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Vertical Rectus Abdominis Myocutaneous Flap Perineal Reconstruction After Extralevator Abdominoperineal Excision for Locally Advanced Low Rectal Cancer: A Case Report

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Locally advanced low rectal cancers pose a challenge for surgeons as reported local recurrence remain high despite the performance of Total Mesorectal Excision and the provision of neoadjuvant treatment. Extralevator Abdominoperineal Excision offers better oncologic margins with reported decreased recurrence rates when compared to the conventional technique. The improvement in oncologic outcomes, however, comes at the cost of producing larger perineal defects—and with this comes concerns related to coverage. Presented here is a case of a patient with a locally advanced low rectal cancer with gluteal extension where a Vertical Rectus Abdominis Myocutaneous flap was utilized as a means of perineal reconstruction.

Key words: rectal cancer, extralevator abdominoperineal excision, vertical rectus abdominis myocutaneous flap, perineal reconstruction

Colorectal cancer is currently the third leading cause of malignancy in the Philippines. Local data show estimated 3- and 5-year survival rates for rectal cancer at 31.3% and 20.0%, respectively.[1] Locally advanced rectal cancers (LARC) are rectal tumors that are clinically stage II or III with tumor stage at least T3 and/or node-positive confirmed by Endorectal Ultrasound (ERUS), or pelvic Magnetic Resonance Imaging (MRI). The management of LARC has significantly evolved, with Total Neoadjuvant Therapy (TNT) having become another viable option in recent years. Management of LARC involves a multimodal approach with the objective of tailoring treatment strategies to achieve the best oncologic outcome while improving patient quality of life.[2] Approximately 10% of rectal cancer cases have locally advanced T4 tumors, and may extend distally to involve the levator muscles, external sphincters, and perianal skin. The definitive surgical treatment for these low rectal cancers is an Abdominoperineal Resection (APR).[3] The perineal wound after an APR is usually closed primarily however, sometimes it may pose a challenge to surgeons due to difficulty in closing a large defect. This also carries a higher risk of wound complications owing to a large perineal defect.[4] A variety of surgical techniques have been used to reconstruct the pelvic floor and perineum.[5] In cases with very large perineal wounds not amenable to primary closure, consultation with reconstructive surgeons may be necessary.[6]

This paper aims to describe the surgical technique for perineal reconstruction using a vertical rectus abdominis myocutaneous (VRAM) flap following an extralevator abdominoperineal excision (ELAPE) for locally advanced low rectal cancer with right gluteal extension.

The Case

A 70-year-old hypertensive male presented with a year history of a gradually-enlarging bleeding right gluteal mass 7 cm x 8 cm in size. Digital rectal examination showed a hard, fixed obstructing rectal mass 4 cm from the anal verge confirmed by proctoscopy. On examination, the gluteal mass and rectal mass appears separate with areas of normal intervening skin and rectal tissue. However, biopsies of both the rectal and right gluteal mass both showed moderately differentiated adenocarcinoma on histopathology.

Abdominal CT scan showed an irregular, lobulated, and exophytic mass arising from the distal rectal segment extending inferiorly to the right gluteal region involving the external sphincter on the right. The surrounding mesorectal fat was noted to have multiple enlarged and enhancing lymph nodes with fat stranding. No liver metastases were noted. Pelvic MRI confirmed a low rectal mass measuring 6.9 cm x 4.6 cmd x 5.0 cm with extension into the external sphincters into the right gluteal region. Chest CT scan showed no pulmonary metastasis. The patient was managed as a case of rectal adenocarcinoma 4cm FAV stage IIIC (T4bN1M0). The baseline CEA was 124 ng/mL. He underwent a laparoscopic sigmoid loop colostomy to relieve obstructive symptoms. Upon consultation with a Multidisciplinary Team (MDT), the patient received TNT following the RAPIDO protocol consisting of short course radiotherapy followed by consolidation chemotherapy with oxaliplatin and capecitabine for 6 cycles.[7]

Repeat abdominal and chest CT scan and pelvic MRI were done after receiving TNT would show a decrease in the size of the circumferential mass in the rectum and in the size and number of the enlarged mesorectal lymph nodes. CEA also significantly decreased from 124 to 56 ng/mL post RAPIDO. However, the previously noted extension of the rectal mass to the right gluteal area was observed to have progressed in size, now measuring 9cm x 12cm in size. (Figure 1)

Figure 1. The right gluteal mass extension from a rectal adenocarcinoma 4cm FAV noted with progression in size after total neoadjuvant therapy (RAPIDO). A photograph of the lesion prior to treatment is provided as an inset to serve as reference. PGH, 2023.

The patient was once again presented at an MDT meeting, where a decision to proceed with tumor extirpation was reached. The plan was to perform an extralevator abdominoperineal excision (ELAPE) with en bloc wide excision of the right gluteal mass extension, with vertical rectus abdominis myocutaneous (VRAM) flap reconstruction. The patient was also referred to the Enhanced Recovery After Surgery (ERAS) program of the hospital prior to admission.

The abdominal phase of the surgery was performed with the patient in lithotomy position. No signs of metastatic disease were appreciated on exploration. A lateral-to-medial mobilization of the sigmoid colon was done with low ligation of Inferior Mesenteric Artery (IMA). Total mesorectal excision of the rectum was continued up to the insertion of the levator ani muscles and the abdominal phase was completed with proximal resection of the sigmoid colon. Performing the procedure through minimally invasive means was entertained.

The perineal phase was performed in an exaggerated dorsal lithotomy position to facilitate better exposure of the perineum. Wide margins of around 2cm were obtained around the right gluteal mass extension and the anus with the dissection carried out circumferentially around the rectum continuing laterally along the levators and divided near the pelvic sidewalls. (Figure 2a) The specimen was extracted completely leaving behind a 10 cm x 15 cm full thickness perineal defect. (Figure 2b)

A skin paddle measuring 7 cm x 15 cm was marked and harvested along the right rectus muscle. Identification of medial and lateral row of perforators was done pre-operatively using a handheld doppler ultrasound. Medial and lateral dissection of the skin paddle was

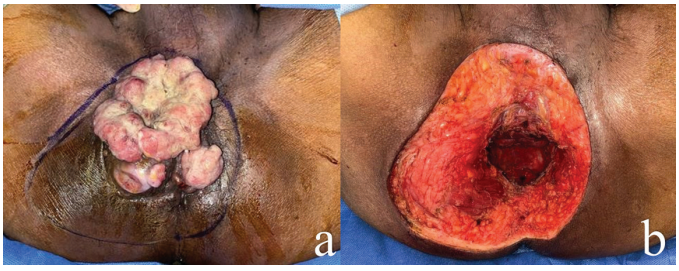

Figure 2 a. Margins were marked, ensuring adequacy, prior to commencing the perineal phase of surgery. b. The perineal defect after extralevator abdominoperineal excision en bloc wide excision of the right gluteal mass extension. PGH, 2023.

performed with careful identification and preservation of the perforators. The anterior rectus sheath was cut just before the perforators (Figure 3). The rectus muscle was transected from its superior insertion and freed from the underlying rectus sheath (sparing 1 cm of the anterior rectus sheath medially and laterally and the posterior rectus sheath). The deep inferior epigastric pedicle was identified and preserved. (Figure 4) After complete release of the rectus muscle, with preservation of the attachments to the pubic tubercle, the rectus along with the skin paddle was flipped through the pelvic cavity and into the perineal defect. The flap was secured using interrupted subdermal sutures. (Figure 5) The abdominal wound was then closed primarily. (Figure 6) Total surgery time was 6 hours with an estimated blood loss of 200cc. No intraoperative complications were incurred.

Histopathology for the rectal specimen showed mucinous adenocarcinoma, moderately differentiated, 13.5 cm in greatest tumor dimension with invasion to the perianal skin and sphincter muscles. No perineural and lymphovascular space invasion was identified. All margins of resection were negative for tumor. One out of 13 lymph nodes, and 1 tumor nodule, was positive for tumor. (Figure 7)

The patient was discharged after 6 days with an unremarkable postoperative course. He was followed-up at 2 weeks post-operatively with a viable flap and with minimal dehiscence on the inferolateral aspect of the flap and was managed conservatively with ointments and wound dressing and was regularly followed up at the outpatient department (Clavien-Dindo Grade I).

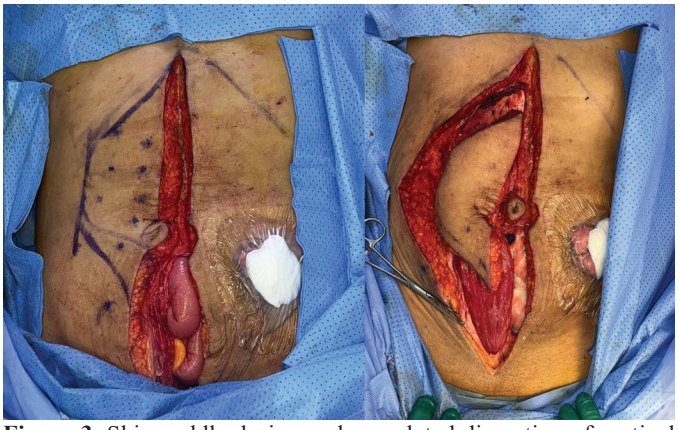

Figure 3. Skin paddle design and completed dissection of vertical rectus abdominis myocutaneous flap. PGH, 2023.

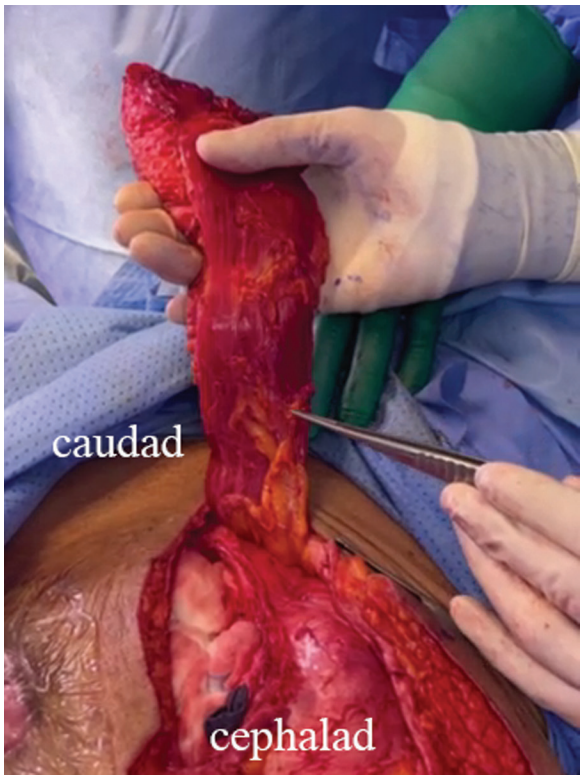

Figure 4. Completed elevation of the rectus muscle with preservation of the inferior epigastric pedicle. PGH, 2023.

Figure 5. Completed vertical rectus abdominis myocutaneous flap reconstruction of perineal defect after extralevator abdominoperineal excision. PGH, 2023.

Sixteen weeks post-operatively, the patient was seen with a viable perineal flap and already healed wound on the previously reported dehiscence site. (Figure 8)

Discussion

Total mesorectal excision for rectal cancer has significantly improved local recurrence rates since being introduced and integrated into surgical practice. However, locally advanced low rectal tumors treated with conventional APR still showed high local recurrence rates because of a higher risk for tumor perforation and positive circumferential resection margins despite neoadjuvant treatment and TME.[8]

A modification to the conventional APR to achieve wider margins of resection is the ELAPE. Levator muscles are divided as laterally as possible close to the pelvic sidewalls in ELAPE compared to the conventional

Figure 6. Abdominal wall primary closure after vertical rectus abdominis myoctunaeous flap harvest. PGH, 2023.

Figure 8. Completed vertical rectus abdominis myocutaneous flap reconstruction of perineal defect after extralevator abdominoperineal excision. PGH, 2023.

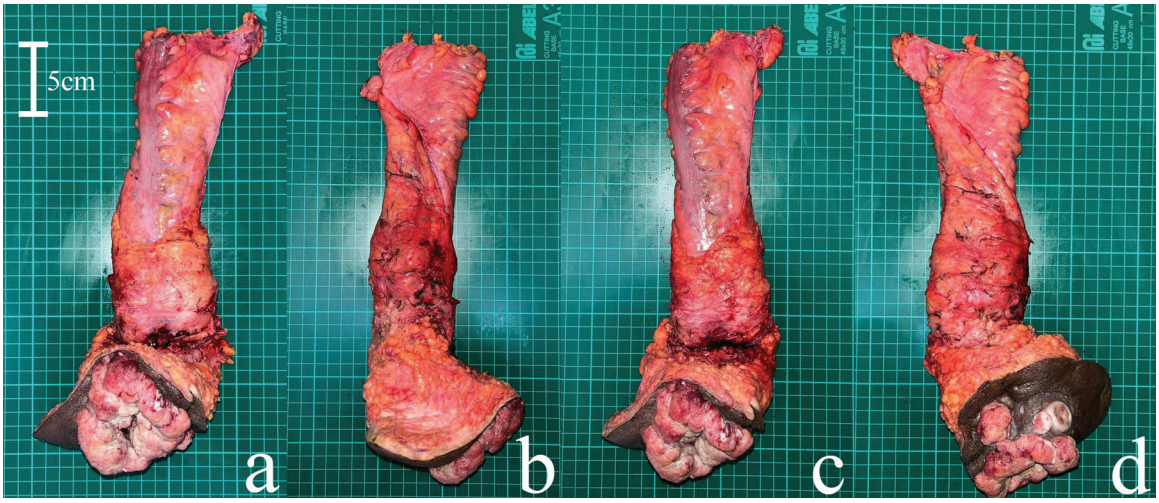

Figure 7. Extralevator abdominoperineal excision specimen (a. anterior b. posterior c. left d. right). PGH, 2023.

APR wherein the levators are resected close the rectum.[9] Hence, ELAPE specimens are of the desired cylindrical shape as "waisting" is avoided.[10] In APR, the abdominal phase of the TME is dissected up to the level of the prostate in men or below the cervix in women before commencing the perineal dissection phase. This leaves a circular remnant of the external sphincter which is primarily sutured to close the pelvic defect. In ELAPE, the abdominal phase of TME is limited only up to the seminal vesicles in men or at the level of the cervix in women, the uppermost part of the coccyx posteriorly and under the autonomic nerves laterally then the perineal phase of ELAPE is started at the outer border of the external anal sphincters into the ischioanal fossa going towards the insertion of the pelvic floor muscles.[11] This technique aimed to improve oncologic outcomes for low rectal tumors by reducing rates of intraoperative perforation and minimizing CRM involvement. In a study by Han et al in 2012, after a median follow-up of 29 months, local recurrence rates for ELAPE was significantly improved from 18.8% in patients who underwent conventional APR vs 2.8% in the ELAPE group.[12] During ELAPE, the patient is usually positioned in a prone jackknife position during the perineal phase to facilitate better exposure and easier perineal dissection. In the case presented, the perineal phase was performed on lithotomy position due to the planned VRAM flap reconstruction that would entail dissection of the rectus abdominis muscle. This maneuver would not be possible if the patient were prone.

The wider lateral dissection during ELAPE although with oncologic significance comes with its downside: a larger perineal defect with very little tissue available for wound re-approximation. There are fortunately, a variety of surgical options available to address perineal defects after APR which include healing by secondary intention, primary closure, omentoplasty, mesh placement – synthetic or biological, and flap reconstruction.[13] Large perineal defects especially those receiving irradiation to the area as shown in the case discussed would be more aptly managed using flap reconstruction. Different flap techniques are available and are classified based on the origin site of the flap. Thigh flaps (gracilis flap and anterolateral thigh flaps) and perineal flaps (V-Y advancement flap and gluteal turnover flap) may be used with the advantage of avoiding further abdominal incisions and produces more inconspicuous scars. However, these flaps have less bulk and there may be a need to harvest bilaterally. Abdominal flaps (VRAM), on the other hand, have more tissue bulk and would be more suitable if an open APR or ELAPE was performed. This carries the disadvantage of a more visible abdominal scar and potential problems with stoma siting.[14] The choice of using VRAM also has the added advantage of using non-irradiated tissue into the perineal defect which may decrease wound complications compared to other types of flaps and achieves acceptable wound healing.[15,16]

Conclusion

Extralevator abdominoperineal excision has been shown to have oncologic advantages over the traditional abdominoperineal resection. Although ELAPE produces a wider perineal wound defect, performing a vertical rectus abdominis myocutaneous flap is a viable surgical option for perineal wound coverage. This case report demonstrates that performing ELAPE in combination with VRAM flap perineal reconstruction produces oncologic and cosmetically acceptable outcomes for locally advanced rectal cancers.

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