

A prosthetic wrist joint complicated by metallosis and polyethylene synovitis, mimicking low-grade bacterial arthritis

Sirs,

A middle-aged woman with longstanding rheumatoid arthritis underwent resection of the distal ulna and radio-carpal arthroplasty of the right wrist (radio-carpal joint) because of osteoarthritis secondary to the long-lasting rheumatoid arthritis. This Biax prosthesis was replaced several years later because of recurrent luxation of this prosthesis. The removed prosthesis showed abrasions of the metal and the polyethylene sliding core parts, with metal particles on the polyethylene surface: Fig. 1A-B. After prosthesis replacement, signs and symptoms of chronic arthritis of the right wrist developed, while in other joints the rheumatoid arthritis was in remission with immunosuppressive medication. The differential diagnosis included microbial/bacterial infection of the prosthesis, also given her immunosuppressive medication consisting of the biologic adalimumab 40 mg subcutaneously every fortnight, and methotrexate 10 mg subcutaneously every week, next to mono-articular rheumatoid arthritis of the intact joints of that wrist. At radiography, no signs of chronic bacterial infection of the prosthesis such as osteolysis were seen, but there were small radiopaque particles in and around the wrist joint (Fig. 1C). At ultrasonography, joint effusion with echogenic particles was seen; at this session, the joint was aspirated. Polarisation microscopy of the joint aspirate yielded amorphous refracting particles, in consultation with the plastic surgeon diagnosed as polyethylene particles, given the known wear of the Biax joint prosthesis replaced four year earlier. The fluid was not suspect of bacterial infection; the culture result was negative. The diagnosis was metallosis and polyethylene synovitis from particles of the replaced Biax prosthesis, retained after joint replacement. Treatment was symptomatic with an intra-articular glucocorticoid injection.

This is the first description of metallosis and polyethylene synovitis mimicking low-grade bacterial arthritis, including images of the damaged prosthesis and metal parts on the x-ray. It aims to increase awareness and knowledge about wear-induced complications of joint prostheses, to avoid false diagnoses and incorrect treatments.

The BIAx wrist arthroplasty was introduced in 1983. It is complicated by abrasion of the dorsal polyethylene edge of the proximal socket, resulting in foreign body reaction, synovitis and loosening of the prosthesis, and complications such as carpal tunnel syndrome (1-4). In a patient with rheumatoid arthritis with mono-arthritis of a joint with an arthroplasty, the differential diagno-

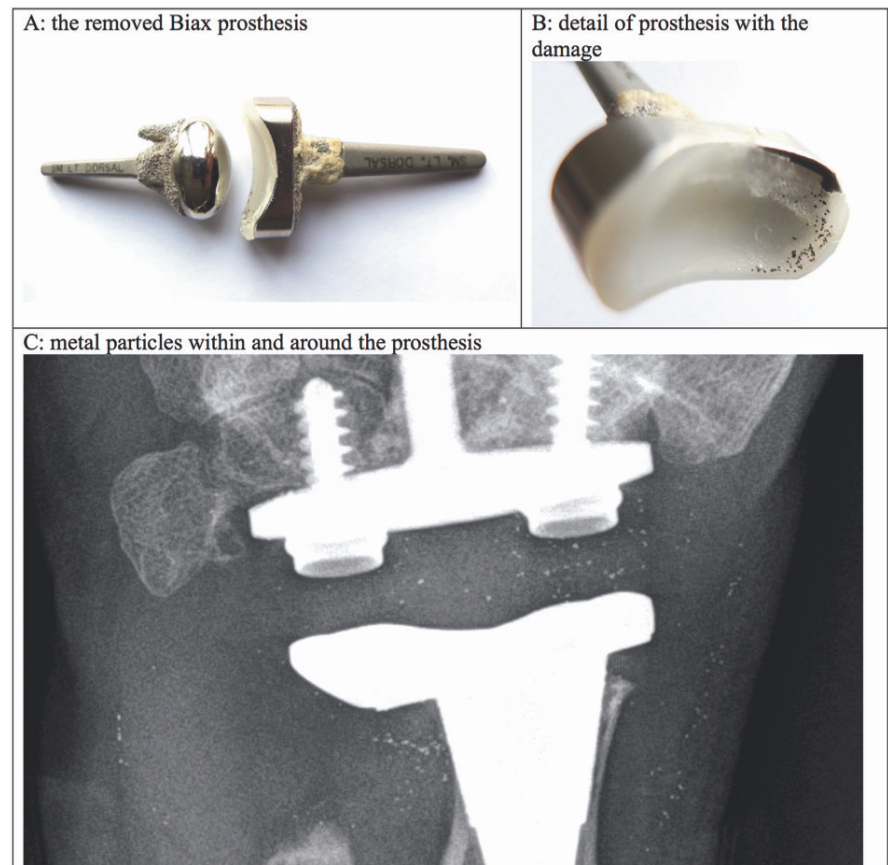


Fig. 1.

sis should first include microbial / bacterial arthritis, especially in case of usage of immunosuppressive medication. As this medication may reduce or mask the signs and symptoms of bacterial arthritis, the clinical picture may not be typical at all. The differential diagnosis of arthritis of the wrist with a radio-carpal arthroplasty and the other joints in that wrist intact, also should include monoarticular rheumatoid arthritis of the intact wrist joints, and for all joints with a metal and polyethylene arthroplasty, also metallosis and polyethylene synovitis. Because this latter diagnosis is less known among rheumatologists, it is less often considered than bacterial arthritis. However, if only one is aware of the possibility of metallosis and polyethylene synovitis, the diagnosis is not difficult. Diagnostic modalities include joint aspiration, with polarisation microscopy of the joint aspirate, and sonography and radiography of the inflamed joint (3). If polyethylene synovitis is diagnosed, antibiotics or escalation of rheumatoid arthritis medication are not indicated; treatment is symptomatic.

J.W.G. JACOBS¹, MD, PhD

A.H. SCHUURMAN², MD, PhD

¹Department of Rheumatology & Clinical Immunology, ²Department of Plastic Reconstructive and Hand Surgery, University Medical Center Utrecht, Utrecht, The Netherlands.

Please address correspondence to:

J.W.G. Jacobs,
Department of Rheumatology
and Clinical Immunology,
University Medical Center Utrecht,
Box 85500, 3508GA Utrecht,
The Netherlands.

E-mail: j.w.g.jacobs-12@umcutrecht.nl

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References

1. KRETSCHMER F, FANSA H: [BIAx total wrist arthroplasty: management and results after 42 patients]. *Handchir Mikrochir Plast Chir* 2007; 39: 238-48.
2. NUNEZ FA JR, WRIGHT L, KILPATRICK SE, SEITZ WH JR: Revision total wrist arthroplasty due to polyethylene wear, metallosis-induced carpal tunnel syndrome, distal ulnar impingement, and fourth carpometacarpal joint pain: case report and pitfalls to avoid. *Hand (N Y)* 2020; 15: NP1-NP6.
3. MALLON S, BUSSIS K, BESWICK Z, NORTH WT, SOLIMAN SB: Ultrasonographic and radiographic findings of polyethylene component displacement with severe metallosis and metal-induced synovitis following total knee arthroplasty. *Knee* 2019; 26: 941-50.
4. PUGLIESE D, BUSH D, HARRINGTON T: Silicone synovitis: longer term outcome data and review of the literature. *J Clin Rheumatol* 2009; 15: 8-11.