

Key words: ALVAL; cobalt allergy; total hip arthroplasty.

Introduction

In recent years, reports have been published about peri-prosthetic, pseudo-tumour masses following total hip arthroplasty employing metal-on-metal implants (i.e. both the acetabular and femoral components are made of metal) with histological evidence of an atypical immunological response (1–3). We present a unique case of peri-prosthetic pseudo-tumours and concomitant cobalt allergy following bilateral total hip arthroplasty with chromium-cobalt-on-polyethylene bearings.

Case Report

A 71-year-old woman was referred with suspected allergy to metal components following bilateral total hip arthroplasty. The patient had no prior history of skin disease or contact allergy. The arthroplasties were symmetrical with uncemented titanium femoral components with femoral heads made of cobalt and chromium combined with uncemented titanium acetabular components with polyethylene inserts (Bi-Metric®, Biomet). Groin pain, resembling the preoperative osteoarthritic state, occurred soon after the surgical procedures but clinical examination showed no sign of prosthetic complication and the patient was referred for rheumatological evaluation. Because of elevated inflammatory parameters, the patient was treated with systemic prednisolone, which improved pain. However, as soon as systemic steroid treatment was discontinued, the pain recurred and a swelling in the left inguinal area was noted. There were no abnormalities on pelvic X-ray examination and a CAT-scan showed a cystic collection of fluid anterior to the left iliopsoas muscle with probable communication with the hip joint. Infection was ruled out with a radiolabelled leucocyte scintigraphy. The left hip was surgically explored and a large peri-prosthetic, cystic mass was removed. Histological examination showed connective tissue fibrinoid necrosis, a chronic inflammatory infiltrate with lymphocytes and macrophages and capillary proliferation. In the area of the cyst wall lymphocytes were arranged perivascularly. Evidence of a foreign-body reaction

Cobalt allergy and suspected aseptic lymphocyte-dominated vascular-associated lesion following total hip arthroplasty

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such as granulomata and giant cells could not be identified and mycobacterial infection was excluded with staining. The patient underwent two surgical soft tissue revisions bilaterally with little effect on the pain and eventually both prostheses were revised to ceramic-on-polyethylene bearings with complete symptom relief. A follow-up pelvic CAT-scan was normal after 1 year.

Patch testing was performed with nickel sulfate 5% pet., cobalt chloride 1% pet. and potassium dichromate 0.5% pet. using Finn Chambers® (8 mm Epitest Ltd Oy, Finland) on Scanpor tape® (Norgesplaster A/S, Alpharma, As, Norway). The patch tests, including a piece of titanium, were applied to the upper back and occluded for 2D. Readings were done on D2, D3 and D7 according to the recommendation from the International Contact Dermatitis Research Group (4). There was a positive reaction to cobalt chloride (2+) on D3 and D7 and a doubtful reaction to potassium dichromate (?+) on D3 and D7.

Discussion

In 2005 Willert et al. (1) coined the term 'aseptic lymphocyte-dominated vasculitis-associated lesion' (ALVAL), histologically characterized by a diffuse, perivascularly located lymphocyte infiltrate with necrosis and limited numbers of macrophages. In contrast, the foreign-body response to metal-on-polyethylene implants is typically granulomatous and dominated by macrophages with only a few lymphocytes (5). Willert and colleagues observed that some patients had early recurrence of symptoms following total hip arthroplasty with metal-on-metal components. Furthermore, the symptoms persisted in patients who were re-operated with the insertion of yet another metal-on-metal prosthesis, whereas patients who had metal-free implants inserted made full recoveries and showed no evidence of immune reactions. These observations suggested that the patients had been sensitized to prosthetic metal components.

We describe a case of suspected ALVAL in a patient where cobalt sensitization possibly developed following insertion of chromium-cobalt-on-polyethylene prostheses. Corticosteroid therapy led to symptom relief during treatment and the patient made a complete recovery after replacement with

ceramic-on-plastic prostheses. Histological examination showed features of an ALVAL reaction with a lymphocyte-dominated inflammatory response and the absence of the usual microscopic features of a foreign-body response.

We therefore conclude that sensitization to prosthetic metals should be suspected in patients with persistent symptoms or early recurrence of pain following artificial joint surgery with the use of metal containing prostheses. Furthermore, this first case of suspected ALVAL after total hip arthroplasty with metal-on-polyethylene components emphasises that metal allergy should not only be considered following the insertion of second-generation metal-on-metal bearings but also following insertions of metal-on-plastic prostheses. Finally, it underscores that patch testing should be performed when orthopaedic patients have symptoms of ALVAL.

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