

Surgical Reconstruction of Perineum and Abdominal Wall: Systematic Review

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Abstract: This systematic review focuses on evaluating the reconstruction plastic surgical techniques of perineum, and abdominal wall defects, we intended to discuss the impact of surgical reconstruction on patients from different perspectives, and also to show different defects causes and their proper management. An organized search of PubMed was conducted up to December 2016 using the search terms: "perineum flaw" "abdominoperineal excision" or "abdominoperineal resection" in order to recognize research studies assessing the various techniques for reconstruction of the premium region and abdominal wall floor. Numerous factors like size and character of the flaw have to receive attention, but typically a pedicled flap like ALT flap or VRAM flap could be utilized. proof revealed patient who presents with an intricate stomach wall hernia, based upon the criteria used in this study, must consist of an assessment of the elements and place of the defect. Adequate tissue for direct closure is usually not available. When steady skin protection is present, intraperitoneal mesh positioning is recommended. When cutaneous protection is absent or compromised, abdominal wall reconstruction typically requires use of a flap.

Keywords: ALT flap or VRAM flap, Perineum and Abdominal Wall.

1. INTRODUCTION

The creation of perineal and pelvic defects following resections of tumour or inflammatory disease such urological (urinary bladder, prostate), and colorectal tumors typically leaves wounds that cannot be closed mainly ⁽¹⁾. These resections might likewise result in functional deficits in both male and female patients. The advancement of flap style has actually caused a variety of options to these problems being offered, including fasciocutaneous flaps, musculocutaneous flaps, muscle just flaps, omental flaps or a combination of different flaps ^(1,2). The evolution of more radical excisional surgery methods resulted in a boost in big flaws of the perineum ⁽²⁾. The perineogenital region per se has several functions for urination, bowel reproduction, evacuation, and sexuality ⁽³⁾, so extensive resection in this area results often in functional deficits.

Abdominal wall reconstruction might be required after unsuccessful closure of a celiotomy wound, or when components of the abdominal wall are either hurt or absent. Decisions relating to technique for stomach wall reconstruction are based upon an evaluation of the defect by area, degree (layers involved), and etiology. Reconstructive alternatives include direct tissue closure, prosthetic mesh, local improvement or local flaps, distant flaps, or combined flap and mesh. Although previous studies have analyzed outcomes with specific techniques for mesh ^(4,5,6,7) or flap ^(8,9) use, data comparing results of mesh and flaps in a population of patients with complex abdominal hernias is not available.

Pelvic surgery is characterized by a complex anatomy, involvement of different organs and microbial environment of this area. Plastic-reconstructive steps like at the same time utilized skin grafts, pedicled, or totally free flaps prevent different problems or lower their occurrence, such as persistent injury recovery disorders and chronic secretion of intrapelvic or peritoneal wound cavities ^(10,11). For in your area innovative main or recurrent rectal cancer attacking the urine bladder or prostate, pelvic exenteration is frequently the only treatment, with is potentially alleviative ⁽¹²⁾. Radical surgical treatment totally resects all deadly disease, often consisting of the complete or a minimum of large parts of pelvic viscera, vessels, muscles, ligaments, or pelvic bone. In contemporary ideas of innovative oncological surgery, survival is not the only factor to consider; quality of life has to be taken into account ⁽¹³⁾.

Objectives:

This systematic review focuses on evaluating the reconstruction plastic surgical techniques of perineum, and abdominal wall defects, we intended to discuss the impact of surgical reconstruction on patients from different perspectives, and also to show different defects causes and their proper management.

2. METHODOLOGY

Systematic review study was performed:

Search methods:

An organized search of PubMed was conducted up to December 2016 using the search terms: "perineum flaw" "abdominoperineal excision" or "abdominoperineal resection" in order to recognize research studies assessing the various techniques for reconstruction of the premium region and abdominal wall floor. Titles, abstracts, and full texts were evaluated for studies reporting on using biologic mesh for restoration of the pelvic floor. Inclusion requirements were studies that talking about the perineal and stomach reconstruction after problems. non-English language research studies were excluded were omitted, along with animal subject.

3. RESULTS & DISCUSSION

A. Perineal defects and surgical reconstruction:

The primary indicators for significant resection of the perineum are vulval cancer and anal/low rectal cancer The most typical flaws of tumors in this area are brought on by rectal and anal cancers. In addition, excision of other tumors demands a resection of the surrounding skin-/ soft tissue, which needs a reconstruction throughout ⁽¹⁴⁾. Abdominoperineal resection stays the gold requirement for treatment of cancers of the lower anus ⁽¹⁵⁾ and for cancers of the anal canal following failure of initial conservative management. Primary radical surgical treatment is likewise shown for anal canal tumours which are in your area advanced at the time of presentation, and alleviative surgical treatment might result in large problems of this area needing reconstruction. The need for restoration is especially essential in the pelvic location. The perineal skin yields high bacterial colony counts, because of the distance of the rectum and vagina, and proof that flap reconstruction lowers infective problems has actually grown in strength over the last decade ^(16,17). Where main closure of perineal flaws is not possible, skin grafting or flap repair is suggested. Skin grafts are suboptimal in this location due to infection leading to graft loss, extended healing causing unsatisfactory scar quality and contractures that might affect urination or coitus ⁽¹⁸⁾. Flap reconstruction has actually mostly superseded this technique over the last three decades.

Plastic-Reconstructive of perineal area using vertical rectus abdominis myocutaneous (VRAM) flap):

The objective is not just a perineal and/or sacral flaw reconstruction but likewise an intrapelvic sealing, as well as a vaginal partial reconstruction if necessary; both is assisted in by the vertical rectus abdominis myocutaneous (VRAM) flap (**Figure 1**) ^(8,19). To accomplish an oncological safe situation, aggressive surgery should be carried out and carrying out pelvic exenteration with "en bloc" resection of multiple pelvic structures is needed ^(8,13). After abdominoperineal extirpation, typically a large intrapelvic cavity stays, perineal wound complications including wound dehiscence and longtime of secretion occur, even innig accordance with radiotherapy. Studies have actually shown that the VRAM flap is a safe and dependable method for pelvic reconstruction in patients with innovative disease requiring pelvic exenteration and radiation, with fairly low rate of donor and recipient site issues ^(20,21,22).

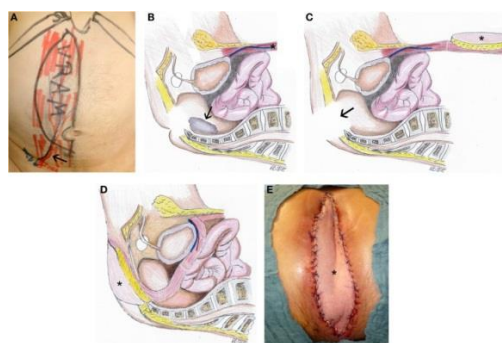


Figure 1: Defect reconstruction after resection of a rectal carcinoma using VRAM flap illustrated by intraoperative photographs and schematic drawings of the surgical technique.

(A) Preoperative marking for VRAM-flap procedure with the planned skin paddle and location of the ostomy performed on the day before surgery. Black arrow marks the flap pedicle. (B) The operation involves a two-part procedure with an anterior abdominal dissection first, which is followed by a second step with perineal tumor excision (black arrow) in prone position. We first ensure the viability of the deep inferior epigastric vessels before we proceed with the flap raising. The design of the flap and the size of the skin paddle are then planned according to the prospective perineal and pelvic defect. The skin island is placed vertically over the rectus muscle. The rectus muscle is dissected cranially from the costal arch. In the prone phase, tumor excision (black arrow) had been completed (C). The flap (black asterisk) is then flipped and rotated at 180° into the pelvic cavity so that the skin paddle closes the defect (D). Intraoperative view with VRAM flap (black asterisk) inserted to reconstruct perineal defect (E). Adapted from Ref#⁽²³⁾

During the last years, essential advances in generation of vascularized tissue engineering have been accomplished⁽²⁴⁾. Nevertheless, till today flap surgical treatment still stays the gold requirement for plastic-reconstructive treatment of oncological problems⁽²⁵⁾. The immediately/simultaneously used trans-pelvic VRAM flap has several benefits: first of all, the VRAM flap is a robust and extremely safe flap and fairly easy to technical perform, when essential plastic-reconstructive knowledge exists. The vascular supply of the deep inferior epigastric vessel is constant. Using the VRAM flap as a trans-pelvic flap not just permits reconstruction of perineal and perigenital skin flaws, but likewise makes it possible for obliteration of the sacral cavity^(26,27). Mainly, biological and alloplastic matrices have likewise been used to prevent a herniation of the small bowel, but these techniques are correlated with a significant risk for foreign body response, and are prone to infections and formation of chronic fistula, particularly if non-absorbable matrices have actually been utilized in a radiated field^(28,29). A vascularized muscle flap can reliably fill dead area in the hips and can even assist to cure regional infection⁽³⁰⁾. Vertical rectus abdominis myocutaneous flap can also be used for reconstruction of the vagina, when part of the vaginal area is penetrated by the tumor and have to be excised. Therefore, the unilateral caudally pedicled VRAM flap can rebuild half of area of the vaginal area. Vaginal fistula development can be avoided, because of the sealing result and the well-vascularized tissue over the sutured vaginal stump⁽³¹⁾. Vertical rectus abdominis myocutaneous flaps can also be desepithelialized, which permits to eliminate bigger dead area volumes and modification of the skin paddle to smaller skin problems, no large perineal skin surface area and a much shorter suture line is accomplished. Vascularized dermis at the wound base appears to be associated with a rapidly healing, even in an irradiated field^(32,33).

Antero-lateral thigh (ALT) flap for perineal reconstruction:

Timing of reconstruction is very challenging. To attain a long-lasting remedy, thorough assessment of the patient and his local findings, in addition to the radiologic findings, needs to be examined in a multidisciplinary technique. No compromise in regards to the level of the oncological resection needs to be accepted, and the degree of the defect chooses the treatment program as a simultaneous vs. a two-stage defect reconstruction^(10,34). As an example for two-stage flaw reconstruction and using a pedicled antero-lateral thigh (ALT) flap, (**Figure 2**) reveals the case of a patient with dermatofibrosarcoma protuberans at the left groin. Negative wound pressure treatment was applied until the histopathological R0-result was confirmed. For defect reconstruction (Figure 2A), a caudally pedicled ALT flap was used (**Figure 2 B&C**).⁽²³⁾

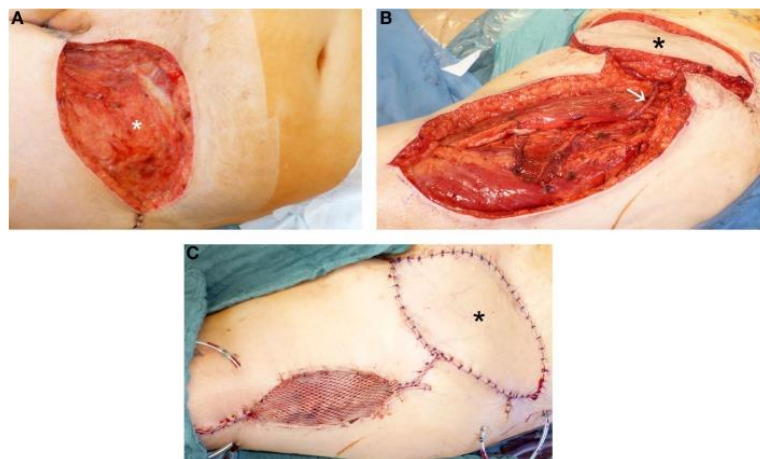


Figure 2: Defect reconstruction at groin after resection of a dermatofibrosarcoma protuberans using caudal pedicled ALT flap.⁽²³⁾

The Gracilis Muscle and Myocutaneous Flap after perineal wounds surgical treatment: Gracilis flap remains among the commonest flaps being done for perineal reconstruction. The significant blood supply to the gracilis myocutaneous or gracilis muscle flap is stemmed from the median femoral circumflex artery. Additional minor perforators come from proximally from the obturator artery and may provide a short gracilis. Bilateral flaps can be utilized to bring back the pelvic cavity and the cutaneous islands can also be tubed to produce a neovagina. For getting rid of pelvic dead space, the flaps might be de-epithelialized if needed. Use of this flap has revealed promising lead to delayed reconstruction of consistent perineal sinus tracts after APR for inflammatory bowel disease^(35,36,37). Advantages of the gracilis flap in the setting of APR are mainly related to its avoidance of disrupting the creation of a colostomy site. The flap is particularly helpful in little defects that are relatively narrow and distal in the hips. Drawbacks include smaller sized muscle mass with decreased efficiency in large perineal flaws and pelvic dead space, and high susceptibility to vascular spasm and cutaneous skin paddle ischemia. The muscle can likewise be used for reconstruction of major urethral losses following injury or electrical burns (Figure 3)⁽³⁸⁾. The urethra can be made from the offered urethral lining and covered with gracilis muscle flap that is then split skin grafted⁽³⁸⁾.



Figure3: (a) Chronic non healing wound perineum following trauma to rectum and anal region. A colostomy can be seen. (b) The defect has been recreated and skin island is marked on the gracilis muscle. (c) Appearance on the third postoperative day⁽³⁸⁾

B. Abdominal wall defects and reconstruction surgical methods:

Revolutionary advances have been developed in the past 20 years with respect to stomach wall reconstruction. Ingenious Surgical approaches and brand-new biological and prosthetic materials have actually become an integral part of the surgical toolbox⁽⁶⁾. Patients with complex abdominal wall defects need to be evaluated on a specific basis; interventions can vary from basic coverage and contouring to reconstruction of a dynamic functional stomach wall^(6,7).

Musculocutaneous flaps are frequently utilized to fill the resulting intra-abdominal space created by the exenteration and to reconstruct the pelvic flooring and perineum. VRAM flaps damage the abdominal wall, which can be reinforced using mesh^(3,4). Due to potential contamination of the surgical field, there has actually been significant debate regarding implantation of foreign material, mainly, in the abdominal wall⁽⁵⁾.

Biologic Mesh Reconstruction of the Pelvic Floor after Extralevator Abdominoperineal Excision (ELAPE):

Making use of ELAPE over standard APER is ending up being more extensive in spite of the bookings of some⁽³⁹⁾, and the ideal method of perineal wound closure stays a topic of discussion. The reported results of main closure of the perineal defect are poor⁽⁴⁰⁾ and most surgeons carrying out ELAPE select an adjunct⁽⁴¹⁾. The literature examined recommends that perineal closure utilizing a biologic mesh produces injury infection and complication rates that are comparable to other techniques of reconstruction, such as myocutaneous flaps. Myocutaneous flap reconstruction utilizing a vertical rectus abdominis (VRAM), gracilis, or the gluteus maximus, however, has short-term drawbacks, such as longer operative times and the need for plastic surgical expertise, leading to greater operative expenses, flap necrosis, wound problems at the donor site, and longer bed rest⁽⁴²⁾. Longer term incisional hernias at the VRAM donor site and minimized stomach wall strength have actually been reported⁽⁴³⁾. Biologic mesh reconstruction prevents all of these possible complications.

The mesh is generally put as an inlay or bridge across the flaw in the pelvic floor in close relation to the bony structures and sutured in 1-cm intervals to the origin of the levator muscles laterally⁽³⁹⁾. **(Figure 4)**⁽³⁹⁾ The mechanism by which the use of a bridging prosthesis lowers perineal injury issues is not clear. It has been recommended that biological mesh enables native cellular ingrowth and promotes tissue improvement, which in turn reduces perineal injury issues⁽⁴²⁾. The biologic mesh may act as a physical barrier, supporting the pelvic contents (omentum, little bowel, and uterus) and decreasing the pressure on the skin and ischioanal fat as they recover.

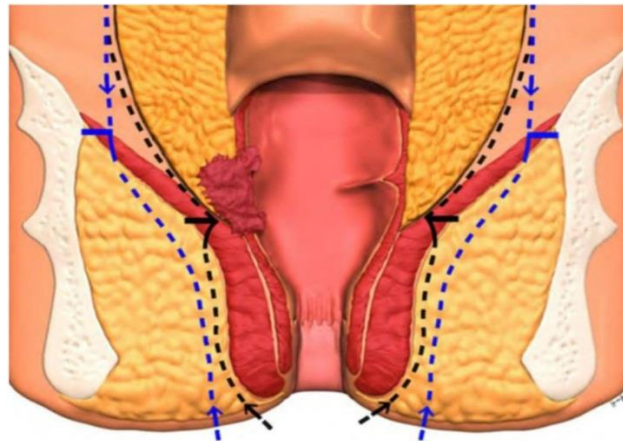


Figure 4: ELAPE technique, Black line indicates dissection line of standard APE and blue line ELAPE. Horizontal line indicates meeting point of abdominal and perineal dissection. Adapted from Ref#⁽³⁹⁾

4. CONCLUSION

Flap reconstruction for pelvic wounds and defects is prone to choices and issues are dictated by patient factors, operative factors and the qualities of the flap. Preoperative preparation in a multidisciplinary setting is important to supply ideal results. In cases of reconstructions after sarcoma resection in the pelvic area, we suggest a two-stage reconstruction where possible, i.e., when no susceptible structures are exposed after tumor resection. Numerous factors like size and character of the flaw have to receive attention, but typically a pedicled flap like ALT flap or VRAM flap could be utilized. proof revealed patient who presents with an intricate stomach wall hernia, based upon the criteria used in this study, must consist of an assessment of the elements and place of the defect. Adequate tissue for direct closure is usually not available. When steady skin protection is present, intraperitoneal mesh positioning is recommended. When cutaneous protection is absent or compromised, abdominal wall reconstruction typically requires use of a flap.

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