Case report

Spontaneous resolution of large acute subdural hematoma and the value of neurological exam in conservative management of high risk patients

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ARTICLE INFO

Article history:
Available online 7 January 2014

Keywords:
Acute subdural hematoma
Spontaneous resolution
Neurological examination
Conservative management

1. Introduction

Acute subdural hematomas (aSDH) are a common consequence of traumatic brain injury. There have been rare reported cases of spontaneous resolution of the aSDH with various explanations as to the possible mechanism. In addition to the radiologic indicators, careful monitoring of the neurological examination is vital in determining the optimal management in these cases.

2. Case report

84 year old female presented after a fall with a brief loss of consciousness and minor facial injury. Her condition declined in the emergency room necessitating a STAT head computed tomogram (CT). At that point the patient was lethargic but arousable, her pupils were sluggishly and symmetric, was not following commands, was able to say some words and she had minimal movements in all extremities; Glasgow Coma Scale of 11 (E3V3M5). The scan demonstrated a large (1.6 cm) left sided aSDH with significant mass effect with what appeared to be the beginning of uncical herniation (Fig. 1). Past medical history is significant for chronic atrial fibrillation for which she was on Coumadin with an international normalized ratio (INR) of 2.06. Patient was started on vitamin K and was admitted for observation and comfort measures given her age and co-morbidities. The family was in agreement that a large craniotomy was not a good option for this patient.

Overnight the patient had a drastic improvement in her neurological examination; she returned to a nonfocal exam, only complaining of headache. Repeat head CT (Fig. 2) performed approximately 12 h post admission revealed decrease in the size of hematoma to 1.0 with significant reduction in mass effect. INR was repeated with a value of 1.2. The patient was now able to make her own healthcare decisions and was interested in proceeding with a craniotomy to evacuate the large hematoma. Again, given the patient’s age, co-morbidities and non-focal neurological exam the decision was made to continue observation and conservative management. The patient remained stable and was discharged home without operative intervention with a plan for future burr hole drainage if she became symptomatic and continues to have a large subdural collection.

Three weeks later the patient presented with increasing headaches, confusion and lethargy. Head CT (Fig. 3) demonstrated a large left sided chronic subdural hematoma. Patient was taken to the operating room and underwent an uneventful burr hole evacuation of the hematoma. She was discharged home back to her baseline neurological function on postoperative day two.

3. Discussion

Large aSDH 10 mm or greater are considered neurosurgical emergencies. There are reports of spontaneous resolution of the aSDH with various theories as to why this phenomenon occurs. Radiologic characteristics can be helpful in determining which...
aSDH is mostly likely to spontaneously resolve. As clearly illustrated in this case, utilizing the neurological examination in making that determination is critical in avoiding an unnecessary craniotomy.

Wen et al. reviewed the literature and identified 19 cases of spontaneous rapid resolution of aSDH [1]. Based on their review, most patients who developed rapid resolution shared 5 characteristics: (1) transitory coma lasting no longer than 12 h, (2) exclusion of cerebral contusion, (3) band of low density between the skull and the hematoma on (CT) imaging, (4) thin width which is widely distributed, and (5) Glasgow Coma Scale >8 on admission. They concluded that conservative management with careful monitoring may be appropriate for conscious patients who show a simple thin aSDH distributed broadly without marked brain shift. Although the patient in this case shared the some of the characteristics described by Wen, she did not have the imaging characteristics to suggest possible spontaneous resolution.

Various hypotheses have been discussed related to rapid resolution of aSDH. Compression of the hematoma due to acute brain swelling could redistribute the aSDH into spaces such as subarachnoid, intracranial subdural, spinal subdural, and extra-cranial [2]. Another hypothesis relates to tearing of the arachnoid membrane which leads to dilution of the hematoma by the CSF. Presence of hypodensity on the lateral side of the aSDH, beaking into sulcus or cistern and evidence of subarachnoid hemorrhage were discussed as important factors in rapid resolution [3]. Brain atrophy has also been discussed as a possible contributing factor to rapid reduction of aSDH. This theory suggests that dissociation between the skull and brain may be a factor in the movement of the hematoma to the supratentorial subdural space [4]. Liu et al. discussed these hypotheses and also proposed what they call the “Piston theory” [2]. They propose that fluctuation of intra-parenchymal cerebral pressure related to agitation or vomiting acts as a piston to redistribute the aSDH.

There are growing numbers of patients who are on oral anticoagulants. Chaudhary et al. reported a case of a double coagulopathic patient who had a spontaneous resolution of aSDH [5]. Their patient had myelodysplastic syndrome with thrombocytopenia and warfarin induced coagulopathy. The authors contend that although these conditions may contribute to the development of aSDH, they may also have contributed to a rapid resolution by preventing well-organized clot formation and therefore the aSDH is predisposed to redistribution per the CSF dilution theory. Similarly in this case, reversal of the patient’s Coumadin induced coagulopathy with vitamin K may have been a key factor in the rapid resolution of aSDH.

In this patient, multiple factors could have contributed to the rapid resolution of the aSDH. Dilution of the hematoma with CSF and redistribution, clot formation and organization after correction of the patient’s coagulopathy as well as the fact that the patient had significant brain atrophy could have all been factors that played a role in this process.
4. Conclusion

It is well noted that a large aSDH and a deteriorated neurological examination should lead to emergent craniotomy. Spontaneous resolution of aSDH is a rare phenomenon with only a few reported cases in the literature such as the one illustrated here. Predicting which patient may have a spontaneous rapid resolution of aSDH, thus preventing emergent surgical evacuation, can be challenging. Our patient did not fit the radiologic criteria previously described that would suggest rapid resolution of aSDH; however, close monitoring of the neurological exam in this case helped evade emergent craniotomy. Simple reversal of coagulopathy, close monitoring of the neurological examination and observation with repeat imaging can result in avoidance of emergency craniotomy in high risk patients.

References