

Emotional and sexual concerns in women undergoing pelvic surgery and associated treatment for gynecologic cancer

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Abstract: The surgical management of gynecologic cancer can cause short- and long-term effects on sexuality, emotional well being, reproductive function, and overall quality of life (QoL). Fortunately, innovative approaches developed over the past several decades have improved oncologic outcomes and reduced treatment sequelae; however, these side effects of treatment are still prevalent. In this article, we provide an overview of the various standard-of-care pelvic surgeries and multimodality cancer treatments (chemotherapy and radiation therapy) by anatomic site and highlight the potential emotional and sexual consequences that can influence cancer survivorship and QoL. Potential screening tools that can be used in clinical practice to identify some of these concerns and treatment side effects and possible solutions are also provided. These screening tools include brief assessments that can be used in the clinical care setting to assist in the identification of problematic issues throughout the continuum of care. This optimizes quality of care, and ultimately, QoL in these women. Prospective clinical trials with gynecologic oncology populations should include patient-reported outcomes to identify subgroups at risk for difficulties during and following treatment for early intervention.

Keywords: Gynecologic cancer; surgery; survivorship; quality of life (QoL); sexual function; emotional function

Submitted Dec 30, 2014. Accepted for publication Mar 20, 2015.

doi: 10.3978/j.issn.2223-4683.2015.04.03

View this article at: <http://dx.doi.org/10.3978/j.issn.2223-4683.2015.04.03>

Introduction

Gynecologic cancers account for more than 90,000 of all new cancer diagnoses in the United States (1) and approximately one million worldwide annually (2). The most common types of gynecologic malignancies are endometrial (54%), ovarian (24%), and cervical (13%) cancers (1); vaginal and vulvar cancers are less prevalent. Regardless of site of disease or age of onset, coping with cancer has physical and emotional consequences. Recommended therapeutic modalities can create short- and long-term challenges to quality of life (QoL) (i.e., sexual dysfunction, menopause, lymphedema). Surgical treatment often involves the removal of some or all of the reproductive organs, including the uterus, cervix, ovaries, and fallopian tubes, and can also include the removal of lymph nodes.

Nearly 90% of patients with a history of cancer have sexual dysfunction at some point in their cancer

experience (3), with the most frequent challenges being vaginal dryness, dyspareunia, and loss of desire (4-7). In addition, approximately 15-25% of patients will report depression and 10-30% will experience an anxiety disorder (8-11). Assessment and treatment are essential, as depression and anxiety not only adversely affect QoL but also compliance with treatment, ability to care for oneself, and length of hospitalization (8). Physical and emotional factors can also negatively influence a woman's sexual response (desire, arousal, and orgasm). Therefore, it is important to address these factors in the context of cancer diagnosis and treatment.

This article provides an overview of the various pelvic surgeries and multimodality cancer treatments by anatomic site and highlights the potential emotional and sexual consequences that can influence cancer survivorship and QoL. This article also provides suggestions for clinical intervention

Table 1 Vaginal health strategies

As a woman ages, or if she has a cancer treatment that results in premature menopause (or hormonal deprivation), the vagina can become dry and lose its elasticity. These issues can also cause dryness and discomfort of the external tissues of the lower genital tract. Simple strategies can help improve vulvovaginal moisture and allow movement without discomfort.

Vaginal moisturizers

- Used to hydrate the vaginal tissues and improve vaginal pH
- Decreases vaginal dryness and increases vaginal comfort
- Can also be applied to the external lower genital tissues to address vulvar dryness and discomfort
- Available in gels, tablets, or liquid bead-form
- Administered in tampon-shaped applicator or as a vaginal suppository
- Not uncommon to use 3-5 times per week after cancer treatment to treat symptoms
- Ideal administration is at bedtime for the best absorption
- Lasts up to 2-3 days and then must be re-applied
- Non-hormonal, over-the-counter products are available [examples: polycarbophil-based gel, hyaluronic-based gel (Hyalogyn), Vitamin E inserts (Carlson KeyE)]

Vaginal lubricants

- Used to minimize dryness and pain during all sexual activity, any vaginal insertion and with gynecologic exams
- Available in gel or liquid form
- Applied in the vagina and around the genitals prior to sexual activity and may need to be re-applied during sexual activity
- Important to also apply to partner's genital area, especially before penetration
- Water- and silicone-based lubricants are recommended (water-based lubricants wash away more easily)
- Avoid petroleum-based lubricants (do not wash away easily and can increase risk of infection)
- Use caution with perfumed or flavored lubricants; they may irritate delicate tissues
- Common brand names can easily be found in drugstore chains, but online websites and sexual boutiques can offer greater variety
- Saliva is a natural lubricant

Adapted with permission from Carter J, Goldfrank D, Schover LR. Simple strategies for vaginal health promotion in cancer survivors. *J Sex Med* 2011;8:549-59.

and screening tools that can be used in clinical practice to identify some of these concerns and treatment side effects.

Ovarian cancer

The treatment for ovarian cancer usually consists of surgery involving a hysterectomy, bilateral salpingo-oophorectomy (BSO), omentectomy, lymph node removal, and tumor debulking with the goal of optimal cytoreduction (12). The removal of the ovaries and the fallopian tubes during a BSO can cause surgical menopause or even potentially aggravate menopausal symptoms in peri- or post-menopausal women. Menopausal symptoms triggered by cancer treatment are typically more abrupt, intense, and/or prolonged (13), which is caused by a sudden fall in estrogen and androgen levels; and these symptoms are qualitatively different than those of a natural menopausal decline (5-7). Cancer patients who experience a menopausal transition due to treatment can be more susceptible

to urinary tract infections, emotional lability, and increased irritability (14). Unmanaged menopausal symptoms like hot flashes, changes in mood, and difficulty sleeping may impact overall QoL, function, and desire for intimacy (15-17). Low-dose antidepressants can be extremely helpful in addressing vasomotor symptoms (18), and when used for the treatment of these symptoms, may not impair sexual function (19).

Vulvovaginal tissue quality issues also tend to be severe and chronic in female cancer patients, which directly impact their ability to feel sexual desire and achieve a fulfilling sex life without pain and discomfort (7). An internet-based evaluation of patients diagnosed with ovarian cancer showed that 63% of women felt like their diagnosis negatively affected their sex life, with both physical and emotional issues leading to diminished rates of sexual activity (20). Suggestions for addressing vulvovaginal issues are described in detail later in the article (see "Vaginal and Sexual Health Promotion Strategies" section and *Table 1*).

Serum CA-125 levels are often elevated in advanced ovarian cancers, providing a good biomarker for this disease (21); however, a patient's preoccupation with these levels throughout cancer care can cause heightened anxiety and significant depressive symptomatology (6,22). Screening tools can be helpful in the clinical setting to monitor distress levels and refer patients for additional support and mental health services (see "Screening and Assessment Tools" section). These women, however, often cope with a delicate balance of wanting information on their health, knowing their "numbers", and the fear of progression or recurrence. Although the biomarker has its limitations as a cancer screening tool in the general population and as a predictor of outcome (23), it is still a valuable clinical tool for oncologists caring for women diagnosed with ovarian cancer.

The majority of advanced-stage ovarian cancer patients will recur, prompting the need for intermittent and/or chronic chemotherapy treatment. Although the literature is more extensive in the breast cancer population, we can infer from studies since similar chemotherapeutic agents can be used in gynecologic cancer patients. Negative sequelae from chemotherapy, such as estrogen deprivation and menopause resulting in vulvovaginal dryness and atrophy, can affect sexual functioning and levels of interest and desire (24,25). Neurotoxicity from chemotherapy (i.e., neuropathy) can also directly impact QoL and function (26). Neuropathy is commonly linked to sensory changes in the hands and feet. This can alter daily activities and serve as a chronic reminder of their cancer. Nerve changes can also occur in the pelvic and clitoral area, diminishing pleasurable sensations and intimacy (27). The frequency and severity of toxicity can be enhanced by multimodal therapy and methods of administration (28,29). Patients receiving intraperitoneal (IP) therapy have reported poor health-related QoL (HRQoL) and significant neurotoxicity 3-6 weeks post-chemotherapy and 1 year later (26). Due to these adverse outcomes, less toxic therapeutic combinations are being explored. Chemotherapy can also result in nausea, vomiting, diarrhea, mucositis and fatigue, which understandably can negatively impact overall well-being and sexual activity, highlighting the need for symptom management strategies. In addition, alopecia from chemotherapy can challenge a woman's view of herself and visibly symbolize her cancer experience (16,30).

BRCA1 and *BRCA2* mutation carriers have an approximate 10-60% lifetime risk of developing ovarian cancer and an 84% risk of developing breast cancer (31).

Risk-reducing salpingo-oophorectomy (RRSO) can lower the risk for ovarian, breast, and fallopian tube cancer in these women. It is recommended that prophylactic surgery be performed once childbearing is completed or at 35 years of age. One study showed an 80% risk reduction in ovarian, fallopian tube, and peritoneal cancers in women between the ages of 35 and 40 as a result of ovary and fallopian tube removal (32). However, hormonal decline and premature menopause can trigger symptoms such as hot flashes, vaginal dryness/discomfort, and a decrease in sexual function in these women to a much greater extent than in women who undergo ovarian cancer surveillance (33-37). Many women delay or defer RRSO due to reproductive and menopausal concerns (38,39). RRSO rates for women who are at risk for ovarian cancer range from 17-80% (40-43).

Psychosocial factors can influence a woman's decision to undergo RRSO, although there is conflicting evidence regarding what these factors are (40,44-47). In one study involving a representative sample of women at high risk for ovarian cancer, decisions about prophylactic surgery were based on risk and individual sociodemographic circumstances (i.e., being parous, knowing mutation status, having a mother or sister who died from ovarian cancer) and not necessarily anxiety or distress over disease development (47). Choosing prophylactic surgery can actually be viewed as an empowering decision when women are provided with adequate information and simple strategies to address negative sexual sequelae (48,49). This consequently minimizes distress and also positively impacts overall QoL postoperatively (50).

Cognitive behavioral therapy combined with sexual health education has been demonstrated as a feasible and effective mechanism for alleviating sexual dysfunction and psychological distress in women at high risk for ovarian cancer (50). Preoperative and postoperative counseling regarding the short- and long-term negative sequelae of RRSO, the potential benefits of the surgery, and coping techniques is essential for these women as they consider this risk-reducing strategy (50). Ovarian cancer clinical trials should include patient-reported outcomes (PROs; i.e., physical symptoms and QoL domains) to help us better evaluate and manage these issues after surgery (51).

Endometrial cancer

Endometrial cancer is the most common gynecologic malignancy in the United States, with an estimated 52,630 new cases in 2014 (52). Endometrial cancer is more

common in postmenopausal patients, with only 3% to 5% of cases occurring in women younger than 40 years of age (53). The standard of care for endometrial cancer usually includes a hysterectomy, BSO, and may include the removal of lymph nodes. However, treatment varies by stage of disease, and in some cases, by the age of the patient.

Many women who have early-stage disease can be observed postoperatively, with no further treatment. Over the past several decades, minimally invasive surgery has been increasingly used in lieu of open procedures to decrease morbidity (54,55). Reduction in blood loss, complications, postoperative pain, and length of hospitalization has been found with minimally invasive approaches. The Gynecologic Oncology Group (GOG) conducted a prospective cooperative trial (LAP2) comparing laparoscopy (minimally invasive approach) with laparotomy (open approach) for comprehensive surgical staging of uterine cancer. Laparoscopic staging was found to be a feasible and safe alternative to laparotomy (56), with laparoscopic patients reporting better QoL, better physical functioning, less pain, more positive body image, and quicker recovery (57,58).

Lymph node sampling as a part of endometrial cancer treatment is a source of debate due to the lack of data supporting its overall and recurrence-free survival benefits (59,60). Recent research has shown sentinel lymph node mapping procedures may be a viable option and prevent the need for regional lymphadenectomy in patients with grade 1 endometrial cancer, thereby minimizing the possibility that these patients will develop lymphedema as a result of lymph node dissection (59-62). The greater the number of lymph nodes removed surgically, the higher the risk for lymphedema of the lower extremity (63). Lymphedema is characterized by localized fluid retention and tissue swelling. It is a chronic, disfiguring, and disruptive condition that necessitates long-term management, which can impact QoL and sexual function (64). Although lymphedema is not fatal, this late effect of cancer treatment is gaining more attention as survivorship increases and adjustment issues persist years after treatment. Currently, a landmark national cooperative group trial is prospectively studying over 1,000 women receiving pelvic surgery for gynecologic cancer to determine the incidence of lower extremity lymphedema, risk factors, and the impact of this condition on emotional and functioning outcomes (GOG244). These results will guide and inform the field about this condition.

For those with higher stage disease, radiotherapy and chemotherapy are often recommended. The Post-Operative

Radiotherapy in Endometrial Cancer trial (PORTEC-2) showed that treatment burden was greatly reduced by using vaginal brachytherapy (VBT) instead of external beam radiation therapy (EBRT) for many endometrial cancer patients (65,66). Longitudinal research evaluating the efficacy and toxicity of EBRT versus VBT in endometrial cancer patients found VBT to be associated with better social functioning and less symptoms of fecal leakage, diarrhea, and limitations of daily activities due to bowel symptoms (65). However, VBT has been shown to cause atrophic changes to the vaginal mucosa. These changes can result in vaginal dryness, dyspareunia, and vaginal fibrosis causing tightening and shortening of the vagina (65,67,68), and in turn can result in higher rates of sexual dysfunction and diminished sexual interest (69,70). Although increased vaginal atrophy has been seen in patients who have undergone VBT compared to EBRT, some research has shown no significant differences in sexual symptoms or sexual functioning between the two groups (65). Vaginal health strategies, including vaginal dilators, can be extremely helpful to both groups, as discussed in a later section of this article (see section on "Vaginal and Sexual Health Promotion Strategies").

Regardless of surgical technique, if the ovaries are removed, estrogen decline can result in hot flashes, vaginal dryness, dyspareunia, and lower overall QoL (7) as well as impact future fertility and sexual function. In two recent studies, 89% of early-stage endometrial cancer survivors scored below the diagnostic clinical cut-off on the female sexual dysfunction index (FSFI), indicating sexual dysfunction (70). These patients present with symptoms of dysfunction both before and after surgical intervention (71). This highlights the need to discuss sexual health throughout the cancer care continuum.

Conservative approaches may be considered in younger women to allow for subsequent childbearing (72,73). Progesterone therapy can slow or stop the growth of cancer cells while maintaining fertility by preserving the uterus and ovaries and has shown positive obstetric outcomes (72,74-76). Duration and type of progestin treatment are debatable. Oral progestin is an alternative to hysterectomy for women younger than 45 years of age; however, live birth rates are low, necessitating fertility specialist involvement (76). When choosing an appropriate progestin, efficacy, side effects, and patient tolerability should be considered (73). A hysterectomy with ovarian preservation in women with early-stage endometrial cancer is another conservative approach that can deter premature surgical menopause and

allow for future oocyte (egg) harvesting, but evaluation of possible synchronous ovarian cancer is required and patients must be committed to regular follow-up (77). The depth of myometrial invasion in the uterus, histologic grade, and potential ovarian cancer risk and that of late recurrences must be taken into account when deciding to use any treatment method (53,72,74,76,78,79).

Since endometrial cancer is typically detected at an early stage, few studies have evaluated QoL using validated measurement tools in women who present with more advanced disease (80). The few studies that have been conducted show that women faced with chronic disease and chronic therapy experience both emotional and physical challenges, with poor sexual function and other negative urinary and gynecologic sequelae (65,81). Although women who undergo chemotherapy for advanced, recurrent, or metastatic disease may experience longer progression-free survival, they may be at greater risk for the development of acute toxicity through the use of more intense chemotherapy regimens (82). Furthermore, although most endometrial cancer patients will survive their cancer, they will die from comorbidities, such as obesity (80), which underscores the need for PROs and symptom assessments in future clinical trials with advanced-disease patients to elucidate their specific needs/concerns (83). Most recently, exercise and dietary interventions have been developed for women diagnosed with endometrial cancer to decrease the risk of comorbidities and in turn have improved QoL and mental health in these women (84).

Cervical cancer

Radical hysterectomy is recommended for the treatment of early-stage cervical cancer. This surgery, however, is associated with short- and long-term changes in sexual function and overall QoL (85). Sexual function can be adversely affected by a radical hysterectomy as a result of the resection of the nerves and vascular supply to the vagina (14). Lack of libido (25-57%), lack of sensation in the labia (71%), decreased vaginal lubrication (10-26%), shortening of the vagina (25-26%), and dyspareunia (18%) have been reported by women who have undergone this intervention (86-88).

Simple hysterectomy for non-malignant indications compared to radical hysterectomy has been associated with lower vaginal blood flow responses in women (89). Denervation of the vagina and surrounding tissues (i.e., perineum) as a result of dissection of the pelvic connective

tissue (or the parametrium) can alter bladder sensations. Loss of control over bodily functions (urinary and bowel) in conjunction with sexual morbidity can create major psychological distress and threaten self-esteem, identity, feelings of intimacy, and relationships (90). As a result, nerve-sparing approaches have received further attention as a means to reduce treatment ramifications and improve women's QoL without compromising oncologic outcomes (91,92). Studies comparing nerve-sparing techniques versus standard radical hysterectomy show improved function (sexual, bowel, bladder) and less postoperative complications (91,92) together with earlier return of bladder function (93) reduced fecal incontinence and irregularity (94) and improved vaginal blood flow during arousal (95).

Cervical cancer is most common in women under 49 years of age (96,97); therefore, fertility preservation may be considered in select women. Radical vaginal trachelectomy has emerged as a safe surgical alternative for young early-stage cervical cancer patients (98-101). This procedure spares the uterus when resecting the cervix. Approximately 48% of women diagnosed with early-stage cervical cancer meet the criteria for radical trachelectomy (102). This procedure has shown similar recurrence rates to radical hysterectomy and has excellent obstetrical outcomes (99,103-106). Most often performed with a vaginal approach, radical abdominal trachelectomy has shown promising results (107,108).

In prospective studies comparing women undergoing radical hysterectomy versus radical trachelectomy, no group differences of distress, sexual function, QoL, or mood were seen (109-111). However, the results illustrated the challenges faced by all early-stage patients with regard to depression, distress, and sexual function (109-111). Although adaptive trends were seen over time, scores suggest persistent sexual function concerns for these women in comparison to healthy controls and/or normative data (109-112). In addition, many radical trachelectomy patients reported issues of neocervical stenosis (10-40%), dysmenorrhea (24%), and/or dyspareunia (10-30%). Dilators can be a helpful strategy to assist in managing neocervical stenosis and dyspareunia in these women. Ultimately, preoperative counseling regarding these potential side effects is essential for realistic expectations and adjustment in the postoperative setting (106,113,114).

Another conservative treatment option currently being explored is large conization and/or simple trachelectomy with pelvic lymphadenectomy for early-stage cervical cancer. Patients must be selected carefully, but this methodology is promising for women who want to maintain

fertility after treatment for cervical cancer (115,116). This conservative surgery may also result in fewer sexual side effects compared to other fertility-preserving options such as trachelectomy, but more research is warranted (117). Women with lesions larger than 2 cm or who have deep stromal involvement are typically unable to undergo trachelectomy (118). In these patients, in whom bulky tumor is present but fertility preservation is important, researchers are exploring neoadjuvant chemotherapy to reduce tumor and lymph node metastasis so that these women can become eligible for fertility-sparing surgery (118,119). In addition, a national cooperative group trial is evaluating large conization with pelvic lymphadenectomy to simple hysterectomy with pelvic lymphadenectomy in order to answer these questions (GOG278). Though not the current standard of care, these are treatment modalities worthy of further investigation.

Multimodal therapy may be recommended for more advanced or recurrent cervical cancer, including radiation therapy with or without chemotherapy, and in some patients, a radical surgical approach may be suggested for a centralized recurrence. Radiation treatment can be delivered either prior to surgery, concurrently, or postoperatively based on the prescribed treatment plan (12). This combination of treatments can result in major vaginal toxicity and can severely impact sexual function (i.e., vaginal dryness, stenosis, dyspareunia, and atrophy) (30,120). The narrowing or shortening of the vaginal canal can result from vaginal fibrosis (68,120), and in some instances, may result in total closure, precluding sexual intercourse and vaginal examination (121,122). Dilator therapy and vaginal health strategies should be suggested (see “Vaginal and Sexual Health Promotion Strategies” section and *Table 1*). Changes to bowel and bladder function may also result from pelvic radiotherapy, creating concerns with sexual activity (67,123,124). Embarrassment related to bowel or bladder incontinence, diarrhea, rectal pain, and cystitis may cause feelings of unattractiveness and interfere with sexual functioning (68).

One of the most radical gynecologic surgical interventions is the pelvic exenteration, a surgery involving the en bloc resection of the pelvic organs (i.e., rectosigmoid colon, lower urinary tract, ovaries, fallopian tubes, vagina, cervix, and uterus) (12). The body is changed fundamentally through the creation of ostomies and, for some, vaginal reconstruction (125,126). This surgery is potentially curative for women with recurrent or advanced disease centrally located in the pelvis, without any sign of distant metastasis; otherwise,

palliative care would be indicated. Exenterative surgery was developed to treat cervical cancer but can be used to treat other select gynecologic cancers (e.g., endometrial, vulvar cancer). Improved screening and patient selection to identify individuals without distant metastases has resulted from technological improvements in imaging (127). The best candidates appear to be those who are younger, have recurrent cervical cancer, and can achieve pathologically negative surgical margins (127). After pelvic exenteration, women often view their bodies differently, and in some cases, as less desirable or attractive (128,129). Reconstruction of a neovagina is an option best performed at the time of resection (130), but some research indicates that only 35% of patients who underwent pelvic exenteration opted to have vaginal reconstruction (127). Regardless of reconstruction decisions, sexual function changes can be expected (130,131). Ostomies for bladder and bowel elimination, for example, can trigger feelings of embarrassment, shame, and an altered body image (30). Therefore it is imperative that the healthcare team and patient discuss potential body changes (i.e., ostomy care and sexual function) preoperatively in order to optimize postoperative adjustment (128,132). A motivated patient with a good support network to assist during the recovery period is a good candidate for this type of invasive surgical procedure.

The human papillomavirus (HPV), a sexually transmitted infection, is the leading cause of cervical cancer worldwide. For many women, feelings of stigma and shame are associated with this diagnosis (133). Recent research within the general population has shown that cervical cancer patients may be judged and blamed for their diagnosis (133,134). Understanding the societal context of cervical cancer is necessary in order to assist patients managing any feelings of stigma and alienation (133). Furthermore, this stigma can be a significant barrier to screening and early detection (133,134).

Vulvar cancer

Management of vulvar cancer ranges from local vulvar excision to radical vulvectomy, which can include the removal of the entire vulva, nearby lymph nodes, and in some cases, the clitoris. Age of onset for this disease can also vary; typically, vulvar cancer presents in patients in the sixth or seventh decade of life; however, an increase in HPV-associated vulvar cancers has been seen in younger women (35 to 65 years of age) in recent years (135-137). This presents new challenges in understanding the long-

term emotional, sexual, and physical consequences in this patient population and requires further study.

The ability of these patients to cope and adjust to postoperative surgical changes is related to the radicality of surgery (138-140), relationship factors (141,142), age (138), and physical function (143-145). Although poorer sexual function and decreased QoL has been associated with older age and more extensive vulvar excisions (138,139), it should be noted that some studies do not show differences in pre- and postoperative function scores. However, when compared to healthy controls, it appears that vulvar cancer patients have sexual dysfunction both before and after treatment (142,146). Permanent numbness, fatty tissue loss, and clitoral removal, as well as tissue quality changes (143), are all specific treatment-related issues known to affect sexual function after vulvar surgery (147). In addition, vulvectomy can lead to uncomfortable gynecologic exams as a result of the narrowing of the vaginal opening and decreased arousal response due to dyspareunia (148). If the clitoris is resected, clitoral orgasms will be absent (30).

Surgical management of vulvar cancer often necessitates inguinal lymph node dissection, unilaterally or bilaterally, to determine regional metastasis. As a result, the potential for wound breakdown, infection, and postoperative complications (e.g., lymphedema), and subsequent sexual dysfunction, is higher for these individuals (144,149-152). Screening tools to detect lymphedema of the lower extremity for early intervention would be ideal in the clinical setting (see "Screening and Assessment Tools" section). Sentinel lymph node procedures have been incorporated into the management of vulvar cancer as a way of assuaging concerns about morbidity, with promising results (139,141,153,154). Sentinel lymph node biopsy provides clinicians with information about lymph nodes while reducing morbidity in the short (i.e., infection) and long term (i.e., lower extremity lymphedema) (77,154). Sentinel lymph node biopsy has shown its value in vulvar cancer, and more recently, in early-stage cervical cancer (155,156). A novel sentinel lymph node mapping approach using fluorescence imaging is currently being investigated in endometrial, cervical, and vulvar cancer patients, with promising results (157,158). This technique provides higher resolution during surgery.

Emotional adjustment

Regardless of disease site, physical complications from illness and treatment can result in a sense of a less

meaningful life and mood difficulties (159). Approximately 15-25% of cancer patients/survivors will be diagnosed with depression, a rate estimated to be at least four times greater than that of the general population (8); anxiety disorders will be diagnosed in 10-30% of these patients (8-11), illustrating the importance of screening in this patient population (160).

Negative feelings and distress can result from a lack of a partner and support during cancer treatment (161). A strong social support network has been found to be a buffering mechanism for physical symptoms and depression (162). For those in or seeking an intimate relationship, surgical scars can remind patients of their cancer experience and can influence self-perception (123). A women's sexual self-schema, or view of the sexual self, can impact sexual function in gynecologic cancer patients (162,163). Women may equate these losses or changes as an insult to their sense of self, viewing their body differently and often as less attractive (128,129). For some, feelings of disconnection or vulnerability can be overwhelming and impact overall wellbeing and sexuality. Possessing a positive sexual self-schema has been found to counteract depressive symptoms (162).

The American Society of Clinical Oncology (ASCO) developed a set of guidelines for the screening, assessment, and care of anxiety and depression in cancer patients (164). These guidelines state that the evaluation and treatment of depressive symptoms should occur throughout the continuum of care. Failure to do so can increase the risk of poor QoL, which can include sexual function (164). The psychotropic medications can be very helpful in treating depression and anxiety. An estimated 79% of cancer patients are on psychotropic medications to assist with depression and anxiety; these medications can also be helpful in addressing sleep disturbances, hot flashes, and pain (165). However, some of these medications can negatively impact sexuality, so risks and benefits should be discussed and weighed accordingly (166,167).

Screening and assessment tools

Individuals at risk for psychological and sexual issues need to be identified in order to improve function, coping and enhance overall QoL. We offer some screening tools that can be used within the clinical setting to identify emotional and sexual concerns, allowing for a more in-depth evaluation for possible intervention and referral.

The distress thermometer (DT) is recommended by the National Comprehensive Cancer Network (NCCN) as a validated tool to assess distress in an oncology population (168).

This simple, self-administered, internationally validated tool can be used to prioritize, triage, and screen patients prior to the initiation of treatment or throughout the continuum of care in a time-efficient and cost-effective manner (168). Distress is defined as “a multifactorial, unpleasant, emotional experience of a psychological, social, and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms, and its treatment” (169). A growing body of research has shown that gynecologic cancer patients may experience more significant distress than other cancer populations (170), with single and younger (under the age of 60) patients being at the greatest risk for distress (170). The DT assesses distress on three separate domains: physical, emotional, and practical. Worry was the strongest factor associated with distress. Another item shown to contribute to distress was difficulty getting around, which may be associated with treatment-related side effects such as fatigue, lower extremity lymphedema, and pain (171). Lack of sleep is associated with mood disturbances, suggesting that emotional distress and insomnia are interrelated in these patients (171). The DT can help identify patient concerns for appropriate triage. We encourage the reader to review the ASCO guidelines for “Screening, assessment, and care of anxiety and depressive symptoms in adults with cancer” for a comprehensive overview of validated measures that could be used for a more in-depth assessment on these domains.

The NCCN also recommends the use of the Brief Sexual Symptom Checklist for Women as a screening tool for sexual dysfunction (172). This four-question checklist enables care providers to quickly ascertain if sexual dysfunction is present and to offer coping tools like moisturizers and lubricants for vaginal dryness and dyspareunia and dilator therapy for vaginal stenosis or atrophy. Once concerns have been identified, simple strategies can be offered (*Table 1*) or appropriate referrals can be made to clinicians with expertise in this area. For a more in-depth assessment, validated measures such as the PROMIS-SxF measure and the FSFI can be considered (173-176). The PROMIS-SxF was developed specifically for the assessment of sexual functioning in cancer patients, and the FSFI is one of the most widely accepted measures of sexual dysfunction. Both have been validated in cancer patients and survivors (177,178).

The Gynecologic Cancer Lymphedema Questionnaire (GCLQ) is a patient-self-reported survey used to assess individuals for lower extremity lymphedema. It is a brief

20-symptom assessment with four supplemental items to assess a patient’s consciousness of their lower or upper extremity lymphedema and their use of treatment and coping tools. This tool has been found to have good sensitivity and specificity and has been used in gynecologic cancer populations (179). If symptoms are detected, a referral should be made for formal limb measurement and/or a referral to specialists for evaluation. Support garments and physical therapy for lymphedema can be helpful to women living with and trying to manage this condition. Research on lower extremity lymphedema is limited and often lacks lymphedema-specific measures assessing the social, sexual, emotional, and QoL effects of this chronic condition (180). Disease-specific measurements and prospective data using lymphedema are greatly warranted so that we can better understand the extent of burden in individuals living with this disorder and further identify cohorts at risk for early intervention. The National Institutes of Health (NIH) and the GOG have recognized this need, and as mentioned, a national cooperative group trial is currently in progress to investigate lower extremity lymphedema in gynecologic cancer patients. The GCLQ is a validated measure that is being used both nationally and internationally to identify lymphedema (181,182).

Vaginal and sexual health promotion strategies

Clinical assessment and intervention for sexual health issues, including menopausal symptom management, may assist in reducing vulvovaginal and menopausal symptoms (hot flashes, vaginal dryness, dyspareunia, chronic UTIs, and incontinence). Simple yet effective strategies such as vaginal moisturizers and lubricants, dilators, and pelvic floor exercises can be utilized to mitigate vaginal discomfort (*Table 1*).

Vaginal lubricants are recommended during sexual activity or with the use of dilators to decrease vaginal irritation. Moisturizers, if applied 3-5 times per week, can help alleviate vulvovaginal symptoms by hydrating the vaginal tissues and re-establishing a normal pH level and providing relief to the lower genital tract tissue if applied externally to the vulva. Unfortunately, some women do not know the differences between moisturizers and lubricants. This results in a failure to implement these strategies correctly and at a frequency that would effectively alleviate symptoms.

Dilator therapy can help to restore elasticity of the vaginal tissues and can be especially beneficial for gynecologic cancer patients who have received pelvic radiation. However, dilators can be helpful to any gynecologic cancer patient or

survivor experiencing discomfort (either with gynecologic exams or dyspareunia) (183). A recent study suggests that provision of information and resources regarding dilator use for sexual rehabilitation should ideally be given to patients before treatment and tailored to an individual's needs (e.g., age and sexual activity) for the most benefit (184). Yet, more rigorous, prospective studies of dilator therapy are needed due to some inconsistencies in the literature (185,186).

Additionally, drawing blood flow to the pelvic floor may have possible restorative effects in the vagina (187). Therefore, the use of pelvic floor muscles could be a mechanism to facilitate circulation and arousal (188). Pelvic floor exercises also can be done in conjunction with dilator therapy for a more comprehensive stretch and provide greater awareness and control over muscles that may be contributing to pain.

Healthcare professionals are encouraged to discuss sexual and vaginal health concerns with their cancer patients (189), but there is a lack of consensus on how to best discuss the topic. In a 2012 literature review, only three studies were found that tested an intervention addressing sexual concerns for gynecologic cancer survivors (90,190-192). Several small studies have shown that education can help decrease the morbidity of vaginal atrophy (90). Telephone counseling and online psychoeducational interventions have been shown to be effective modalities for extending psychosocial services to cancer survivors (193,194).

Several models have been offered to facilitate communication between cancer patients and the healthcare team. The 5As for sexual health communication is an adaptation of a behavioral health counseling model that targets the oncology team and uses a multi-disciplinary approach (195,196). They consist of: (I) ask—raise the topic throughout the continuum of care; (II) advise—normalize any difficulties/concerns and reassure that help is available; (III) assess—brief assessment to identify symptoms in order to initiate further discussion and provide treatment recommendations; (IV) assist—provide resources such as patient educational materials, information sheets, or booklets (i.e., ACS cancer and sexuality) and referral for specialists (counselor, gynecologist urologist); and (V) arrange follow-up—patients should receive follow-up on the topic or referral at subsequent visits. The PLISSIT model can also help enhance communication about sexual function in the clinical setting (197,198). This graduated counseling system consists of four parts: (I) permission giving—letting patients know that it is common to have and discuss sexual concerns; (II) limited information—giving patients a brief

education of how cancer and its associated treatments can impact sexual function; (III) specific suggestions—giving patients resources for improving sexual activity and information on interventions; and (IV) Intensive therapy—initiating or referring patients to individual therapy or sexual health counseling (199). Utilizing these models may be helpful in facilitating a discussion regarding sensitive topics such as sexual health. It is important to acknowledge the potential for sexual side effects due to treatment and to provide patients the opportunity to discuss their sexual health in a comfortable setting.

Conclusions

Surgical intervention is not typically the only treatment modality used to treat gynecologic cancer (i.e., chemotherapy, radiation therapy), and the multimodal nature of gynecologic cancer treatment has a significant impact on adjustment and QoL (85,200). QoL issues, emotional and sexual wellbeing, and treatment side effects (lymphedema/menopause) are important to women in survivorship and those living with chronic disease. The treatment decision-making process should include the potential impact of gynecologic cancer surgical treatment, associated treatment modalities, and their ramifications on physical, sexual, and emotional function and QoL. Brief assessments can be useful in the clinical care setting to assist in the identification of and addressing problematic issues throughout the continuum of care. This optimizes quality of care and ultimately the QoL in these women. Prospective clinical trials with gynecologic oncology populations should include PROs to identify subgroups at risk for difficulties during and following treatment for early intervention.

Acknowledgements

None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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Cite this article as: Stabile C, Gunn A, Sonoda Y, Carter J. Emotional and sexual concerns in women undergoing pelvic surgery and associated treatment for gynecologic cancer. *Transl Androl Urol* 2015;4(2):169-185. doi: 10.3978/j.issn.2223-4683.2015.04.03