Rectus abdominis myocutaneous flap used to close a median sternotomy chest defect

A case report

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Summary

A 55-year-old white man presented with an infected median sternotomy wound after coronary artery bypass grafting, with subsequent dehiscence and exposure of the heart and great vessels. A left-sided rectus abdominis myocutaneous transposition flap was used for closure.

In two large studies in the USA the incidence of infection after median sternotomy is given as 1.5 - 1.8%. A number of vascular flaps have been used to close the chest defects. These include latissimus dorsi and pectoralis major myocutaneous flaps and omental transposition with an overlying skin graft. Although the rectus abdominis flap is well described in breast reconstruction it has not been reported as a method to close chest defects after median sternotomy. A muscle flap is useful in infected wounds as it improves the blood supply in the area and enhances its ability to combat bacterial infection. It also provides the necessary tissue to replace the skin defect.

Case report

A 55-year-old white man with unstable angina underwent a coronary artery bypass operation via a median sternotomy. Bypass time was 104 minutes. The pericardium was left open and two drains were inserted.

Nine days after the initial operation surgical rewiring of the sternum was necessary because of sepsis; a second rewiring was performed 23 days after the bypass was performed. An ascending aorta/saphenous vein graft site subsequently bled after the sternum had dehisced again (Fig. 1) and at emergency surgery Teflon pledgets were used to control the bleeding. Forty-one days postoperatively a second haemorrhage from the same site necessitated emergency surgery.

Bacteriological investigation of the wound showed Enterobacter cloacae and Klebsiella oxytoca; this infection was treated with clindamycin, netilmicin and povidone-iodine dressings. Staphylococcus epidermidis only was cultured the day before reconstructive surgery.

Fifty-three days after the bypass operation a left-sided rectus abdominis myocutaneous flap was transposed after the defect had been thoroughly debrided. The flap measured 21 x 7 cm and was turned almost exclusively on the vascular pedicle of the left superior epigastric vessels. The flap extended only down to the arcuate line in an attempt to prevent herniation in the lower abdomen, and the distal rectus abdominis was sutured to the posterior sheath as an adjunct to this.

The anterior sheath, subcutaneous tissue and skin were closed primarily. Because of the bulk of the muscle no attempt was made to close the skin between the chest defect and the abdominal wound, but a split-skin graft was stapled in place over the exposed rectus muscle (Fig. 2). A corrugated drain was placed inferiorly and a 3 mm Portovac drain was passed through the entire cavity to allow suction drainage as a venturi drain and also for irrigation with a povidone-iodine solution.

The entire flap survived. The endotracheal tube was removed within 10 days without the patient experiencing any breathing difficulty; this was the first time he was able to breathe normally since the coronary artery bypass operation.

The Portovac drain was removed from the upper end of the wound at 7 days, while the inferior corrugated drain continued minimal drainage. The flap edges healed rapidly and sutures were removed at 12 days.

Nineteen days after the plastic surgery and 72 days after the initial operation the patient was discharged with a good exercise tolerance of over 500 m and negligible wound drainage (Fig. 3). However, 4 days after discharge the patient had a fatal aortic haemorrhage beneath the flap, which almost certainly occurred at the site of the Teflon pledgets on the aorto-saphenous vein graft anastomosis.

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Fig. 2. Immediately after surgery — the corrugated drain appears at the inferior part of the flap. To the left of the drain is a skin graft covering the muscle at its rotated base. The donor site has been closed in layers primarily.

Discussion

Two lessons emerge from this case. Teflon pledgets were used to close the leak in the aorta. This foreign-body material probably served as a focus of friction and continued sepsis at the sites of anastomosis. The use of pericardium or fascia lata might have prevented the subsequent course of events. The second lesson is that it is important to initiate treatment early. Treatment of the infected wound includes extensive debridement, satisfactory drainage and definitive operative therapy within 30 days.

The only references in the literature to the use of a rectus abdominis flap to close median sternotomy wounds suggest that the flap would not be big enough to close an entire wound; however, in our case the entire wound was easily closed right up to the sternal notch. The lower portion was left open and grafted in an attempt to prevent pressure on the vascular pedicle.

The use of unilateral and bilateral pectoralis major muscle turnover flaps is well documented, but Nahai et al. have noted that this causes loss of the anterior axillary fold and is also a more elaborate procedure. The suggestion that the wound can almost always be closed by undermining of the lateral edge and secondary suture does not seem valid since this entails putting tension on an already infected area and risking a second dehiscence.

Conclusion

This case represents a fairly easy method of closure of the infected median sternotomy wound in which two important lessons were learnt. Foreign material should be avoided, especially in an infected wound and even more so where vessels are involved. Secondly, it seems that early definitive therapy would improve the prognosis markedly; that includes wide debridement, appropriate antibiotics, and a procedure that provides secondary closure without tension on the wound edges.

REFERENCES


Fig. 3. The patient at discharge, completely healed.