Wydawnictwo UR 2021
ISSN 2544-1361 (online); ISSN 2544-2406
doi: 10.15584/ejcem.2021.3.13

http://www.ejcem.ur.edu.pl
European Journal of Clinical and Experimental Medicine
Eur J Clin Exp Med 2021; 19 (3): 273–276

CASUISTIC PAPER

Berrin Erok [1(ABCDFG)], Kenan Kıbıcı [2(ACD)]

Posttraumatic arachnoid cyst rupture and delayed acute subdural hygroma

[1] Department of Radiology, University of Health Sciences, Prof Dr Cemil Tascıoglu City Hospital, Istanbul, Turkey
[2] Department of Neurosurgery, Altinbas University School of Medicine Bahcelievler Medical Park Hospital, Istanbul, Turkey

ABSTRACT

Introduction. Subdural hygromas (SDGs) are the accumulation of fluid in the subdural space. Arachnoid cysts (ACs) on the other hand are common cerebrospinal fluid (CSF) containing lesions of the central nervous system, located within the subarachnoid space. They are generally found incidentally on neuroimaging studies and remain asymptomatic throughout the life. Rupture into the subdural space resulting in subdural hygroma (SDG) is relatively rare.

Aim. We aimed to show the importance of the radiological follow up in head trauma patients having large ACs.

Description of the case. We report a case of a 69-year-old male patient with a known large Galassi type III AC, presented to our hospital with traumatic brain injuries and re-presented with acute posttraumatic SDG in association with AC rupture.

Conclusion. This case emphasizes the importance of radiological follow up in head trauma patients having large ACs to reveal and appropriately manage traumatic subdural collections.

Keywords. acute subdural hygroma, arachnoid cyst rupture, delayed subdural collection

Introduction

Subdural hygromas (SDGs) are the accumulation of fluid in the subdural space. They may be encountered in all age-groups depending on the etiology, but are overall most common in the elderly.[1] Arachnoid cysts (ACs) on the other hand are common cerebrospinal fluid (CSF) containing lesions of the central nervous system, located within the subarachnoid space.[2] They are generally found incidentaly on neuroimaging studies and remain asymptomatic throughout the life. Rupture of an AC into the subdural space resulting in subdural hygroma (SDG) is relatively rare and is resulted from trauma or surgical manipulations. In rare instances, it may also occur spontaneously. On radiological imaging, ACs are well circumscribed extra-axial cysts following CSF pattern on computed tomography (CT) and magnetic resonance imaging (MRI) without restricted diffusion. The ruptured ACs are associated with the same CSF density/intensity fluid extending into the subdural space resulting in a SDG.

Aim

We aimed to show the importance of the radiological follow up in head trauma patients having large ACs.

Corresponding author: Berrin Erok, e-mail: drberrinerok@hotmail.com

Participation of co-authors: A – Author of the concept and objectives of paper; B – collection of data; C – implementation of research; D – elaborate, analysis and interpretation of data; E – statistical analysis; F – preparation of a manuscript; G – working out the literature; H – obtaining funds

Received: 28.04.2021 | Accepted: 9.05.2021
Publication date: September 2021

Erok B, Kıbıcı K. *Posttraumatic arachnoid cyst rupture and delayed acute subdural hygroma.* Eur J Clin Exp Med. 2021;19(3):273–276. doi: 10.15584/ejcem.2021.3.13

Description of the case

We report a case of a 69-year-old male patient presented to our hospital with scalp hemorrhages, headache and confusion following falling from the ladder on the roof of his house. On examination, there were left periorbital ecchymosis and multiple scalp lacerations. Neurological examination showed a Glasgow coma score (GCS) of 13 (eyes:3, verbal:4, motor:6) without focal neurological deficits. Initial CT of head showed left frontotemporal subgaleal hematoma (Fig. 1A) and subcortical hemorrhagic contusions with focal subarachnoid hemorrhages (SAHs) (Fig. 1B, 1C) on the right frontotemporal lobes, representing countercoup injury. There were also mega cysterna magna (Fig. 1A, 1B), cavum septum pellucidum (Fig. 1C) and a large middle cranial fossa AC (Galassi type III) compressing the temporal lobe on the left side (Fig. 1A, 1C). Scalp lacerations were sutured and he was hospitalized for close follow up. On day 3, the GCS was 15 with CT scan showing no extra axial fluid collection (Fig. 1D). Since the patient was asymptomatic from traumatic brain injuries (TBIs), he was discharged from the hospital with recommendations.

After 1 week, he was re-presented with headache and altered consciousness with CT scan demonstrating bilateral hypodense (similar to CSF) subdural fluid collections (SDFs) on the cerebral convexities, more prominent on the left side where it was associated with compression of the adjacent brain and a slight ventricular compression without midline shift (Fig 2A, 2B).

On 3-tesla MRI of the brain the SDF collections were found to have the same intensity as CSF with homogeneous appearance (Fig 3A, 3B).

The diagnosis of acute posttraumatic subdural hygroma (SDG) was made. Since the patient was symptomatic from the SDG, bilateral burr hole evacuation under general anesthesia (on the left 2 burr hole; frontal and temporoparietal, on the right 1 burr hole; frontal) was performed. The drained fluid was slightly xantochromic

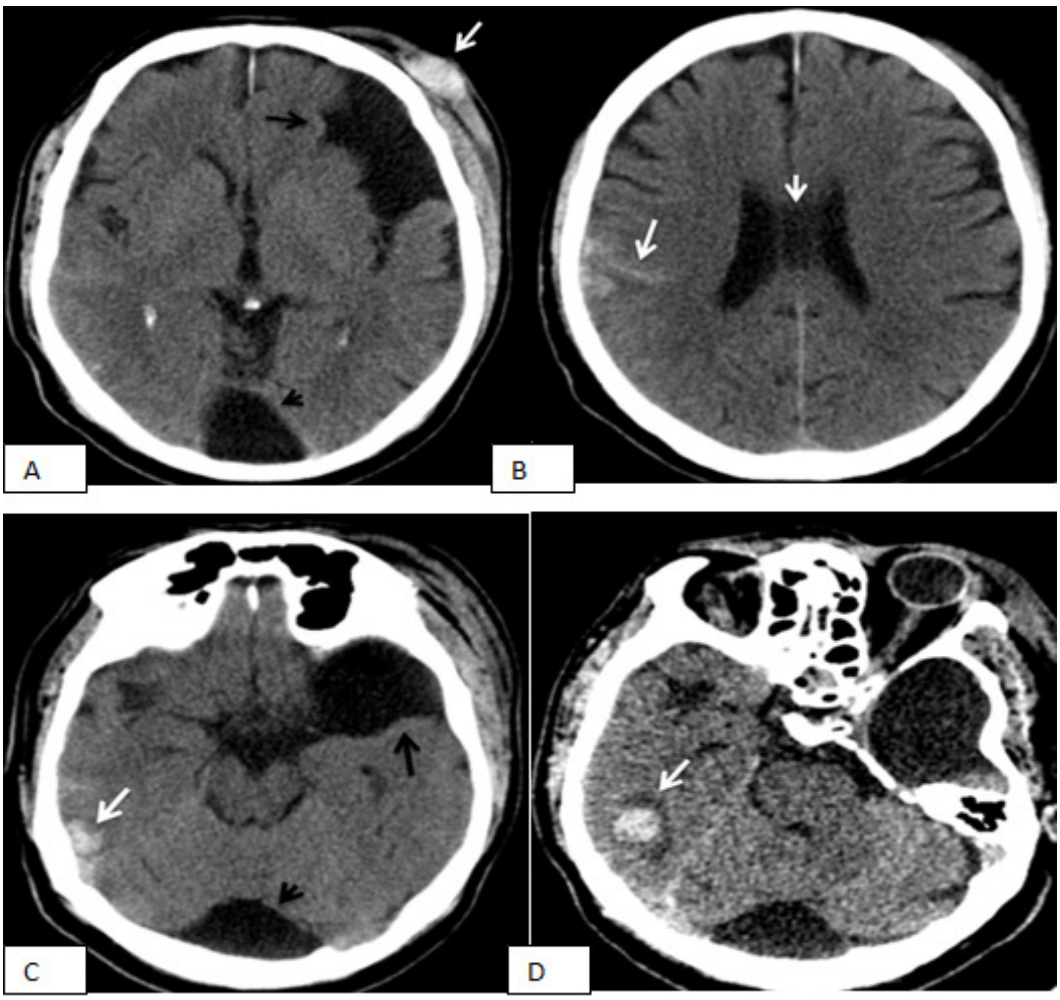

Fig. 1. Initial head CT images show the left frontotemporal subgaleal hematoma (A, white arrow), hemorrhagic contusions and focal subarachnoid hemorrhages at the right frontal lobe (B, white arrow) and the right temporal lobe (C, white arrow). Note the presence of a large middle cranial fossa AC compressing the temporal lobe on the left side (A, C, black arrow), mega cysterna magna (A, B, short black arrow) and cavum septum pellucidum (c, short white arrow). Follow-up CT scan after 3 days from the trauma shows the hemorrhagic contusion which is more prominent due to the surrounding edema (D, white arrow)

supporting its origin of CSF. Postoperatively, he recovered uneventfully and was discharged on the 3th postoperative day by removing the drains with control CT examination. 2 weeks later, in the radiological examination of the patient who came for control evaluation, it was found that the right collection disappeared completely, but the collection on the left increased (Fig 4). There was no neurological deficit but, he had a headache. Considering that this was due to the rupture of the left middle cranial fossa AC, a shunt catheter extending from the existing burr hole into the arachnoid cyst from the subdural area was placed and this was connected to the abdominal cavity. In the subsequent follow-ups, the clinical findings and complaints of the patient recovered completely, and regression was found in the radiological control examinations.

Discussion

SDG is one of the main associated complications of TBIs, most frequently hemorrhagic cerebral contusions or subarachnoid hemorrhages (SAHs).[3-5] However, in these cases, SDG is expected to be more prominent at the same side with these TBIs. Traumatic rupture of existing middle cranial fossa ACs into the subdural space may also be the underlying cause of the acute traumatic SDG. Since the SDF collection was more prominent near the AC in our patient, we thought rupture of the AC as the main cause of the SDG. On head CT scans, SDG appears as a crescentric CSF density accumulation in the subdural space that does not extend into the sulci, usually located along the supratentorial cerebral convexity in frontal or frontoparietal regions.[6] If the

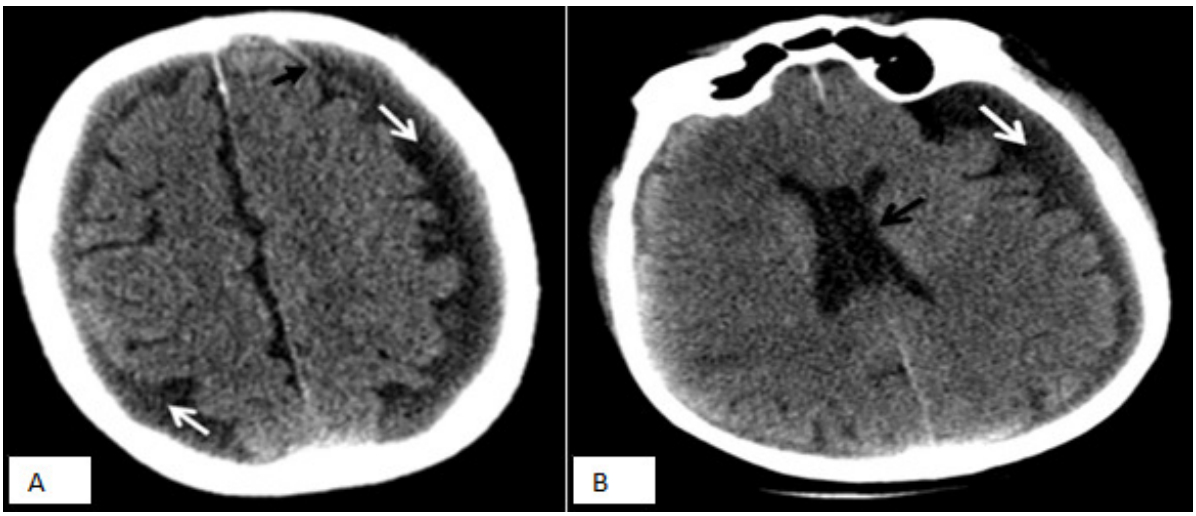

Fig. 2. CT images 1 week after the trauma show bilateral newly developed hypodense SDF collection (A, B, white arrows) on the cerebral convexities which is more prominent on the left side and associated with compression of the adjacent brain (A) and a slight ventricular compression (B, black arrow) without midline shift. Note the presence of vessel crossing the SDF collection (A, black arrow)

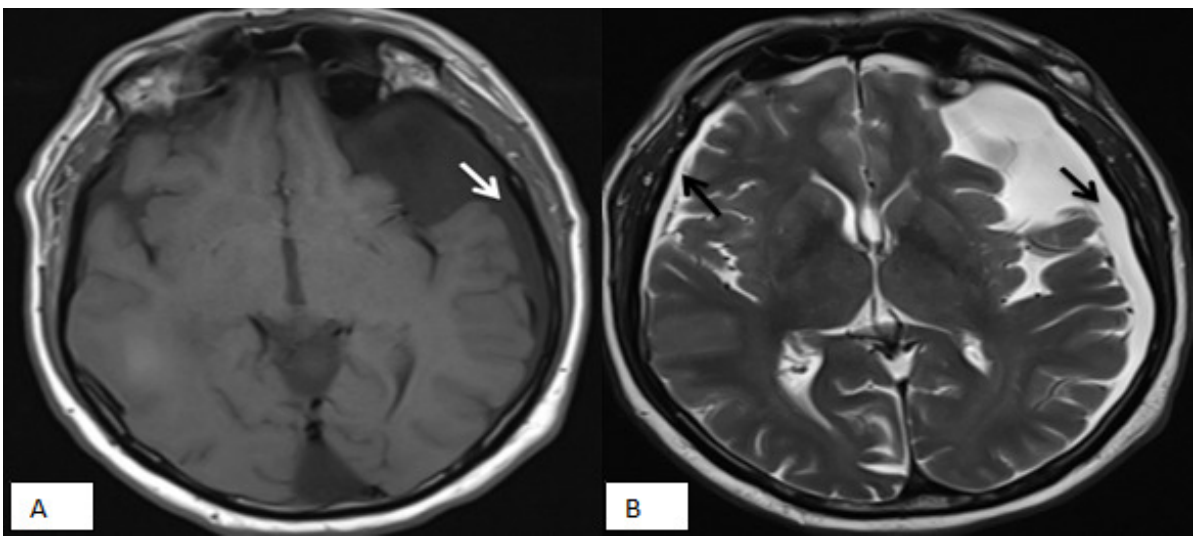

Fig. 3. MRI shows the SDF collections having homogeneously same signal intensities with the CSF on T1w (A, white arrow) and T2w (B, black arrow) images

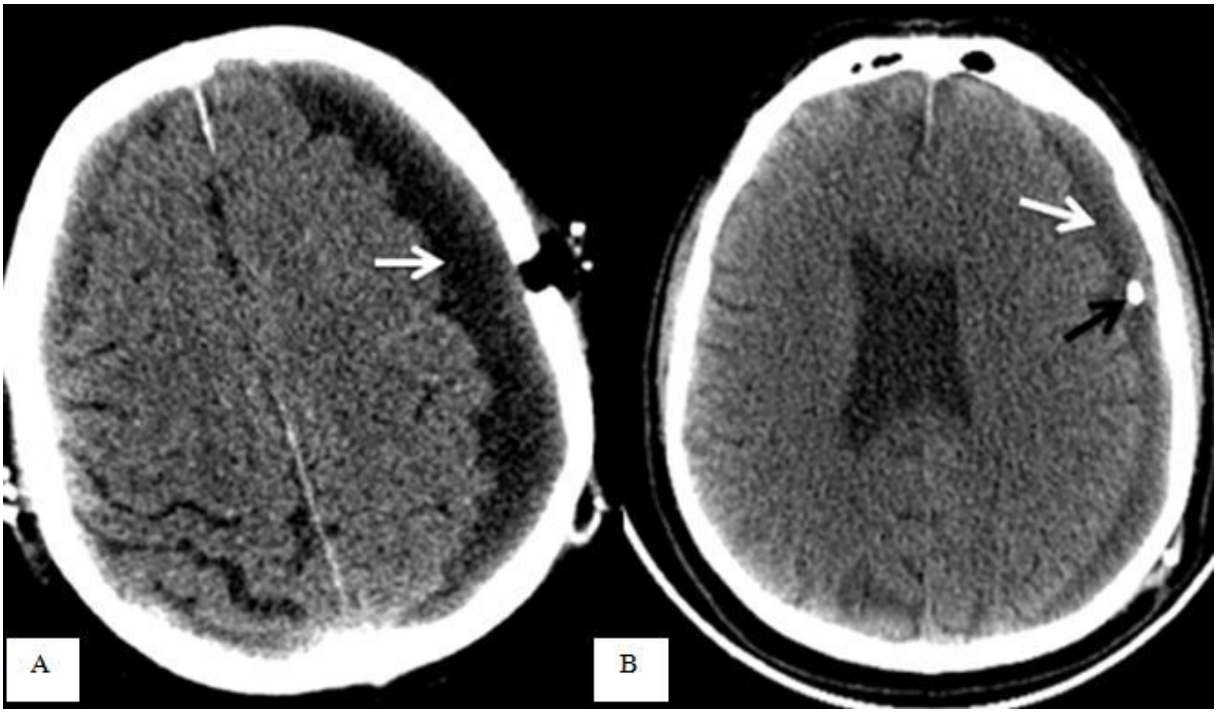

Fig. 4. Follow-up CT scan after burr hole evacuation showing obvious decrease in the right side collection but increase in the left side collection (a, white arrow). Follow-up CT scan after shunt placement (b, black arrow) showing decrease in the amount of left sided collection (b, white arrow).

symptomatic posttraumatic SDF collection is diagnosed as SDG with its characteristic radiological imaging findings and if the patient is symptomatic from the SDG, subduroperitoneal shunt is the first and effective method of management. Due to their identical appearance on CT scans, the main differential diagnosis is chronic subdural hematoma (CSDH) which appear as also near CSF density collection due to the liquefaction of the blood clot.[1-7] However, by definition CSDH is at least 3 weeks of age in contrast to the age of the SDF collection in our patient which was less than or equal to 1 week old. In addition, presence of vessels crossing the SDF collection distinguishes SDG from CSDH and also from cerebral atrophy.[8]

Conclusion

Traumatic rupture of existing middle cranial fossa ACs into the subdural space may be the underlying cause of the acute traumatic SDG**.** Therefore, radiological follow up in head trauma patients having large ACs is important to reveal and appropriately manage traumatic subdural collections.

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