

Allergic Dermatitis Caused by Endovascular Coiling of Brain Aneurysm

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PRECÍS

Neurological endovascular coils used for aneurysm embolization may be composed of nickel alloys that can cause transient allergic contact reactions.

DISCUSSION

A 39-year-old woman with a history of skin irritation to jewelry presented for patch testing because of abnormally enhancing white matter lesions observed on magnetic resonance imaging (MRI) and neurologic symptoms attributed to inflammation secondary to recently placed endovascular coil components (Fig. 1). After embolization of a left supraclinoid carotid ophthalmic artery aneurysm with 4 detachable Stryker (Stryker Corporation, Kalamazoo, MI) endovascular coils, she immediately developed transient numbness and tingling of her left face and a persistent left-sided headache. An MR image was unremarkable at this time. Three months later, additional paresthesias of the right extremities prompted an extensive negative infectious and rheumatologic work-up by neurology, but a lumbar puncture detected 15 oligoclonal bands, suggesting central nervous system inflammation corroborated by newly enhancing MRI white matter lesions. Etiologies such as multiple sclerosis or acute disseminating encephalomyelitis were ruled out based on inconsistent cerebral spinal fluid patterns. Her symptoms completely resolved after 2 weeks of systemic steroid treatment. At the time of her presentation for patch testing 1 year later, her MRI lesions had completely resolved.

Patch testing was performed with the Chemotechnique Diagnostics North American 80 Comprehensive Series and Metal

series (Chemotechnique MB Diagnostics AB, Vellinge, Sweden). The tests showed positive reactions to nickel (2+ at 96 hours) and sodium tetrachloropalladate (II) hydrate (2+ at 96 hours) (Fig. 2). Further inquiry into the composition of the coils confirmed the presence of stainless steel alloys with nickel components but no palladium. Repeated requests for a sample of the coil to use for patch testing went unanswered.

There have been reports of hypersensitivity to nickel-containing dental, orthopedic, and cardiac medical devices presenting with systemic symptoms, but few cases implicate neurological endovascular devices. The coils placed in our patient were partially composed of type 316 low carbon vacuum melt (LVM) stainless steel. Coil packaging warnings include the possibility of developing allergic reactions to 316LVM stainless steel in patients with metal hypersensitivity.¹ Type 316LVM stainless steel is a chromium, nickel, and molybdenum alloy that is commonly used for implantable medical devices but has been hypothesized to release nickel ions in the past.² These factors combined with the temporal course of our patient's presentation suggest a hypersensitivity response, although causation is difficult to prove without patch testing a coil sample.

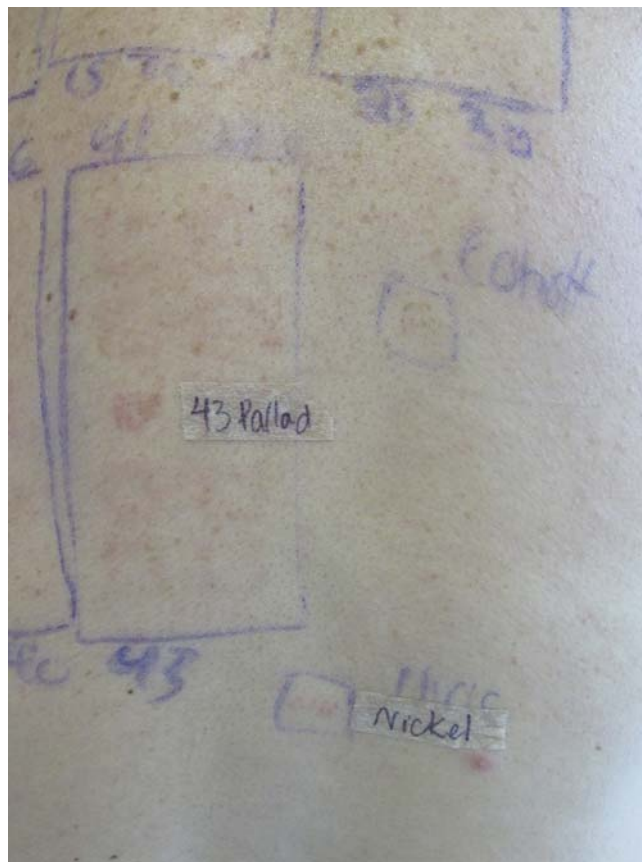


Figure 1. Patch testing results at 72 hours showing positive response to palladium and nickel.

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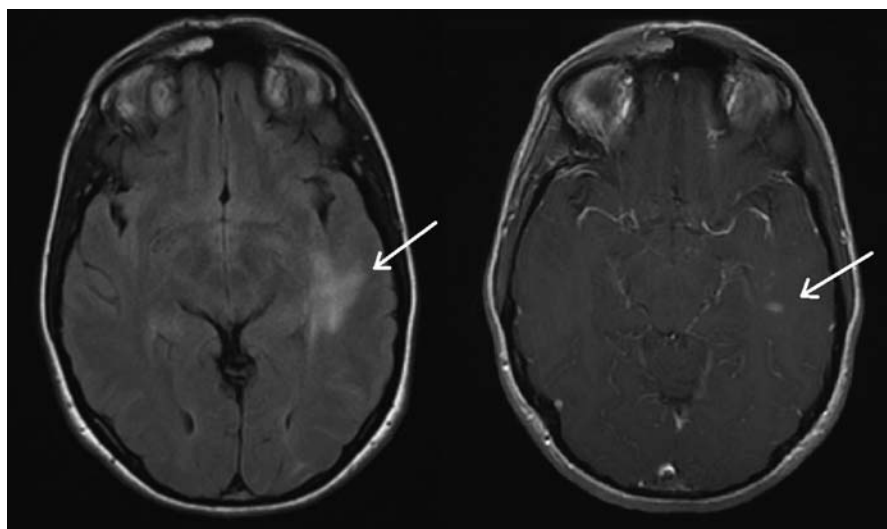


Figure 2. Left temporal lobe lesion seen in MRI fluid-attenuated inversion recovery on the left with corresponding area of enhancement in T1-weighted MRI with gadolinium on the right.

Hypersensitivity symptoms of contact dermatitis typically resolve after withdrawal of offending agents. Systemic steroids have traditionally been reserved for severe cases of persistent dermatitis involving a large body surface area or sensitive sites. There have not been studies assessing their efficacy in treating hypersensitivity to endovascular implants. Ulus et al³ reported a similar case of a 41-year-old woman who demonstrated reversible cortical parenchymal changes on MRI after endovascular nitinol stent-assisted coil embolization. She did not receive treatment, suggesting that nickel release from endovascular implants may be transient. This theory has also been proposed for cases of hypersensitivity to metal cardiac devices.⁴ Our patient may have had more rapid resolution of symptoms with her course of systemic steroids. The rarity of these cases makes it difficult to study the necessity for systemic therapy.

In general, screening for potential metal allergies is complex, because studies have been inconclusive and mostly retrospective.⁵ However, most studies agree that it is rare to develop cutaneous or systemic reactions to implanted metals. A positive patch test alone is not enough to definitively change management, especially if the patient is asymptomatic. Prospective trials are still needed to determine the role of patch testing in guiding management.

PEARL

Immunogenic reactions to nickel-containing endovascular coils are rare and transient, requiring only supportive care with close follow-up; patients do not need patch test screening before implantation.

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