MIDDLE MENINGEAL ARTERY EMBOLIZATION IN CHRONIC SDH PATIENTS

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Background

Chronic subdural haematoma (CSDH) is an encapsulated collection of fluid, blood and blood degradation products layered between the arachnoid and dura mater coverings on the brain's surface.

The prevalence of cSDH is approximately 14 patients per 100 000 in the general population, with an increase to 17 per 100 000 in the >70-year-old population. (1)

Aside from age, other well-established risk factors include male gender, usage of antiplatelet or anticoagulant medication, and chronic alcoholism. Early stages are insidious and without clear symptoms. Later stages may include gait disturbance and falls, mental deterioration, limb weakness, acute confusion, headache, drowsiness or coma, speech impairment, collapse, and seizure.

Surgical management with burr-hole or craniectomy is the current treatment of choice for managing cSDH. Middle meningeal artery embolization (MMAE), however is a relatively new non surgical treatment modality (1) for managing cSDH or its recurrence.

Recurrence rates following burr hole irrigation or craniotomy range from 5% to 30%(1), often requiring a rescue re-operation.

MMAE is an emergent adjunctive or alternative therapy that might modulate the recently proposed pathophysiology of cSDH through neo-vessel devascularization with an embolic agent to disrupt the vascular supply that contributes to hematoma maintenance and expansion resulting in avoidance of a noninvasive surgical procedure as well as for prevention of a recurrence.

Aim

To ascertain if middle meningeal artery embolization (MMAE) safety and efficacy in managing patients with cSDH and its ability to prevent reoccurrence

Method

From January 2024 till January 2025, 46 patients with CSDH underwent surgery in our hospital. Among these patients, recurrence of cSDH was observed in 5, which underwent MMA embolization. No patients were taken up for primary MMAE .

Result

5 patients out of total 46 (11%) presented with both clinical and radiographic recurrence with clinical symptoms attributable to chronic SDH with an increase in size from the postoperative CT and were previously operated (burr-hole).

These 5 patients included 4 men (80%) and one female (20%). Age of male patients varied between 63-70 years and the single female patient was 54 years old. MMAE was performed on all 5 recurrent SDHs.

Occlusion of the frontal and parietal branches of the MMA was confirmed under fluoroscopy. Clinical symptoms in all 5 patients were significantly improved or resolved by latest follow-up.

All 5 patients (100%) had significantly reduced cSDH in size.

For the 5 patients with MMA embolization alone, 1 achieved 50% reduction in 2 months and 1 achieved >75% in 2 months and 3 achieved complete resolution at 3 months. There were no procedure related complications, and there were no subdural recurrence, nor any need surgical evacuation of the hematoma.

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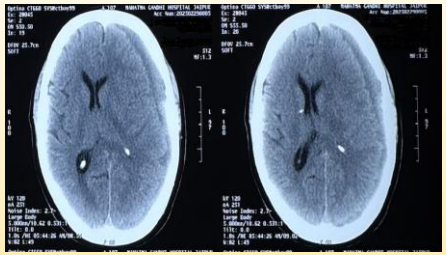
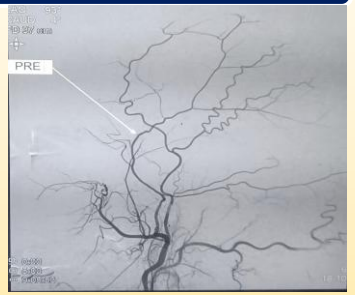
Result

Case	Age	Sex	Max Diameter/ Midline shift	Requiring Surgery	Status at last follow up
1	63	M	15mm/4mm	NIL	Complete resolution in 3 months
2	65	M	10mm/3mm	NIL	> 75 % reduction in 2 months
3	54	F	15mm/5mm	NIL	Complete resolution in 2 months
4	70	M	12mm/3mm	NIL	Complete resolution in months
5	69	M	16mm/4mm	NIL	> 50% resolution in 2 months

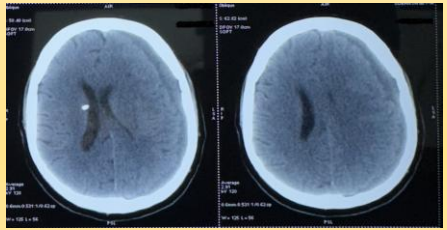
Result



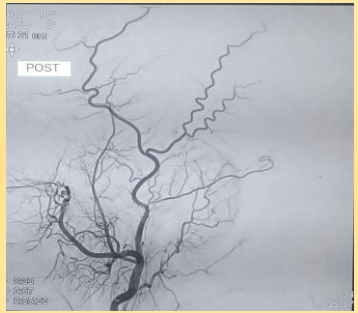
Pre MMAE CT scan



Pre MMAE DSA



Post MMAE (Day 4) CT scan



Post MMAE DSA

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Discussion

CSDH is often observed in elderly people after head trauma. Steroids are also reported to contribute to adsorption of hematomas. A single burr-hole surgery with irrigation and drainage is the curative treatment for CSDH (2).

Reports revealed that about 3.7% to 30% of patients have recurrence of CSDH (2). In our series , the ratio of first-time recurrence of CSDH was 11% (5 of 46 patients) in all cSDH cases.

Large craniotomy, creating a subdural-peritoneal shunt or placing an Ommaya reservoir for permanent drainage of an intra- cranial hematoma, have been proposed as a treatment modality for recurrent cSDH (2).

These treatments modalities might induce infection or other complications. Prevention of subdural haemorrhage by occlusion of the MMAE has been proposed as an alternative therapy for recurrent CSDH (2).

A Study (3)showed recurrence of cSDH in 10% patients who subsequently underwent MMAE with a favourable outcome in the patients after 6 weeks which is similar to our study.

Another case series (2) reviewed 5 out of 6 cases, in which MMAE was successful with no recurrence of CSDH.

Another Study (4) showed MMAE in 6 out of 7 patients with occurrence after surgery and embolization was technically successful using polyvinyl alcohol particles measuring 150- 250 microns and there were no complications. In 6 of the 7 treated SDHs, follow-up CT scans demonstrated significant reduction in size at longest follow-up which was similar to out study.

Conclusions

In this case series of 5 patients presenting with postoperative recurrent chronic SDHs, all 5 patients were successfully treated with MMA embolization and were able to avoid surgery for re-evacuation with no complications, suggesting that this minimally invasive technique may represent an effective alternative to surgery.

References

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