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PEDICLED PERFORATOR FLAPS FOR COVERING THE ELBOW REGION. A CASE REPORT

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Abstract

Covering the elbow soft tissue defects is a difficult task for the plastic surgeon. Because of, the important anatomical structures situated superficially and the high tendency for stiffness of the elbow, the reconstructive method must be chosen carefully. Traditionally the free flaps were the choice method for elbow reconstruction. In our department, we use the perforator pedicled flaps for covering elbow defects, as a viable alternative to the free microsurgical transfer. This paper presents a successful case of covering an elbow soft tissue defect in a male patient. By using a local pedicled flap we replaced "like with like" to obtain a very good cosmetic result. The lack of microsurgical anastomosis allowed an early physical therapy.

Keywords: elbow, propeller flap, pedicled flap

Introduction

The reconstruction of the elbow area is always a challenge in the field of plastic surgery [1,2]. A very soft skin is covering "noble" anatomical tissues that include the brachial, radial and ulnar arteries as well as the ulnar, radial and median nerves [1-3]. Moreover, the elbow joint is very sensitive to trauma and immobilization, showing a susceptibility to stiffness [1,3].

Traditionally the gold standard for covering medium to large elbow defects were the free flaps [1,4]. In recent years the pedicled propeller flaps become more and more an alternative to the microsurgical free transfer. The advantages of the propeller flaps include a shorter intraoperative time, reduced costs and the lack o microsurgical anastomoses that make possible a rapid postoperative physiotherapy [1,5]. Nevertheless, there are skeptics that are not convinced by the role of propeller flaps. Still, in our experience in covering elbow soft tissue defects we had a 100% success rate.

Case report

Patient presentation

To emphasize the role of propeller flaps in covering elbow defects we present the case of a 35-year-old male patient from a rural area, who was suffering from an old contractile post burn scar in the cubital fossa.

On admission to our department the patient presented a 50 square centimeters scar. The maximum extension in the elbow joint was 120° both for active and passive motion. No other major pathological modifications were observed. In order to obtain a normal extension of the elbow we decided to replace the scar with a propeller perforator flap. Because of the many false positive and false negative Doppler signals we decided to rely on the intraoperative identification of the perforator pedicle [6,7].

Surgery and follow-up

Under general anesthesia the excision of the scar tissue was performed. The noble anatomical structures that lie in the cubital fossa were identified and showed no sign of pathological modifications at inspection. Intraoperatively a complete, 180° passive extension of the elbow was possible. The post-excisional defect that was obtained had an area of 60 square centimeters.

A longitudinal incision at the lateral margin of the future flap was performed. Under loupe magnification several perforators were found. A large caliber perforator bundle arising from the inferior cubital artery was chosen as a pedicle for the flap. It had an advantageous location

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that could permit an ideal rotation. After the pedicle was chosen, the flap design was extended, to obtain a complete insular flap. The flap was eventually rotated 180° around its bundle axis so that the larger pad could cover the defect. The donor area was covered with a split-thickness skin graft harvested from the ipsilateral thigh.

Due to the lack of microsurgical anastomosis, physiotherapy was started on the first postoperative day. Four weeks after surgery the patient was able to perform a full active extension of the elbow joint.

Figure 1. Post burn contractile scar in the elbow.

Figure 2. Postoperative result after scar excision and propeller flap defect coverage.

Results

No necrosis occurred in the flap. The skin graft was completely integrated. Twelve month postoperatively the patient was highly satisfied with the cosmetic results. The range of movement was in normal limits with a neutral position in full extension at 0° and a full flexion till 150°. The patient was reintegrated in his social and professional life.

Discussion

Searching the literature we observed and increased number of papers dealing with propeller flaps reconstruction for the upper limb in the last five years. But still, the more traditional surgeons, stick to the free flaps [7,8]. This is partly because some of the propeller flaps surface cannot be predicted and partly because of the elaborated pedicle dissection technique [9-11].

From our own experience we never had a case of a total flap necrosis. Only in limited cases did marginal necrosis occur. The literature results are encouraging: all the authors reported a 100% survival rate of the flap [1,2,12,13].

In this clinical case, the donor site was closed with a skin graft. However, donor areas that are tighter than 5-6 cm may be closed by direct suture [1,3,14-16].

A big advantage of propeller flaps is that they are harvested from the same anatomical segment as the defect. This responds to a basic principle in plastic surgery, to replace "like with like" [1,5,17,18]. The cosmetic results are superior to covering alternatives that bring tissue from distant regions of the body [5,19]. Also the flap integration

becomes more natural [3,5].

Another important advantage of the pedicled propeller flaps is the possibility to start the physiotherapy on the first postoperative day without risking to compromise the flap vascularization [1,16].

The massive reduction of intraoperative time brings two major benefits. Firstly, for the patients with polytrauma it reduces the critical anesthesia time. Secondly, by reducing the operation time, it automatically reduces the operative costs [1,5,10].

Conclusions

Soft tissue defects in the elbow region require a good coverage to protect the vessels and nerves that lie superficially in these area. The propeller perforator flap are capable of offering a good coverage in the elbow, by replacing "like with like". This is the key of a successful cosmetic result in comparison with the free transfer that is covering the defect with tissue situated at a distance. Also, the absence of the microsurgical anastomosis allows an early physiotherapy in order to avoid joint stiffening.

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