

Gentamicin allergy as an unexpected 'hidden' cause of complications in knee arthroplasty

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In patients with complications after arthroplasty, common potential causes, such as malpositioning, mechanical problems, or infections, are usually investigated first. After exclusion of such causes, or in cases of local eczema, implant allergy might be suspected. We report a patient who developed pain and swelling of the knee with subsequent local eczema after cemented total knee arthroplasty.

Case Report

A 79-year-old patient had received a right cemented total knee arthroplasty in November 2013. Initially, full recovery and uncomplicated performance of the endoprosthesis was reported. In February 2014, however, pain, swelling and a reduced range of motion were noted after an extended walk. Physical examination by the orthopaedic surgeon showed joint effusion. Subsequent computed tomography showed a correct implant position without any signs of loosening. Diagnostic joint aspiration and microbiological analysis showed no signs of infection. Scintigraphy was suggestive of local synovitis. Thus, synovitis caused by 'excessive walking' was diagnosed, and oral diclofenac was prescribed. However, the patient complained of increasing pain, and presented with local eczema of the right knee a few weeks later (Fig. 1).

Allergy diagnostics were initiated, including patch testing with the baseline series, supplemental series, including a metal series, and components of the bone cement. In addition, systemic sensitization to Ni, Co and

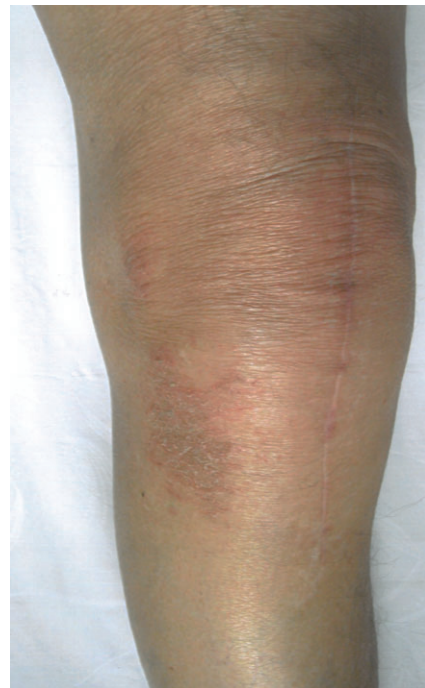


Fig. 1. Patient with a painful knee arthroplasty and local eczema.

Cr was assessed with the lymphocyte transformation test (LTT). Patch tests were read on day (D) 2, D3, and D6, and + reactions to neomycin and gentamicin were found on D6. The LTT gave a negative result. However, as the orthopaedic surgeon had used antibiotic-free bone cement, the tentative diagnosis of implant allergy caused by gentamicin-containing bone cement was not confirmed.

Careful repeated history-taking, however, showed that the patient had used gentamicin-containing eye drops to treat conjunctivitis during the previous year, and that a corticosteroid-containing ointment was used to treat the patient's eczema. Furthermore, an additional piece

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of information was discovered in the medical records: While performing the diagnostic joint aspiration, the orthopaedic surgeon had injected 'Gentamicin 80 Hexal SF®' solution to prevent infection. Taking this detail into account, we were able to diagnose 'synovitis and allergic contact dermatitis' resulting from intra-articular gentamicin application. In the course of the next 10 months, the patient's symptoms, including his eczema, completely resolved.

Discussion

Both the numbers of metallic total hip and knee replacements and the number of reported arthroplasty complications are increasing every year. In 2011, 168 486 knee endoprotheses were implanted in Germany alone, of which about 9.5% were revision surgeries (1). A rare, but well-recognized, complication is implant allergy (2, 3). Today, most knee endoprotheses are cemented. Antibiotic-loaded (e.g. gentamicin-containing) bone cement is frequently used to prevent infection. Correspondingly, prolonged local gentamicin release is intended, and can be observed for years (4, 5).

Usually, 'implant allergy' is an exclusion diagnosis after more common problems have been ruled out.

Allergy diagnostics should comprise several steps, in particular (i) patch testing, and, if possible (ii) histological evaluation of peri-implant tissues or implant-associated skin changes. Moreover, the LTT can provide additional information on metal sensitization, if interpreted carefully. In patch testing, late readings on D6 or D7 are recommended. Otherwise, as shown by various authors (6–8), a substantial number of allergic reactions can be missed. This is particularly important for 'late allergens' such as gentamicin. In a recent study (9), gentamicin allergy was discovered in 25 of 250 patients with complicated cemented total knee arthroplasties. Interestingly, 17 of the 25 gentamicin-allergic patients (i.e. 68%) were only detected by late reading on D6.

In conclusion, our patient had probably been sensitized to gentamicin by the use of eye drops prior to surgery, and developed complications as a result of intra-articular re-exposure. When looking for the clinical relevance of contact allergy, it is important not to overlook 'hidden', or otherwise non-obvious, exposure. In addition, patch testing should always include a late reading. Finally, implant allergy – caused by metals or bone cement components – is a differential diagnosis of complicated arthroplasty, but requires careful evaluation and thorough history-taking.

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