

CASE REPORT

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Intestinal obstruction following harvest of VRAM-flap for reconstruction of a large perineal defect

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ABSTRACT

A patient with locally advanced adenocarcinoma of the rectum was operated with abdominoperineal resection and perineal reconstruction with a vertical rectus abdominis musculocutaneous flap. Six days postoperatively, there was herniation of the small bowel, between the anterior and posterior rectus sheaths, to a subcutaneous location.

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Introduction

The vertical rectus abdominis musculocutaneous flap (VRAM) is a reliable method for primary closure of perineal skin defects up to medium size, which otherwise might have been left for healing by secondary intention [1–18]. The VRAM-flap is indicated not only for closure of perineal skin defects, following (e.g. abdominoperineal resection of the rectum), but also for reconstruction of the posterior vaginal wall and not the least obliteration of dead-space in the pelvis following resection of the levator ani muscles [2,4,5,9,19,20]. The flap provides well-vascularized tissue in an area, which frequently has been subjected to preoperative radiation therapy, and may contribute to wound healing [11,16–20]. The flap can further prevent herniation of the bowel to a subcutaneous location in the perineum if the muscular portion of the flap is sutured to the remnants of the levator ani muscles [9,13,15,17,18].

Following flap harvest, the donor site can usually be closed without excessive tension. Lateral undermining above the abdominal fascia can, if necessary, be performed to facilitate skin closure if a wide skin paddle has been used. The hernia is the most common donor site complication with a reported incidence of 19% [21], followed by skin infections reported in 15–21% [22–24].



Wound infection is the most common perineal complication, reported in 10–12% of patients in

retrospective as well as prospective studies. Wound dehiscence has been reported in 7–11% of the patients and wound abscess in 3–4% [6,22,23,25]. Less common complications in the perineum are partial or total flap and/or fat necrosis in the case of pedicle kinking or twisting [6,8,11,15,16,18].

Patient and method

Our report concerns a 52-year-old male patient presenting with an adenocarcinoma of the rectum T4b, N1b, M0 with metastatic spread to mesorectal lymph nodes and engagement of the right levator muscle. Preoperatively, the patient received 50.4 Gy radiation therapy and concomitant chemotherapy with Capecitabine (Xeloda[®]). The tumor downsized whereupon the patient was operated with an abdominoperineal resection of the rectum. Due to engagement of the levator muscles and need of a wide skin excision, a reconstruction of the perineum with a musculocutaneous VRAM-flap was planned.

In the supine position, a standard abdominoperineal resection was first performed. A VRAM flap was then elevated with a skin island positioned vertically over the right rectus muscle, from slightly below the level of the umbilicus to the xiphoid. The entire posterior rectus sheath, as well as the anterior rectus sheath below the umbilicus, were left intact, and the rectus muscle was

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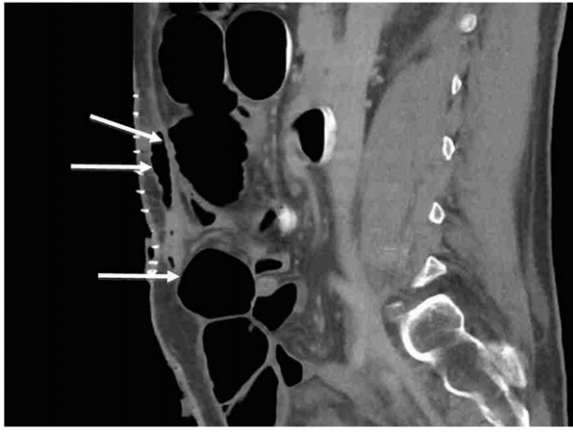


Figure 1. Postoperative CT sagittal view. Posterior rectus sheath (top arrow). Herniated small bowel beneath the staple-lines (middle arrow). Semilunar line (lower arrow).

divided at the costal margin. The cranial tip of the elevated VRAM flap skin island was sutured to the rectal specimen, carefully securing a correct orientation of the flap when transferring it into the pelvic cavity to prevent twisting of the pedicle.

The rectus sheath was repaired with a double PDS suture. A colostomy was constructed through the left rectus abdominis muscle before turning the patient to a prone position.

After completion of the posterior dissection and removal of the rectum, the VRAM flap was pulled out through the perineal defect. The lateral and medial edges of the rectus muscle and the anterior rectus sheath were sutured to the remnants of the levator muscles. After de-epithelization of the distal portion of the skin island, the remaining island skin was sutured to the surrounding perineal skin.

Six days postoperatively, the patient presented with nausea and gastric retention. Bowel discharge ceased. A CT-scan showed small intestinal herniation at the level of the umbilicus (Figures 1 and 2). The patient was readmitted to OR and a herniation of the small bowel between the anterior rectus sheath of the lower abdomen and arcuate line/posterior rectus sheath was found. The bowel was considered viable and was repositioned into the abdomen followed by renewed and reinforced suturing of the upper posterior to the lower anterior rectus sheath. Particular care was taken when suturing the linea semilunaris/arcuate line. Healing was thereafter without complications, and the patient could quickly be mobilized and subsequently discharged. At follow-up three weeks after discharge, the perineal and the donor areas had healed, and no signs of an incisional hernia or abdominal bulging were evident.



Figure 2. Postoperative CT, transverse view. White arrow showing subcutaneously located small bowel loop anterior to the rectus sheath. Intra-abdominally dilated and fluid-filled proximal loops of small bowel are visualized. Left rectus abdominis muscle (black arrow).

At 1 year follow-up, the flap was viable and the perineum well healed. There were no signs of herniation, neither in the abdomen nor perineum. Unfortunately, a routine CT-scan showed signs of tumor recurrence with peritoneal carcinomatosis.

Conclusion

There are several options for perineal flap reconstruction, such as the gracilis flap, the inferior gluteal artery flap and the omental flap [24,26–28]. An elegant, but technically more challenging, solution for perineal reconstruction is the rectus muscle sparing perforator flap based on the deep inferior epigastric vessels [29].

In our experience, however, the VRAM-flap is robust, quick and useful for closure of perineal skin defects alone or with defects in the posterior vaginal wall. The flap further eliminates pelvic dead space if a wide resection of the levator ani muscles has been necessary. Commonly, the right rectus abdominis muscle is used as the donor site, as the left usually is used for construction of a colostomy.

Our case illustrates that the semilunar or arcuate line, i.e. where the posterior rectus sheath connects to the peritoneum, can be a locus minoris resistentiae with respect to herniation of bowel when raising a VRA flap. The semilunar line is sometimes rather a gradual distal thinning, than a distinct structure (Figure 3), of the posterior rectus fascia below the level of the umbilicus. We have not routinely used alloplastic mesh for donor site reinforcement, but it must be considered if any risk factor of an incisional hernia is present [28,30,31]. No such risk factors were identified in our patient.

We suggest that the skin and fascial incision of the VRAM flap below the level of the umbilicus is limited, if

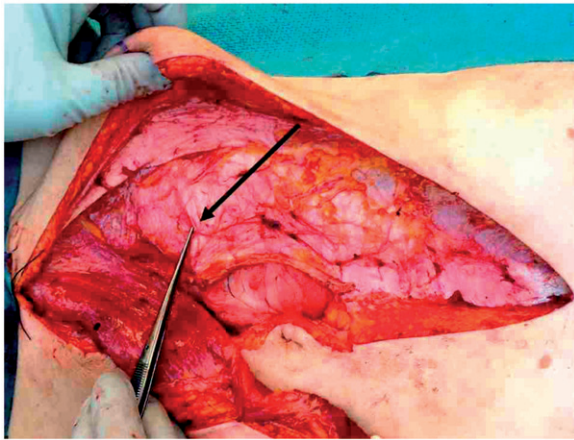


Figure 3. Intraoperative illustration of linea semilunaris/arcuate line (arrow).

possible, in order to enable a strong suture of the anterior rectus fascia to the distal part of the posterior rectus sheath. Particular attention is to be taken in suturing the linea semilunaris/posterior rectus sheath of the upper abdomen to the anterior rectus sheath of the lower abdomen if the linea semilunaris is indistinct.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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