Spontaneous hemorrhage in an arachnoid cyst
A Case report & review of literature

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Abstract
Spontaneous hemorrhage in arachnoid cyst unassociated with subdural hematoma is an extremely rare entity. Hemorrhage in arachnoid cyst and subdural hematoma is encountered in association with head trauma and also spontaneously.
The authors report a unique case of spontaneous bleeding in an arachnoid cyst in a young primi gravida healthy lady during post partum period and not known to have a past history of any illness or head trauma, and not diagnosed to have arachnoid cyst.
A 30 year old lady underwent elective caesarean section for delivery under epidural anesthesia. On third day of post partum period she developed mild headache, slurring of speech, right-sided facial twitching and right sided body numbness and mild weakness. She was referred to accident & emergency department 6 weeks after delivery and was managed surgically with excellent outcome. The authors present the history, examination, neuroradiological findings, surgical management and outcome, histopathology with pertinent literature review and discuss the possible mechanism of intracystic hemorrhage.

Key words: Arachnoid cyst, Lumbar puncture, Spontaneous hemorrhage, Surgical management

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Introduction
The risk of intracystic hemorrhage or hemorrhage around the arachnoid cyst was reported as less than 0.1% per annum (22, 26). It was reported by Robinson and smith that 2.43% of middle fossa arachnoid cysts may present with subdural hematoma or hygroma (3, 23, 26) and the diagnosis of these cases is made when the patient is symptomatic following mild to moderate head injury.
Arachnoid cysts are considered as a risk factor for chronic subdural hematoma in young people after head injury (16, 20). Arachnoid cysts with subdural hematoma in the absence of head trauma are rare, and the rarer than that is the intracystic hemorrhage associated with chronic subdural hematoma (7, 10, 11, 16, 20).
Spontaneous hemorrhage in arachnoid cyst without subdural hematoma is an extremely rare incidence. An isolated spontaneous intracystic hemorrhage as a result of ruptured cerebral aneurysm was reported previously (2, 6, 9, 15).
We present a case of spontaneous hemorrhage in arachnoid cyst without subdural hematoma in a young woman who underwent lumbar puncture and epidural anesthesia for elective caesarean section. To our knowledge this is the first case reported in an otherwise healthy adult

**Case Report**

**History**
A 30 years old lady, primi gravida was not known to have medical problems. She underwent elective caesarean section under epidural anesthesia for delivery. On third post operative day she developed mild headache, slurring of speech and right sided facial twitching, as well as mild right sided body weakness and numbness. Those symptoms were controlled by anticonvulsant (Phenytoin)

Three attempts of lumbar puncture were reported by anesthetist and CSF was retrieved in first two attempts. She was managed by neurologist over 6 weeks as a case of epilepsy. Neuroimaging was obtained on June 5, 2009 and the patient was referred to accident & emergency department on the same day. Diagnosis of arachnoid cyst was not made before this incidence because she was asymptomatic and no history of head trauma during that period.

**Examination**
Young healthy lady. Vital signs were stable and neurological examination was unremarkable. Caesarean section scar was clean. No CSF leak or swelling at the site of lumbar puncture.

**Neuroimaging**
Figure 1(a) Axial T2 and (b) T1 weighted MRI of the brain at the level of the lateral ventricles revealing an extra-axial subacute hematoma with predominant high signal intensity on both T1 and T2 due to the presence of extracellular methemoglobin. Anteriorly, on the T2 weighted images a wall (arrow) can be delineated surrounding the hematoma which may be used as a pointer to an Underlying cyst.

![Figure 1(a). MRI-Axial T2](image1.png)  
![Figure 1(b). MRI-Axial T1](image2.png)
Figure 2 (a) and (b) sequential images from a diffusion weighted sequence at b1000 revealing a fluid-blood level in (a) that completely suppresses in signal at b1000 (b) suggestive of the presence of some clear fluid again indicating hemorrhage within a cystic structure.

Figure 3. Axial non-contrast CT scan at the level of the lateral ventricles obtained postoperatively reveals complete excision of the cyst.

Figure 3 and figure 4 Axial non-contrast CT scan at the level of the lateral ventricles obtained postoperatively revealed complete excision of the cyst.
Management

Cross matching was performed and 3 units of packed cells were saved. Coagulation profile, complete blood count and blood biochemistry were normal. An informed consent was obtained from the patient for left frontoparietal craniotomy and evacuation of intracystic hematoma and excision of the arachnoid cyst. Operative findings: arachnoid cyst containing CSF mixed with blood under high pressure and bridging veins were noticed in the floor of the cyst, one of the veins was bleeding. Hemostasis was performed. After evacuation of the cystic contents the enveloping arachnoid membrane was totally excised. Dura was closed with Vicryl 3/0, bone flap was fixed with Vicryl 2/0, Redivac drain was inserted in extracranial space, galea aponeuritica was closed with Vicryl 3/0 and skin was closed with Nylon 3/0. She was commenced on phenytoin 100 mg three times daily and advised to continue for 3 months. Patient has uneventful post operative recovery. CT-Scan of the head was obtained on the first post operative day which revealed minimal blood in subdural space, and few droplets of air with no mass effect (Figure 5).

Redivac drain was removed on the second post operative day. Patient was discharged from the hospital on fifth post operative day. She was neurologically intact. CT-Scan of the head was obtained on 15th post operative day and after completing 6 weeks and both revealed complete resolution of the thin subdural collection. She was asymptomatic when seen in the clinic four months postoperatively.

Histopathological examination

Grossly many light brown and few dark brown firm thin pieces of tissue largest mg. 2 x 0.5 x 0.4 cms were received. Microscopic examination revealed segments of edematous fibro-connective tissue with areas of granulation tissue (Figure A & B), lymphocytes, few eosinophils infiltration, focal fibrino purulent exudate, collections of siderophages and haemorrhages. Pathologic features confirmed the diagnosis of arachnoid cyst with organized hematoma.

Legends to figures:
Figure A: Cyst wall with granulation tissue in the lumen. (H &E x 40X)
Figure B: Close up depicts inflammatory granulation tissue and fibrous wall at the periphery. (H & E x 100X)
Arachnoid cysts are CSF filled congenital, benign intracranial extra axial space-occupying lesions lined by arachnoid matter and account for 1% of intracranial tumors. (3, 4, 14, 16, 18, 19, 21, 22, 23, 26) Arachnoid cyst is commonly located in middle cranial fossa in 49% of cases in relation to sylvian fissure and convexity arachnoid cyst accounts for 4% (25). It is often asymptomatic and discovered incidentally (1, 8, 16, 24, 26). They rarely become symptomatic only when intracystic pressure increases due to increased fluid secretion or due to hemorrhage – intracystic in association with chronic subdural hemorrhage following head trauma (3, 5, 11, 16, 17, 20, 26).

Arachnoid cysts are considered as a risk factor for chronic subdural hematoma following head trauma in young people (16, 20). Arachnoid cyst with traumatic intracystic hemorrhage unassociated with subdural hematoma are a rare incidence (3, 13).

Spontaneous hemorrhage in arachnoid cyst associated with subdural hematoma is a rare entity (7, 11, 16). Spontaneous intracystic hemorrhage without subdural hematoma is an extremely rare occurrence (2, 3, 9, 12, 15). Four cases of arachnoid cysts complicated by spontaneous intracystic hemorrhage were reported in the literature (3, 9, 12).

Our patient was 30 years old developed her neurological symptoms at post-partum stage – three days post epidural anesthesia for elective caesarian section for delivery. She experienced mild headache, slurring of speech, right sided facial twitching and right sided body numbness and mild weakness. She was managed by neurologist for 6 weeks then MRI head was obtained and that revealed right fronto-parietal convexity arachnoid cyst with intracystic hemorrhage, midline shift and no subdural or extradural hematoma or subarachnoid hemorrhage. Her symptoms were controlled with anticonvulsant (Phenytoin) before obtaining the MRI and referring her to A/E. We managed her appropriately where left fronto-parietal craniotomy, cruciate durotomy, once the arachnoid membrane was punctured CSF mixed with blood was found under high pressure. Cyst contents were evacuated and arachnoid puncture was extended. Bridging vein was found bleeding; hemostasis was performed and cyst membrane was totally excised. Patient had uneventful postoperative recovery and discharged on 5th postoperative day. No residual cyst was noticed in postoperative imaging even after 6 months. Patient is asymptomatic and anticonvulsant drug was discontinued 3 months postoperatively. Histopathological examination of the cyst membrane confirmed the radiological and gross surgical findings.

What was the possible mechanism of spontaneous hemorrhage in this case?

She underwent an epidural analgesia for elective caesarian section for delivery. Three attempts of lumbar puncture were done, in first two attempts CSF was retrieved in the puncture and third was successful. We think that CSF drainage in spinal extradural space produced a pressure gradient in intracranial CSF and that influenced the intracystic pressure in a form of sudden reduction and that lead to tear of a bridging vein and caused bleeding. Re-accumulation of CSF and hemorrhage increased the size of the cyst and intracystic pressure and that produced the symptoms.

To our knowledge this is the first case of its entity to be reported in literature.
Conclusions:
Spontaneous hemorrhage in an arachnoid cyst unassociated with subdural hematoma is an extremely rare. Its occurrence in association with lumbar puncture for epidural analgesia as in our case has not been reported before. We report first case of spontaneous hemorrhage in an arachnoid cyst associated with lumbar puncture.

References:


