

Severe Pseudotumor Formation on an Asymptomatic Well Functioning Metal-On-Metal Total Hip Arthroplasty - A Case Report and Follow - Up

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Abstract

A 72-year-old patient who had metal-on-metal (MMO) total hip arthroplasty (THA) 7 years ago has developed a gluteal mass and pain. Plain radiographs showed a well-fixed THA on the left side with an increased acetabular inclination. Needle aspiration of the mass showed “milky stained” highly viscous liquid. After the approval of the patient, a revision total hip arthroplasty had been performed. There were severe necrosis and granulomatous type reactions all around the hip and the components. After extensive debridement, all the components were removed and a long-stemmed revision total hip arthroplasty with polyethylene insert was performed. We think that patients with MMO THA must be carefully reviewed after the surgery even if they are asymptomatic.

Key words: Metal-on-metal ,pseudotumor, ALVAL, total hip arthroplasty

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Introduction

Although metal-on-metal (MMO) total hip arthroplasty had become popular since the last decade, there is limited studies showing the long-term results. MMO is a choice in total hip arthroplasty with elimination of polyethylene wear debris and the possibility of using larger femoral head for better stability and range of motion. A variety of soft tissue reactions caused by metal-on-metal bearing surfaces had been described in earlier studies including ALVAL (aseptic lymphocyte-dominated vasculitis associated lesion) (Willert et al., 2001), pseudotumor (Pandit et al., 2008) and metallosis (Neumann et al., 2010). Herein, a case with a gluteal mass and pain associated with a MMO total hip arthroplasty was reported. Because this complication is rare, arthroplasty surgeons should be aware of this entity and how to diagnose and treat this condition.

Case

A 72-year-old male patient admitted to our outpatient clinic with a complaint of left groin and gluteal mass. He had a metal-on-metal total hip arthroplasty seven years ago in a different institution due to coxarthrosis on the left hip. After six years without any complaints some swelling had begun to occur slowly on his left buttock. Because the patient had minimal pain without any restrictions of daily activities patient didn't administered to any doctor. But the gluteal swelling had become noticeably large and severe pain especially at night had begun to disturb the patient.

On physical examination, there was a large gluteal and anterolateral groin mass without any erythema or skin lesion except the posterolateral surgical incision. The patient was able to walk without crutches with a mild limp on his left side. With palpation the mass was semi-solid and fluctuation was notable. There was no local temperature difference over the mass. Plain radiographs showed a well fixed uncemented total hip arthroplasty with an increased inclination of the acetabular cup and a large diameter femoral head (Figure 1).



Figure 1. Total Hip Arthroplasty with a large diameter femoral head and an increased acetabular inclination

There was no evidence of loosening or implant failure of the components on the radiographs. WBC and CRP levels were normal but sedimentation was high. Needle aspiration of the mass showed “milky stained” highly viscous liquid. Microscopic examination and cultures including tuberculosis were negative. There was a large posterolateral cystic mass on the CT scan of the pelvis but no sign of osteolysis or aseptic loosening of the components (Figure 2).

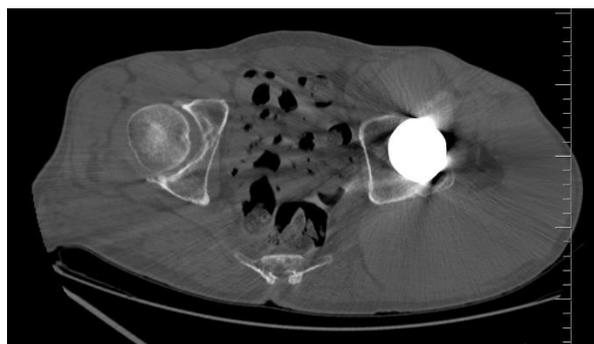


Figure 2. CT of the hip showed a large gluteal mass around the prosthetic components

Left hip of the patient was functioning so well that he had hesitations about the necessity of the revision surgery. After detailed information given to the patient we performed a hybrid revision total hip arthroplasty to left hip through posterolateral incision. Massive “milky stained” fluid was drained after the incision of the fascia lata. There were severe necrosis and granulomatous type reactions all around the components, trochanteric region, gluteal muscles, pericapsular tissues and short external rotators (Figure 3).



Figure 3: Severe pseudotumor and necrosis around the components and hip

Multiple pathologic specimens were taken from involved areas. After intense debridement of necrotic tissues and irrigation acetabular component which is placed with increased inclination was removed. There were no osteolysis or bone deficiency around the acetabulum. After reaming and medialization of the acetabulum an uncemented acetabular component was inserted. There was no femoral component loosening but after reaming and medialization of the acetabular component, we decided to revise the femoral component. A cemented long femoral stem was placed with a bone cement with antibiotic. A 36 mm femoral head and a polyethylene insert was used. After the reduction of the hip the stability was good (Figure 4).

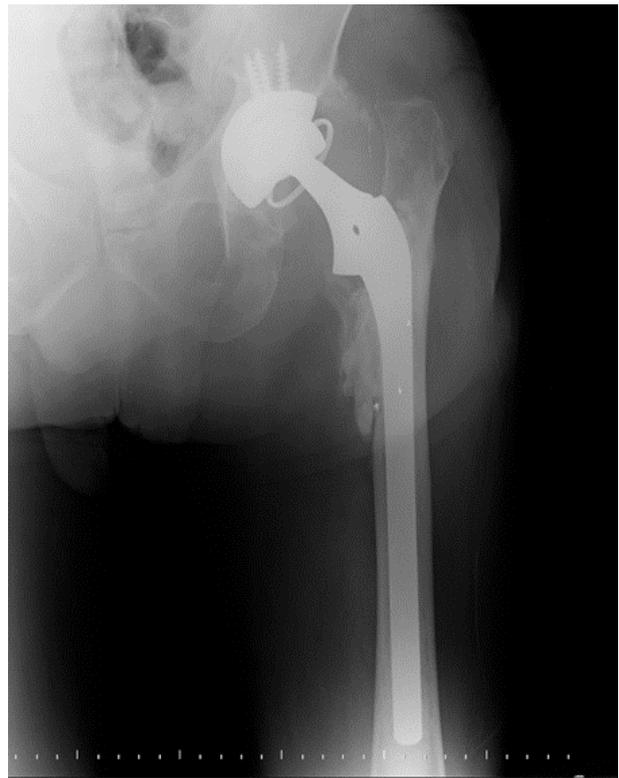


Figure 4: Revision arthroplasty with a longer stem and a polyethylene insert

Following intense debridement of necrotic tissues and irrigation incision was closed. Ten days after the surgery patient has suffered a posterolateral hip dislocation. Closed reduction under general anesthesia was successful but stability seemed to be poor, therefore we decided to replace the acetabular component. The acetabular component was replaced with a locked acetabular component. Weight bearing with a cane was allowed immediately on the first day of the surgery. Patient was reviewed at 5 months at the outpatient clinic. He was walking without crutches with a mild limp without pain on daily activities. Also, there were no evidence of gluteal mass or swelling and patient satisfaction was fairly enough.

Discussion

Metal-on-metal hip arthroplasties had become popular in past years for potential solution of polyethylene wear problems. Use of large diameter femoral heads in this type of articulations provides increased stability and range of motion. But nowadays, after various reports of periarticular soft tissue masses, increased plasma metal ion levels and early failure rates, there is a great debate about the

future of metal-on-metal bearing surfaces (Hallows et al., 2011; Smith et al., 2012; Almousa et al., 2013).

A variety of soft tissue reactions caused by metal-on-metal bearing surfaces had been described earlier including ALVAL (Willert et al., 2001), pseudotumor (Pandit et al., 2008) and metallosis (Neumann et al., 2010). ALVAL is a histological diagnosis characterized with infiltration of lymphocytes around pericapsular tissue while pseudotumors generally appears as periarticular soft tissue masses (Willert et al., 2001; Pandit et al., 2008). These periarticular soft tissue masses so called “pseudotumors” may be solid granulomatous or destructive cystic lesions of non-neoplastic origin (Daniel et al., 2012).

The prevalence of asymptomatic pseudotumors after metal-on-metal resurfacing arthroplasties had been reported by Kwon et al. was 4% with the use of ultrasound as the initial imaging modality (Kwon et al., 2011). According to a recent meta-analysis study, incidence of pseudotumor/ALVAL ranged from 0% to 6.5% of hips with a mean follow-up ranging from 1.7 to 12.3 years across the studies (Wiley et al., 2013). But with the use of MARS-MRI (metal artifact reduction sequence magnetic resonance imaging) the prevalence of pseudotumors could be found as high as 60.9% or 61% according to some studies (Hart et al., 2009; Sutphen et al., 2015).

There is also debate about the pathogenesis of pseudotumors. Some studies show that pseudotumors are adverse tissue reactions to metal wear debris and raised metal ion levels (Pandit et al., 2008). Bosker et al. reported that patients with elevated serum metal ion levels had four times increased risk of developing a pseudotumor (Bosker et al., 2012). But some studies demonstrated that pseudotumors may be seen in patients with asymptomatic MOM arthroplasties (Kwon et al., 2011) and also with low serum metal ion levels (Matthies et al., 2012; Sutphen et al., 2015). Also, a recent study reported that there is no correlation between the presence of pseudotumor and major risk factors including metal ion levels, femoral head size, femoral offset, head neck taper length, acetabular component inclination angle, patient sex or age, body mass index, WOMAC or UCLA activity score (Bayley et al., 2015).

Our patient had an asymptomatic well-functioning hip for almost 6 years after the surgery. A gradual swelling occurred on his buttock and groin last year without any limitation of function and pain. This seems to be correlating with various reports

reporting that pseudotumors can be found in asymptomatic MOM hip arthroplasties. (Hart et al., 2012; Almousa et al., 2013). Increased inclination of the acetabular component may be associated with severity of the pseudo tumor due to increase of metal wear debris. But as we mentioned before some studies reported that there is no correlation between acetabular component inclination and pseudotumor formation (Bayley et al., 2015).

Conclusion

It is important to investigate metal-on-metal arthroplasty patients whether they are symptomatic or not. Also, further studies needed to discover the factors associated with pseudotumors and pathogenesis of adverse tissue reactions.

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