

# Chronic Bilateral Subdural Hematoma Complicated by Bilateral Epidural Hematoma Complicating Ventriculo-peritoneal Shunt

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## Abstract

We report the case of a 40-year-old man with ventriculo-peritoneal shunt who presented with chronic subdural hematoma (CSDH). He underwent burr-hole craniostomy with a closed drainage system. A computed tomography scan conducted on postoperative demonstrated a bilateral acute epidural haematoma in the occipital location. Craniotomy and haematoma evacuation were immediately performed. To the best of our knowledge, this is the first reported case of an acute bilateral hematoma after drainage of a chronic bilateral subdural hematoma complicating ventriculo-peritoneal shunt. Although extremely rare, it should be considered as a possible complication.

**Keywords:** Ventriculo-peritoneal shunt; Chronic subdural hematoma; Acute epidural hematoma

## Introduction

Hydrocephalus is a common neurosurgical condition, which can lead to significant morbidity and mortality if left untreated [1,2]. Among the procedures performed for hydrocephalus, cerebrospinal fluid (CSF) diversion with insertion of ventriculo-peritoneal (VP) shunt remains the most popular method in both adult and pediatric patients [3,4].

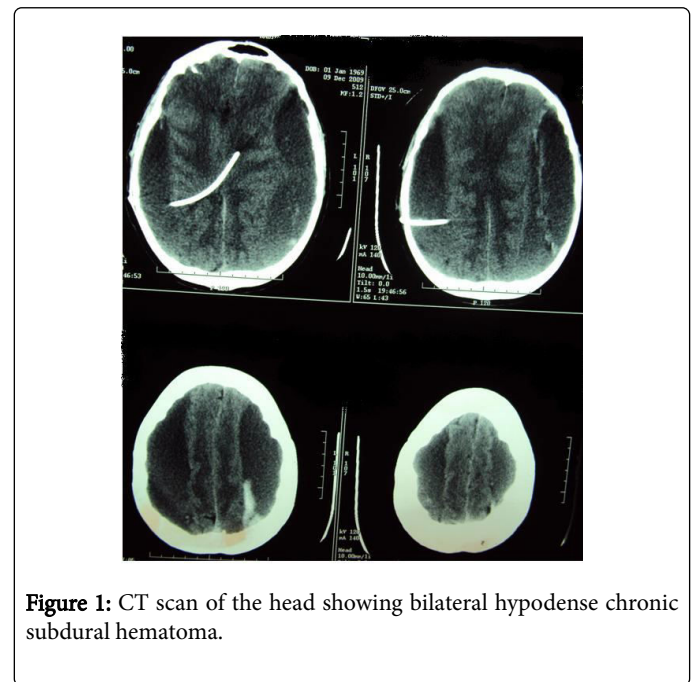
Although common, these surgical procedures require careful patient selection and technical skill to ensure an adequate level of surgical success and careful surveillance to assess for complications VP shunt complications are common in both pediatric and adult populations, with reported frequency ranging from 45% to 59% in different reports [5,6]. We report a very exceptional case of chronic bilateral subdural hematoma complicated by bilateral epidural hematoma complicating ventriculo-peritoneal shunt.

## Case Report

We report a case of a 42-year-old man. His medical and surgical histories were unremarkable presenting with an ependymoma of the fourth ventricle associated chronic obstructive hydrocephalus. The patient was operated by Ventriculo-peritoneal (VP) shunt. The immediate postoperative period was uneventful. Four months later he presented with headache.

Neurological examination revealed mild right hemiparesis and laboratory studies, including coagulation function, showed no remarkable abnormalities. A cranial CT scan revealed a hypodense bilateral chronic subdural hematoma (Figure 1). Under general anesthesia, the drainage of the bilateral haematoma was performed immediately after the procedure with ablation of the ventriculo-peritoneal shunt. The patient complained of headache, which rapidly increased over the next hour together with vomiting and altered consciousness. Urgent CT revealed a large acute extradural haematoma

on the same side (Figure 2). The haematoma was evacuated through a craniotomy. The patient was discharged after 20 days with no neurological deficit.

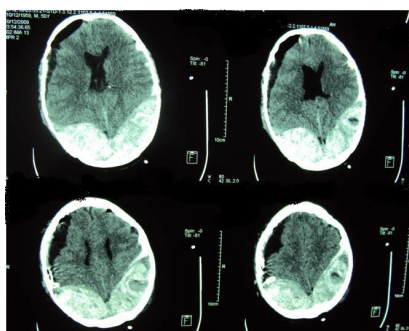


**Figure 1:** CT scan of the head showing bilateral hypodense chronic subdural hematoma.

## Discussion

Ventriculo-peritoneal shunts are a well-accepted treatment for hydrocephalus and intracranial hypertension. Contemporary surgical series report that approximately a fifth of adult patients experience complications in their first year, with complications occurring about twice as frequently in children [7]. However the chronic bilateral subdural hematoma complicated by bilateral epidural hematoma is a recognised but rare complication following ventriculo-peritoneal shunt [4]. We are not aware of any previously reported cases of this

association complicating ventriculo-peritoneal shunt in adults. Differential valve shunts systems work on the basis of a differential pressure gradient. The siphon effect of a differential pressure shunt is well known [8-10]. This leads to over drainage of CSF, which predisposes the patients to subdural hematoma, and it is known to have a good prognosis with a relatively simple surgical intervention. However, some postoperative hemorrhage can arise from the craniostomy site and may cause significant morbidity and mortality [11,12].



**Figure 2:** Post-operative CT scan of the head showing bilateral epidural hematoma in occipital location.

The causative factors of the epidural hematomas that happen following chronic bilateral subdural hematoma (CSDH) draining are not explicit. A rapid expansion in the cerebral blood flow with inadequate autoregulation, sudden intra or post-operative stir of the intracranial elements provoke injury to the cerebral vasculature and hemorrhage, with contusion [13,14].

In the present case as well, the pathogenic mechanism underlying the formation of a bilateral epidural haematomas is not only a sudden change in pressure between epidural and subdural space but also excessive detachment of the dura mater.

The patient's medical and family histories did not indicate any coagulopathies, bleeding diathesis, malignancy or systemic disease.

However, the most important factor, as discussed by several authors [14-16] is damage to the cerebral vasculature (diapedesis through the increased permeability of parenchymal blood vessels), secondary to the rapid perioperative parenchymal shift, and a sudden increase in cerebral blood flow combined with focal disruption of autoregulation and cerebral perfusion immediately after surgical decompression [14].

In our patient, the thick dura was particularly resistant to penetration by a relatively blunt subdural needle and, hence, led to the use of sufficient force to detach the dura matter from the inner surface.

Presumably, the bleeding occurred into this space separated from the inner table and compounded by the lack of tamponade by the now evacuated chronic subdural collection.

## Conclusion

Chronic bilateral subdural hematoma complicated by bilateral epidural hematoma is a very rare complication of ventricular

decompression in the treatment of hydrocephalus and invariably occur in children or young adults. It should be considered as a possible complication. Clinicians should suspect its occurrence without delay when a postoperative neurological deterioration is demonstrate.

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