

Alopecia secondary to repaired occipital encephalocele - role of tissue expander in hair restoration

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SUMMARY

Partial scalp alopecia is a common problem that can lead to severe social and psychological problems. Tissue expansion, although an old concept, provides a surgical alternative to manage areas of alopecia. We describe a case of alopecia secondary to repaired occipital encephalocele that was successfully treated using tissue expansion technique.

INTRODUCTION

Hair loss can cause undesirable consequences on the professional, personal, and sexual aspects of life. Hair restoration procedures help to overcome these negative psychological effects.¹ Besides hair transplantation and various local scalp flaps, there is another surgical technique to manage baldness namely alopecia reduction with or without tissue expander. The first clinical experience with tissue expansion was by Neumann in 1957 and since then has undergone many advances. Tissue expanders are balloons of various shapes made of silicone. It is inserted beneath the skin through surgical incision and gradually filled with saline through a valve system throughout weeks or months. The expansion process enables the skin to lengthen through mechanisms known as mechanical creep; stretching the collagen fibres and biological creep; stimulating new tissue growth, thus, provides the hair-bearing skin after excision of the scarred area.²

Encephalocele is a form of neural tube defect and is categorized as secondary cicatricial alopecia.³ To our knowledge, this is the first reported case of an adult with alopecia secondary to repaired occipital encephalocele which was successfully treated using tissue expander.

CASE REPORT

A 35-year-old man presented with a patch of baldness over occipital scalp since childhood, requesting hair restoration over the area. He had a surgery during childhood to remove a lump over the scalp and recovered well since. He had no neurological deficit and no symptoms of increased intracranial pressure. There was no family history of similar illness.

Clinically, he was a medium built man and there were no signs of increased intracranial pressure. There was midline, 5 X 5.5 cm area of alopecia at the occipital scalp. The scar

was firm and not pliable with contour irregularity. Computed tomography of the brain revealed a midline occipital skull defect (0.9 X 2.0 cm), bounded by meningeal layer with minimal protrusion of cerebrospinal fluid (CSF) through the defect. There was no brain protrusion. These were the features of Dandy-Walker malformation (figure 1A and 1B).

He was counselled on tissue expander insertion. Bi-occipital crescentic tissue expanders (11.4 [L] x 6.2 [W] x 6.5 [H] cm) with internal port were placed at sub-galeal plane surrounding the defect (figure 1C and 1D). No galeal scoring was performed prior insertion of tissue expander. Immediate expander inflation was done to the right (40 cc) and left (110 cc) expander post scalp closure (figure 2A).

Serial expansions were performed once per week as outpatient basis, ranging from 20 to 50 cc. He only complained of discomfort during expansion process, otherwise tolerated the procedure well. However, there was minimal extrusion of left expander through the previous skin incision which occurred at 6th week post tissue expander insertion (figure 2B). However, there was no evidence of local infection and decision for scalp closure was made within 2 weeks with antibiotic (Augmentin) coverage. The total fluid accumulated was 200 cc and 250 cc in the left and right tissue expander respectively.

Removal of the expanders, excision of scar tissue and primary closure with bilateral advancement of scalp tissue was performed after two months. Intraoperatively, there was minimal protrusion of meningeal layer bounded by thick skin, thus no manipulation was done to the meninges. The scalp was closed vertically in layers. Six months after the operation, the wound healed well with fine scar covered with hair (figure 2C and 2D).

DISCUSSION

Alopecia especially the cicatricial type brings about significant disfigurement, whereby it is difficult to conceal and causes various sequelae including physical and psychological problems. The primary goal of reconstruction for this type of alopecia is to recreate the natural hair-bearing appearance on the reconstructed scalp.⁴

Encephaloceles are rare neural tube defects resulted from failure of normal midline fusion of the cranial neural tube. It produces a skull defect, which allows herniation of the

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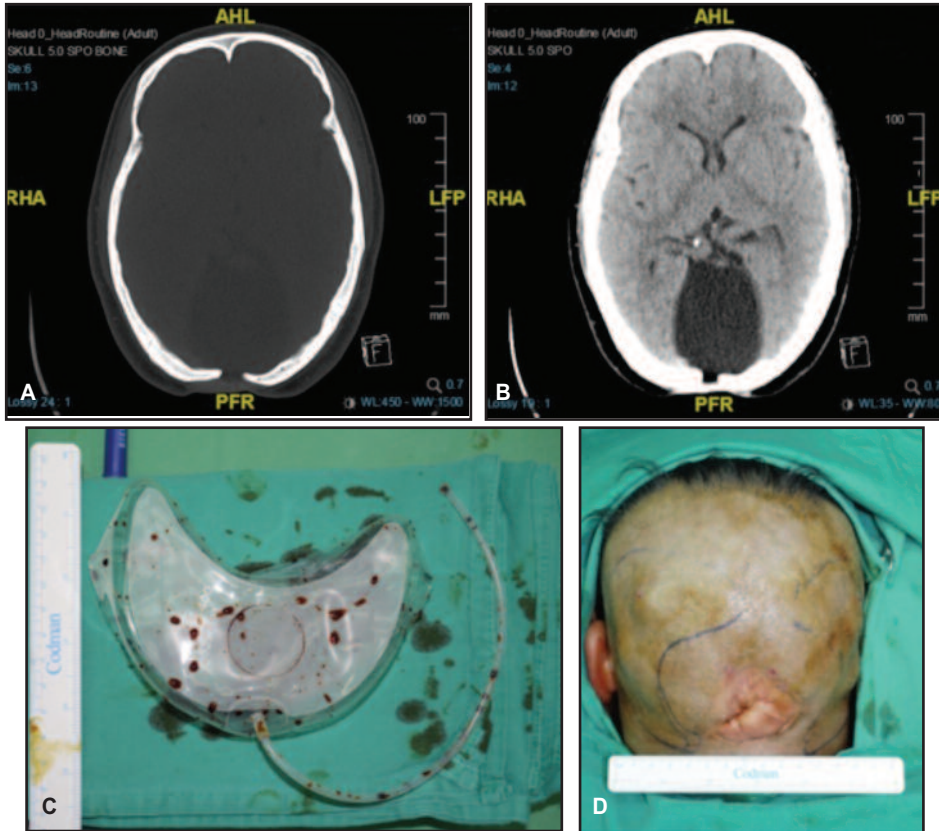


Fig. 1: CT scan images of bone (A) and soft tissue (B) windows. One of the crescentic tissue expander with external port, soaked in povidone iodine (C). Posterior view of occipital scalp defect with marking prior to tissue expanders insertion (D).

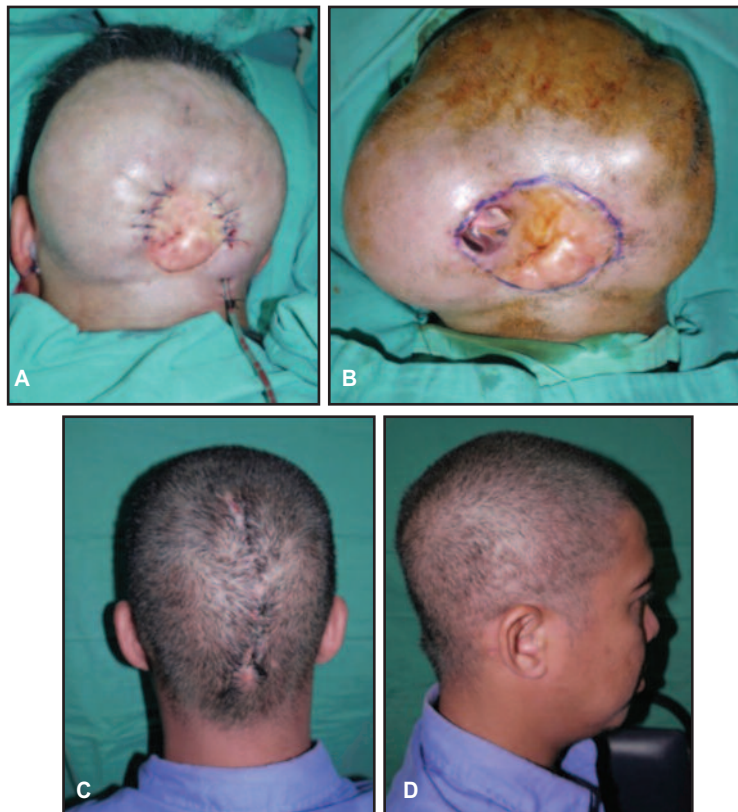


Fig. 2: Post insertion and immediate inflation of tissue expanders (A). Left tissue expander extrusion secondary to wound dehiscence at 6 weeks post insertion (B). Satisfactory result post removal of tissue expanders, excision of scar tissue and primary closure of scalp (C)(D).

meninges (meningocele) or brain tissue (encephalocele) and is associated with various abnormalities.⁵ The protruded encephalocele may contain normal brain or fibrous atrophic gliotic tissue which occasionally has diminutive function.⁵ In this case, the patient has already underwent an operation during childhood. Specific type of operation was unable to be determined as both of his parents have passed away thus no further history could be obtained and no record pertaining to the previous procedure was able to be retrieved.

Surgical management of occipital encephalocele hinges upon the type of neural tissue that is protruding beyond the skull. If it composes of gliotic tissues, the mass can be excised in level with the skull. If the mass contains normal brain tissue, efforts should be made to preserve it.⁵ Once the neurological matter has been addressed and taken into account, only then the cosmetic issue is entertained.

Surgical hair restoration can be classified into hair transplantation, various scalp flaps and alopecia reductions (with combination of scalp extension or tissue expansion).² Excision of bald scalp has undertaken significant changes over the years. Scalp reduction or alopecia reduction termed as excision an area of alopecia. It is used for male pattern hair loss and cicatricial alopecia.²

The extent of alopecia that can be excised is restricted by amount of creep (stretching) and surgical undermining, obtained perioperatively.² Even though the area of alopecia was small (less than 50 cm²)⁴ in this patient but the quality of the scar tissue was poor. The fibrotic tissue is not an optimal ground for hair grafting due to unpredictability of the blood supply. Moreover, the meningeal layer was immediately underneath the scar and was in direct contact with the scalp through the skull defect. Thus, alopecia reduction with serial excision is not a likely option in order to avoid unnecessary injury to the meningeal layer.

Alopecia reduction with prior tissue expansion (volumetric) serves as the first choice in this case as it provides abundant hair-bearing scalp to the alopecic region with minimal donor site morbidity after the scar excision without an appreciable change in hair density. However it does have the disadvantage of requiring multiple hospital visits and the accompanying "bubble-head" appearance with the total period of expansion approaching 6 to 12 weeks before the final surgery.²

Scalp flap is an option whenever patient couldn't afford the tissue expander in which the tissue is rotated around a pivot point to cover the occipital defect but potential complications include wide donor scarring and partial or complete necrosis of the flap.⁴

In this patient, the alopecia was a circular fibrotic area and adjacent to meningeal layer. However, it had clear plane for dissection. Two crescentic expanders were inserted through a vertical incision at the edge of the defect, underneath the galea. Crescentic expander was chosen as the expansion mostly occurs over the central portion of the expander and will result in shorter defects with minimal dog ears.

The shortcoming of using expanders is the substantial cosmetic deformity prior to definitive closure.² Nevertheless, the deformity was not obvious because of the posterior location and is easily hidden under a cap or beanie. Pain and discomfort during the expansion process was the most common complication especially in the later stages of expansion.²

Unfortunately, this patient experienced wound dehiscence resulting with left tissue expander protrusion. This might be due to the larger initial volume as compared to the right expander. The decision to expedite scalp closure while patient was on antibiotic prophylaxis was to prevent local infection that might complicate closure later.

Other usual recognised complications include infection, hematoma, seroma, expander rupture, necrosis of flap tip and scar necrosis at injection port.⁴ Generally, all the complications were effectively treated with a satisfactory therapeutic result.

CONCLUSION

Tissue expansion is a simple and safer technique to effectively treat cicatricial alopecia and should be used as primary procedure in patients with scalp defects.

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