RESEARCH ARTICLE

Repairing Facial Soft Tissue Defects by Swelling Anesthesia after Tumor Resection with Narrow Pedicle Flaps

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Abstract

Aims: To investigate the role of swelling anesthesia in repairing facial soft tissue defects after tumor resection and temporal superficial artery frontal branch of narrow pedicle flap. Materials and Methods: From January 2008 to June 2008, 16 patients from Department of Ophthalmology with eye or eyelid tumors after eyeball removal of eye and part resection of surrounding soft tissue, undergoing postoperative swelling anesthesia with superficial temporal artery flap repair to prevent facial soft tissue defect formation and bone exposure, were recruited. Results: In all 16 patients facial soft tissue defect repair had good effects, with limited bleeding, and short operation times. Seven days after surgery, all flaps were in good repair. On postoperative follow-up after 3 months, flaps showed a similar appearance as with facial tissue. Conclusions: Swelling anesthesia for superficial temporoparietal artery frontal branch of narrow pedicle flap to repair soft tissue defect after facial tumor resection is feasible, and is linked with good analgesic effects, high postoperative survival of skin flaps, and good cosmetic effects.

Keywords: Swelling anesthesia - narrow pedicle skin flap - tumor resection

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Introduction

In treating patients with malignant tumour of the skin and soft tissue around eyes and eyelids, it is required that tumor and its surrounding tissues should be resected. And after operation, the repair of facial skin soft tissue defect or even bone exposure is considered to be a problem for surgeons. Meanwhile, cosmetic effect after repair is harder to achieve, and mostly under general anesthesia with free flap or forehead island skin flap to repair it before. But when repairing the wound for facial soft tissue defect, it should according to the requirement of defect degree and the difference of treatment chose the appropriate method, to obtain good result (Zhang et al., 2010). In order to achieve good appearance effect and reduce the occurrence of intraoperative complications, we applied swelling anesthesia for superficial temporoparietal artery formed forehead narrow pedicle skin flap repairing postoperative facial skin defect in 16 patients from January 2008 to June 2014.

Materials and Methods

Incidence, a total of 16 cases, of which 8 cases, 8 patients were male, aged 68-90, an average of 79±11, mainly because of tumor involved eyes and eyelids, in our hospital remove eyeball and excise partial soft tissues around the eyes, form the facial skin defect wound range from 5. 0 cm *2. 0cm to 8. 0cm *5. 0cm, and skull exposure.

Anesthesia

Configuration tumescent fluid before operation, Mark the temporal shallow artery and frontal branch line direction, According to the size and appearance of facial soft tissue defect area while designing forehead skin flap. Flap of the length, the width should be designed more than defect wound of 0. 5 cm, and greater than the defect area 1. 0-1. 5cm, about 2cm wide. Along the temporal shallow artery frontal branch line direction and the original design of pedicle skin flap and tunnel location inject swelling fluidin superficial fascia, while the part of flap are injected into the superficial layer of deep fascia. Preoperative 5min to intravenous injection of diazepam 10mg (Zhou et al. , 2007). Tumescent fluid configure: Isotonic saline 1000ml+Adrenaline 2mg+Lidocaine 5g+5% sodium bicarbonate 2ml (Wei et al. , 2009).

Adopting 20ml syringe connected to 10cm long on the 7th needle marks along the extent of surgery patients were injected into the donor site skin and superficial fascia flap edge of the design, the injection fluid is about 40-60ml, after injection you should make it uplift, stiff and slightly pale.

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Surgical Procedures

Temporal shallow artery is the frontal temporal region, one of the largest and most constant scalp artery. The temporal shallow in mandible neck from external carotid artery, in parotid gland parenchyma of the superior border of zygomatic arch 3-4cm send out frontal branch and parietal branch the two terminal branch (Zhu et al. , 1986; Cong et al. , 2003). Choose the forehead flap to repair facial soft tissue defect due to the blood vessels location is shallow, little variation, rich in blood supply, and its location near facial defect, So is the first choice for repairing the most of facial soft tissue defect (Hurvize et al. , 2006). Frontal branch direction is constant, on the surface of the frontalis muscle slant forward to the rise of calvarium, auriculotemporal nerve accompanying with it. Frontal branch, supraorbital artery and supratrochlear artery on forehead formed arteries network. Forehead skin flap based on superficial temporal artery frontal branches pedicled flap. Principle of the tumescent anesthesia is injected tumescent fluid into the skin and under the deep fascia, subcutaneous edema caused by artificial, the anatomical level more clearly, in separation reduces the vascular of pedicle tissue and shorten the time of stripping.

Preoperative using Doppler Blood measure the path of superficial temporoparietal artery frontal branch, and mark it with methylene blue. First of all, debridement, facial ulcer surface along with periosteum shave their clean, completely exposed healthy bone surface, and remove ulcer edge necrotic tissue, exposed to normal fresh skin wounds. On the forehead near the hairline edge along the artery path design beyond the wound 2cm of forehead skin flap, and along the extension of the superficial temporal artery frontal branch of path of flaps of skin and pre-designed injection tumescent fluid under the skin and superficial layer of deep fascia. Intraoperative cut flap provides two options: a. According to the direction of superficial temporal artery frontal branch vertical skin incision, And exposed frontal branch, cut and ligation pedicle of either side of the penetration vessels on both sides of the frontal branch of 3-4mm, pay attention to protect vascular pedicle, the cut out containing superficial temporal artery flap preferably has a total length of artery through flap, or at least half of the flap, to ensure adequate blood supply (Wang et al. , 1999); b. According to the design line, using retrograde flap cut method, cut the skin until deep fascia layer, and then blunt dissection to the pedicle part, find the superficial temporal artery frontal branch, pay attention to protect the frontal branch. Then cut next to 0. 5cm, when formed about 1cm wide vessel pedicle, preparation of the tunnel after the wound comparison. Now tunnel superficial subcutaneous row sharp dissection, deep surface to the deep fascia, row blunt dissection, preparation flap. Lifting the flap and the vascular fascial pedicle together through the subcutaneous tunnel, and next transfer the frontal flap to the orbital region. Observe whether vascular pedicle department and organization is under pressure or not. if pedicle pressure significantly, towards the direction of superficial temporal artery separate or, in the case of reservations branch of superficial temporal artery to reduce the pedicle soft tissue, be sure to make pedicle blood vessels and tissues without compression.

Since the flap through out of tunnel, make the flap and normal tissue around the wound sutured. And then placing VAC negative pressure drainage on the surface, pressure adjust about to 50mmHg. For donor site with same method to take medium thickness skin graft to cover, removed negative pressure after 7 days, flaps and skin grafts survived, shape is not bloated, and the overall appearance effect is good after surgery.

Results

This group of 16 cases, adopt the method for frontal flap repair, intraoperative analgesia effect is good, the operation time significantly shortened, less intraoperative bleeding. 7 days after demolition of negative pressure material, see flap and the forehead skin grafts all survived well. Postoperative follow-up of 3 months, see flap skin and normal skin of the face is similar, and overall appearance of the face effect is good.

Case for Example

A male patient, 83 years of age, because of the right eyelid malignant tumor five days after surgery and then admitted to our hospital. For five days ago, the patient found he right eyelid tumors and tumors burst four years , in our hospital of Ophthalmology surgical remove right eye and periorbital tissue. Postoperative form a size of about 6cm*7cm flaky skin and soft tissue defects, basal see cheekbones and nasal bone exposed. Postoperative pathology confirmed for right eye orbital basal cell carcinoma. After entering into our department check the various check did not see obvious operation taboo. Hence under tumescent anesthesia do the operation of the frontal branch of the frontal flap transfer + autologous skin graft + negative pressure drainage, intraoperative formed the flap about 8cm * 7cm in size. Because of the nasal bone and zygomatic bone exposed during operation, complete excision of the periosteum must be clean, exposing the healthy bone surface, and remove the edges of crisp necrotic tissue, exposing the healthy skin edge wound. Then the skin flap and the surrounding normal tissue were interrupted suture, the surface cover negative pressure drainage material. On the 7 day after the removal of negative pressure drainage material, the skin flap survived well, the overall appearance of the effect is good.

Discussion

At present, there is no exact clinical data reporting a method that is used to adopt tumescent technique to cutting the forehead with the frontal branch of the superficial temporal artery narrow pedicle flap tunnel repair of facial soft tissue defect after tumor resection. In particular, large areas of soft tissue defects caused by tumor of face and eyelids. The color and texture of frontal skin were similar to that of orbital skin, and the location of this skin was close to that of the skin, and the effect could be superior to other parts of skin flap.

For patients with advanced stage of cancer, cancerous tissue would invade orbit, near the side of the sinus and

orbit around. The lesions invaded could be large, so surgical resection of the lesion often results in large area skin and soft tissue defect. Therefore, soft tissue defect of orbit is needed to be repaired. The frontal skin flap was good, and the temporal artery and frontal branch were constant, and the variation was very few (Wehage et al. , 2011; Vaz et al. , 2013). And when cutting a part of skin flap with swelling method, the swelling liquid inject into the subcutaneous and superficial fascia makes the separation of pedicle tissue and tissue flap in a clearly level, and also will minimize the intraoperative damage of the flap and pedicle. At the same time, after the injection of swelling liquid can make local tissue swelling, solid, so that the oppression the blood vessels, reducing intraoperative bleeding. The adrenaline in the swelling fluid can make blood vessels contract, and also can reduce bleeding, while in the whole operation process, the patient consciousness is always in a state of awake, which obviously reduces the risk of the operation. The key of the operation is to inject the swelling fluid into the subcutaneous and fascia accurately.

Operation using tumescent anesthesia, considering the eyelid malignant tumor mostly elderly patients, more general underlying diseases, poor tolerance to the operation, so the selection of this method, on the one hand, can greatly reduce the risk of anesthesia, achieves the required for the operation of the analgesic effect of shorter operation time, and also reduce the amount of bleeding during operation. On postoperative wound covering negative pressure drainage materials, pressure adjustment is appropriate, on the one hand can reduce postoperative flap pedicle vascular pressure induced ischemic necrosis of the flap, and reduce the incidence of postoperative skin flap congestion. make the flap survival rate increased.

Attention should be paid when transfer of the forehead skin flap: *i)* When the pedicle was isolated, it was noted that the temporal artery and frontal branch were protected, and the width of the pedicle was controlled at about 2cm; *ii)* The length and width of the skin flap should be slightly wider than the length and width of the tissue defect; *iii)* The injection of the swelling fluid should be accurate injected into subcutaneously and deep fascia, make it obvious that it is easy to be separated from the pedicle and skin flap, reduce the influence of the blood flow and shorten the preparation time of the skin flap; *iv)* Negative pressure adjustment should be appropriate, not too high, but also not too low. if the pressure too high, it will impact of pedicle blood supply, if it too low , easy to cause hematoma formation, all can affect the skin flap survival.

The advantages and disadvantages of the operation should be mentioned. *i)* The blood vessels of the selected frontal skin flap are constant, the anatomic variation rate is low, and the blood supply of the flap is easy to be cut, and the blood supply of the flap is rich and easy to survive; *ii)* The operation was done in one time, the survival rate of the flaps was high, and the complications were few; *iii)* The color and texture of the skin of the forehead skin were similar to that of the orbital skin, and the postoperative effect was better than other parts of the skin flap, which can further improve the appearance of the skin; *iv)* Because the flap is large, forehead donor generally required skin grafting, so it may affect the appearance of the recent.

In conclusion, swelling anesthesia for superficial temporoparietal artery frontal branch of narrow pedicle flap to repair soft tissue defect after facial tumor resection is feasible during operation, and is linked with good analgesia effect, high postoperative survival rate of skin flap, and with good cosmetic effect.

References

Cong XG, Wang AG, Zhou KJ, et al (2003). Temporal shallow artery frontal flap of applied anatomy. *J Anatomy*, **26**, 85-6

Hurvize KA, Kobayashi M, Evans GR (2006). Current options in head and neck reconstruction. *Plast Reconstr Surg*, **118**, 122-33

Vaz JA, Cote DW, Harris JR, et al (2013). Outcomes of free flap reconstruction in the elderly. *Head Neck*, **35**, 884-8.

Wei Q (2009). Analysis of clinical application of tumescent anesthesia in orthopedic surgery under local anesthesia in operation. *Chin Medical Innovat*, **7**, 88-9.

Wang W (1999). Editor in chief, Plastic surgery. *Zhejiang Science Technology Press*, 938-9

Wehage IC, Fansa H (2011). Complex reconstruction in head and cancer surgery:decision making. *Head Neck*, **13**, 14.

Zhang PH, Hao XG, Luo SJ, et al (2010). Repair of facial tissue defect by using a full forehead flap of superficial temporal artery. *Chin J microsurgery*, **33**, 415-7

Zhou QG, He B (2007). Application of local swelling technique in cosmetic surgery. *Chin J Aesthet Med*, **11**, 1586-7

Zhu HX, GH He, Liu ZJ (1986). The micro cut of the forehead, parietal and temporal region vessels of flap. *J Anatomy*, **17**, 119-126