CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 5 (2014) 161–163

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Pedicled omental and split skin graft in the reconstruction of the anterior abdominal wall

Priyadarshini Manay*, Monty Khajanchi, Ram Prajapati, Rajeev Satoskar

Department of General Surgery, Seth G.S. Medical College, K.E.M Hospital, Parel, Mumbai 400012, India

ARTICLE INFO

Article history:
Received 5 July 2013
Received in revised form
11 December 2013
Accepted 23 December 2013
Available online 18 January 2014

Keywords:
Pedicled omental flap (POSSG)
Split skin graft
Dual mesh
Anterior abdominal wall
Reconstruction

ABSTRACT

INTRODUCTION: The POSSG is a pedicled graft based on either the right or left gastro-epiploic arteries. It is used with a dual mesh in reconstruction of full thickness defects of anterior abdominal wall and covered by skin grafts.
PRESENTATION OF CASE: A recurrent malignant peripheral nerve sheath tumor (MPNST) of the anterior abdominal wall was excised leaving a large defect. The POSSG was used for reconstruction. A large dual mesh was placed to close the defect in the abdominal wall by suturing it to the remnant rim of abdominal muscles. The omental pedicle was brought through a keyhole in the mesh, spread out over the mesh, sutured and covered by split skin grafts. The final graft take was 90 percent.
DISCUSSION: The POSSG can be used to reconstruct any size of anterior abdominal wall defects due to the malleable nature of omentum. Its prerequisite however is a dual mesh like PROCEED. The POSSG helps keep the more complex musculofasciocutaneous flaps as lifeboats. It can be used singly where multiple musculofasciocutaneous flaps would otherwise have been required. It can be used in patients with poor prognosis of underlying malignancy. It may be used by general surgeons due to familiarity with anatomy of the relevant structures and lack of need for microsurgical skill.
CONCLUSION: The POSSG can be used in reconstruction of abdominal wall defects of any size by general surgeons.

1. Introduction

The Pedicled Omental graft with Split skin graft (POSSG) is a reconstructive surgery, which may be performed by general surgeons in defects of the anterior abdominal wall of any size following oncological resection. Lesser operative time required as compared to time required for multiple musculocutaneous or fasciocutaneous flaps for primary reconstruction, helps reduce the morbidity of prolonged surgery in a patient in whom the prognosis is already grim due to underlying malignancy. For example, a recurrent malignant peripheral nerve sheath tumor (MPNST). A prerequisite for POSSG is a dual mesh on which the pedicled omental graft will need to be sutured, the bioresorbable side facing the abdominal organs. We used PROCEED surgical mesh.

2. Case profile

A 45 year old male, came with a recurrent soft tissue tumor of anterior abdominal wall which had grown to gigantic proportions (Fig. 1) a large tumor approximately 25 cm × 20 cm × 25 cm, hard, lobulated and with a necrotic centre.

Punch biopsy of the tumor revealed a peripheral nerve sheath tumor (PNST). MRI revealed that the tumor involved all the layers of the abdomen, was bulging into the abdominal cavity but the peritoneal lining was not breached. Wide excision of the tumor resulted in a full thickness defect of approximately 25 cm × 22 cm (Fig. 2). Frozen section reported tumor free margins. The omentum was first separated from the transverse colon through the avascular plane. It was then separated from the greater curvature of the stomach taking care to preserve the gastro epiploic arcade. The left gastro epiploic artery was ligated and cut as we had decided to base the flap on right gastro epilpoic artery. The omentum was brought out through a keyhole made in the mesh in the right upper quadrant (Fig. 3) taking care to see that the pedicle did not twist. Then the mesh was fixed to the defect in muscle (onlay). We used a PROCEED mesh of 35 cm × 25 cm. The omentum was spread evenly over the mesh and sutured with absorbable suture material (Fig. 4). The skin grafts were harvested and spread and fixed by quilting technique over the omentum. An occlusive dressing was given. Suction was applied to the wound so as to prevent seromas and increase chances of graft uptake.

* Corresponding author at: A-401, Trans Apartments, Mahakali Caves Road, Andheri East, Mumbai, Maharashtra 400093, India. Tel.: +91 9619916604.
E-mail address: manaypriyadarshini82@gmail.com (P. Manay).

2210-2612
http://dx.doi.org/10.1016/j.ijscr.2013.12.027

Fig. 1. Recurrent MPNST of anterior abdominal wall.

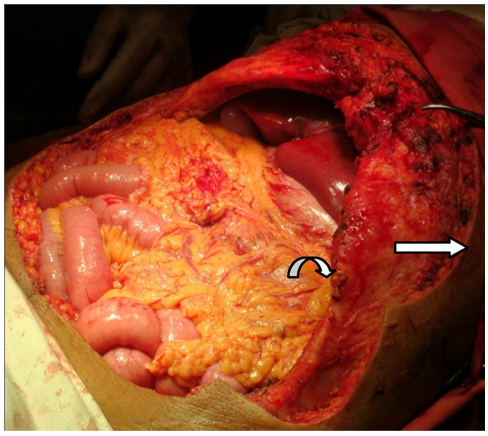

Fig. 2. Skin defect (straight arrow) and muscular defect (curved arrow) after tumor excision.

The time taken for entire procedure was about 6 h. There was 90 percent graft uptake by fourth check dress. Only the left upper 10 cm × 3 cm patch failed to take and the mesh was exposed (Fig. 5). The patient later underwent a pedicled radial forearm flap to cover this area two weeks after the first procedure which healed without complications and the patient was discharged five weeks after his first procedure. He was lost to follow up thereafter.

3. Discussion

Malignant peripheral nerve sheath tumor (MPNST) is a tumor of mesenchymal origin[1] which arise from peripheral nerve branches

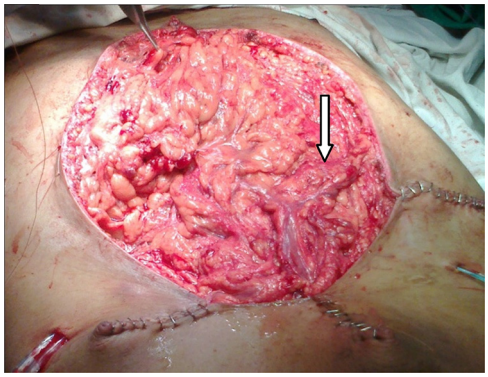

Fig. 4. Omentum spread out over mesh.

or sheath of peripheral nerve fibers.[2] Radical surgical resection is the treatment of choice in MPNST. A good three-dimensional clearance initially gives the best chance of survival. In our patient, the tumor had not only recurred but had also gained gigantic proportions. This meant a poor prognosis and reduced survival even in the absence of distant metastasis. Therefore our aim was not only to excise tumor and reconstruct abdominal wall but also avoid the morbidity of lengthy surgery. Adequate excision of these tumors proves a challenge for reconstructing the resultant defect, especially in areas such as the chest wall and upper abdomen. The goals of reconstruction are to provide optimum structural support with stable soft tissue and good esthetic result.[3] Traditional flaps like anterolateral thigh flap (ALT), tensor fascia lata flap (TFL), rectus abdominis flap and gracilis were not used for the following reasons. A local flap such as rectus abdominis may be used for upper or lower lateral defects[4] and not for a multiquadrant defect. The limitation of size applies to the gracilis flap as well. The TFL and the ALT are highly reliable flaps in terms of blood supply, large arc of rotation, pliability and minimal donor site morbidity. Their main limitation is, difficulty in identification of a safe dimension for these flaps so as to prevent distal edge necrosis.

The multiple quadrant defect created by the oncological clearance, would have required multiple flaps, if we had chosen the ALT or TFL flaps. This would have increased the surgical time and the complexity of the procedure. Subjecting the patient to a long surgery without an improved longterm outcome because he had recurrence would have been unethical. Also musculocutaneous flaps carry the attendant risk of recurrence underneath the flap, which is difficult to detect early. Hence we kept conventional flaps as lifeboats. Gradual tissue expansion of abdominal muscles over weeks[5] and components separation technique, have been described[6] but are unsuitable in surgical oncology, due to either

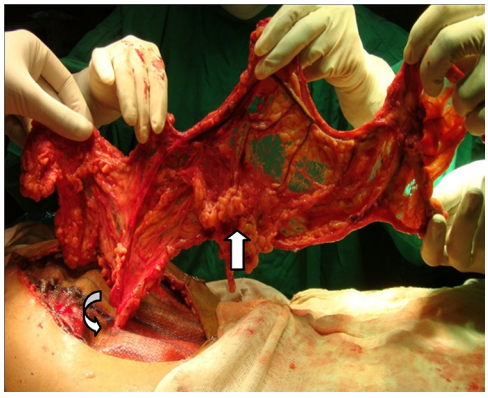

Fig. 3. Omental pedical (straight arrow) through keyhole (curved arrow) in mesh.

Fig. 5. Graft take at first check dress.

resection of the residual muscles, or the time required for tissue expansion.[7] The omentum is a versatile tool due to its rich blood supply and malleability. The potential limitations of this technique are:

(1) A healthy omentum, which can be difficult to find in a patient who has previously had a laparotomy or peritoneal pathology (ex-Kochs).
(2) Laparotomy is required to harvest the omentum. A one cavity procedure is turned into a 2 cavity procedure when used for reconstruction of chest wall defects.
(3) No imaging exists which can help in pre-operative assessment of omentum.[8]
(4) It may be unreliable in the extremes of age because of incomplete development or atrophy.
(5) There is a risk of prolonged exudate from the omental flap and seroma formation.
(6) The potential complications common to other flaps like flap failure, exposure of mesh and future ventral hernia may occur with this technique.

Finally, factors that affect wound healing, can affect this technique however there is no specific age or condition in which this flap is contraindicated. The POSSG has been used in reconstruction of chest and abdominal wall defects with reliable results.[9–11] A second flap was required at a later date due to partial flap failure (10 percent area of the original defect). The risk of flap failure can never be completely eliminated by using multiple flaps. Our aim had been to limit the reconstruction to a single flap – single procedure as against a multiple flap – single procedure, as a second procedure may have been required either way. Hence we tried our best to limit the number of flaps and operative time at first procedure.

The POSSG when used for reconstruction of full thickness abdominal wall defects requires a dual mesh on which the graft needs to rest and also to provide strength to the anterior abdominal wall soft tissue reconstruction so as to prevent ventral hernias. A variety of such meshes is available. We used the 35 cm × 25 cm PROCEED mesh (~1670 US$). The prices, of other available dual meshes of this dimension range from 1400 (PARIETEX) to 2000 US$ (PHYSIO mesh). We used PROCEED as our hospital provides this mesh free of cost to patients. As general surgeons are well versed with the anatomy of the omentum, the abdominal wall and skin grafting, the POSSG is a procedure which may be used more often by general surgeons for anterior abdominal wall reconstruction even though we had plastic surgeons do it for us in this case.

4. Conclusion

The procedure of POSSG requires no special instruments or microsurgical skill. It can be done by general surgeons. The omentum has the advantage of malleability and is readily available after full thickness resection of an abdominal wall tumor. The high cost of a dual mesh, which is necessary when repairing full thickness defects in the anterior abdominal wall with POSSG may limit use.

Conflict of interest statement

None.

Funding

None.

Consent

We affirm that fully informed written consent was taken from the patient for the publication of this report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Priyadarshini Manay – data collection, research and writing article. Monty Khajanchi – data collection, research. Ram Prajapati and Rajeev Satoskar – revising for intellectual content and final approval.

References

1. Angelov L, Guha A. In: Berstein M, Berger MS, editors. *Peripheral nerve tumors. Neuro oncology essentials*. 1st ed. New York: Theme Publishers; 2000. p. 434–44.
2. Cashen DV, Parisien RC, Raskin K, Hornicek FJ, Gebhardt MC, Mankin HJ. Survival data for patients with malignant schwannoma. *Clin Orthop Relat Res* 2004;**426**:69–73.
3. Dorai AA, Halim AS. Extended double pedicle free tensor fascia latae myocutaneous flap for abdominal wall reconstruction. *Sing Med J* 2007;**48**:e141–5.
4. Mathes SJ, Bostwick III J. A rectus abdominis myocutaneous flap to reconstruct abdominal wall defects. *Br J Plast Surg* 1977;**30**:282–3.
5. Jacobson WM, Petty PM, Bite U, Johnson GH. Massive abdominal wall hernia reconstruction with expanded external/internal oblique and transversalis musculofascia. *Plast Reconstr Surg* 1997;**100**:326–35.
6. Ramirez OM, Ruas E, Dellon AL. "Components separation" method for closure of abdominal – walldefects: an anatomic and clinical study. *Plast Reconstr Surg* 1990;**86**:519–25.
7. Chevray PM, Singh NK. Abdominal wall reconstruction with the free tensor fascia lata musculofasciocutaneous flap using intraperitoneal gastroepiploic recipient vessels. *Ann Plast Surg* 2003;**51**:97–102.
8. Smith JW, Aston SJ, editors. *Clinical microvascular surgery and free tissue transfers. Smith Grabbs*. 4th ed. Little Brown and Company; 1991. p. 1047.
9. Anindya Chattopadhyay, Biswas SK, Dutta M. POSSG: a novel method for reconstruction of full-thickness abdominal wall defect. *J Indian Assoc Paed Surg* 2010;**15**(October–December (4)):142–4.
10. El-Muttardi N, Lancaster K, Ng R, Mercer D. The sandwich omental flap for abdominal wall defect reconstruction. *Br J Plast Surg* 2005;**58**:841–4.
11. Yang F. Radical tumor excision and immediate abdominal wall reconstruction in patients with aggressive neoplasm compromised full-thickness lower abdominal wall. *Am J Surg* 2013;**205**(1):15–21.