

METAL IMPLANT ALLERGY: A DIAGNOSTIC CHALLENGE ILLUSTRATING THE LIMITS OF THE NICKEL SPOT TEST

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Cases report

A 36-year-old woman, former hairdresser and supermarket cashier, presented a recalcitrant right lateral epicondylitis. Two months after a surgical procedure with use of suture anchors (allowing fixation of tendons to bone), she reported a trauma of the surgical site creating a hematoma (Fig.1A). Despite multiple topical treatments, the evolution was unfavourable with presence of a fibrinous wound (Fig.1B). Osteitis was eliminated and a radial forearm flap was realized six months later to cover the loss of substance. Vascular clips were used to haemostasis. Due to the presence of an old tattoo on the donor site, the wound was covered by a tattooed skin (Fig.2). Six weeks later, the patient reported the onset of erythematous and vesicular lesions around the skin flap with burning sensation, but no involvement of the tattoo. The evolution was centrifugal with oozing and crusting lesions (Fig.3A). Topical corticosteroids were useful at the beginning but the situation rapidly worsened, involving the tattoo (Fig.3B).

An allergic reaction to metal implants or tattoo inks was suspected. The histopathological exam of skin biopsy showed an eczema. Patch testing showed positive reactions at day 3 for nickel sulfate (+++), methylchloroisothiazolinone/methylisothiazolinone (++) and Myroxylon pereirae (+) (Fig.S1). In the absence of involvement of other tattoos, the presence of nickel in the metal implants remained the most relevant hypothesis. However, the composition of the vascular clips was not provided by the manufacturer, that of anchors showed titanium as main component and the dimethylglyoxime (DMG) test was negative for both sterile devices. An inductively coupled plasma mass-spectrometry (ICP-MS) analysis was thus realized. Although a complete mineralisation of the metal devices was not possible, an immersion in nitric acid showed a release of nickel from the anchor, but not from the clips.

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The lesions worsened and a surgical removal of the anchor was realized. A gradual disappearance of eczema was noted, leading to the presence of post-inflammatory hypopigmentation (Fig.4) three months after surgery, without any active lesion.

Discussion

Hypersensitivity to a metallic suture anchor is a rare condition (1) illustrating the diagnostic difficulties of metal implant allergy. Titanium is the main component of orthopaedic implants but nickel remains the main allergen (2). The delay between the surgical procedure and the onset of the skin lesions can be longer than in traditional allergic contact dermatitis: several weeks or months can be necessary to observe a deterioration of the device, and so a nickel release (3). In our case, the onset of cutaneous lesions after the flap made us suspect the role of tattoo inks, but skin changes attributed to the trauma could already be the sign of allergy to suture anchor.

To identify the presence of nickel in the metal implant is also a challenge. Indeed, false negative responses can be observed using the DMG test due to the sterile device coating and the absence of physiological conditions (blood, temperature...) (3). In our case, immersion in nitric acid associated with ICP-MS analysis released nickel from the implant, as may do physiological conditions, and compensated the low sensitivity of the DMG test (4). This result was essential to help the surgeon to decide to remove the device, only way to support the relationship between the metal implant and the skin changes.

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Legends

Fig. 1A : hematoma and superficial loss of substance of the right elbow

Fig. 1B : fibrinous wound with unfavourable evolution despite multiple topical treatments

Fig. 2 : tattooed skin after radial forearm (Chinese) flap

Fig. 3A : centrifugal evolution with crusting lesions

Fig. 3B : extension of vesicular lesions involving the tattoo area

Fig. 4 : postoperative aspect at three months













