Neurology Asia 2025; 30(3) : 913 – 916

Persistent foreign body granuloma developing on the face following embolization agent and stent placement: A rare case report

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Abstract

Foreign body granulomas represent a complex defense mechanism developed by the body in response to foreign substances. While some granulomas remain asymptomatic, others may cause pain, swelling, or functional impairment. A 28-year-old male patient presented to our clinic with complaints of dull pain in the right temple and wounds with discharge opening to the skin in the right frontal, right maxillary, and mandibular regions. The patient's history revealed that an arteriovenous malformation developed following trauma to the right eyelid at the age of 3, which was subsequently treated at age 18 with an embolizing agent and stent placement due to mass effect and ptosis. Within the first postoperative week, swelling, redness, and pain developed in the right eyelid and forehead, which eventually evolved into discharge opening to the skin. In the subsequent period, this discharge spread toward the maxillary and mandibular regions. A biopsy taken from the open wounds, which persisted for approximately 5 years and showed resistance to antibiotic therapy, revealed foreign body material from the stent and giant cell granuloma tissue. These findings were corroborated by digital cerebral angiography. Foreign body resection of the granuloma tissue has been planned. In conclusion, the present case exemplifies a rare and noteworthy instance of long-term complications of foreign body reactions.

Keywords: giant cell granuloma, coil embolization, late coil migration, endovascular surgery

INTRODUCTION

Coil migration following endovascular surgery and the subsequent development of a foreign body granuloma extending to the skin are exceedingly rare complications. This is a case report of a late-onset coil migration and symptomatic foreign body granuloma extending to the skin in a patient who underwent intracranial coil embolization.

CASE REPORT

A 28-year-old male patient presented to our clinic with complaints of dull pain in the right temple and wounds with discharge opening to the skin in the right frontal, right maxillary, and mandibular regions. The patient's history revealed that, at the age of 3 years, following a traumatic fall, an arteriovenous fistula developed in the right eyelid. As it grew over time, when the patient was 18 years old, the lesion was treated due to the mass effect and ptosis through coil embolization proximally, liquid agent embolization distally, and stent placement. Within the first postoperative week, redness and pain developed in the right eyelid, forehead, and temporal regions, which eventually transformed into subcutaneous inflammatory nodules. During follow-up, the patient experienced some relief when purulent discharge opened to the skin. After approximately 5 years of persistent purulent discharge resistant to antibiotic therapy, the patient underwent plastic surgery, where the granulomatous tissue was resected, achieving a complete cure. However, during the follow-up, it was observed that the same discharging lesion also occurred in the maxillary and mandibular regions.

Physical examination of the patient revealed scar tissue approximately 1.5 cm in length in the right supraorbital region and approximately 5 cm in length in the right temporal region. There were two wounds with purulent discharge, each

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Date of Submission: 7 March 2025; Date of Acceptance: 27 March 2025

https://doi.org/10.54029/2025ktw

2 cm wide, in the right maxillary and mandibular regions (Figure 1). Neurological examination were normal. The present findings suggest multiple inflammatory lesions following the superficial temporal artery trace, with an etiology that is yet to be determined.

A biopsy of the skin tissue revealed foreign body material related to the coil and giant cell granulomatous tissue (Figure 2). The foreign body material and liquid embolisan agent was also demonstrated by skull radiography (Figure 3) and digital cerebral angiography (Figure 4). After re-consultation with plastic surgery, foreign body resection was planned for the granulomatous tissue. The patient who underwent foreign body resection is continuing antibiotic therapy in the first postoperative week. The patient's purulent discharge has primarily decreased, but follow-up is ongoing.

DISCUSSION

Arteriovenous (AV) fistula of the superficial temporal artery is a rare occurrence, with trauma being the most common etiology. Blunt trauma to this region can result in an aneurysm or, less frequently, an AV fistula (ratio 23:131).[1] Traumatic AV fistula is treated through either conventional surgical approach or endovascular intervention. In the conventional surgical approach, the lesion tissue is completely resected.[2] Endovascular treatments include percutaneous coil embolization, liquid agent embolization, and alcohol injections.[3] In our case, percutaneous coil embolization was performed proximal to the AV fistula, whereas a liquid embolic agent was applied distally.

The displacement of medical materials used during endovascular procedures to locations outside the intended site is termed 'migration.' Complications associated with endovascular procedures are typically symptomatic. Temporally, it may develop during the acute or late chronic periods.[4] Acute migration was detected prior to arterial access closure during the procedure. Delayed migration refers to coil migration along the arterial blood flow trajectory following the procedure. Regardless of the acute or chronic period, the most concerning complications are ischemic/hemorrhagic events associated with arterial occlusion by the coil material.[5] In contrast to other case series, our case demonstrated migration of the coil implant along the superficial temporal artery trajectory, resulting in a foreign body granuloma that manifested in the maxillary and mandibular regions and extended to the skin. Due to its low incidence, there is no standardized management protocol for coil migration. However, an algorithm based on a common consensus is recommended. (Figure 5).[6]

Coil migration risk factors can be classified as those related to aneurysms and parent artery anatomy, as well as technical factors associated with the coils and endovascular devices utilized. Lower aneurysm aspect ratios (height-to-neck

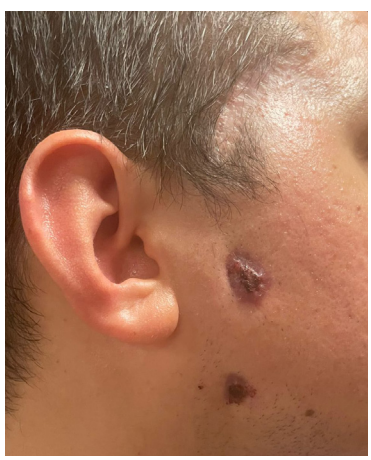

Figure 1: Physical examination of the patient revealed scar tissue approximately 1.5 cm in length in the right supraorbital region and approximately 5 cm in length in the right temporal region. There were two wounds with purulent discharge, each 2 cm wide, in the right maxillary and mandibular regions

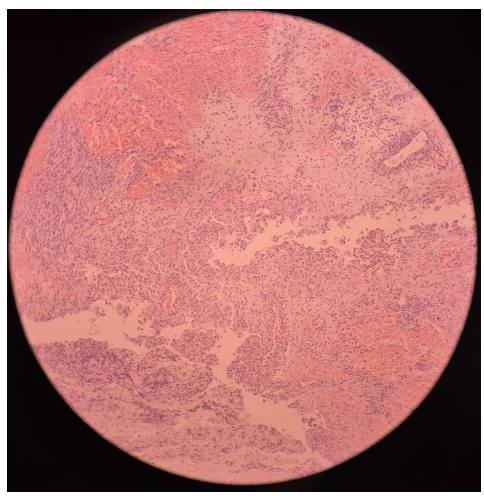

Figure 2. In a 10x objective hematoxylin-eosin stained preparation; granulomatous inflammation in the subcutaneous soft tissue, characterized by foreign body-type giant cells, polymorphonuclear leukocytes, histiocytes, and lymphocytes.

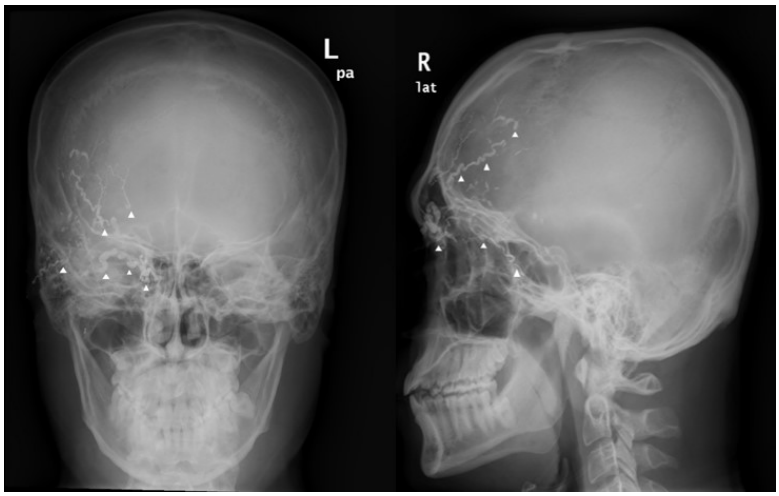

Figure 3. AP and lateral plain head X-rays: Linear, continuous, tortuous opacities (arrowheads) extending from the right periorbital region to the right frontal and temporal areas, consistent with prior interventional embolization.

ratio) and small aneurysms are associated with more complex technical challenges and an increased risk of complications. The increased utilization of smaller coils, while enabling the treatment of small aneurysms, may also elevate the risk of migration. This phenomenon can be attributed to difficulties in catheterization of small aneurysms and inadequate microcatheter stabilization.[7] Furthermore, the size, type, and configuration of the coils, particularly the use of very short and extremely soft coils, are among the critical factors determining the risk of migration.[8]

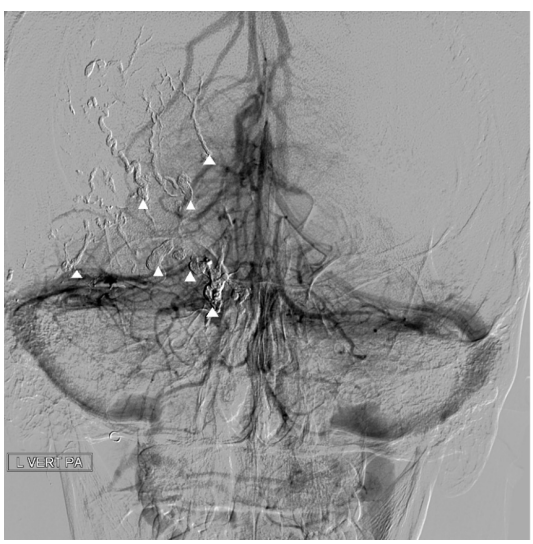

Figure 4. PA projection DSA image shows Tortuous, abnormal structures (arrowheads) are observed in the right periorbital, frontal, and temporal regions, corresponding to embolic material within the previously treated vascular malformation, suggesting prior interventional embolization. No evidence of new arteriovenous shunting or significant residual malformation is observed

In cases of delayed migration, the precise timing of migration is often indeterminable. Particularly, when the patient is asymptomatic, ascertaining the exact time of migration is considerably challenging. These cases are typically detected incidentally during routine cross-sectional or angiographic imaging follow-up. A recent study reported that delayed migration occurs most frequently between 1 hour and 1 year.[6] In our case, however, this period was prolonged due to a foreign body granuloma accompanying coil migration, and the patient was generally managed with antibiotic therapy and local surgical resection.

Foreign body granuloma is typically defined as an inflammatory response that develops within the tissue in response to external material entering the body. Granulomatous tissue characteristically contains multinuclear giant cells, lymphocytes, and plasma cells. The clinical symptoms may vary depending on the location and composition of the foreign body.[8] Foreign body granulomas commonly occur in the facial region following subcutaneous injections for aesthetic purposes.[9] Less frequently, they may develop as a result of subcutaneous surgical implantation or foreign body reactions due to trauma.[10] In our case, this reaction occurred on the face because of the migration of an external coil agent.

The treatment of peripheral giant cell

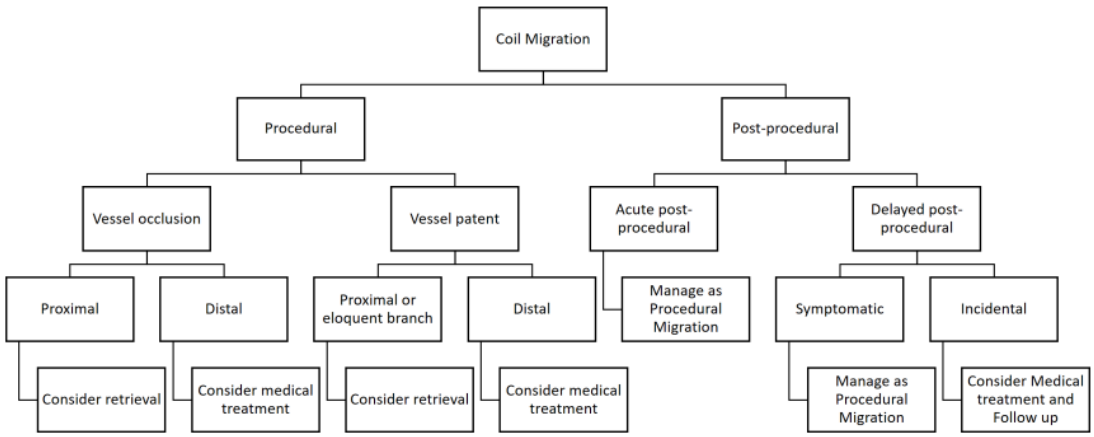

Figure 5. Recommended coil migration consensus

granulomas involves excision of the lesion from the surrounding soft tissues and curettage of the affected area. Furthermore, the elimination of etiological factors such as local irritants or infection, which are believed to cause the lesion, is crucial for reducing the risk of recurrence.[11] In our case, following surgical curettage of the granuloma that developed in the temporal region, the patient's symptoms subsided, and a curettage plan was developed with plastic surgery for the maxillary and mandibular granuloma tissue.

In conclusion:, this case study highlights an uncommon and significant occurrence of a complication linked to the delayed movement of coils used in endovascular procedures. A thorough examination of the patient's medical history is of paramount importance for determining the etiology and identifying the most efficacious treatment approach in terms of timing.

DISCLOSURE

Ethics: The authors obtained written consent from patients for their photographs and medical information to be published in print.

Financial support: None

Conflicts of interest: None

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