



## Case Series

# A Novel Approach to Vulvectomy Care: The Role of Hydrolyzed Collagen Surgical Powder

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## Abstract

Surgical site infections in gynecologic procedures significantly contribute to health care costs, prolonged hospital stays, and patient morbidity. Patients undergoing vulvectomy are at a higher risk of postoperative wound complications due to the location of the surgical incision and the prevalence of comorbidities, such as obesity, diabetes, and smoking. The successful use of topical collagen, specifically, hydrolyzed type 1 bovine, in other surgical specialties has led clinicians to explore its use in gynecologic surgery. This case series reports on patients receiving topical hydrolyzed collagen after a vulvectomy. Hydrolyzed collagen was applied directly to the surgical wound. Patients were monitored for postoperative complications during routine follow up visits. This case series highlights the ease of application and clinical efficacy of topical collagen powder when applied to the wound bed following a vulvectomy. Treated surgical sites exhibited reduced inflammation, minimal exudate, and no signs of dehiscence. These findings indicate that hydrolyzed collagen may serve as a valuable adjunct in enhancing postoperative wound healing in vulvectomy patients. The preliminary results underscore the need for larger, randomized clinical trials to further evaluate this novel therapeutic approach.

**Keywords:** Hydrolyzed collagen, surgical site infection, reduced wound complication, vulvectomy

## Introduction

Vulvar cancer is the fourth most common gynecologic cancer in women [1]. Previously thought to be a disease of the elderly, 50% of vulvar cancers are attributed to human papillomavirus in women ages 35-65 [1]. Vulvar cancer, vulvar dysplasia and other vulvar skin conditions often require surgical management with either a simple or radical vulvectomy, depending upon the size and depth of the lesion. However, due to the anatomical location and high comorbid population, surgical site infections (SSIs) have been reported to be as high as 47% after a partial radical vulvectomy for vulvar cancer and accounts for a 35% reoperation rate [2].

Care bundles have been developed to address modifiable risk factors associated with SSIs by standardizing perioperative practices and promoting consistent, evidence-based interventions [3]. When standardized processes are followed, programs, such as the Enhanced Recovery After Surgery (ERAS), have shown that care bundles reduce postoperative complications and infections [4].

While much has been done to study care bundle processes in obstetrics to reduce cesarean section infection rates and in gynecology to reduce hysterectomy infection rates, little has been done to develop care bundles for vulvar surgery [3, 5].

Given the high complication rates associated with a vulvectomy, it is critical to explore adjunctive interventions that could be integrated into vulvar surgery care bundles. One such intervention demonstrating promise is the intraoperative application of hydrolyzed collagen powder. The purpose of this case series is to examine the wound complication rate in patients undergoing a vulvectomy to treat vulvar cancer, premalignant disease of the vulva, or benign dermatoses of the vulva when applying hydrolyzed collagen powder to the surgical wound bed.

## Case Presentation

A retrospective review of clinical data from five patients who underwent vulvar surgery for vulvar dysplasia or vulvar cancer from 2019 to 2024 were analyzed. All vulvar surgeries were performed by a single gynecologic oncologist in a local community-based

hospital or outpatient surgery center. All patients had intravenous surgery site prophylactic antibiotics before skin incision. After the lesion was removed and hemostasis had been achieved, one gram of hydrolyzed collagen powder (Cellerate Rx, Wound Management Technologies, Fort Worth, TX) was sprinkled in a light dusting on the surgical wound prior to skin closure. Data was abstracted from each patient: age, race, ethnicity, and comorbidities such as BMI, diabetes, tobacco use and postoperative infection within eight weeks after surgery. The patients were seen 1-2 weeks then 6-8 weeks after surgery to evaluate for any postoperative complications. The data was analyzed using descriptive statistics (mean or percent of patients).

**Results**

The mean age of the patients was 68.2 and sixty percent of the patients were current smokers (Table 1). Eighty percent of the patients had a simple partial vulvectomy for vulvar intraepithelial neoplasia type 3 (Table 2). One patient had rheumatoid arthritis treated with methotrexate (MTX). The methotrexate was stopped two weeks before surgery. There were no wound dehiscence or wound separations. There was only one postoperative wound infection and it occurred in a patient with undiagnosed type 2 diabetes. She did not require reoperation and she recovered without sequelae after taking oral antibiotics. There were no other complications from any of the patients in this study.

		N=5
Age (years)		68.2
BMI (kg/m <sup>2</sup> )		28.2
Race	White	5 (100%)
Ethnicity	Non-Hispanic or Non-Latino	5 (100%)
	Hispanic or Latino	0 (0%)
Current Smoker		3 (60%)
Hypertension		1 (20%)
Type 2 Diabetes		1 (20%)
Rheumatoid Arthritis		1 (20%)
BMI=Body Mass Index (kg/m2); Mean or Number in percentage		

**Table 1:** Patient Demographics and Baseline Risk Factors

	N=5
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Vulvar Surgery	Partial Simple Vulvectomy	4 (80%)
	Anterior modified radical vulvectomy	1 (20%)
Pathology	Vulvar intraepithelial neoplasia III	4 (80%)
	Invasive squamous cell carcinoma of the vulva	1 (20%)

**Table 2:** Type of Vulvar Surgery

Number in percentages

**Discussion**

Wound breakdown and surgical site complications are common following vulvar surgery, contributing to increased infections, health care costs, and decrease quality of life. In a retrospective cohort study, Mullen et al. found that 28.7% of patients undergoing vulvar surgery for premalignant lesions had a surgical wound complication, defined as a wound separation, or wound infection within eight weeks of surgery [2]. Similarly, Boyles et al. reported a 42.3% rate of postoperative wound complication after a simple vulvectomy [5] and Gitas et al. reported a dehiscence rate of 17-39%, lymphocele rate of 7-40%, and lymphedema rate of 14-49% in their patient population. These complications led to a poor quality of life and high morbidity rate [1].

Despite a high incidence of complications, vulvar surgery lacks standardized procedures within the field of gynecology or gynecologic oncology [5,6]. The ERAS system has made great strides in reducing perioperative complications [3-4]. However, no dedicated care bundle has been implemented for vulvar surgery. Given the complex anatomical location and the multiple comorbidities present in this patient population, the development of care bundles could improve surgical outcomes.

Therefore, one adjunct to a vulvectomy care bundle is hydrolyzed type I bovine collagen powder. Collagen has reported use in many disease states to support wound healing in multiple surgical specialties, including neurosurgery, general surgery, and trauma surgery [7-17]. The solubility of hydrolyzed collagen powder, attributed to its low molecular weight peptides, facilitates timely integration without compromising tissue approximation [8-12]. It is bioavailable and actively contributes to an optimal wound healing environment [8-12]. Specifically, the unique physical and chemical properties exhibit antioxidant, antimicrobial, chemotactic and adhesive properties to the local microenvironment [8-12]. These properties make hydrolyzed collagen an ideal adjunctive therapy for assessing its potential to reduce surgical wound complications following vulvectomy, particularly in environments where healing

is impeded by moisture, tissue tension, and microbial burden.

In this case series, the application of hydrolyzed collagen powder to the vulvectomy wound bed was technically simple and well tolerated by patients. One patient developed a superficial wound cellulitis, which resolved with a two-week course of oral antibiotics. Of note, this patient had undiagnosed type 2 diabetes, identified based on an elevated hemoglobin A1c level that was ordered with her preoperative labs. Her vulvectomy site healed well and she had no additional complications.

The findings of this case series align with prior research in other surgical specialties [10, 13–17]. Notably, Nowrouzi and Awad conducted a retrospective review of over 5,300 elective surgeries and reported a 59% reduction in SSI rates when type I bovine hydrolyzed collagen was applied intraoperatively [13]. The current case series extends the application of hydrolyzed collagen to vulvectomy wounds, highlighting its potential as an adjunctive therapy within care bundles aimed at reducing SSIs in patients undergoing a vulvectomy.

## Conclusion

Bovine Type 1 hydrolyzed collagen powder is safe and easy to use in vulvar surgery. Future studies are needed to evaluate the use of hydrolyzed collagen in vulvar surgery to reduce the risk of surgical site complications and to further develop care bundles in vulvar surgery that will improve patient outcomes and lower hospital costs.

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**Conflict of Interest:** Dr. duPont serves as a consultant to Sanara Med Tech and has served on its speaker's bureau. An Investigator Initiated Grant was provided by Wound Management Technologies, Inc to support this research.

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