EXTRADURAL HAEMORRHAGE BY DISJUNCTION OF CORONAL SUTURE. CASE REPORT

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Abstract: *Extradural haemorrhage (EDH) is most often produced by bone fractures with secondary lesion of the middle meningeal artery, being of a higher frequency in the young due to a weaker attachment of the dura mater to the inner side of the cranium. The main cause of the fractures is represented by cranio-cerebral trauma, which occurs mainly through car accidents. The fractures are the cause of vascular ruptures that lead to fast accumulations of blood. These, in turn lead to a high intracranial pressure. EDH is an emergency because it can lead to permanent cerebral lesions and even death when not promptly approached, the aggravation taking place in mere minutes. Next, we present the case of a 48 year-old patient who had been involved in a car accident as a pedestrian. This caused an altered state of consciousness (GCS=6 points) and hemiplegia of the left side limbs.*

Cuvinte cheie: *hemoragie extraduralĕ, hipertensiune intracraniană, traumatism cranio-cerebral*

Rezumat: *Hemoragia extraduralĕ (HED) este cel mai adesea cauzată de fracturi osoase cu leziunea secundară a arterei meningee medii, fiind mai frecventă la tineri deoarece meningele nu este foarte bine atașat de endocraniu. Fracturile au ca și cauză traumatismele cranio-cerebrale, produse cel mai adesea prin accidente rutiere. Prin acestea se produc rupturi vasculare care duc la acumulări rapide de sânge, care duc la creșterea presiunii intracraniene, rezultând sindrom de hipertensiune intracraniană (HIC). HED este o urgență deoarece poate duce la leziuni cerebrale permanente și chiar exitus dacă nu e tratată la timp, agravarea producându-se în minute. Alăturat prezentăm cazul unui pacient de 48 de ani, implicat într-un accident rutier în postura de pieton, în urma căruia a prezentat stare alterată a conștienței cu GCS 6 puncte și hemiplegie a membrelor de partea stângă.*

CASE REPORT

Patient, aged 48, smoker, is involved in a car accident as a pedestrian in May 14, 2014. Following the accident, the patient suffered multiple injuries, being examined in the emergency unit and released afterwards with CGS = 15 pts. 6 hours later, there has been an alteration of the consciousness with a GCS of 6 points, and the occurrence of a motor deficit in the left hemi-body, leading to his taking over by the first aid crew and his transportation in the emergency service.

In the first instance, the patient was monitored, presenting vital signs - BP = 130/80 mm Hg, AV = 100b / min. Oro-tracheal intubation was practiced with prior sedation. Neurological examination showed a coma with GCS of 6 points, impossible gait and orthostatism, equal, intermediary pupils, hemiplegia on the left side, osteotendinous reflex present bilaterally, diminished on the left side, plantar reflex in flexion on the right side and slightly in extension on the left side.

Brain CT scan was decided, which detected an acute extradural blood collection F-T right-sided with a maximum thickness of about 4 cm, with the deviation of the midline structures to the left of about 2 cm (subfalciform engagement) and transtentorial engagement, cortical grooves deletion with diffuse cerebral edema appearance (figure no. 1).

Following this diagnosis and the patient's condition, the emergency surgery is decided upon. An arched scalp incision for right-sided F-T-P craniotomy is practiced. After scalping, one could notice the large dehiscence of the coronal suture (figure no. 2).

Craniotomy was practiced, including the dehiscence fragments and a giant extradural hematoma could be seen on the right-sided F-T-P (figure no. 3) that was evacuated (figure no. 4). Hemostasis was practiced. The dura mater was suspended, the bone flap was repositioned by remodelling the dehiscent fragments with cranial vault structure reconstruction and with the positioning of the drain.

Figure no. 1. CT appearance upon admission

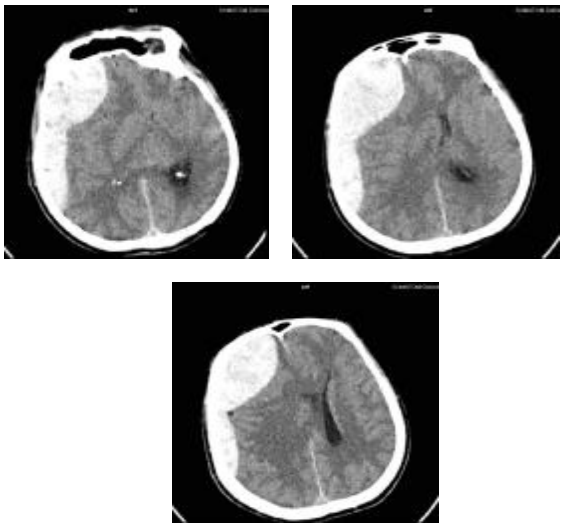

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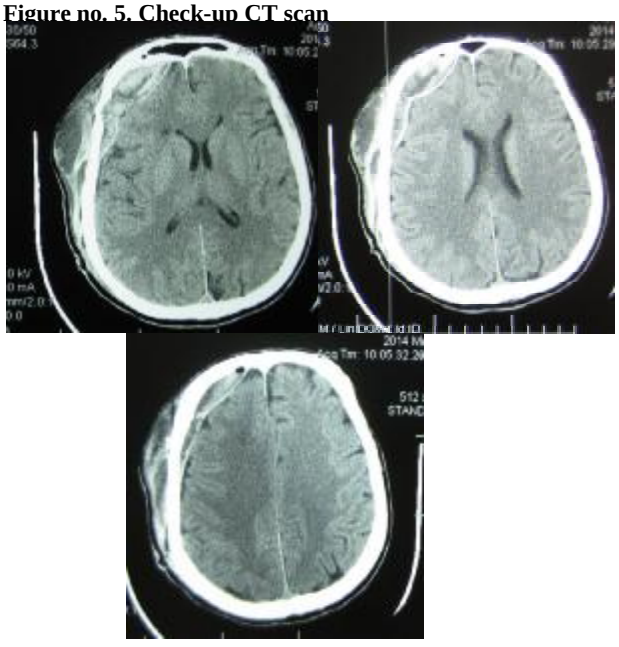
Figure no. 2. Dehiscence of the coronal suture

Figure no. 3. Right-sided F-P-T extradural hemorrhage, intraoperative appearance

Figure no. 4. Intraoperative appearance, after the evacuation of the extradural hemorrhage

The patient has been admitted to the ICU ward until 18/05/2014, when he was transferred to the neurological ward, with improved general condition and total remission of left limb motor deficit. Antibiotic and hemostatic therapies were preserved. During the night, the patient was agitated psychomotorly, removed his bandages and the surgical wound started to bleed.

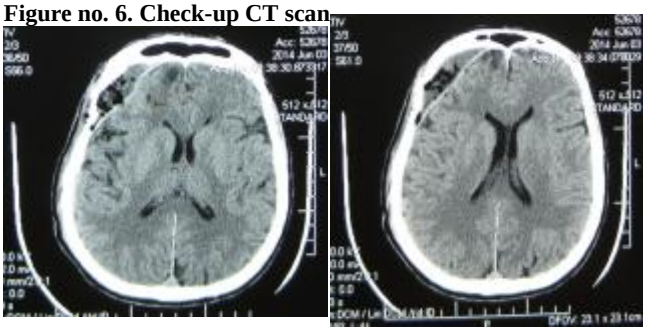
Figure no. 5. Check-up CT scan



On 26/05/2014, a control cranial CT scan was practiced, which detected a collection of extradural mixed density (fluid and blood) right-sided F, without mass effect, epicranial fluid collections right-sided F-T (figure no. 5). For this reason, surgical intervention was decided to evacuate the hematoma with the preservation of the drainage tube.

After this procedure, the patient's general condition gradually improved. A control CT scan was practiced again on 06/03/2014, which revealed a remaining epidural fluid collection right-sided F less than 1 cm, without mass effect (figure no. 6).

Figure no. 6. Check-up CT scan



The patient was discharged in a conscious status, CGS = 15 pts., with complete remission of the motor deficit, the wound healed, afebrile.

DISCUSSIONS

Most extradural hemorrhage (EDH) are traumatic being associated to local external traumic lesions (lacerations, contusions, hematomas). Depending on the impact force, the episode of loss of consciousness may be absent, of short or long term. Classic lucid interval occurs in 20-50% of patients with EDH. Initially, the impact force can result in the loss of consciousness. After the return to consciousness, EDH may extend until the mass effect can lead to intracranial hypertension, impaired consciousness.

In the case of severe intracranial hypertension, clinical manifestations may occur including the Cushing classic triad: systemic hypertension, bradycardia, respiratory distress that occurs when cerebral perfusion, especially at brainstem level is compromised thorugh the intracranial hypertension. Antihypertensive therapy may produce cerebral ischemia and cell death. Improvements can be achieved through the evacuation of EDH.

Neurological evaluation is essential, aiming at consciousness status level, motor activity, eye opening, speech, photomotor reflex, signs of lateralization (hemiparesis / plegia). GCS is very important in assessing the patient's condition.(1)

EDH treatment depends on various factors with negative effects: mass effect, intracranial hypertension, herniation of brain substance. Treatment options for such patients are immediate surgery or the initial conservative approach with a possible subsequent evacuation, situation in which careful monitoring is necessary, the increase in volume of EDH is faster than of subdural hematoma. Conservative approach is suitable for patients with small lesions without patological neurological signs (eg: EHD of the temporal pole venous origin EDH) with small zises, less than 1cm on CT.

It is recommended that in patients with EDH with a length less than 30 mm, thickness less than 15 mm and midline effect less than 5 mm without focal neurological deficit, GCS> 8 may be approached conservatively. Early imaging monitoring is associated in order to observe the size of the hematoma. In the

case of a marked growth and / or anisocoria or motor deficit, surgical intervention will be practiced.(2,3,4)

If EDH has a volume > 30 ml, it is recommended either to be evacuated, regardless of GCS, especially when the hematoma has a thickness of 15 mm and a midline effect greater than 5 mm, in which case the majority of patients have impaired consciousness or signs of lateralization.(5) Also, in initiating the surgical approach, the location of EDH is also very important. Large and expansive temporal EDH can lead to uncinate herniation and rapid deterioration. EDH in the posterior fossa, usually associated with lateral venous sinus obstruction requires prompt intervention due to the limited space.(6,7)

Many EDH *complications* occur when the pressure exerted has as effect the brain mass movement. When a subfalciform herniation occurs, anterior cerebral artery (ACA) and posterior cerebral artery (PCA) can occlude and cerebral infarction may occur. Transtentorial herniation can lead to bleeding in the brain stem, especially in the bridge. Transtentorial herniation may result in ipsilateral oculomotor nerve palsy (ptosis, mydriasis, impossible verticle movement, eyeball abduction), with long term recovery after removing the cause.

In children under 3 years old, a skull fracture may result in a leptomeningeal cyst or progressive fracture. Cysts are formed because the cerebral mass is developing, preventing the fracture to heal, forming a dural “polyp” and removing the fracture edges.

There is a risk of permanent brain damage regardless of the therapeutic approach. Some complaints (epileptic seizures) can persist for months, even under treatment, but they usually get attenuated or disappear completely. It is to be noticed that the onset may be at 2 years after the surgery.

Recovery in adults is done especially in the first six months, with improvements over two years. Children recover more quickly and completely than adults. Incomplete recovery is due to remaining brain damages.

Other permanent complications include paralysis or numbness, herniation of brain tissue with coma, normotensive hydrocephalus that can lead to weakness, headache, incontinence, gait difficulties.(8)

Prognosis. Recovery varies greatly from case to case. The most important predictor factors are initial GCS, photomotor reflex, presence or absence of motor deficits and associated brain lesions detected on CT scan.(9)

As a feature of the case, we note that the fracture produced a coronal suture disjunction with the flap centred on the disjunction. In this case, suture disjunction was required. Also, mention must be made of the evolution in two times, with the intermediary lucid interval, the patient being initially treated without intracranial traumatic pathology.

CONCLUSIONS

1. EDH is a neurosurgical condition that can be solved by clinical and imaging monitoring or surgical evacuation. Prompt diagnosis and appropriate approach may result in a low mortality and good functional results.
2. Neurosurgical clinical and imaging surveillance is mandatory in the case of traumatic brain injury (TBI) with impaired consciousness with repeated head CT exam whenever the patient’s condition requires.
3. Prompt neurosurgical intervention is required.
4. Neurological worsening requires imaging reassessment and neurosurgical intervention when needed.
5. The growing experience and interest in minimally invasive techniques, the accomplishment of a burr hole for the evacuation of hematoma can be considered as a manoeuvre of first intention.

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