

# Minicraniotomy for endoscopic third ventriculostomy in babes: technical note with a 7-year-segment analysis

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## Abstract

**Introduction** An alternative approach to the burr hole technique for endoscopic third ventriculostomy (ETV) in babes, the minicraniotomy, is described. It is easily performed and allows to close the dura mater and restore the bone integrity. Since 2002, it is the approach to ETV in babes with open fontanel in our service.

**Results** Analyzing 41 surgeries, the technique did not interfere with the safety and efficacy of the procedure. No cerebrospinal fluid leak occurred. The minicraniotomy seems to be appropriate and advantageous to that age.

**Keywords** Endoscopic third ventriculostomy · Hydrocephalus · Minicraniotomy

## Introduction

Endoscopic third ventriculostomy (ETV) is a well-accepted technique to treat obstructive hydrocephalus and is actually used all around the world. The usual approach consists of a linear skin incision in the right frontal region, followed by a burr hole around the coronal suture, exposing the dura mater. After cauterization, the dura is open. The cerebral cortex is also cauterized, allowing the neuroendoscope introduction. At the end of the endoscopic procedure, the dura is left open, as well as the cranium. The subcutaneous tissue and the skin are closed [2, 5, 8, 10].

The cerebrospinal fluid (CSF) leak is an uncommon complication in the adult population but is a preoccupation

for pediatric neurosurgeons that underwent the procedure, specially in babes with large ventricles and macrocephaly [1, 4, 11, 12]. Otherwise, family discomfort after the surgery is not uncommon as they could see the pulsing hole in the frontal region of the babe.

We developed an alternative approach technique for those children. A minicraniotomy could be easily done, correctly closing the dura mater, restoring the bone integrity, and avoiding the burr hole [6].

## Technique

The indications are the procedure done in babes in the first 24 months of life with open anterior fontanel. The child is positioned in a *supine* position, the shoulders elevated and the head in a light extension. The limits of the anterior fontanel are defined. An elliptical incision is done in the middle way between the edges of the frontal and parietal bones, beginning from the midline and extending for 4 or 5 cm, usually in the right side (Fig. 1). The fontanel and the lateral edge of the frontal bone are exposed. With a Penfield dissector, the inferior surface of the bone is left free (Fig. 2). With the aid of a sharp toll, an osteoplastic minicraniotomy is done (Fig. 3), leaving the lateral pedicle attached in its lateral aspect and held by a minihook.

Under direct vision and avoiding the sagittal sinus and dural veins, a straight dural incision is done. Cauterization is not used to avoid retractions and to allow the closure. The endoscopic procedure continues in a standard way. After the neuroendoscopic withdraw, the dura is closed with nonabsorbable sutures (Fig. 4). Fibrine glue could be used over the suture. The osteoplastic flap returns to its place, attached with the pericranium aid (Fig. 5). The skin is closed in a conventional way.

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