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Case Report

Mycobacterium avium complex olecranon bursitis resolves without antimicrobials or surgical intervention: A case report and review of the literature

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ABSTRACT

Introduction: Nontuberculous mycobacteria are an uncommon cause of septic olecranon bursitis, though cases have increasingly been described in both immunocompromised and immunocompetent hosts. Guidelines recommend a combination of surgical resection and antimicrobials for treatment. This case is the first reported case of nontuberculous mycobacterial olecranon bursitis that resolved without medical or surgical intervention.

Case presentation: A 67-year-old female developed a painless, fluctuant swelling of the olecranon bursa following blunt trauma to the elbow. Due to persistent bursal swelling, she underwent three separate therapeutic bursal aspirations, two involving intrabursal steroid injection. After the third aspiration, the bursa became erythematous and severely swollen, and bursal fluid grew *Mycobacterium avium* complex. Triple-drug antimycobacterial therapy was initiated, but discontinued abruptly due to a rash. Surgery was not performed. The patient was observed off antimicrobials, and gradually clinically improved with a compressive dressing. By 14 months after initial presentation, clinical exam revealed complete resolution of the previously erythematous bursal mass.

Discussion: This is the first reported case of nontuberculous mycobacterial olecranon bursitis managed successfully without surgery or antimicrobials. Musculoskeletal nontuberculous mycobacterial infections are challenging given the lack of clinical data about optimal duration and choice of antimicrobials or the role of surgery. Additionally, the potential toxicity and drug interactions of antimycobacterials are not insignificant and warrant close monitoring if treatment is pursued.

Conclusion: This case raises an important clinical question of whether close observation off antimicrobials is appropriate in select cases of immunocompetent patients with localized atypical mycobacterial disease of soft tissue and skeletal structures.

Introduction

Nontuberculous mycobacteria are ubiquitous in the environment, yet remain uncommon causes of septic bursitis, with most cases reported as occurring in immunocompromised hosts. However, cases of nontuberculous mycobacterial olecranon bursitis occurring in the immune competent have been described in the recent past [1–4]. Our review of the literature demonstrates that 42 percent (8 of 19) of reported cases of nontuberculous mycobacterial olecranon bursitis had some form of immune compromise, such as immunosuppressive medications or conditions (Table 1). Potential portals of entry of atypical mycobacteria into the bursa include introduction through bursal aspiration or steroid injection into an initially inflamed, uninfected bursa, or percutaneous entry through a minor traumatic break in the skin contaminated by soil or water. An outbreak of atypical mycobacterial intramuscular infections was described in China in 1997–1998, which was traced back to contaminated vial lids for penicillin injections [5]. The diagnosis of nontuberculous mycobacterial bursitis is often delayed, as symptoms tend to be mild and constitutional symptoms are typically absent. This clinical presentation often leads to therapeutic modalities for aseptic bursitis, such as repeated steroid injections, which may exacerbate

Abbreviations: AFB, acid-fast bacillus; MAC, *Mycobacterium avium* complex; MRSA, methicillin-resistant *Staphylococcus aureus*; *M.*, *Mycobacterium*; ATS, American Thoracic Society.

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Table 1
Cases of olecranon bursitis caused by nontuberculous mycobacteria.

Age/sex	Comorbidities or risk factors	Steroid Use	Organism	Antimicrobial treatment regimen	Duration of treatment (months)	Number of surgical procedures	Outcome	Reference
58/M	Colon cancer	None specified	*M. avium* complex	Rifampin	1	2	Resolved	Kozin and Bishop [4]
49/F	MCTD, chronic corticosteroids	Oral	*M. avium* complex	Rifampin, ethambutol, isoniazid	36	1	Recurrence	Kozin and Bishop [4]
57/M	Psoriasis, immunomodulator use (Alefacept)	None	*M. avium* complex	Ciprofloxacin, rifampin, clarithromycin	Not specified	1	Resolved	Prasertsuntarasai et al. [7]
53/M	None	Oral	*M. avium* complex	Rifampin, ethambutol, azithromycin	8	1	Resolved	Garrigues et al. [1]
61/M	Type II DM, atrial fibrillation	Intrabursal	*M. avium* complex	Ethambutol, clarithromycin	Not specified	1	Resolved	Olsen et al. [6]
54/F	ESRD, CHF, AS, atrial fibrillation; 1 year s/p operative fixation of radial head fracture	Intrabursal	*M. avium* complex, MRSA, *C. glabrata*	Unspecified multidrug therapy	Not specified	Not specified	Resolved	Olsen et al. [6]
68/F	Blunt trauma to elbow in lake	None	*M. lacus*	None	0	1	Resolved	Turenne et al. [10]
42/M	None specified	None specified	*M. szulgai*	None	0	1	Resolved	Marks et al. [11]
66/M	Elbow laceration in river	None specified	*M. marinum*	Minocycline	6	0	Resolved	Saadatmand et al. [9]
24/M	Superficial elbow laceration	Intrabursal	*M. asiaticum*	Flucloxacillin	Two courses given, duration not specified	0	Resolved	Dawson et al. [3]
79/M	None specified	None specified	*M. chelonae*	Cefazolin	1	1	Resolved	Kozin and Bishop [4]
20/F	Systemic lupus erythematosus, chronic corticosteroids	Oral	*M. fortuitum* (grew from disseminated nodules)	Doxycycline, erythromycin, norfloxacin then amikacin and cefoxitin	11	0	Disseminated infection, death	Laborde et al. [13]
60/M	Type II DM, monoclonal gammopathy	Intrabursal	*M. goodii*	Doxycycline and ciprofloxacin	2½	1	Resolved	Friedman and Sexton [14]
40/M	Previous bursal aspirations, swimmer	None	*M. gordonae*	Isoniazid and rifampin	12	0	Resolved	Lorber et al. [8]
35/M	Rugby player	Intrabursal	*M. gordonae*	Azithromycin and moxifloxacin	2½	1	Resolved	Garrigues et al. [1]
59/M	Elbow laceration in public swimming pool	Intrabursal	*M. kansasii*	Rifampicin, ethambutol, isoniazid and pyrazinamide	6	1	Resolved	Barham and Hargreaves [2]
64/M	Hepatitis; hit elbow on ice, previous unsuccessful bursal excision	Intrabursal	*M. szulgai*	Rifampin and ethambutol pre-op, rifampin, ethambutol, isoniazid and erythromycin post-op	18	2	Resolved	Maloney et al. [15]
40/M	Mountain biker but no reported elbow trauma	Intrabursal	*M. terrae*	Rifampin, ethambutol, and clarithromycin (latter changed to azithromycin)	11	1	Resolved	Garrigues et al. [1]
71/M	DM	None	*M. longobardum*	Rifampin, ethambutol, isoniazid, pyrazinamide, then clarithromycin and ethambutol	1st regimen, 7; 2nd regimen, unspecified	2	Developed recurrent infection with chronic osteomyelitis after initial surgery and treatment for extrapulmonary TB; resolved after second debridement and targeted antimycobacterial therapy	Hong et al. [16]

Abbreviations: *M.*, *mycobacterium*; DM, diabetes mellitus; CHF, congestive heart failure; AS, aortic stenosis; MRSA, methicillin-resistant *Staphylococcus aureus*; *C.*, *Candida*; TB, tuberculosis; MCTD, mixed connective tissue disease; s/p, status post.

an underlying mycobacterial infection. Among the cases described of atypical mycobacterial bursitis, the average delay in diagnosis is more than 6 months [1].

Our review of published cases of nontuberculous mycobacterial olecranon bursitis suggests that surgical resection of the bursa with or without antimycobacterial therapy is commonly recommended for definitive treatment. All reported cases of *Mycobacterium avium* complex (MAC) olecranon bursitis received bursal resection plus antimicrobial therapy for definitive cure [1,4,6,7]. We describe a case of iatrogenic MAC olecranon bursitis in an immunocompetent 67-year-old female that resolved without antimicrobials or surgery.

Case presentation

A 67-year-old Caucasian female with a past medical history of coronary artery disease, generalized anxiety disorder and hypothyroidism developed a fluctuant swelling of the olecranon bursa following a non-penetrating, mild trauma to the elbow. There was no associated break in the skin, and no local erythema, pain, or systemic symptoms. Due to persistent swelling 1 month later, she sought medical evaluation and underwent bursal aspiration of serous-appearing fluid followed by injection of ten milligrams of triamcinolone acetonide into the bursa. No cultures were sent. Several weeks later she developed recurrent bursal swelling for which she underwent repeat aspiration and steroid injection of ten milligrams of triamcinolone acetonide. Bursal fluid analysis from the second aspiration showed nucleated cell count of 2862 with 18% neutrophils, 66% lymphocytes, 16% monocytes, glucose of 41 mg/dl, total protein of 3.9 g/dl, and no crystals. Routine bacterial cultures of bursal fluid were negative. Five weeks following the second aspiration and injection, the patient developed recurrent symptoms of non-erythematous, painless fluctuant swelling over the olecranon bursa. A third aspiration of serous fluid was performed and fluid sent for routine bacterial cultures, which remained negative. The cell count was 3025 with 7% neutrophils, 61% lymphocytes, 32% monocytes, 490 red blood cells per microliter, and no crystals. Glucose and protein were not performed. Subsequent to this third aspiration, the bursal swelling recurred to its previous, pre-aspiration size within two days, and the patient developed localized warmth and erythema over the elbow (Fig. 1). The patient continued to have no constitutional symptoms. She then underwent a fourth aspiration, and cultures of bursal fluid grew *M. avium* complex eleven days later in both aerobic and anaerobic culture media. This positive bursal fluid culture prompted referral to infectious diseases clinic in September 2013, at which time her physical exam was noteworthy for a tennis ball-sized fluctuant, erythematous, nontender, mobile mass over the left elbow. The growth of MAC in routine bacterial cultures was initially thought to represent a contaminant, so antimicrobials were not recommended at the time of initial consultation. However, repeat diagnostic aspiration with routine bacterial and AFB cultures of bursal fluid was performed 1 month later to evaluate for persistence of the organism, and MAC grew a second time, so was therefore felt to represent a true pathogen. Surgical resection of the bursa followed by a prolonged course of targeted antimicrobial therapy was considered, however the need for surgical management of aseptic and septic olecranon bursitis is an area of debate, and is typically decided on a case-by-case basis. In this situation, surgical resection of the bursa was ultimately deferred due to the lack of systemic illness or prior course of systemic antibiotic therapy with immobilization, as this is the standard treatment protocol for suspected septic olecranon bursitis that is utilized by the treating upper extremity orthopedic surgeon consulted in this case. Antimicrobial therapy with three-drug treatment was initiated thrice weekly with azithromycin,

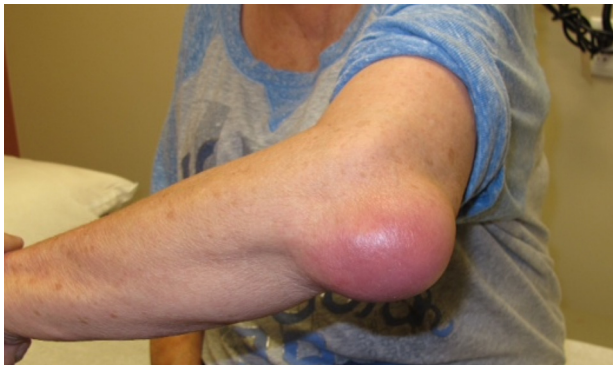

Fig. 1. Olecranon bursal swelling at the time of initial presentation, September 2013.

ethambutol and rifampin and the patient was referred to occupational therapy for a compressive dressing and fabrication of a custom orthosis that limited elbow range of motion. After three doses of this antibiotic regimen, the patient developed a diffuse urticarial rash and all medicines were discontinued. By her 8-week follow up visit to infectious diseases clinic, however, the patient was noted to have clinical improvement with use of a compressive dressing and splint. She had marked decrease in the amount of swelling and erythema of the bursa. We decided to continue to observe the patient off antimicrobials and continue with local supportive care. Seven months later, the patient returned for follow up. The erythematous fluctuant bursal mass noted on initial presentation had nearly resolved. At 14 months after initial presentation a clinical examination revealed full elbow range of motion, no pain, and complete resolution of the previously erythematous bursal mass (Fig. 2).

We suspect that in our case patient, MAC was introduced into the bursa during one of her repeated bursal aspirations or injections, since cultures of bursal fluid were negative on two separate occasions before turning positive and the development of positive cultures for MAC correlated with a clinical change, with acutely progressive fluctuant swelling of the bursa and new localized erythema over the bursa. A number of *Mycobacterium*

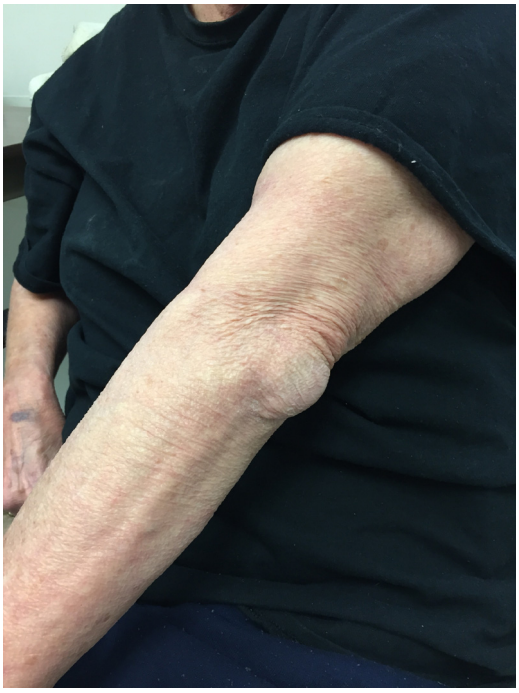

Fig. 2. Left elbow appearance 14 months after initial presentation, November 2014.

species including *M. avium* have been demonstrated to grow on blood agar; Lowenstein–Jensen medium is not necessarily required to isolate most species [8]. In fact, Drancourt et al. [8] found the use of blood agar to be more cost-effective and perform as well or better than reference culture broth for the isolation of most *Mycobacterium* species.

There are no current standardized guidelines for management of atypical mycobacterial olecranon bursitis. Our review of reported cases demonstrated that bursal resection with or without antimycobacterial therapy is commonly recommended for definitive treatment, and all described instances of cured MAC olecranon bursitis received bursal resection as well as antimicrobials [1,4,6,7]. One case of olecranon bursitis described by Olsen et al. did not specify whether surgery was performed, but this case may not be entirely applicable as the infection was polymicrobial, with cultures positive for methicillin-resistant *Staphylococcus aureus* (MRSA), *Candida glabrata*, and MAC, so as such it is unclear if MAC was truly a pathogen. Cure was attained in two cases with antimicrobial therapy alone, including one case of *Mycobacterium gordonae* infection that was treated with 12 months of isoniazid plus rifampin, but this diagnosis was made fairly early in the disease course, there was no underlying immune compromise, and intrabursal steroid injections were never administered [9]. The second case involved *Mycobacterium marinum* infection after a laceration to the elbow in a river, which resolved with 6 months of minocycline [10]. Again, there was no form of systemic immune compromise and no mention of intrabursal steroid injections in this case. One case each of *Mycobacterium lacus* and *Mycobacterium szulgai* olecranon bursitis have been described as resolving with surgery alone [11,12]. Dawson et al. [3] reported one case of probable *Mycobacterium asiaticum* olecranon bursitis occurring in a young, healthy male that resolved with povidone-iodine and hydrogen peroxide dressings to an open, draining bursa without antimycobacterial therapy or surgery, but the microbiologic diagnosis was not certain in this case, as *M. asiaticum* was isolated in low numbers in only one bursal fluid culture, with failure of the organism to grow on repeat mycobacterial cultures 8 weeks later.

It is unclear whether antimicrobials are needed after surgical resection, and if so, for what duration of time. The total duration of antimicrobials given to the patients in our review varied widely, ranging from 1 to 36 months, even if surgical resection was performed. It has been suggested by Garrigues et al. [1] that greater than 1 year of therapy is likely not necessary, and shorter courses of antibiotics or no antibiotics may be reasonable if bursal resection has been performed. The American Thoracic Society (ATS) guideline provides guidance on choices and duration of antimicrobials for nontuberculous mycobacterial skin, soft tissue, and skeletal disease, but notes that optimal antimicrobial regimens and duration of treatment have not been established for most species [13]. For extrapulmonary, localized MAC disease involving skeletal structures such as tendons and joints, the ATS recommends 6–12 months of triple-drug therapy, usually combined with surgical debridement [13].

Upon analyzing published cases of nontuberculous mycobacterial olecranon bursitis and suggested guidelines, it is evident that our patient's clinical course and management is unusual in that no other published cases exist of nontuberculous mycobacterial olecranon bursitis that resolved without antimicrobials or surgical resection. Our patient did receive three doses of antimycobacterial therapy, but this duration of therapy is unlikely to have led to any significant microbiologic cure, since MAC infections across all body sites typically require multiple months to a year or more of treatment for cure. Additionally, there was no observed clinical change in the erythema, swelling or warmth of our patient's bursa after this 1-week period of treatment; the bursal erythema and swelling did not subside until 6–7 weeks later. This timeline suggests this minimal exposure to antimicrobials had no appreciable impact on her clinical outcome. The reasons for our patient's apparent resolution of infection remain unclear, but may relate to compression provided by the pressure dressings and splint, with resorption of bursal fluid and gradual spontaneous mycobacterial death over time.

Discussion

We report this case of a clinically resolved MAC olecranon bursitis in order to illustrate that a strategy of close observation off antimicrobial therapy without surgical intervention may be worthwhile to consider in select cases of localized nontuberculous mycobacterial infections of soft tissue and certain skeletal structures. Such cases may include those who are not surgical candidates, patients who cannot tolerate multi-drug antibiotic therapy, and/or those in whom the risk of drug–drug interactions precludes the use of antimycobacterial agents. However, we do not recommend this treatment option in the immunocompromised host.

Conflict of interest statement

None.

Author contributions

Selene Working, Dana Levy, and Andrew Tyser were all involved in managing the patient. Selene Working conducted the literature review and drafted the manuscript. Both Dana Levy and Andrew Tyser reviewed and made revisions to drafts of the manuscript. All authors have approved the final manuscript.

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