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Mirror image extradural hematoma in elderly population: management strategy with surgical bilateral or unilateral evacuation or conservative treatment modality with literature review

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Abstract: Extradural hematomas (EDH) represent one of common imaging findings in cases sustaining traumatic brain injury. Bilateral extradural haematoma is considered rare and even rarer in elder people male. Bilateral extradural hematoma is usually acute, and generally associated with severe traumatic head injury. Mirror-image extradural hematomas (MEDH) constitute a special type of bilateral extradural hamatomas, which is placed anatomically symmetrically on both the sides of the intracranial compartment, requires prompt diagnosis and emergent surgical intervention as it carry high mortality if evacuation of hematoma is not carried out expeditely. The mortality rate still remains higher in comparison to unilateral single extradural hematomas. The postoperative outcome depends on preoperative neurological status, total volume of blood, accurate diagnosis and prompt shifting to neurosurgical facility, expatiation of surgical procedure, pre- hospital care. Authors report a case of a - 65-year-old man who presented with acute simultaneous bilateral extradural haematomas following road traffic accident, underwent bilateral trephine craniotomy and simultaneous evacuation on both side led to good recovery.

Key words: mirror image extradural hematoma, simultaneous evacuation, bilateral trephine craniotomy

Introduction

Mirror-image extradural hematomas (MEDH) are usually placed anatomically

symmetrically on both side of the intracranial compartment. It occurrence is extremely unusual and carries associated high mortality

and morbidity due to rapid rise in the intracranial pressure which lead to transtentorial herniation so need to be managed by surgical evacuation on emergency basis. The incidence is about 1.8 %. (1)

Further acute extradural hematomas are infrequent among elderly patients. A greater adhesion between calvarial bone and endosteal layers of dura is responsible for very low incidence elderly persons and lucid interval is less common. (2) The most frequent mechanisms in elderly for extradural hematomas include falls and assaults. (2)

Case Illustration

A-65- year male presented with loss of consciousness following motor vehicular accident, while he was riding bicycle hit by speeding car with right sided hemiparesis associated with repeated episodes vomiting and ear- nose bleed with one episode of generalized tonic - clonic seizure. He was immediately intubated in emergency services nad put on ventilatory support. Examination at arrival, vitals were stable with GCS was 8/15(E3M4VET). On Neurological examination revealed, his right pupil was dilated not reacting to light with left sided paucity of movement.

Non-contrast CT scan head revealed presence of bilateral extradural hematoma located over frontoparietal region on both side of intracranial compartment, more on left side with right temporal contusion with presence of mass effect producing mass effect, as chinked ventricle on right side with subfalcine herniation. (Figure 1)

He was rushed to operation theatre from

CT room, bilateral trephine craniotomy (Figure 2) was made with about 25 ml hematoma on right side and 100 ml on left sided was evacuated (Figures 3, 4A&B, 5, 6) The source of bleed was identified and coagulated, hemostasis secured. At the end of surgery the brain was lax, multiple hitch sutures was taken. The bone flap was replaced and central hitch taken subgaleal extradural drain placed and wound were closed in layers. Following surgery, he was extubated on third post- operative day with slow recovery of hemiparesis.



Figure 1 - NCCT head showing mirror image extradural hematoma causing mass effect with subfalcine herniation

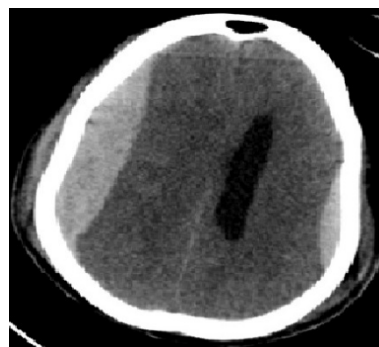


Figure 2 - NCCT head showing mirror image extradural hematoma causing mass effect with subfalcine herniation



Figure 3 - Intra-operative view of bilateral trephine craniotomy

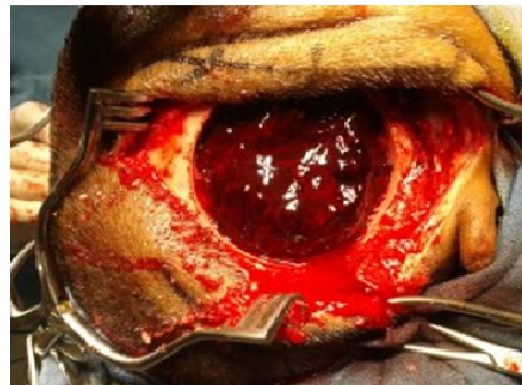


Figure 4B - Intra-operative photograph showing right side extradural hematoma



Figure 4A - Intra-operative photograph showing left side extradural hematoma



Figure 5 - Clinical photograph of evacuated hematoma of Mirror image extradural hematoma

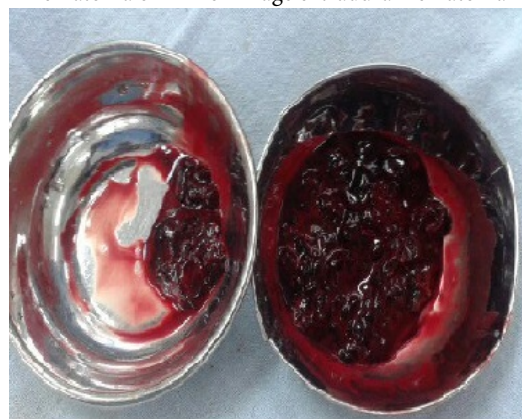


Figure 6 - Clinical photograph of trephine bone flap raised for evacuation of Mirror image extradural hematoma

Discussion

Usually, bilateral extradural hematoma tends to occur more commonly in the young adult patients. The reported incidence range varies 2 to 10%. [6-8]

Male to female ratio is 5:1; as male are more affected as outdoor activity, can be found across the midline in about 50-70% of cases. ([8-10] there is associated skull fracture observed in about 95-100% of patients in their imaging study. [7, 8, 9, 11] In that case of bilateral EDH with fractures across the midline, the source of bleeding may result from the superior sagittal sinus. [12]

EDHs are contact injuries resulting from blunt trauma to the skull; it was thought that the initial impact with cranial fracture detaches the dura and injures blood vessels - once bleeding begins, the extradural space fills with blood. (2-60) Depending on the source of bleed in extradural hematoma, the bilateral extradural hematoma can be classified into venous and arterial origin. The venous bleeding source type is much commoner, as blood accumulate slowly, so presents with delay following accident but may present quite rapidly and patient can show neurological deterioration very quickly. Further venous bleeding is slower, so tends to be smaller in size and less severe due to the ease of spontaneous arrest.

Arterial bleeding produces hydrostatic water pressure effects progressively stripping away the dura from the skull and widening the perimeter of the hematoma.

The elderly are less likely to manifest signs or symptoms of increased intracranial

pressure due to cerebral atrophy, and almost all haematomas commonly used to occur in the parietal area (3).

MEDH usually follows sustaining significant head trauma resulting in rapid, occasionally late deterioration in sensorium, even in patients with initial no neurological deficits; this indicates rapid expansion with imminent tentorial herniation of the brain with rapid rise of intracranial pressure. [12]

Rarely, MEDH may develop sequentially rather than simultaneously and may escape imaging evaluation on initial cranial CT scan further serial cranial CT scanning is also important for diagnosis when a patient deteriorates in the post-operative period following removal of the unilateral haematoma. [7, 12]

Verma et al. advocated rapid evacuation for such lesions, which is the key for good neurological outcome. (1) Majority of cases with MEDH require surgical evacuation, sometimes bilateral simultaneous craniotomies as our case was managed by bilateral trephine craniotomy with evacuation of extradural hematoma. [10, 11] However, few surgeons in past tried conservative measure of management [10] but need vigilant clinical observation in ICU setup with no neurological deficit, very small amount of intracranial blood, serial cranial computed tomography imaging, and arrangement for bed side burrhole or trephine facility should be available. We strongly feel bilateral evacuation is usually required as patient presents with delay, having poor GCS, imaging showing sizeable blood collection with associated mass effect.

Post-operative results were satisfactory. Hamlat et al. analyzed 14 elderly male with unilateral extradural hematoma, which was managed with surgical evacuation with 7.2 % mortality, highlighting early diagnosis and urgent surgical treatment is highly advocated. (3) Authors concluded extradural hematoma in elderly following a fall, carries better prognosis. (3) Huda et al. analyzed 46 patients with double extradural hematoma, 39 cases with bilateral EDH underwent bilaterally surgical evacuation. (5)

Conclusion

Mirror image extradural hematoma (MEDH) are anatomically and symmetrically placed extradural hematoma on both side of the intracranial compartment needs prompt diagnosis, early referral to neurosurgical centre and emergent bilateral surgical evacuation in poor neurological grade patients can improve the neurological outcome as our had good neurological outcome.

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