

# Pseudotumor due to metallosis after total elbow arthroplasty

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## ABSTRACT

The incidence of primary total elbow arthroplasty (TEA) in young patients is increasing. The indications for revision surgery are also rising. Here, we report a rare case of pseudotumor detected in a patient 16 years after TEA. Intraoperative findings revealed a necrotic mass characterized by a conspicuous metallosis in the soft tissues around the prosthesis, which caused ulnar nerve dislocation. Due to this anatomical change, a lesion of the nerve was accidentally produced during revision surgery. The case report emphasizes that the indications for elbow replacement, as well as the patient education about the permanent physical limitations, should be carefully considered. Moreover, the high risks of complications related to the revision procedure and pseudotumor removal need to be addressed before surgery. The technique should be done carefully and a preliminary thorough imaging should be performed, since a newly formed mass can cause significant distortion of the anatomy.

**Key words:** Total elbow arthroplasty, elbow prosthesis, pseudotumor, metallosis, revision elbow arthroplasty

**MeSH terms:** Joint, elbow joint, arthroplasty, prosthesis, metals, revision

## INTRODUCTION

Total elbow arthroplasty (TEA) is the elective surgery for elderly patients with severe elbow osteoarthritis or unreconstructible elbow fractures.<sup>1</sup> Expanding these indications to a young and active population can significantly increase the risk of early wear and prosthesis loosening.<sup>2</sup> Revision surgery is difficult and the outcome is less satisfactory compared to primary implants.<sup>3</sup> We describe a unique case of pseudotumor in a young patient who underwent revision surgery 16 years after TEA.

## CASE REPORT

A 56-year-old woman presented to us 16 years after left

TEA with a Kudo prosthesis (Biomet UK Ltd., Bridgend, Wales) performed in another hospital for a complex fracture of the distal humerus [Figure 1], followed by plaster immobilization for 40 days with an outcome of joint stiffness. 18 months after surgery, manipulations under anesthesia were performed, a joint motion of 70–120° was obtained, and the patient resumed her normal activity level. 9 years after surgery, she returned to the same hospital complaining about pain and elbow swelling and underwent an exploratory surgery with removal of “a broken part.” Afterwards, she resumed the same activity levels as before.

When the patient came to our institute 16 years after the index procedure, she complained about elbow pain and instability. She had one posterior and one lateral surgical scar, joint deformity and a posterolateral soft swelling [Figure 2]. The range of movement in flexion and extension was 60–120°. No vascular-neurological symptoms were observed. Radiographs [Figure 3] revealed dislocation and loosening of the implant, surrounded by a slightly

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Access this article online	
Quick Response Code:	Website: www.ijoonline.com
	DOI: 10.4103/0019-5413.197557

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**How to cite this article:** Rotini R, Bettelli G, Cavaciocchi M, Savarino L. Pseudotumor due to metallosis after total elbow arthroplasty. Indian J Orthop 2017;51:103-6.

radio-opaque mass. Anti inflammatory therapy and restricted use of the arm were prescribed, and after few weeks she was admitted to our unit for revision surgery. Low infection probability was suggested by scintigraphy with labelled leukocytes and a needle aspirate was performed. The cultures resulted negative, but blood leucocytes were increased, and erythrocyte sedimentation rate and C-reactive protein showed borderline values. Since periprosthetic infection could not be ruled out, a two-stage surgery was planned. She was operated in supine position, maintaining the upper limb above the chest with the best possible alignment of the elbow joint that remained dislocated and unstable.

Of the two surgical scars the lateral one was followed. As the ulnar nerve was expected to lie medially to the mass, the dissection was begun on the posterior midline. During the isolation of the huge pseudotumoral mass, an oblique division of the ulnar nerve was accidentally produced [Figure 4]. The nerve had been dislocated from its normal course by the scar tissue and by the mass, and actually lied in the posterior midline of the elbow. The two ends of the ulnar nerve were dissected and isolated, and then the dissection and excision of the mass was completed. Grossly the tissue was necrotic, bloodless and dark-grey to blackish, with the unequivocal

aspect of metallosis, as a consequence of the metal-on-metal friction of the dislocated components. Histology was thus deemed not necessary. In order to definitively rule out infection, multiple tissue biopsies were harvested and sent for culture and no aerobic/anaerobic bacteria were isolated. The stems were well fixed in the medullary canals.

After implant removal, thorough debridement was performed and temporary spacers (one humeral and one ulnar) were built with tobramycin and vancomycin-loaded cement supported by metal rods [Figure 5]. Ulnar nerve paralysis was present. 10 days later, the second surgery was performed. Antibiotic-loaded cement spacers were removed and again samples for culture were retrieved. After thorough debridement, a Latitude (Tornier, Warsaw, IN) anatomic prosthesis was implanted with tobramycin-loaded cement. A proper nerve repair was performed by a neurosurgeon with 8/0 polypropylene suture and fibrin glue. The postoperative course was uneventful; the arm was protected in a brace and mild elbow mobilization started after 2 days. Cultures



**Figure 1:** X-ray of the elbow joint anteroposterior and lateral views showing the distal humerus fracture in a 40 years old patient



**Figure 2:** Clinical photograph of the elbow showing the swelling, skin discoloration and two surgical scars



**Figure 3:** X-ray of the elbow joint anteroposterior and lateral views showing loosening of both components of the Kudo elbow prosthesis after 16 years and one surgical revision. Soft tissue swelling with metal debris



**Figure 4:** Intraoperative picture showing the pseudotumor mass. The ulnar nerve has been accidentally divided (arrow); the stumps of the nerve have been temporarily put close



**Figure 5:** X-ray of the elbow joint anteroposterior and lateral views showing temporary cement spacers

again were negative. The patient was instructed to use her arm only for mild activities, avoiding loads over 2–3 kg.

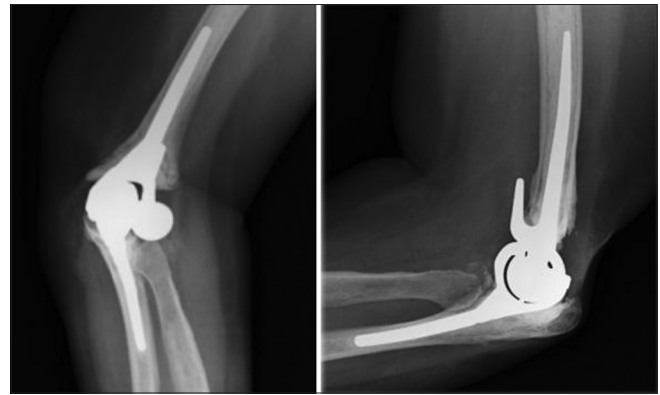
At 26 months followup [Figure 6], the elbow was stable with a range of motion from 30° to 130°. Ulnar nerve paralysis was persistent with only slight sensory recovery.

## DISCUSSION

Total elbow arthroplasty is a surgical procedure that should be reserved, as a general rule, for elderly patients. Expanding the indications to younger patients increases the already high risk of complications and implant failure,<sup>4,5</sup> with consequent need of revision surgery. TEA revision is a difficult surgical act, frequently requiring bone augmentation<sup>6-8</sup> and the survival rate of these implants can be as low as 64% at 5 years.<sup>9-11</sup>

In this patient, the decision to perform a TEA when she was 40 years old was certainly a hazardous choice. Every effort should be done in this age group to perform fixation even in case of complex fractures. On the contrary, in this case, the retrospective evaluation of the pre surgery X-rays of the elbow, taken in the hospital where the patient had undergone TEA 16 years before, showed that the fracture pattern was not particularly complex. The correct treatment indication was therefore an internal fixation through trans-olecranon approach. Another point to be stressed is that when no alternative to prosthesis is possible, it is mandatory to instruct the young patient about the permanent functional limitations to be observed in order to avoid abnormal wear.

Cystic or solid masses resulting from wear debris have been commonly reported in patients with metal-on-metal hip prostheses<sup>12-14</sup> and have been termed “pseudotumors.”<sup>15</sup> Differently from hip surgery, only rare reports exist in



**Figure 6:** X-ray of the elbow joint anteroposterior and lateral views at 2 years after revision with Latitude prosthesis showing implant *in situ*

literature about metallosis as a consequence of instability or loosening after TEA.<sup>16,17</sup> However, in case of painful/loose elbow prosthesis, the pseudotumor occurrence must be suspected, together with aseptic loosening and infection.

In this condition, the revision surgery can be extremely complex. The excision required for the mass removal bears unusual risks, since anatomic relations may have been distorted. In our case, considering the two surgical procedures, it seemed highly probable that the ulnar nerve had been translocated anteriorly or that it lied in its anatomical position. Anterior transposition during primary TEA is a common practice associated with a lower risk of neurological complications.<sup>3</sup> Unexpectedly, the nerve had been dislocated posteriorly and laterally by the development of the pseudotumor, from which it could not be differentiated both visually and by palpation. This unpredictable setting created the conditions for its lesion, a complication in which we never incurred in our experience of several dozens of primary elbow prostheses and revisions.

In the preoperative workout, deep attention had been paid to the risk of infection. Additional imaging examinations could have been performed. A magnetic resonance imaging and a computed tomography scan of the elbow would have perhaps disclosed in higher detail the shape and size of the pseudotumor, but almost certainly would not have been able to show the relationships of the ulnar nerve with the mass.

To conclude, a soft swelling around unstable elbow prosthesis is not always due to infection, but can also be caused by a pseudotumor. Surgery in this condition has an additional risk of complications related to possible anatomy distortions.

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