Novel treatment (new drug/intervention; established drug/procedure in new situation)

Vulva reconstruction after pelvic exenteration, using an unique combination of two flaps

Annelotte C M van Bommel,¹ Henk W R Schreuder,² Pascal P A Schellekens¹

¹Department of Plastic and Reconstructive Surgery, University Medical Centre, Utrecht, Netherlands;

²Department of Gynecologic Oncology, University Medical Centre, Utrecht, Netherlands

Correspondence to Dr Henk W R Schreuder, h.w.r.schreuder@umcutrecht.nl

Summary

A 64-year-old woman with recurrence of carcinoma of the vulva in an irradiated area received an en-bloc total pelvic exenteration. Reconstruction of the pelvic defect was performed with an anterolateral thigh (ALT) flap and a rectus abdominis muscle (RAM) flap (PM/RAM). This combination of flaps is unique, with excellent results.

In a large defect, often irradiated in advance, well-vascularised tissue should be placed. Multiple flaps can be used to reconstruct these large pelvic defects, each with their own advantages and disadvantages.

The combination of flaps used in this case uses the good properties of both flaps: the reliable and well-vascularised PM/RAM in combination with the ALT flap to provide much bulk in extreme large defects.

BACKGROUND

Radiotherapy is often used as adjuvant treatment for vulvar cancer. However, sometimes a large defect, for example, after a pelvic exenteration, has to be filled with well-vascularised tissue. A flap with the donor site outside the irradiation field is preferred, since the healing capacity of irradiated tissue is reduced. Multiple myocutaneous or fasciocutaneous flaps are designed to close the vulva defect. This case describes a unique combination of two flaps to provide tissue into a large defect, with excellent results.

CASE PRESENTATION

A 64-year-old woman was treated for squamous cell carcinoma of the vulva, FIGO stage II in 2004. A local radical excision and a sentinel node procedure of the groins were performed. The patient received postoperative radiotherapy on the vulva because of a small excision margin. The radiotherapy had a total dose of 4500 cGy, and the patient received this in 25 fractions of 180 cGy. Side effects occurred as a result of the radiotherapy; she suffered epidermolysis and multiple radiation ulcers of the irradiated tissue. These side effects have been treated with 40 times of hyperbaric oxygen in 2007.

In 2009, 5 years after the first manifestation, a local recurrence was discovered in the irradiated area (figure 1). There were no lymph node metastases. Two possibilities were presented to the patient: a curative treatment such as a total exenteration, or chemotherapy as a palliative treatment.

INVESTIGATIONS

A CT-scan of the abdomen and thorax showed no evidence for distant metastases. The MRI scan of the pelvis showed a tumour of 2.1×3.7×3.9 cm, close to bladder, rectum and the pubic bone (figure 2).

TREATMENT

Total en-bloc exenteration was performed (figure 3) with immediate reconstruction of the pelvic defect with a pedicled left rectus abdominis muscle (RAM) flap (PM/RAM) (figure 4). This flap prevented the bowels from herniation into the pelvis. The vaginal defect was closed with a large pedicled right-sided anterolateral thigh (ALT) flap (figure 5). The colostomy was placed at the left side, next to the place where the RAM was harvested. The Bricker type urostomy was placed on the right side of the abdomen.

OUTCOME AND FOLLOW-UP

Both flaps healed without complications. No flap failure or wound dehiscence was seen. One and half years after treatment, there has been no indication of tumour recurrence. The donor site as well as the recipient site healed completely (figure 6). There are no signs of bowel herniation. The patient is satisfied with the results of the reconstruction and able to deal with the colo and urostomy. She has a good quality of life.

DISCUSSION

During a total pelvic exenteration the bladder, urethra, uterus, ovaria, vagina, vulva and rectum are removed. The remaining cavity has to be closed, preferably by a reconstruction with well-vascularised flaps, in order to reduce postoperative complications and improve quality of life.¹ Because many patients have been treated with previous radiotherapy when the pelvic exenteration is performed, healthy, well-vascularised tissue to close the defect is required. A flap harvested from outside the radiation field will decrease the risk of wound infection and will improve wound healing.^{2 3}

Two parts have to be reconstructed after a pelvic exenteration: the pelvic floor and the genital area. Sometimes one

Figure 1 Recurrent vulvar cancer, and marked area for radical excision.

Figure 2 MRI scan with recurrent vulvar cancer.

single flap is able to provide enough bulky tissue to close the defect. However, sometimes one single flap is not enough and an omental sling or absorbable or non-absorbable mesh can be used to close the pelvic defect. Fistulae occur more frequently in those reconstructions than when using a PM/RAM.⁴ A pelvic reconstruction with a PM/RAM is therefore a better choice.

The genital area can be closed with a gracilis myocutaneous flap, a vertical rectus abdominis myocutaneous (VRAM) flap, an ALT flap or a deep inferior epigastric artery perforator (DIEP) flap.

Many different types of flaps have been designed over the past decades. First, the gracilis myocutaneous flap was introduced by McCraw in 1976.⁵ This myocutaneous flap

Figure 3 Situation after en-bloc resection.

Figure 4 Placement of the rectus abdominis muscle flap.

Figure 5 Situation after closure with the anterolateral thigh flap.

contains skin, subcutis, fascia and muscle. It can be used for large tissue defects because it is able to provide a lot of tissue. However, the gracilis myocutaneous flap has a poor reputation, because of its unreliable skin island. The flap has a higher overall complication rate compared to the more reliable VRAM flap.^{6 7} Therefore, the gracilis myocutaneous flap is not very often used anymore. The VRAM flap has become the most commonly used flap for closure of large defects. This flap consists of a vertically oriented skin island and the underlying RAM. The flap has a reliable vascular pedicle and relatively few complications.⁶ The use of a VRAM flap also provides an opportunity to construct a neovagina.¹ The flap is folded around a mould and placed into the defect. Fifty-six per cent of the women who received a neovagina are sexually active. This technique results in a high rate of patient satisfaction.⁴

Although there may be a possibility of abdominal wall herniation because of the removal of the RAM, no specific articles confirm this relationship.³ A comment to this fact is the relatively short follow-up time, with a maximum duration of 3.5 years.⁸

Besides the myocutaneous flaps, as the gracilis and the VRAM flaps, fasciocutaneous flaps can be used to provide bulky tissue into a defect.

The pedicled ALT flap used for genital defects has been developed relatively recently. It has a reliable vascularisation and therefore a low complication rate. One of the main advantages is that it can provide sensory innervation.^{9 10} A tensor fascia lata muscle or a vastus lateralis muscle can be added to the fasciocutaneous flap to provide more bulk

Figure 6 Situation 18 months after reconstruction, anterior (left) and posterior view (right).

if necessary. The disadvantage of the myocutaneous ALT flap is a reduction in strength of the knee extension.¹¹

The DIEP flap spares the underlying RAM; the vessels are dissected through the muscle. The possible advantage of this flap is a reduced change of postoperative abdominal wall hernia. The flap is less bulky compared to a conventional PM/RAM and could therefore be used to close medium-sized defects.^{12 13}

In this case, a unique combination of the two flaps is used. First, the PM/RAM with a reliable pedicle was transported through the abdomen to close the pelvic defect and to prevent bowel herniation. There are excellent results of this flap as a myocutaneous flap, so using just the muscle would be expected to give the same results because this flap has the same reliable vascular pedicle. Secondly, a fasciocutaneous ALT flap was used in this case to close the vaginal defect. The flap has the advantage of a reliable pedicle, sensory innervation and provides much bulk without sacrificing a muscle at the donor site.

The good properties of these flaps are combined in this way in order to achieve an excellent result.

Learning points

- ▶ Well-vascularised tissue is important to provide wound healing, especially in an irradiated area.
- ▶ Although more flaps are known to reconstruct large pelvic defects, a combination of flaps can be a good alternative as well.
- ▶ This case indicates that using a combination of two different flaps can give excellent results in reconstructing a huge pelvic defect.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Salom EM**, Penabaz MA. Pelvic exenteration and reconstruction. *Cancer J* 2003;**9**:415–24.
2. **Staiano JJ**, Wong L, Butler J, *et al*. Flap reconstruction following gynaecological tumour resection for advanced and recurrent disease—a 12 year experience. *J Plast Reconstr Aesthet Surg* 2009;**62**:346–51.
3. **Butler CE**, Gündeslioglu AO, Rodriguez-Bigas MA. Outcomes of immediate vertical rectus abdominis myocutaneous flap reconstruction for irradiated abdominoperineal resection defects. *J Am Coll Surg* 2008;**206**:694–703.
4. **Goldberg GL**, Sukumvanich P, Einstein MH, *et al*. Total pelvic exenteration: the Albert Einstein College of Medicine/Montefiore Medical Center Experience (1987 to 2003). *Gynecol Oncol* 2006;**101**:261–8.
5. **McCraw JB**, Massey FM, Shanklin KD, *et al*. Vaginal reconstruction with gracilis myocutaneous flaps. *Plast Reconstr Surg* 1976;**58**:176–83.
6. **Soper JT**, Secord AA, Havrilesky LJ, *et al*. Comparison of gracilis and rectus abdominis myocutaneous flap neovaginal reconstruction performed during radical pelvic surgery: flap-specific morbidity. *Int J Gynecol Cancer* 2007;**17**:298–303.
7. **Casey WJ 3rd**, Tran NV, Petty PM, *et al*. A comparison of 99 consecutive vaginal reconstructions: an outcome study. *Ann Plast Surg* 2004;**52**:27–30.
8. **Lefevre JH**, Parc Y, Kernéis S, *et al*. Abdomino-perineal resection for anal cancer: impact of a vertical rectus abdominis myocutaneous flap on survival, recurrence, morbidity, and wound healing. *Ann Surg* 2009;**250**:707–11.
9. **Wang X**, Qiao Q, Burd A, *et al*. Perineum reconstruction with pedicled anterolateral thigh fasciocutaneous flap. *Ann Plast Surg* 2006;**56**:151–5.
10. **Friji MT**, Suri MP, Shankhdhar VK, *et al*. Pedicled anterolateral thigh flap: a versatile flap for difficult regional soft tissue reconstruction. *Ann Plast Surg* 2010;**64**:458–61.
11. **Ali RS**, Bluebond-Langner R, Rodriguez ED, *et al*. The versatility of the anterolateral thigh flap. *Plast Reconstr Surg* 2009;**124**:e395–407.
12. **Santanelli F**, Paolini G, Renzi L, *et al*. Preliminary experience in reconstruction of the vulva using the pedicled vertical deep inferior epigastric perforator flap. *Plast Reconstr Surg* 2007;**120**:182–6.
13. **Wang X**, Qiao Q, Burd A, *et al*. A new technique of vaginal reconstruction with the deep inferior epigastric perforator flap: a preliminary report. *Plast Reconstr Surg* 2007;**119**:1785–90.

This pdf has been created automatically from the final edited text and images.

Copyright 2011 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Please cite this article as follows (you will need to access the article online to obtain the date of publication).

van Bommel ACM, Schreuder HWR, Schellekens PPA. Vulva reconstruction after pelvic exenteration, using an unique combination of two flaps. *BMJ Case Reports* 2011;10.1136/bcr.01.2011.3717, date of publication

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow