

## A Surgical Solution for Wound Management in a Large Perineal Defect Covered by Vertical Rectus Abdominis Myocutaneous Flap after Abdominoperineal Resection; A Case Report

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### Abstract

The management of extensive perineal defects resulting from aggressive tumor resections, such as abdominoperineal resections for advanced pelvic malignancies, can be a complex and demanding process during treatment. The primary options for reconstructing perineal defects are vertical rectus abdominis myocutaneous (VRAM) and anterolateral thigh (ALT) flaps. While both flaps are commonly used in reconstructive surgery, VRAM is often preferred due to several advantages. These include the ability to provide ample tissue to fill large perineal defects, as well as the convenience of harvesting this type of flap through a midline incision. This approach allows for a more cosmetically favorable scar location compared to other techniques. Overall, VRAM is a superior choice for perineal reconstruction due to its versatility and effectiveness in addressing complex defects. In this article, we describe our experience with utilizing a VRAM flap to close a 20×10 cm perineal defect that arose after an abdominoperineal resection performed due to extensive rectal melanoma in a 46-year-old man. We found that the vertical VRAM flap was an exceptional choice for covering this substantial defect in our patient.

**Keywords:** Perineal defect, Myocutaneous flap, rectus abdominis, Surgery, plastic

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### Introduction

Abdominal cancers involving the gastrointestinal system and other abdominopelvic viscera are very prevalent and challenging worldwide (1). Abdominoperineal resection (APR) is a surgical procedure for removing the sigmoid colon, rectum, and anus in conditions such as Crohn's disease or

low rectal cancers that involve the anal sphincter complex. This extensive resection can result in a large perineal defect, which can be effectively managed using flaps such as the vertical rectus abdominis myocutaneous (VRAM) or anterolateral thigh (ALT) flaps. Among these options, the VRAM flap is often considered to be superior in addressing this complication (2).

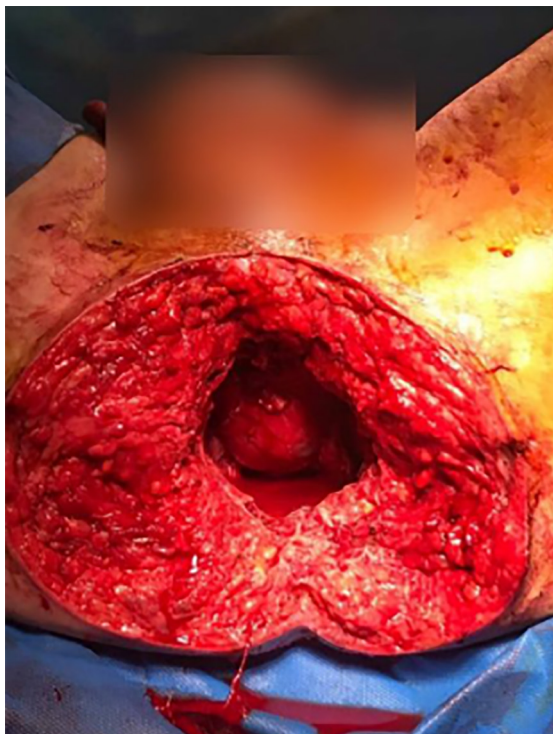
The rectus abdominis myocutaneous (RAM) flap features a dependable vascular anatomy, characterized by a long pedicle and vessels with substantial diameters, making it highly suitable for microvascular anastomoses. Additionally, its ability to fold allows for effective coverage of complex defects (3). The most effective way to optimize wound healing and minimize potential complications is through the use of suitable flaps for reconstructing perineal defects.

Herein, we present our experience of using a VRAM flap following a large abdominoperineal resection with a great post-op result.

### Case Presentation

In September 2020, a 46-year-old man was diagnosed with an extensive sarcoma involving the rectum and all soft tissues of the perineum, along with segments of the gluteum in Shahohadaye Tajrish Hospital, affiliated with Shahid Beheshti University of Medical Sciences. Subsequently, the patient underwent an inferior midline laparotomy. During the operation, there was no indication of perineal seeding or any distant metastasis in the abdomen. A substantial pelvic mass encompassing the mentioned regions was detected. Following the examination of the ureters, the iliac lymph nodes were carefully dissected, and the mass was successfully removed. Additionally, a descending colon end colostomy and cystostomy were performed. As a result of the procedure, a significantly large perineal mass measuring approximately 20×10 cm (figure 1) was present, which would be addressed with a VRAM flap once the patient's condition is stable. After conducting a histopathological evaluation and

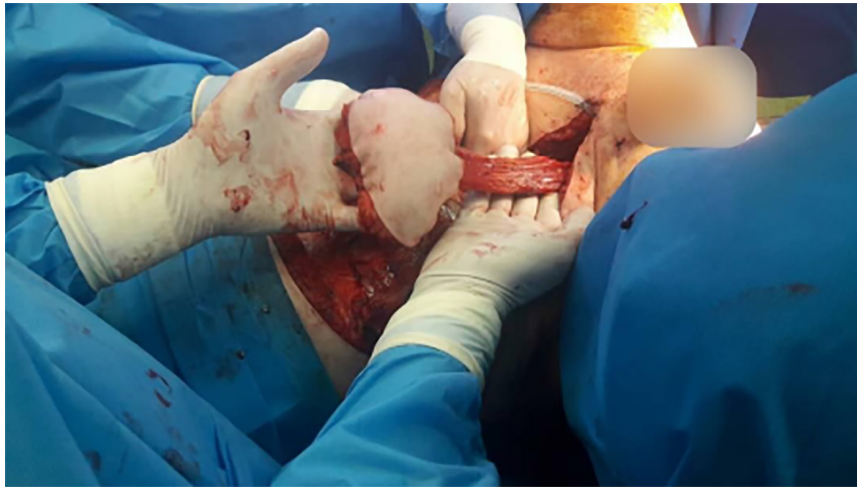
immunohistochemical studies on the resected mass, it was confirmed that the diagnosis of malignant melanoma, the epithelioid type with lymphovascular and perineural invasion, was accurate. The presence of strong positivity for HMB-45 and S-100 indicated the cancer's nature. Furthermore, the stage was determined to be pT4N3. After additional imaging, the patient underwent a second operation to eliminate the perineal mass, one day after the APR. The rectus abdominis flap, comprising the right rectus abdominis muscle and the deep inferior epigastric artery pedicle, was designed to have an approximate size of 22×10 cm (figure 2). The midline incision that had previously been stitched was reopened and deepened directly to the anterior rectus sheath, with minimal undermining of the subcutaneous tissue to protect the blood supply to the skin. The anterior rectus sheath was then vertically incised and gently detached from the rectus abdominis on both sides of the linea semilunaris and linea alba. This exposed the front surface of the rectus muscle, and the underside of the rectus abdominis was carefully separated from the posterior rectus sheath, ensuring that the vessels and nerves on the back of the muscle were retained to preserve the inferior epigastric pedicle. The harvested right rectus abdominis muscle, along with the entire skin island (figure 3), was transferred to the perineum using a transpelvic route (figure 4). Continuous Prolene 1-0 sutures were used to properly close the anterior rectus sheath, ensuring no abdominal hernia would occur. The surgical area was then closed using Nylon 2-0 to close the skin. The patient's recovery after surgery was uneventful. It was recommended that the patient maintain a semi-flow position for six weeks after surgery and begin sitting and walking on the first day after surgery.



**Figure 1:** A Large perineal defect measuring 20×10 cm encountered following APR is seen in this figure.



**Figure 2:** We designed the VRAM flap before the operation



**Figure 3:** VRAM flap along with its skin island measuring 22×10 cm in size was harvested



**Figure 4:** The perineal defect obliterated with the VRAM flap

Movement and exercise were restricted to prevent any possible dehiscence of the skin flap edges. The viability of the flap and wound healing were confirmed, and the patient was referred to an oncologist to continue the treatment process. The surgical team conducted outpatient visits for six months without detecting any major issues.

A written informed consent was obtained from the patient and he agreed that the physicians could publish his disease-related article and any accompanying images with personal information deleted. The consent has been attached as a separate file.

## Discussion

Reconstructive surgery poses challenges due to several factors affecting perineal wounds. The extensive pressure on pelvic and perineal soft tissue requires the consideration of a robust alternative post-surgery treatment. Moreover, in cases of malignancies, prior radiation can render the area highly susceptible to pressure, shear forces, and ischemia. Additionally, the perineal region, being heavily contaminated by bacteria in the body, presents another obstacle in preventing wound contamination and infection (4, 5). It is generally

recommended to use local transposition flaps for small perineal defects (less than 20 cm<sup>2</sup>), gluteal thigh or pedicled gracilis flap for medium-sized defects (20-60 cm<sup>2</sup>), and vertical/oblique rectus abdominis musculocutaneous flaps for large defects (greater than 60 cm<sup>2</sup>). In general, the management of perineal defects primarily involves either the VRAM or the ALT flap (2).

In a systemic review in 2020, overall, 1827 patients were studied. They concluded that the overall mortality rate in these patients was high, however, the risk of major complications remains low (6).

RAM flap, an autologous flap, was initially introduced by Holmström in 1979 (7). This technique further progressed in reconstructive surgery by Hartrampf and colleagues (8) in 1982, who used the RAM flap based on the superior epigastric artery for breast reconstructions. The deep inferior epigastric artery perforator (DIEP) flap, a variation of the RAM flap, was originally proposed by Koshima and co-workers (9) in 1989, emphasizing the complete preservation of the RAM and its innervation.

In a similar study, a VRAM flap was used to reconstruct a large perineal defect (10). The location of the skin island in the inferior abdomen is one reason why the RAM flap is more widely accepted

(3). Additionally, a VRAM flap can be obtained through a midline incision, avoiding the need for extra incisions in most pelvic cancer surgeries (11-13). Compared to primary perineal closure and thigh-based flaps, VRAM flaps have shown superior outcomes in APR and pelvic surgeries (12, 14). Moreover, VRAM flaps can prevent herniation of abdominal contents into the pelvic cavity, which is not observed with lower extremity flaps (12, 14-16). The limitation of this study is the low number of under-studied cases, and lack of long-term follow-up of the patient.

## Conclusion

In this case report we achieved a favorable outcome

for our patient by employing the VRAM flap for pelvic floor reconstruction.

## Authors' Contribution

All authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by Seyed Reza Mousavi, Adel Zeinalpour, and Hamed Ebrahimibagha. The first draft of the manuscript was written by Hamed Ebrahimibagha and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

**Conflict of interest:** None declared.

## References

1. Zeinalpour A, Taleghani M, Rostami T, Ebrahimibagha H. Factors affecting 5-year mortality of colon cancer in a single center. *Iranian Journal of Colorectal Research*. 2023;11(4):-.
2. Copeland-Halperin LR, Stewart T, Chen Y, Funderburk CD, Freed GL. Perineal reconstruction following abdominoperineal resection: Comprehensive review of the literature. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2020;73(11):1924-32.
3. Radwan RW, Tang AM, Harries RL, Davies EG, Drew P, Evans MD. Vertical rectus abdominis flap (VRAM) for perineal reconstruction following pelvic surgery: a systematic review. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2021;74(3):523-9.
4. Weichman KE, Matros E, Disa JJ. Reconstruction of peripelvic oncologic defects. *Plastic and reconstructive surgery*. 2017;140(4):601e-12e.
5. Guarner F, Malagelada J-R. Gut flora in health and disease. *The lancet*. 2003;361(9356):512-9.
6. Radwan RW, Tang AM, Harries RL, Davies EG, Drew P, Evans MD. Vertical rectus abdominis flap (VRAM) for perineal reconstruction following pelvic surgery: A systematic review. *Journal of plastic, reconstructive & aesthetic surgery : JPRAS*. 2021;74(3):523-9.
7. Holmström H. The free abdominoplasty flap and its use in breast reconstruction: An experimental study and clinical case report. *Scandinavian journal of plastic and reconstructive surgery*. 1979;13(3):423-7.
8. Hartrampf C, Schefflan M, Black PW. Breast reconstruction with a transverse abdominal island flap. *Plastic and reconstructive surgery*. 1982;69(2):216-24.
9. Koshima I, Soeda S. Inferior epigastric artery skin flaps without rectus abdominis muscle. *British journal of plastic surgery*. 1989;42(6):645-8.
10. Faur IF, Clim A, Dobrescu A. VRAM Flap for Pelvic Floor Reconstruction after Pelvic Exenteration and Abdominoperineal Excision. 2023;13(12).
11. Campbell CA, Butler CE. Use of adjuvant techniques improves surgical outcomes of complex vertical rectus abdominis myocutaneous flap reconstructions of pelvic cancer defects. *Plastic and reconstructive surgery*. 2011;128(2):447-58.
12. Nelson RA, Butler CE. Surgical outcomes of VRAM versus thigh flaps for immediate reconstruction of pelvic and perineal cancer resection defects. *Plastic and reconstructive surgery*. 2009;123(1):175-83.
13. Casey III WJ, Tran NV, Petty PM, Stulak JM, Woods JE. A comparison of 99 consecutive vaginal reconstructions: an outcome study. *Annals of plastic surgery*. 2004;52(1):27-30.
14. Nigriny JF, Wu P, Butler CE. Perineal reconstruction with an extrapelvic vertical rectus abdominis myocutaneous flap. *International Journal of Gynecological Cancer*. 2010;20(9):1609-12.
15. Tobin GR, Day TG. Vaginal and pelvic reconstruction with distally based rectus abdominis myocutaneous flaps. *Plastic and reconstructive surgery*. 1988;81(1):62-70.
16. Butler CE, Gündeslioglu AÖ, Rodriguez-Bigas MA. Outcomes of immediate vertical rectus abdominis myocutaneous flap reconstruction for irradiated abdominoperineal resection defects. *Journal of the American College of Surgeons*. 2008;206(4):694-703.