

Chronic Subdural Hematoma Secondary to Cortical Cerebral Artery Perforation

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Abstract

Introduction: Chronic Subdural Hematoma (CSDH) is generally attributed to pathological changes in the arterial system of the dura mater. There are no case reports of CSDH due to cerebral cortical artery perforation.

Method: We report a case of spontaneous CSDH caused by cortical artery rupture that was identified on digital subtraction angiography and could be visualized on Computed Tomographic Angiography (CTA).

Result: A 56-year-old man presented with daily headache for three weeks with no history of trauma. Neurologic exam only showed subtle left pronator drift. A CT scan of the head showed a right CSDH with a midline shift. CTA was suspicious for a dilated vein in the subdural collection. Catheter cerebral angiogram demonstrated contrast extravasation from a small cortical branch of the middle cerebral artery with no aneurysm, arterial dissection, or vascular malformation. In retrospect, CTA findings represented contrast extravasation, not a dilated vein. Burr-hole mini-craniotomy was performed, and the hematoma was evacuated. The patient had complete clinical and radiographic recovery.

Conclusion: Ruptured cerebral cortical artery can cause CSDH. In atypical cases of CSDH, careful evaluation of selective internal carotid artery angiography is advised to look for alternative pathologies prior to proceeding with MMA embolization. CTA images may demonstrate active extravasation from a small cortical artery.

Keywords: Chronic subdural hematoma • Computed tomographic angiography • Burr-hole mini-craniotomy

Description

The prevalence and incidence of Chronic Subdural Hematoma (CSDH) are rising due to increased longevity, use of antithrombotic medications, and utilization of modern neuroimaging [1]. The precise pathophysiology of CSDH is not described yet, but there is a general acceptance that the bleeding source is fragile capillaries of the dural arteries. It is hypothesized that a small traumatic subdural bleed triggers an inflammatory state in the dura's inner layer that promotes angiogenesis

and formation of subdural membranes with abnormal "leaky" capillaries [2,3,4]. We recently published the first case report of chronic subdural hematoma due to perforation of a leptomeningeal artery [5]. The report also offered a brief review of previous autopsy- and surgical studies that described a cortical artery perforation as the underlying cause of acute subdural hematoma. The report described a man in his fifties with no history of trauma who had had headache for 3 weeks with subtle left arm weakness. Head CT scan showed a large right chronic SDH with a right-to-left midline shift and a small more acute clot in the temporal region. Head CTA showed a tubular hyper density in the temporal area that was suspected to be a dilated vein. Catheter cerebral angiography was done to evaluate for vascular malformations. It demonstrated active extravasation from a small cortical branch of the Middle Cerebral Artery (MCA) with no aneurysm, dissection, or arteriovenous shunting. The extravasation jet corresponded to the CTA tubular hyper density that had been thought to be a vein. Mini craniotomy was performed, and the hematoma was evacuated. A subdural drain was left in place for two days. The patient had complete clinical and angiographic recovery. Imaging follow-up at 6 months showed no recurrence. We believe that our manuscript highlights two interesting points besides reporting the first case of chronic subdural hematoma due to cerebral cortical artery rupture. First, clinical suspicion for an alternative etiology should be kept high in atypical patients with CSDH. Middle Meningeal Artery (MMA) embolization has been increasingly utilized for CSDH treatment. Careful evaluation of selective internal carotid artery runs is recommended in atypical cases of CSDH prior to MMA embolization as that might uncover an alternative etiology. Secondly, advanced neurovascular imaging including catheter cerebral angiography should be pursued in patients with acute subdural hematoma without a clear history of head trauma. The "bridging veins injury" hypothesis as the mechanism of acute subdural bleeding is not well documented or confirmed. Previous autopsy and surgical studies suggest that an arterial origin of acute subdural hematoma might be more common than what clinical teaching indicates. Middle cerebral artery aneurysm rupture and dural arteriovenous fistula could also cause acute SDH. If we may, we also would like to raise a practical point unrelated to our case report at hand. Spontaneous Intracranial Hypotension (SIH) due to Cerebrospinal Fluid (CSF) leak might be the underlying etiology in a good proportion of atypical patients with chronic subdural hematoma [6]. In the author's experience, a few CSDH patients who were referred for MMA embolization ended up being diagnosed with SIH. Brain MRI with and without contrast to evaluate for signs of SIH is recommended for atypical patients with CSDH. We hope that our report and discussion in this publication will be beneficial for clinicians around the world.

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