 2006-10, 140 women were diagnosed, with the following distribution: I-40, II-36, III-32, IV-32. (p<0.01) The mean time from last pap smear to diagnosis in 2000-5 was 4.2 years, vs. 7.7 years from 2006-10. (p<0.01) Mean age for the 2000-2005 group: 48.3 years, vs. 51.1 years for 2006-2010. (p<0.001) Ethnicity: 2000-5 –Black-176(78%); white-33(15%); Hispanic-11(5%); Asian-6(2.6%). 2006-10:Black-77(55%); White-29(20.7%); Hispanic-30(21.4%); Asian-4(2.8%)

Conclusion: Following a catastrophic natural disaster, women diagnosed with cervical cancer in this center had higher stage disease at diagnosis, were older, and included fewer black, but more white and hispanic women. This likely reflects the population changes in the city and may also be a result of decreased utilization of cervical cancer screening services. These long-term effects should be recognized and addressed as part of disaster planning.
Objective: To determine if Flavokawain B (FKB), a novel kava chalcone, exhibited anti-tumor efficacy in the treatment of uterine leiomyosarcoma and endometrioid adenocarcinoma cell lines.

Methods: Uterine leiomyosarcoma (SK-LMS-1) and endometrial adenocarcinoma (ECC-1) cell lines were cultured in RPMI 1640 and MEM Alpha medium with 10% FBS (fetal bovine serum). Cell lines were grown and treated with 8.8, 4.4, 2.2, and 1.1 µM of FKB. The IC50 was determined for each cell line using MTT assays. Fluorescence-activated cell sorting (FACS) analysis of apoptosis and cell cycle were performed. Real-time reverse transcription-polymerase chain reaction (RT-PCR) and Western blot analysis were performed to evaluate differences in the expression of apoptotic markers in treated and non-treated cell lines.

Results: SK-LMS-1 and ECC-1 were sensitive to FKB treatment. FKB treatment significantly increased both early and late apoptosis in SK-LMS1 and ECC-1 cell lines relative to control (35.4 ± 3.1%; 29.1 ± 1.3%; p<0.01). Cell cycle assays illustrated an increase in the G2-M fraction in treated cell lines relative to control (34.3 ± 4.9%; 22.1 ± 3.5%; p<0.01). RT-PCR and Western blot showed a dose dependent up-regulation of death-receptor 5 (DR5), Bim and Puma, and down regulation of survivin consistent with the pro-apoptotic effects of FKB. Furthermore, FKB acted synergistically when combined with Docetaxel and Gemcitabine (Combination Index = 0.260).

Conclusion: FKB results in a robust induction of apoptosis in SK-LMS-1 and ECC-1 cell lines via increased expression of DR5, Bim and Puma, and down regulation of survivin.
CHALCONE DERIVATIVES AS POTENTIAL CHEMOPREVENTIVE AGENTS IN OVARIAN CANCER

D.D. Jandial¹, Y. Zhang², M. Gang², C.A. Blair¹, R.E. Bristow¹, H.M. Liu², E.R. Jarvo¹, X. Zi¹

Objective: Chalcones are a family of naturally occurring plant-derived dietary compounds which have been demonstrated to have both chemopreventive and anticancer benefits in some solid tumors, while having minimal to no toxicity in normal tissues. Additionally, their pliable chemical structure lends itself to ease of synthetic manipulation and production, and the molecular effects of these compounds are likewise varied. Our objective was to perform an exploratory screen of the cytotoxicity of 160 newly synthesized chalcone derivatives against a panel of 4 ovarian cancer cell lines to examine their potential utility in ovarian cancer prevention and treatment.

Methods: A library of 160 chalcone derivatives was synthesized. Ovarian cancer cell lines with differing p53 status were chosen: A2780 and HEYA8 cell lines contain wild-type p53, OVCAR3 harbors p53 mutation at codon 248, and SKOV3 shows p53 deletion. The cytotoxicity of these compounds against these ovarian cancer cell lines was tested using the MTT assay.

Results: Of the 160 compounds tested, 32 (20%) demonstrated marked cytotoxicity with IC₅₀ values in the low micromolar range (range 0.4 – 4.5 µM). An additional 13 compounds (8%) were found to have preferential cytotoxicity against p53 wild-type A2780 and HEYA8 cell lines versus OVCAR3 and SKOV3 with loss of p53 function. Conversely, another 8 compounds were more effective in the growth inhibition of p53 mutant OVCAR3 cells when compared to cells with functional p53 status.

Conclusion: Our results indicate that a chemical structure-related mechanism of chalcone derivatives against proliferation of ovarian cancer cell lines exists. In particular, chalcone derivatives may act through both p53-dependent and p53-independent mechanisms in inhibiting ovarian cancer cell growth. Further studies are in progress to elucidate the structure-activity relationship between chalcone derivatives and cytotoxicity stratified by the p53 status of these tested cell lines. In addition, mechanisms of these compounds’ action are being investigated with regard to both p53-dependent and p53-independent cell growth inhibition and apoptosis. As p53 mutations are detected with very high frequency in advanced ovarian cancer patients, the compounds identified in our study are of particular translational value in the potential chemoprevention or therapy for this disease.

This work is supported by NIH R01CA122558-04S1 to XZ and DJ.
Poster # 29

ZMIZ1 IS OVEREXPRESSED IN EPITHELIAL OVARIAN CANCER AND ASSOCIATED WITH P53 GENE MUTATIONS

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Objective: A recent transposon mutagenesis screen has identified the Zmiz1 gene as a new potential oncogene in carcinomas of the skin. It is well known that mutations of the p53 tumor suppressor gene are the most common genetic alterations in epithelial ovarian cancer. Previous studies have shown that Zmiz1 appears to transcriptionally regulate the p53 gene. There are no studies that evaluate Zmiz1 expression and alterations in the p53 gene in gynecologic malignancies, specifically epithelial ovarian cancer. We hypothesize Zmiz1 expression is elevated in epithelial ovarian tumors and there is an interaction between Zmiz1 and the p53 tumor suppressor gene in ovarian tumors.

Methods: A retrospective chart review was performed to identify patients diagnosed with epithelial ovarian cancer. Data collected included clinico-pathologic factors, patient follow-up and mortality. Zmiz1 staining and p53 sequencing were performed on all patients. Statistical analyses included chi-square analysis and the binomial test for clinical and pathologic factors. The log rank test was used to evaluate survival analysis.

Results: Included in the analysis were sixty-one patients diagnosed with epithelial ovarian cancer. Immunostaining for the Zmiz1 protein was performed with the following results: 17 (28%) tumors were positive, 11 (18%) tumors had equivocal staining, and 33 (54%) tumors were negative. All of the benign ovarian specimens were negative for Zmiz1 immunostaining. Of the tumors with positive Zmiz1 staining, 13/17 (76%) had p53 gene mutations (p=0.03). The majority of patients without p53 mutations stained negative for Zmiz1 (p=0.005). The overall survival for patients with Zmiz1 positive staining was 37% vs. 52% for patients with negative staining (p=0.10).

Conclusion: Zmiz1 staining is elevated in patients with epithelial ovarian cancer. Tumors that are Zmiz1 positive are associated with mutations of the p53 gene. Zmiz1 overexpression may be associated with decreased survival in patients with epithelial ovarian cancer. Additional studies are needed to more clearly determine the role of Zmiz1 in patients with epithelial ovarian cancer.
PERITONEAL STAGING BIOPSIES IN BORDERLINE OVARIAN TUMORS: ARE THEY NECESSARY?

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Objective: Surgical staging of clinical early borderline tumors includes performing peritoneal staging biopsies. We sought to determine the percentage of cases in which these biopsies revealed borderline tumor and whether biopsy results were correlated with borderline tumor found in other specimens and subsequent sites of recurrence.

Methods: A retrospective review of all patients undergoing surgical staging for presumed early stage borderline tumor was conducted. Patients were identified using a cancer database between Jan 1, 2004 to Sept 15, 2010. The percentage of cases that were upstaged solely based on peritoneal biopsies was calculated. Data was also examined for correlation between site of positive staging biopsies and subsequent site of recurrence.

Results: One hundred twenty-two charts were reviewed. Thirty-eight patients who had disease confined to the ovaries had staging biopsies performed and were included in this review. Four (11%) had malignancy found in staging biopsies. Two of these four patients had staging biopsies as the only evidence of extraovarian spread, and both were upstaged from stage I to II. Of the other two patients with extraovarian spread, one had disease in the lymph nodes, and one had disease in the small bowel mesentery. One patient who was upstaged due to borderline tumor found in cul de sac biopsies has a presumed recurrence in the right side of the pelvis. No patients received further treatment based on pathology from peritoneal biopsies.

Conclusion: Borderline tumor is rarely found in peritoneal staging biopsies, and performance of the biopsies does not change management. Consideration should be given to eliminating biopsies from the staging procedure, depending on the rate of upgrading to invasive cancer on final pathology.
INDICATIONS FOR NEOADJUVANT CHEMOTHERAPY IN A COHORT OF PATIENTS WITH ADVANCED STAGE CARCINOMA OF THE OVARY

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Objective: Prior studies have proven the survival benefit of upfront surgical resection to < 1 cm gross residual disease followed by platinum based chemotherapy in patients with advanced ovarian cancer. A dilemma exists with the lack of predictive models to select patients for non-surgical management, as not all patients may be fit to undergo surgery. The alternative strategy in such patients is to use neoadjuvant chemotherapy followed by interval surgery. Our goal was to identify indications for neoadjuvant chemotherapy with advanced serous ovarian carcinoma at a historically surgically aggressive institution.

Methods: A retrospective review was performed of patients with advanced epithelial ovarian cancer treated with neoadjuvant chemotherapy between 1995 and 2008 at a single tertiary academic hospital. Patients with non-serous epithelial tumors and low malignant potential tumors were excluded. Data collected includes demographic information, tumor grade, histology, predominant site of disease burden (pelvic, upper abdominal, extra-peritoneal), medical morbidity, pre-operative serum albumin and Cancer Antigen 125 (CA 125), chemotherapy regimen, site of recurrent disease, time to recurrence, and date of death. Demographic data and disease characteristics are presented using descriptive statistics. Chi square test was used to analyze categorical variables. Kaplan-Meier method was used to illustrate survival data according to variables of interest, based on date of initial treatment to date of last contact or death. Death status was coded as a binary variable when used for cross-tabulation with other variables of interest.

Results: Forty-three patients with Stage IIIIC or IV epithelial ovarian cancer met criteria for inclusion. Mean age was 61.4 years; median follow-up period was 33 months. 81.4% of patients had Stage IIIIC disease; 18.6% had Stage IV disease. 27.9% of patients were deemed surgically unresectable. 48.8% of patients had significant medical comorbidities; cardiac disease was the most common, noted in 23.3% of patients. Surgical effort was abandoned in 24 patients due to unresectable carcinomatosis. Sites of recurrence were not exclusive of each other. Chi square analysis showed no statistically significant association between death status and recurrence sites, serum albumin and CA 125, medical comorbidity or presence of unresectable carcinomatosis. Patients with upper abdominal recurrence had higher CA-125 levels and lower albumin levels than those who did not have recurrence in the upper abdomen. The reverse trend was true with pelvic recurrence; however, these trends did not achieve statistical significance, likely due to small sample size. The mean progression free survival for the cohort was 20.7 months and mean overall survival was 40.2 months.

Conclusion: Neoadjuvant chemotherapy may be a reasonable therapeutic alternative in patients with advanced stage ovarian cancer who are suboptimal surgical candidates due to medical comorbidities or unresectable disease. Counseling regarding reported differences in outcomes with neoadjuvant chemotherapy is essential.
Poster # 32

LEEP RESULTS INCREASINGLY CORRELATE WITH HISTOLOGY AT COLPOSCOPY AS ADDITIONAL CERVICAL BIOPSIES AND ECC ARE PERFORMED IN TWO STEP DISCREPANCY


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Objective: In patients presenting with high-grade squamous intraepithelial lesion (HSIL) Pap test in which colposcopy fails to identify a correlated high-grade lesion, literature suggests the risk of occult CIN 2 or 3 remains as high as 35%. Current ASCCP management guidelines for a 2-step discrepancy (HSIL Pap with ≤ CIN1 cervical biopsies and ECC results) recommend an excisional procedure or repeat Pap tests and colposcopy at 4-6 month intervals for a year. These guidelines do not take into account the number or type of cervical sampling performed at colposcopy. Our objective was to assess the impact of increasing numbers of colposcopically directed cervical biopsies, repeat Pap tests, and ECC performance on the correlation between colposcopic findings and LEEP pathology results in patients with 2-step discrepancies.

Methods: Between 6/2003 and 6/2010 we identified 201 patients at our institution who underwent colposcopy for high grade Pap test and LEEP for two-step discrepancy. The number of cervical biopsies, repeat Pap tests, and ECC performance at colposcopy were evaluated for associations with final LEEP pathology report as well as other clinical and pathologic factors. Descriptive statistics, chi-squared analysis, and logistic regression were utilized for statistical analyses.

Results: Median age was 29 (range 18-69). Forty-nine percent of patients were current smokers (99), 42% (76) patients had a abnormal Pap test prior to HSIL Pap necessitating colposcopy, and only 9 patients had a prior cervical excisional procedure performed. The distribution of cervical biopsies at colposcopy was: 8(4%) patients underwent ECC alone, 134 (67%) had 1 biopsy, 44 (22%) had 2 biopsies, 4(2%) had 3 biopsies, and 11(5%) had 4 biopsies. 80 (40%) patients had ECC performed in addition to at least 1 cervical biopsy and 41 patients underwent repeat Pap test at the time of colposcopy. LEEP pathology results: 56%(114) ≤CIN1 and 41% (83) CIN2, CIN3, or AIS pathology. With one biopsy performed, less than 50% of LEEP specimens correlated with histology results at colposcopy. With 4 biopsies ≤ CIN1 greater than 80% of LEEP specimens correlated with colposcopic findings. Performing an ECC resulting in ≤ CIN1 pathology was highly correlated with low grade or no disease on final LEEP specimen (p=0.0026). If all information gained at colposcopy (including number of cervical biopsies, ECC performance, high-grade impression, and repeat Pap test at colposcopy) is combined, a direct association between increasing quantity of information obtained at visit and increasing correlation between LEEP and colposcopy pathology is noted (p=0.0097).

Conclusion: Our results suggest that complete colposcopic exam with multiple cervical biopsies and particularly an ECC at the initial followup in patients with high grade pap tests may help direct patient care in those with resulting 2-step discrepancies. Although overall risk of high grade disease on LEEP is relatively high in patients with 2-step discrepancies, patients with multiple, independent histologic specimens suggesting low grade disease are more likely to have low grade disease on LEEP pathology if LEEP is performed.
Poster # 33

RETURN TO WORK EXPERIENCE AMONG FEMALE CANCER SURVIVORS FROM OVARIAN, ENDOMETRIAL OR CERVICAL CANCER

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Objective: Cancer survivors identify employment issues as one of their most significant unmet need. Historically female cancer survivors are less likely to return to work than male cancer survivors. Identifying barriers to maintaining or returning to work that are experienced by gynecologic cancers survivors can assist in development of services to enhance their success. To assess changes in work status during the first six months following diagnosis and identify cancer or treatment-related limitations which restrict the ability to work.

Methods: Women diagnosed with ovarian, endometrial or cervical cancer were recruited from the Women’s Health Center Clinic at the University of Minnesota from November, 2008 to February 2009. Women within two years of their primary cancer diagnosis were eligible for the study. A survey, information sheet and consent form were provided to women at the time of their regular clinic visit. This study was approved by the University of Minnesota IRB.

Results: Fifty-six percent (155 women) of the 276 women who were invited to participate in this study complete the survey. One hundred and ten surveys were analyzed. The mean age of participants was 49.1 years (range 24-79 years). Ovarian cancer was the most common diagnosis (47.3%), followed by endometrial cancer (32.7%) and cervical cancer (9.1%). The stage distribution included all stages: Stage I (39%), Stage II (15%), Stage III (33%) and Stage IV (5%). Most of the women (71%) reported that they were working at the time of their cancer diagnosis.

Most women (84%) who were working at the time of their diagnosis were still working at the time they completed the questionnaire.

However, 32% of these women decreased their hours. Twenty nine percent of patients quit during the first month after diagnosis. Ovarian cancer patients were more likely to report quitting their job in the first month (60%) compare to endometrial cancer (26%) and cervical cancer (40%). Only 10% of ovarian cancer patients were able to continue working at the same level job through-out their treatment. For the other cancer patients, maintaining their work was more common (20% cervical cancer, 33% endometrial cancer). Most frequently fatigue and nausea were the factors that restricted work participation.

Conclusion: A significant percentage of ovarian cancer survivors experience loss or reduction of their work due to their cancer treatment. Patients diagnosed with cervical and endometrial cancer also reduce their work participation, but less so than ovarian cancer patients. Further efforts are needed to support female cancer survivors and facilitate their return to work.
SURVIVAL IMPACT OF CLINICAL TRIALS IN PATIENTS WITH RECURRENT CERVICAL CANCER

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**Objective:** Survival outcomes in most patients with recurrent cervical cancer that is not amenable to radical excision or curative local radiation is usually less than one year. These patients are generally candidates for cytotoxic chemotherapy and clinical trials are recommended in an attempt to improve the prognosis of these patients. The objective of this study was to compare survival outcomes in patients with recurrent cervical cancer treated on versus off clinical trial.

**Methods:** This was a retrospective cohort study of patients treated for recurrent cervical cancer on versus off clinical trial between 1998-2010. Patients on Gynecologic Oncology Group (GOG) clinical trials for recurrent cervical cancer were identified and matched 1:1 with patients treated off trial based on age (within 10 years), ethnicity, stage at initial diagnosis, histology, primary treatment, and baseline renal function. All patients treated for a recurrence had a performance status of 0-2. Paired t-tests and Kaplan Meier survival analyses were used to determine the effect that a clinical trial had on survival.

**Results:** Fifty-eight patients with recurrent cervical cancer were identified. Twenty-nine were treated for their recurrence on GOG 127 (n=4), GOG 179 (n=9), GOG 204 (n=12), GOG 76GG (n=3), or GOG 240 (n=1). These were matched to 29 patients treated off trial by the above criteria. Twenty patients were initially stage IB, 4 stage IIA, 24 stage IIB, and 10 stage IIIB. Forty-eight patients had squamous histology while the remaining 10 were adenocarcinoma. The mean number of salvage regimens was 1.9 for the trial group (range 1-5) and 1.8 for the non-trial group (range 1-5) (p=0.69). There was also no difference in the number of cycles of chemotherapy completed by on versus off trial groups (7.6 vs. 6.1, p=0.50). There was no difference in survival from time of recurrence to last follow up/death between patients on vs. off clinical trials (16.8 vs. 16.3 months, p=0.94).

**Conclusion:** Patients with recurrent cervical cancer treated with cytotoxic chemotherapy on or off clinical trials uniformly have a poor prognosis. Our findings emphasize the need to further investigate the efficacy of molecular targeted therapy in these patients.
Poster # 35

AGE DOES NOT IMPACT SURGICAL INTERVENTION FOR UTERINE CANCER PATIENTS.

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Objective: To evaluate the association of age and surgical interventions for women who underwent surgical treatment for uterine cancer.

Methods: The design was a retrospective cohort study of discharge data from nonfederal acute care hospitals in Maryland from 2000-2009. Women aged 18 and older who underwent hysterectomy for uterine cancer were included in the study population. We analyzed premenopausal women, defined as women ≤ age 50; and postmenopausal women age >50 years old; elderly (≥65 years old) and octogenarians (≥80 years old). The premenopausal group was further subdivided into two categories, those ≤ 45 years old and those ≤ 50 years old. The main outcome measure was individual surgeon and individual hospital annual uterine cancer case volume. Secondary outcomes included minimally-invasive surgical approach and lymphadenectomy. The independent variable was age. We used multivariate logistic regression to calculate odds ratios and confidence intervals for each outcome of interest.

Results: Among the 5470 women who underwent hysterectomy for management of uterine cancer, premenopausal ≤45 years old were more likely to see a high-volume surgeon than postmenopausal women, though this result was not statistically significant. In fact, there was no statistically significant difference when premenopausal women (both ≤45yo and ≤50yo groups) were compared to postmenopausal women in regards to individual hospital and surgeon case volume (adjusted OR=0.933, 95% CI: 0.599-1.454; adjusted OR=0.869, 95% CI: 0.734-1.029; adjusted OR=1.192, 95% CI: 0.787-1.804; adjusted OR=0.938, and 95% CI: 0.805-1.092), minimally invasive surgical approach (adjusted OR=1.149, 95% CI: 0.670-1.969 and adjusted OR=1.069, 95% CI: 0.856-1.321), or lymphadenectomy (adjusted OR=0.823, 95% CI: 0.549-1.232 and OR=1.104, and 95% CI 0.949-1.284). Elderly patients were less likely to be operated on by high-volume surgeons compared with non-elderly patients (adjusted OR=0.86, 95%CI: 0.76-0.96).

Conclusion: In this retrospective analysis of uterine cancer patients, age does not seem to adversely impact surgical care in any age group. We did not find a statistically significant association between age and surgical care in our population of women diagnosed with uterine cancer.
Poster # 36

IS THE 2009 ENDOMETRIAL CANCER STAGING SYSTEM MORE ACCURATE BASED ON SURVIVAL, STAGE, GRADE, AND HISTOLOGY?

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Objective: The International Federation of Gynecology and Obstetrics (FIGO) recently updated the 1988 endometrial cancer staging system. The objective of this study is to compare survival outcomes in a large cohort of patients with endometrial cancers of varying histologies and characteristics when staged using the 1988 versus 2009 FIGO staging systems.

Methods: Data between 1998-2006 were obtained from the NCI’s Surveillance, Epidemiology and End Results database with complete staging information. Cause-specific and overall survival was examined by histology and for grade 3 adenocarcinomas according to the new staging system. Patients were staged according to both the 1988 and 2009 FIGO staging systems and Kaplan Meier survival curves for Cause-Specific Survival (CSS) were derived comparing the groups. Univariate and multivariate analysis for CSS were conducted using Cox proportional hazards models.

A total of 51,720 patients were examined including 47,284 with endometrial adenocarcinoma, 6403 of which had grade 3 endometrial adenocarcinoma (G3A). In addition, 1377 patients clear cell carcinoma (CC), 2304 with uterine papillary serous carcinoma (PSC), and 755 cases of carcinosarcoma (CS), were included.

Results:
Clinical Characteristics of Patients with Adenocarcinoma
The majority of patients (79.7%) were stage I by the 2009 system. The majority race was white (86.9%). Median age at diagnosis was 61 (range 18-101). The tumor grade was grade 1 in 44.6%, grade 2 in 32.1%, grade 3 in 16.9% and unknown in 6.4%. Median followup was 37 months. 7.1% of patients died of endometrial cancer during the follow-up period. 13.2% of patients died of any cause.

Clinical Characteristics of Patients with CC, PSC, and CS, and G3A
The median age was 67 years and median follow up was 26 months. White, black, and other ethnicities composed 87.5%, 12% and 7% of this group respectively. A higher proportion (60%) of white females had G3A, versus 41.8% of black females (p<0.001). Black females had a higher incidence of CS, CC, and PS. Five year cause specific survival was 76.2% for G3A, 53.4% for CS, 68.8% for CC, and 59% for PS. Five year overall survival was 63.2% for G3A, 37.4% for CS, 54.6% for CC, and 42.8% for PS. Patients with IIIC2 disease (para-aortic nodal disease) had inferior outcomes in CC (p=0.0079) and G3A (p=0.04) compared to IIIC1 (pelvic nodal disease) patients. However, this was not significantly different for CS and PS. Positive washings were found in 3%, 5%, 3% and 7% of AC, CS, CC, and PS histologies respectively. However, there was no difference in cause specific survival between cases with positive washings compared to other cases of stage IIIA disease.

Conclusion: Recent recommendations for changes to the endometrial cancer staging system are validated in this dataset of over 51,000 patients; the 2009 system produced better discrimination in CSS than the 1988 system. For patients with involved lymph nodes, positive pelvic nodes (IIIC1) portend a better survival outcome than involvement of the paraaortic chain (IIIC2). Predilection for non-adenocarcinoma histology was found in the black population. These findings should be considered in counseling and treating patients, as well as the design of future clinical trials.
Poster # 37

VERSATILITY OF GELPOINT LAPAROSCOPY ACCESS DEVICE (GLAD) AS A MINIMALLY INVASIVE APPROACH FOR VARIOUS GYNECOLOGIC ONCOLOGY PROCEDURES

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Objective: Minimally invasive approaches for gynecologic malignancies have primarily focused on initial staging procedures for uterine and cervical cancer. Few minimally invasive strategies exist for the management of large adnexal masses, endometrial cancer with an enlarged uterus, and ovarian cancer. The purpose of our study was to determine the utility of a Gelpoint laparoscopy access device in conjunction with minimally invasive approaches for diagnosis and treatment of gynecologic diseases.

Methods: We prospectively followed all gynecologic oncology surgical cases performed using Gelpoint access device in conjunction with laparoscopy or robotics over 1 year (March 2010-March 2011). Demographics, preoperative indications, tumor size, postoperative outcomes, feasibility and complications were analyzed.

Results: A total of 29 patients underwent a minimally invasive approach using the Gelpoint laparoscopy access device over the study period. The average age was 50 years (range 27-85), and average BMI-26 (range 18-40). Preoperative indications for use included adnexal mass (n=20), enlarged uterus (n=3), restaging procedures for ovarian cancer (n=4), and endometrial cancer(n=2). An elevated CA 125 was detected in 56% (13/23) (range 34-1547). The average initial incision size for gelpoint access device was 5.2 cm (range 3cm-8cm). Single port surgery was performed in 20% (5/29) and one additional port used in 21% (6/29) of patients. The average number of ports used was 2.9 (range 1-5). There was a 0% conversion rate to formal laparotomy. 14 patients underwent laparoscopic surgery and 15 patients underwent robotic surgery utilizing the gelpoint access device. Of the 20 patients with adnexal masses, the average tumor size was 11.25cm, (range 5cm-40cm; >10cm n=9pts). 85% (17/20) of adnexal masses were benign (mucinous n=3, serous n=1, dermoid n=3, endometrioma n=3, fibroma n=5, hemorrhagic cyst n=1, struma ovarii n=1) and 15% (3/20) was borderline at the time of frozen section and subsequently underwent routine staging. 100% of masses were able to be removed through gelpoint access device without enlarging initial incision, or intraoperative spillage. 30% (6/20) of patients required controlled drainage for removal. 2/3 patients with enlarged uterus had endometrial cancer, 1 had hyperplasia, and all had fibroids. The average uterine weight was 365 grams. 67% (4/6) of patients who underwent restaging procedures had chemotherapy prior to interval surgery (Stage III/IV ovary n=2 Stage IV/recurrent uterine cancer n=2) . 33% (2/6) with ovarian cancer underwent upfront formal staging. Utilizing the gelpoint access device with laparoscopy or robotics was associated with a short hospital stay, minimal EBL, and rare complications.

Conclusion: The Gelpoint access device used with laparoscopy/robotics is a safe and feasible alternative to traditional laparotomy for treatment of large adnexal masses, endometrial cancer within an enlarged uterus, and for specific restaging procedures. The device facilitates multi-quadrant minimally invasive surgery via small incisions, with few complications, minimal blood loss, and short hospital stay.

<table>
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<th>Indications for Gelpoint Device</th>
<th>Patients (N)</th>
<th>Number of Ports used (avg)</th>
<th>Estimated Blood Loss (avg)</th>
<th>Hospital Stay (days)</th>
<th>Complications</th>
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CHALLENGING PROGNOSTIC FACTORS FOR CHEMOTHERAPY RESISTANCE IN HIGH-RISK GESTATIONAL TROPHOBLASTIC NEOPLASIA

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Objective: Gestational trophoblastic neoplasia is one of the most curable gynecologic tumors. Patients with WHO scores equal to or greater than 7 are considered high risk and treated with multi-agent chemotherapy. Certain risk factors, such as stage IV disease and a WHO score of greater than or equal to 12 have been identified as predisposing patients to chemotherapy resistance. Our objective was to review the characteristics of patients treated for high-risk gestational trophoblastic neoplasia (GTN) at our institution.

Methods: This is a retrospective review of patients diagnosed with high risk GTN based on the revised WHO scoring system at from 1999-2010. Descriptive statistics were performed using Microsoft Excel 2011 and Instat was used to perform Fisher’s exact test.

Results: Seventeen women were identified as having been treated for high risk GTN. The mean age was 28 years (range 15-48) and the mean WHO score was 10 (range 7-19). All patients were initially treated with EMA-CO and received an average of 7 cycles (range 5-12). Three patients presented with symptomatic brain metastases and underwent surgical resection prior to the initiation of chemotherapy. Seven patients underwent hysterectomy during the course of their initial treatment. Two of the 17 patients treated for high risk GTN were diagnosed with persistent disease and 1 was diagnosed with a recurrence. EMA-EP was used to treat two of these patients and TPTE was used to treat the third. None of the patients with brain metastases had persistent/recurrent disease. No patients died of disease. Neither WHO score > 12 (p=1.0) or stage IV disease (p=1.0) were significant prognostic factors for recurrence or persistence. All other WHO risk factors also did not predict patients at risk for disease recurrence or persistence.

Conclusion: High risk Gestational trophoblastic neoplasia continues to have an excellent prognosis. Standard WHO risk factors and previously identified prognostic indicators such as stage IV disease and a WHO score greater than or equal to 12 do not correlate with disease recurrence or persistence.
EVALUATING OPERATIVE TIMES FOR DUAL-CONSOLE ROBOTIC GYNECOLOGY PROCEDURES AT A SINGLE INSTITUTION: A REVIEW OF OUR FIRST FIFTY CASES

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Objective: Robotic surgery has emerged as an alternative option in minimally invasive gynecologic surgery. As technology continues to advance, the advent of the dual-console da Vinci Si Surgical System has allowed for further modifications in the training atmosphere. We sought to investigate operative times and estimated blood loss while operating with the dual-console model in a training environment for our first fifty cases.

Methods: We retrospectively identified the first fifty patients who underwent robotic-assisted total laparoscopic hysterectomy (TRH), with or without bilateral salpingo-oophorectomy (BSO), with or without pelvic and para-aortic lymph node dissection (PPALND) using the dual-console da Vinci Si Surgical System at a single institution. Records were reviewed for patients’ age, body mass index, pre-operative diagnosis, procedure, complications, estimated blood loss, and total surgery time. All surgeries were conducted using the dual-console system and were performed by staff physicians and fellows. Operative time was calculated from robotic docking until the completion of the procedure.

Results: Cases were identified from November 2009 through July 2010. The Median age was 57 years old (Range 22-87). Median body mass index was 27.5 (17-49), with 17 overweight patients (BMI 25-29.9), 12 obese patients (BMI 30-34.9), and 10 morbidly obese (BMI ≥ 35). Surgeries completed included PPALND alone (n=10); radical hysterectomy for cervical cancer (n=1); TRH only (n=3); TRH/BSO (n=25); and TRH/BSO/PPALND (n=20). Median total operating room time 178 minutes (108-314), with a median operative time of 106 minutes (57-251). Two vascular injuries were encountered intra-operatively, with one requiring a conversion to laparotomy.

Conclusion: This data compares favorably with historically reported outcomes from single console systems. Utilizing the dual-console allows for an integrated teaching and supervising environment, without compromising operative times or patient outcomes.
Poster # 40

DOES THE NEW SARCOMA STAGING SYSTEM BETTER PREDICT OVERALL SURVIVAL FOR LEIOMYOSARCOMA?

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Objective: To determine if the new FIGO 2009 sarcoma staging system better predicts overall survival for uterine leiomyosarcomas than the previous FIGO 1988 staging system.

Methods: Retrospective review of our tumor board registry from January 1988 to December 2009 was performed. Included were all patients with leiomyosarcoma who underwent surgical staging. Excluded were any patients who did not undergo surgical staging, did not have complete pathology reports to allow for the restaging, or did not have their primary staging surgery at our hospitals. Patients who did not undergo pelvic and paraaortic lymph node dissections were included and staged without this information.

Results: 23 patients were identified and 19 were included with complete data. 10 patients were treated with a TAH/BSO alone; 5 patients underwent additional staging procedures including lymph node dissection and/or omentectomy; 3 patients underwent a SCH and 1 underwent only biopsies. Mean age was 56 years (range 35-75). In the old classification, 1 patient was Stage IA, 3 were IC, 3 were IIIB, 1 was IIIA, 2 were IIB and 9 were Stage IVB. Under the new Staging system, 2 patients were now Stage I, 5 were Stage IB, 1 was IIA, 2 were IIIA, 1 was Stage IIIB and 8 were Stage IVB. 5 patients are currently alive, 2 patients were alive at last contact, and 12 patients are known to be deceased. Overall survival was 24.6 months (range 1-150). One patient is alive who was originally Stage IA, one Stage IC (now IB), one Stage IIB (now IA), two patients are alive who maintained Stage IIIB and IVB, respectively. In the original Stage I patients, the overall survival was 14 months (range 1-27). In the restaged Stage I patients, the overall survival was 19.6 months (range 1-48). In Stage IVB, the overall survival was 17.3 months (range 1-46). The removal of the one patient who was downstaged did not significantly change the overall survival.

Conclusion: The aim of a staging system is to provide uniform terminology and appropriate prognosis for patients. Based on our patient population, this new staging system does not predict overall survival any better than the previous staging system. This is likely due to the aggressive nature of the tumor and the non-uniformity of surgical staging and treatment options.
COMPARISON OF P53 MUTATION STATUS, PRIMARY CYTOREDUCTIVE SURGICAL OUTCOMES, AND OVERALL SURVIVAL IN PATIENTS WITH OVARIAN CANCER

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Objective: We examined both p53 mutation status and primary surgical cytoreduction status in ovarian cancer patients to define possible characteristics associated with improved survival.

Methods: 270 ovarian cancer samples were obtained from a large divisional tumor bank. cDNA was extracted from stored tumor tissue, and the entire open reading frame (exon 2-11) was amplified and sequenced in both directions. Patients were then divided into 2 cohorts based on p53 mutational status. Surgical, clinical and survival data was then obtained.

Results: Of the 270 identified patients, 258 were evaluable for mutation status and clinical correlation. 160 (62%) patients were found to have a p53 mutation. Poorly differentiated tumors were more frequently associated with p53 mutations (80% vs. 67%; p=0.0015). No statistically significant difference between stage, histology, or overall survival was noted between the 2 groups.

Optimal cytoreduction, n=162 (64%), was not different between mutated (61%) or non-mutated groups (65%; p=0.59). Optimal cytoreduction was however, associated with a statistically significant better overall survival among both the p53 mutated (p=0.0007) and non-mutated patients (p=<0.0001). In the p53 mutation group the median survival for both the optimal and suboptimal patients is approximately 4 years. While in the non-mutated group the median survival is 5 years for the optimally cytoreduced vs. 1 year for the suboptimal.

Multivariate analysis showed p53 mutation was not predictive of survival for optimally cytoreduced patients (HR=1.315; 95%, CI 0.851-2.031). The risk of death decreased in suboptimally cytoreduced patients with a p53 mutation (HR=0.553; 95%, CI 0.343-0.890). Additionally, for those patients who are suboptimally cytoreduced there is a statistically significant difference in survival that favors the p53 mutation group (p=0.015).

Conclusion: Optimal surgical cytoreduction continues to be an important prognostic variable in patients with ovarian cancer independent of p53 mutational status. Among patients with suboptimal cytoreduction a p53 mutation may offer a survival advantage.
DOES MYOMETRIAL INVASION CONFER A POORER PROGNOSIS IN UTERINE ADENOSARCOMA?

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Objective: Uterine adenosarcomas are rare tumors that are often diagnosed at an early stage and characterized as having a low potential for metastasis. Despite this, several studies have identified prognostic factors such as myometrial invasion, sarcomatous overgrowth, and tumor cell necrosis that confer a poorer prognosis. Our objective was to review the clinicopathologic features of uterine adenosarcomas treated at our institution and identify prognostic features.

Methods: This was a retrospective study of patients treated for uterine adenosarcoma at our institution between 1991-2010. Patients were identified from tumor registries and institutional databases. Descriptive statistics were performed using Microsoft Excel 2011 and Instat was used to perform Fisher’s exact test.

Results: Twelve patients were diagnosed with uterine adenosarcoma from 1991-2010. The mean age of patients was 54 years (range 33-88) and the average follow up was 66 months (range 8-235 months). A total hysterectomy with bilateral salpingo-oophorectomy was performed in eleven patients. Nine (75%) of these had complete surgical staging with pelvic +/- paraaortic lymphadenectomy. All patients who underwent complete surgical staging had stage I tumors and the 2 who underwent TAH/BSO had disease confined to the endometrium. The twelfth patient underwent a polypectomy, as she was not a candidate for surgical resection and staging. Seven patients (58%) had low-grade tumors, 3 (25%) had high-grade tumors, and 2 tumors (17%) were not graded. Myometrial invasion was identified on five patients (3 high grade, 2 low grade) ranging from 0.2-12.5%. Sarcomatous overgrowth was identified in three patients all of whom had high-grade tumors. No adjuvant treatment was given to patients who underwent surgical resection. None of the patients identified as having myometrial invasion (p=1.0) or sarcomatous overgrowth (p=1.0) experienced a recurrence. Ten of the 11 patients who underwent surgery are alive without evidence of disease. The 11th patient died of other causes without evidence of recurrence. The only patient who died of disease was the 12th patient who underwent polypectomy. She received whole pelvic radiation, but ultimately developed a vaginal recurrence and died of disease.

Conclusion: Surgery leading to complete resection of disease is the cornerstone of treatment for uterine adenosarcomas. The benefit of lymphadenectomy is to assess extent of disease and define a stage. Adenosarcomas confined to the uterus, even with poor pathologic prognosticators, appear to have a low risk of recurrence when completely resected.
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