



Endovascular treatment of subdural haematoma in patient under anti-platelet therapy: a case report

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Introduction: The incidence of chronic subdural haematoma (cSDH) is relatively high among the elderly population. Other known risk factors for cSDH include male sex, dependency on anti-platelet or anticoagulant medication, and chronic alcoholism. Although, the standard mode of treatment for cSDH is surgery, embolization of the middle meningeal artery (MMA), either upfront or as an adjunct to surgical evacuation can be used for the treatment of cSDH.

Case presentation: The authors present a case of a 75-year-old female with prior history of posterior-lateral wall myocardial infarction (MI) eight years back presented to our centre with the chief complaints of a gradual onset of cough and headache for 2 months. The patient had no history of trauma, loss of consciousness, seizures, and vomiting. There was no history of diabetes, hypertension, pulmonary tuberculosis, and other chronic illness.

Discussion: The concurrent use of anti-platelet drug during a surgical procedure can make the treatment challenging. Endovascular treatment can be a primary treatment modality in such situation.

Conclusion: Elimination of blood supply by middle meningeal artery embolization is emerging as a safe, minimally invasive alternative to treat cSDH.

Keywords: anti-platelet therapy, chronic subdural haematoma (cSDH), elderly, middle meningeal artery embolization

Introduction

Chronic subdural haematoma (cSDH) is an accumulation of blood between the dura-mater and arachnoid^[1] and is a commonly encountered neurosurgical case. The incidence of (cSDH) is ~1–5.3 per 100 000 people and its incidence increases to 8.2–18.8 per 100 000 in people above 65 years of age^[2]. Apart from age, other well-established risk factors include male gender, dependency on anti-platelet or anticoagulant medication, and chronic alcoholism^[3]. The presenting symptoms include gait disturbance and falls, mental deterioration, limb weakness, acute confusion, headache, drowsiness or coma, speech impairment, collapse and seizure^[4]. The standard mode of treatment for cSDH is surgery. However, eliminating the blood supply by embolization of the middle meningeal artery (MMA), either upfront or as

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HIGHLIGHTS

- Chronic subdural haematoma(cSDH) is a commonly encountered neurosurgical case with higher incidence rate in the elderly population.
- The concurrent use of anti-platelet medication in a patient of cSDH during a perioperative phase increases the risk of bleeding.
- As the embolization of middle meningeal artery reduces the recurrence rate of cSDH, it is emerging as a safe non-invasive procedure for the treatment of patients with cSDH

an adjunct to surgical evacuation, has emerged as a minimally invasive treatment for cSDH^[2]. In this case report we share our experience of performing MMA embolization for bilateral cSDH in our hospital. This case report has been reported in line with the SCARE criteria^[5].

Case presentation

A 75-year-old female with previous history of posterior-lateral wall myocardial infarction (MI) eight years back presented to our centre with the chief complaints of a gradual onset of cough and headache for 2 months, she developed gradual onset headache which was initially on the left side and later it progressed to right side. The pain was dull aching with no diurnal variation. The patient had been regularly using aspirin and glyceryl trinitrate for eight years. The patient denied the history of trauma, loss of consciousness, seizures, and vomiting. The patient had no history of diabetes, hypertension, pulmonary tuberculosis, and other chronic illness. She did not consume alcohol or tobacco. On examination she was well oriented to time, place, and person and

her vitals were within the normal range for her age. Cranial nerve examination, motor, sensory, and autonomic examination revealed normal findings.

A head computed tomography (CT) revealed a concavo-convex shaped mixed density subdural haematoma which was predominantly iso-dense extra-axial collection along bilateral cerebral convexities more along the frontal region. (Fig. 1) Layering of the hyperdense components were seen within the collection suggesting acute on chronic haematoma. T2-weighted MRI scan showed bilateral subdural collections. (Fig. 2) During the hospital stay, patient had platelet count of $137\ 000/\text{mm}^3$, urea and creatinine level of 10.4 mmol/l and 106 micromol/l respectively. Her prothrombin time/ international normalized ratio was 17 sec/1.41.

Considering the chronic nature of the haematoma and the concurrent use of antiplatelets, an MMA embolization was planned. Multiple attempts of Digital Subtraction Angiography (DSA) by the femoral artery failed because of the vascular tortuosity. The radial artery also had tortuous course and narrow lumen due to thick atherosclerotic plaque thus right brachial artery was used as an access for the embolization. Selective cannulation of distal part of MMA was done and the embolization of the anterior and posterior branches of

bilateral MMA was done with poly vinyl alcohol (PVA) particle. The post-embolization scan showed non opacification of anterior and posterior branches of MMA (Fig. 3). There were no post-procedural complications. The patient was discharged to home two days later.

In the first outpatient follow 7 days after the discharge, the patient showed gradual improvement of headache. On follow up after 1 and 3 months she was improving and had no other complains. (Fig. 4).

Discussion

The successful initiation of MMA embolization in our hospital marks a remarkable landmark for the healthcare system in the nation. It expands the treatment options and providing the optimal health care to patients with bilateral for patients with cSDH. This early experience not only manifests the achievements but also encourages other health care professionals for further research, collaboration, and training, aiming to broaden the benefits of this advanced intervention to a larger number of patients in the future. We aim to exhibit our ability to effectively

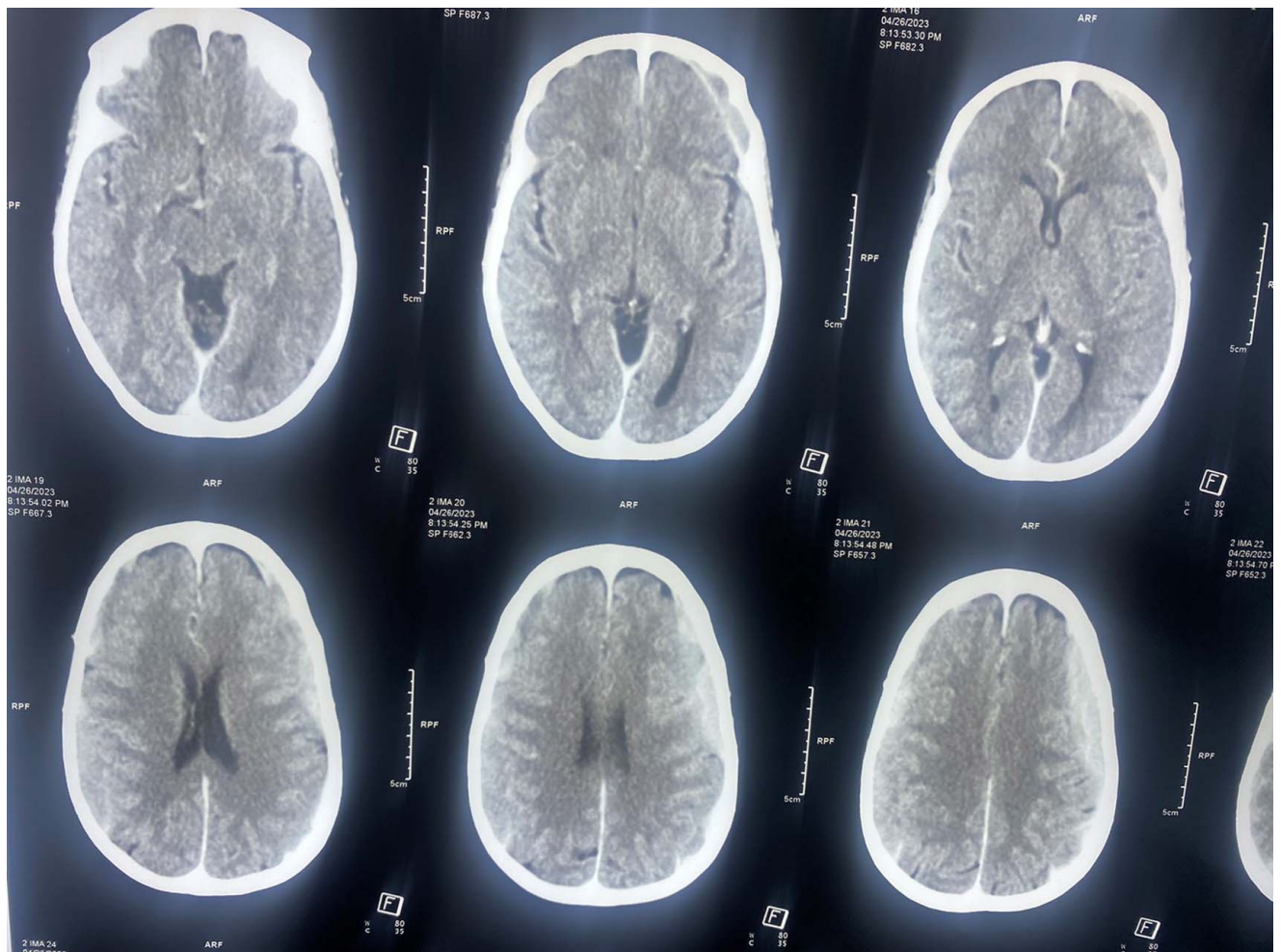


Figure 1. Pre-embolisation computed tomography scan showing mixed subdural hyper and hypodensities suggesting acute on chronic subdural haematoma.

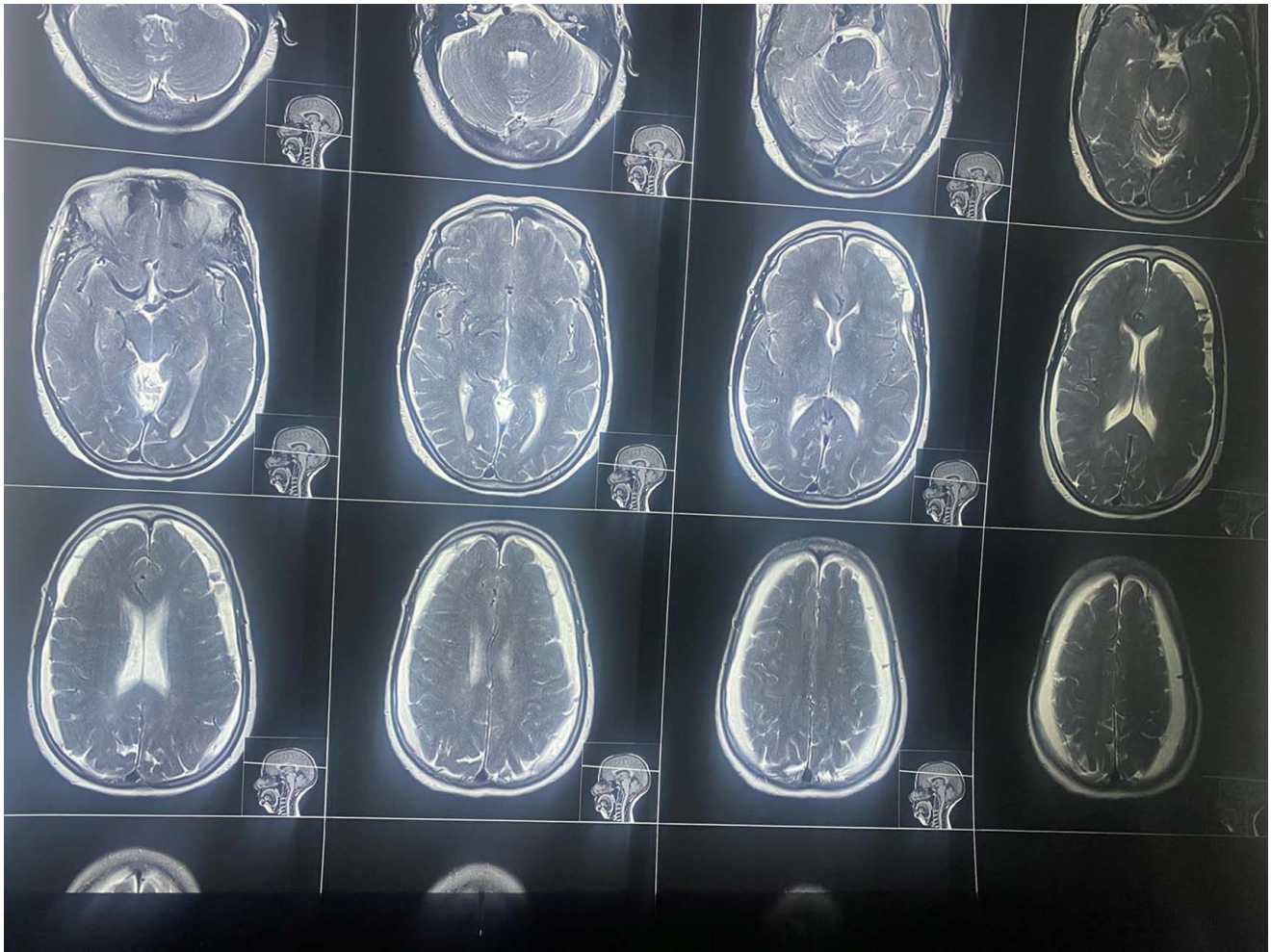


Figure 2. T2 MRI showing bilateral subdural collections.

manage cSDH and prevent recurrences in the future. This report serves as a pioneer and informative document.

The fragile vascular neo-membrane derived from the dura-mater undergoes repetitive cycles of breakdown and reconstitution leading to cSDH pathogenesis and recurrence. Collection of blood within the subdural space, induces an inflammatory response leading to fibroblast proliferation, granulation tissue formation along with the release of angiogenic factors that results into the formation of a neo-membrane within 3–4 weeks of the primary injury. The leakage from the neo-membrane capillaries containing highly permeable endothelial gap junctions, might contribute to cSDH enlargement and recurrence^[2].

The diagnosis of chronic SDH is clinically challenging, as the early stage of the disease can usually remain insidious, while the later-stage symptoms can be hard to recognize^[6]. CT has a major role in the evaluation and the diagnosis of subdural haematomas. The cSDH mostly appears hypo, hyper or mixed density, repeated trauma may cause acute bleeding that makes a lump or a layer of hyper-density within hypo or iso-dense haematoma^[7].

Variety of surgical approaches are available for the treatment of cSDH. Burr hole craniotomy followed by irrigation of the subdural space, with or without sub peri-osteal or subdural drain placement, is the preferred technique for cSDH evacuation at many health centres^[2]. As a general rule, haematomas greater than 1 cm in diameter or with midline shift or hypertensive aspects on neuroimaging are prone to surgical evacuation independently of symptoms^[8].

Although cSDH drainage is not technically difficult, our patient was unique with previous history of MI and was on aspirin; the discontinuation of this medication potentially increasing the risk of thromboembolic and cardiac events^[9]. It is MMA that is believed to feed the capillaries involved in the formation of cSDH. Thus, eliminating the blood supply to the neo-membrane by embolization of MMA can be a better minimally invasive treatment for cSDH. It has previously been highlighted that bilateral cSDH themselves are risk factors for recurrence^[3]. Our patient has bilateral cSDH so there are high chances for recurrence. The recurrence rate of cSDH after the conventional surgical evacuation is as high as 20% while the recurrence rate of

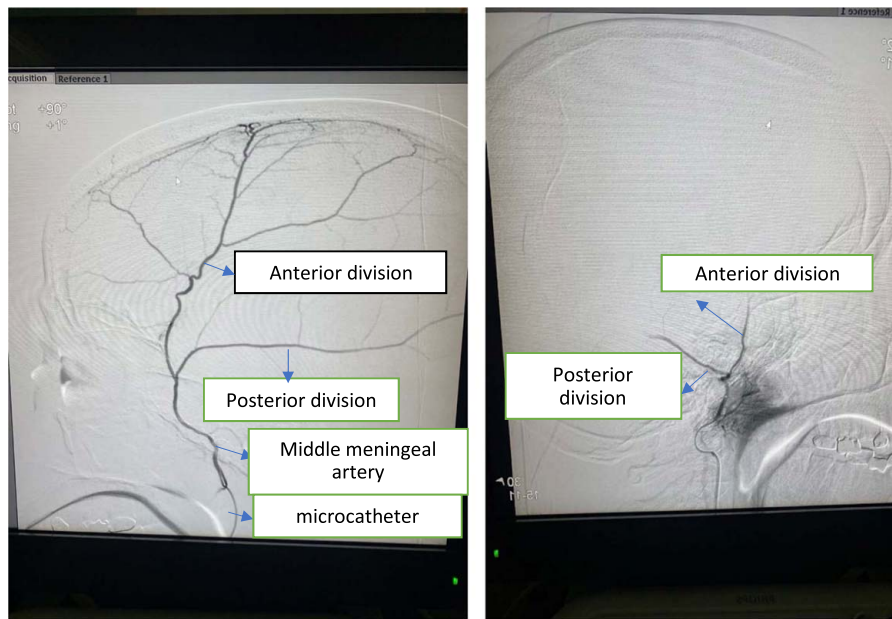


Figure 3. (A) Middle meningeal artery (MMA) angiogram showing anterior and posterior division prior to embolization. (B) Post-embolisation angiogram showing embolisation of MMA branches.

cSDH after MMA embolization is reduced to 4%^[2]. In the case where recurrence is not seen after the conventional surgical evacuation for cSDH, there is a chance of failure of cerebral re-expansion which is mainly due to the persistence of dural membrane. In comparison to unilateral cSDH, poor brain re-expansion in bilateral cSDH can lead to brain parenchyma shift, damage to blood vessels, postoperative pneumocephalus and accumulation of cerebrospinal fluid (CSF) in haematoma cavity leading to higher recurrence rate^[10]. Therefore, MMA embolization was ideal for our patient.

The decrease in recurrence rate of the cSDH after the MMA embolization results in reduction of repeated hospital visits and admission. This, in turn, improves the quality of the life of patients of cSDH. Thus, MMA embolization can be a better minimally invasive safe and effective alternative treatment option in the days to come.

Conclusion

MMA embolization for the treatment of cSDH is associated with lower probabilities of recurrence and surgical rescue than conventional management, with comparable in-hospital complication rates. Even though the efficacy of the embolization of MMA has been documented in different reports, further studies and large-scale randomized control trials have to be done.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

Consent

Written informed consent was obtained from the patient for the anonymized information to be published in this article.

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Author contribution

P.T., G.B. and S.K.K. wrote the original manuscript, reviewed, and edited the original manuscript. B.S.P., R.G., P.K., S.B., S.B., S.S., B.T. and A.T. revised and edited the original manuscript and were in charge of the case.

Conflicts of interest disclosure

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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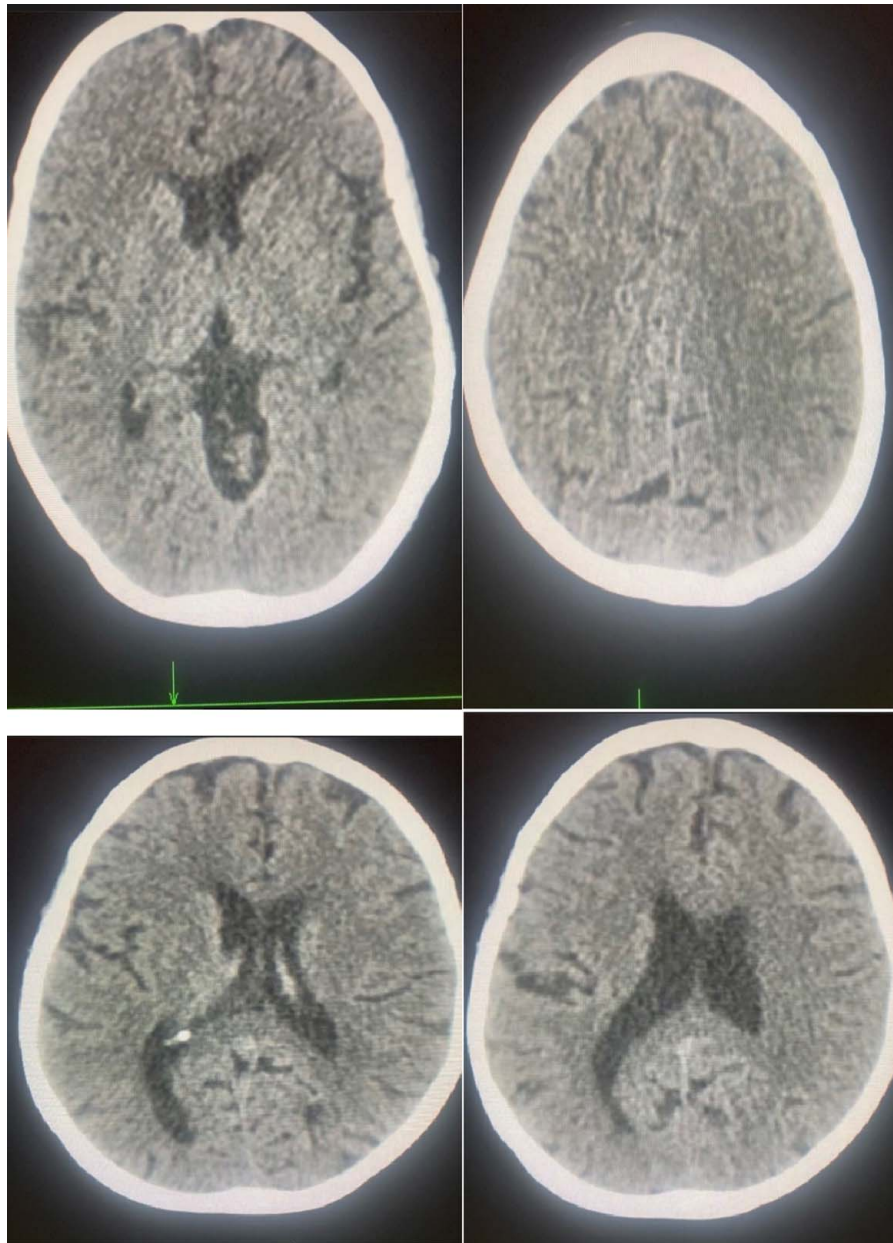


Figure 4. Post embolization computed tomography scan showing resolution of bilateral subdural effusion.

Data availability statement

All the relevant data have been included in the manuscript itself.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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