



Case Report

Options for repair of rectus abdominis myocutaneous perineal/vaginal flap prolapse: A case series [☆]

Laura B. Huffman ^a, Laura K. Randolph ^b, Georgia A. McCann ^c, Caroline Billingsley ^c, Michael P. Hopkins ^b, David E. Cohn ^{c,*}, Andrew F. Hundley ^d

^a Department of Obstetrics and Gynecology, The Wexner Medical Center at the Ohio State University, 395 West 12th Avenue, 5th Floor, Columbus, OH 43210, USA

^b Department of Obstetrics and Gynecology, Aultman Hospital, 2600 Sixth Street, Canton, OH 44710, USA

^c Department of Obstetrics and Gynecology, Division of Gynecologic Oncology, The Ohio State University Comprehensive Cancer Center- Arthur G. James Cancer Hospital and Richard J. Solove Research Institute, 320 West 10th Avenue M210 Starling-Loving Hall, Columbus, OH 43210, USA

^d Department of Obstetrics and Gynecology, Division of Urogynecology, The Wexner Medical Center at the Ohio State University, 395 West 12th Avenue, 5th Floor, Columbus, OH 43210, USA

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vertical rectus abdominis myocutaneous (VRAM), and posterior thigh flaps. Studies have shown the VRAM flap to be a superior option for filling dead space, for vaginal reconstruction, and for its decreased postoperative complications when compared to other techniques (Goldberg et al., 2006; Butler et al., 2008; Casey et al., 2004). Despite these advantages, reported complications of the VRAM flap include donor site wound separation, flap necrosis, flap separation, and abscess.

We present two cases of prolapse of the VRAM flaps that were used for perineal and vaginal reconstruction following pelvic exenteration with a discussion of the surgical repair and potential risk factors associated with this complication.

Case A

A 56 year old with Stage IIIA endometrial stromal sarcoma was treated with hysterectomy, adjuvant pelvic radiation, and ifosfamide and cisplatin in 1992. In July 2011, she experienced right flank pain and hematuria. A computed tomography (CT) showed right hydronephrosis and a soft tissue density in the right pelvis. Physical exam demonstrated a six centimeter fungating mass that was adherent to the right vaginal wall. Percutaneous biopsy demonstrated poorly differentiated squamous cell carcinoma. Imaging failed to demonstrate any extrapelvic disease. Following review of her treatment history, a total pelvic exenteration was presented as a potentially curative therapy, with supportive care or chemotherapy presented as palliative options. In August 2011 the patient underwent a total pelvic exenteration, double barrel wet sigmoid loop colostomy (an incontinent urinary conduit that allows for separation of urinary and fecal streams) and VRAM flap for perineal reconstruction (Backes et al., 2013). A neovagina was not created according to patient preference. Over the next year, she developed prolapse of the VRAM flap past the point of the introitus. This resulted in discomfort, characterized as pressure pulling sensation in her perineum. On examination, the flap measured 8 cm long and 4.5 cm wide. The flap was noted to protrude beyond the pelvic outlet and was on tension at rest (Fig. 1). It could be reduced to the level of the labia with external compression which improved her symptoms, but the prolapse could not be internalized above the pelvic outlet. After consultation with a urogynecologist, options for either fixation of the flap in the peritoneal cavity or an obliterative procedure were discussed. Colpopexy was not

Introduction

Brunschwig and colleagues first described pelvic exenteration in 1948 (Brunschwig, 1948). The procedure has evolved from a palliative surgical option to curative treatment for advanced and recurrent gynecologic malignancies that are confined to the pelvis. Advancements in surgical techniques, anesthesia, and post-operative care have improved post-surgical mortality and long-term survival. However, post-surgical morbidity remains high (Goldberg et al., 2006).

Several techniques using myocutaneous flaps have been developed for perineal wound closure and vaginal reconstruction at the time of pelvic exenteration resulting in reduced morbidity and improved quality of life. Myocutaneous flaps provide well-vascularized, healthy tissue to aid in the closure of a previously irradiated perineum after surgical resection (Buchel et al., 2004). When compared to primary closure, myocutaneous flaps have been shown to decrease the rates of complications including abscess formation, major wound dehiscence, and fistula formation (Butler et al., 2008). Commonly used flaps for perineal and vaginal reconstruction include the gracilis myocutaneous,

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* Corresponding author. Fax: +1 614 366 7942.

E-mail address: David.Cohn@osumc.edu (D.E. Cohn).



Fig. 1. Prolapse of VRAM flap used for pelvic reconstruction one year after total pelvic exenteration (Case A).

deemed feasible, as there was not enough mobility in the flap to allow for fixation to the sacrum.

In October 2012, the patient underwent repair of perineal VRAM flap prolapse. The patient was placed in the dorsal lithotomy position with her legs in Allen stirrups. The transition point between the lateral margins of the rectus muscle flap and the labium minus was incised in an ovoid fashion. Allis clamps were then placed on the free edges of the epithelium overlying the muscle flap and tenotomy scissors were used to dissect this epithelial layer off the underlying periadventitial tissue and muscularis of the muscle flap. The flap was mobilized from the lateral edges of the external genitalia circumferentially for approximately 1 cm. Traditional obliteration with successive purse-string layered reduction was not feasible given the nearly 2:1 ratio of vertical to horizontal dimensions of the prolapsed flap. Therefore, the prolapse was reduced using multiple columns of horizontal mattress sutures. Three layers of non-absorbable suture were used to imbricate the prolapse, followed by a final layer of 2-0 absorbable sutures to bury the non-absorbable suture layers. With each layer, the prolapse was gradually imbricated to the point where the flap was level with the pelvic outlet and the external genitalia. Interrupted 2-0 absorbable sutures were used to bring the edges of the external genitalia together. There was good reduction of the prolapse with a narrowed outlet, resulting in reduced pressure on the flap from the abdominal contents. The patient is doing well six months post-procedure with resolution of her prolapse (Fig. 2).

Case B

A 44 year old with Stage IVA vulvar verrucous squamous cell carcinoma that extended to the anal verge, underwent a posterior



Fig. 2. Five months after repair of VRAM prolapse with oblitative technique (Case A).

exenteration, hysterectomy, bilateral salpingo-oophorectomy, omental pelvic floor graft, and colostomy in January 2004. Eighteen months later she developed increased vaginal discharge and pelvic pressure. Exam showed prolapse of the reconstructed posterior compartment and enterocele. An exploratory laparotomy was performed with enterocele reduction, partial vaginectomy, and pelvic floor reconstruction utilizing a VRAM flap. Eighteen months later, the patient developed pelvic pain and a reducible prolapse of the anterior edge of the VRAM flap was noted protruding 4 cm beyond the introitus. A revision vaginoplasty was performed to affix the flap to the pubic arch by suturing it to the fascia lateral to each side of the urethra with absorbable suture. Three months later the patient noticed worsening pelvic pressure and the posterior portion of the flap had prolapsed 5 cm beyond the introitus. A modified perineoplasty and posterior repair was performed in which a diamond-shaped portion of skin overlying the posterior introitus and flap was excised and dissection occurred down to the level of the levator muscles, which were brought together in the midline with absorbable suture. The denuded edges of the posterior introitus and VRAM flap were reapproximated with multiple layers of figure-of-eight absorbable sutures bringing the medial edges together and working lateral with good resolution of the prolapse.

Over a year later, recurrence of the prolapse was noted with complete extrusion of the VRAM flap through the introitus. The prolapse extended 10 cm beyond the level of the introitus, and was reducible. This was managed conservatively until an enterocele developed with thinning of the overlying skin. An exploratory laparotomy was performed. The prolapsed flap was elevated into the pelvis, enterocele reduced, and sacral suspension performed using three permanent sutures affixing the flap directly to the anterior longitudinal ligament of the sacrum. No mesh was needed to assist with fixation. A large piece of biologic mesh was then placed over the entire pelvis and secured in place. The patient is doing well with no evidence of prolapse for two years (Fig. 3).

Discussion

Myocutaneous flaps are a successful surgical tool in the setting of pelvic reconstruction after an exenteration; however, complications do occur. Prolapse of the gracilis myocutaneous flap used for vaginal reconstruction has been documented (Copeland et al., 1989; Barnhill et al., 1985; Delmore et al., 1987). Modifications in surgical technique including decreasing the flap size, suturing the neovagina to the levator and retropubic fascia, and sacrificing the dominant neurovascular pedicle to provide additional mobilization have been shown to decrease the rate of gracilis flap prolapse (Copeland et al., 1989). Barnhill et al. reported the repair of gracilis myocutaneous neovagina prolapse after pelvic



Fig. 3. Two years after repair of VRAM prolapse by sacral suspension. The total length of the neovagina is 10 cm (Case B).

exenteration using sacrospinous ligament suspension (Barnhill et al., 1985). Delmore et al. reported a similar case of gracilis myocutaneous neovagina prolapse that occurred 12 months after pelvic exenteration. The neovagina was excised by patient request and the remaining perineal defect was closed using human dura (Delmore et al., 1987).

Gracilis myocutaneous flaps have traditionally been used in the past for pelvic and vaginal reconstruction. However, poor healing, high rate of necrosis, and vaginal prolapse have caused this approach to fall out of favor. The VRAM flap has shown improved rates of these complications. We searched PubMed from 1975 to 2013 using the terms VRAM, neovagina, prolapse, and pelvic exenteration and found no publications describing VRAM prolapse or the surgical repair after pelvic exenteration. We discussed two different cases of VRAM flap prolapse and the surgical techniques used for repair. Case A had complete resolution of the prolapse using an obliterative technique. Case B had three episodes of prolapse occurring at different portions of the VRAM flap. Anterior fixation, posterior repair with perineoplasty, and sacral suspension were performed with the last procedure ultimately resolving the prolapse and preserving the neovagina. While permanent suture was not used in the first repair of Case B, it is uncertain whether its use to secure the anterior prolapse to the pubic arch would have prevented the ultimate total prolapse of the flap that developed over 2 years later. These cases had different presentations, tissue dimensions and reducibility, and patient functional preference. Consideration of these factors was key in determining the appropriate repair technique.

Our institution performs on average 8 pelvic exenterations annually. VRAM flaps have been used routinely for perineal repair and neovagina creation for 10 years in approximately 90% of our cases. This reflects a potential 1/72 risk of developing VRAM flap prolapse in our patients.

When considering traditional pelvic organ prolapse risk factors include advancing age, menopause, Caucasian race, genetics, vaginal parity, smoking, and chronic strain due to body weight, constipation, or work/exercise (Chow and Rodriguez, 2013). Both patients have a

20 pack/year history of smoking. Case A is obese with a BMI of 32.5 kg/m². Modifiable factors to reduce recurrence in these women include smoking cessation, weight loss, and limiting work stress with excessive lifting. From a surgical perspective, it is uncertain whether the risk of flap prolapse varies between supralelevator and infralevator exenterations as this complication is rare. The levator muscles are an important pelvic support structure and some studies suggest a relationship between traditional pelvic organ prolapse and levator injury from prior vaginal deliveries (Memon and Handa, 2012). Furthermore, reducing the pelvic outlet to minimize the total surface area that is exposed to abdominal pressure may help reduce recurrence of prolapse in these patients. The exact risk of recurrence in these patients is unclear, however both are currently doing well without evidence of prolapse.

There is no clear algorithm to follow regarding collaboration with Urogynecology in situations such as these. Certainly in instances in which prolapse or incontinence are identified both physically and as a functional concern for the patient, pre-operative consultation and evaluation would be reasonable provided it does not adversely delay management of the primary diagnosis. In many instances, combined procedures may be possible, although the use of permanent materials such as mesh should be considered within the context of planned treatment for the patient's malignancy, including the likelihood of impaired wound healing secondary to chemotherapy or exposure to radiation treatment. The gynecologic oncology surgeon may often feel comfortable taking preventative measures to guard against prolapse and incontinence issues following the primary surgery. In these cases, consultation may not be necessary.

Conflict of interest statement

All of the authors of this manuscript have nothing to disclose.

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