Inflammatory pseudotumor simulating malignancy: a rare complication after total hip arthroplasty

Abstract

Purpose: Particulate debris created by accelerated polyethylene wear in totally replaced hips causes adverse local reactions. We report an extreme form of such a reaction in a patient who developed progressive thigh pain, weakness and numbness after total arthroplasty of his left hip.

Methods: An abdominopelvic computed tomogram showed a large intrapelvic mass interpreted as a malignant tumor. Dark grayish-green fluid was aspirated from the cyst and cytopathologic examination showed necrotic debris without malignant cells. Biopsy revealed necrosis and abundant foreign body granulation tissue with polarizable debris.

Results: During surgical removal of the cyst a defect of the inner acetabular wall was noted. After successful revision arthroplasty with allograft bone the clinical symptoms improved.

Conclusion: A foreign-body reaction to wear debris may produce an unusual clinical presentation mimicking malignancy.

Keywords: total hip arthroplasty, intrapelvic mass, wear debris, foreign body reaction.
INtROductIOn

Inflammatory processes have to be kept in mind when considering the differential diagnosis of a pelvic mass. Following total hip arthroplasty (THA), accelerated polyethylene wear is often associated with periprosthetic osteolysis, which may be asymptomatic, present with groin pain, or even produce compression symptoms including urinary obstruction, venous thrombosis, and neuropathy [1, 2]. We present a case in which a large mass containing wear debris originating from a failed THA mimicked malignancy and produced intrapelvic compression of the femoral nerve.

Case report

A 58-year-old male had undergone a left uncemented THA in 1994 because of osteoarthritis. Nine years later he experienced pain in the left groin and thigh. Over the next 4 years he noted loss of strength in his left thigh. On physical examination, diminished quadriceps motor function, hypoesthesia in the anteromedial aspect of the thigh, and an absent patellar reflex on the left side were noted. Plain films of the left hip showed the eccentric location of the femoral head. An electromyogram (EMG) demonstrated a lesion of the left lumbosacral plexus with denervation predominantly of muscles innervated by the femoral nerve. An abdominopelvic computed tomogram (CT) scan showed a large intrapelvic cyst (Figure 1). Percutaneous aspiration of the fluid was performed and a total of 80 mL of thick, grayish-green fluid was removed. Cultures of the fluid were negative. These findings were believed to be consistent with malignancy. However, cytopathologic examination showed necrotic debris without malignant cells (Figure 2).

During surgical removal of the cystic mass, a defect was noted on the medial acetabular wall. Histologically, the cyst wall consisted of hyalinized fibrous and foreign-body granulation tissue without epithelial elements, and the mass was believed to represent a foreign body reaction to polyethylene wear debris originating from a failed THA (Figure 3). The hip was treated surgically 4 weeks later. On incising the pseudocapsule, large, thick, black masses were found around the neck of prosthesis (Figure 4). The polyethylene liner was fractured and the articular surface of the titanium alloy socket was burnished. The
acetabular shell, the modular neck and the head of the prosthesis were replaced. Histological analysis of the resected tissue revealed foreign-body giant cells within hyperplastic synovium. Abundant foreign-body granulation tissue containing coarse granular black pigment, an unusually large number of histiocytes and polarizable polyethylene particles were noted (Figure 5).

The pain from the femoral nerve irritation improved postoperatively. Ten months later, follow-up EMG demonstrated neurophysiologic improvement without any significant denervation. On X-ray the prosthesis remained securely stable at the 12-month follow-up examination.

**DISCUSSION**

Particulate debris from total joint implants extending well beyond bone can simulate malignancies owing to mass effects and pressure on adjacent tissues [3]. However, malignant tumors can arise a long time after bone surgery [4]. Therefore, each case of such a mass needs surgical removal and thorough histopathological examination.
Characteristic osseous and soft tissue reactions caused by release of polyethylene particles into periarticular tissue as well as the differential diagnosis, including infectious and malignant conditions, are discussed in a paper by Olesen Schaarup and Varmarken [5]. Parwani et al. described the cytopathologic findings of particle disease in an unusual case in which an ultrasound-guided aspiration produced hypercellular smears consisting predominantly of proliferating mesenchymal cells, foamy macrophages, inflammatory cells and background acellular debris [6]. Numerous multinucleated giant cells were also observed. Their differential diagnosis included primary or metastatic clear-cell tumors.

A delayed onset of nerve palsy after THA is rare. In a meta-analysis of the English literature on intrapelvic complications after THA failure, Bach et al. identified 50 cases of injury, including three cases of sciatic nerve injury and two cases involving intrapelvic mass formation [7]. In a thorough recent report, Hananouchi et al. described a huge pelvic mass causing severe ureteral obstruction and found 18 additional cases of pelvic masses caused by particle debris after THA [8]. With regard to wear debris masses and femoral nerve palsy after THA, we are aware of only two previous reports [9, 10].

CONCLUSION

In this case a large mass containing particulate wear debris originating from a failed THA mimicked malignancy and produced intrapelvic compression of the femoral nerve. We suggest looking carefully for mass effect symptoms and signs in addition to osteolysis during follow-up examinations of THA patients. Cytologic examination of the mass or fluid may aid in interpreting the clinical picture and imaging studies. Moreover, thorough histopathological examination of such lesions is highly important to exclude malignant tumor.

REFERENCES