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Microsurgical Replantation of An Amputated Nasal Segment – Challenges Over Time

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Abstract

Microsurgical approach of a nose trauma is always challenging. In the last 40 years there are just a few cases of successful replantation of a nasal segment, especially when it comes to small segments that requires super-microsurgery.

Keywords: *Nose amputation; arterial anastomosis; lack of vein anastomosis*

Introduction

The nose is the first facial structure that stands out, both in frontal and in lateral view. It's a great challenge for a plastic surgeon to even think to re-attach an amputated segment of the nose.

Technically speaking, microsurgical replantation of a segment of the nasal unit it's both difficult and experience-based procedure. It takes a highly qualified plastic surgeon to perform such delicate operation.

But, besides the surgeon's experience, the success of this procedure depends also on other factors such as: type of injury (mechanism), viability of the amputated segment, quality of the vessel from the receiving bed, time lapsed from the injury, biological status of the patient. Even though reconstructive techniques for nose defects are in hand, using local, loco-regional flaps or composite grafts, it's desired to first try to micro-surgically reattach the fragment, after a thorough assessment of the local blood vessel network and supporting structures.

Case Report

A 68 years old male patient presented in the emergency room with a quasi-complete nasal amputation after a domestic quarrel. He presented with a partially amputated lower third of the nose, the amputated fragment having just a few 2mm diameter strings of cartilage anchorage to the columella. The remaining defect involved the lower third of the dorsum nasi, alar subunits, nasal lobule and columella. There was exposure of the cartilaginous septum and a remaining part of the middle crura of the left lower lateral cartilage. Clean cut margins of the lesion conclude that it was a sharp object trauma, leading to no tissue loses.

Fig 1. Preoperative aspects

The amputated part, measuring 3.5/3 cm, was inspected to assess the existence of possible blood vessel to microsurgical reattach the fragment. At a first look, there were no visible artery sprouts that could lead to a possible microvascular reattachment of the fragment, therefore the decision was made to reassess the tissue intraoperatively.

After several investigations and blood analysis, the patient went under general anesthesia. Under microscopic enhancement, we were able to find a proximal end of the left lateral nasal artery, but no communicating distal artery. On the right side, we were able to find a proximal arterial end of the right lateral nasal artery and the distal part also, both measuring 0.6 mm in diameter.

Considered super-microsurgery, after reattaching the cartilaginous frame, underlying soft tissue and the mucosal part of the nose, in order to create a proper “bed”, and carefully dissecting the vascular structures, the artery was anastomosed with a 10-0 Prolene. After removing the vascular clamp, reperfusion was observed, with a few seconds delay, suggesting that single arterial anastomosis was sufficient enough to sustain the blood flow through the amputated segment. After refilling the vascular bed, concern was to create a venous outflow to avoid congestion, but no veins were suitable for anastomosis. The wound was subsequently closed using 5-0 Prolene sutures.

Fig. 2 Intraoperative and postoperative aspects

The procedure lasted for about 4 hours and the total ischemic time was 6 hours. Slow reperfusion did not indicate the immediate need of medicinal leaches, but 24 hours after surgery, the nose became congested and medicinal leaches were use for the next 7 days.

Superficial skin necrosis was observed in the next week, which required chemical debridement with sulfadiazine ointments, leaving the tissue to epithelize per secundam. At 6 months follow-up, there were almost no visible scars, no functional impairment and the patient was very pleased with the results.

Fig. 3 Follow-up (2 weeks, 6 weeks, 6 months

Discussion

Nose reconstructive surgery is known to be happening since ancient history. Although the literature is abundant in articles and book chapters regarding reconstructive procedures of nose defects after various injuries, there are few mentions of microsurgical reattachment of amputated nasal segments. Both challenging and difficult, replantation of the nose segment seems the best option, if the case allows it, in order to obtain the best outcomes, since no other facial segment can offer the same characteristics as the segment itself.

But the microsurgical procedure has to take in consideration a series of factors, such as the type of the injury (mechanism), the dimensions of the amputated nose segment, the location of the injury, time lapsed since the injury, aspect of the margins on both nasal segment and the remaining part, age and biological status of the patient, patient's lifestyle (smoker or non-smoker), and, most important, the surgeons skills and experience.

As it can be seen in the table below, microsurgical reattachment of an amputated nose segment has been performed and described in the literature only in a few cases in the last decade.

No.	First Author (year)	Age/sex of the patient	Size of defect (subunits involved)	Ischemic time	Anastomosis Arterial/Venous	Use of medicinal leeches	Survival (results)
1.	Akyurek (2019) [1]	47/male	Lower third of the nose	n/a	Vein graft for arterial anastomosis/ no vein anastomosis	yes	Partial skin necrosis – total survival
2.	Elzinga (2018) [2]	17/male	Complete nose and upper lip	2 hours	2 arteries, 1 vein	no	total
3.	Tee (2017) [3]	8/male	1 X 1,5 cm / tip, alar and soft triangle units	n/a	Arterial anastomosis	yes	total
4.	Jason (2017) [4]	8/male	2.5 X 2.2 cmnasal tip	5 hours	No anastomosis/ attached as composite graft	No/use of Hyperbaric oxygen therapy	total
5.	Larsson (2016) [5]	70/female	Lower half of the nose and upper lip	7 hours	2 arteries and 1 vein anastomosis	yes	total
6.	Gilleard (2014) [6]	36/male	3.5 X 4 cm / nasal tip, columella and right alar	12 hours	Arterial and venous anastomosis; vein grafting	Yes (5 days po)	Total survival
7.	Stemann (2012) [7]	41/female	Lower third of the nose	n/a	Arterial anastomosis	yes	total
8.	Stillaert (201) [8]	66/female	Lower half of the nose 3.5 X2.5 cm	6 hours	Arterial anastomosis	yes	Total survival

9.	Stillaert (2011) [8]	10/ male	Subtotal nose amputation	n/a	Arterial anastomosis	yes	Total survival
10.	Sun W (2010) [9]	38/female	Lower half of the nose 3.0 X3.0 cm	n/a	2 arteries and an arteriovenous bypass	no	Total survival with minila scar
11.	Sun W (2010) [9]	39/female	Complete nose amputation 3.0 X 4.0 cm	n/a	2 arteries and 2 veins anastomosis	no	Total survival
12.	Pereira (2010) [10]	19/male	Quasi complete dorsum nasi avulsion, with a small left ala pedicle	n/a	No anastomosis – reattach the flap based on the left lateral nasal artery	No / just soft massage for venous drainage	Total survival
13.	Okumuș A (2010) [11]	34/male	Nasal tip	n/a	1 artery and 1 vein anastomosis	no	Total survival

Table 01

Frequently, if the amputated segment is less than 1,5 cm, the preferred method is to just reattach the part as a composed graft, waiting to see if it integrates. But the challenge appears if the fragment exceeds this limit, due to the necessity of recreating a sufficient amount of blood blow to sustain the tissues.

As shown in the published articles and in our case, it's important to have clean cut margins and no tissue lose in order to find a patent vessel to be microsurgical reattached. In this case, being a clean cut-sharp object trauma, there were no crushed or avulsed tissues or arteries, so we were able to find a small arterial bud that could provide a proper blood in-flow.

Other main reasons for our choice to do this procedure was the fact that the patient was in good condition, although being in his 6th decade, and nonsmoker, and a short ischemia time between the trauma and the actual surgical step.

Since we established to recreate an adequate blood in-flow, we had to take into consideration the venous drainage as well. But since the distal part of the nose has no big caliber veins that could be microsurgical repaired, the necessity of having a blood out-flow required the use of medicinal leaches. Since the amputated part had been composed of mixed cartilaginous and soft tissue, there was no need for a high blood in-flow, cartilaginous tissues being non- vascularized, hence the repair of only one artery and the need of leaches for only few days postoperatively. Although intensely discussed in terms of local contamination of the wound, there were no local complications of using the medicinal leaches, and the small surface hematomas that lead to superficial skin necrosis did not impair the final outcome. The scaring was acceptable both to the patient and to us, at a 6-month follow-up.

Conclusion

Since reconstructive procedures have been performed for more centuries, a pertinent question is whether to try a microsurgical approach or a reconstructive one. In most cases, with tissue lose or crush injuries, it's preferable to debride all the nonviable tissue and try to use the most suitable reconstructive option. But in blunt trauma with clean margins and enough vascular resources, if in hands of an experienced surgeon, is always best to reattach the fragment, as it has all the characteristics of that subunit. The esthetic outcome has to be taken into consideration too, when choosing the proper procedure. Also, the venous out-flow should not condition a microvascular replantation.

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