Guidelines for vulvar and vaginal surgery: Enhanced Recovery After Surgery Society recommendations

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Introduction

Enhanced Recovery After Surgery (ERAS) is regarded as a global surgical quality improvement initiative that results in clinical[1] and cost benefits.[2] The ERAS gynecologic oncology guidelines[3,4]

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This is the first collaborative Enhanced Recovery After Surgery Society guideline for optimal perioperative care for vulvar and vaginal surgeries. An Embase and PubMed database search of publications was performed. Studies on each topic within the Enhanced Recovery After Surgery vulvar and vaginal outline were selected, with emphasis on meta-analyses, randomized controlled trials, and prospective cohort studies. All studies were reviewed and graded according to the Grading of Recommendations, Assessment, Development and Evaluation system. All recommendations on the Enhanced Recovery After Surgery topics are based on the best available evidence. The level of evidence for each item is presented.

Key words: gynecology, Enhanced Recovery After Surgery, ERAS, vaginal surgery, vulvar surgery

EDITORS' CHOICE

were first published in 2016 and updated in 2019.[5] The ERAS gynecology protocols to date, however, have focused mainly on intraabdominal surgery, with no recommendations for vulvar and vaginal surgeries, often performed in the oncology and urogynecology settings, respectively. To address this gap, the ERAS Society Gynecology Chapter convened to critically review the existing evidence and make recommendations for the elements of pre-, intra-, and postoperative care as it relates to vulvar and vaginal surgeries.

Methods

Literature search

The guideline was developed according to published methodology from the ERAS Society.[6] The authors convened in September 2019 to discuss topics for inclusion; the topic list was based on the ERAS gynecologic oncology guidelines,[3–5] which were used as a template, and expanded to include topics unique to vulvar and vaginal surgeries. The topics were then allocated among the group according to expertise. The Embase and PubMed databases were searched for medical subject headings between 1975 and 2020, including "gynecology," "gynecologic oncology," "urogynecology," and all pre-, intra-, and postoperative ERAS items (Table 1). Reference lists of all eligible articles were cross-checked for other relevant studies. Meta-analyses, systematic reviews, randomized controlled trials (RCTs), nonrandomized controlled studies, reviews, and case series were considered for each individual topic. In this study, 2 to 3 authors reviewed the evidence base for each item. The quality of evidence for each item was then reviewed and cross-checked by the senior editorial team (A.D.A., G.N., and S.C.D.). The final manuscript was then reviewed by all authors to assess the quality of evidence and relevant studies for final inclusion; all papers that were examined for inclusion are listed in the Supplemental Appendix (Supplement #1). The search strategy was focused on relevant papers and supplemented by expert citation searches to identify further important studies. The purpose of the search strategy and

TABLE 1
Recommendations, evidence level, and recommendation grade for individual ERAS elements

Item	Recommendation	Evidence level		Recommendation grade	
		Vulvar	Vaginal	Vulvar	Vaginal
Preadmission information, education, and counseling	Patients should routinely receive dedicated preoperative information, education, and counseling	Low	Low	Strong	Strong
Preoperative optimization	Routine removal of pubic hair should not be used to decrease infection rates	Low	N/A	Strong	N/A
	If hair is removed, it should be clipped and not shaved	High	N/A	Strong	N/A
	Use of preoperative vaginal estrogen in postmenopausal women decreases postoperative complications	N/A	Low	N/A	Weak
Preoperative bowel preparation	Preoperative bowel preparation should not be used before vulvar and vaginal surgery	Moderate	Low	Strong	Weak (may consider enema to reduce stool burden)
Prophylaxis against thromboembolism	Patients undergoing malignant procedures lasting >30 min should receive dual mechanical prophylaxis and chemoprophylaxis with either low-molecular-weight heparin or unfractionated heparin	Moderate	Moderate	Strong	Strong
	Prophylaxis should be initiated preoperatively and continued throughout the hospital stay for malignant surgery	Moderate	Low	Strong	Strong
	Prophylaxis should be initiated preoperatively and continued throughout the hospital stay for benign surgery	Low	Low	Weak	Weak
	Extended postoperative prophylaxis	Low	Low	Weak	Weak
Antimicrobial prophylaxis	IV antibiotics should be administered routinely within 60 min before vaginal hysterectomy	N/A	High	N/A	Strong
	Antibiotic prophylaxis may be considered for vaginal surgery without hysterectomy	N/A	Low	N/A	Weak
	Antibiotic prophylaxis may be considered for vulvar surgery	Low	N/A	Strong (radical vulvectomy)	N/A
Standard anesthetic protocol and fluid management	Use of short-acting anesthetics	Low	Low	Strong	Strong
	Objective monitoring of the level of neuromuscular block and ensuring complete reversal	High	High	Strong	Strong
	Fluid balance to achieve euvolemia	Moderate	Moderate	Strong	Strong

Altman. Enhanced Recovery After Surgery Society recommendations for vulvar and vaginal surgeries. Am J Obstet Gynecol 2020.

(continued)

TABLE 1
Recommendations, evidence level, and recommendation grade for individual ERAS elements (continued)

		Evidence level		Recommendation grade	
Item	**Recommendation**	**Vulvar**	**Vaginal**	**Vulvar**	**Vaginal**
	Preemptive analgesia is recommended for vaginal surgery	N/A	Moderate	N/A	Strong
Urinary drainage	Retrograde bladder fill for voiding trial should be considered for vaginal procedures	N/A	High	N/A	Strong
	Urinary catheters should be removed as soon as possible for vaginal procedures	N/A	High	N/A	Strong
	Urinary catheters should be removed as soon as possible for vulvar procedures	Low	N/A	Strong	N/A
Postoperative analgesia	A multimodal postoperative analgesic protocol should be used routinely, and home-going opioid prescriptions should be minimized	High	High	Strong	Strong
	Combination of acetaminophen and nonsteroidal antiinflammatory drugs should be used	High	High	Strong	Strong
Preoperative and postoperative nutrition	Patients should be encouraged to eat a light snack up until 6 h and clear fluids (including oral carbohydrate drinks) up until 2 h, before initiation of anesthesia	High	High	Strong	Strong
	A regular diet within the first 24 h after vaginal or vulvar surgery is recommended	Moderate (by indirectness)	Moderate (by indirectness)	Strong	Strong
Postoperative dressing care	Vaginal packing does not decrease postoperative bleeding and hematoma formation or increase postoperative pain	N/A	High	N/A	Strong
	If used, vaginal packing should not be left in for more than 24 h	N/A	Low	N/A	Strong
	Occlusive dressings may be used after laser treatment to promote healing	Low	N/A	Weak	N/A
Postoperative drains and adjuvant therapies	Inguinofemoral drains should continue until <30—50 cc/d of drainage (cancer surgery)	Moderate	N/A	Strong	N/A
	Saphenous vein preservation should be considered in all inguinofemoral lymph node dissections (cancer surgery)	Moderate	N/A	Strong	N/A

ERAS, Enhanced Recovery After Surgery; *IV*, intravenous; *N/A*, not applicable.

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guideline formation was not to obtain a comprehensive summary of all literature but to ensure that the most important and current work is highlighted.[6]

Quality assessment

The quality of evidence and recommendations were assessed on the basis of the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system, presented in Table 2 as per previous guidelines.[3−5,7] Each study included was assessed according to the GRADE criteria, and the final list of referenced studies was decided on by the guideline development group; although not all papers are referenced in the final product, the studies chosen are representative of the best quality of evidence with the broadest scope of application.[6] The recommendations are based on the level of evidence as high, moderate, and low, equalized by desirable and deleterious effects. Strong recommendations mean that the ERAS group believed that the advantages of the recommendations outweighed the risks, whereas a weak recommendation indicates that the group believed that the advantages likely outweigh the risks but felt less confident in the overall strength of the evidence. As such, there may be cases in which strong recommendations are reached from low-evidence data and weak recommendations from strong-evidence data.

Results

The recommendations, evidence level, and recommendation grade are provided for each of the individual ERAS elements in Table 1, with summary descriptions of the evidence below with the associated level of evidence in parentheses.

Preadmission information, education, and counseling

The goal of preoperative education is not only to physically prepare the patient for surgery but also to prepare them for what to expect after the surgery. Preoperative preparation allows patients to better understand the procedure, feel more in control, and experience decreased postoperative pain and anxiety and can even reduce the length of hospital stay.[8]

Information may be provided in many forms—verbal, written, or multimedia—and should be adapted to cultural and social aspects. Written information was found to be superior to verbal alone in 1 randomized trial for satisfaction, days of hospitalization, and pain.[9] However, the addition of an educational video for pelvic reconstructive surgery did not improve patient preparedness for surgery.[10]

Recommendation
Although there is limited evidence in this field, most studies from other specialties provide evidence of beneficial effects and no evidence of harm. It is therefore recommended that patients should routinely receive dedicated preoperative information, education, and counseling (Low).

Preoperative optimization

In the past, it has been postulated that as hair harbors bacteria, the removal of hair should decrease surgical site infection (SSI) rates. A Cochrane review showed lack of evidence supporting hair removal; however, there were no specific studies examining the removal of pubic hair.[11] A small study comparing perineal shaving with no hair removal showed no difference in infection rates.[12] However, if pubic hair is removed to improve visualization of the surgical field, clipping should be used over shaving to reduce the rate of SSIs.[11]

The use of preoperative vaginal estrogen in postmenopausal women has been shown to increase the maturation index and vaginal epithelial thickness, but there is a lack of evidence that this translates to improved outcomes in prolapse surgery.[13] An RCT using vaginal estrogen before and 1 year after vaginal prolapse surgery with mesh found no estrogen to be noninferior to estrogen therapy when examining mesh erosion and anatomic success as endpoints.[14]

Recommendation
The routine removal of pubic hair for vulvar surgery does not decrease infection rates (Low). If hair is removed, it should be clipped and not shaved (High). There is little evidence to support the use of preoperative vaginal estrogen in

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TABLE 2
GRADE system rating of quality and strength of evidence

Evidence quality level	Definition
High	Subsequent research unlikely to change confidence in estimate of effect
Moderate	Subsequent research likely to have an impact on estimate of effect and may change estimate
Low	Subsequent research very likely to have an impact on estimate of effect and likely to change estimate
Very low	Any estimate is uncertain
Recommendation level	**Defintion**
Strong	Desirable effects of intervention clearly outweigh, or clearly do not outweigh, the undesirable effects
Weak	Effects are much more unclear

GRADE, Grading of Recommendations, Assessment, Development and Evaluation.

Adapted from Guyatt et al.[7]

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postmenopausal women to decrease postoperative complications (Low).

Preoperative bowel preparation

Traditionally, mechanical bowel preparation (MBP) in gynecologic surgery, especially in anticipation of potential bowel resection, was believed to decrease the risk of anastomotic leak and prevent perioperative infectious morbidity.[15] In 2018, a meta-analysis of 21,568 patients undergoing colorectal surgery showed that MBP was not associated with any difference in anastomotic leak rates, SSI, intraabdominal collection, reoperation, or hospital length of stay when compared with no MBP.[16] Similar conclusions were reached in a 2015 meta-analysis of 5 RCTs in gynecologic surgery.[17] There are limited data in vaginal surgery with the exception of a recent RCT that showed that women who underwent MBP before minimally invasive sacrocolpopexy demonstrated benefit to postoperative defecatory function and improved surgeon's perceptions of the case.[18] Enemas, however, do not seem to adversely affect recovery or electrolytes and may be useful to reduce the stool burden at the time of vaginal or vulvar procedures, although no further data exist on the rates of infection.

Recommendation

Preoperative bowel preparation is not recommended before vulvar (Moderate) and vaginal (Low) surgeries; enemas may be considered to reduce the stool burden at the time of vaginal surgery.

Prophylaxis against venous thromboembolism

The literature suggests that the risk of venous thromboembolism (VTE) in vulvar and vaginal cancer surgeries is similar to that observed among patients undergoing surgery for other gynecologic cancers.[19] The formulation of guidelines is complicated by wide variations in surgical complexity for vulvar procedures, ranging from outpatient laser ablation and limited wide local excisions to radical resections with inguinal lymphadenectomy and potential reconstruction. In an evaluation using the American College of Surgeons National Surgical Quality

Improvement Program (ACS-NSQIP) database, the 30-day rate of deep vein thrombosis and/or pulmonary embolism was 1.2% in 497 patients undergoing surgery for vulvar cancer compared with 3.0%, 1.4%, and 1.5% for ovarian, cervical, and endometrial cancers, respectively.[20] However, less than a third of patients undergoing vulvar resection had a concurrent inguinal lymphadenectomy, suggesting that many of these patients had preinvasive or microinvasive disease, and the VTE rate may therefore be underestimated. A single-institution study over a 10-year period reported on 219 patients with vulvar cancer and 141 with vaginal cancer (including resection for Paget disease), only 5 of whom were not comprehensively staged.[19] Perhaps because of a higher rate of lymphadenectomy or longer follow-up, the rates of VTE were higher than those reported in the ACS-NSQIP, 3.7% for vulvar cancer and 0.7% for vaginal cancer. Patients were purported to have received prophylaxis with stockings and low-molecular-weight heparin (LMWH) from 48 hours to 14 days postoperatively, but no assessment of compliance was provided.

Patients undergoing surgery for vulvar or vaginal cancer should therefore receive dual VTE mechanical prophylaxis and chemoprophylaxis with either LMWH or unfractionated heparin (UFH) to begin before the induction of anesthesia as recommended by the American Society of Clinical Oncology (ASCO).[21] Dual prophylaxis should continue throughout the hospital stay. In keeping with ASCO recommendations, procedures lasting >30 minutes should be managed as described above. In contrast to patients with advanced ovarian cancer, the residual tumor burden for patients with vulvar and vaginal cancers is quite low; no data exist for prolapse or benign procedures. For this reason, it is premature to recommend routine extended prophylaxis for these patients, although it may be considered in elderly, frail, and immobile patients depending on their Caprini scores.[22]

In benign vaginal surgery, the data continue to be limited as well. In a large retrospective analysis of NSQIP data, 26,103 women who underwent surgery for pelvic organ prolapse were evaluated

for VTE; 81.7% had a vaginal approach. The overall rate of VTE in this population was <1% for all groups, with the vaginal group having the lowest rate of 0.17% (P<.01).[23] A second similar study for 20,687 women with pelvic reconstructive surgery showed a rate of VTE of 0.1%.[24]

Summary and recommendation

Patients undergoing procedures lasting >30 minutes should receive dual mechanical prophylaxis and chemoprophylaxis with either LMWH or UFH for cancer surgery (Moderate). Prophylaxis should be initiated preoperatively and continued throughout the hospital stay for malignant surgery (vulva, Moderate; vaginal, Low). In benign vaginal and vulvar surgeries, the rates of VTE are very low, but prophylaxis may still be considered (Low). Studies on extended postoperative prophylaxis are needed in vulvar and vaginal surgeries for both malignant and benign indications (Low).

Antimicrobial prophylaxis

It is well established that patients undergoing vaginal hysterectomy, similar to abdominal hysterectomy, should receive single-dose antimicrobial prophylaxis within 1 hour of incision.[25] A Cochrane review showed that compared with placebo, women who received antimicrobial prophylaxis for vaginal hysterectomy had a reduction in total postoperative infections, including urinary tract infections (UTIs).[26]

For patients undergoing vaginal surgery without hysterectomy, such as with anterior or posterior colporrhaphy, the evidence for antimicrobial prophylaxis is less clear. Although theoretically there could be benefit from prophylaxis in these cases given that they are classified as clean-contaminated, at the present time, there is insufficient evidence to make concrete recommendations; thus, the decision is left to the discretion of the surgeon.[27] Although this appears to be similar for patients undergoing a vaginal surgery with the use of mesh (eg, midurethral sling) where infection rates are very low,[28,29] 93% of surgeons said they administered some form of antibiotic prophylaxis when graft material was used in prolapse surgery.[30]

Vulvar procedures such as vulvectomy, which are typically performed for cancer, are associated with a high risk of infection. Radical vulvectomy has an SSI rate comparable with that of patients undergoing abdominal hysterectomy with a type IV wound.[31,32] Similar to vaginal surgery without hysterectomy, there is no randomized evidence supporting antimicrobial prophylaxis in this setting. However, given the high rate of SSI, it seems reasonable to give a single dose of antibiotic, consistent with other published guidelines.[25]

Recommendation
Intravenous (IV) antibiotics should be administered routinely within 60 minutes before vaginal hysterectomy (High). IV antibiotics should be considered for vaginal surgery without hysterectomy (Low) and vulvar procedures (Low), particularly radical vulvectomy (contaminated wound), where SSI rates are high.

Standard anesthetic protocol and fluid management
The anesthetic protocol for patients undergoing major vulvar and vaginal surgeries is conducted with the aim of providing anesthesia that reduces the surgical stress response, provides analgesia, and encourages the rapid return of mobilization, eating, and drinking. In addition, postoperative nausea and vomiting (PONV) with multimodal prophylaxis in this high-risk group of patients is required. Extremes of fluid balance and organ dysfunction should be avoided.[33,34]

For many patients, either general or regional anesthesia can be used; there is little evidence to recommend one technique over the other. If general anesthesia is chosen, maintenance can be provided with either a volatile-based approach or total IV anesthesia (TIVA). Nitrous oxide is not recommended because of increased nausea and vomiting.[35,36] There is much enthusiasm for TIVA over volatile anesthesia because it reduces the incidence of PONV and may improve long-term survival in patients with malignancy.[37] If TIVA is used, processed electroencephalogram monitoring (eg, bispectral index) is recommended to ensure appropriate depth of intraoperative anesthesia, permitting rapid return of consciousness.[38] If neuromuscular (NM) blocking drugs are used, then complete reversal of NM function must be confirmed at the end of the procedure with objective NM monitoring. The use of protective mechanical ventilation with tidal volume of 6 to 8 mL/kg and the use of positive end-expiratory pressure may be of benefit.[5]

Regional anesthesia (such as intrathecal or epidural) can provide excellent intraoperative and postoperative analgesia. However, side effects such as motor block, hypotension, and urinary retention limit their postoperative use. If an epidural catheter has been used, it should be discontinued soon after the surgery because analgesic requirements are generally modest. There is little evidence to support other modalities such as ketamine, lidocaine, alpha-2 agonists, and pregabalin, although some advocate the use of these drugs if undertaking opioid-free anesthesia to reduce the problems associated with opioids, particularly opioid tolerance and opioid-induced hyperalgesia.[39] Three small RCTs have shown efficacy of preemptive paracervical block in patients undergoing vaginal hysterectomy.[40,41] A number of series have indicated that local anesthesia with sedation can be successfully used for vaginal prolapse surgery.[42]

Fluid management should be directed toward replacing intraoperative blood loss while aiming for euvolemia to avoid the problems associated with fluid overload (eg, edema, ileus) or hypovolemia (eg, acute kidney injury). Maintenance of blood pressure once euvolemia is achieved should be with vasoactive drugs to avoid fluid overload. The use of cardiac output monitoring and/or goal directed therapy is not routinely recommended.[43]

Recommendation
The use of short-acting anesthetics (Low), monitoring of NM block depth, and complete reversal (High) is recommended. Fluid balance should be directed with the goal of euvolemia (Moderate). Preemptive analgesia is recommended for vaginal hysterectomy and can be considered for vaginal prolapse surgery (Moderate).

Urinary drainage
Immediate postoperative voiding dysfunction is potentially a complication of most pelvic surgeries. It is a particular problem for procedures targeting the urethra such as surgeries for stress urinary incontinence. It is such a common issue that some centers routinely teach patients how to perform clean intermittent self-catheterization as part of the preoperative teaching. After stress incontinence surgeries such as midurethral sling, bladder emptying is assessed with a voiding trial (VT). VT involves measuring voided volume followed by an assessment of the postvoid residual volume. There are multiple methods of filling the bladder before a VT, such as filling the bladder in the operating room (OR) to a defined volume, retrograde catheter fill in the postanesthesia care unit (PACU), or awaiting spontaneous bladder fill in the PACU. Foster et al[44] performed a randomized trial evaluating bladder function after outpatient vaginal surgery and found that patients were more likely to successfully void after a retrograde fill compared with spontaneous bladder fill (61.5% vs 32.1%, respectively; P=.02). In a subsequent trial, Myers et al[45] documented that retrograde filling the bladder in the OR rather than in the PACU was an effective strategy for the postoperative VT. However, this approach did not significantly reduce total PACU time. In both studies, the retrograde bladder fill method was demonstrated to be more accurate and preferred by patients and also enabled women to be discharged from the PACU up to 27 minutes earlier.

A small randomized prospective study examined catheterization in 100 women undergoing vaginal hysterectomy and found that catheterization after surgery was unnecessary, but there were no increased complications if left in for 24 hours.[46] In women undergoing Burch colposuspension, a randomized trial reviewed the removal of catheter on postoperative days 1 vs 5 and found no benefit for prolonged catheterization.[47] A randomized trial in patients

undergoing vaginal prolapse surgery, with the removal of catheter on postoperative days 1 vs 5, again found no benefit to prolonged catheterization, with a higher rate of positive cultures, prolonged hospitalization, and increased recatherization rate in the day 5 group.[48] A Cochrane review was performed in 2006[49] on short-term catheterization policies and included 39 RCTs with a heterogeneous mixture of surgeries, including vaginal or abdominal hysterectomy, anterior or posterior repairs, Burch colposuspension, and urological surgery; the length of catheterization also varied from 1 to 28 days. The review found that not using a catheter had an increased risk of recatheterization; similarly urethral catheterization had a high risk of recatheterization compared with a suprapubic approach after removal.[49,50] In 11 trials, shorter catheterization resulted in a lower rate of infections. Finally, using a clamp-release protocol resulted in a higher risk of infection and delay of normal urination than an immediate release policy.[49]

Recommendation
Retrograde bladder filling for VT should be considered in vaginal surgery because it seems to be preferred by patients and may shorten time in the PACU (High). Urinary catheters should be used for postoperative bladder drainage in complex vaginal surgery but may be safely eliminated in simple vaginal hysterectomy. Removal after a short period postoperatively seems to be associated with lower rates of recatheterization, bladder infection, and length of stay (vaginal, High; vulvar, Low). The suprapubic route is associated with a lower rate of bladder infection but higher rate of catheter-related complications and may be considered if prolonged catheterization is expected. There remain insufficient data on urinary drainage in vulvar surgery.

Postoperative analgesia
Patients presenting with vulvar and vaginal abnormalities requiring surgical resection frequently complain of pain; in particular, those with ulcerative or malignant lesions may already be receiving preoperative analgesics and are often anxious about control of their postoperative pain. However, removal of the lesion usually reduces pain significantly, even when large resections are needed, and postoperative pain control is rarely problematic. Published studies evaluating optimal control of postoperative pain in patients undergoing vulvar procedures are nonexistent, but the paradigm of multimodal, opioid-sparing postoperative analgesia used commonly within the ERAS pathways should also be used for these patients as well.[51] In addition, the postoperative strategy should be reviewed with patients before surgery to aid optimal pain control and functional recovery and to minimize nausea, sedation, fatigue, and risk of opioid addiction.[52]

The use of preoperative oral acetaminophen and an antiinflammatory drug (if not contraindicated) has been shown to reduce opioid requirements and should be a routine element in all ERAS pathways.[53,54] Because patients undergoing vulvar procedures, particularly patients with vulvar cancer, tend to be elderly, anticonvulsant medications and chronic pain drugs should not routinely be used in the PACU.[55,56] The use of local anesthetic medication may be feasible into the wound edges, but its use in regional anesthetic techniques, for example, caudal epidural anesthesia is not advocated, as it may be associated with postoperative problems such as hypotension and urinary retention for vulvar procedures. For vaginal surgery, there is some support for using local anesthetics, especially for paracervical and vaginal cuff blocks[54,57]; liposomal bupivacaine may be helpful but still requires further study.[54,58] Postoperatively, patients should receive scheduled oral acetaminophen and ibuprofen, oral opioids as needed, and IV opioids for breakthrough pain. Given the rarity of severe pain in this population, patients with breakthrough pain should be carefully examined for infections, wound breakdown, or other complications. Patients who do not require opioids in hospital will not require home-going opioid prescriptions and should be counseled to continue scheduled ibuprofen and acetaminophen.

For patients requiring home-going opioids, we recommend a prescription for the minimum duration, for example, 10 tablets of oxycodone 5 mg to minimize the risk of opioid dependence and diversion.[59]

Recommendation
A multimodal postoperative analgesic protocol should be used routinely, and home-going opioid prescriptions should be minimized (High).

Preoperative and postoperative nutrition
Historically, surgical patients have been subjected to the "nothing per orem after midnight" rule preoperatively with no supporting evidence. In fact, adoption of modern fasting rules whereby a patient is allowed to have a light snack up until 6 hours and clear fluids (including oral carbohydrate drinks) up until 2 hours before surgery has been shown to be safe.[60] Furthermore, administration of oral carbohydrates preoperatively is associated with improved preoperative well-being and reduced postoperative insulin resistance.[61] There remain no specific trials in vulvar or vaginal surgery, but the underlying principles from laparotomy can be broadly adopted here until further research is completed.

Similarly, in the past, it was common practice to withhold food from postoperative patients until passage of flatus. Early feeding, whereby nutrition is introduced within 24 hours after gynecologic surgery, has been shown to be safe without increased gastrointestinal concern or postoperative complications.[62] This approach is associated with earlier return of bowel function, shorter length of hospital stay, and improved patient satisfaction. A number of studies have now successfully and safely incorporated these perioperative nutritional practices into their urogynecologic ERAS protocols. Finally, there is little concern for ileus in patients undergoing vulvar or vaginal surgery,[63,64] which further strengthens an early refeeding approach.

Recommendation
Patients should be encouraged to eat a light snack up until 6 hours and clear

fluids (including oral carbohydrate drinks) up until 2 hours before the initiation of anesthesia (High). A regular diet within the first 24 hours after vaginal or vulvar surgery is recommended on the basis of extrapolation from larger more invasive procedures (Moderate by indirectness).

Postoperative dressing care

Vaginal packing is thought to decrease postoperative vaginal and vault hematoma formation and consequently decrease infection rates in prolapse surgery. However, it has been suggested that packing also increases pain, prolongs hospitalization, and can lead to leaving packing accidentally in place, resulting in retained "foreign objects." Recent trends have been to use vaginal packing for 24 hours postoperatively,[65] which requires indwelling catheterization. One RCT involving 190 women examined outcomes at 24 hours postoperatively for patients packed with proflavine-soaked cotton gauze vs no packing and found no difference in pain scores, infectious morbidity, or hematoma formation (7.3% in pack group vs 14.8% in no pack group; P=.204).[66] A second small RCT showed similar pain on a visual analog scale but less use of ketorolac in the first 24 hours and nursing-reported pain in the packing group.[67] Two RCTs investigated the length of time for packing and found no difference between 3 hours and 24 hours; there was no difference in febrile morbidity and complications, but shorter packing was associated with nonsignificantly higher urinary retention rates.[68,69]

Although no specific research has been conducted for patients undergoing laser treatment of the vulva, several studies have examined the role of occlusive dressings after laser skin resurfacing. A small retrospective study of open wound care compared with perforated silicone occlusive dressing found a decrease in the rate of erythema, swelling, and crusting.[70] Occlusive dressings may promote reepithelialization and improve wound healing by creating a moist environment.[71–73]

Vacuum-assisted closure (VAC) dressings have also occasionally been

used for the closure of radically excised perineal and vulvar wounds.[73–80] One investigation retrospectively examined 54 patients with VAC compared with standard postoperative care in patients after radical excisions and found a decrease in time to complete healing (44.4 vs 60.2 days; P=.0175).[80] Another group retrospectively assessed 24 patients with penile or urethral cancer requiring inguinofemoral lymph node dissections and found decreased rates of hospitalization, lymphocele, persistent lymphorrhea, and lymphedema with the use of VAC.[81] Contamination with stool and urine must be avoided when VAC dressings are applied to the vulva and perineum; immediate treatment solutions have included the use of Foley catheters, antimotility agents (eg, Imodium and codeine), rectal tubes, and waterproof dressings (eg, Duo-DERM).[75,77] VAC dressings have also been used in complicated inguinal incisions.[73,78,82–84] Although it continues to be common practice, there are no high-quality studies examining the utility of silver sulfadiazine cream after the laser vaporization of the vulva.

Recommendation

Vaginal packing does not seem to decrease postoperative bleeding and hematoma formation or increase postoperative pain (High). Vaginal packing may result in an increase in postoperative infection rates when left for longer than 24 hours (Low) and longer use of packing results in longer catheterization and thus higher rates of UTI. Occlusive dressings may be used after laser treatment to promote healing (Low).

Postoperative drains and adjuvant therapies

Postoperative drains after systematic inguinofemoral lymph node (IFLN) dissection are used routinely and often left in situ until producing <20 to 50 mL per 24 hours,[85–89] with some recommendations to leave the drains in place at least 5 to 7 days postoperatively.[73,90,91] This is thought to decrease lymphocyst formation by allowing the overlying skin flaps to adhere to the underlying

connective tissue.[85] Separate vulvar drainage has been abandoned by most.[32] Adjuvant products such as fibrin sealant and albumin-glutaraldehyde adhesive have not been proven to decrease morbidity.[73,92–94] The preservation of the saphenous vein seems to reduce the rate of lymphedema, cellulitis, and dehiscence.[95]

Multiple retrospective studies have investigated time-based or volume-based IFLN drainage to guide drain removal, with no definitive conclusions. Overall, short duration of use (<3 days) was associated with higher rates of wound breakdown, whereas longer duration of use (>7 days) was associated with higher rates of lymphedema.[86] Drain use has also been shown to be associated with higher rates of cellulitis.[96] Another investigation showed that higher drain output on the final day before removal was a risk factor for complications, including lymphocele formation.[91] Two prospective studies demonstrated that removal once the output had decreased to <30 to 50 cc per day resulted in lower rates of lymphocele formation and other complications. No prospective studies have evaluated drainage after inguinal sentinel lymph node biopsy in women with vulvar cancer.

There were no studies examining the role of surgical drains for vaginal or prolapse surgery.

Novel postoperative therapies

Routine postoperative vulvar care for radical vulvar excisions often consists of irrigation and perineal drying with either a hair dryer or vulvar blower or fan.[73,80] However, no studies have been identified showing efficacy for this practice.

A small RCT was performed on granulocyte colony-stimulating factor (G-CSF) vs placebo in 40 patients undergoing vulvar cancer resection based on an earlier retrospective study.[97] The authors found no difference in rates of wound infection between the groups, with increased cost associated with G-CSF. Adjuvant platelet gel has been studied in a retrospective study[98] applied to the vaginal resection portion of the

radical vulvectomy; the platelet gel group had significantly fewer wound complications; no prospective or randomized trials have been performed.

Hyperbaric oxygen (HBO) has been used to improve tissue oxygenation, thereby stimulating healing and angiogenesis. Investigation of HBO in patients undergoing radical vulvectomy showed significantly less wound breakdown compared with historical controls (P=.0105).[89,99] Although HBO is a very promising treatment that is commonly used, further trials must be performed to demonstrate efficacy of this expensive therapy.

Zinc has been shown to be necessary for the early stages of repair, and oral supplementation is thought to restore subclinically low levels. A pilot study investigated the dosage of zinc sulfate 220 mg orally 3 times daily for 7 days preoperatively in patients undergoing radical vulvectomy and lymphadenectomy. The authors showed a decreased rate of wound dehiscence and a reduced hospital stay from 37 to 18 days.[73]

Recommendation
The drainage of inguinal lymph node dissection should continue until <30 to 50 cc per day of drainage (Moderate). Saphenous vein preservation should be considered in IFLN dissection (Moderate).

Comment
This guideline summarizes current evidence examined by the ERAS Society Gynecology Chapter on recommendations for the elements of pre-, intra-, and postoperative care in vulvar and vaginal surgeries. In several instances, where good quality data were not available, recommendations were made on the basis of other surgical disciplines and the original ERAS gynecologic oncology guidelines. The guideline committee decided to combine vulvar and vaginal surgeries because these surgeries are common approaches in practice for general gynecology and subspecialties, including urogynecology and gynecologic oncology. The authors believed that the perioperative care for both was similar, and the differences have been

highlighted in the aforementioned sections. As ERAS guidelines are created by reviewing all the current and updated literature, including systematic reviews, meta-analyses, RCTs, retrospective studies, and studies in similar disciplines, it does not follow the same process as a systematic review of looking at only specialty-specific randomized trials. The advantages of this process include using any relevant information that is currently available, which is then reviewed by an international panel of experts. The disadvantages are that some of the recommendations are based on expert opinion and low levels of evidence.

This guideline summarizes the best evidence in common practices for vulvar and vaginal surgeries but recognizes the paucity of evidence specific to this area in topics such as ileus prevention, postoperative diet, and mobilization. We hope that these guidelines will help expand ERAS protocols into gynecologic surgeries outside of the realm of laparotomy or laparoscopy, helping improve patient outcome, optimize hospital stay, and reduce systemic costs. ∎

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