Devitalized Rib as a Cause of Non Healing Pectoralis Major Donor Site: A Case Report

Priyesh N Patel*, Sunshine M Dwojak, and Sarah L Rohde
Department of Otolaryngology, Vanderbilt University Medical Center, USA

Abstract

The pectoralis major myocutaneous flap (PMMF) is a widely used pedicled flap for soft tissue reconstruction. 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 case report describes the etiology and management of a non healing donor site found to have devitalized rib after a PMMF in a 73-year-old male. 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, with resulting rib sequestration, osteomyelitis, and poor wound healing. As many patient’s undergoing PMMF reconstruction may have underlying vascular disease and poor perfusion to tissue, extra care during elevation of the flap to avoid the rib periosteum should be exercised in these patients.

ABBREVIATIONS

PMMF: Pectoralis major myocutaneous flap (PMMF)

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 flap itself, there are fewer reports of complications related to the thoracic donor site [1]. Although there have been previous reports of osteochondritis at the donor site of a PMMF, this is not a commonly cited complication [1-4]. Moreover, most of these reports describe this complication in the setting of incomplete donor site coverage, the use of a skin graft, and exposed rib at risk of infection [2-4]. This case report describes a patient with a non healing donor site wound with devitalized rib and osteomyelitis after a PMMF without the use of a skin graft or exposed rib. The etiology and management of this complication are discussed.

CASE PRESENTATION

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

The patient subsequently underwent total laryngopharyngectomy, bilateral modified radical neck dissections, and bilateral pectoralis major myocutaneous flap for reconstruction. Intraoperatively, the muscular pectoralis flap was noted to have a robust blood supply and separated easily from the chest wall without gross injury to the chest wall. The patient’s immediate post-operative course was uncomplicated.

Approximately 2-3 months after completing surgery, the patient developed an area of granulation tissue and thin, serous drainage along the left inferior incision of his flap donor site. This was debrided in clinic, treated with silver nitrate, and conservatively managed with iodoform gauze dressing. Despite aggressive wound care, the patient’s open wound developed purulent drainage, prompting antibiotic treatment. Due to persistent poor healing refractory to aggressive medical management, the patient was taken to the operating room for wound debridement. Intraoperatively, there was a tract of granulation tissue that extended to the level of the chest wall and ribs. A segment of rib measuring 1x5cm was noted to be entirely mobile and devascularized. The devitalized portion of the rib was removed (Figure 1), leaving a final soft tissue defect measuring 5x3x2cm (Figures 2a,b,3). The surgical site was treated with negative pressure wound vacuum dressing, transitioning to wet-to-dry dressing changes. Given would cultures positive for pseudomonas and a diagnosis of osteomyelitis of the devitalized rib, the patient was treated with ciprofloxacin for 6 weeks per infectious disease recommendations. Over a two-month period, the patient’s wound entirely healed and has remained healed with one-year follow-up.
DISCUSSION

The PMMF is a commonly used pedicled flap for soft tissue reconstruction in the head and neck region [5]. The wide use of the PMMF is secondary to its ease of harvest with resulting shorter operative times, versatility in addressing soft tissue defects, and favorable morbidity profile [6]. Although free flaps are being increasingly used for reconstruction in otolaryngology, PMMF is often the best option when free flap reconstruction is not possible (i.e. lack of microsurgical expertise, poor state of vasculature secondary to medical comorbidities, lack of recipient vessels) or for salvage procedures after free flap failure. In addition, given its significant muscle bulk, PMMF 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% [1]. While commonly cited complications associated with PMMF relate to the pedicled flap itself (i.e. necrosis secondary to impaired blood supply, development of fistula), there are fewer reports of complications associated with the thoracic donor site. 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 [1]. Amongst individual studies the rates of donor site complications are variable, although <10% in the majority of series [1,2,5-9]. Infection and wound dehiscence are the two most commonly cited complications [3]. Infectious complications typically relate to soft tissue infection, with osteochondritis and osteomyelitis making up a small component 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 may relate to impaired blood flow to the rib. The periosteum and perichondrium receive blood supply from the pectoral branch of the thoracoacromial artery, the vascular pedicle supplying the bulk of the pectoralis muscle [1]. In elevating the pectoralis major muscle off the chest wall, injury to the indistinct overlying vascular network supplying the periostem/perichondrium can lead to avascular necrosis and subsequent Osteomyelitis [4]. Two previous retrospective studies evaluating patients undergoing PMMF report a 2-4% rate of osteochondritis at the donor site [2,3]. All of these patients underwent skin graft placement for initial repair of the donor site and ultimately required removal of the osteo-cartilaginous 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

Figure 1 Devitalized rib removed from poorly healing pectoralis major myocutaneous donor site.

Figure 2 (A) Exposed chest wall at 2cm from skin surface after removal of devitalized. Chest wall defect measuring 5x3 cm at pectoralis major myocutaneous donor site after removal of necrotic rib.

Figure 3 Final chest wall defect after sequestered rib removed from poorly healing pectoralis major myocutaneous donor site.
the donor and recipient site, especially if the recipient site is in communication with the aero digestive tract [1]. However, in this 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 [4]. 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 to the operating room for 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 examined and may not be 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.

CONFLICT OF INTEREST

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. This research was presented at the American Academy of Otolaryngology – Head and Neck Surgery Foundation Annual 2016 Meeting, San Diego, Ca.

REFERENCES