Small ‘b’ Affecting the BIG ‘B’

Dr. Viren B. Attarde
MBBS, MD, DM (Critical Care Medicine)
Assistant Professor
Dept Of Critical Care Medicine

At Presentation…

- 22 year old female presented with alleged history of RTA on 29/4/23.
- She received initial treatment at local hospital at Thergaon and later transferred to DYPMC Hospital.
- H/o Loss of consciousness & retrograde amnesia present.
- Vital on admission to CCM:

Pulse 130 per minute, BP 120/74, Spo2 98% and RR 20/min.

Neurologically conscious irritable and obeying simple commands.

- GCS E3 V5 M6

- Bilateral periorbital ecchymosis present
- Left shaft of femur fracture present with Thomas Splint in situ.
- Right upper limb distal end radius and ulna fracture present.
- CT brain was suggestive of small hemorrhagic contusions in the right frontal, anterior high parietal and right temporal lobe. No obvious fracture or mid line shift noted.
- CT spine: NAD
- X ray pelvis suggestive of small minimally displaced oblique fracture of the postero superior wall of the acetabulum.

- Pulmonology review done for Lung Contusions that were present in Right upper middle and lower lobes- Managed Conservatively.

- 24 hours post admission patient had seizure (GTCS) episode. Anti epileptic medications optimised and repeat brain CT was done.

- On day 2 patient was intubated and ventilatory support initiated i/v/o decreased GCS and airway protection. Subsequently MRI brain with angio was planned.
- MRI brain suggestive of diffuse axonal injury **(Grade I-II)** in Right Frontal lobe /multiple tiny Infarct in B/L cerebral hemisheres ?embolic with SAH.
- At this stage GCS was E2 VT M4.

- Patient posted for orthopaedic surgical intervention:

- Left shaft of femur ORIF with platting

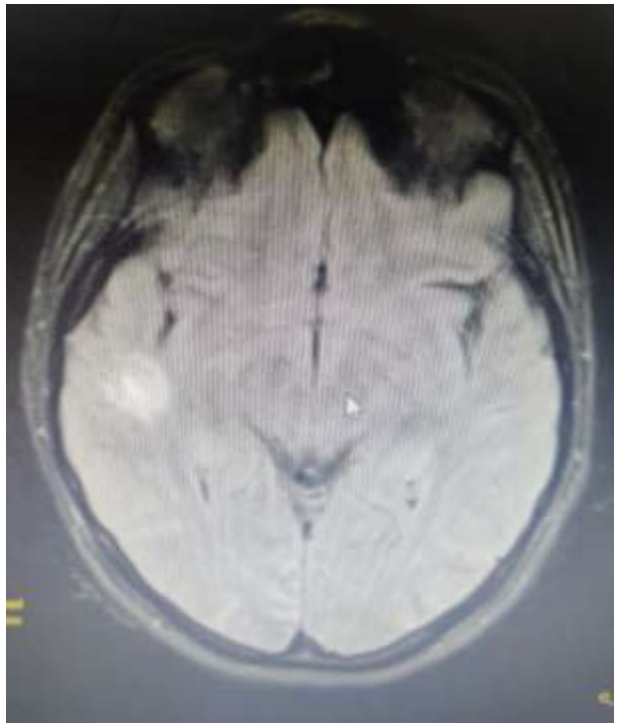
- Right Ulna ORIF with platting

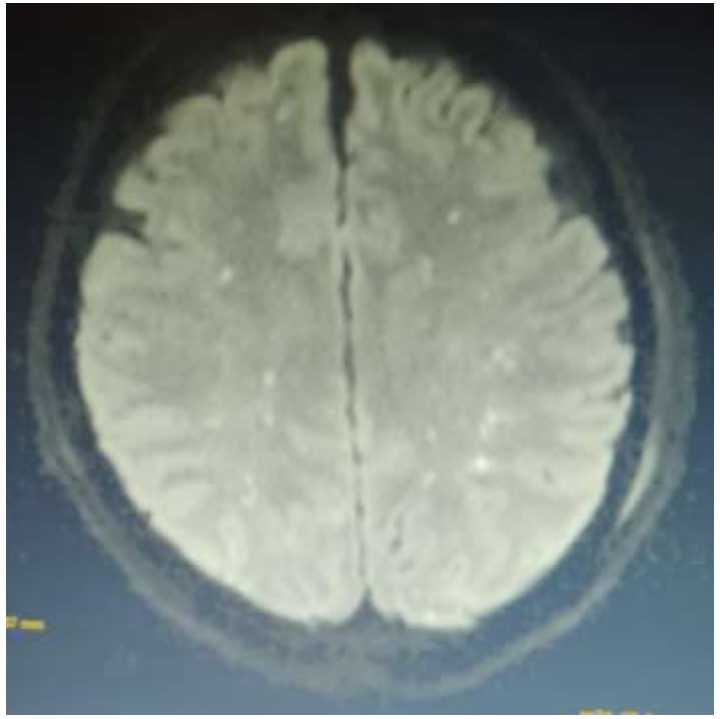
- Right Distal End Radius : K wiring

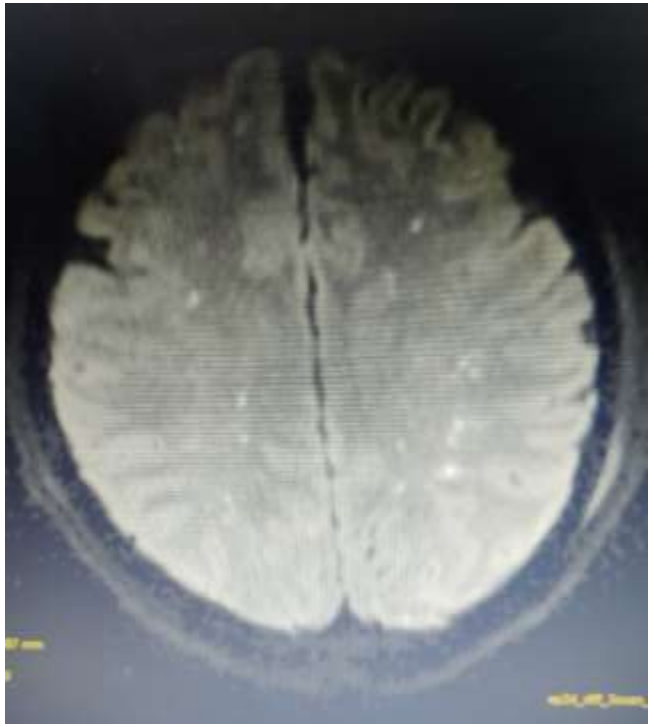
- Right base of 5^{th} metacarpal : K wiring.

- Right ICD placed i/v/o moderate pleural effusion. 400ml drained.
- 2D echo suggestive of raised Pulmonary artery pressure. No evidence of PFO. ?Fat embolism.
- CTPA was done. no evidence of pulmonary thromboembolism.

MRI







Fat Embolism syndrome.

The fat embolism syndrome can be divided into three types:

- Subclinical FES - It manifests as reduced partial pressure of oxygen (PaO2) on arterial blood gas (ABG) with deranged blood parameters (reduced haemoglobin or thrombocytopenia) associated with fever, pain, discomfort, tachypnoea, tachycardia. However, there is no respiratory distress. However, it is often confused with post-operative symptoms of fever, pain, and discomfort.

- Subacute FES (non-fulminant FES) - The three characteristic features of fat embolism are present: respiratory distress, neurological signs, and skin petechiae. Petechiae are seen on the chest, axilla, shoulder, and mouth. Occulsion of dermal capillaries by the fat emboli result in petechial rash. Petechiae rash occurs in 50 to 60% of the cases.[7] Neurologic signs such as confusion, stupor, and coma may be present. These are usually temporary and do not happen on one side of the body. Respiratory distress can be mild and tends to improve on the third day. Retinal changes similar to Purtscher's retinopathy may also be present. Retinal changes happens in 50% of the patients with FES. These are the cotton wool exudates and small haemorrhages along the retinal vessels and macula.

Fat Embolism syndrome…

- Fulminant FES - This type of FES is much rarer than the above two types. It usually happens within the first few hours of the injury. The three characteristics of FES existed in the most severe form. Cause of death is usually due to acute right heart failure.

Cerebral Fat Embolism…

- MRI
- Lindell Gentry translated the histopathologic grading system to imaging in the following manner in a review article in 1994:
- **stage 1** (lobar): diffuse axonal injury lesions confined to the lobar white matter, especially grey-white matter junction
  - most common sites: parasagittal regions of frontal lobes, periventricular temporal lobes
  - less common sites: parietal and occipital lobes, internal and external capsules, cerebellum
- **stage 2** (callosal): diffuse axonal injury lesions in the corpus callosum, almost invariably in addition to the lobar white matter
  - most common sites: posterior body and splenium of corpus callosum
  - less common sites: anterior body and rostrum of corpus callosum (usually in conjunction with posterior involvement)
  - usually unilateral and eccentric but may be bilateral and symmetric
- **stage 3** (brainstem): diffuse axonal injury lesions in the brainstem, almost invariably in addition to the lobar white matter and corpus callosum
  - most common sites: dorsolateral midbrain, upper pons, and superior cerebellar peduncles

- Thank you…