Case Report

Bilateral gluteal V-Y fascio-cutaneous advancement flap reconstruction of the perineal defect following laparoscopic Extra Levator Abdominoperineal Resection (ELAPR) for advanced lower rectal cancer with malignant perianal fistula

ABSTRACT

Advanced lower rectal cancer may present with malignant perianal fistulae. When the fistulous tracts are extensive, achieving an adequate margin and covering the soft-tissue defect following perineal resection present a significant challenge.
We managed a male patient with locally advanced lower rectal cancer with recurrent perianal fistulae. After appropriate imaging and histological confirmation, he was treated with neoadjuvant long-course chemo-radiotherapy followed by Laparoscopic ELAP. The soft-tissue defect was covered with bilateral gluteal V-Y fascio-cutaneous advancement flap reconstruction. He recovered without significant complications and was discharged on post-op day 7. The specimen histology revealed an adequate pathological margin. He was started on adjuvant chemotherapy.
This case emphasises the feasibility of Laparoscopic ELAP with bilateral gluteal V-Y fascio-cutaneous advancement flap reconstruction for advanced lower rectal cancer with malignant perianal fistula.

Key words: Bilateral gluteal, flap reconstruction, rectal cancer, perianal fistula

Introduction

Rectal cancer is notorious for local recurrence, and it had been challenging to achieve optimal local control until the introduction of total mesorectal excision (TME). But despite TME, local recurrence and survival after abdominoperineal resection for very low rectal cancer has not improved to the extent seen in anterior resection[1]. Extra levator abdominoperineal resection (ELAPR) was introduced to achieve a wider margin and improve the local control. However, ELAPR usually leaves a significant perineal soft tissue defect, especially with an associated malignant perianal fistula. Many soft tissue covers are available with varying complexity for a perineal defect. Herein, we report a case of a male patient with low rectal cancer and perianal fistula, treated with Laparoscopic ELAPR and bilateral gluteal V-Y advancement fasciocutaneous flap repair.

Case presentation

A 72-year-old male patient was referred to us with a perianal fistula for five months. He had no past history of perianal fistulae or bowel malignancies. He also complained of alteration of bowel habits and episodes of painless bleeding with defecation. Examination under anaesthesia revealed a lower rectal growth extending to the upper half of the anal canal with an associated fistula tract opening at 5 O'clock position. The internal opening could not be delineated. Biopsies from both the growth and the fistula tract showed a moderately differentiated mucinous adenocarcinoma. A subsequent complete colonoscopy confirmed the same growth without any synchronous lesions up to the caecum.

Tumour staging with High-resolution MRI Pelvis showed a fistulous tract from the left inter-sphincteric region associated with a multiple septated irregular lesion measuring 4.0 x 4.7 × 5.5 cm. It involves the left puborectalis, levator ani muscles and the ischiorectal fossa.
The Contrast Enhanced CT and Inguinal Ultrasonography revealed no regional or distant metastasis.
After a multidisciplinary team (MDT) discussion (including oncologists, radiologists, pathologists, and surgeons), neoadjuvant long-course chemoradiotherapy followed by abdominoperineal resection with sigmoid colostomy was proposed. The patient agreed to the proposed management plan and signed a written consent.
He was given 50 Gy of Radiotherapy to the pelvis in 28 fractions. On each day of the Radiotherapy, he was also given oral Capecitabine 825mg/m2 twice daily. Six weeks after completion of neoadjuvant therapy, a re-staging MRI of the Pelvis revealed a poor tumour response.
Ten weeks after the completion of neoadjuvant therapy, we performed a successful laparoscopic ELAP with bilateral gluteal V-Y fascio-cutaneous advancement flap reconstruction. Preoperatively, with the help of a stoma care nurse, the stoma site was marked in the left iliac fossa. Under general anaesthesia, he was placed in the Lloyd-Davies position. A supraumbilical 10 mm port was inserted using open Hasson's technique, and 12mmHg pneumoperitoneum was achieved. Diagnostic laparoscopy did not reveal any intraabdominal metastasis. Three 5 mm working ports were inserted (right lumbar, right and left iliac fossae). Medial to lateral mobilisation of the left colon was performed while preserving the left ureter, gonadal vessels, and hypogastric nerves. The inferior mesenteric was isolated and divided after it gave off the left colic artery. The colon was observed for colour demarcation, and the mesenteric division was carried out up to the proposed proximal transection line. The bowel is divided using a stapler. Then, the pelvic dissection commenced, initially in the TME plane. But as it proceeds inferiorly, it is directed towards the origin of the levator ani from the pelvis and stopped there. The proximal bowel was delivered by dissecting the preoperatively marked stoma site, and a sigmoid end colostomy was fashioned.
Then, the patient was turned to a prone jack-knife position. The skin incision was marked, incorporating the fistula tract. The inferior gluteal artery was located at the intersection of the lower and mid-third portions of the line drawn from the posterior superior iliac spine to the ischial tuberosity. A handheld Doppler was used to confirm the locations of the perforators. A 'V' was drawn based on the perineal incision marking, directed laterally on either side. The perineal dissection commenced staying close to the pelvic wall up to the origin of the levator ani muscle, where it was incised to reach the abdominal dissection plane circumferentially. The specimen was delivered through the perineal wound. After achieving haemostasis, flap incisions were made, and the dissection started superiorly and laterally down to the gluteal fascia. Subfascial dissection was carried out medially. The inferior gluteal artery perforators were skeletonised, ensuring adequate flap mobility into the wound. The redundant medial skin was marked out and de-epithelialized. The flap was then inset with a suction drain in layers using absorbable sutures. The skin was closed with Nylon, making the 'V-shaped donor site into a 'Y'.

He had an uneventful post-operative period, with complete flap acceptance. He was discharged from the ward on post-op day 7. Specimen histology revealed the presence of 10% residual viable tumour in the tumour bed, with tumour regression grade 2. The proximal resection margin was well away, and the circumferential resection margin was 5 mm from the tumour. He was started on adjuvant chemotherapy.

Discussion

Rectal cancer, as a rule, was considered an unsurvivable disease for decades due to the lack of attention to the embryological planes, lymphatic drainage, and non-standardised techniques. The introduction of the Total Mesorectal Excision (TME) by Professor Bill Heald for Anterior Resection (AR) in the 1980s significantly reduced local recurrence[2]. TME aims to en-bloc excision of the rectum with its mesorectal lymphatics and mesorectal fascial envelope as a "Tumour package" [1]. The objective is to resect the specimen as a cylinder, avoiding coning or "waisting", to reduce the involvement of Circumferential Resection Margin (CRM) and intraoperative tumour perforation. But when it comes to the Abdomino-perineal Resection (APR) for cancers involving or abutting the anal canal, a natural waist at the levator ani level threatens the resection margin. Because of that, conventional APR is associated with greater CRM positivity (41% v 12%), greater local recurrence (23.8% v 13.5%) and poorer 5-year cancer-specific survival (52.3% v 65.8%) compared to AR[3], [4].

Extra Levator abdominoperineal Resection (ELAP) is a technique that emphasises the complete resection of the levator ani muscle that surrounds the mesorectum as a cylindrical specimen and aims to reduce the incidence of positive CRM, intraoperative tumour perforation, and the rate of postoperative local tumour recurrence [5], [6]. Applying the ELAP technique becomes even more critical when the tumour extends to the perineal skin via a fistula. Such locally advanced disease demands a wider excision to incorporate the fistula tract and associated involved tissue to achieve adequate margins, as in our case.

Laparoscopy has been shown as a viable alternative to open surgery in ELAP, with significantly reduced hospitalisation, early bowel function return and less analgesic requirement without compromising specimen quality [6]. Following the laparoscopic ELAP, our patient had an uneventful post-operative period and was discharged on post-op day 7.

Even though the perineal soft tissue defect could be closed primarily, such an extensive excision may lead to perineal herniation of the small bowel. Also, the resultant dead space will lead to the "Empty Pelvis Syndrome" condition [7]. The aim of perineal defect repair is to close it with vascularised tissue to improve healing and reduce the pelvic dead space. Many surgical options are available to reconstruct the pelvic floor with varying complexity. The common preferences are the vertical rectus abdominis myocutaneous flap, gracilis myocutaneous flap, and gluteal V-Y fasciocutaneous advancement flap [8]. A bilateral V-Y Gluteal fasciocutaneous advancement flap is a reliable option for perineal wound reconstruction. It carries minimal donor site morbidity. The surgical complexity of the procedure is relatively low. It requires a shorter learning curve, which makes us, the surgical oncologists, master the technique and perform as in our case, without the help of plastic surgical colleagues.

Biological meshes are also frequently used in perineal reconstruction. They require shorter surgical time and minimal skills compared to native tissue reconstruction. But when the soft tissue defect is substantial, especially with the loss of skin, the mesh needs to be combined with native tissue, minimising the advantage. There is an association of infection [9]. The meshes are usually prohibitively expensive in the resource-limited public health sector, making native tissue-based reconstruction the only reliable choice.

Conclusion

Laparoscopic ELAPR with bilateral V-Y gluteal fasciocutaneous advancement flap pelvic floor reconstruction is a feasible technique with adequate tumour clearance and perineal wound outcome in locally advanced low rectal cancer.

Ethical Approval:
As per international standard or university standards written ethical approval has been collected and preserved by the author(s).

Consent
As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

Reference:

1. Marr R, Birbeck K, Garvican J, et al. The modern abdominoperineal excision: The next challenge after total mesorectal excision. *Ann Surg*. 2005;242(1):74-82. doi:10.1097/01.sla.0000167926.60908.15
2. Heald RJ, Husband EM, Ryall RDH. The mesorectum in rectal cancer surgery—the clue to pelvic recurrence? *Br J Surg*. 1982;69(10):613-616. doi:10.1002/bjs.1800691019
3. West NP, Finan PJ, Anderin C, Lindholm J, Holm T, Quirke P. Evidence of the oncologic superiority of cylindrical abdominoperineal excision for low rectal cancer. *J Clin Oncol*. 2008;26(21):3517-3522. doi:10.1200/JCO.2007.14.5961
4. Nagtegaal ID, Van De Velde CJH, Marijnen CAM, Van Krieken JHJM, Quirke P. Low rectal cancer: A call for a change of approach in abdominoperineal resection. *J Clin Oncol*. 2005;23(36):9257-9264. doi:10.1200/JCO.2005.02.9231
5. West NP, Anderin C, Smith KJE, Holm T, Quirke P. Multicentre experience with extralevator abdominoperineal excision for low rectal cancer. *Br J Surg*. 2010;97(4):588-599. doi:10.1002/bjs.6916
6. Tao Y, Han JG, Wang ZJ. Extralevator abdominoperineal excision for advanced low rectal cancer: Where to go. *World J Gastroenterol*. 2020;26(22):3012-3023. doi:10.3748/wjg.v26.i22.3012
7. Bankar S, Desouza A, Paliwal V, et al. Novel use of the Bakri balloon to minimize empty pelvis syndrome following laparoscopic total pelvic exenteration. *Color Dis*. 2020;22(12):2322-2325. doi:https://doi.org/10.1111/codi.15319
8. Chavan RN, Saklani AP, Desouza AL, et al. V-Y Gluteal Advancement Fasciocutaneous Flap for Reconstruction of Perineal Defects After Surgery for Anorectal Cancers— A Single-Center Experience. *Indian J Surg Oncol*. 2021;12(2):241-245. doi:10.1007/s13193-021-01311-x
9. Alam NN, Narang SK, Köckerling F, Daniels IR, Smart NJ. Biologic Mesh Reconstruction of the Pelvic Floor after Extralevator Abdominoperineal Excision: A Systematic Review. *Front Surg*. 2016;3(February):1-8. doi:10.3389/fsurg.2016.00009