A modified bipedicled VRAM flap for simultaneous reconstruction of a perineal and posterior vaginal defect

Case report

Medical history and clinical diagnostics

The patient is a 52-year-old woman with a history of low anterior resection in 2008 for a carcinoid tumor of her rectum. The patient did not require adjuvant treatment and had negative surveillance through 2010. In early 2013 she developed rectal bleeding and a workup including a computer tomography of the abdomen and pelvis, followed by colonoscopy revealed a 9 cm pelvic mass in the posterior pelvis involving the rectum, rectovaginal space, and impinging on the posterior vaginal tissues to the extent that the vaginal canal was severely displaced anteriorly (Fig. 1). A diagnostic biopsy of the mass was performed.

Fig. 1 Preoperative CT scan showing displacement of the rectum and the vagina by malignant pelvic mass
**Diagnosis:** Poorly differentiated adenocarcinoma of Mullerian origin.

**Therapy**

She subsequently underwent neoadjuvant chemotherapy with cisplatin and whole pelvic radiation. Residual disease was noted in the right pelvic sidewall, the rectal mesentery, the rectovaginal space abutting the upper half of the vagina as well as in the periaortic lymph nodes. The patient underwent a bilateral salpingo-ophorectomy, partial posterior vaginectomy, pelvic and paraaortic lymph node resection, left hemicolecotomy, tumor debulking with posterior infralevator exenteration, and end colostomy. After completion resection, a large perineal wound as well as a 5 cm posterior upper vaginal defect resulted (Fig. 2).

**Surgical technique**

We elected to utilize a bipedicle VRAM flap for reconstruction; specifically a right-sided flap 15×10 cm was outlined. The skin was incised with a scalpel and the dissection proceeded with electrocautery. The inferior epigastric artery and vein were outlined using an acoustic Doppler system, and protected during further dissection. Once the VRAM flap was completely elevated, it was divided maintaining two independent pedicles to two myocutaneous flaps, each measuring approximately 8×6 cm (Fig. 3). The distal flap was then externalized through the pelvis and inset in the perineal defect. The skin edges were closed using multiple interrupted 3-0 non-absorbable sutures (Fig. 4). The superior flap was now used to reconstruct the proximal half of the posterior vagina that was removed during the tumor extirpation. Multiple absorbable 3-0 sutures were used to close the vaginal mucosa interface with the flap skin edges. The donor site was closed primarily.

**Clinical progress**

The patient tolerated the procedure well and she was discharged on post-operative...
day 13. Final pathology revealed clear cell adenocarcinoma arising in endometriosis. She received three further cycles of adjuvant chemotherapy with carboplatin and paclitaxel. She was seen in the plastic surgery clinic for her post-operative follow up appointment 1 month after surgery and both parts of the flap were completely viable (Fig. 5). At 5 months post-procedure her flap has completely healed and the vaginal caliber was found to be normal (Fig. 6).

Discussion

The management of locally advanced pelvic tumors regularly requires radical surgical resection. Although such an aggressive approach is associated with increased cancer-specific and overall survival [4], it may result in a significant intrinsic and extrinsic pelvic defect [9]. Additionally, the tissues can be further compromised by concomitant radiotherapy with consequential impaired wound healing. These wounds themselves are associated with increased morbidity, which can often delay adjuvant chemotherapy [8]. Furthermore, surgical absence of the vagina has a detrimental impact on the patient’s body image, sexual function, and quality of life [5].

Immediate flap reconstruction of pelvic defects has been associated with improved healing and reduced rates of postoperative complications as well as improved body image and sexual function [7]. Numerous reconstructive options have been recommended, such as the gracilis myocutaneous flap, neurovascular pudendal-thigh flaps (“Singapore flap”) and distally based rectus abdominis myocutaneous flaps, particularly the vertical rectus abdominis myocutaneous (VRAM) and the transverse rectus abdominis myocutaneous (TRAM). The VRAM flap has been considered to be superior to all the above flaps for the reconstruction of vaginal and perineal defects following abdominoperineal resection (APR) with fewer major complications and without increased abdominal wall morbidity [1, 8].

Furthermore the VRAM has proved to be associated with fewer major complications compared to the Singapore flap [8]. Casey et al. [2] have shown that the overall complication rate was lower with the VRAM than either gracilis or Singapore flap reconstructions (31.7, 61.5, and 46.7%, respectively) for vaginal reconstruction. The flap specific complication rate was least in the VRAM group (22, 53.8, and 37.8%, respectively). Also, the VRAM was found to have significantly lower incidence of perineal abscess formation (9% versus 37%) and major perineal wound dehiscence (9% versus 30%) when compared to primary closure after APR on irradiated tissues [8]. More recently, a distal inferior epigastric perforator (DIEP) flap has been described for total vaginal reconstruction after pelvic exenteration with promising results and decreased donor site morbidity compared to the TRAM flap [10]. The donor site morbidity of VRAM flaps mainly includes postoperative ventral hernia and bulging of the abdominal wall [3]. In a clinical trial the donor site morbidity could not be significantly decreased using a mesh for abdominal wall reinforcement [6].

In this case report the authors present a unique modification of the previously described technique [1], using a bipedicule VRAM myocutaneous flap, based on two individual perforators off the inferior epigastric artery and vein. The bipedicule VRAM was utilized for reconstruction of a perineal and posterior vaginal defect in a patient undergoing extensive pelvic and vaginal tumor resection. The rationale behind the decision was the need for si-
multaneous reconstruction of two separate and isolated defects, a posterior vaginal defect and a perineal defect. The flap covered the defects with bulky, mobile and well vascularized tissues incorporating well into the recipient site. To our knowledge, reconstruction of such independent defects with a perforator based bipedicle VRAM flap has not been described.

**Conclusion**

- The described modified VRAM flap is a reliable option for simultaneous reconstruction of a perineal and posterior vaginal defect
- The modified flap includes a bipedicle myocutaneous VRAM flap based on two individual perforators off the inferior epigastric artery and vein.

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**Compliance with ethical guidelines**

**Conflict of interest.** G. Kokosis, R. Schmitz, A.A. Secord, L.J. Hawrlesky, A. Berchuck, C.R. Mantyh, and D. Erdmann state that there are no conflicts of interest. The accompanying manuscript does not include studies on humans or animals.

**References**