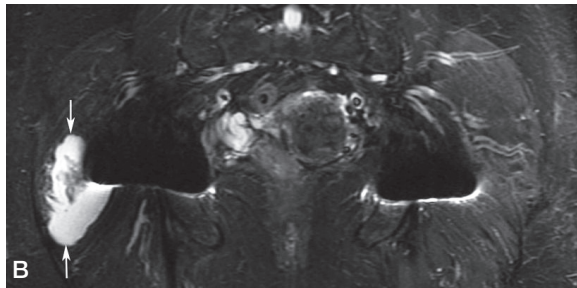
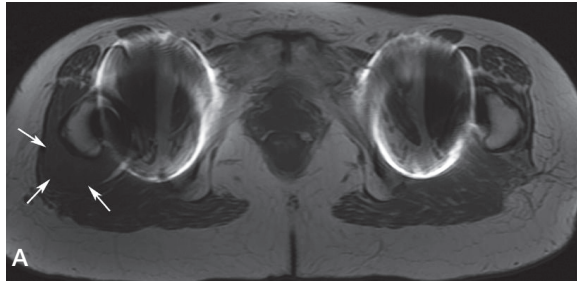


CASE 56 Hip Pain

PAIN IN THE HIP: 1. A 50-year-old female who had undergone total hip arthroplasty [Metal on metal] of the right hip 3.4 years earlier. Shee had a tingling sensation in the trochanteric region and the replaced right hip made clacking sounds.



? Diagnosis

DIAGNOSIS

ARMD Adverse reaction to metal debris. Langton identified that there is no clear consensus in the literature defining the boundaries of the terms “metallosis”, “aseptic lymphocyte-dominated vasculitis-associated lesions” (ALVAL), and “pseudotumors” and used the term **adverse reactions to metal debris**

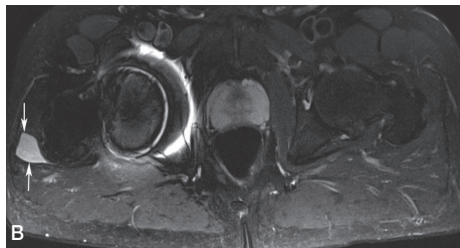
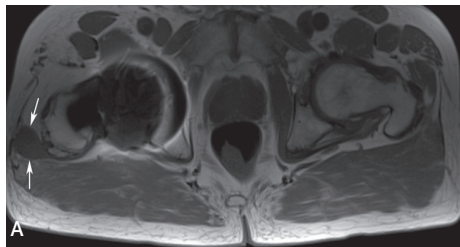
INVESTIGATIONS:

Urine and Serum for Chromium and Cobalt

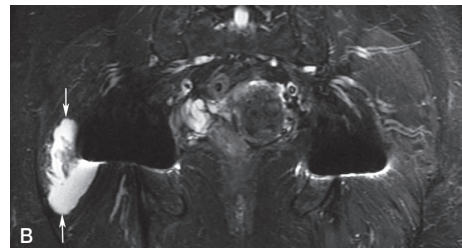
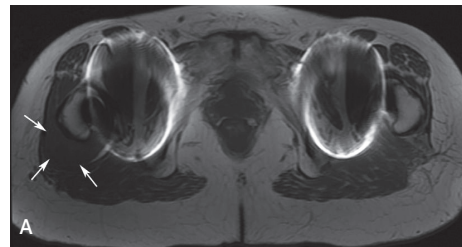
Whole-blood metal ion levels were slightly elevated (cobalt 7.5 ppb and chromium 5.8 ppb; [normal reference values are < 0.8 ppb for Co and Cr])

MRI Types of Pseudotumors

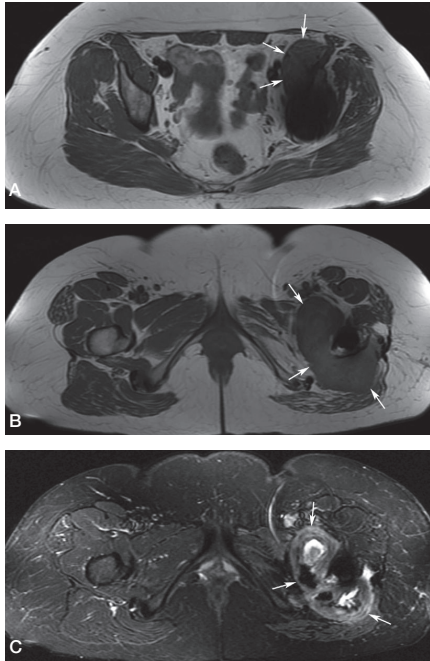
I Thinned wall cyst



II Thick walled cyst

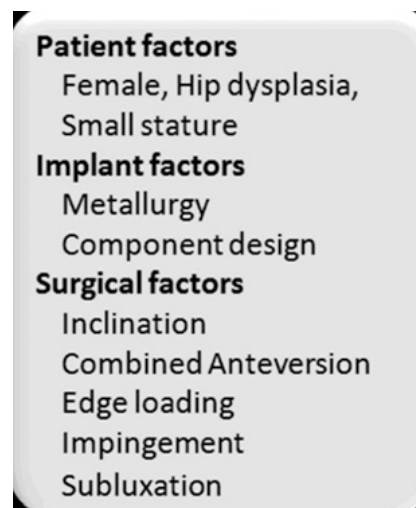


III Predominantly solid swelling extending to iliopsoas area



In revision surgery, 98 pseudotumors were found in 167 ASR MoM hips (59%).

FACTORS



The duration of follow-up did not prove to be a predictor. In some developed between 1.5 and two years postoperatively, **suggesting patient susceptibility is an important etiological factor.**

Some studies have suggested that edge-loading, resulting from adverse cup orientation, leads to more wear. In a recent study it was shown a rate of pseudotumor formation in hips with well-positioned metal-on-metal hip replacements to be similar to that in hips with replacements positioned outside the safe zone. Inclination angle did not prove to be a predictor in a recent study.

Pathogenesis

Metal-on-metal articulations generate approximately $6.7 \cdot 10^{12}$ to $2.5 \cdot 10^{14}$ particles every year, which is 13,500 times the number of polyethylene particles produced from a typical metal-on-polyethylene bearing.

a. **Polywear and pseudotumor:** Polyethylene debris is taken up by macrophage giant cells that release prostaglandin E₂, which resorbs bone, causing the implant to loosen and leading to a vicious cycle of wear and loosening. Usually represent a nonspecific foreign-body reaction.

b. Metallosis and pseudotumor:

Willert et al. revealed an active cellular reaction with diffuse and perivascular infiltrates of lymphocytes and plasma cells, increased endothelial venules, fibrin exudation, accumulation of macrophages with drop-like inclusions, and infiltrates of eosinophilic granulocytes and necrosis. These histological findings were described as ALVAL [hypersensitivity reaction]

Incidence: It was thought to be 1% symptomatic pseudotumor and 5% asymptomatic pseudotumor with surface replacement [high in modular due to increase trunion corrosion as in ASR]. Recent report [JBJS 95-A,17:1560] indicates the prevalence of pseudotumors was high (28%). Most of the pseudotumors (72%) were asymptomatic. Recently Williams et al. found a 25% prevalence of pseudotumors detected by ultrasound in twenty asymptomatic hips after a resurfacing arthroplasty

CLINICAL FEATURES

1. Painful THR with or without click
2. Pain is usually in the groin or trochanteric region

3. Pressure effects on vital structures in the vicinity, including veins, nerves, and ureters.
4. Suboptimal component positioning

The recent focus on pseudotumors associated with metal-on-metal bearings indicates that pseudotumors are associated not only with a soft-tissue mass and osseous changes of osteolysis and erosions but also with damage to the periarticular soft tissue. The damage may lead to soft-tissue and muscle necrosis, osseous denudation, pathological fractures, and hip dislocations. The problem of hypersensitivity to metal in patients with metal-on-metal bearings has been suspected, investigated, and debated for over thirty years.

Investigations

1. **Suspect:** when there is groin and hip pain.
2. **Radiographs** to exclude aseptic implant loosening, femoral neck stress fracture or collapse of the femoral head, and femoroacetabular impingement.
Identify prosthesis: ASR more than Birmingham
3. **Alignment:** more with malaligned [due to edge loading] more with excessive cup inclination or anteversion.
4. **Multislice computed tomography** scanning is necessary to allow assessment of femoral neck anteversion.
5. At this time, there is no reliable blood or urine screening test that offers a high predictive value for subsequent pseudotumor development.
A very high serum ion levels, however, were at risk. Serum ion levels can therefore be used as a screening tool.
6. **MRI** (with metal artifact-reducing sequences) is useful in the assessment of soft-tissue masses or fluid collections.
7. **Hematologic testing** and microbiological assessment of joint aspirate is needed to rule out infection
8. Positive bone scan studies can indicate infection/loosening.

9. In the past, skin patch testing was used. The value of patch testing is limited
10. biopsy and tissue analysis allows an appropriate diagnosis of these reactions.

Biopsy ARMD

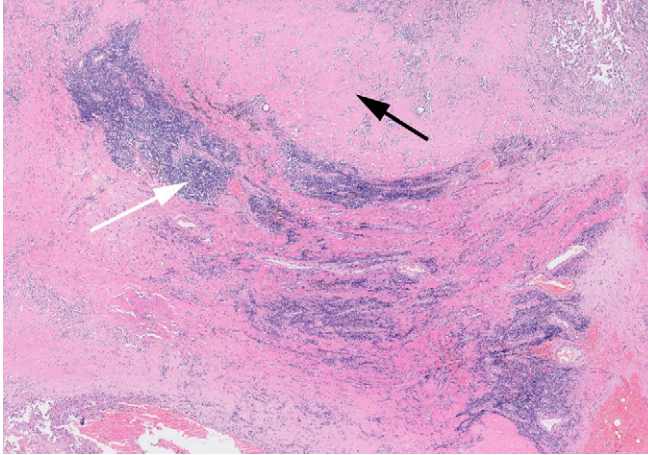


Fig. 3
Low-power photomicrographic image of ARMD (adverse reactions to metal debris), demonstrating the dense, deep eosinophilic (pink) fibrinoid material lining the pseudocyst (upper and lower area), with the thick dense (blue) lymphoid aggregates, composed of lymphocytes and plasma cells, between the fibrinoid material. The white arrow indicates lymphocytic aggregates, and the black arrow indicates fibrinoid necrosis and tissue organization (hematoxylin and eosin stain, original magnification, $\times 25$).

TREATMENT

1. Pseudotumors in patients with metal-on- polyethylene implants

A cementless revision prosthesis combined with cancellous bone-grafting. Logical to use: ceramic on ceramic; or poly Vs metal

2. Metal-on-metal bearing hip replacement fails from a pseudotumor

There is growing support for an early revision to a non- metal-on-metal bearing hip arthroplasty

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