CASE REPORT

CASE PRESENTATION - RECONSTRUCTION OF THUMB DEFECT WITH NEUROVASCULAR CROSS-FINGER FLAP AFTER ELECTRICAL BURNS

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SUMMARY. The advantages are underlined of the use of the neurovascular flap, as seen in a patient with injuries in all anatomical structures after electrical burns, with defect in the soft tissue together with tendon, vessel, and nerve injuries and necrosis of the skin of the hand and fingers.

Introduction

High-voltage electric burns, especially in the upper extremity, are usually very aggressive injuries, and troublesome for both patient and surgeon. The surgical operation should, if possible, be performed immediately after the accident, when the patient’s general condition is stable. Treatment consists of immediate fasciotomy and early necrectomy as soon as the extent of the injury is established by MRI scan.

The parameters to be considered in selecting the most appropriate surgical method for reconstruction of the thumb are: patient’s age and sex, extent of neurovascular damage, the patient’s dominant side, and the patient’s expected co-operation. This last aspect requires thorough discussion with the patient and his or her family - often there is insistence on saving the hand and fingers, no matter what the expected outcome may be. This reality is often explained by the fact that in our culture such patients are psychologically much more willing to accept a contracted and useless finger than an amputated one, in the hope of possible surgical reconstruction in the future.

Case report

At the age of 24 this female patient suffered an accident to her left hand (1st, 3rd, and 4th fingers) due to elevated electric current. She suffered fourth-degree burns that also involved the neurovascular bundles, the tendons, and the distal part of the distal phalanges. On first examination, three weeks after the trauma, she showed complete necrosis of the volar skin covering the distal phalanges (Figs. 1–4). After amputation of two-thirds of the thumb, neurovascular flap was performed in 4th week after the trauma. (Figs. 5–8).
distal phalanges of the 3rd and 4th fingers, the wounds were left for secondary healing. The reconstruction of the volar defect of the thumb was then planned and performed with a flap from the dorsal side of the proximal part of the index finger, a flap described by Adams. Through a zigzag incision and a gradual dissection of the radial nerve to supply the thumb with sensation (Fig. 5), the flap was raised and rotated 180° in its long axis and transferred to the thumb defect, like a crossfinger flap but with preserved sensation. The secondary defect of the index finger was covered with a full-thickness graft from the left inguinal area (Figs. 6, 7). The 1st and 2nd fingers were then immobilized for three weeks, whereupon separation of the fingers was performed.
Discussion

Electrical burns causing loss of sensation in the pinch grip areas of the fingertips are difficult to treat. In this case report we present the successful reconstruction of the pulp of the thumb with a radial nerve sensory-supplied cross-finger flap from the index finger. The incision was planned to prevent cicatricial contractures. Owing to difficulties with post-operative care we decided to make the flap reconstruction in a two-stage procedure based on both a cutaneous and a neurovascular bridge instead of solely on an island flap. The patient’s history was uncomplicated: she did not suffer any neurinomas, causalgia, or dystrophy and she recovered full functionality. The donor site of the index finger healed without functional impairment. A full-thickness graft was considered the best way to prevent contractures and to give good mechanical strength - some sensation was also noted at the follow-up. In this patient the graft was harvested from the left inguinal area so that the cicatrix should not be mistaken for an appendectomy scar.

Conclusions

1. Electrical burns of the fingers usually damage the deep anatomical structures, with severe loss of hand function, especially when the thumb is affected.
2. Surgical intervention should therefore be planned in detail from case to case. This presentation describes a successful reconstruction of the thumb, the hand’s most vital finger. Although the Adam flap is well known, we would stress its importance as a valuable tool in a hand surgeon’s arsenal.
3. In our culture it is essential not to amputate a finger as, psychologically speaking, patients accept deformed and contracted fingers without function more readily than having none at all.

RÉSUMÉ. Les Auteurs soulignent les avantages de l’emploi du lambeau neurovasculaire, comme ils les ont vus chez un patient atteint de lésions dans toutes les structures anatomiques après des brûlures électriques qui présentait un défaut du tissu mou avec en outre des lésions des tendons, des vaisseaux et des nerfs et la nécrose de la phalange distale du pouce. Ils considèrent aussi la valeur de cette technique aujourd’hui dans le champ de la chirurgie plastique reconstructrice.

BIBLIOGRAPHY


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