Total reconstruction of giant congenital circumferential nevi of the upper limb using a large pedicle expanded flank flap: A brief report

J-P Ding*, B Chen*, L Fang, L-Z Wang

Plastic Surgery Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, PR China

*Contributed equally

ABSTRACT

Tissue expansion is an invaluable reconstructive strategy after surgical excision of a congenital naevus. However, reducing the number of operations is very important for patients with a giant congenital naevus. We used a large pedicle expanded flank flap to successfully treat a giant circumferential naevus that extended from the left upper arm to the wrist, which also provided excellent contour and colour match. We consider this an effective and convenient method to treat a circumferential naevus covering almost the entire upper limb of the paediatric patient.

KEYWORDS

Giant congenital circumferential naevus – Tissue expansion – Pedicle flank flap

Accepted 31 January 2016

CORRESPONDENCE TO

Lian-Zhao Wang, E: zhengxingyiyuan@126.com

The choice of reconstructive strategy after surgical excision of congenital naevus depends on the size of the lesion. Tissue expansion has emerged as an invaluable treatment for many congenital naevus and acquired defects in a wide range of diseases.^{1,2} Here, we present a case of giant circumferential naevus that extended from the left upper arm to the wrist, which was treated with a large pedicle expanded flank flap.

Case presentation

A four-year-old boy presented with congenital circumferential pigmented naevus of the left upper limb approximately 27cm long and 15cm at the widest perimeter. For this large circumferential lesion, expansion of the flank flap was necessary.

The optimal locations for expander insertion, in which the patient felt comfortable, were identified by placing the left upper limb against the flank and abdominal wall. To obtain an extensive pedicle flank flap, two 400 cc inflatable oval expanders were placed subcutaneously by crossing the axillary line obliquely (Figure 1A–B). After 16 weeks, the two expanders had extended from the axilla to the groin and sufficient skin was available.

Expander removal was performed before the naevus excision. The inlet and outlet incisions into the pocket were made, allowing the upper limb to be covered by the expanded pocket without any tension. The naevus was then excised

completely. After inseting the flap, several large nylon sutures were tied over three large-caliber silicone tubes between the limbs and the visceral capsule of the expanded cavity to constrict the pedicle (Figure 1C). Two negative pressure drains were placed for 5 days in the capsule to ensure the attachment of the pedicle flap. After 21 days, the silicone tubes were removed and the pedicle was cut off. The donor site was closed primarily. After 6 months, the colour and contour match were excellent (Figure 1D).

All procedures were approved by the ethics committee of Peking Union Medical College, and the study was conducted in compliance with the Declaration of Helsinki.

Discussion

A giant congenital naevus of the upper extremity was reconstructed by Lui et al using repeated and staged expanded flaps.³ Although the final goals were achieved, the child had to go through multiple staged operations that left him with many unpleasant scars. Based on their experience of treating a large number of patients, Margulis et al proposed an algorithm for the surgical reconstruction each region of a giant congenital naevus of the upper extremity.⁴ For cases such as ours, however, it is not possible to achieve satisfactory results in terms of the timing of surgery (early to minimise the risk of malignant change) and the best possible cosmetic outcomes when using traditional methods.

Figure 1A–D A 4-year old boy presented with congenital circumferential pigmented naevus of the left upper limb. **(A)** Two expanders were placed by oblique in anterior view. **(B)** The top expander was placed across the midaxillary line in dorsal view. **(C)** A large pedicle expanded flank flap was transferred to reconstruct the wound after naevus removal. **(D)** At 6-month follow-up, the naevus was completely removed, and left upper extremity had good contour and colour and normal function.

In this regard, our goals were directed at reducing the number of the operations and medical expense, and at eliminating contour and colour defects. We believe that the good skin elasticity and expansibility of the longitudinal flank tissue during childhood are beneficial for tissue expansion. It should be borne in mind, however, that the inflation speed of the top expander should initially be slower than that of the bottom one; otherwise, the two expanders cannot be expanded effectively.

Several technical tips have been suggested to improve the reconstructive effect. First, the two expanders should be

placed separately in two cavities to avoid them shifting due to gravity. Second, the top expander should be placed across the midaxillary line so as not to pull the left nipple. This design is beneficial not only for making full use of the pedicle expanded flank flap but also for placing the extremity in the most comfortable position. If it is accomplished, the child can tolerate the immobilisation period well and postoperative complications such as hematoma and poor wound healing will be prevented. Third, using silicone tubes to narrow the base of the expanded pocket can enable the large surface area of the forearm to make full contact with the pedicle expanded flank flap, which can otherwise gradually induce delays through deprivation of the blood supply from the base of the flap and produce ‘external expansion’ of the skin. Careful hemostasis, correctly separated layers, thorough suturing and reliable bandaging are also not to be overlooked. Moreover, such an operation may affect the shape of the breast/breast development.

Conclusions

For congenital giant naevus in children, it is important to craft the reconstruction to achieve good functional and aesthetic outcome and minimise pain. It is an effective and reliable method for transferring a large pedicle expanded flank flap to reconstruct the lesion after removal of a giant circumferential naevus covering almost the entire upper limb of the paediatric patient. With the development of tissue expansion surgery, the risk of complications such as hematoma, infection and expander exposure are relatively reduced.

References

1. Arneja JS, Gosain AK. Giant congenital melanocytic nevi of the trunk and an algorithm for treatment. *J Craniofac Surg* 2005; **16**: 886–893.
2. Corcoran J, Bauer BS. Management of large melanocytic nevi in the extremities. *J Craniofac Surg* 2005; **16**: 877–885.
3. Liu Y, Huang J, Wen K *et al*. Treatment of giant congenital melanocytic nevus of the left upper extremity with staged expanded flap. *J Plast Reconstr Aesthet Surg* 2012; **65**: 258–263.
4. Margulis A, Bauer BS, Fine NA. Large and giant congenital pigmented nevi of the upper extremity: an algorithm to surgical management. *Ann Plast Surg* 2004; **52**: 158–167.