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NATURAL EVOLUTION AND POSSIBLE COMPLICATIONS OF CHRONIC SUBDURAL HEMATOMA

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Abstract: *Mr. P.A, a 81-year-old man with prior diagnosis of atrial flutter, being under oral anticoagulation therapy (Apixaban), denying any head traumas, presented for 2,5 months vertigo and falling episodes, with progressive worsening. The CT scan revealed bilateral, fronto-temporo-parietal, chronic subdural hematoma with acute hemorrhage. A bilateral parietal craniotomy was performed with evacuation of both chronic hematoma. After removal of drain tubes, patient's state suddenly worsened, Emergency CT scan shown: frontal bilateral tension pneumocephalus and bilateral subdural fronto-temporo-parietal collections with acute and subacute hematic area- known complications of SDH;an emergent surgery followed, with bilateral, frontal, craniectomy. Further clinical evolution of this patient was maintained positive.*

INTRODUCTION

Subdural hematoma (SDH) is defined as a collection of blood between the inner meningeal layer of the dura and the arachnoid matter. SDHs are generally divided into three main entities: acute presenting within 3 days, subacute between 3 and 2-3 weeks and chronic after 3 weeks. Chronic subdural hematoma (CSDH) is a hematoma that is encapsulated and has an inner and outer membrane.(1,2)

The average age of 63 years old is known to be the general age at which the chronic subdural hematoma occurs. They occur as a result of head trauma and traumatic brain injury (only 50% of patients), coagulopathies and anticoagulant therapy (in this case, frequently occur bilaterally in ~ 20-25% of cases).

The clinical evolution is slow and progressive. The patient may present with minor symptoms, like: headache, confusion, language disorder or speech arrest, usually in case of dominant hemisphere lesions.

CT scan is the investigation of choice. Classically, CSDH contains dark "motor oil" fluid which does not clot. After 2-3 weeks, the hematoma appears hypodense on CT scan.

Residual subdural fluid collections are a common phenomenon after SDH's treatment. Thus, CT scan showed that in 78% of cases, on 10th day post-surgery, there is persistency of fluid.(2,3,4)

CASE REPORT

Mr. P.A, a 81-year-old man with prior diagnosis of atrial flutter, being under oral anticoagulation therapy (Apixaban), presented for 2,5 months vertigo and falling episodes, with progressive worsening.

During his 1st hospitalization, a brain CT scan was performed (figure no. 1), which pointed out bilateral subdural fronto-temporo-parietal fluid collection with a slight compressive effect on the adjacent brain parenchyma.

According to the fact that patient's neurological status was normal, the Glasgow coma score (GCS) on presentation was 15, he was discharged with a suitable neuroprotective treatment.

1 month apart, patient started to have headaches and decision of hospitalization was made.

The 2nd brain CT scan revealed bilateral, fronto-temporo-parietal, chronic subdural hematoma with acute hemorrhage (figure no. 2). The patient did not admit that he could lately hit his head, thus, we conclude that this scan appearance is a result of his chronic anticoagulation therapy.

Surgical treatment was indicated in this patient. He agreed for the surgical intervention. Informed consent was obtained from the patient and his family. A bilateral parietal craniotomy was performed with evacuation of both chronic hematoma and placement of 2 parietal subcutaneous drain tubes.

Figure no. 1. Initial CT brain scan: axial, sagittal and coronal view (14th of March)

Figure no. 2- 2nd CT brain scan: axial, sagittal and coronal view (24th of April)

48 h after the surgery, the control CT scan (figure no.

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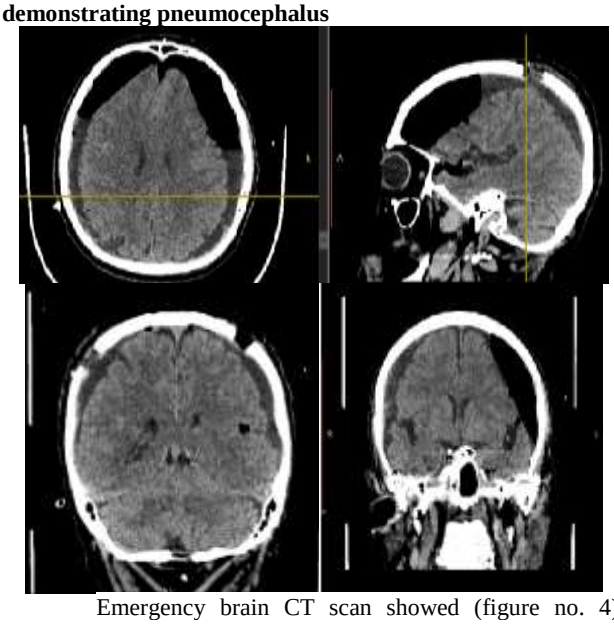
3) delineated infra- and supratentorial pneumocephalus, extended frontal bilateral and temporal on the left, with compressive effect on the adjacent cerebral parenchyma; and bilateral parieto-temporal subdural fluid collection, with slight compressive effect on adjacent brain parenchyma.

Same day, both of drain tubes were removed. Meanwhile, the patient's clinical state was stable and favourable.

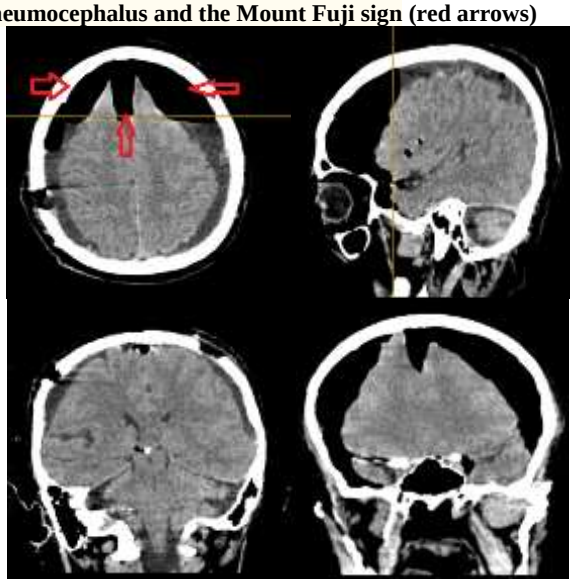
Next day, patient's state suddenly has worsened, he was self-orientated, but confused and delirious while answering to general questions, he was bradylalic and bradypsychic; with a Glasgow score of 13 and reduced pupils' reaction to light.

Figure no. 3. Control brain CT scan, 48 hours after surgery, demonstrating pneumocephalus



Emergency brain CT scan showed (figure no. 4): frontal bilateral tension pneumocephalus. Bilateral subdural fronto-temporo-parietal collections with acute and subacute hematic areas.

Figure no. 4. Brain CT scan, demonstrating tension pneumocephalus and the Mount Fuji sign (red arrows)



The most common radiological finding that we can see in tension pneumocephalus is the Mount Fuji sign. It is the result of the pressure on the frontal lobes. When there is a large accumulation of air in the lateral and anterior part of the frontal lobes, there occurs compression, which is the peaking sign.(5)

The informed consent was obtained from the family as well as the decision of repeated surgery.

A frontal, bilateral craniectomy was performed, with further hemostasis and opening of the visceral membrane on the left side, which was under tension. For filling the cavity, warm saline was used and after this, the dura was closed to give a water-tight seal. 2 frontal subcutaneous drains were placed and the craniotomy wound was closed.

In this case, "gates" that allowed air to get in the cranial cavity, were represented by drain tubes holes, after tubes' removal.

Postoperative evolution was satisfactory, no other complications had occurred and further clinical evolution of this patient was maintained positive, GSC score of 15 points.

Drain tubes were removed 3 days after the surgery (figure no. 5), with proper, sterile incisions' care.

Figure no. 5. Status localis the day drain tubes were removed

The patient will be monitored closely to observe the evolution that follows the surgical procedure.

DISCUSSIONS

Chronic Subdural Hematoma is one of the most frequent neurosurgical conditions. It is linked with a high incidence of mortality and morbidity. There is an annual incidence of 1-5.3 cases per 100, 000 population. An increase in incidence can be caused by different factors, like: aging of population, anticoagulant (like our patient) or antiplatelet treatment, chronic alcohol use and chronic use of anti-inflammatory drugs. One of the biggest challenges of this condition is the frequency of recurrences that tend to be about 5 to 30%. It was shown that the rate of this complication can be reduced by external subdural drains.(6,7)

The use of anticoagulants mainly in older population increases the total of intracranial spontaneous bleeding- the intracerebral either subdural ones. CSH can be caused by minimal, but recurrent bleedings that can lead to a large subdural hemorrhage and causing brain herniation.(8)

When talking about methods of choice in treatment of this condition, the burr holes either drill craniostomy with subdural drainage system are preferable. But in case of extensive subdural fresh blood accumulation, the craniotomy can be needed.(8)

The clinical manifestations of CSH could be: headaches, confusion, seizures, motor deficits, limb or face numbness, speech or swallowing impairment and memory disorder. The other time, patient can have no symptoms.(9) Our patient presented headaches and some difficulties to walk, characterized by periodical instability and falling episodes, but denying any head traumas.

The control CT scan is usually made 3-5 days after surgery, but it is considered that it should be performed only in patients that have a worse clinical state after the surgical intervention. In numerous cases, the CT performed the 1st week after surgery, detected presence of blood in the subdural space,

but it does not request any surgical intervention.(8)

If talking about "location preference", the CSDHs appear more often on the frontal or occipital convexities.(10)

CSDH can be associated with complications like: recurrence, new intracranial hematoma, seizure, cerebral edema, tension pneumocephalus, impossibility of the brain to expand because of the cranio-cerebral disproportion and infections.(11)

Pneumocephalus represents a collection of air in the cranial cavity that usually is resorbed in time without giving any clinical manifestations. Also, it is a frequent phenomenon that follows craniotomy and burr-holes. A rare complication and a neurosurgical emergency that occurred to our patient is tension pneumocephalus- a condition that can affect the clinical state, because of the mass effect.(5)

The Mount Fuji sign can be seen on CT scan in this condition, this appearance being caused by the air compression on the frontal lobes. It happens because the air's pressure in the skull is higher than cerebral fluid's surface tension.(5)

There are two theories that try to explain this occurrence: the 1st one, named "the ball-and-valve theory", when air is flowing in the cranial cavity only in one direction. The cranial pressure being greater than the atmospheric one, leads to trapping the osteomeningeal fistula in the brain tissue, like this blocking the intracranial air and by this causing the midline shift. And the 2nd theory, called 'inverted-soda-bottle-effect'- the air can get into the cranial cavity through an existent fistula/hole, if the intracranial pressure is negative (as it can happen after the neurosurgical intervention).(5)

The presence of air in the subdural space prolongs the period of CSDH's resolve by preventing the adherence of membranes and thus allowing reaccumulation.(5)

Methods of pneumocephalus's prevention could be: placement of subgaleal or subdural drains, saline irrigation of the subdural space, making burr holes on the highest points of the skull, Valsava maneuver and Trendelenburg position maintained at 30°.(12)

Another possible complication can be infection of subdural space with Klebsiella pneumonia.(6)

CONCLUSIONS

Chronic subdural hematoma is one of the most common clinical entities encountered in daily neurosurgical practice, usually encountered in the elderly. Clinical presentation may vary from no symptoms or oligosymptomatic to unconsciousness. In the majority of cases, the history of trauma is frequent, but in this specific clinical case, the hematomas were secondary to use of anticoagulants.

The advent of CT has made a major impact on radiological diagnosis of CSDHs. They are usually hypodense.

Surgery is the treatment of choice in the most of CSDHs. In this case, the technique was craniectomy with burr holes.

Possible complications of surgical treatment are recurrence, seizures, new intracerebral hemorrhage, reaccumulation of the subdural fluid, subdural empyema, tension pneumoencephalus and failure of the brain to expand due to cranio-cerebral disproportion, as it was discussed in the present case. So, pneumoencephalus after surgical evacuation of CSDH is a common finding in the immediate CT scan.

The prognosis in CSDH depends on the age, GCS score at presentation, and associated illnesses like cardiac and renal failure.(2,3,7,13)

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