
Radial Artery Pedicle Flap To Cover Exposed Mesh After Abdominal Wound Dehiscence-An Easy Solution To A Difficult Problem

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Abstract

Abdominal wall dehiscence poses a difficult problem to treat. It is ever difficult to treat an exposed mesh when it is utmost important to retain it to give strength to the abdominal wall. Many flaps have described in literature. Each flap has limited area of reach on the abdominal wall. A 55 year old thin built man had undergone operation for perforation peritonitis. Post operatively the wound gaped exposing bowel. Closure of burst abdomen was done by a mesh 30X30 cm. After 3 days of operation abdominal wound again developed superficial dehiscence, skin margins necrosed leaving a gap of 13X 7 cm of exposed mesh. A radial artery pedicled flap planned from the left forearm was used to cover the exposed mesh. Flap detachment and inseting was done after 3 weeks with good aesthetic result and acceptable donor site scar.

CASE REPORT

A 55 year old male of thin built reported to casualty of J.N.Medical college and Hospital , Aligarh Muslim University, Aligarh with pain and distension of abdomen. Clinical and radiological study confirmed perforation peritonitis.

Patient was operated and duodenal perforation was closed by modified Graham repair.

Post operatively, patient had serous discharge from the main wound and the wound gaped. Then complete burst abdomen developed with evisceration of small bowel.

Subsequent surgery was undertaken when the infection was controlled. Burst wound was closed with in-lay (size 30X 30 cm) poly propylene mesh after cutting its corners

After 3 days of surgery, skin stitches start giving way and by 7th day whole of the incision gaped exposing 13 X 7 cm of the mesh.

Figure 1

Figure 1: Follow-up case of laparotomy with dehiscence with exposed mesh



Radial artery based fasciocutaneous flap was planned from the left forearm after confirming the patency of the palmar arch by Allen's test .

Figure 2

Figure 2: Marking of left radial artery pedicled flap over left forearm



Flap was elevated based proximally and secured into the defect. Donor area was covered with split thickness graft.

Figure 3

Figure 3: Photograph showing raised proximally based left radial artery flap secured over the exposed mesh.



Pedicle was divided after 3 weeks and inseting was done.

Figure 4

Figure 4: The left radial artery flap after flap detachment & inseting.



A small area of mesh of size (0.5 X0.5) cm was still left exposed which healed with secondary intention.

Figure 5

Figure 6 :Photograph showing healed left radial artery flap over exposed mesh with a small mesh over superior pole remained exposed which healed with secondary intention.



Flap survived well and the donor area was also aesthetically acceptable.

Figure 6

Figure 5: Photograph showing donor site forearm with partial loss of graft.



DISCUSSION

Wound dehiscence is a difficult problem to treat. Careful evaluation of the patient who presents with abdominal wall dehiscence reveals inadequate local fascial and muscular layers due to prior tissue loss; muscle denervation or vascular insufficiency due to prior irradiation or infection; wound infection; obesity; Chronic pulmonary disease, malnutrition, sepsis, anemia, corticosteroid dependency and/or concurrent malignant process as predisposing factors. Reconstruction of anterior abdominal wall is based on six basic principles.

1. The anatomy of the abdominal wall and adjacent donor sites must be understood clearly including the complete knowledge of the neurovascular anatomy, the arc of rotation of each subunit.
2. The defect has to be exposed completely before definitive closure.
3. Abdominal domain is restored with some sort of support.
4. Reassigning local tissue to close the defect.
5. If not possible, distant tissue cover is planned.
6. Skin involved is readjusted and closed

The techniques used for abdominal wall reconstruction range from simple skin grafting to free flap reconstruction. Treatment needs to be individualized to suit

the condition of the patient and to provide the best functional and cosmetic result with minimal morbidity. Different modalities include:

1. Primary closure without tension
2. Vacuum –assisted closure
3. Skin and fascial grafts
4. Local skin flaps
5. Skin graft over mesh/ omentum/ viscerae
6. Fascial release
7. Component separation
8. Tissue expansion
9. Pedicled muscle and myocutaneous flaps
10. Free flaps

Once the mesh is exposed as in this case one of the options is removal of mesh ₁ and primary closure which was not possible in this case because of previous surgery and infection. Vacuum assisted closure ₂ was not possible because of the huge size of the exposed mesh which needed a cover early. We could have waited for granulation tissue cover over mesh and then split thickness grafting over it, which is a time consuming procedure. Moreover, mesh is often reported to extrude through graft in a majority of the cases ₃ apart from poor cosmesis and recurrent hernia (9% cases). Relaxing incisions over transverse abdominis and external oblique muscles and subsequent medial advancement (local flaps) ₄ could have achieved closure without tension, but not possible in this case because of previous surgery leading to fibrosis, loss of tissue planes and the use of a big mesh(30X30 cm) covering large area of abdominal wall. Ramirez described the component separation technique ₅ to close large defects (upto 20 cm) with bilateral advancement. In this technique, the rectus abdominis muscle is dissected from posterior sheath and external oblique is separated from internal oblique. The rectus muscle and anterior sheath with attached internal oblique and transverse abdominis muscles are advanced medially towards midline. The undermined external oblique is left in its original position, but previous surgical procedures as here in this case limited the use of this technique by destroying the tissue planes. Tissue expansion ₆

was not feasible because of inflammatory fibrosis and improper delineation of planes.

So here, the only options left were to cover with distant tissues either with pedicled flaps or free flaps. Free flaps need microvascular expertise and not available at all the places, hence pedicled flaps considered as a better option. Different pedicled flaps frequently used for abdominal wall reconstruction are tensor fascia lata, rectus femoris flaps for lower abdomen and latissimus dorsi, external oblique and rectus abdominis flaps are good options for upper abdomen.

A flap based on left radial artery in the present case produced with early satisfactory coverage which is a thin, fasciocutaneous flap, blends well with abdominal contour and is a good option for cover.

ADVANTAGES

Flap is reliable with robust blood supply.

It gives a thin flap for cover, hence, aesthetically acceptable.

Unlike musculocutaneous flap, any quadrant of the abdomen can be covered.

DISADVANTAGES

Two stage procedures; the pedicle is divided after 3 weeks.

It sacrifices one of the major vessels of the hand.

In spite of above mentioned disadvantages, radial artery flap is good choice when other regional and distant flaps are not possible.

In view of the minimum morbidity, the radial artery base flap is a good option and is recommended in selected cases, especially with large exposed mesh over abdomen, however its limitation- two stage procedures and sacrifice of a major vessel must always be remembered.

References

1. Steven R. Szczerba, MD and Gregory A. Dumanian, MD ; .Definitive Surgical Treatment of Infected or Exposed Ventral Hernia Mesh: Ann Surg. 2003 March; 237(3): 437–441.
2. Bradon J Wilhelmi, MD, Leonard Weiner, MD, Professor, Chief of Division of Plastic Surgery, University of Louisville : eMedicine February 2003 : Abdominal Wall Reconstruction
3. C R Voyles, J D Richardson, K I Bland et al; .Emergency abdominal wall reconstruction with polypropylene mesh: short-term benefits versus long-term complications: Ann Surg. 1981 August; 194(2): 219–223.
4. Stephen J. Mathes, MD, Paul M. Steinwald, MD, Robert

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D. Foster et al.; Complex Abdominal Wall Reconstruction: A Comparison of Flap and Mesh Closure: Ann Surg. 2000 October; 232(4): 586–596
5. Ramirez OM, Ruas E, Dellon M, Components separation method for closure of abdominal defects in anatomic and

clinical study.: Plast Reconstr Surg 1990;86:519-26.
6. Carlson GW, Elwood E, Losken A. ET AL. The role of tissue expansion in abdominal wall reconstruction. Ann Plast Surg 2000; 44(2):147-53.
7. Roshini Gopinathan, Mark Granick, Anterior abdominal wall reconstruction: Clin Plast Surg 33 (2006) 259-267.

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