

# Gynecologic Considerations for the Urologic Surgeon

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## Last Updated:

Wednesday, January 11, 2023

## 1. Introduction

Figure 1. Optimizing Surgical Care for Women

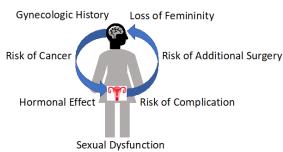


Figure 1. The various factors that urologists consider when providing surgical care for women with pelvic organ prolapse or prior to radical cystectomy.

A patient's gynecologic history is one of the many factors that urologists consider during (1) surgical planning for apical **pelvic organ prolapse** and (2) surgical planning for **bladder cancer**. With respect to pelvic organ prolapse, information from the gynecologic history can help guide management of the uterus at the time of apical/uterine prolapse repair as well as the decision to perform adjunctive ovarian cancer risk reduction surgery. Regarding bladder cancer, information from the gynecologic history can be used to assess a patient's candidacy for gynecologic organ sparing at the time of radical cystectomy, which may improve continence and sexual function as well as maintain reproductive function. Altogether, information from the gynecologic history helps to optimize surgical care for women ( **Figure 1**).

In this chapter of the Core Curriculum, we review background gynecologic information that is utilized by urologists prior to performing apical prolapse repair or radical cystectomy. Gynecologic considerations for the urologic surgeon performing these surgical procedures are discussed. For practical purposes, this information is presented according to anatomic site.

## 2. Cervix

### 2.1 Background

As a result of cervical cancer screening and HPV vaccination, there has fortunately been a dramatic decline in cervical cancer specific mortality. Regardless, in 2021, approximately 14,000 women in the United States will be diagnosed with cervical cancer, and 4,280 women will experience mortality from cervical cancer.<sup>1</sup> Cervical cancer incidence and mortality rates are significantly higher in financially poorer countries.<sup>2</sup>

### 2.2 Cervical cancer screening methods

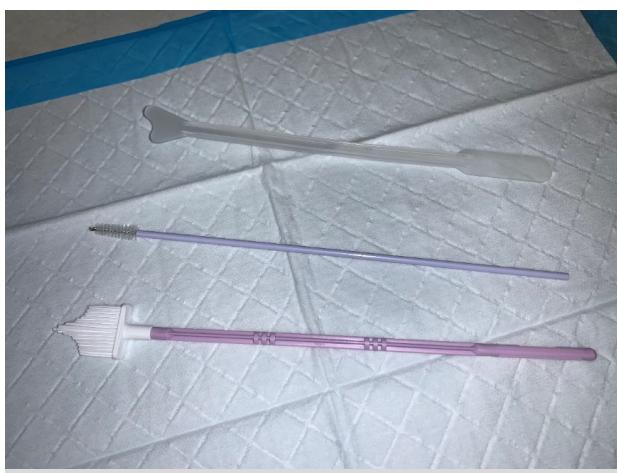


Figure 2. Spatula (top instrument) and cytobrushes (bottom)

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two instruments) used for cervical cancer screening

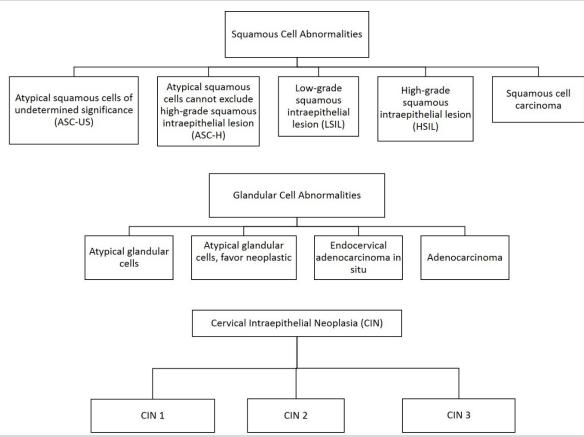


Figure 3. Squamous cell abnormalities and glandular abnormalities are cytologic results reported on Pap smear test while findings of CIN are histologic results that are diagnosed during colposcopy and biopsy.



Figure 4. Colposcope

The two methods used for cervical cancer screening include the Papanicolaou test (i.e. Pap smear) and the HPV test. The Pap smear and HPV tests can be performed alone or together (i.e. co-testing).

In the Pap test, cervical cells are obtained using a spatula and brush with the aid of a speculum (Figure 2). The cells are then analyzed and classified according to the Bethesda System. Abnormal epithelial cell results are classified by this system as either squamous cell abnormalities or glandular cell abnormalities (Figure 3).

The basis for the HPV test is that certain types of HPV (e.g. HPV 16, 18) are associated with the development of cervical cancer. For the HPV test, a spatula or brush is also used to obtain a specimen at the time of speculum examination and tested for high risk HPV DNA or RNA by assay.

### 2.3 Results of cervical cancer screening

Abnormal cervical cancer screening results, which are detected by Pap and/or HPV testing prompts future retesting or evaluation with colposcopy (Figure 4). During colposcopy, the cervix is visually magnified with a colposcope and lesions are biopsied. There are several methods available to help aid in the identification of pathologic tissue, including the application of acetic acid to the cervix, which causes abnormal cells to appear white (this phenomenon is



termed “acetowhite change”). At the time of colposcopy, an endocervical curettage may also be performed to increase disease detection.<sup>3</sup> This additional step may especially increase detection of glandular lesions, which are characteristically noncontiguous in nature and thus described as “skip lesions.”

## 2.4 Results from colposcopy and biopsy

Pathologic results from colposcopy include cervical intraepithelial neoplasia (CIN) and cervical cancer. CIN is considered a precursor to cervical cancer and graded as CIN 1, CIN 2, or CIN 3 (**Figure 3**). CIN 1 is a low grade lesion with a low risk of progression to malignancy while CIN 2 and 3 are typically grouped together and considered to be a high grade lesion with a greater chance of progression to malignancy.

## 2.5 Treatment of CIN and recurrence

Treatment of CIN 1 may include either observation with repeat Pap and HPV testing in 1 year, repeat colposcopy and biopsy with endocervical curettage, or an excisional procedure e.g. loop electrosurgical excision procedure (LEEP). The Pap smear and HPV results that prompted the colposcopy in addition to patient preferences and childbearing goals are main factors which are considered when selecting a treatment option.

CIN 2 and 3 are not observed and are typically treated with an excisional procedure e.g. LEEP. In select cases of CIN 2, repeat colposcopy and HPV testing can be performed to avoid an excisional procedure. Needless to say, the above information is a simplified overview of CIN treatment. Detailed information on the treatment of CIN can be found in the 2019 American Society of Colposcopy and Cervical Pathology (ASCCP)-sponsored consensus guidelines.<sup>4</sup>

In terms of CIN recurrence, most cases of CIN 1 either regress or persist as the same grade on follow up; however, approximately 7% of patients will progress to a higher grade lesion on follow up.<sup>5</sup> In patients who undergo an excisional procedure for CIN, margin status and HPV persistence on follow up testing are main risk factor for recurrence.<sup>6</sup>

## 2.6 Cervical cancer screening guidelines

There are several publications available that offer guidance on cervical cancer screening with no universally agreed upon screening strategy as to the age at which to initiate screening, the screening method, the screening frequency, or the age at which to discontinue screening.<sup>7</sup> According to the USPSTF guideline,<sup>8</sup> screening should be initiated at age 21 and consist of a Pap test every three years until age 29. For women age 30 or older, screening may consist of either: (1) Pap test every 3 years, (2) primary HPV test every 5 years, or (3) co-testing with the Pap and HPV tests every 5 years. At age 65, screening can be discontinued as long as the patient is not considered to be at high risk for cervical cancer and there has been adequate prior screening. In women who underwent hysterectomy with removal of the cervix, screening is not recommended unless there is a history of cervical cancer or a high grade lesion (i.e. CIN 2,3).

# 3. Uterus

## 3.1 Background

The most common type of uterine cancer is endometrial, accounting for greater than 90% of uterine cancer diagnoses.<sup>9</sup> Uterine sarcoma, arising from the mesenchymal cells of the uterus, is the other main type of uterine cancer. Approximately 3% of women develop uterine cancer in their lifetime.<sup>10</sup> Main risk factors for uterine cancer, include age, unopposed estrogen (e.g. systematic estrogen replacement therapy), obesity, anovulation, and hereditary risk factors (e.g. Lynch syndrome/hereditary nonpolyposis colorectal cancer syndrome and hereditary leiomyomatosis and renal cell carcinoma syndrome).<sup>11-12</sup> The most common presenting symptom of endometrial cancer is abnormal uterine bleeding.<sup>14</sup> Uterine sarcomas can present with bleeding but also with symptoms from mass effect. Sarcomas can be mistaken for a benign leiomyoma (i.e. fibroid); as such, sarcomas may initially be diagnosed on pathology at the time of fibroid surgery/hysterectomy.

## 3.2 Vaginal bleeding

In postmenopausal women, any vaginal bleeding is presumed to be pathologic until proven otherwise. However, atrophy is the most cause for bleeding in this age group. In premenopausal women, bleeding which occurs more than every 24 days or lasts for more than 8 days, or is heavy in nature (either defined as bleeding volume > 80mL per cycle or perceived by the patient to interfere with quality of life) is considered abnormal.<sup>15-16</sup>

## 3.3 Evaluation of abnormal bleeding

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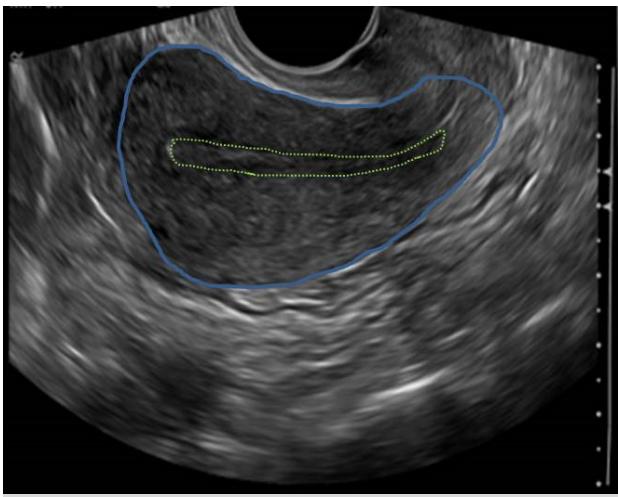


Figure 5. Transvaginal sonogram of uterus

Transvaginal ultrasound of the uterus (highlighted in blue) demonstrating a 7mm thick endometrial stripe (highlighted in green).



Figure 6. Endometrial suction curette used for biopsy

Two commonly used diagnostic modalities to evaluate abnormal bleeding are: (1) transvaginal sonogram and (2) endometrial biopsy. Using transvaginal sonography, the endometrial lining is measured and further characterized (Figure 5). In postmenopausal women, endometrial cancer is highly unlikely if the endometrial lining (i.e. "endometrial stripe") measures  $\leq 4\text{mm}$ .<sup>14-17</sup> In a patient with postmenopausal bleeding with a  $>4\text{mm}$  lining on sonogram or with persistent bleeding or abnormal echogenicity of the endometrium, an endometrial biopsy is typically performed. An endometrial biopsy is an office based procedure where a sampling device such as a Pipelle, is introduced into the uterine cavity through the cervical os to obtain endometrial cells for evaluation (Figure 6). Imaging with ultrasound can play an important role in the evaluation of abnormal uterine bleeding in premenopausal women; however, it is not used to rule out endometrial cancer in this group as the lining will be thicker and fluctuate in size as compared to postmenopausal women. Therefore, in premenopausal women, an endometrial biopsy is more valuable in the evaluation for endometrial cancer.

### 3.4 Evaluation of uterine sarcoma

It is extremely difficult to distinguish a uterine sarcoma from a benign leiomyoma. Historically, rapid growth of a uterine mass was considered to suggest a sarcoma but this has been questioned.<sup>18</sup> In patients with vaginal bleeding and a uterine mass, endometrial biopsy may diagnose a sarcoma but is not completely reliable. Ultimately, sarcomas may first be diagnosed on pathology after hysterectomy or myomectomy.

### 3.5 FDA advisory on morcellation

In 2014, the FDA raised concerns about the use of power morcellation to remove uterine specimens at the time of hysterectomy.<sup>19</sup> This was based on the possibility of morcellating an unsuspected uterine malignancy and disseminating disease. The FDA advisory has since been updated, and more recently, in December 2020, the FDA advised that power morcellation only be used for myomectomy or hysterectomy specimens with a legally marketed tissue containment system.<sup>20</sup> That way, the morcellated tissue is prevented from contaminating the peritoneal cavity. As well, the FDA advised to avoid using power morcellation for specimen removal with fibroid tissue in women who are post-menopausal, age  $> 50$ , or candidates to have the entire specimen removed through the vagina or mini-laparotomy. When using power morcellation, the patient should be informed of the risk of occult cancer and associated risk of morcellating an undiagnosed malignancy and upstaging disease.<sup>21</sup>

## 4. Adnexa

#### **4.1 Background**

Ovarian cancer remains the most common cause of death from gynecologic malignancy in the US and in many parts of the world.<sup>22-23</sup> There are different histologic types of ovarian cancer, including epithelial, germ cell and sex cord-stromal neoplasms. The most common histology of ovarian cancer is epithelial, and several subtypes of epithelial ovarian cancer exist (serous, endometrioid, clear cell and mucinous). As high grade serous epithelial ovarian cancer shares similar characteristics to fallopian tube carcinoma and peritoneal carcinoma, they are commonly grouped together and considered as a single entity.

#### **4.2 Risk factors for ovarian cancer**

There are many risk factors for ovarian cancer, including environmental and hereditary risk factors (**Table 1**).<sup>24</sup> Two hereditary risk factors include BRCA 1&2 gene mutations as well as genetic mutations associated with Lynch Syndrome (hereditary nonpolyposis colorectal cancer). While studies estimating the rate of ovarian cancer in patients with genetic risk factors vary, a large cohort study of over 3000 women with BRCA mutations estimated a 44% risk of ovarian cancer in women with a BRCA 1 mutation and a 17% risk in women with a BRCA 2 mutation.<sup>25</sup> The risk of ovarian cancer in women with Lynch Syndrome is approximately 10.<sup>26</sup>

**Table 1. Commonly reported risk factors for ovarian cancer**

Hereditary/genetic risk factors (e.g. BRCA 1 mutation, BRCA 2 mutation, Lynch Syndrome)

Endometriosis

Tobacco use

Infertility

Age

Use of hormone therapy

#### **4.3 The role of fallopian tube in the pathogenesis of ovarian cancer**

Research has identified a role for the fallopian tube in ovarian cancer carcinogenesis in many cases.<sup>27</sup> Two potential mechanisms are: (1) precursor neoplastic cells originate in the fimbriated portion of the fallopian tube and implant on the ovary/peritoneum during carcinogenesis, and (2) the fallopian tube serves as a conduit allowing carcinogens to reach the ovary (from the outside environment and uterus). Evidence supporting the theory of precursor lesions in the fallopian tubes emerged from studies looking at fallopian tube pathology slides in women with BRCA mutations who were undergoing risk reducing bilateral salpingo-oophorectom.<sup>28-29,30</sup> In these studies, ovarian cancer precursor lesions were found in the fallopian tubes and not in the ovaries. Evidence supporting the theory that the fallopian tube serves as a conduit for carcinogens is based on epidemiologic evidence demonstrating a protective effect of tubal ligation on ovarian cancer development.<sup>31</sup>

### **5. Gynecologic Considerations for the Urologist Prior to Apical Prolapse Repair**

#### **5.1 Considerations relating to the cervix at the time of apical prolapse repair**

Clearly, there are many factors that go into decision making during the reconstructive surgical planning process and each patient is handled on a case by case basis. However, it is important to understand cervical cancer screening results during reconstructive surgical planning for uterine/apical prolapse as the cervix is managed differently among the available operations (**Table 2**). In women with pelvic organ prolapse and high risk cervical pathology (i.e. CIN 2,3), leaving the cervix in place as done during a hysteropexy or supracervical hysterectomy is not advisable. Likewise, in patients at high risk for recurrent cervical pathology (e.g. a patient with CIN 3 and/or a positive margin at the time of LEEP), leaving the cervix in place at the time of prolapse surgery may also be inadvisable. Preferred surgical options in these patients consist of total vaginal hysterectomy and native tissue apical suspension (i.e. uterosacral suspension or sacrospinous fixation) or total hysterectomy and sacrocolpopexy (robotic, laparoscopic or open). Although debatable, some surgeons may elect to avoid sacrocolpopexy in women undergoing total hysterectomy based on data suggesting a higher rate of future mesh exposure when removing the cervix and placing mesh adjacent to the vaginal cuff closure.<sup>32,33</sup>

**Table 2. Review of common types of hysterectomy from Weissbart, S. J., & Smith, A. L. (2017). Hysterectomy in the Urologist's practice. Current urology reports, 18(1), 4.**

### Total hysterectomy

*Description:* The uterus and cervix are removed through an abdominal approach. (Can be done using a minimally invasive approach, i.e., laparoscopic total hysterectomy, robotic total hysterectomy).

*Advantages:* Can remove cervical pathology if present, can be useful if large fibroids are present, and allows easy access to adnexa for concomitant removal when needed.

*Disadvantages:* Open approach is associated with increased pain and wound complications. In the setting of mesh sacrocolpopexy, the vaginal suture line is at risk for mesh erosion.

### Supracervical hysterectomy

*Description:* The uterine body is removed and the cervix is left in situ through an abdominal approach. (Can be done using a minimally invasive approach, i.e., laparoscopic supracervical hysterectomy, robotic supracervical hysterectomy).

*Advantages:* Leaving the cervix can provide an important barrier between mesh and vaginal apex, can be useful if large fibroids are present, and allows access to adnexa for concomitant removal when needed.

*Disadvantages:* Prevents removal of the uterine specimen through vagina (in minimally invasive supracervical hysterectomy cases), and women with cervical pathology (or risk factors) may not be ideal candidates.

### Vaginal hysterectomy

*Description:* The uterus and cervix are removed through a vaginal approach.

*Advantages:* May cause less pain than abdominal approach and may expose women to risk of fewer complications.

*Disadvantages:* Removing adnexa, large uteri, or fibroid uteri can be challenging through a vaginal approach.

### Radical hysterectomy

*Description:* The uterus, cervix, fallopian tubes, ovaries, upper vagina, lymph nodes, and parametrium are removed through abdominal approach. Used in surgical care of women with gynecologic malignancy.

Another clinical scenario when cervical cancer screening results are extremely important in female pelvic reconstructive surgery is when considering Le Fort colpocleisis in a patient with uterine prolapse. After colpocleisis, the vaginal vault will be obliterated, which precludes access to perform future cervical screening or diagnostic biopsies. While each patient is typically handled on a case by case basis, **it may be inadvisable for women with a history of cervical pathology to undergo obliterative prolapse surgery such as colpocleisis**. While hysterectomy may be considered prior to colpocleisis, it is associated with a higher risk of complications as compared to leaving the uterus in situ.<sup>34</sup>

Women undergoing supracervical hysterectomy and prolapse repair should be reminded that they may require continued cervical cancer screening as the cervix was retained during surgery. In women undergoing total hysterectomy, screening of the vaginal cuff may be required based upon history of cervical pathology.<sup>8</sup>

## 5.2 Gynecologic considerations relating to the uterus at the time of apical prolapse repair

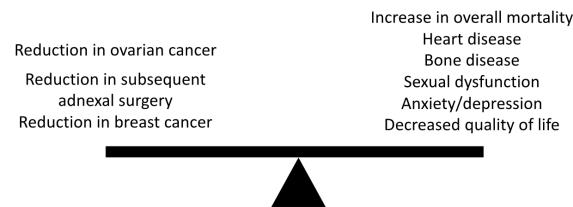
Abnormal vaginal bleeding in women with prolapse should be evaluated prior to reconstructive surgery. In postmenopausal women with vaginal bleeding, a benefit of **transvaginal sonogram** (compared to endometrial biopsy) is its ability to additionally evaluate for occult ovarian pathology as well as to further anatomically characterize the uterus.

In the absence of symptoms such as bleeding, it does not appear to be cost-effective to obtain routine pelvic imaging prior to reconstructive surgery to screen for uterine cancer. This is based on data from numerous studies showing an extremely low rate of occult uterine malignancy at the time of surgery for prolapse.<sup>35</sup> One specific instance when screening may be more strongly considered is prior to Le Fort colpocleisis. As the endometrium cannot be evaluated after colpocleisis due to the obliterative nature of the procedure, preoperative evaluation of the endometrium with sonogram or biopsy is considered. However, data have demonstrated that owing to a low rate of occult malignancy in this population, it is not cost-effective to obtain routine imaging or perform an endometrial biopsy in women prior to Le Fort colpocleisis.<sup>36</sup>

It is important for surgeons performing supracervical hysterectomy during prolapse repair to be knowledgeable of the current FDA advisory on power morcellation. Surgeons who wish to avoid using power morcellation can consider alternative methods for specimen extraction, such as mini-laparotomy. Of course, after vaginal hysterectomy or total hysterectomy, specimen extraction is not typically an issue as the uterus can be delivered through the open vaginal cuff and sent for pathology.

## 5.3 Gynecologic considerations relating to the adnexa at the time of apical prolapse repair

**Figure 4. Bilateral Salpingo-oophorectomy at the Time of Urologic Surgery**



**Figure 7. Factors consider when deliberating adjunctive ovarian cancer risk reduction surgery at the time of prolapse repair**

During apical prolapse repair, it has become common practice to consider adjunctive ovarian cancer risk reducing surgery (**Figure 7**). Two options that surgeons consider, include bilateral salpingo-oophorectomy or bilateral salpingectomy alone (i.e. without removal of the ovaries). The decision to perform which, if any, procedure is decided on an individual basis, and surgeons must weigh the risks and benefits of all options. While salpingectomy has been shown in retrospective studies to significantly decrease risk of ovarian cancer,<sup>37-38</sup> large scale prospective studies are needed to fully understand its protective effects in comparison to bilateral salpingo-oophorectomy. Notably, salpingectomy has been shown to not add significant surgical risk<sup>39</sup> and is not likely to diminish future ovarian function.<sup>40-41</sup> Multiple societies support the role of opportunistic salpingectomy at the time of pelvic surgery.<sup>42</sup>

At the time of hysterectomy, bilateral salpingo-oophorectomy significantly decreases ovarian cancer risk; however, it may also expose women to serious long-term health risks, such as cardiovascular disease, cognitive dysfunction, and chronic kidney disease.<sup>43-44-45</sup> Even after menopause, the ovaries still release estrogen, which has a protective effect for women. In fact, data has suggested that when salpingo-oophorectomy is performed prior to age 65, it increases the risk of all-cause mortality (likely from death due to cardiovascular, pulmonary and neurologic disease).<sup>46</sup> It has been argued that at age 65 and older, the beneficial effects of bilateral salpingo-oophorectomy (in reducing death from ovarian cancer) counterpose the harms.<sup>46</sup> Thus, it is essential to consider patient age as well baseline risk factors for ovarian cancer when planning potential ovarian cancer risk reducing surgery at the time of prolapse repair. Lastly, it is important to be cognizant of the short term effects of "surgical menopause" when performing bilateral salpingo-oophorectomy in pre- and peri-menopausal women. Symptoms from surgical menopause, including vasomotor instability and poor sleep are especially bothersome to patients and challenging to treat.<sup>47</sup>

## 6. Gynecologic considerations for the Urologist Prior to Radical Cystectomy

In the standard technique of radical cystectomy in a female, the uterus, ovaries, fallopian tubes, and anterior vaginal wall are resected along with the **bladder and urethra**. This is performed in order to maximize oncologic control. However, recent literature has questioned the necessity of removing the

gynecologic organs at the time of cystectomy. The impetus for this research has been trying to **improve urinary and sexual outcomes after surgery**. Additionally, it has been clearly demonstrated that the ovaries still provide a benefit to overall health even after menopause.<sup>48-49-50</sup>

Pertaining to urinary outcomes, gynecologic organ sparing may especially be important when considering an orthotopic neobladder. After neobladder creation, some patients experience urinary retention / incomplete emptying (known as “hypercontinence”), which may result from kinking of the urethro-ileal anastomosis due to poor anatomic support.<sup>51</sup> By sparing the gynecologic organs, anatomic support to the vagina and urethro-ileal anastomosis is improved, which theoretically should decrease the risk of hypercontinence. Additionally, sparing the anterior vaginal wall minimizes injury to the neurovascular bundles (which pass near the lateral vaginal walls) and may result in improved continence outcomes.<sup>52</sup>

Sexual outcomes may also be improved when sparing the gynecologic organs at the time of cystectomy. Resecting the vaginal wall causes vaginal shortening, and during resection, the clitoris and neurovascular bundles may be harmed. This may contribute to the high rate of dyspareunia and sexual dysfunction seen after radical cystectomy. Removing the ovaries may also lead to some degree of sexual dysfunction, although one would expect this to be less likely in postmenopausal women.

Gynecological organ sparing is typically considered for young sexually active women as this group may experience the greatest benefit. In fact, there have even been reports of pregnancy after gynecologic organ sparing cystectomy.<sup>53</sup> However, it is extremely important to **consider bladder tumor characteristics when considering gynecologic organ sparing, and women with hydronephrosis, a palpable mass, or a positive lymph node appear to be especially at high risk for finding the gynecologic organs to be involved with malignancy**.<sup>54</sup> Currently, there are no agreed upon indications or patient criteria for gynecological organs sparing at the time of cystectomy; patients are considered on a case-by-case basis. Notably, in the **2020 AUA/ASCO/ASTRO/SUO guideline** on muscle invasive bladder cancer, gynecologic organ sparing may be considered in select cases in women with early stage disease.<sup>55</sup>

It is important to **review a patient's gynecologic history when considering gynecologic organ sparing. Women with abnormal cervical cancer screening or a history of high risk CIN** are not be ideal candidates for gynecologic organ sparing. As well, sparing the gynecologic organs in **women with vaginal bleeding** isn't prudent as the bleeding may represent involvement by the bladder tumor. In **women with risk factors for ovarian cancer**, it may be disadvantageous to spare the ovaries at the time of surgery.

## 7. Conclusions

A patient's gynecologic history is one of the many factors to consider prior to prolapse repair or radical cystectomy. Preoperatively, surgeons should ask about prior cervical cancer screening results and/or the presence of vaginal bleeding, which could be indicative of malignancy. In post-menopausal women, transvaginal sonogram can evaluate for endometrial cancer based on measurement of the endometrial lining. The decision to perform adjunctive ovarian cancer prevention surgery at the time of surgery is based on patient age, risk factors, and preferences. There is growing interest in gynecologic organ sparing cystectomy as a way to improve functional outcomes.

## Videos

V13-12: Adnexal Management at the Time of Elective Pelvic Surgery in Women

V12-06: Female Organ-Sparing Robot-Assisted Radical Cystectomy: Technique and Initial Experience.

## Presentations

Gynecologic Considerations for the Urologic Surgeon Presentation 1

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