

Technical Note

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Elevation of Depressed Skull Fracture with a Cup of Breast Pump and a Suction Generator : A Case Report in Technical Aspects

Surgical elevation of the depressed bone is known to be the conventional treatment usually recommended for a simple depressed skull fracture in the adult or pediatric age. The authors introduce, however, a case of depressed skull fracture in an infant which was elevated by means of a cup of breast pump and a suction generator without surgical elevation. In our case, without surgery, a 'cup-shaped' depressed skull fracture in an infant was safely elevated with no neurological signs. This method is considered a simple, effective, safe, and alternative procedure in an infant with simple depressed skull fracture.

KEY WORDS : Skull fracture · Depressed fracture · Infant · Breast pump · Suction generator.

INTRODUCTION

Many cases of depressed skull fractures have been described as "ping-pong ball" fractures in new bones and infants^{2,11}. Similar to the "greenstick fractures" of the long bones in children, the depressed skull fractures usually have the localized depressions of the skull without the loss of bone continuity^{4,11}. Depressed skull fractures in newborns are caused mainly by the compression of the head against the sacral prominences during labor, and in the cases of infants, they are caused primarily by the head trauma⁷. Operative interventions have been recommended for simple depressed skull fractures for the following reasons : cosmetic results, possible underlying pathological features, the prevention of seizures, and the improvement of focal neurological signs^{2,3,9}. However, nonsurgical modalities, including digital pressure, the use of a breast pump, and the use of an obstetrical vacuum extractor, have been successfully used in the treatment of several reported cases^{1,4,14}.

The authors report a case of depressed skull fracture elevated by means of a cup of breast pump and a suction generator. We introduce the method that was used successfully in our case with a brief review of nonsurgical modalities for depressed skull fractures in infants.

CASE REPORT

A 3-month-old baby boy presented with irritability caused

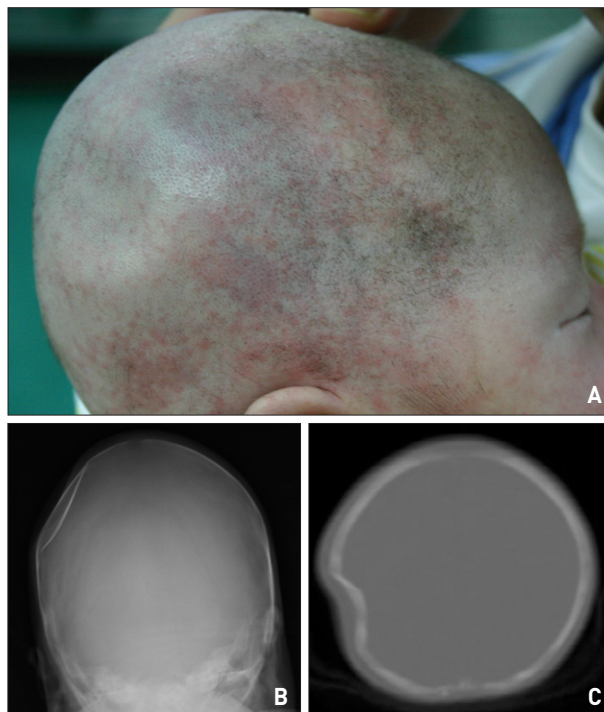


Fig. 1. Photograph (A), plain skull Town's view (B) and computed tomography (CT) scan (C) showing a depressed skull fracture in the right parietal region.

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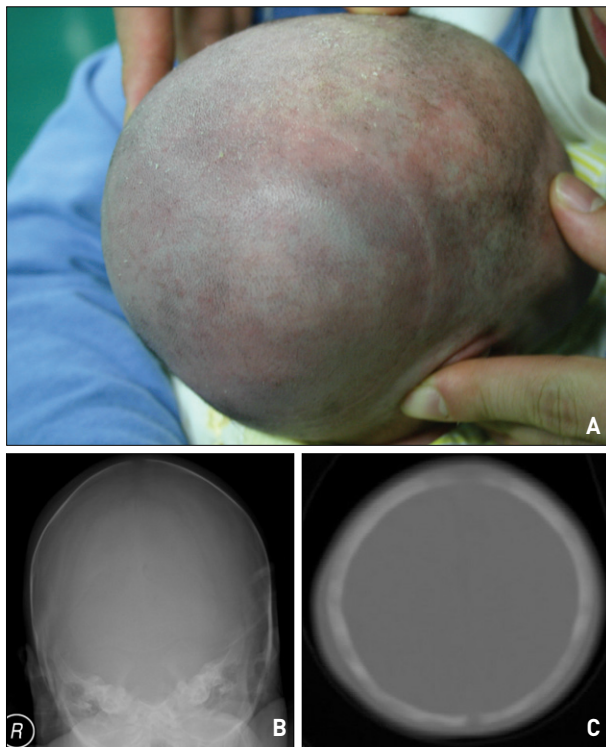


Fig. 2. Photograph (A), Town's view (B) and computed tomography (CT) scan (C) showing a complete reduction of the depressed skull bone after non surgical elevation.

by a traffic accident in a car. At the moment of the accident, his mother unintentionally dropped him from her bosom. The infant was admitted within 30 minutes of the accident. On examination, he had no altered consciousness but was crying with irritability. His pupils were of equal size and reacted to light. All his extremities moved actively. There were no other neurological abnormalities. We immediately noted a depression in the left parietal region of his scalp. The depression was visible and palpable (Fig. 1A).

The Town's view and brain computed tomography (CT) scans of the skull with the bone setting showed marked depressions of the right parietal area of the skull (Fig. 1B, C). The depressed skull fracture was elevated by means of a cup of breast pump and a suction generator without surgical procedures. The depressed scalp was puffed back to normal position with mild scalp swelling (Fig. 2A). Radiographs and brain CT scans taken immediately after the procedure demonstrated a complete elevation of the depressed fracture (Fig. 2B, C). After release of the pressure and removal of the cup, a circular patch of edema was observed. However, the scalp swelling disappeared within a day, revealing a normal head contour. He was observed in the hospital for a week, but there were no specific findings suggesting the presence of developing intracranial lesions on neurologic examination and follow-up CT scans.

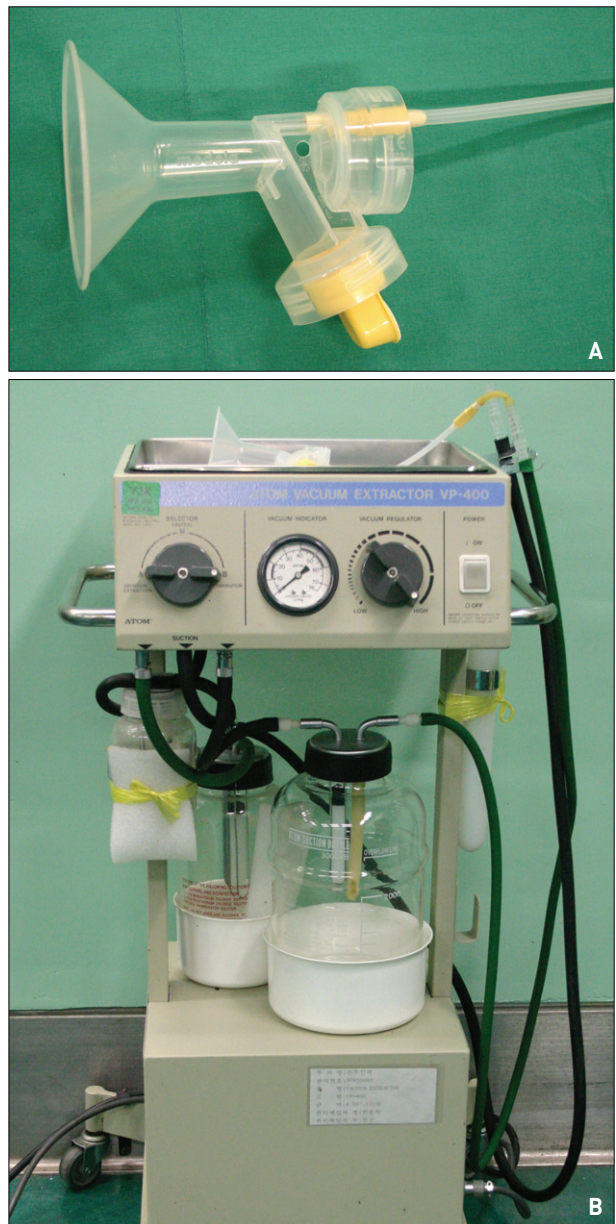


Fig. 3. Photographs showing a cup of breast pump (A) and a suction generator (B).

Technical Note

The cup of breast pump was originally made for pumping breast milk (Fig. 3A). The suction generator has been primarily utilized to suck all kinds of fluids at the operating room, intensive care unit, and emergency department (Fig. 3B). The cup of breast pump (5 cm in diameter) is placed over the depressed region after gel is applied to the margin of the depression for obtaining the airtight seal between the scalp and the cup of breast pump. Breast cup is connected to a suction generator. A negative pressure of 100 mmHg is maintained for 10 seconds. The method is performed repeatedly while observing the scalp swelling and skull contour.

DISCUSSION

Depressed skull fractures may not only interrupt the growth and function of the brain but also give rise to an epileptogenic focus or other signs of dysfunction^{4,14}. Therefore, early treatment is needed. The surgical elevation of depressed bone fragments is the standard treatment of depressed skull fractures in cases where the depression involves the full thickness of the normal adjacent skull¹. Also, indications for surgical treatment include parental desire for cosmetic correction and any definite evidence of dural penetration^{3,8}. It is necessary to make a burrhole in the normal bone at the margin of the depressed bone and to elevate the depressed bone under local or general anesthesia.

In recent years, a nonsurgical technique in which a breast pump or vacuum suction is used has been successful as illustrated by our case^{2,4,9,13}. Several investigators have suggested that surgical treatment is not obligatory in depressed skull fractures. De Paul Djientcheu et al¹ reported successful results in nine cases of 'cup-shaped' depressed skull fractures that were elevated using an obstetrical vacuum extractor. Hung et al⁴ have also stated that vacuum extraction is another treatment option for larger and deeper depressions to attain prompt recovery from a defect at the acute stage without additional risks. Steinbok Paul et al¹⁴ have advocated that there is no difference in treatment outcomes between surgically and nonsurgically treated patients with simple depressed fractures, and that the standard treatment of simple depressed skull fractures in the pediatric age group without any definite evidence of dural penetration should not include surgery. There have been a few reports on spontaneous reduction without any surgical and nonsurgical elevation^{6,7,8,10}. The advantage of nonsurgical elevation is simplicity, effectiveness and safety. Also, it can avoid complications due to following anesthesia and craniotomy or burrhole craniectomy. Resultant scalp edema is only temporary. The oldest reported case of successful nonsurgical elevation is of a 17-year-old girl¹. However, we failed nonsurgical elevation of simple depressed skull fracture in a 6-year-old boy.

The authors have successfully elevated a depressed skull fracture using a cup of breast pump and a suction generator

without surgical elevation. Information on the pressure level and suction time of the surgical equipment will be a great help to the operators.

CONCLUSION

The elevation of simple depressed skull fractures using a cup of breast pump and a suction generator may be a simple, effective, and satisfactory method for the treatment of pediatric patients. This treatment option should be attempted before other operative interventions are considered.

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