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Case report

A blackhole over brain: Interdural hematoma – A challenging diagnosis

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ABSTRACT

Hematoma in between two dura leaves, named as 'interdural hematoma', is a very rare entity in adulthood. Interdural hematoma may emerge spontaneously or secondary to coagulopathies. A 61-year-old male patient, who had a medical history of alcoholic cirrhosis, presented with interdural hematoma. The case has been discussed with a literature review about diagnostic and therapeutic approaches in this pathology.

1. Introduction

Hematoma in between two dura leaves, named as 'interdural hematoma', is a very rare entity in adulthood. Interdural hematoma may emerge spontaneously or secondary to underlying vascular pathologies like aneurysms [1–3]. Incidence has been reported as much as 13% in a postmortem study of stillborns and deceased life-birth infants [4]. However, only 5 adult patients with interdural hematoma have been presented, so far (Table 1) [1–3,5,6]. We are reporting a 61-year-old male patient with alcoholic cirrhosis, who developed interdural hematoma spontaneously. We have also reviewed the current literature and discuss about pathophysiology of interdural hematoma.

2. Case report

A 61-year-old man was admitted to our clinic because of left-sided hemiparesis, which evolved slowly in 2 weeks. On his neurological exam, there was a 1/5 motor weakness of his left upper and lower extremities. His medical history was positive for alcoholic cirrhosis. There was no traumatic or infectious event that had happened previously. His admission international normalized ratio (INR) was 1.5. We ordered an MR study

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Table 1 – Adult interdural hematoma cases presented in the literature.

Authors	Age (year)/Sex	Presentation	Associated lesion	Treatment	Follow-up
Miyajima et al. (2004)	79/M	Parietal headache	None	Craniotomy	N\A
Eom et al. (2009)	78/M	Severe headache 3 days after treatment of contralateral chronic subdural hematoma	None	Craniotomy	Discharged 14 days later
Brock et al. (2010)	42/F	Thunderclap headache, and right ophtalmoplegia	Right infraclinoid internal carotid artery aneurysm	Aneurysm clipping	Fully recovered in 3 months
Bartoli et al. (2011)	35/F	Headache, neck stiffness, bilateral abducens nerve palsy, nausea, photophobia	Ruptured posterior communicating aneurysm and unruptured anterior communicating aneurysm	Coiling of both aneurysms	Vasospasm and emboli 14 days after and complete recovery 22 days after the incident
Baharvahdat et al. (2012)	51/M	Incidental finding after the index surgery for intracerebral hematoma evacuation	None	Craniotomy	Died 10 days after the 2nd surgery due to aspiration pneumonia
Present case	61/M	Left hemiparesis	None	Craniotomy	Fully recovered immediately

Abbreviations: M: male, F: female, N\A: not available.

for his brain. There was a sausage-like mass over the right cerebral hemisphere, which was hyperintense on T1- and hypointense on T2- and FLAIR-weighted images (Fig. 1). Hematoma evacuation via parietal craniotomy was performed. Prior to surgery, his INR value was dropped to 1.2 with fresh frozen plasma supplements. Level of platelets was 104,000 (normal range = 180,000–370,000); activated partial thromboplastin time was 37.7 s (normal range = 20–40 s). After

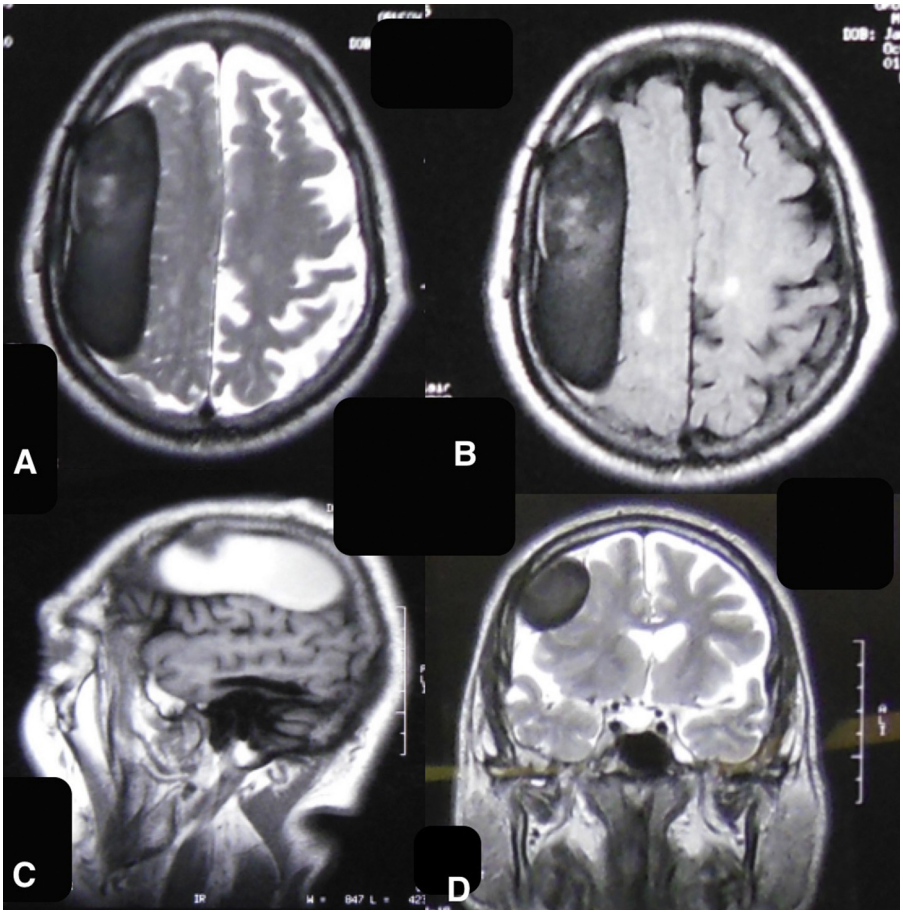

Fig. 1 – A sausage-like mass is observed over right cerebral hemisphere. It is hypointense on T2- and FLAIR-weighted (A, B and D), hyperintense on T1-weighted MR images (C).

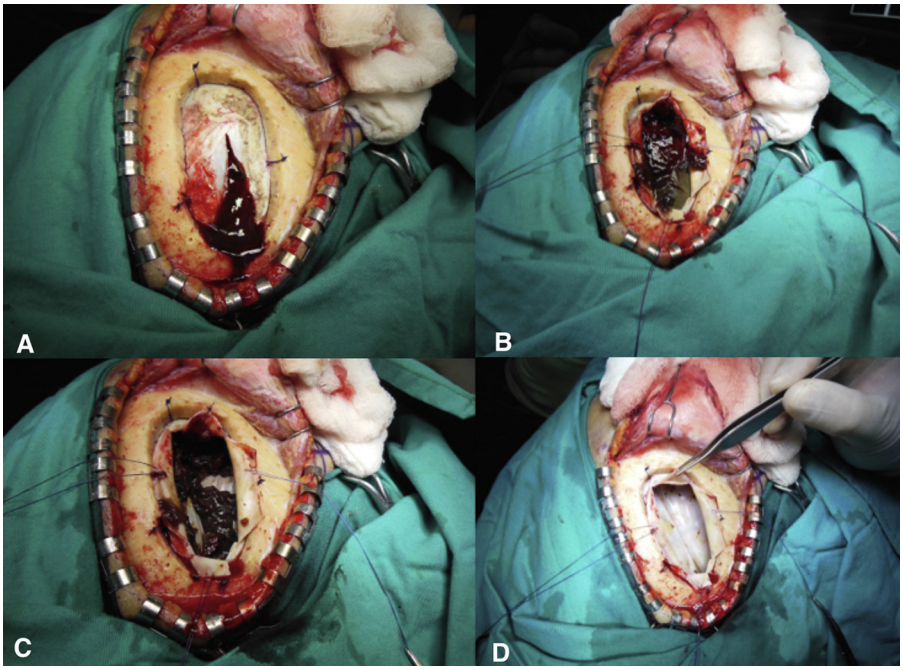

Fig. 2 – Interdural hematoma evacuation with parietal craniotomy.

craniotomy, periosteal dura was observed to be intact. Periosteal dura was opened with scapel. A thrombosed cherry-red blood was present in between two dura leaves. Coagulated blood was irrigated with warm saline (Fig. 2). Dura was closed with secondary duraplasty. Post-operative course of the patient was uneventful and his weakness recovered fully after the surgery. Pathology result was coagulated blood sample.

3. Discussion

In cranium; dura is composed of two leaves, inner 'meningeal' layer and external 'periosteal' layer [7,8]. Periosteal dura is mainly composed of collagen and lesser number of fibroblasts, whereas meningeal dura contains fibroblasts more than collagen fibers. Nerves and vessels also convey periosteal layer [1]. Dural layers encompass the venous sinuses inside them [2]. These two dura layers are adherent to each other over all around the brain till the foramen magnum, except 2 locations: Meckel cave (the apex of the pyramid of temporal bone) and parasellar region [9–11]. At the level of foramen magnum, meningeal layer continues downward through the spinal canal, while the periosteal layer adheres tightly to the endocranium and interdural space of cranium continues as spinal epidural space [8].

Intrauterine asphyxia or mechanical injury was proposed as the mechanism of injury in infants. In vascular events such as aneurysmal rupture, it was theorized that dome of pulsating aneurysm may have thinned weaker inner dura and penetrated it as the aneurysm ruptured [2,3]. Due to lack of large sized and homogenous cohort, there is no one widely accepted theory for isolated interdural hematoma cases. Our case suggests that underlying coagulopathies may be another mechanism leading to interdural hematoma beyond aneurysm rupture and head trauma.

Inter- or intradural hematoma is mostly observed in infants and stillborns (13%), yet rare in adulthood (5 previous patients) (Table 1) [1–6]. The reason for high prevalence in infancy is due to dura composition in early life. Dura contains higher amount of venous plexus and acts as a drainage pathway for cerebrospinal fluid until arachnoid villi become functional. Increase in intravascular and intracerebral pressure yield hemorrhage in this highly vascularized and valveless venous plexus on dura mater [13].

Location of interdural hematoma differs according to underlying pathology and patient age. Falx and tentorium for infants, skull base for adult patients with aneurysm rupture, cranial convexity for adult patients without any vascular lesion are common locations for interdural hematomas [1–3,5,6,12].

Although CT is valuable for diagnosis of intracranial hematoma, it has not found to be valid in diagnosing interdural hematoma [2,3,5,6]. Bartoli et al. [2] mentioned that CT misled them to a pre-operative diagnosis of subdural hematoma, whereas Eom et al. [5] and Baharvahdat et al. [6] made a pre-diagnosis of epidural hematoma depending on what they had seen on CT. Magnetic resonance imaging will be more useful than CT even though it may still not fully depict the exact location and nature of the hematoma [3]. When space-occupying interdural hematoma is diagnosed, surgical decompression should be conveyed to relieve underlying brain parenchyma.

4. Conclusion

Interdural hematoma is very rare in adulthood, and can be easily misdiagnosed as epidural or subdural hematoma. For

correct diagnosis, magnetic resonance imaging should be used. It should be kept in mind that interdural hematoma may occur in an adult patient with coagulopathy, even in the absence of trauma history.

Conflict of interest

All the authors declare that there is no conflict of interest.

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Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals.

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