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Case Report

Early Epidural Hematoma after Cerebrospinal Fluid Shunt Followed by Subdural Hematoma - Ⓜ

Hatim Belfquih*, Brahim El mostarchid

Department of Neurosurgery, Mohammed V Military Teaching Hospital, Rabat, Morocco

***Address for Correspondence:** Hatim Belfquih, Department of Neurosurgery, Mohammed V Military Teaching Hospital Hay alkham III, Temara, Morocco, Tel : +0661338623; E-mail: hatimbelfquih@gmail.com

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ABSTRACT

Ventriculo peritoneal shunt operations represent the most used choice for treating hydrocephalus. Occurrence of Epidural Hematoma (EH) after ventriculo peritoneal shunt operations is a catastrophic complication of a relatively minor neurosurgical procedure. The presence of a Cerebrospinal Fluid (CSF) shunt is a predisposing factor for the development of Subdural Hematoma (SDH) in patients with hydrocephalus. We present the first case of early epidural hematoma after CSF shunt followed by subdural hematoma, discussing its pathophysiology.

Keywords: Epidural Hematoma; Subdural Hematoma; Ventriculo-Peritoneal Shunt

INTRODUCTION

Cerebrospinal Fluid (CSF) shunts are designed to treat hydrocephalus and increased intracranial pressure by diverting CSF from the ventricles to another part of the body (most commonly, the peritoneal cavity). Epidural Hematoma (EH) is an unusual complication after intracranial decompressive procedures such as CSF fluid shunt operation. The presence of a CSF shunt is a predisposing factor for the development of SDH in patients with hydrocephalus. We present the first case of early epidural hematoma after CSF shunt followed by subdural hematoma, discussing its pathophysiology.

CASE REPORT

A 16-year-old mal child presented with intermittent headache for 2 years, with repeated vomiting and papillary edema. There was no history of trauma, fever, any anticoagulation drug intake, or any other co-morbid disease seemingly responsible for such event as elaborated from history. On examination, there was a right hemiparesis. Magnetic resonance imaging revealed obstructive hydrocephalus due to the third ventricular lesion. Patient underwent right ventricular peritoneal shunting procedure with medium pressure valve. Post operative Computed Tomography (CT) scan was performed for persistent headache showed an EH at the posterior left parietal region (corresponding to the area of ventricular catheter) (Figure 1). Patient underwent strict observation without surgical intervention as his hematoma volume was small. Headache was controlled by the use of analgesics. The patient's conditions markedly improved within 3 months. Computed Tomography (CT) scan was performed as part of the evaluation revealed bilateral SDH, compression of lateral ventricles and minimal mass effect (Figure 2). The SDH was considered to be caused by the over-drainage of cerebrospinal fluid. The patient underwent a revision of the ventriculo-peritoneal shunt with change of reservoir. He did well post-operatively and was discharged from the hospital.

DISCUSSION

EH, as a complication of ventriculoperitoneal shunt surgery for the management of hydrocephalus, is a rare condition [1]. There are some anatomical regions (parietal and frontal) where the pathology is more frequently found. After a sudden removal of CSF, a contraction of the dura mater and stripping away from the bone causes venous bleeding. In the early stage, these patients show a paucity of neurological signs in spite of the large size of hematoma, because collapsed ventricles may create enough space for the expanding intracranial hematoma [2].

We think that the forced introduction of the ventricular catheter through a narrow burr hole displaced the duramater on our Case.

CT scan helps to diagnosis, showing the EH image with other

associated lesion [1]. Suggested a way of preventing postoperative epidural bleeding by dural fixing stitches in the neighborhood of the burr hole. To minimize some bleeding complications after ventricular shunting, some precautions are necessary: minimal CSF spillage at the time of ventricular catheter insertion; meticulous surgical technique; use of high or medium pressure valves; slow return to the full upright position and a close follow-up even with post-operative CT scan.

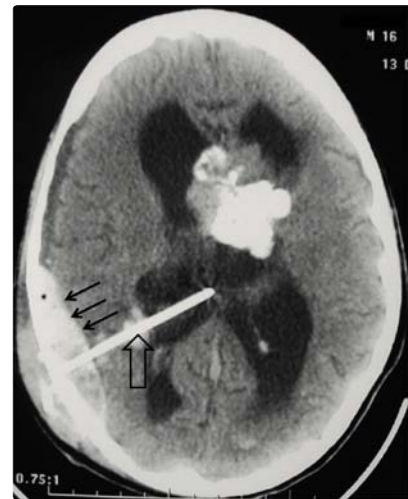


Figure 1: Computed Tomography (CT) scan showing epidural hematoma (filled arrows) and a portion of the shunting apparatus (open arrow).

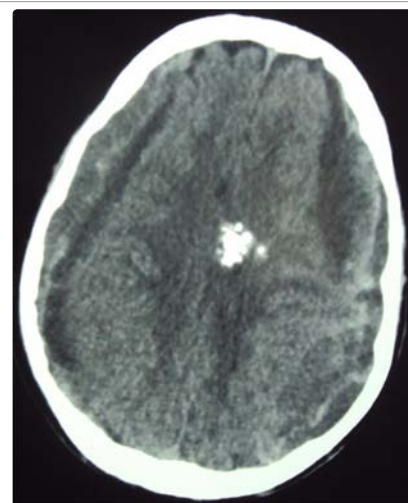


Figure 2: Computed Tomography (CT) scan showing bilateral subdural hematomas with compression of lateral ventricles.

The incidence of SDH related to over-drainage varies considerably in published reports, and appears to be approximately 4–5% [3]. Negative ventricular pressure produced by over-drainage appears to be an important predisposing factor [4]. Hemorrhage is of venous origin, due to injury of the sagittal sinus tributaries and the bridging veins from the cerebral cortex to the undersurface of the dura. An osmotic mechanism also appears to play a part in growth of the subdural collection. A major reduction in CSF volume and intraventricular pressure caused by over-shunting may lead to separation of the brain from the dura, there by increasing tension on the bridging veins and predisposing them to rupture. Over-shunting also produces more space for the accumulation of subdural fluid. Surgical evacuation of the hematoma is often not necessary. In one reported series of 17 SDH attributed to cerebrospinal fluid over-drainage, only five required surgical management.

CONCLUSION

Patients should be monitored closely post shunt if any evidence

of deterioration like SDH, EH and others. Better understanding and increased surgical team acquired experience will help this complication not to happen.

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