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Reconstruction of Myofasciocutaneous Defect with Free Latissimus Dorsi Flap

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Abstract

Introduction: Epidermoid cancer is a common disease with low mortality, which generates a great economic weight in public health due to the high cost of its diagnosis and treatment. This disease commonly occurs in skins that suffer chronic damage and is associated with actinic keratosis. Therefore, the reconstruction of the cutaneous defect with a free latissimus flap is considered, since it constitutes a method of choice for treatment of wide excisional defects.

Objectives: To demonstrate the beneficial results obtained by presenting a clinical case of a 65-year-old male patient with slow and progressive growth for 5 years of squamous cell carcinoma of 13 x 13 x 9 cm in the left temporoparietooccipital region in which reconstruction of the defect was performed. with free wide dorsal flap at the Hospital Central Militar.

Material and methods: A case report in which a skin defect was covered with a free wide dorsal flap was mentioned at the Central Military Hospital in the Plastic and Reconstructive Surgery service.

Results: The patient did not present any complications, being discharged on the seventh postoperative day, not deserving reoperation.

Conclusions: The length of the vascular pedicles of the thoracodorsal artery, its anatomical constancy, the vascular diameter and its flexibility to be coupled with volume on exposed bone surfaces make the reconstruction with the free wide dorsal flap be considered as a workhorse in reconstructive surgery.

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Introduction

Over time, the different branches of medicine have evolved and adapted to generate more effective, save and decisive treatments. A few years ago, we would never have thought that we could use part of our musculoskeletal and cutaneous system as an autologous transplant for another area of our body; however, thanks to technological, technical and academic advances, today we are able to use complex reconstruction techniques to resolve complicated defects, secondary to surgical, traumatic and congenital processes. The first flap was described in 1959, using a section of intestine to correct an imperfection in the esophagus [1]. Squamous cell cancer is the second most common cancer in the United States, but it has a low mortality rate. A disease generates a great economic burden on public health due to the high cost of its diagnosis and treatment [2, 3]. This disease occurs mainly in skins that have suffered severe damage, and it is associated with actinic keratosis. The main risk factor is solar UVR, other less common ones include exposure to chemicals such as pesticides, herbicides, industrial oils, arsenic and ionic radiation.

The incidence in immunosuppressed patients is very high [1]. The average age of people who presents the disease is around sixty and they are mainly male patients [4]. The clinical presentation is variable and depends on the location and subtype. It mainly occurs in a specific region of the body as erythema, edema, and a mass that can be painful or not [5]. The diagnosis is made through the clinic and the definitive one with histopathological differences will be observed; the subtypes are well differentiated from those that have a low metastatic potential; this diagnosis can be supported with dermoscopy [5]. In this case, the scalp defect was the result of a wide resection secondary to squamous cell carcinoma and it was concluded with the realization of a free flap. The latissimus dorsi free flaps are considered a choice to cover the defects that remain on the scalp [6].

Methods

A 65 years old male patient, family background; his father died of prostate cancer. No-pathological personal history. He claims to work in the agriculture industry, exposing himself to solar UVR, 3 to 4 hours a day with no protection and interacting with pesticides. He denies any pathological personal history. Early signs of the current illness started 5 years ago with a one-centimeter warty temporo-parieto-occipital lump. During the following 3 years, the tumor showed a slow and progressive growth without any medical examination. The patient refers a fast growth of the lump for the past 18 months, serous exudate and oozing bleeding for which he goes to a private hospital in Guadalajara, Jalisco. In the hospital, he undergoes a biopsy, which shows a squamous cell carcinoma. Nevertheless, the patient does not follow up as he doesn´t have health insurance. In April 2020, he is examined at Central Military Hospital in México City. A second biopsy confirms the previous diagnosis; the squamous cell carcinoma. A physical examination revealed a pedunculated fungiform tumor in the left parieto-temporo-occipital region, measuring 13 x 13 x 9 cm, with a pedicle of 7-8 centimeters in diameter, approximately a friable and mobile tumor. The patient is conscious, oriented afebrile and showing no pain in the tumor area. The reports from laboratories show Hb 11 g/dl, platelets 443 10^9/L, Leukocytes 6.7 x 10^9/L, PT 11.6 s, PTT 29 s, glucose 103 mg/dl, Urea 30 mg/dl, creatinine 0.9 mg/dl.

Surgical time is scheduled by the oncology service, piece is sent to the pathology service, reporting free-edged squamous cell carcinoma, for which a plastic surgery is consulted for a latissimus dorsi free flap to correct the imperfection than measuring 10 x 12 cm (Figure 1). Prior to surgical approach, the patient was delimited with an indelible marker, taking the dimensions of the cutaneous island delimiting the latissimus dorsi muscle and the site of the main pedicle (Figure 1). The axis of the flap was located 2 cm posterior to the anterior border of the muscle, the incisions started on the previously configured line of the skin island, dissecting in layers until the muscle fascia was identified, afterwards the fibers of the latissimus dorsi muscle were identified from its anterior border and the anterior serratus was bluntly dissected. The dissection process continued towards the lower portion of the muscle, the middle and posterior third of the iliac crest were disinserted. It was dissected and raised from the serratus anterior muscle up to the dissection of the ventral edge of the latissimus dorsi. It is released from its attachments in the thoracolumbar spinous processes, keeping the muscle together with the latissimus dorsi tendon to the humerus and its blood supply from the thoracodorsal artery. A three-centimeter-long preauricular incision is vertically made, 1 cm away from the tragus. A dissection is carefully performed using Iris scissors, as well as microsurgical dissections until the superficial temporal artery is exposed and prepared, which is then followed and cephalad dissected until its bifurcation. The receiving artery and vein are referred to with silastic, the thoracodorsal artery, vein and nerve are referred, leaving a 6.5 pedicle, it is clamped and ischemia is started. The piece is extracted, a flap is prepared under microscope where perivascular and adventitial fatty tissue is removed up to 3 mm from the anastomotic edge (Figure 2). The surgical specimen is carried towards the skin defect, a dissection is performed between the aponeurosis of the temporal muscle and the fatty tissue in the direction of the already prepared recipient artery, it is verified that the space is ample, it is tunneled and partially fixed and the flap is set inside the defect, vascular pedicles are passed over the tunnel and the anastomosis of the vein is started with prolypropylene 9-0 and later on, the artery with prolypropylene 9-0 placing the posts with prolypropylene 8-0 (Figure2). Prior to the preparation and anastomosis of the flap and its pedicle, fibrinogen, plasma fibronectin, factor Xlll, plasminogen, bovine aprotinin + thrombin and calcium chloride (Tissucole) were applied to the donor site, after the placement of two Blake-type 19 Fr drains on the anterior and posterior sulcus of the donor site. The dermis was faced with 2-0 polyglactin, reversed points by halves and reinforced with 3-0 polyglactin, leaving a hermetic seal. The flap was fixed to its receptor site and, prior to the complete fixation, a 9 Fr Blake-type drain was placed on the marginal edge of the receptor site, extracting the drain at the level of the mastoid process and fixing it. Partial thicknessed autologous skin graft was taken and applied to the exposed portion of muscle without skin covering, which was fixed with simple 5-0 nylon stitches and then vaseline organdy was applied. The ischemia time was 4.3 hours, showing during the intraoperative period that, after maintaining an immediate capillary filling, it began to be delayed, so the anastomosis was explored, revealing a thrombus in the area of the superficial temporal artery with the thoracodorsal artery itself. The thrombus was partially dismantled with microsurgical forceps, maintaining adequate capillary filling immediately after this maneuver. He was kept under observation for 30 minutes prior to the closure of the periauricular wound, which was closed with 5-0 nylon single stitches. (Figure 2).

Results

A functional latissimus dorsi free flap was obtain to correct the imperfection. In the immediate postoperative period, an exhaustive continuous monitoring was conducted every hour, assessing body temperature, flap temperature, color, and capillary filling of the flap, skin turgor, oxygen saturation, blood pressure, heart rate and diuresis. After two weeks of continuous monitoring the plastic surgery, service decides to give him the medical discharge (Figure 3).

Figure 1

Figure 2

In him follow-up at the outpatient clinic, after 4 months of the procedure, the patient was conscious, oriented afebrile and showing no pain in the flap area. A hypertrophic scar was observed in the scalp as a consequence of the reconstruction (Figure 3). There was no data of infection and automation of the flap was observed. The obtained outcomes were auspicious. A physical examination revealed; body temperature 36.4 ^{O}C, flap temperature 36.6 ^{O}C, blood pressure 130/84 mmHg, SaO2 95%. The patient has not return to the outpatient clinic due to the COVID-19 health contingency. It is planned in the future to perform a hair graft.

Figure 3

Discussion

The latissimus dorsi was describe for the first time in 1896 by Tansini, he described it as a pedunculated and rotated tissue, it has a long history in thoracic, rib and mammary reconstructions [7]. It is one of the most frequently used flaps in reconstructive surgery due to its large diameter vasculature, length of pedicle, size and versatility; making it the workhorse of reconstructive surgery[7]. The origin of the latissimus dorsi muscle derives from the last six thoracic vertebral spinous processes to the medial and external posterior border of the iliac crest [7]. It inserts superiorly and externally into the lesser tubercle and the medial lip of the intertubercular groove of the humerus [7]. The muscle dimensions that it has are; length 35 cm (limits 21- 42 cm), width 20 cm (limits 14- 26 cm), thickness 1.5 cm (limits 0.5-4.5 cm)[7]. The dimensions of its cutaneous island are; length of 18 cm, a width of 7 cm with a maximum for primary closure of 8-9 cm and a thickness of 2.5 cm [7]. The free latissimus dorsi flap falls into the Mathes-Nahai type V classification with a main pedicle that is the thoracodorsal artery; branch of the subscapularis and minor pedicles from the posterior intercostal perforators and the lumbar artery perforators [7]. The average length of the thoracodorsal artery is 8.5 cm (limits 6.5-12 cm) and a diameter of 3 mm (limits 2- 4 mm) [7]. The thoracodorsal vein has an average length of 9 (limits of 7.5- 10 cm) and a diameter of 3.5 mm (limits 2- 5 mm) [7]. Among the advantages of this type of procedure we can find a fast and safe dissection, this is due to the constant anatomy of the thoracodorsal and subscapular vessels, the vascular transfer is facilitated by the length and di-

ameter of the pedicle as well as the orientation of the cutaneous island that can be vertical, oblique or transverse according to what it refers to [7]. The complications that can be observed are; pain in donor area, seroma formation, malfunction of the arm, and cosmetic complications due to the large volume of the flap, despite post-implantation atrophy [7].

These types of techniques are used in the same way in resections of tumors that invade the base of the skull and peripheral structures that generate a tissue defect [8]. The main objective of these procedures is the reconstruction of the affected areas, covering the dural exposure or, protecting the intracranial content of the microbiota [8]. The recovery process after a reconstruction of head and neck defect requires time and adequate wound healing to optimize aesthetics and restore sensation if possible [9]. When there are multiple lesions or these are irradiated to the scalp, a two-step reconstruction is required: First, the making of the flap and then the removal of the defect to fix it [10]. Head and neck free flap reconstruction have a 94-99% success rate [11]. Despite the very meticulous procedure, there may be a total and corrected with a new intervention to save it [11].

The evolution of this type of free flaps used in head and neck cancers has facilitated surgeries to correct these types of defects [12]. The transfer of microvascular free tissue is considered the method of choice in these complex cases, and the choice of flap will depend on the factors of the lesion, including the site, size and complexity of the defect, as well as comorbidities [11]. The soft tissue flap is generally the latissimus dorsi and the thoracodorsal artery and the scapula belong to the osseous component [12].

The choice of this technique for the reconstruction was due the size of the defect after resection procedure, it needs a flap that could cover more than though the scalp defect. With the use of locoregional flaps as the Orticochea multiflap closure was not enough to provide coverage. In our experience at the Hospital Central Militar, the latissimus dorsi free flap it is capable to bring adequate coverage to large defects with the only limitation of the cutaneous horn.

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