Remote Acute Extradural Hematoma Formation after Ventriculoperitoneal Shunt - A Rare Occurrence

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ABSTRACT

Formation of acute epidural hematoma after Ventriculoperitoneal shunt insertion is rare in adults, more so at a site remote from the site of shunt insertion. We are presenting such a rare occurrence and discussing possible factors involved in this complication. A 35-year-old male was diagnosed with a third ventricular colloid cyst with hydrocephalus. A Ventriculoperitoneal medium pressure shunt was placed through right Keen point burr hole and the patient developed a right frontal extradural hematoma on the 4th post-operative day which was subsequently evacuated by craniotomy and the patient recovered fully thereafter. Acute extradural hematoma is a potentially life threatening complication. High index of suspicion, precautions during shunt insertion and early detection can prevent mortality and severe morbidity in these cases.

Keywords: Extradural hematoma; Ventriculoperitoneal shunt; Hydrocephalus.

INTRODUCTION

Ventriculoperitoneal (VP) shunt placement is associated with several complications, including intracranial haematomas. Although acute subdural haematomas (SDH) after ventricular decompression are well known, the formation of acute epidural haematoma (EDH) after a VP shunt is rare. Most of the cases reported belong to the paediatric population. We describe its occurrence in an adult at a site distant from shunt insertion and discuss the possible causes of this potentially life threatening complication.

CASE REPORT

The patient, a 35-year-old male, presented with complaints of severe headache and blurring of vision for the past 2 months and drowsiness for 1 day. On examination, the patient was localizing painful stimuli but he was not obeying simple verbal commands. Fundus examination revealed bilateral papilledema. All the blood work including coagulogram was
within normal limits. A MRI of the brain revealed a colloid cyst of the third ventricle causing hydrocephalus (Figure 1). In view of poor neurological status, a right sided Chabra® medium pressure ventriculoperitoneal shunt was placed via a parietal (Keen point) burr hole. Head fixation with pinhead holder was not used and the head was fixed on a doughnut headrest. The sensorium of the patient improved after shunt insertion. Post-operative period was uneventful for the first three days with the patient reporting an improvement in headache and blurring of vision.

However, on the 4th post-operative day, the patient became drowsy and developed weakness of the left side of the body. An immediate check CT scan was done which showed a massive epidural hematoma in the right frontal region which was away from the site of shunt insertion (Figure 2).

![Figure 1. Colloid cyst of the third ventricle with hydrocephalus.](image1)

![Figure 2. Post-op right frontal extradural hematoma.](image2)

The patient was immediately shifted to the operating room where a right frontal craniotomy was done and the epidural hematoma evacuated. Dural tack up sutures were applied all around to prevent further EDH formation. The patient improved and a post-operative scan showed satisfactory EDH evacuation (Figure 3). The hemiparesis also improved post EDH evacuation and the patient was discharged uneventfully.

**DISCUSSION**

Subdural hematomas following ventricular drainage due to shunting or intracranial surgery are usual and may undergo calcification and ossification. The usual cause of subdural hematomas developing is the drop in intracranial pressure leading to tearing of the cortical bridging veins and subdural hematoma formation.[1] However, the incidence of epidural hematoma formation is rare after shunt surgery. Most of the cases reported are in the paediatric age group as the dura is less firmly adhered to the skull in this age group and can be stripped off the skull with a rapid decrease in the intracranial pressure[1-4]. An epidural hematoma after shunt insertion in an adult is very rare and one distant from the site of shunt insertion has so far not been reported in literature.

Most of the reports of epidural hematoma following shunt insertion have been in the paediatric population and the case reported by Fujimoto, et al had congenital Factor X deficiency and post haemorrhagic hydrocephalus, who underwent a VP shunt. In this patient coagulopathy was also responsible for postoperative spontaneous EDH formation[5]. Kalia, et al proposed that in some patients, discrepancy between cranial and brain volumes, or craniocerebral disproportion may be responsible. However, in adults these causes are considered unlikely. Ahmed et al hypothesised that coagulation of the dura may lead to its stripping from the bone with attendant tear in the emissary vein(s) in some adults whose dura is not tightly stuck to the bone, resulting in the possibility of EDH formation in adults. This dural separation is further aided by rapid lowering of intracranial pressure[6-7]. Coagulopathy, if present, may contribute to EDH formation. In case of EDH directly adjoining the burr hole site of VP shunt, excessive coagulation of dura of the burr hole before dural incision, may in some cases cause enough shrinkage, to result in dural separation from the skull and EDH formation. This dural separation is further aided by rapid lowering of intracranial pressure. However, as in our patient, the EDH developed away from the burr hole site, that mechanism is unlikely. There was no coagulopathy detected in our patient.
We hypothesize that a rapid decrease in intracranial pressure alone can result in EDH formation even in adults after ventriculoperitoneal shunt insertion. In our patient, the complication resulted even after using a medium pressure valve, which regulates the amount of CSF drained. At the time of shunt insertion, excess CSF drainage from the ventriculostomy catheter should be avoided. High-pressure valves should be used if excess drainage is anticipated and such patients should have the head end down in wards and slowly mobilized thereafter. Such measures may prevent the occurrence of this potentially life threatening complication.

CONCLUSION
Acute extradural hematoma is a potentially life threatening complication. High index of suspicion, precautions during shunt insertion and early detection can prevent mortality and severe morbidity in these cases. Avoidance of rapid drainage is very important to prevent such a complication and the potential mortality and severe morbidity arising out of such an occurrence.

What this study adds
1. What is known about this subject?
The occurrence of acute extradural hematoma after insertion of VP shunt is commonly due to dural stripping at the point of shunt insertion. This, however, occurs at the site of shunt insertion. It usually occurs in children or in patients with coagulopathy. It also occurs if the surgeon does not exercise proper care during shunt insertion and strips the dura from the bone.

2. What new information is offered in this study?
Its occurrence in an adult and that too at a site, which is different form the site of shunt insertion, is rare. In our paper, we have reported this rare occurrence and postulated the various reasons as to why the complication occurred.

REFERENCES

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