

Internal Mammary Artery Perforator Flap for Coverage of Wounds in the Forearm

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ABSTRACT

Introduction: In severe upper limb injuries, which leave extensive and deep wounds with significant damage to vascular and nervous structures and bone exposure, surgical options are often limited. In these cases, when patients present severe vascular damage, comorbidities or they are in a center that does not count with the conditions for a microsurgical reconstruction; the internal mammary artery perforator flap is a great option for coverage.

In this work we describe the use of the Internal Mammary Artery Perforator (IMAP) flap for coverage of a wound in the forearm in a non candidate patient for reconstruction with microsurgical flaps.

Discussion: The internal mammary artery perforating flap is a widely known flap in its vascular anatomy, technically simple, safe, versatile, with a good arc of rotation and with low morbidity.

Conclusion: Due to all the virtues that this flap offers and its low morbidity it is an excellent option to cover not only local and regional wounds, but also distant wounds as in the case described, interpolating it to the upper extremities with excellent results.

Keywords: Internal mammary artery, Flap, Perforator

INTRODUCTION

There are patients who suffer trauma to the upper limb, leaving extensive and deep wounds that not only leave soft tissues (muscles, tendons, blood vessels and nerves) exposed, but also the bone; having, therefore, to cover these areas with quality tissue, well vascularized, wide and with plentiful thickness. Although most of the time this type of lesions can be ideally covered with free flaps, in certain cases, due to the presence of a major lesion and loss of the main arteries of the affected limb, free flaps cannot be performed and other option should be consider [1].

The internal mammary artery perforator flap is a good option for these cases given its well known anatomy, technical ease to perform, due to the size and thickness of the tissue that can be interpolated and its low morbidity [2]. This flap is a modification of the medially based deltopectoral flap which was described in 1965. It is a very versatile fasciocutaneous flap, of good thickness, easily foldable, with a large arc of rotation and with low morbidity since the donor area can be primarily closed. It is based on perforating arteries of the internal mammary artery and its main use is described for reconstruction of the head and neck [3,4].

Different clinical applications exist for the IMAP flaps. The flaps based on IMAP 1 or 2 may be rotated cranially for tracheostoma or anterior neck reconstruction. The flaps based on IMAP 4 or 5 supplying the skin of the inframammary fold could be used for reconstruction of the contralateral thoracic wall, breast or thoracic limb. The harvest site of IMAP 1 and 2 can be closed directly if the width of the flap is less than 6 cm. The IMAP 4 and 5 harvest site could be closed via a reduction mammoplasty technique, thus minimising donor-site morbidity [5].

In this work we describe the use of this versatile flap for coverage of the forearm in a patient who suffer an extensive

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and deep wound secondary to an exposed fracture of the left forearm with extensive soft tissue loss and that was non candidate for reconstruction with microsurgical flaps.

TECHNIQUE

With the patient in a decubitus position, the flap is marked at the level of the 4th or 5th intercostal space, once de perforator was identified with the help of a Doppler, the flap is drawn transversely. The medial limit was the sternum (midline), the length was just at the anterior axillary line and the width was based on the coverage required (8 cm to obtain a primarily

closure of the defect) (**Figure 1**). The superior and inferior incisions were first made down to the pectoralis fascia and subfascial dissection was carried out from lateral to medial using monopolar diathermy, until 4-5 cm from the sternal border. At this point, dissection was performed using tenotomy scissors until the perforator vessels were identified. After that, the flap onset in the forearm was made (**Figure 2**) and an on layer primarily closure of the donor defect was done after undermining and a suction drain placement [6].

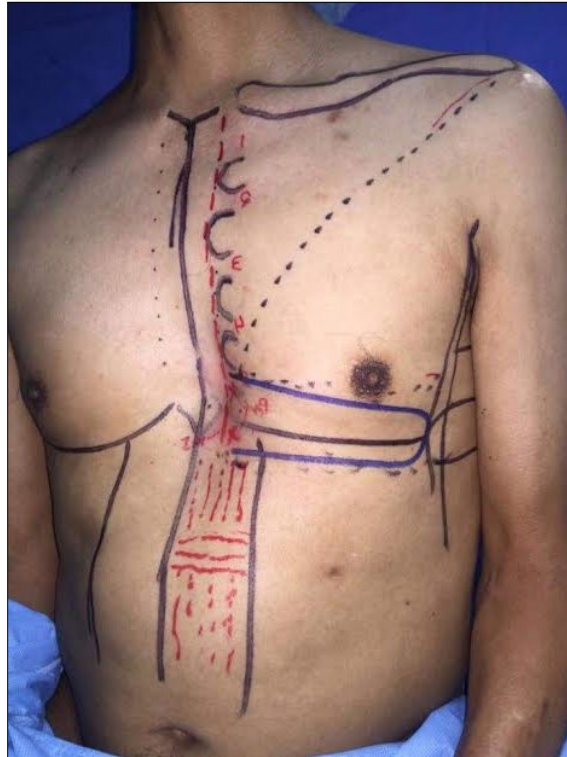


Figure 1. Medial limit in the sternum.



Figure 2. Flap onset in the forearm.

DISCUSSION

Different clinical applications exist for the IMAF flaps. The flaps based on IMAF 1 or 2 may be rotated cranially for tracheostoma or anterior neck reconstruction. The flaps based on IMAF 4 or 5 supplying the skin of the inframammary fold could be used for reconstruction of the contralateral thoracic wall, breast or thoracic limb.

The internal mammary artery perforating flap is a widely known flap in its vascular anatomy, technically simple, safe, versatile, with a good arc of rotation and with low morbidity.

For all these features this flap is a great option for the coverage of wounds in patients that are not candidates for microsurgical flaps.

CONCLUSION

Due to all the virtues that this flap offers and its low morbidity it is an excellent option to cover not only local and regional wounds, but also distant wounds as in the case described, interpolating it to the upper extremities with excellent results.

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