Reconstruction of a subtotally amputated auricle with a very narrow inferior pedicle

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ABSTRACT

In our case study, the left ear of a 57-year-old male patient was subtotally amputated due to an iron-plate cutting accident. Only a 5-mm inferior skin pedicle connected the amputated ear to the lobule. The ear was reattached with primary suture without microsurgery. The reattached ear healed uneventfully.

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Introduction

Total or subtotal ear amputations are common. Microvascular ear replantation is the preferred choice for the reconstruction but many reasons such as the small vessel size of the amputated part, difficulty of the opposition of the vessels, and associated traumas besides the main injury make microsurgical repair difficult [1,2].

Subtotal ear amputations supplied by narrow pedicles, however, have rarely been reported [3,4]. In subtotal amputations, survival depends on pedicle width and its containing artery and vein. In the literature, there are a few case reports about subtotal ear amputations which were managed without microsurgery [5,6]. We expect that our case may make a contribution to the literature about subtotal ear amputation treatment.

Case report

Herein we present the case of a 57-year-old non-smoking male patient who suffered left subtotal ear amputation because of an iron-plate cutting accident. On examination, the subtotal ear amputation of the helix, antihelix and a part of the choncha from the apex of the helix to the middle part of the lobule was seen. The subtotal amputated ear was measured as 80 × 25 mm. Only a 5-mm wide skin pedicle, which connected the amputated ear to the inferior part of the lobule, was left intact (Figure 1). The edges of the wounds were irregular and the superior part of the amputated ear had congestion due to its bleeding too little. The patient had no associated injury or medical disorders.

The operation was performed under general anesthesia, about two hours after the injury. First, the wound margin was debrided for about 1 mm until bleeding was observed, except for the skin pedicle. The ear was reattached without microsurgical techniques and layers including skin and cartilage were sutured by using 5/0 PDS sutures with 2 mm suture intervals. A light compression bandage was used at the end of the operation. Post-operatively, low-molecular weight heparin (clexane 0.4 ml, every 12 hours) and a prophylactic antibiotic (1 g cefazolin, every 12 hours) were administered for one week. Venous congestion was seen just after the operation and intermittent bleeding was performed especially in the upper part of the segment to improve circulation for three days (Figure 2). After two months, the replanted auricle healed completely and, compared to the right ear, the reconstructed ear had the same two-point discrimination sensitivity (Figure 3).

Discussion

Subtotally amputated ear segment management requires either microsurgical replantation or primary reattachment if perfusion of the segment is adequate. Microsurgical replantation of the auricle after traumatic...
amputation is a very challenging procedure because of the small size of the vessels. If the initial examination of the amputated ear reveals suitable vessels for anastomosis, microsurgical replantation should be done; otherwise, an attempt should be made to salvage the amputated part.

In the literature, subtotal amputation with a narrow pedicle has been reported very rarely. Previously, only a few reports have been published about subtotal amputation with a superior pedicle in which the width of the pedicles ranged from 3 mm to 10 mm [3,4]. In these cases, the amputated segment was perfused by the intact branch of the superficial temporal artery venous system and therefore successful reconstruction could be achieved without microsurgery.

Conversely, subtotal ear amputation which was supplied by an inferior pedicle has been reported in only a small number of cases [5–7]. In these cases, the pedicle width ranged from 10 mm to 30 mm and the amputated ear was sutured following post-operative heparin, nicotinic acid or cooling treatment. These cases healed uneventfully.

The mechanism of the injury is a very important factor and influences the treatment directly. Crush injuries are unlikely to be treated by simple reattachment or microvascular anastomosis and, in this case, secondary reconstruction with rib cartilage is the preferred technique. The major determinants as to whether the auricle should be sutured directly or whether vascular anastomosis is required are the relation of the remaining attachment to the vasculature and the amount of bleeding from the stump. Other techniques like the pocket method and periauricular skin or fascia flaps should not be considered because they rarely achieve such a consistently good aesthetic outcome as a secondary reconstruction with rib cartilage [8].

Figure 1. Pre-operative views of a subtotally amputated left ear. Only a 5-mm skin pedicle connected the amputated ear to the lobule. The helix, antihelix and a part of the choncha were completely amputated.

Figure 2. In order to relieve venous congestion, the reattached ear was bled intermittently for 3 days.

Figure 3. Two months post-operatively: natural appearance of the ear after primary reattachment without vascular anastomosis.
A thorough understanding of the vascular anatomy of the ear is essential to decide which reconstruction technique should be used. Park et al. demonstrated the detailed anatomy of the arterial supply of the auricle [9]. The superficial temporal artery and the posterior auricular artery are the two main arteries which are responsible for ear perfusion. However, the caudal side of the lobule is primarily supplied only by the lower branch of the superficial temporal artery and is not linked to a major network. The auricular dermis also has a distinct vascular profile as compared with other regions, which might contribute to the high-survival rate of the subtotal amputated part of the auricle [10]. Therefore we think that, in our case, arterial support may have been provided by the lower branch of the superficial temporal artery and the rich subdermal vascularity of the auricle may have contributed to the success of the treatment. In contrast to the arterial support, venous drainage was not adequate for the whole amputated ear probably because of the small diameter of the vein which was located in the pedicle but we managed this problem by intermittent bleeding. Additionally, the auricle has a large piece of cartilage and also thin subcutaneous tissue which explains why the auricle has low metabolic demand. These unique features increase the chance of subtotal amputation survival by simple reattachment.

Our case only had a 5 mm inferior pedicle and this is the narrowest to be reported in the literature. The existence of little bleeding from the amputated part, good general condition, non-smoking status and no associated medical disorder in the patient supported the indication for simple reattachment. In order to prevent edema, local anesthesia was not used and general anesthesia was preferred. To provide neovascularization, adequate debridement was performed but microvascular anastomosis could not be achieved due to the vessel sizes. If no suitable vessels exist for microsurgery in patients with subtotal ear amputation, successful reattachment can be achieved by simple reattachment, as in our case.

**Conclusion**

If there is no chance of microsurgical replantation, primary repair may be a convenient treatment for the subtotal amputated ear even with a small inferior pedicle. In this way, the duration of the surgery and costs can be decreased without severe complications.

**Declaration of interest**

The authors report no conflicts of interest.

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