

## Complications of the Mayfield Skull Clamp

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Fixation of the skull in the sitting position can be difficult. Gardner<sup>1</sup> designed a headholder and surgical chair for this purpose. Today, various modifications of the Gardner headholder (e.g., Mayfield skull clamp) exist, and all include three pins to hold the skull in a fixed position (fig. 1). We report a case showing a potentially dangerous complication associated with the use of this type of pinpoint headholder.

## REPORT OF A CASE

A 10-year-old girl was referred because of progressive headaches, vomiting, and a minimal leftsided hemiparesis. Computed tomography (CT) scanning showed a large lesion in the right fronto-temporal region for which a craniotomy was scheduled.

After induction of anesthesia with fentanyl, pancuronium, and thiopental iv and intubation of the trachea, anesthesia was maintained with 60% nitrous oxide in oxygen. Increments of fentanyl and pancuronium were administered iv when needed. Radial artery and central venous catheters were inserted, and the head was fixed in the Mayfield skull clamp with child-size pins. The single pin was placed in the right parieto-occipital skull region.

Intraoperative diagnosis revealed a glioma, and a frontal lobe resection was performed. Surgery and immediate postoperative recovery were uneventful.

Ten days after surgery, during her stay in the hospital awaiting irradiation therapy and after discontinuing corticosteroid therapy, there was a recurrence of headaches and vomiting. CT scanning (fig. 2) showed an epidural hematoma in the right parieto-occipital region, remote from the initial craniotomy boundaries. Subsequent explorative surgery revealed a minor impression fracture of the skull under the place of one of the pins of the Mayfield skull clamp. By means of a small craniotomy, the hematoma under the skull lesion was evacuated. The child remains in good general condition 4 weeks postoperatively.

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## DISCUSSION

Venous air embolism is a well-recognized dangerous complication of neurosurgical procedures, performed in patients in the (semi) sitting position.<sup>2-4</sup> The wounds of pintype headholders are reported to be the source of air entry, remote from the operative field.<sup>5-7</sup> We describe another type of a potentially dangerous complication remote from the operative field: an epidural hematoma due to the Mayfield skull clamp.

Our case demonstrated an impression fracture due to the Mayfield skull clamp. Such fractures would occur especially in children either having long-standing increased intracranial pressure or hydrocephalus.<sup>5,8</sup> This may cause a thin skull, vulnerable to penetration of the pins. One thus should, especially in children, be aware of the possibility of an epidural hematoma at a craniotomy using the Mayfield skull clamp.

To avoid the complications of this type of headholder (air embolism and compression fracture), we recommend the following steps: 1) avoid the pintype headholder whenever possible; 2) place the pins of the headholder with gentle care and at places where no major vessels

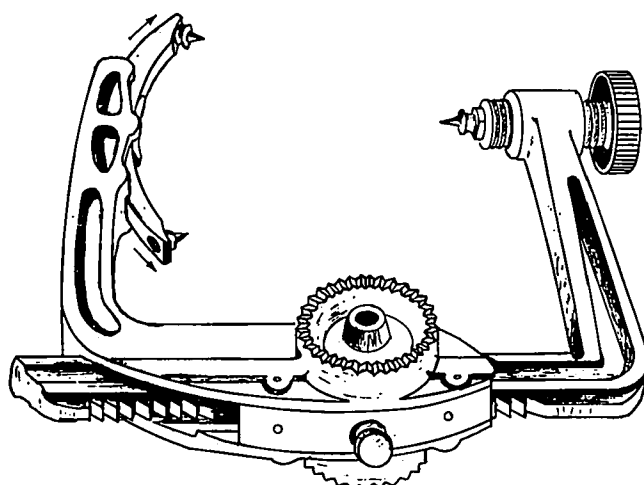


FIG. 1. The Mayfield skull clamp (Reprinted from Martin JT: Positioning in Anesthesia and Surgery. New York, WB Saunders, 1978, with permission of the publisher).

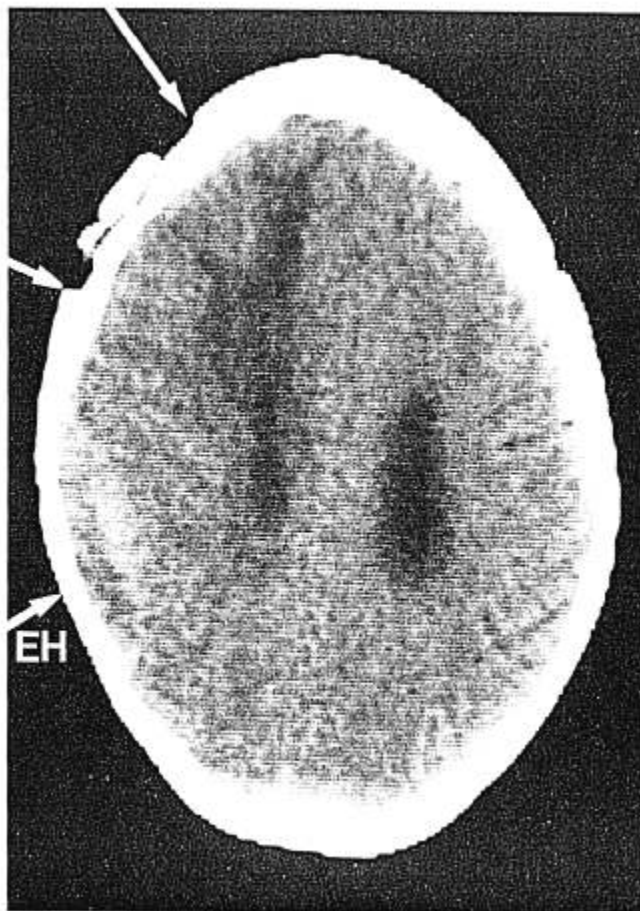


FIG. 2. Computerized tomography scan, showing the epidural hematoma (EH) and the old craniotomy boundaries (at arrows).

are to be expected; 3) always use an abundant amount of sealing ointment around the pins; 4) never remove the headholder, unless there is no gradient left between head and heart level.

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### Short-term Sterility of the Pulmonary Artery Catheter Inserted Through an External Plastic Shield

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Flow-directed, pulmonary artery catheters frequently require repositioning after initial insertion to obtain wedge pressures with an appropriate volume of air for balloon inflation. Since Kopman and Sandza<sup>1</sup> and Gomez *et al.*<sup>2</sup> reported protecting the catheter within a plastic

shield, several manufacturers have provided catheter shields. However, no one has examined the ability of those shields to prevent contamination of the catheters. We therefore studied the incidence of bacterial colonization of the pulmonary artery catheter within one commercially available shield (Cath-Gard™ Catheter

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