CASE REPORT

Dermatitis caused by metal allergy after coil embolization for unruptured cerebral aneurysm

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SUMMARY

We report a rare case of metal-induced dermatitis after coil embolization for cerebral aneurysm. A 51-year-old woman experienced a rash around the lips and neck 3 weeks after coil embolization. Judging from the clinical course and results of several patch tests, platinum coils were considered to have induced the dermatitis. Symptoms were relieved with administration of oral steroids. This represents the first report of metal-induced dermatitis after neuroendovascular treatment. The possibility of metal allergy was difficult to suspect preoperatively. However, early evaluation and referral are important when skin symptoms are observed postoperatively.

BACKGROUND

Metal allergy can arise in various areas of medical practice,¹ even after neuroendovascular treatment, despite being very rare. We report a case of allergic dermatitis after coil embolization for unruptured brain aneurysm.

CASE PRESENTATION

A cerebral aneurysm was incidentally found in a 51-year-old woman in the right internal carotid artery on magnetic resonance angiography. She had a history of hypertension, but no history of allergy.

Cerebral angiography showed a saccular aneurysm projecting medially to the paraclinoid portion of the right internal carotid artery, about 8 mm in maximum diameter and about 3.8 mm in neck diameter. Coil embolization was performed under general anesthesia in July 2013 (figure 1).

TREATMENT

Coil embolization was performed using the balloon remodeling technique. First, a SHOURYU14 (Kaneka Medix, Osaka, Japan) 4 mm×10 mm balloon was placed in the neck of the aneurysm. A Headway17 microcatheter (Terumo, Tokyo, Japan) was placed in the aneurysm with a microwire, and an ED α spiral coil (7 mm×20 cm; Kaneka Medix) was placed as a frame. Thereafter, Galaxy complex fill coils (6 mm×15 cm; Codman & Shurtleff, Johnson & Johnson, Raynham, Massachusetts, USA), ED Infini (16 mm×10 cm; Kaneka Medix) and another nine ED Extra soft coils (Kaneka Medix), 2–3.5 mm in diameter, were placed into the aneurysm. The final volume embolic rate was 25% and the aneurysm disappeared with the neck remnant.

OUTCOME AND FOLLOW-UP

The patient was discharged without symptoms 6 days after treatment. About 1 month after treatment she complained of swelling in both eyelids and rash on the neck. Drug eruption was initially suspected because a calcium antagonist had been changed to an angiotensin receptor antagonist just before coil embolization. Antihypertensive medication for the patient was therefore changed and she was followed up.

About 6 months postoperatively, swelling around the lips and rash around the neck remained. We consulted a dermatologist in our hospital. Patch testing was performed, including a platinum reagent. A faintly positive result was seen for the platinum reagent and definite positive reactions

Figure 1 Left internal carotid angiograms during coil embolization. (A) Preoperative angiogram showing internal carotid artery aneurysm projecting medioposteriorly. (B) Skull X-ray showing initial coil insertion. (C) Postoperative angiography showing neck remnant state just after coiling.

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Figure 2 Skin findings when rash appeared around the eyelids, lips and neck (A) and second patch test (B).

were recognized against daily cosmetics, nickel, and chromium. The patient therefore changed the cosmetics she was using and dental metal was removed.

One year after coil embolization the skin symptoms persisted without obvious improvement (figure 2A). At that time she told us that the skin symptoms had recently worsened the day after wearing a platinum necklace. A second patch test, which included a reagent triturated from the same type of platinum coil used for embolization, was then carried out. Positive reactions were confirmed for the coil reagent, platinum, and gold (figure 2B). Judging from this test, the platinum coils used for embolization were considered responsible for the skin symptoms and low-dose oral steroids and antihistamines were administered. The symptoms subsequently showed gradual improvement (figure 3).

DISCUSSION

We encountered a very rare case of dermatitis attributed to platinum coil allergy. A prospective study reported that metal allergy arises in association with medical practice in about 5% of cases.² Causes of metal allergy include various metal devices.^{1 2} However, reports of metal allergy resulting in skin symptoms associated with platinum coils are very rare. To the best of our knowledge, only one such case has been reported previously.³

Some reports of skin symptoms due to intravascular metal implants have recently been described in areas other than neuroendovascular treatment (table 1). We therefore need to be aware that this kind of complication may be encountered more frequently in the neuroendovascular field in the near future.

Symptoms of metal allergy may exhibit skin dysfunction ranging from mild redness or erythema to eczema.⁷ When metal allergy is suspected, patch testing is the most effective option.² However, false-negative or false-positive results are frequent, as seen in our first patch test, so exclusion of other suspicious drugs is also essential. Moreover, metal allergy usually develops after sensitization and induction to the metal, and takes at least a few days to 2 weeks before symptoms arise because metal allergy is thought to be a type IV allergy.^{7 8} In reports of skin symptoms from other vascular lesions, 3–4 weeks have been needed from implantation to appearance of symptoms (table 1). This temporal course is important when this type of allergy is suspected.

With regard to the treatment of metal allergy, removal of potential causes is the most effective option as in the dental field.⁹ Limited reports have also described the removal of intravascular metal implants (table 1). However, removal of coils placed in intracranial blood vessels is impractical and difficult. Administration of oral steroids or immunosuppressive agents is

Figure 3 Perioperative clinical course and medication in this case.

Table 1 Summary of previous cases of intravascular metal-induced dermatitis

Author (year)	Target vessel	Placement device	Containing metal	Skin symptom (onset time from device placement)	Prognosis (therapy performed time from placement)
Nagata and Kawakubo (2013) ⁴	Coronary artery	Coronary stent	Nickel, chromium, cobalt, iron	Erythema (3 weeks)	Coronary bypass performed after resection of occluded stent (2 years)→improvement
Jetty <i>et al</i> (2013) ⁵	Superficial femoral artery (SFA)	Self-expandable stent	Nickel	Eczematous dermatitis (2 weeks)	Saphenous vein reconstruction performed after resection of SFA with stent (8 months)→improvement
Gimenez-Arnau <i>et al</i> (2000) ⁶	Abdominal aorta	Stent graft	Nickel	Eczematous dermatitis (3 weeks)	Oral antihistamine and topical steroid therapy (3 weeks)→improvement
Clague <i>et al</i> (2012) ³	Gonadal vein	Platinum coil	Platinum, tungsten	Urticaria (1 month)	Gonadal vein resection with coils (14 months)→improvement
Present case	Internal carotid artery	Platinum coil	Platinum, tungsten, gold	Rash, erythema (3 weeks)	Oral steroid administration (12 months)→improvement

thus considered as the first option for medical treatment.² Fortunately, in this case the symptoms were controlled by administration of oral steroids.

No consensus has yet been reached on whether it is possible to expect or prevent symptoms based on a history of metal allergy prior to metal implantation. Some reports have stated that prior interview is meaningless and some opinions have suggested that we should refrain from patch testing prior to treatment to avoid a risk of sensitization.² Therefore, at this point, changing treatment strategy and performing preoperative examinations for metal allergy is not realistic for neuroendovascular treatment. In the present case, about 1 year passed from symptom onset to a definitive diagnosis of metal allergy to the coil material. Diagnosis was difficult because symptoms after coiling are very rare. Also, in the aforementioned four case reports, with the exception of one case in which topical steroid was administered 3 weeks after symptom onset without definitive diagnosis of metal allergy, aggressive medical therapy and metal removal were undertaken 8–10 months after onset (table 1). In addition, metal

allergy symptoms are considered to last more than a few years after appearing.¹⁰ If unusual skin symptoms are seen after implantation of a metallic device, metal allergy should be considered.

Contributors TU is one of the physicians attending the reported case. TT is a leader of the author. NW and KU are dermatology physicians in charge of the reported case. YS, ST and YT are colleagues in treatment along with the author. YO is also a leader of the author.

Competing interests None declared.

Patient consent Obtained.

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Learning points

- We describe a very rare case of dermatitis due to platinum coil allergies.
- In neuroendovascular treatments to place metal implants in blood vessels, such metal allergy may lead to decreased quality of life and patient satisfaction.
- During postoperative observation, the possibility of such allergies needs to be recognized to allow diagnosis and treatment as early as possible.

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