

A Rare Complication of Burr hole Drainage of Chronic Subdural Hematoma: Cerebrospinal Fluid Leak via the Subdural Drain, Case Report with Literature Review

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Abstract

Chronic subdural hematoma is a common neurosurgical problem, especially in the elderly, which is frequently treated by burr hole drainage. Recurrence is the most frequent complication of chronic subdural hematoma surgery reported in literature. However, cerebrospinal fluid leak resulting subgaleal pseudomeningocele has been reported. We report a 67-year-old man who had burr hole drainage of chronic subdural hematoma and subsequently developed cerebrospinal fluid fistula which was drained by subdural drain inserted intraoperatively. A 67-year-old right-handed man who presented with nine days' history of progressive pan-cranial persistent headache following a fall from the bathroom associated with irrational behavior and weakness of the left side of the body. His Glasgow Coma Score (GCS) was 12/15, with generalized hypertonia, left-sided hemiparesis, and left-sided grade + 3 deep tendon reflexes. Brain computed tomography scan [Figure 1] showed right-sided fronto-temporoparietal chronic subdural hematoma with midline shift and effacement of the ipsilateral lateral ventricle. He had right frontal and right parietal burr holes, such as subdural hematoma and insertion of nonnegative subdural drain through the parietal burr hole. He developed cerebrospinal fluid leak, which drained into the drainage bag and subsequently managed conservatively. Cerebrospinal fluid leaks can occur following burr hole drainage of chronic subdural hematoma. Subdural drain inserted intraoperatively is helpful in preventing the sequelae of cerebrospinal fluid accumulation in the subdural and subgaleal spaces.

Keywords: Burr hole, complication, head injury

INTRODUCTION

Chronic subdural hematoma is the presence of cystic unclotted hematoma within the subdural space, bounded by both outer and inner membranes.^[1] This was first recognized by Virchow in 1857 who used the term “pachymeningitis haemorrhagica interna” to describe the pathology based on his recognition of both inflammatory and hemorrhagic components.^[1]

Chronic subdural hematoma is one of the most frequent diagnoses in neurosurgical practice, with an overall incidence of 1.7/100,000 people. However, the incidence of chronic subdural hematoma rises with age reaching 58/100,000 in people above 65-years-old.^[2] The mean age at occurrence of chronic subdural hematoma is 63 years with a male preponderance (64% vs. 36%).^[2] Up to 77% of chronic subdural hematoma patients present with a history of fall in the recent past, and about 44% of them taking antiplatelet or

anticoagulant medications.^[3] Symptomatic recurrence is one of the most common complications of treatments ranging from 23% to 33%.^[1,3] A randomized controlled trial showed that burr hole drainage with the insertion of subdural drain reduces symptomatic recurrence to 9.3 as against 24% without the use of the drain.^[4] A study on the outcome of chronic subdural hematoma by the British Neurosurgical Trainee Research Collaboration also found symptomatic recurrence requiring reoperation as low as 9% following burr hole craniotomy with

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the insertion of the subdural drain.^[5] Cerebrospinal fluid fistula is a very rare complication of burr hole drainage of chronic subdural hematoma, with only one report in literature reviewed. Karavelioglu *et al.* reported subgaleal cerebrospinal fluid leak following burr hole drainage of chronic subdural hematoma in a 9-year-old boy with arachnoid cyst.^[6] In this report, we present a cerebrospinal fluid leak through the subdural drain following burr hole craniostomy for chronic subdural hematoma in a 67-year-old man.

CASE REPORT

67-year-old man right-handed man who presented on October 8, 2019 with nine days' history of progressive pan-cranial persistent headache following a fall in the bathroom. The headache was relieved by analgesics but got worse with a sudden change of position of the head and during defecation. Three days before presentation, he developed an altered level of consciousness associated with irrational behavior and weakness of the left side of the body. There was no fever, neck stiffness, seizures, visual impairment, or hearing impairment.

He is a known hypertensive, who was regular on his controlled medications. He was not on anticoagulant medication and not a diabetic.

On examination, he was afebrile, acyanosed, not pale, and not dehydrated. Pupils were 3 mm bilaterally with normal responses to light. He was disoriented with a GCS of 12/15. He had no cranial nerve palsies or signs of meningeal irritations. He had normal muscle bulk globally, generalized hypertonia, left-sided hemiparesis, and left-sided grade + 3 deep tendon reflexes. His sensations were generally preserved.

The chest was clear clinically with a respiratory rate of 16/min. Cardiovascular system examination showed a pulse rate of 78/min with a blood pressure of 160/95 mmHg, and one and two heart sounds were audible. Other aspects of systemic examination were normal.

Urgent brain computed tomography scan [Figure 1] showed right-sided fronto-temporoparietal chronic subdural hematoma with midline shift and effacement of the ipsilateral lateral ventricle. His full blood count, clotting profiles and electrolytes, urea, and creatine were normal.

He had right frontal and right parietal burr hole drainages of such as with the insertion of nonnegative subdural drain through the parietal burr hole. However, the drainage bag effluent changed in color and volume gradually from the typical motor oil like fluid on the same day after surgery, through the bloody cerebrospinal fluid by the first postoperative day, and to xanthochromic cerebrospinal fluid by the second postoperative day with a progressive increase in the drainage volumes reaching 600 mls by the second postoperative day [Figure 2]. Due to financial constraints, he could not afford immediate postoperative brain computed tomography scan requested. The subdural drain was removed on the third postoperative day and the patient was commenced on osmotic diuretics, prophylactic

antibiotics, and firm turban dressing of the operative wounds with crepe bandage for five days. The patient sustained marked clinical recovery with speech and resolution of the limb weaknesses, and was discharged home to be followed up in the outpatient clinic with the following instructions: to return to the hospital in case of worsening symptoms or emergence of new symptoms, to be closely monitored by relatives and to continue limb physiotherapy.

He had postoperative computed tomography done six weeks after surgery, which showed resolution of the right-sided subdural haematoma [Figure 3].

DISCUSSION

Age-related reduction in brain volume with a corresponding increase in the size of the subdural space increases the vulnerability to developing chronic subdural hematoma.^[7] Chronic subdural hematoma is seen less frequently in young people, usually due to cerebral atrophy from causes such as epilepsy, alcoholism, and cerebrospinal fluid over-drainage from a ventriculoperitoneal shunt in hydrocephalic patients.^[6] Coagulopathies, the use of antiplatelet and anticoagulant are associated with an increased risk of chronic subdural hematoma.^[6,7] Studies have shown that up to 43% of chronic subdural patients have a history of the current use of antiplatelet medication.^[5,7]

The chief complaint in most patients with symptomatic chronic subdural hematoma is cognitive impairment, which is seen in about 58% of them, this is closely followed by hemiparesis (41%) and headaches (41%), respectively.^[1]

A watch, wait, and rescan policy is recommended in asymptomatic patients with a thin chronic subdural hematoma on imaging study.^[7] Osmotic diuretics and corticosteroids have been tried either as adjuncts to surgery or as sole treatments with little or no evidence to support their use.^[7] Surgery is the treatment of choice in symptomatic chronic subdural hematoma and the various surgical options are twist-drill craniostomy, burr hole craniostomy, and craniotomy. The Symptomatic recurrence rate after burr hole craniostomy is lower compared to twist drill craniostomy; and morbidity is lower with burr hole craniostomy compared to craniotomy.^[5] Evidence from the literature has shown that burr hole craniostomy is most popular among neurosurgeons; however, a recent meta-analytical study suggested twist drill craniostomy as first-line treatment for chronic subdural hematoma, whereas burr hole and craniotomy is to be reserved for the symptomatic recurrence.^[1,3] The use of a closed subdural drain is routine in many practices. Some prospective studies showed no beneficial effect, whereas others reported lower recurrence rates with the use of postoperative subdural drains.^[6,8] A British Neurosurgical Trainee Research Collaborative study on management and outcome for patients with chronic a subdural hematoma showed that the use of a subdural drain is associated with a reduction in recurrence rate.^[9,10] The range of surgical complication in chronic subdural hematoma is between 3% and 28% regardless of the

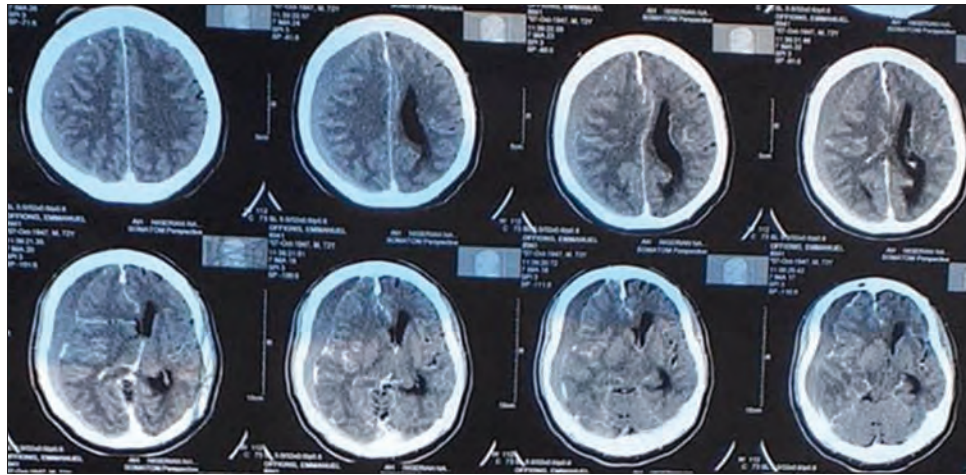


Figure 1: Preoperative computed tomography images showing right chronic subdural hematoma with midline shift and effacement of the ipsilateral lateral ventricle

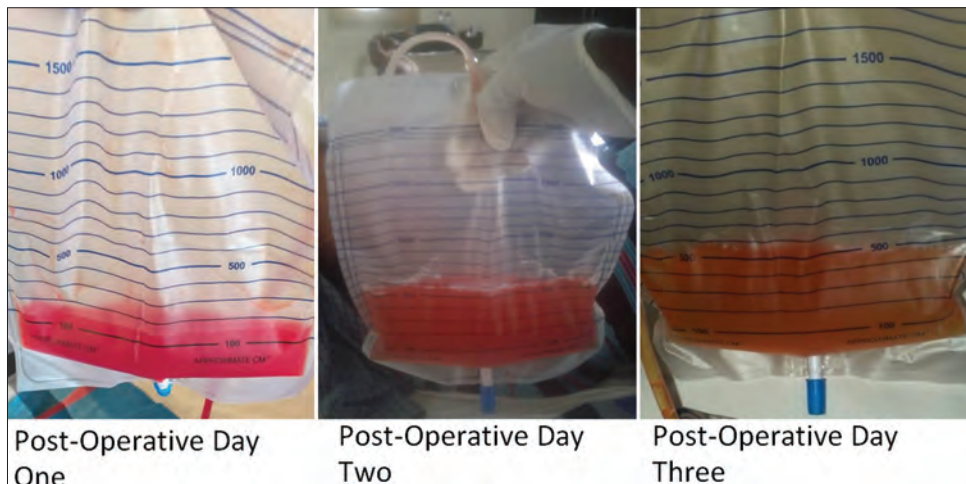


Figure 2: Subdural drain drainage bag improvised with urine bag

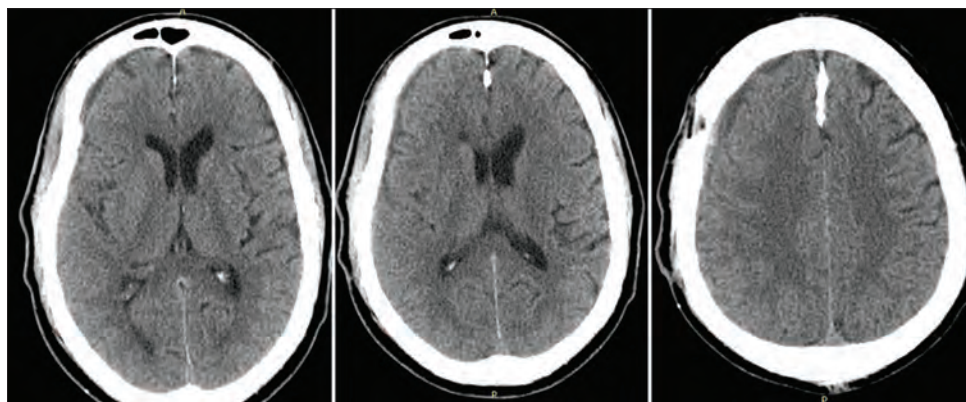


Figure 3: Postoperative computed tomography images showing resolution right chronic subdural collection

surgical option used.^[11,12] Rohde *et al.* reported a complication rate of 20.5% in a series of 376 patients with chronic subdural hematoma treated by burr hole craniostomy.^[13,14] Complications that are commonly seen with chronic subdural hematoma surgeries are recurrence, seizure, subdural

empyema and other infections, acute subdural hematoma, intracerebral hemorrhage, epidural hematoma, intracerebral abscesses, and pneumocephalus.^[15,16] Karavelioglu *et al.* first reported cerebrospinal fluid leaks into the subgaleal space following burr hole drainage of chronic subdural hematoma

in a 9-year-old boy.^[6,17] This study is a report of a case of cerebrospinal fluid leaks, which is prophylactically drained by subdural drain inserted intraoperatively. In our opinion, apart from draining the residual subdural collection and prevention of recurrence of chronic subdural hematoma, insertion of subdural drain subserved a rare function of preventing the sequelae of cerebrospinal fluid leaks such as symptomatic subdural hygroma and subgaleal pseudomeningocele.

CONCLUSION

Cerebrospinal fluid leak is not an uncommon complication following craniotomy but rarely occurs with burr-hole drainage of chronic subdural hematoma. Subdural drain inserted intra-operatively is helpful in preventing the sequelae of cerebrospinal fluid accumulation in the subdural and subgaleal spaces.

Consent for publication

An informed written consent was obtained from the patient to report this case and the accompanying images.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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