

A Simple Option Added for Reconstruction of Posterior Neck Defects

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Abstract

Background: Posterior neck defects are uncommon and are mainly caused by infections or tumors. Consequently, the reconstruction options are limited in the literature. They vary according to the size and type of the defect, and options range from grafts to free flaps. In this article, we present a series of cases where we used a transpositional locoregional flap as a simple and effective way for the coverage of posterior neck defects. **Materials and Methods:** In a series of 11 patients, we designed locoregional transpositional flaps unilaterally or bilaterally, according to the defect size. Dissection was carried on a subfascial plane. **Results:** All flaps survived without necrosis. We had two incidents of minimal wound gaping that healed without any intervention. **Conclusion:** In this series, we introduce a new option and its algorithm to reconstruct moderate-sized posterior neck defects using locoregional transpositional flaps, either unilaterally or bilaterally. It is simple, easy to conduct, and has a better color match and less complication rate than other options mentioned in the literature.

Keywords: Defects, flap, locoregional, posterior neck, transposition

INTRODUCTION

Posterior neck defects are uncommon. They can be a result of tumor resection, trauma, or infections that start as a carbuncle that extends to form big defects, abscesses, or even necrotizing fasciitis. Owing to the rarity of posterior neck defects, very limited options for its reconstruction are mentioned in the literature. Following our reconstruction ladder, management options vary from primary closure to free flaps depending on the size of the defect. Reconstruction with locoregional flaps has the advantages of better matching and lower donor site morbidity. We report a series of posterior neck defects that were reconstructed with locoregional transposition flaps as a safe and effective alternative way of managing such defects.

MATERIALS AND METHODS

A series of 11 patients underwent posterior neck reconstruction using either unilateral or bilateral locoregional transpositional flaps at the Department of

Plastic and Reconstructive Surgery in Hamad General Hospital. Our patients were all diabetic male workers, the average age was 45 years, the defects were a result of debridement of the area due to carbuncles or abscesses, and the mean defect size was 8.2×5 cm [Table 1].

Surgical technique

The flap described in this paper takes the blood supply from branches of posterior auricular and occipital arteries. It is a fasciocutaneous random flap, not based on a specifically named perforator. The flap was marked adjacent and almost perpendicular to the defect. Base to length ratio of the flap was 1:4 on average. The longest flap we designed was 13 cm, and it survived without any necrosis. A total of 1/100,000 adrenalin solution was infiltrated in the area to prevent excess bleeding of such highly vascularized

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Table 1: Patients demographics size and type of flap used and the post operative course of healing

Gender	Age (years)	Comorbidities	Size (cm)	Flap type	Postop course
M	37	DM	13×6	Bilateral flap	Mild gapping (6mm) at the two flaps' meeting points healed secondarily
M	43	DM	7.5×5	Unilateral flap	Smooth
M	56	DM/HTN	7×4	Unilateral flap	Smooth
M	44	DM/HTN	9×5	Unilateral flap	Smooth
M	42	DM	7.5×5.5	Unilateral flap	Smooth
M	39	DM	9×4.5	Bilateral flaps	Smooth
M	35	DM	8.5×4.5	Unilateral flap	Smooth
M	54	DM/HTN	6.5×4	Unilateral flap	Mild gapping at the tip healed secondarily
M	51	DM	7×4	Unilateral flap	Smooth
M	48	DM	7.5×5	Unilateral flap	Smooth
M	46	DM/HTN	7×5	Unilateral flap	Smooth

M = male, DM = diabetes mellitus, HTN = hypertension

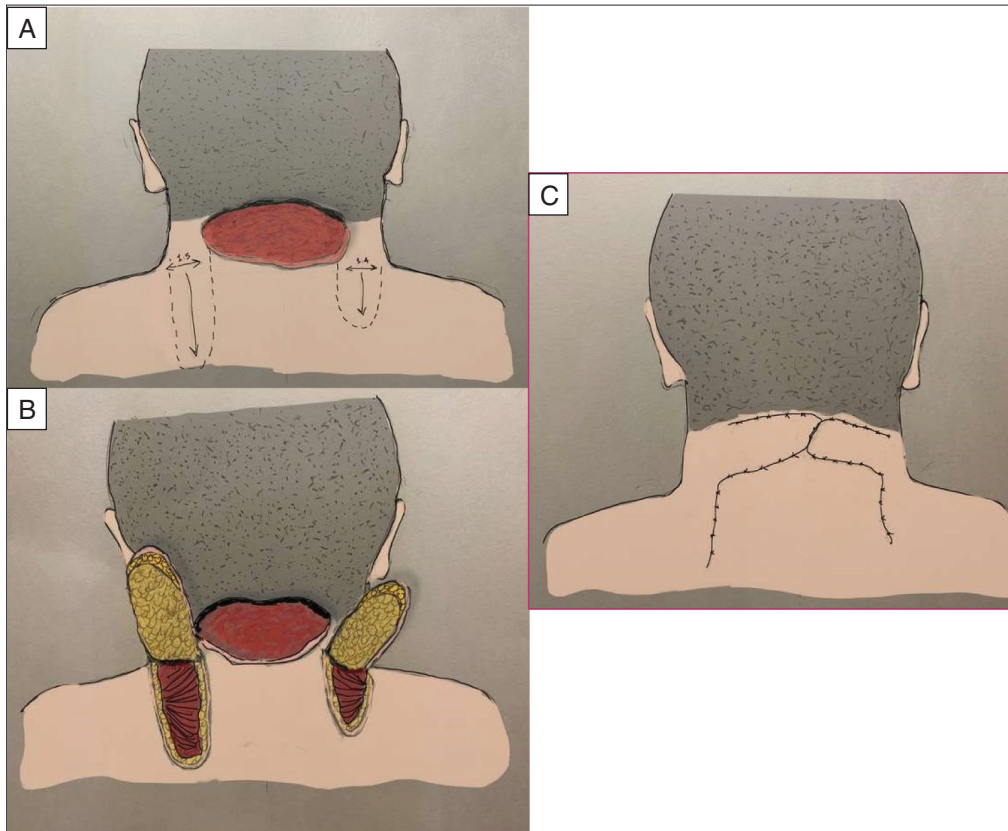


Figure 1: Diagram presenting the elevation of bilateral locoregional transpositional flaps in a subfascial plane to cover the posterior neck defect

region. Using a 15 blade, the incision was made along the markings reaching the subcutaneous tissue. After that, dissection was made using tenotomy scissor along the edges down to the fascia. Hemostasis was secured with bipolar. Fascia was incised on the distal end, and elevation of the flap on a subfascial plane was carried on from distal to proximal ends. The elevation ended at a point where we could easily transpose the flap to the defect. Reaching the base of the flap was not obligatory so as to preserve the maximum number of blood vessels supplying it. The arc of motion was 90°–100°. According to the defect, we tailored the flap design, the choice of using bilateral versus

unilateral flap [Figures 1-3], and the arrangement of the flaps. For example, if the defect's length exceeded its width, we would arrange flaps that kiss each other, and if the width exceeded the length, they would be above each other. Two minovac drains were inserted in the donor area, and it was closed primarily. All wounds were closed in two layers using subcutaneous 2-0 vicryl sutures and 4-0 Ethilon simple suturing for the skin. Noncompressive dressing was applied, and it was changed on the second postoperative day. Drains were removed when they had less than 5 mL output over 24h, and the patients were discharged home and followed in the outpatient clinic.



Figure 2: A case of posterior neck defect after debridement reconstructed with bilateral locoregional transpositional flaps. (A) Preop, (B) 1 day postop, and (C) 3 months postop

RESULTS

All flaps survived without any necrosis. In two cases, there was minimal gapping that resolved without any intervention, one of which was at the point where the distal end of the flap met the defect's edge. Drains were removed when their output was less than 5 mL of serosanguineous fluid; they were in place for 2 days on average. Complete healing of the wounds took approximately 2 weeks. No infections were encountered in any of the cases. The patients were followed in the clinic for a period of 3 months after which they were discharged. No scale was used to determine the cosmetic outcomes, but all patients reported satisfactory results.

DISCUSSION

Raw areas in the posterior neck are rare. The thick and nonpliable skin of the region makes simple closure without tension difficult, and reconstruction options are limited in the literature.^[1] Grafts can only be used to cover the defect if it was small and superficial, and it has the drawbacks of color mismatch and contour defects due to the natural thickness of the posterior neck skin; therefore, a thin graft would look unappealing and leave a depressed zone. Moreover, using big grafts may lead to contractures and limited movement, two complications that would also be encountered if the defects were primarily closed under tension.

Locoregional flaps that are reported to cover posterior neck raw areas include pedicled trapezius, supraclavicular,

latissimus dorsi, and pectoralis major flaps.^[1-3] The latissimus dorsi flap needs extensive mobility, and it may not be able to reach the upper posterior neck region.^[4] The myocutaneous trapezius flap can be raised as superior, lateral island, vertical, or lower island flap. It is easier to harvest, and its blood supply is based on the descending branch of the transverse cervical vessels. It has a large arc for rotation and is more pliable than the latissimus dorsi flap.^[5-7] Free-style fasciocutaneous perforator flaps can be used to cover posterior neck defects based on the transverse cervical artery. They can be used as advancement or propeller flaps, and these techniques need accurate planning and advanced skills.^[8,9]

El-Khatib described the use of a large bilobed flap based on the perforators that traverse the trapezius, originating from the posterior intercostal arteries, to cover defects that were caused by necrotizing fasciitis on the posterior neck, which averaged 11 × 8 cm in size.^[10] Free flaps are also reported to be used. In a series of six patients, Yanko-Arzi *et al.* described their experience in using free flaps for the reconstruction of the posterior neck defects that were mainly caused by tumors. They used anterolateral thigh and deep inferior epigastric artery flaps with the recipient vessels being the transverse cervical artery and vein. No failure was reported.^[1] Free flaps have the drawbacks of long operating time, which requires specialized teams and equipment, and have a higher rate of complications than locoregional flaps; however, their use is preferred when there are large defects reaching and exposing the spine.



Figure 3: A case of posterior neck defect after debridement reconstructed with unilateral locoregional transpositional flap. (A) Preop, (B) 1 day postop, and (C) 1 month postop

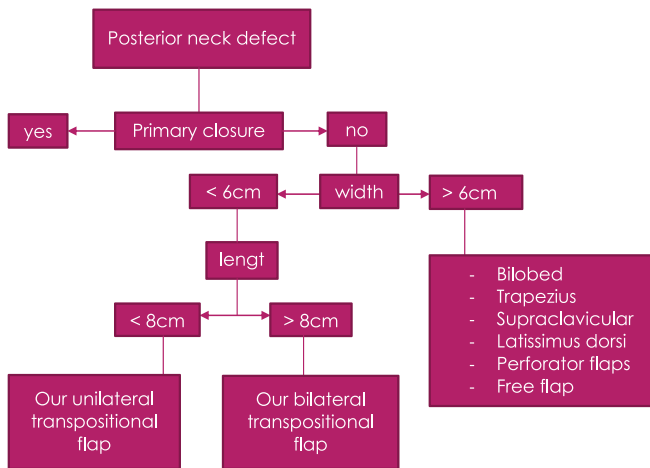


Figure 4: Algorithm demonstrating how to manage posterior neck defects

In our series, we explored a new technique to reconstruct posterior neck defects. Our random locoregional flaps can be designed either unilaterally or bilaterally where the bases of the flaps are at the sides of the defect and the distal parts extend down to the back. Our base to length ratio can reach 1:4, and the longest flap we designed was 13 cm long. Dissection was carried out at the subfascial plane to ensure maximum blood supply. Locoregional flaps have better cosmetic results than skin grafts, and better matching and lower complication rate than free flaps. Our flaps had no donor or recipient sites morbidity in comparison to the commonly used trapezius flap, which has around 20% complication rate.^[11]

This technique has the advantage of best color and contour match, but it cannot be used for large-sized defects for which free flaps remain the only choice for reconstruction.

We believe that this method could provide coverage for up to a 14×6 cm big defect. In some cases, we opted for flap coverage despite being able to close primarily to provide more mobility to the neck by adding good quality tissue to the area. We closed the donor sites primarily in all cases, which resulted in acceptable scars. Bilateral flaps can be arranged at the recipient bed according to the defect length and width.

Based on this series, we developed a simple algorithm that can ease the choice of proper management according to the size of the defect. First, it is advisable to do a pinch test to check if the defect can be closed primarily. If primary closure is not possible, then the size of the defect should be measured. At first, the width should be taken into consideration; if it is more than 6 cm, then the flap described in the series will not be sufficient to cover the defect and another reconstruction option should be chosen. If the width is less than 7 cm, the defect's length should be measured to decide on unilateral or bilateral flap coverage. If the length is less than 8 cm, unilateral flap would be enough to cover the defect, and if it is more than 8 cm, then bilateral flaps must be raised [Figure 4].

In conclusion, posterior neck defects are rare and their reconstruction options are limited. For moderate sized defects, coverage with locoregional flaps would be the best option because it has better cosmetic results than a skin graft, and less morbidity and better match than free flaps. With this study, we aim to introduce a newly designed technique and its algorithm using locoregional flaps that are simple, easy to raise, and have low morbidity rates for donor and recipient sites, to be added as an option for posterior neck reconstruction.

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Conflicts of interest

There are no conflicts of interest.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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