Use of extended vertical myocutaneous trapezius flap in neck reconstruction

Ana Rodríguez-Vega, María Teresa Sánchez-Medina, Jaime Lima-Sánchez, Orlando García-Duque, Javier Fernández-Palacios

Abstract

Background: Carbuncles are acute, deep and necrotizing infections of several hair follicles. Most cases are caused by *Staphylococcus aureus*. It usually requires only medical treatment, but in some cases surgical debridement is necessary. Surgical debridement may cause large defects that require reconstruction.

Clinical case: We report a case of an 80-year-old patient who came to our Emergency Room with a large inflammatory plaque on the back of the neck that required surgical debridement and delayed reconstruction with an extended vertical myocutaneous trapezius flap.

Discussion: The extended vertical myocutaneous trapezius flap is highly useful in head and neck reconstruction. It is large, reliable, thin and pliable, with minimal morbidity in the donor region. It is a better option than the use of grafts or other myocutaneous flaps such as the latissimus dorsi flap.

Conclusions: The extended vertical myocutaneous trapezius flap can be very extensive. It is easy to perform, reliable and results in minimal morbidity in the donor region. We consider it the first choice for reconstruction of large defects on the posterior neck region.

Key words: trapezius myocutaneous flap; *Staphylococcal* skin infection.

Introduction

Infection of several contiguous hair follicles, which most often affects the posterior cervical region and back, is called a carbuncle. The germ responsible in most of these cases is *Staphylococcus aureus*.1 The typical lesion is an inflammatory, erythematous and painful plaque with abundant abscesses that drain purulent material through multiple openings that resemble a “slotted spoon.”2

The majority of cases are treated with antibiotics. Local treatment is sufficient for control of the infection. However, surgical drainage may be necessary, especially in the case of extensive and fluctuant lesions.

Regional myocutaneous flaps are the first option for reconstruction of the posterior cervical region. The extended myocutaneous flap of the trapezius is a safe flap that is rapidly done and offers a large surface and a wide range of rotation. This flap is ideal for reconstructing defects on the posterior side of the head and neck. Its characteristics are the most similar to the tissues lost and can be performed in the decubitus prone position to avoid changes of position intraoperatively.

The case of an 80-year-old male is reported. The patient had a carbuncle that required treatment with systemic antibiotics, radical debridement, and deferred closing with an extended vertical myocutaneous trapezius flap.

Clinical Case

We report the case of an 80-year-old male patient with type 2 diabetes mellitus as the only clinically significant medical history. The patient presented to the Emergency Department due to the appearance of an inflammatory plaque in the left posterior region of the neck of ~6 months evolution that grew slowly with continuous suppuration. This was accompanied by fever, general deterioration and marked leukocytosis.

On physical examination, an erythematous, nonfluctuant, hard, cellulitic plaque (15 × 5) cm was found with spontaneous suppuration through the fistula openings with loss of
skin integrity in ulcerated points. It was very friable and painful to superficial palpation (Figure 1). Due to the appearance of systemic symptoms, broad spectrum antibiotic treatment was started with piperacillin-tazobactam and intravenous linezolid.

Cervical computed tomography (CT) demonstrated increased volume and density of the posterior and left lateral musculature of the neck, with striation of subcutaneous fat and increase in its density, which did not capture the contrast media; therefore, it was related with a phlegmon or cellulitis. It began in the left retroauricular space, going down to the ipsilateral posterior cervical region and up to the hyoid bone. Microbiological study of the skin biopsy and purulent exudate revealed abundant colonies of *Staphylococcus aureus*. Histopathological study of the skin biopsy reported unspecified acute and chronic dermopanniculitis and serology was negative for HIV.

The patient showed clinical and laboratory improvement after the initiation of antibiotic therapy and local treatment. However, control CT revealed worsening compared to the previous study with involvement of the pericarotid space with increase in the density of the perivascular space of the neck that completely surrounded the left internal jugular vein without signs of thrombosis. There were no tracheoesophageal complications or extension to the mediastinum.

Due to the radiological imaging, the patient was scheduled for surgery under general anesthesia. Debridement and excision of the left posterior cervical lesion was done, which included the sternocleidomastoid muscle, trapezius and homolateral paravertebral musculature (Figures 2 and 3). Closure was not done at the time of the surgery so as to wait for the microbiological results to ensure a clean, uncontaminated bed.

The anatomic pathological study of the skin and subcutaneous cellular tissue described necrosis with extensive areas of acute inflammatory infiltrate, with abscesses that affected 80% of the surgical specimen. Findings were compatible with the clinical diagnosis of cellulitis. Microbiological specimen showed *Staphylococcus aureus*.

![Figure 1. Cellulitic plaque with fistulous openings ("slotted spoon sign").](image1)

![Figure 2. Specimen of surgical resection that includes the trapezius, sternocleidomastoid muscles and homolateral paravertebral musculature.](image2)

![Figure 3. Posterior cervical defect after surgical debridement.](image3)
At 10 days from the first surgical intervention the patient was reoperated with general anesthesia for closure of the defect. For this procedure an extended myocutaneous vertical flap of the right trapezius was designed, based on the dorsal artery of the scapula, of $33 \times 11$ cm pediculated and rotated $90^\circ$ for placement in the area of the defect (Figure 4).

**Direct Closure of the Donor Area**

The patient progressed favorably without postoperative complications, with the exception of dehiscence of an area of the wound in the left retroauricular region, which closed progressively by second intent. A month after the second surgical intervention the patient was discharged to home, with the surgical wound completely closed and only had limitation of movement due to tension in the midline of the back and also for lateral movements of the head (Figure 5).

![Figure 4. Myocutaneous flap of the right trapezius.](image1)

![Figure 5. Flap pedicle (over blue background). Branch of the trapezius of the dorsal scapular artery that comes out on the superior border of the rhomboid major muscle.](image2)

**Discussion**

The majority of anthrax cases are successfully treated with systemic antibiotics and local treatments. However, in cases of torpid evolution, serious complications can occur such as septic shock, endocarditis, osteomyelitis, epidural abscesses, meningoencephalitis or glomerulonephritis.

Surgical treatment of anthrax remains limited to cases in which medical treatment is not effective and consists of surgical excision of all tissue affected by fistula tracts and abscesses. It is important to remove all devitalized tissue until a clean and well-vascularized bed is obtained. It may be necessary to delay reconstruction to a second surgical time when the infection is eradicated.

Surgical debridement can cause extensive skin defects, which are mainly located in the back and on the back of the neck and are challenging to achieve closure. The use of skin grafts in these regions is not recommended because they are areas of support and of great mobility in which the inherent retraction to the graft shrinkage produces limitations in mobility, along with poor aesthetic results.

Regional myocutaneous flaps represent the best choice in the reconstruction of defects in the back of the neck and provide appropriate and aesthetically acceptable coverage. Among the different reconstructive possibilities in this region, the more accessible myocutaneous flaps are latissimus dorsi and trapezius muscle flaps.

The myocutaneous flap of the underlying latissimus dorsi is the flap of choice in reconstruction of thoracic defects. Its use in cervical defects was published by Quillen et al. who suggested the complete removal of the wide dorsal muscle, which remains attached only by the thoracodorsal...
pedicle and requires axillary dissection and modification of the patient's position during surgery. Nonetheless, its large pedicle and skin extension barely cover the defects that span the entire posterior cervical region.

Mathes and Nahai in 1980 described the vertical flap of the trapezius and since then it has been utilized on countless occasions in head and neck reconstruction. It is one of the most versatile flaps because it allows a wide arc of rotation, which allows for it to be easily transposed from the back to the posterior cervical region without the need to modify the patient's position. Its color and texture make it ideal for reconstruction of the posterior region of the neck and the procedure is safe, simple and rapid.

The vascular anatomy of the trapezius muscle is complex. Two dominant flaps have been described (the superficial branch of transverse cervical artery and the deep or dorsal scapular artery) and several lesser pedicles (occipital artery and intercostal perforants).

In the case of our patient, an extended vertical myocutaneous flap was done based on the dorsal artery of the scapula, which provides flow to the inferior portion of the trapezius muscle. This flap is designed with a large island of skin whose greater axis is centered between the spine and the medial border of the scapula. The medial edge of the flap is located 0.5 cm of the vertebral spinous apophysis, which vary the width according to the default for reconstruction. The maximum width that ensures the direct closure of the donor zone is 8-10 cm; however, flaps of greater dimensions have been described. In this case the width of the flap was 11 cm and direct closure of the donor area was achieved (Figure 4).

The pivot point is determined by the origin of the vascular pedicle, varying the arc of rotation between 10 and 15 cm. The length of the flap is defined by the distance between the pivot point and the defect. The wide surface of contact between the muscle and skin allows to extend the flap even 15 cm beyond the inferior border of the muscle, and a well-vascularized flap is obtained with considerable length to cover defaults at distance, reaching a maximum length of 38-40 cm.

In the prone decubitus position, elevation of the flap is carried out. The skin incision is deepened to the fascia, and dissection is begun in the midline with identification of the trapezius muscle and it medial vertebral insertions are cut. Continuous caudal to cranial dissection is done by the underlying plane to the trapezius muscle, with special care taken when reaching the superior margin of the rhomboid major muscle. In the line that separates the rhomboid major from the minor, one can see the perforating branch of the dorsal artery of the scapula for the trapezius muscle (Figure 5). The descending branch of the dorsal artery of the scapula that continues its trajectory under the rhomboid major muscle should be ligated at this level. The rhomboid minor can be cut to increase the arc of rotation of the flap, if necessary.

After the pedicle is identified, the lateral margin of the flap can be sectioned. The cranial dissection should not affect the descending fibers of the trapezius (superior portion) and its lateral insertions to the acromion and the spine of the scapula. If these fibers are damaged there will be weakness for elevation of the shoulder, the arm and scapular ala postoperatively.

Once the flap has raised it transposes a twist on the pivot point that can zoom in 180° in the case of defects in the occipital region. Tunneling through the subcutaneous cellular tissue can also be done to provide coverage for intraoral and oropharyngeal defects. In our case it was necessary to do a 90º turn for placement of the flap over the defect that spanned the entire posterior region of the neck. The resulting scar from closure of the donor area is acceptable cosmetically (Figure 6).

In conclusion, surgical debridement of deep skin infections is reserved for cases that do not respond to medical therapy. It is important to carry out an exhaustive debride-
dement of all the tissue involved before the reconstruction or closure of the affected region is planned. The extended vertical myocutaneous flap of the trapezius is, for us, the first choice for coverage of large defects in the region of the posterior neck. Because of its simplicity, reliability and minimal morbidity we recommend its use in these types of reconstruction.

References