Devitalized Rib Causing Delayed Healing after Pectoralis Major Flap

Priyesh Patel, MD • Sunshine Dwójak, MD, MPH • Sarah Rohde, MD

Department of Otolaryngology | Vanderbilt University Medical Center, Nashville, TN

ABSTRACT

Objectives To report a case of a nonhealing wound at a pectoralis major myocutaneous flap (PMMF) donor site secondary to underlying devitalized bone

Methods The PMMF is a widely used pedicled flap for soft tissue reconstructive purposes. While commonly cited complications associated with this flap relate to the pedicled flap itself (i.e. necrosis secondary to impaired blood supply), there are less reports of complications related to the thoracic donor site. This retrospective case report describes etiology and management of a chronically draining wound with underlying sequestered rib after a PMMF.

Results A 73-year-old male underwent a PFFM for reconstruction after a total laryngopharyngectomy with postoperative course complicated by a poorly healing wound along the inferior incision of the flap. This was characterized by purulence, persistent serious drainage, and hypervascular refractory to local wound care, excision of granulation tissue, and several courses of antibiotics. Subsequent operative exploration revealed an underlying devitalized bone with surrounding purulence, which was removed, and the patient treated with local wound care and antibiotics, resulting in improvement.

Conclusion Although ribs have a robust blood supply, in elevating a PMMF there is a risk of injury to rib periosteum. This likely resulted in devitalization of bone in this case, with resulting rib sequestration, osteomyelitis, and poor wound healing that only resolved with removal of involved bone. As many patients undergoing PMMF reconstruction may have underlying vascular disease and poor perfusion to tissue, including ribs, extra care during elevation of the flap should be exercised in these patients.

INTRODUCTION

The pectoralis major myocutaneous flap (PMMF) is a widely used pedicled flap for soft tissue reconstructive purposes in the head and neck. While commonly cited complications associated with PMMF relate to the pedicled flap itself, there are fewer reports of complications related to the thoracic donor site. This retrospective case report describes etiology and management of a chronically draining wound with underlying sequestered rib and osteomyelitis after a PMMF.

CASE REPORT

A 73-year-old male underwent chemoradiation therapy for a T3N2cM0 squamous cell carcinoma originating from the right laryngeal wall. At routine 4 month follow-up after completion of treatment, the patient was noted to have increased fullness at his original tumor site on endoscopic examination. This prompted direct laryngoscopy with biopsy, which revealed recurrent moderately differentiated HPV positive squamous cell carcinoma.

The patient subsequently underwent total laryngopharyngectomy, bilateral modified radical neck dissections, and bilateral pectoralis major myocutaneous flap for reconstruction. Intraoperatively, there was a tract of granulation tissue that extended to the level of the chest wall and ribs. A segment of rib measuring 1x2cm was noted to be entirely mobile and this was removed (Fig 1), leaving a final soft tissue defect measuring 5x3x2cm (Fig 2-4). This was treated with negative pressure wound vacuum dressing, transitioned to wet-to-dry dressing changes on postoperative day 2. Given would cultures positive for pseudomonas, the patient was treated with ciprofloxacin for 6 weeks for osteomyelitis. Over a two month period, the patient’s wound entirely healed.

DISCUSSION

The wide use of the PMMF for reconstructive purposes is secondary to its ease of harvest, versatility in addressing soft tissue defects, and favorable morbidity profile (1,2). PMMF is the best option when free flap surgery is not practical (i.e. lack of microsurgical expertise, lack of recipient vessels) or for salvage procedures after free flap failure. In addition, it is commonly employed for coverage of the great vessels with radical neck dissections and to prevent fistula formation in laryngopharyngectomies.

Published complication rates associated with PMMF range from 16-77% (3). Overall, 96% of complications reported in literature are associated with the reconstruction site, while only 4% of published complications are related to the donor site (3). Amongst individual studies the rates of donor site complications are variable, although <10% in the majority of series (2-7). Infection and wound dehiscence are the two most commonly cited complications (3). Infection complications typically relate to soft tissue infection, with osteochondritis and osteomyelitis making up only 7% of reported donor site complications (3).

Thus, poor wound healing secondary to rib pathology, as reported in this case, is a rare complication encountered in PMMF. The etiology of osteochondritis and osteomyelitis, while not confirmed in this case, may relate to impaired blood flow to the rib. The period between devitalized rib and vascular pedicle receive blood supply from overlying muscles and the periosteal vascular network can help maintain the integrity of the outer cortex of bone in conjunction with larger internal nutrient arteries (8). While blood supply to the ribs arises predominantly from the internal thoracic artery, the periosteum and perichondrium of the anterior ribs receive blood supply from the pectoral branch of the thoracoacromial artery, the vascular pedicle supplying the bulk of the pectoralis muscle (3).

In elevating the pectoralis major muscle off the chest wall, injury to the indistinct overlying vascular network supplying the periosteum/perichondrium can lead to avascular necrosis and subsequent osteomyelitis (9). Two previous retrospective studies evaluating patients undergoing PMMF report a 2-4% rate of osteochondritis at the donor site (10,11). All of these patients underwent skin graft placement for initial repair of the donor site and surgery required removal of much of the osteocartilaginous segment. The etiology of osteochondritis in this setting was in part thought to be related to failure to close the donor site primarily with resulting exposed rib at risk for infection. In the case presented here, no skin graft was used and adequate, low tension coverage of the chest wall was obtained through primary closure. Thus, the finding of sequestered necrotic bone in this patient is believed to be largely secondary to impaired blood flow rather than exposed rib at risk for infection. There is a theoretical route of contamination through the subcutaneous tunnel between the donor and recipient site, especially if the recipient site is in communication with the aerodigestive tract (3). However, in that scenario, a significant soft tissue infectious process would be expected and extension to the rib would be a secondary sequela.

As reported by Donegan et al., osteomyelitis and chondritis of ribs in the setting of PMMF is a difficult problem to treat and requires removal of the affected bone (9). In our experience, conservative management with antibiotics and aggressive wound care did not yield benefit until the involved bone was removed. The decision to proceed with surgical debridement, however, would likely clinically occur only after these conservative measures have been attempted. While the general diagnosis of osteochondritis and osteomyelitis can be supported through the use of MRI or bone scans, the use of these modalities in the setting of a non-healing wound after PMMF has not been as well examined and may need to be more practical. Ultimately given the prolonged course of osteochondritis and osteomyelitis after a PMMF, awareness and prevention of such complication is important. Preservation of periosteal blood flow via careful dissection of the pectoralis muscle off the chest wall is imperative.

CONCLUSION

The PMMF is a widely used pedicled flap for soft tissue reconstructive purposes with uncommon complications occurring at the donor site. Osteomyelitis and chondritis of the ribs, with resulting impaired soft tissue wound healing, can occur if blood supply to the anterior ribs is compromised. Therefore, careful dissection of the pectoralis muscle off the chest wall is important.

REFERENCES: