

Short Report

Considerations for Treating Women with Cancer

JoAnn R. Gurenlian, RDH, PhD

Introduction

It is estimated that approximately 44.85% of the U.S. population will develop cancer at some point in their lives.¹ According to the National Cancer Institute and the American Cancer Society, over 1.6 million new cases of cancer will occur in 2012, with over 577,000 cancer related deaths. Cancer accounts for 1 in 4 deaths and is the second leading cause of death in the U.S.^{1,2}

With respect to cancers affecting women, Table I highlights current statistics concerning incidence and survival.¹⁻³ As can be seen from this table, women remain challenged to address this health concern. Current approaches to prevention of women's cancers include screenings such as a PAP test, HPV DNA test, self-examinations and clinical examinations by specialists during routine gynecologic visits. Approaches to diagnosing women's cancers range from physical examination and blood studies to radiography evaluations (ultrasound, CT/PET scans, diagnostic mammograms and MRI) and biopsy. Treatment of women's cancers consists of surgery, radiotherapy, chemotherapy, nutrition and complementary medicine. Although these methods are beneficial, there remains room for improvement. Fortunately, numerous research studies are being conducted to address women's cancer prevention, diagnosis and treatment. The purpose of this paper is to highlight current research related to women's cancers demonstrating the prospect of hope for the future health of women.

Preventing women's cancers requires due diligence on the part of females, their sexual partners and health specialists. Surgeries, vaccinations, healthy lifestyle choices and medication supplements are being investigated to determine the impact of prevention in lowering cancer risk. Table II presents preventive approaches that have shown promise in this regard.⁴⁻⁶

Diagnostic markers are being studied to determine if there are other means of identifying early female cancers. Although the blood marker CA-125

Abstract

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This study supports the NDHRA priority area, **Clinical Dental Hygiene Care:** Assess how dental hygienists are using emerging science throughout the dental hygiene process of care.

has been available as a marker for ovarian cancer, it has limitations in terms of sensitivity and specificity. Current studies have been evaluating the effectiveness of lysophospholipids, growth factor, soluble urinary type plasminogen activator, matrix metalloproteinases, hypermethylated gene products, extracellular matrix proteins, HE4-protein overexpression and ovarian screening using saliva testing as mechanisms for the detection of ovarian cancer. In addition, gene expression profiling and biomarkers, such as clusterin, TP53 and HE4, are being evaluated to predict ovarian cancer tumor behavior. In the near future, diagnostic markers for ovarian cancer may be available that are more accurate than CA-125.

Considerable research is being devoted to diagnostic HPV testing across the globe as it relates to cervical cancer. Studies are examining high risk types of HPV, the safety of delaying cervical cancer screening if HPV testing is negative, if the HPV test may be used as a reliable screening test for women in multiple age groups, the possibility of home kits for HPV testing and the use of computerized PAP tests for cervical cancer screening. A new vaccine to target L2, a minor surface protein for HPV, for broader protection is being evaluated, as well as the efficacy of HPV RNA testing. The overexpression of DEK oncogene is being studied to determine if it may be useful as a diagnostic test for cervical tumors and cancers. These studies may help to refine screening and diagnostic procedures for cervical cancer.

Diagnostic procedures being investigated for

Table I: Cancer Statistics¹⁻³

Cancer Type	Rate in 2012	Mortality in 2012	Survival
Ovarian	<ul style="list-style-type: none"> 22,281 new cases 	<ul style="list-style-type: none"> 15,550 will die Fifth leading cause of cancer death in women age 35 to 74 Highest mortality of all cancers of the female reproductive system 	<ul style="list-style-type: none"> 90% if detected early Only 20% found at an early stage Stage III or higher, survival rate is ~29%
Cervical	<ul style="list-style-type: none"> 12,170 new cases 	<ul style="list-style-type: none"> 4,220 will die Number one cause of cancer-related deaths among women in developing countries 	<ul style="list-style-type: none"> 68.6%
Breast	<ul style="list-style-type: none"> 226,870 new cases in women 2,190 new cases in men 	<ul style="list-style-type: none"> 39,920 women will die; 410 men will die Breast cancer kills someone in the world every 69 seconds 	<ul style="list-style-type: none"> 89%

Table II: Prevention of Women’s Cancers⁴⁻⁶

Cancer Type	Prevention Strategies Investigated Showing Favorable Outcomes
Ovarian	<ul style="list-style-type: none"> Oral contraception (lowers risk 30 to 50% if used 3 years or more) Breast feeding Pregnancy (first born before age 25) Tubal ligation (including removal of fallopian tubes) Hysterectomy Prophylactic oophorectomy (does not lower the risk for primary peritoneal carcinoma) Maintain healthy weight/eat healthy Exercise/be active
Cervical	<ul style="list-style-type: none"> Vaccinations (protects against cervical pre-cancers and cancers associated with HPV) Limit number of sexual partners Maintain monogamous relationship with someone who has had few sexual partners Use condoms (areas not covered by a condom are still exposed to skin-to-skin sexual contact)
Breast	<ul style="list-style-type: none"> Use of tamoxifen, raloxifen to lower hormone levels Use of aromatase inhibitors (anastrozole, letrozole, exemestane) to reduce the risk of developing breast cancer in post-menopausal women Use of fenretinide to reduce the risk of breast cancer

Table III: Types of Investigations for Treatment of Women’s Cancers⁷

Cancer Type	Types of Clinical Trials
Ovarian	<ul style="list-style-type: none"> Poly (ADP-ribose) polymerase (PARPs) – helps fight cancers caused by mutation in BRCA 1 and BRCA 2 Tumor vaccines that program the immune system to better recognize cancer cells Monoclonal antibodies (farletuzumab, catumaxomav, apomab) that specifically recognize and attack ovarian cancer cells Consolidation therapy – chemotherapy, growth factor inhibitors, and monoclonal antibodies
Cervical	<p>Pre-Cancers</p> <ul style="list-style-type: none"> Diindolylmethane (DIM) used for 12 weeks Cidofovir applied to cervix <p>Cancer</p> <ul style="list-style-type: none"> Surgical approaches – laparoscopic radical hysterectomy, robotic radical hysterectomy, total mesometrial resection, radical trachelectomy, laparoscopic radical trachelectomy Intensity-modulated radiation therapy (IMRT) Brachytherapy Targeted therapy – Pazopanib, bevacizumab and lapatinib
Breast	<p>Targeted Therapies</p> <ul style="list-style-type: none"> HER2 –TDM-1, pertuzumab and neratinib Anti-angiogenesis drugs – bevacizumab Epidermal growth factor – cetuximab, erlotinib Everolimus with letrozole Bisphosphonates – Aredia and Zometa Vitamin D Denosumab – inhibits RANKL

Table IV: Examples of Current Clinical Trials with Contact Information

Cancer Type	Trial	Contact Information
Ovarian	<ul style="list-style-type: none"> • Bevacizumab (advanced ovarian cancer) • Morab-003 (relapsed ovarian cancer) • Bevacizumab (relapsed ovarian cancer) (study ID: GOG-0213) • Vargatef (BIBF 1120) (ovarian cancer) • AMG 386 (ovarian cancer) 	<ul style="list-style-type: none"> • Lillian Hu 415-885-7206 • Susan C. Weil, MD 610-423-6182 • NCI –multiple locations 800-422-6237 • Boehringer Ingelheim Call Center 800-243-0127 • Amgen Call Center 866-572-6436
Cervical	<ul style="list-style-type: none"> • PARP inhibitor and chemotherapy (for women who have not responded to previous treatment) NCI-11-C-0022 • Ixabepilone (advanced cervical cancer that has recurred or demonstrated resistance prior to chemotherapy and cannot be treated surgically) • Paclitaxel in combination with cisplatin or topotecan hydrochloride with vs without bevacizumab in patients with Stage IVB, recurrent or persistent cervical cancer • Vaccine for testing HPV-16 positive patients with atypical squamous cells of undetermined significance or low-grade squamous intraepithelial lesions of the cervix 	<ul style="list-style-type: none"> • NCI Clinical Trails Referral Office 888-NCI-1937 888-NCI-1937 • NCI Cancer Information Service 800-422-6237 • NCI Cancer Information Service 800-422-6237
Breast	<ul style="list-style-type: none"> • Sister Study (collects information about genes, life-style, and environmental factors that cause breast cancer) • Two Sister Study (looks at causes of early onset breast cancer) 	<ul style="list-style-type: none"> • 1-877-4-SISTER (1-877-474-7837) www.sisterstudy.org

breast cancer include combinations of radiologic procedures, including mammograms and ultrasounds, mammograms and PET scans, scintimgraphy, tomosynthesis, and magnetic resonance elastography. Ductal lavage and a breath test identifying markers for those with breast cancer are being investigated. These studies may allow for more sophisticated evaluations of smaller and earlier breast cancer lesions.

Intervention trials for the treatment of ovarian, cervical and breast cancer are based primarily on the use of medications, vaccines, monoclonal antibodies and consolidation therapy. Table III highlights descriptions of current research in women’s cancer treatment.⁷ Many of these targeted therapies focus on both treatment and prevention of recurrence offering opportunities for changing the landscape of treatment options for women.

Women who are experiencing ovarian, cervical or breast cancers may wish to participate in clinical trials. Table IV presents examples of ongoing research studies that may be supported by active involvement as a subject. Further, additional organizations and website information is provided in Table V to assist those female patients who present with newly diagnosed cancer conditions.

Table V: Organizations and Websites

Organization	Website
National Ovarian Cancer Coalition	<ul style="list-style-type: none"> • nocc@ovarian.org 888-ovarian
Ovarian Cancer National Alliance	<ul style="list-style-type: none"> • ocna@ovariancancer.org 866-399-6262
National Cancer Institute	<ul style="list-style-type: none"> • www.cancer.gov 800-4-CANCER
National Center for Complementary and Alternative Medicine	<ul style="list-style-type: none"> • www.nccam.nih.gov 866-464-3615
National Cervical Cancer Coalition	<ul style="list-style-type: none"> • www.ncccconline.org
National HPV Cancer Coalition	<ul style="list-style-type: none"> • www.ncccconline.org
National Cancer Institute	<ul style="list-style-type: none"> • www.cancer.gov 800-4-CANCER 1-800-422-6237
Susan G. Komen Foundation	<ul style="list-style-type: none"> • www.komen.org 1-800-GOKOMEN 1-877-465-6636

Although cancer impacts the health of women, research demonstrates continued efforts in addressing factors that improve prevention, diagnosis, treatment and recurrence.⁸ It is anticipated that

results of these clinical investigations will provide for more sophisticated regimens that will positively impact a return to health that is safe and effective.

JoAnn R. Gurenlian, RDH, PhD, is Professor and Graduate Program Director of the Department of Dental Hygiene at Idaho State University.

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