Remote contralateral intraparenchymal hemorrhage after overdrainage of a chronic subdural hematoma∗

Aaron A. Cohen-Gadol

Goodman Campbell Brain and Spine, Department of Neurological Surgery, Indiana University School of Medicine, Indianapolis IN, USA

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A B S T R A C T

INTRODUCTION: Chronic subdural hematoma (cSDH) is frequently seen by neurosurgeons. Treatment often includes evacuation of the subdural hematoma (SDH) through one or two burr holes and placement of a drain in the subdural space to further evacuate subdural fluid and prevent reaccumulation of blood during the immediate postoperative period. Complications associated with this type of drainage include fluid and blood reaccumulation, tension pneumocephalus, seizures, and subdural empyema.

PRESENTATION OF CASE: The author presents a case in which aggressive CSF overdrainage most likely led to acute severe intracranial hypotension, causing the collapse of the contralateral bridging veins and ultimately resulting in venous insufficiency and hemorrhagic infarction. The remote intracerebral hemorrhages were suspected to be due to CSF overdrainage through the subdural space, so the drain was immediately removed. After drain removal, the patient’s neurologic status improved and his hemiplegia disappeared within 4 h. A follow-up head CT scan 1 month later revealed resolution of his subdural fluid collection and right-sided intraparenchymal hemorrhages. He returned to work 1 month later in good condition.

DISCUSSION: Although many authors have examined factors affecting the success of cSDH drainage procedures, there are few reports about the risks of overdrainage and little information available about drainage volume. This report links excessive cSDH drainage of with a remote contralateral intraparenchymal hemorrhage, a complication that has been noted only twice previously, and neither report suggested the mechanism for occurrence of the hemorrhage, or specified the amount of drainage.

CONCLUSION: Subdural drainage should be carefully monitored to avoid overdrainage.

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1. Introduction

Chronic subdural hematoma (cSDH) is a condition often seen by neurosurgeons. Treatment often includes evacuation of the subdural hematoma (SDH) through one or two burr holes and placement of a drain in the subdural space to further evacuate subdural fluid and prevent reaccumulation of blood during the immediate postoperative period. Complications associated with this type of drainage include fluid and blood reaccumulation, tension pneumocephalus, seizures, and subdural empyema.

2. Presentation of case

A 52-year-old man presented to the emergency room with progressive intractable headaches, nausea, and mild gait imbalance. He had been involved in a motor vehicle accident 8 weeks prior to admission. He had not suffered any loss of consciousness at the time of his accident. His neurologic examination was remarkable only for a mild gait ataxia. He was not consuming any anticoagulation medication and his coagulation panel was within normal limits. A head CT revealed a sizable left-sided, chronic (with acute and subacute components) subdural hematoma (cSDH) with a moderate amount of midline shift (Fig. 1). Due to the symptomatic nature of his subdural hematoma (SDH), he underwent its evacuation through 2 burr holes, one each in the frontal and parietal regions. Intraoperatively, since his brain did not move closer to the burr holes after drainage of the SDH, a subdural drain (9Fr round Jackson-Pratt drain attached to a suction bulb) was placed in the subdural space to facilitate further evacuation of the subdural fluid and prevent reaccumulation of blood during the immediate postoperative period.

A head CT on the first postoperative day revealed adequate drainage of the hematoma. Since the subdural drain output remained moderately bloody, the drain was left in place. The
An emergent head CT revealed right-sided intraparenchymal and intraventricular frontal and parietal hemorrhages associated with a small amount of subarachnoid hemorrhage (Fig. 2). These remote intracerebral hemorrhages were suspected to be due to CSF overdrainage through the subdural drain; therefore, the drain was immediately removed. Following drain removal, the patient’s neurological status continued to improve and his hemiplegia completely disappeared within 4 h. MRI and 4-vessel cerebral angiography did not disclose any cause for his intracranial hemorrhages. No episode of uncontrolled hypertension was noted during his hospitalization. A follow-up head CT scan 1 month later revealed resolution of his subdural fluid collection and right-sided intraparenchymal hemorrhages. He returned to work 1 month later in good condition.

Recognized complications associated with cSDH drainage include fluid and blood reaccumulation, tension pneumocephalus, seizures and subdural empyema. Only two previous reports have noted an association between cSDH drainage and remote intracranial hemorrhage. One study demonstrated a fatal cerebellar hemorrhage associated with repeated evacuation of a cSDH.1 Another study reported a contralateral right parietal intraparenchymal hemorrhage after a left-sided cSDH drainage.2 Both patients in these reports underwent postoperative closed-system subdural drainage but no comment about the amount of drainage was made. No convincing mechanism for occurrence of these remote hemorrhages was provided. Infratentorial craniotomies for various pathologies may lead to supratentorial hemorrhages and vice versa. CSF overdrainage has been speculated to be the most likely etiology for these remote hemorrhages.

We believe subdural fluid and CSF overdrainage was most likely the cause of remote hemorrhages and neurological deterioration in our patient. We did not find any cause of hemorrhage despite adequate work-up, and the patient improved neurologically expeditiously after discontinuation of subdural drainage. Our patient’s bradycardia may have been a reflection of intracranial pressure changes associated with CSF overdrainage and resultant brain shift; it is difficult to use this sign as a predictive factor of overdrainage in future patients since the sample size is small.

3. Discussion

The pathophysiology of hemorrhages in our patient remains speculative. The patient’s aggressive CSF overdrainage most likely led to acute severe intracranial hypotension. This process placed the...
contralateral bridging veins under tension, causing their collapse and ultimately resultant venous insufficiency and hemorrhagic infarction. Nonetheless, there is a lesson to be emphasized from this complication: Subdural drainage through the drains needs to be carefully monitored and overdrainage should be avoided.

4. Conclusion

This case illustration may also help us understand the pathophysiology underlying remote intracranial hemorrhages.

Conflict of interest statement

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Ethical consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author Contributions

Aaron A. Cohen-Gadol, MD, MSc, is the sole author of this manuscript. He did the data collection, analysis, and writing of this manuscript and reviewed it before submission. There were no other contributors.

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