Metastatic muscle abscesses complicating infected total hip arthroplasty

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SUMMARY

A 73-year-old woman with rheumatoid arthritis presented to our institution with infection of her right total hip arthroplasty. On admission, a draining sinus tract over the hip and a palpable mass in the left lower posterior region of the neck were detected. The contrast CT scan showed a large abscess in the trapezius muscle and multiple abscesses involving muscle of the neck and right shoulder. Intraoperative specimens from the muscle abscess were positive for presumably the same methicillin-resistant *Staphylococcus aureus* that sustained the prosthetic joint infection. Prolonged intravenous daptomycin led to remission of the muscle abscess and control of the prosthetic joint infection. The patient refused revision total hip arthroplasty and oral cotrimoxazole was prescribed for chronic suppression of the infection. Three years after the primary surgery there was stable remission of the prosthetic joint infection. This rare case demonstrates the severity of prosthetic joint infections sustained by multiresistant bacteria in immunocompromised hosts, which may result in their bacteraemic spread.

Keywords: muscle abscess, infection, total hip arthroplasty, rheumatoid arthritis, pyomyositis.

INTRODUCTION

Muscle abscess is an uncommon purulent infection and is more frequently diagnosed in immunocompromised patients [1]. In patients with infected total hip arthroplasty (THA), the muscle abscess can develop because of the contiguity spread of infection and most cases involve the iliopsoas muscle [2-6]. This article describes the occurrence of an infection of total hip arthroplasty sustained by methicillin-resistant *Staphylococcus aureus* (MRSA), which was followed by the development of multiple metastatic abscesses in the neck and in the trapezius muscle because of hematogenous spread of the periprosthetic joint infection (PJI).

CASE REPORT

A 73-year-old woman with a 20-year history of rheumatoid arthritis (RA) receiving chronic treatment leflunomide and steroids underwent right THA in September 2010. The postoperative period was uneventful until 5 months after the operation, when the patient was admitted in another hospital because of pain and movement limitation in the operated hip and sinus tract formation in trochanteric region. Before our observation, physical examination revealed extensive erythema, swelling at the surgical site and leakage of pus from a sinus-tract. The patient was afebrile but laboratory tests revealed an erythrocyte sedimentation rate (ESR) of 121 mm/h and a C-reactive protein (CRP) level of 7.32 mg/dl (normal <0.5). Leukocyte and haemoglobin count was normal. The anteroposterior radiograph of the right THA showed penetration of the femoral ball in the acetabular cup and loosening of the acetabular component with breakage of fixation screws.

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Periprosthetic fluid aspirate and deep sinus tract culture for aerobic and anaerobic bacteria were obtained and methicillin-resistant *Staphylococcus aureus* (MRSA) [Minimal Inhibitory Concentration (MIC) >4 μg/ml] was isolated by cultured specimens. The patient was observed in another center where intravenous teicoplanin (8 mg x kg body weight daily) was administered along a 3-month period on the basis of a favorable MIC of 1 μg/ml. Teicoplanin was stopped after symptoms disappearance both closure of the sinus tract and persistent normalization of inflammatory markers were observed. In August 2011 the patient started again to feel pain in her right hip, but she also complained of a painful mass in the left postero-lateral region of the neck. Thus, she was referred to our department.

On admission the patient was forced to walk with crutches. Local swelling and redness of the surgical scar over the hip and a nearby draining sinus tract were noted. There was also a palpable cystic mass in the left trapezius muscle. Laboratory values showed an ESR of 130 mm/h and a CRP level of 8.53 mg/dL, whereas the white blood cell count was normal. Purulence obtained from the sinus tract and periprosthetic fluid aspirate were sent for microbiology cultures, and presumably the same MRSA that had been formerly isolated grew in the aerobic cultures. Ultrasound revealed an abscess in the left trapezius muscle (diameter 13 cm). A contrast computed tomography scan confirmed this finding and showed further abscesses in supraclavicular fossa involving the scalenus anterior muscle (diameter 6 cm) and in the areas surrounding right shoulder involving deltoid and subscapularis muscles (diameter 4 cm) (Figure 2).

Percutaneous ultrasound-guided fine needle aspiration of the trapezius muscle mass revealed frank pus and presumably the same MRSA as in the hip was isolated from the culture. The abscess was surgically drained and tissue specimens harvested intraoperatively were positive again for MRSA. The patient also underwent transthoracic echocardiography to assess possible bacterial endocarditis justifying multiple body abscesses with unremarkable findings. The patient refused further surgery because of her poor general condition and the high surgical risk. Intravenous daptomycin (8 mg/kg/die) in combination with rifampin per os (900 mg/die) was started on the basis of favorable MIC (rifampin 0.06 μg/mL and daptomycin 0.5 μg/mL). One month later the sinus tract over the right hip was closed. Antibiotic therapy was prolonged for 90 days without significant side-effect according to an outpatient parenteral antibiotic therapy (OPAT) model based on a daily access of a trained nurse who administered daptomycin as a 2 minutes intravenous injection. In November 2011 no clinical or laboratory sign of infection was present. No clinical or CT scan abnormality was detected in the chest or neck region. Thus, the intravenous daptomycin and rifampin per os were discontinued. She was discharged and oral cotrimoxazole was prescribed for long-term chronic suppression of the
infection. At the last follow-up in July 2014 there was stable remission of the prosthetic infection. Informed consent was obtained for participation in this case study.

**DISCUSSION**

Several risk factors for PJI have been identified. Patient related risk factors include previous revision arthroplasty or previous PJI at the same site, tobacco abuse, obesity, a neoplasm, diabetes mel-litus, psoriasis, immunosuppression, and RA [7-9]. Patient with RA have higher baseline risk of infection compared to the general population [10, 11]. Total hip or knee PJI has a 4.2% prevalence in RA patients and *S. aureus* is the most commonly isolated pathogen [12, 13]. A high proportion of episodes of PJI sustained by *S. aureus* in patients with RA involve concomitant bacteraemia. This may due to the fact that bacteraemic episodes are common in this patient population, allowing for potential bacteraemic seeding of a joint prosthesis [13]. Intrinsic cellular immunity alterations or the use of immunosuppressive agents for chronic therapy may account for the increased risk of infection in RA patients [12]. Indeed, severe infections may rapidly develop in patients taking leflunomide, particularly in combination with methotrexate or steroids as in the current case report [14]. MRSA bacteraemia arising from the infected THA may have set the stage for abscesses formation in the neck, in the left trapezius muscle and muscles around right shoulder of our patient. In fact, the same microorganism was isolated from both septic foci. The muscle abscess or pyomyositis can be primary or secondary [4]. Primary muscle abscess is caused by haematog-enous or lymphatic diffusion from distant infectious sources, while secondary abscess is the consequence of direct spread from an adjoining septic focus. Risk factors for primary muscle abscess include diabetes mellitus, steroid therapy, cancer, and any immunocompromised conditions. Any muscle can be affected, but primary abscesses usually affect tight, gluteal and abdominal wall muscles, whereas locations in the neck and upper limb are exceedingly rare [15, 16]. *Staphylococcus* is the most frequent pathogen isolated from pyomyositis but the pathogenesis of this condition is not fully understood as skeletal muscle is typically resistant to infection, and acute bacteraemia rarely leads to muscle infection [17]. The responsibility of a previous muscle trauma has been advocated, but even the muscular damage induced by several conditions such as diabetes or steroid therapy may increase the potential for local infection [18, 19]. Muscle abscess originating from THA infection mainly develop in the iliopsoas as a consequence of the contiguity spread, and to the best of our knowledge 17 cases of such muscle abscesses have been reported so far [2-6]. The spread of infection between prosthetic implant and the iliopsoas compartment can be explained...
by the presence of acetabular fissures or direct spread through the iliopectineal bursa [3]. The present case report describes the clinical course of a patient affected by THA infection who presented with a metastatic muscle abscess in the trapezius. To the best of our knowledge, no previous case of muscle abscess in the neck or upper limb caused by haematogenous or lymphatic spread of a PJI has been reported up to date.

OPAT programs have to be implemented to shorten the hospitalization period and consequently reduce the cost. In the case reported a single access of a trained nurse permitted a long treatment and lowered the total cost of assistance [20].

The current study represents a contribution to the available literature regarding the relationship between PJI and muscle abscess. This case also demonstrates the severity of PJIIs sustained by MRSA in immunocompromised hosts, which may result in bacteremic spread. In patients with PJI and retention of their prosthetic joint implant, suppressive therapy with drugs active against biofilm forming bacteria has always to be considered and long term treatment with cotrimoxazole can be adopted, as current guidelines suggest [21, 22].

**REFERENCES**


