



Short communication

## Patient reported opioid usage following vulvar surgery in gynecologic oncology

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### ABSTRACT

**Background:** There remains a paucity of data for vulvar surgery outcomes in gynecologic oncology in the era of Enhanced Recovery After Surgery (ERAS)®. As such, the primary objective is to assess the impact of patient and procedural factors on patient reported postoperative opioid usage following vulvar surgery. Secondary objective is to create a tailored opioid prescribing algorithm for this population.

**Methods:** A retrospective cohort study was performed of patients who underwent vulvar surgery for a gynecologic malignancy between 3/2019–7/2022. Covariates of interest included a history of risk factors for opioid usage, age, anatomic location of the vulvar resection, radicality of surgery, groin dissection, use of postoperative non-steroidal anti-inflammatory drugs (NSAIDs), and complications. Logistic regression models evaluated the effects that sociodemographic characteristics and procedural factors have on opioid usage. Linear regression models were created to determine prescribing guidelines.

**Results:** A total of 100 patients were included. Following surgery, 35 patients (35 %) were not sent home with an opioid prescription, 39 patients (39 %) reported using at least one opioid pill from their prescription, and 26 patients (26 %) reported not using any opioid pills from their prescription. In the regression models, patient age ( $p < 0.006$ ) had a significant impact on opioid use, while all other factors did not. Contraindications to NSAIDs did not have a statistically significant impact ( $p = 0.1$ ) but was deemed clinically meaningful and included in the final model. Proposed opioid prescribing guidelines were created.

**Conclusion:** In conclusion, most patients after vulvar surgery require little to no opioids. Identifiable preoperative factors can aid providers to manage postoperative pain while minimizing unnecessary opioid prescriptions.

### 1. Introduction

In 2023, an estimated 6,470 patients were diagnosed and 1,670 died from vulvar cancer in the United States (American Cancer Society, 2023). Dating back to the 1940s, vulvar cancers were treated with an en bloc radical vulvectomy with a butterfly incision (Way, 1960). Due to the extent of the surgery, there was a high incidence of morbidity and mortality (16 %) with these operations (Way, 1960). There have been improvements in vulvar surgery over time to decrease the radicality of resections using separate incisions and the introduction of sentinel lymph nodes (Bristow and Chi, 2015; Berek and Hacker, 2020). These more conservative techniques allow for better pain management, less risk complications and decreased hospital stays (Bristow and Chi, 2015).

In 2020, the Enhanced Recovery After Surgery Society guideline published recommendations for care as it relates to vulvar and vaginal surgeries (Altman et al., 2020). These recommendations include preoperative counseling and preoperative optimization as well as postoperative analgesia (Altman et al., 2020).

Despite this, there remains a paucity of data for vulvar surgery

outcomes in gynecologic oncology especially for pain management. As such, the primary objective of this research is to assess the impact of patient and procedural factors on patient reported postoperative opioid usage following vulvar surgery in the era of ERAS. Secondary objective is to create a tailored opioid prescribing algorithm for this patient population.

### 2. Methods

#### 2.1. Implementation of enhanced recovery pathway

In 2018, in accordance with the Society for Gynecologic Oncology recommendations for Enhanced Recovery After Surgery (ERAS) guidelines, our institution standardized our gynecologic oncology enhanced recovery care perioperative pathway for our division (Nelson et al., 2016). This encompasses phases of care for preoperative, perioperative and postoperative optimization. Components include pre-admission education and counseling regarding postoperative pain management and expectations with written materials provided to the patient during

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their preoperative visit (Nelson et al., 2016). This also includes intraoperative measures for VTE prevention, infection control, nausea/vomiting prophylaxis, fluid management and normothermia management.

For perioperative pain management, patients who did not have any medical contraindications received preoperative acetaminophen and post-operative medications of scheduled nonsteroidal anti-inflammatory medications, acetaminophen and oxycodone. The opioid prescription is sent preoperatively, after meeting the patient in the preoperative area. If the patient is admitted, the prescription is sent to their preferred pharmacy upon discharge. Most patients receive a total of 30 mL of local anesthetic with wound infiltration with 0.25 % bupivacaine for both vulva and groin procedures as part of our multimodal pain management strategy (Kalogera et al., 2016). Intraoperatively, the anesthesia team uses fentanyl for induction and during the case as needed as well as ketorolac 15 mg at the end of the case unless contraindicated. At times, lidocaine 2 % 20 mg/mL is also used intraoperatively per anesthesia's discretion.

## 2.2. Collection of patient reported outcomes

As part of a perioperative quality improvement intervention, all patients who undergo vulvar surgery are entered into our institution's prospectively curated surgical database. On postoperative day 30, all patients complete a questionnaire regarding pain and postoperative opioid usage including: 1) the number of opioid pills used after discharge, 2) whether they made any phone-calls to our clinic regarding pain, and 3) if the patient had a pain medication refilled (from any provider). In addition to the patients reporting their refill status, the Michigan's Automated Prescription System (MAPS) was queried to confirm the refill status. Patients are also asked about 30 day complications, visits to the emergency room, and readmissions.

## 2.3. Study cohort

All patients ages 18 years and older and undergoing vulvar surgery for a suspected or known malignancy between 3/2019–7/2022 were identified in our institution's surgical database.

There are known risk factors for increased postoperative pain and possible opioid misuse (Straubhar et al., 2021). Patients were assessed for the presence of these risk factors including depression, anxiety, chronic pain, current opioid use, or substance abuse.

## 2.4. Statistical analysis

The primary outcome of interest was patient reported total opioid pill use. To evaluate this, independent variants of interest including patient and preoperative factors, intraoperative covariants, and post-operative complications were investigated. Patient characteristics included age at the time of surgery, body mass index (BMI), American Society of Anesthesiologists (ASA) classification score (defined as dichotomous variable as ASA class < 3 or ≥ 3), comorbidities like diabetes mellitus. We also investigated the impact of having a history of a risk factor for opioid use. Preoperative variants included prior pelvic radiation and history of prior surgery. Intraoperative variants of interest were surgical mode (wide local excision, radical vulvectomy), anatomic location of the vulvar resection (lateral, anterior, posterior), incision length, lymph node assessment, reconstruction (skin flap, graft), operative time (defined as time from skin incision to skin closure) and if any intraoperative complication occurred. Anterior vulva is defined as area from mons pubis to the level of the urethra, posterior is defined as the area from inferior aspect of the introitus to the anus, and lateral is defined as lateral to the labia majora. Postoperative complications were investigated and included both vulvar or groin complications. Use of postoperative non-steroidal anti-inflammatory drugs (NSAIDs), number of opioid pills used by the patient after discharge, request of refill of

**Table 1**

Comparisons between patients who used ≥ 1 opioid pill versus none after a vulvar surgery.

Characteristic		1 or more pill (s) used N = 39	No pills used N = 61	P-value
Duration of surgery (mins, skin to skin)		68 (42–116)	54 (33–92)	0.095
BMI Category	Normal	6 (15 %)	15 (25 %)	0.73
	Overweight	11 (28 %)	14 (23 %)	
	Obese	18 (46 %)	26 (43 %)	
	Morbidly Obese	4 (10 %)	6 (10 %)	
	Obese			
ASA score	2	12 (30 %)	13 (21 %)	0.29
	3	24 (60 %)	43 (70 %)	
	Missing	3 (8 %)	5 (8 %)	
Opioid risk factor	No	18 (46 %)	33 (54 %)	0.44
	Yes	21 (54 %)	28 (46 %)	
Any SSI	No	35 (90 %)	55 (90 %)	0.95
	Yes	4 (10 %)	6 (10 %)	
Smoking	No	25 (64 %)	46 (75 %)	0.16
	Yes	14 (36 %)	15 (25 %)	
Surgical mode	Wide local	17 (44 %)	22 (36 %)	0.45
	Radical	22 (56 %)	39 (64 %)	
Resection location	Anterior	20 (51 %)	22 (36 %)	0.35
	Lateral	13 (33 %)	27 (44 %)	
	Posterior	6 (15 %)	11 (18 %)	
	Missing	0 (0 %)	1 (2 %)	
Length (cm)	0–3	4 (10 %)	6 (10 %)	0.59
	3–6	16 (41 %)	33 (54 %)	
	6–10	14 (36 %)	18 (30 %)	
	Missing	5 (13 %)	4 (7 %)	
	Missing	0 (0 %)	1 (2 %)	
Diabetic	No	5 (13 %)	5 (8 %)	1.00
	Yes	2 (5 %)	2 (3 %)	
	Missing	32 (82 %)	54 (89 %)	
NSAID contraindicated	No	28 (72 %)	53 (87 %)	0.061
	Yes	11 (28 %)	8 (13 %)	
Groins	No	21 (54 %)	42 (69 %)	0.13
	Yes	18 (46 %)	19 (31 %)	
Groin SSI	No	39 (100 %)	61 (100 %)	
Vulvar SSI	No	25 (64 %)	46 (75 %)	0.22
	Yes	14 (36 %)	15 (25 %)	

BMI: body mass index, ASA: American Society of Anesthesiologists, SSI: surgical site infection, NSAID: nonsteroidal anti-inflammatory drug.

opioid prescriptions and need for a return visit were assessed.

Univariate analyses were performed to determine the impact patient characteristics and procedural factors had on postoperative opioid usage and wound complications. Within the models, covariants of interest that had a significant p value (<0.05) or a clinically meaningful impact were included. Due to the sample size, multivariate analysis was not feasible.

Using these models, a mean marginal effects model was generated for opioid usage. This model is useful as it examines the magnitude of impact the independent variables of interest have on opioid usage. It describes the predictive probability change in opioid use with discrete changes in the covariant of interest (Norton et al., 2019).

STATA 15.1 was used for all the statistical analyses performed. Our institutional review board approved this project (HUM00190295).

## 3. Results

A total of 100 patients were identified during the study timeframe and had completed 30 day follow up. Following surgery, 35 patients (35 %) were not sent home with an opioid prescription following discussion with their provider, 26 patients (26 %) reported not using any opioid pills from their discharge prescription, and 39 patients (39 %) reported using at least one opioid pill from their discharge prescription. The median number of opioid pills prescribed was 6 (range 1–40) and patients reported using a median of 2 pills (range 0–20).

Table 1 compares the demographic, clinical and operative information of the patients who underwent vulvar surgery between those who

**Table 2**

Univariate analysis assessing association between patient characteristics and pill use.

Characteristic	P-value	95 % confidence interval
Age	<b>0.006</b>	1.015—1.100
Groins	0.506	0.233—2.051
Resection location		
Lateral	0.304	0.608—4.935
Posterior	0.573	0.364—6.196
Incision length		
3–6	0.382	0.420—9.628
6–10	0.895	0.214—5.836
NSAIDs contraindicated	0.108	0.080—1.285

Bolded items are significant p values.

used any opioids following discharge to those who used none.

In univariate analysis, the patient’s age ( $p < 0.006$ ) had a significant impact on opioid use, with younger patients having higher opioid use (Table 2). A contraindication to taking NSAIDs did not have a statistically significant impact ( $p = 0.1$ ) but was deemed clinically meaningful and included in the final model. Opioid use was not impacted by duration of surgery, ASA classification score, resection location, groin dissection, incision length and risk factors for opioid misuse.

Supplemental Fig. 1 highlights the results of the marginal effects models that predict opioid usage by age and the presence or absence of risk factors remains constant. These models were then used to create new prescribing guidelines. Through this guideline, age is categorized into 3 discrete groups. A contraindication to NSAIDs increases the opioid recommendations by 2 pills (Fig. 1).

**4. Discussion**

Given its rarity, postoperative pain control in vulvar cancer has been less studied compared to other gynecologic cancers. Our data demonstrate that over half of patients undergoing vulvar surgery may not require a postoperative opioid prescription and reveals identifiable characteristics of patients who are more likely to use opioids post-operatively. To the best of our knowledge, this is the first study quantifying these risk factors in this surgical population.

Our study reports the number of narcotics as a representation of patient’s pain in this population. When looking at patient reported outcomes (PROs) in vulvar cancer surgery, our results echo recently published literature (Alimena et al., 2021 Jan). Overall, patients who undergo radical vulvar surgery for vulvar cancer report that they do not feel burdened by pain with only 18.6 % of patients complaining of discomfort after surgery with no significant differences in cancer stage (Alimena et al., 2021 Jan). This aligns with our result that 25 % of patients in this cohort reported not using any opioids following discharge, and the median number of pills used was two.

Conversely, Senn et al. showed 80 % of patients with vulvar neoplasia and vulvar cancer reported pain up to seven days post-operatively (Senn et al., 2013 Apr). This study allows for the use of identifiable factors to assist with postoperative opioid prescription needs. When looking at characteristics and variables that may lead to greater narcotic needs, our current study identified age and

contraindication to NSAIDs as variables related to greater narcotic needs. Patients undergoing vulvar surgery can be stratified by their age and whether they have contraindication to NSAIDs when prescribing opioids. Age has been demonstrated as a significant variable in PROs as well with greater age (>65) having more positive findings on quality of life surveys in this patient population (Alimena et al., 2021 Jan). In another study of PROs, younger age was reported as associated with increased psychosocial symptoms but there was no significant association between age and wound-related symptoms including pain (Senn et al., 2013 Apr).

The ERAS Society Gynecology Chapter published recommendations for care as it relates to vulvar and vaginal surgeries in 2020 (Altman et al., 2020). These recommendations include preoperative counseling and preoperative optimization as well as antimicrobial prophylaxis, drain and dressing management, and postoperative analgesia. These guidelines have a general recommendation to use ‘a multimodal post-operative analgesic protocol’ (Altman et al., 2020). The multimodal approach includes scheduled oral acetaminophen and ibuprofen, oral opioids and IV opioids for breakthrough pain. The recommended home-going prescription is stated to be for the minimum duration. The publication of this guideline demonstrate that perioperative improvements have been made in vulvar cancer but, nevertheless, we lack clear guidance for pain management with vulvar surgery in the era of ERAS.

There are several limitations to this study. First, this is a retrospective study and is limited to a single institution study without randomization with a comparative arm which may not be generalizable to other centers. Second, data of patients who did not complete the 30 day questionnaires was not included. A national database may help generate more robust guidelines.

**5. Conclusions**

In conclusion, our study demonstrated most patients after vulvar surgery use little to no opioids. Using identifiable preoperative factors can aid providers to manage postoperative pain while minimizing unnecessary opioid prescriptions. Overall, this highlights the need for further multi-institutional research and tailored approaches in vulvar surgery patients where data may be limited.

**Author contributions**

Conception and design: A Straubhar, S Uppal.

Acquisition of data: All authors.

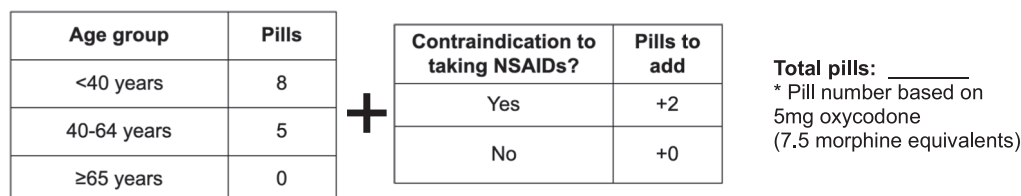
Analysis/Interpretation of Data: All Authors.

Writing manuscript: K Tondo-Steele, A Straubhar, S Uppal.

Approval of final manuscript: All authors.

**CRedit authorship contribution statement**

**Katelyn Tondo-Steele:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Data curation. **Cynthia Stroup:** Writing – review & editing, Data curation. **Shitanshu Uppal:** Writing – review & editing, Writing – original draft, Supervision, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Alli Straubhar:** Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology, Investigation, Formal



**Fig. 1.** Gynecologic oncology vulvar opioid prescribing guidelines based on patient characteristics. Pill number is based on 5 mg of oxycodone.

analysis, Data curation, Conceptualization.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.gore.2024.101446>.

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