An unusual presentation of metastatic melanoma in the shoulder

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Abstract

A 72-year-old lady underwent a Copeland hemiarthroplasty of the shoulder for rotator cuff arthropathy with a good functional outcome. Her past medical history included previous management of a malignant melanoma. Several years following arthroplasty surgery, she acutely developed signs and symptoms of prosthetic joint infection. The present case report describes the metastatic spread of malignant melanoma mimicking that of prosthetic sepsis.

Keywords

Copeland hemiarthroplasty, melanoma shoulder

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Introduction

Malignant melanoma, which is one of the most aggressive forms of skin cancer, has increased in incidence over the past decade.¹ Unfortunately, the 10-year survival rate of those with metastatic disease remains poor at around 10%.² The Copeland shoulder arthroplasty, as first used in 1986, is a cementless pegged humeral head surface replacement.³ The design is based on the principle of minimal bone resection, which preserves bone stock and the ability to more easily mimic normal joint geometry.⁴ The newer Copeland Extended Articular Surface EAS Shoulder™ (Biomet Ltd, Swindon, UK) resurfaces the whole of the humeral head and the greater tuberosity, providing an increased surface for articulation. Primary shoulder sepsis and infection after shoulder arthroplasty are rare, with a reported incidence of between 0% and 4%.^{5,6} for infected shoulder arthroplasty. To our knowledge, this is the first reported case of a metastatic melanoma lesion mimicking the clinical presentation of an infected Copeland shoulder hemiarthroplasty.

Case report

A 72-year-old lady who had previously undergone rotator cuff repair presented with right shoulder pain secondary to rotator cuff arthropathy. She underwent a

Copeland EAS shoulder hemi-arthroplasty after which she had symptomatic improvements in Oxford Shoulder Score from 24 to 35. One year later, she was diagnosed with a 1.4-mm melanoma on her cheek (wild-type BRAF), which was treated with surgical excision and local radiotherapy. Five years later, she was seen in the orthopaedic outpatients department because was developing some discomfort in her shoulder and was investigated for this with routine blood tests and radiographs that illustrated lucency around the prosthesis (Figures 1 and 2). Two weeks later, she presented with symptoms of increasing malaise, confusion, hypotension, anaemia, an erythematous warm swollen right shoulder and was admitted to hospital. She was found to be afebrile with an elevated C-reactive protein (CRP) of 348 mg/L and white cell count of 51 K/ μ L. Following exclusion of other sources of infection (e.g. chest and urine), sepsis was presumed to be related to the shoulder prosthesis. After two failed aspirations, an ultrasound scan confirmed a soft tissue swelling with

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Figure 1. Anteroposterior view of right shoulder Copeland EAS hemiarthroplasty. Surgical clips are seen on the right side of the neck from a previous melanoma surgery.

Figure 2. Axillary lateral of right shoulder illustrating lucency around the prosthesis.

no clear area of fluid collection. A subsequent computed tomography scan of her chest and abdomen illustrated a few tiny lung nodules of uncertain significance and extensive soft tissue around the right shoulder considered to represent a haematoma and bony metastasis in the public rami. Because concern over prosthetic sepsis remained, removal of the shoulder prosthesis was undertaken. Intra-operatively, the prosthesis was solidly fixed *in situ* but a soft tissue tumour was found surrounding the shoulder joint. This was observed to be black in colour and clinically similar to that found in secondary metallosis. The tumour was extensively debrided, the prosthesis excised and the joint thoroughly irrigated. Intra-operative cultures and biopsies were taken. Histologically, biopsies showed severely atypical tumour cells with epithelioid nuclei, prominent macronucleoli and cytoplasmic melanin pigment. Subsequent immunohistochemistry showed strong positivity for S100 HMB-45 and melan-A, confirming a diagnosis of

malignant melanoma. Further management was discussed at the melanoma multi-disciplinary team meeting and she underwent a course of local radiotherapy to the shoulder once the surgical wound was well healed. Unfortunately, over the following months, her condition deteriorated through disease progression and palliative care was initiated.

Discussion

Copeland resurfacing hemiarthroplasty of the shoulder is commonly used to treat rotator cuff arthropathy, with good functional results being reported.^{3,7,8} The patient in the present case report had had a good response from her initial surgery with an improvement in her Oxford Shoulder Score. Just prior to her acute presentation, she had been seen in the orthopaedic outpatients department with increasing pain and was investigated for this. With the benefit of hindsight, this was likely to have been a result of the subsequently identified metastatic lesion in the shoulder; however, no acute signs were observed at the time. The presentation of general malaise, elevated inflammatory markers and a painful swollen erythematous right shoulder indicated the classic signs of sepsis. Elevated CRP and white cell count (WCC) were observed, which was assumed to be secondary to sepsis. Interestingly, CRP has been studied as a biomarker in metastatic melanoma and shown to correlate with poor survival when elevated.^{9,10} Similarly, WCC has been used as a predictor of treatment responses, with a higher WCC being predictive of a lower disease-free interval.¹¹ Following her surgery, her WCC and CRP both decreased, which was assumed to be a result of the elimination of infection. This decrease in blood markers may have been a result of reducing the tumour burden.

At the time of surgery, the black pseudotumour surrounding the prosthesis was assumed to be secondary to deposit of metal ions. Metallosis is the accumulation of metal wear debris in the peri-prosthetic tissues, which results in a cellular reaction characterized by a macrophagic response with the formation of giant cells and fibrosis.¹² Metallosis of the Copeland and newer Copeland EAS shoulder prosthesis has not been reported previously in the literature. Khan et al.¹³ described an individual case of metallosis following Nottingham shoulder replacement where they assumed that the titanium porous coating was separating from the humeral stem and becoming embedded in the ultra-high-molecular-weight polyethylene glenoid component, resulting in abrasive wear of the humeral component. Meyskens et al.¹⁴ identified patients who had undergone metal on metal hip hemiarthroplasties and who had an increased risk of developing cutaneous melanoma. They attributed this to elevated blood levels of

chromium and cobalt. Although unlikely to be relevant in this circumstance with a Copeland hemiarthroplasty, the need to be aware of such complications of metallosis is important.

A comprehensive literature search has been carried out and no similar reports of metastatic involvement of shoulder or arthroplasties in general have been identified. This is a novel observation in a patient with a joint arthroplasty where sepsis was confused with the presence of a metastatic lesion.

Declaration of Conflicting Interests

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