

LETTER TO THE EDITOR

Case of allergic contact dermatitis due to nickel contained in stainless steel skull pins

Dear Editor,

Allergic contact dermatitis due to stainless steel is rare,^{1,2} and only one case of allergic reaction to stainless steel skull pins has been reported.³ As a patch test was not performed, this is the first report of allergic contact dermatitis due to nickel contained in stainless steel skull pins.

A 27-year-old woman with no history of metal allergy underwent biopsy for an intramedullary tumor. She was placed in the prone position and her head was fixed using a DORO® skull clamp (pro med instruments) with three skull pins (stainless steel DORO disposable skull pins; pro med instruments) (Figure 1a) during surgery. The surgery took approximately 17 h. Nine days after surgery, erythema developed on all three sites of the head where the skull pins were inserted. The eruptions were partially improved by topical steroids. The histopathological findings of the intramedullary tumor suggested glioblastoma, and 2 weeks after the previous surgery, radical resection of the intramedullary tumor was performed using the same fixator. The surgery time was approximately 9 h. New erythema at the three sites corresponding to the skull pins developed the day after surgery. Physical examination revealed edematous erythema

with central crusted erosion on her head where the skull pins were inserted (Figure 1b,c). Erythema was more marked than previously. Considering the possibility of allergic contact dermatitis, patch tests with a metal series (Torii) and Patch Test Panel® (S) (Sato) were conducted on the upper back. As a result, positive reactions to nickel sulfate (5% aq. and 0.2 mg/cm²) were observed on day 2, day 3, and day 7 according to the International Contact Dermatitis Research Group criteria (Figure 1d,e). Potassium dichromate was negative. DORO disposable skull pins are stainless steel made of SUS420J2, containing chromium (12.00–14.00%), manganese (≤1.00%), silicon (≤1.00%), nickel (≤0.60%), carbon (0.26%–0.40%), phosphorus (≤0.040%), sulfur (≤0.030%), and iron (remainder). The surface of skull pins is uncoated. Based on the test results, she was diagnosed with allergic contact dermatitis due to nickel contained in skull pins. The erythema subsided with atrophic scars 4 weeks after applying topical steroids.

Prior sensitization to nickel before the first surgery cannot be excluded in this case, but the time lag between local symptoms, which developed 9 days after pin fixation in the first surgery, is more consistent with primary sensitization than pre-existing nickel allergy.

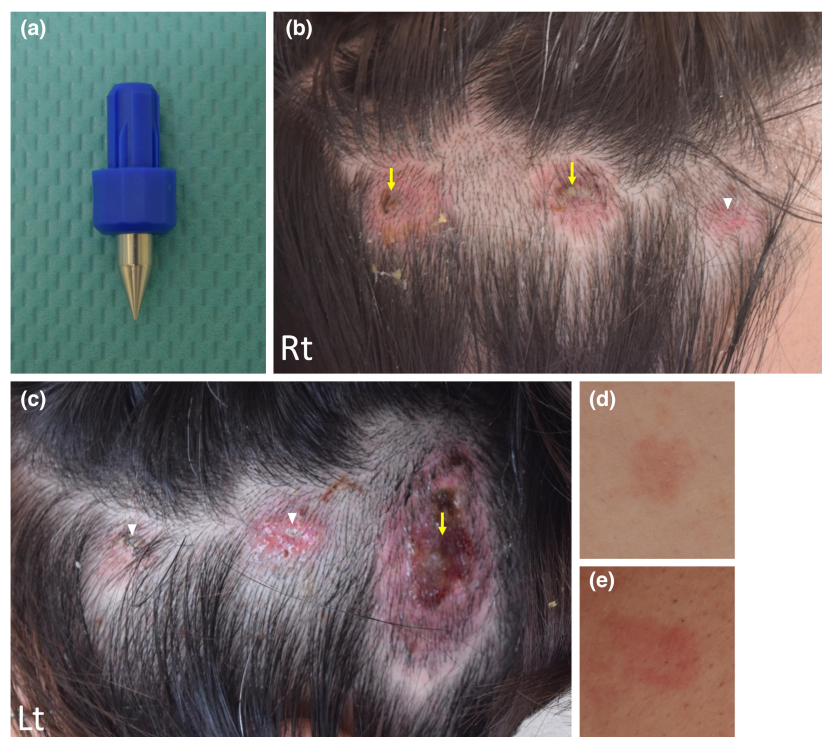


FIGURE 1 (a) Stainless steel DORO® disposable skull pins. (b,c) Clinical presentation 3 days after the second surgery. Edematous erythema with central crusted erosion was observed on her head where the skull pins were inserted in the second surgery. Yellow arrows indicate the insertion sites of skull pins in the second surgery and white arrowheads indicate those in the first surgery. Patch testing with (d) 5% aq. and (e) 0.2 mg/cm² nickel sulfate resulted in erythema and infiltration on day 3

Stainless steel becomes ionized in distilled water.⁴ Although the nickel content is low, the skull pins were inserted directly into the dermis and subcutaneous tissue, similar to ear-piercing kits, leading to nickel sensitization.^{1,2}

Although the patch test was unable to be performed due to a lack of time before the second surgery, nickel-free skull pins (e.g., titanium DORO disposable skull pins; pro med instruments) should have been employed in the second surgery considering the possibility of allergic contact dermatitis. Physicians should be aware of allergic contact dermatitis due to stainless steel skull pins even if patients have no history of metal allergy.

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CONFLICT OF INTEREST

None declared.

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