

# Allergy to stents, clips and coils

## Metal allergy and implanted medical devices

MELISA® is a blood test which can test for multiple metal allergies with a single test. Current research into the effects of metal allergy is generally concentrated on adverse health effects caused by metal allergy in orthopaedics, mainly large devices; hip, knee replacements etc. There is more limited research into allergy and smaller implanted devices, but researchers recommend pre-testing for metal allergy in patients with a history of dermal reactions to metals and in those, post-surgery who become symptomatic [1].

## Stents

Given that research reports that allergic reactions to nickel and molybdenum released from stents may be one of the triggering mechanisms for in-stent restenosis [2,3,4] patients should be tested for possible metal allergy. The US FDA lists warnings about metal allergy on all stents eg [5]. Surveys show that cardiologists are also well aware of the problems of stenting and nickel allergy [6]. Unfortunately many patients are unaware of their metal allergies.

Coronary stents are usually made from stainless steel (containing nickel), cobalt chromium, platinum chromium or nitinol (nickel and titanium). Konishi et al suggest that an allergy to the stent should be considered as a possible cause of recurrent stent thrombosis in relatively young patients and that “a history of metal allergy should be meticulously explored before elective percutaneous coronary intervention” [7].

## Staples and clips

Allergy to stainless steel clips used in surgery may appear as granulomas, which have even been mistaken for recurrence of malignant tumours on scans [8]. Titanium is seen as a “biocompatible” alternative to traditional stainless steel clips but there are reports of granuloma from hypersensitivity to titanium alloy staples and/or clips [9]. Titanium ear piercings have, in rare cases, engendered granulomatous dermatitis which persisted 10 years after the original piercings were removed [10]. Chronic urticaria, along with abdominal pain and coughing were reported after a cholecystectomy using 10 tantalum clips. After these were removed the patient’s symptoms resolved within 4-6 weeks [11].

Breast clips are tiny radio-opaque markers (titanium or stainless steel). There is only a single published report of allergy to a titanium marker which caused a worsening of existing atopic dermatitis [13].

## Coils

Coils used in surgery may be stainless steel or titanium. In one case report, 11 days after a coil embolization there was a severe decline in the patient’s health: seizures, infarctions etc. After reoperation to replace the nickel-containing coil with a titanium alloy, the patient had an uncomplicated postoperative course and was discharged 6 days later to a rehabilitation facility [14]. The authors have suggested that nickel hypersensitivity may also present as chest pain, palpitations, oedema migraine, respiratory and digestive issues [19,20].

## Adverse reaction to titanium staples following cholecystectomy

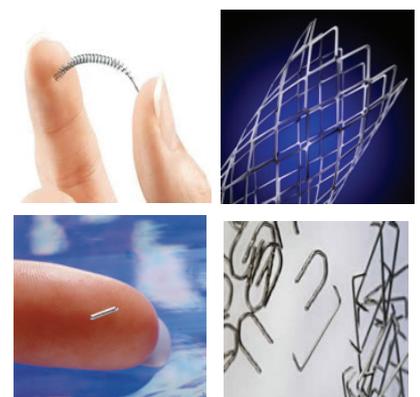
Ten months after surgery, a 66 year old woman presented with a myriad of symptoms including burning sensations in her arm, conjunctivitis, sinusitis and irregular bowel movements. She had previously exhibited an allergic reaction to titanium plates in her ankle including: oedema, slow wound healing and erythema.

After MELISA testing for titanium allergy, her clips were removed. One month post-surgery she reported being symptom free.

*Tiesenga F et al. [12]*

## MELISA testing

MELISA is an optimised lymphocyte transformation test (LTT) with improved specificity and sensitivity. The lymphocyte reaction to metals is measured by two separate methods: uptake of radioactive thymidine by dividing lymphocytes and the evaluation of cellular stimulation by microscopy.



A 29-year old man approached MELISA for allergy testing to a varicocele embolization coil. He had pain, recurrent areas of urticaria, tingling in his hands and feet, dizziness, brain fog and headaches. He tested positive to tungsten which was present at 8% in his coil. The patient's symptoms resolved after the coils were removed [15].

Symptoms of allergy vary widely: palpitations, severe pelvic pain, fatigue, night sweats, heavy legs and dermatitis were all present in a 34 year old woman with nickel/palladium endovascular coils placed for pelvic congestion syndrome. The patient, who was bed-bound at times, was found to suffer from both palladium and nickel allergy. Again all symptoms resolved after removal [6].

Traditional implanted contraceptive devices (IUDs) contain copper and copper allergy is contraindication to placement in these devices. At least three cases of systemic allergic dermatitis have resulted from IUDs and symptoms resolved after removal [17]. The Essure micro-insert includes nickel-titanium alloy, in vitro testing has shown that nickel is released from this device. Patients who are allergic to nickel may have an allergic reaction to this device, especially those with a history of metal allergies. Additionally, some patients may develop an allergy to nickel if this device is implanted [18]. Typical allergy symptoms reported for this device include rash, pruritus, and hives. Some authors have suggested that nickel hypersensitivity may also present as chest pain, palpitations, oedema, migraine, respiratory and digestive issues [19,20].

### Allergy testing

Cutaneous and systemic hypersensitivity reactions to implanted metals are challenging to evaluate and treat. The incidence and prevalence of dermal and systemic hypersensitivity reactions are uncertain, as studies are limited. Complications related to metals may have been underestimated as a recent study showed that up to 5% of patients experience metal-related cutaneous complications post-implant placement [21].

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### Testing procedure

A blood sample can be sent to any licensed MELISA laboratory. Samples are time sensitive and should arrive within 24hrs (maximally 48hrs).

The blood sample should be kept at room temperature and sent in tubes sodium citrate light blue vacuette tubes. The amount of blood required depends on how many antigens are to be tested.

For adults, a screening of 10 metals, 36 ml (or 4 large 9ml tubes) of blood is needed.

Taking steroids or other immuno-suppressant drugs may affect the test results.

A questionnaire which helps to identify patients who are likely to benefit from MELISA testing can also be provided and evaluated. However, patient history alone is not sufficient to diagnose metal hypersensitivity.

