Septic Arthritis Of The Finger Due To Corynebacterium Argentoratense

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Citation

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Abstract

We report a case of native finger joint septic arthritis due to *Corynebacterium argentoratense* in a healthy immunocompetent 50-year-old woman after a penetrating injury. The patient was successfully treated with open debridement and synovectomy followed by 6-week course of oral Doxycycline. Despite being a ubiquitous human commensal and often considered contaminant when isolated in culture, our report further confirms the pathogenic role of Corynebacterium species in certain clinical circumstances. To the authors' knowledge, this is also the first reported case of septic arthritis due to C. *argentoratense*.

INTRODUCTION

Corynebacterium is a genus of club-shaped Gram-positive bacilli and a common commensal in human skin and mucosal membranes. They were historically considered contaminants when isolated in culture, but have been increasingly recognized as emerging pathogens causing device-related infections and opportunistic infections in immunocompromised patients, including respiratory tract infections, endocarditis, and bone and joint infections [1-2].

Corynebacterium argentoratense was first identified in 1995 from the throat specimens of patients with tonsillitis in France [3], and since it has only been sporadically isolated from specimens of the respiratory tract, blood culture, conjunctiva and mucosal biofilm in adenoid tissues [3-4]. Herein, we report the first case of C. *argentoratense* septic arthritis of a native finger joint following a penetrating injury in a healthy immunocompetent patient.

CASE PRESENTATION

A 50-year-old woman was referred to our clinic for a 1-month history of persistent right middle finger swelling after a penetrating injury by a sea urchin sting. Her past medical history included hyperlipidemia, and right ring finger enchondroma that was treated operatively with curettage and bone grafting more than 10 years ago. Prior to presenting to our unit, she was treated by a general practitioner and was given a course of oral Augmentin (amoxycillin and clavulanic acid).

On physical examination, there was swelling and erythema around the right middle finger's proximal interphalangeal joint (PIPJ). The PIPJ was tender on palpation, but there was no obvious joint effusion nor collection. The active range of motion was full. Plain x-ray of the finger revealed no bony erosion nor presence of a radio-opaque foreign body (Figure 1). Blood tests including serum white blood cell count, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), urate, as well as a panel of autoimmune markers (rheumatoid factor, and antinuclear antibodies) were all unremarkable. It was initially treated as cellulitis and the patient was given a course of oral Levofloxacin.

The patient was reviewed in our clinic after completing the course of antibiotic, at two months after the initial injury. There was improvement of swelling and tenderness around the affected joint. There was no joint effusion and the active range of motion was full. Thus, we opted for observation at that juncture. However, over the subsequent six months, she had persistent mild residual swelling and tenderness at the affected joint. Magnetic resonance imaging (MRI) of her right middle finger demonstrated synovial thickening with associated contrast enhancement suggestive of synovitis at the PIPJ (Figure 2). There was no rim enhancing collection, foreign body, nor evidence of bony erosion. The patient elected to proceed with operative treatment. Open arthrotomy was performed between the central slip and the radial lateral band. Synovitis and mild degenerative changes of the PIPJ were observed intraoperatively. Synovectomy

was performed. Histological study of the synovial tissue revealed chronic synovitis with foreign body granulomas. Culture of the synovial tissue was positive for C. argentoratense. The patient was given a 6-week course of oral Doxycycline based on the susceptibility testing.

At 3-months follow-up, the surgical wound had healed well with no sign of infection. The right middle finger PIPJ swelling had completely resolved. The active range of motion was full and painless. Plain x-ray revealed no bony erosion.

Figure 1

Figure 1: Right middle finger anteroposterior (AP) and lateral plain films

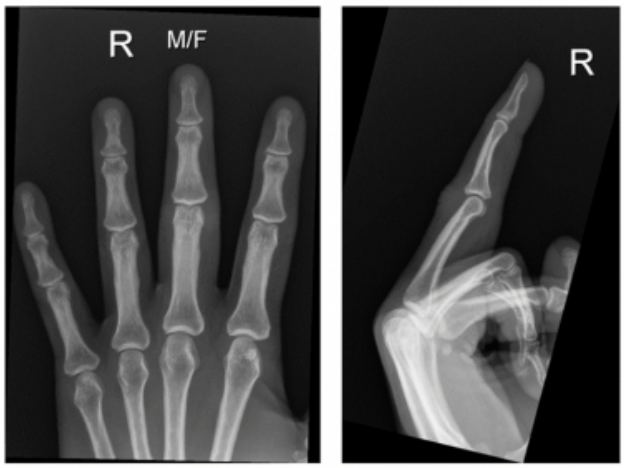
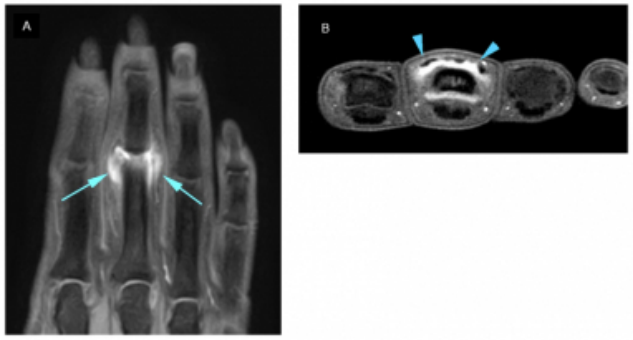


Figure 2

Figure 2: MRI scan of the right middle finger. A. Coronal T2-weighted gadolinium-enhanced image demonstrating effusion in the proximal interphalangeal joint (arrows). B. Axial T1-weighted gadolinium- enhanced image demonstrating enhancing synovitis (arrowheads).



DISCUSSION

Corynebacterium is a non-sporulating, non-acid fast, non-branching, club-shaped Gram-positive bacilli that are aerobic and facultative anaerobic. With the exception of C. *diphtheriae*, the rest of the species are common commensal in human skin and mucosal membranes. Over the recent decades, they have been increasingly recognized as emerging pathogens causing device-related infections and opportunistic infections in immunocompromised patients including respiratory tract infections, endocarditis, and bone and joint infections [1-2]. However, septic arthritis at a native joint caused by Corynebacterium species are rare. Sporadic cases have been reported in the medical literature, and the species isolated included *C. diphtheriae, C. pyogenes, C. xerosis, C. kutscheri, C. amycolatum, C. pseudodiphtheriticum,* and *C. striatum* (Table 1).

Table 1

Cases of native joint septic arthritis caused by Corynebacterium species

References	Sex	Age	Site	Comorbidities	Predisposing factor or condition	Species isolated from joint fluid culture	Blood culture	Treatment
Nuremberg et al. (1972)	M	78	Knee	Monoclonal gammopathy, osteoarthritis	Unknown	C. Pyogenes	NA	Penicillin, debridement
Duran et al. (1979)	M	2	Hip	Excoriated skin lesions on toes	Unknown	C. diphtheriae	Negative	Kanamycin, debridement
Appelbaum et al. (1982)	F	12	Knee	Acute lymphocytic leukemia	Arthrocentesis	Corynebacterium species	Negative	Amoxicillin
Valenstein et al. (1988)	M	60	Knee	DM, CAD, ileo-oral popliteal bypass graft	Unknown	C. xerosis	Negative	Ampicillin
Morales et al. (1989)	F	68	Knee	Polymyalgia rheumatica	Intraarticular steroid injection	C. kutscheri	Negative	Vancomycin
Booth et al. (1991)	M	74	Knee	Popliteal artery aneurysm with bypass graft done, osteoarthritis	Unknown	C. xerosis	NA	Ceftriaxone, debridement
Afghani et al. (1995)	F	2	Hip	Healed papular lesions on legs	Unknown	C. diphtheriae	NA	Penicillin, debridement
Barnett et al. (1995)	M	47	Knee	Alcoholic liver cirrhosis	Unknown	C. diphtheriae	Negative	Oxacillin, rifampicin, debridement
Dumade et al. (1995)	F	68	Wrist	Alcoholic liver cirrhosis	Unknown	C. diphtheriae	Positive	Ceftriaxone
Cone et al. (1998)	F	51	Elbow	None	Scalpel blade laceration	C. striatum	NA	Vancomycin, debridement
Clarke et al. (1999)	M	63	Hip	RT, osteoarthritis, PVD	Infected ileo-oral popliteal bypass graft	C. amycolatum	NA	Vancomycin
Peng et al. (2000)	M	6	Hip	None	Unknown	C. diphtheriae	Negative	Amoxycillin, debridement
Schelle et al. (2007)	M	87	Knee	Osteoarthritis, heart failure	Trauma	C. striatum	Negative	Vancomycin, debridement
Rollin et al. (2009)	F	88	Shoulder	Myasthenia gravis, seronegative arthritis	Arthrocentesis	C. striatum	Positive	Vancomycin
Ertuna et al. (2012)	M	54	Knee	Osteoarthritis	Intraarticular steroid injection	C. pseudodiphtheriticum	NA	Vancomycin, debridement
Pessoa-Chaves et al. (2013)	F	59	Shoulder	Hypercholesterolemia	Intraarticular steroid injection	C. striatum	NA	Ceftriaxone
Wiethäuser et al. (2014)	M	84	Knee	DM, HT, CAD, DVT	Trauma	C. striatum	Negative	Vancomycin, debridement
Roy et al. (2016)	M	77	Shoulder	Lung transplantation on immunosuppressant, hemodialysis-dependent ESRD	Infected AV fistula	C. striatum	Negative	Vancomycin, debridement
Molina-Collada et al. (2018)	M	84	Knee	COPD, atrial fibrillation, left nephrectomy, pseudogout	Intraarticular steroid injection	C. striatum	NA	Linezolid, debridement
Hidalgo et al. (2020)	M	78	Knee	DM, prostate cancer, osteoarthritis	Intraarticular steroid injection	C. striatum	NA	Daptomycin, debridement
Umezawa et al. (2020)	F	85	Shoulder	Hypothyroidism	Aortic stenosis with infective endocarditis	C. striatum	Positive	Vancomycin, debridement

M: male; F:female; DM: diabetes mellitus; HT: hypertension; PVD: peripheral vascular disease; CAD: coronary artery disease; DVT: deep vein thrombosis; COPD: chronic pulmonary lung disease; ESRD: end stage renal disease; NA: not available

To our knowledge, this is the only reported case of septic arthritis due to *C. argentoratense. C. argentoratense* was first identified in 1995 from the throat specimens of patients with tonsillitis in France [3]. It is a nonlipophilic, facultative anaerobic, nitrate reductase-negative, urease-negative, and oxidase-negative corynebacterium capable of utilizing glucose but not maltose nor sucrose [4]. Antimicrobial resistance to β-lactams, erythromycin and clindamycin has been reported [4]. Similar pattern of antimicrobial susceptibility was found in this case. The isolated C. *argentoratense* from the synovial tissue demonstrated resistance to penicillin G, moxifloxacin and clindamycin, whereas it was susceptible to doxycycline and vancomycin. Trial of oral Doxycycline was commenced and later continued for a total of 6 weeks because of the good clinical response it gave.

In the present case, C. *argentoratense* was most likely introduced into the finger joint from the penetrating injury.

Having the organism isolated from the intraoperatively and aseptically collected synovial tissue sample confirmed that it was the primary pathogen and a genuine infection. In fact, half of the reported cases of Corynebacterium-associated native joint septic arthritis were preceded by trauma or instrumentation to the affected joint such as arthrocentesis and intraarticular injection [Table 1]. In essence, although Corynebacterium is a common human commensal, when it is introduced into a joint, it has the potential to cause septic arthritis even in an otherwise healthy immunocompetent person. Given that Corynebacterium infection often presents as a subacute or even indolent infection, it can potentially lead to a delay in diagnosis and treatment. A high degree of suspicion should be warranted when there is a history of trauma or instrumentation to the affected joint. Early detection and appropriate treatment is important to improve clinical outcomes.

CONCLUSION

We report for the first time a case of C. *argentoratense*-associated septic arthritis of a native finger joint after a penetrating injury. The infection was successfully treated with open debridement and synovectomy, followed by a 6-week course of oral Doxycycline. Our report further confirms the pathogenic role of Corynebacterium species in certain clinical circumstances. Our report also demonstrates that oral antibiotic treatment can be effective, allowing ambulatory care of the patient, while sparing the potential complications associated with prolonged hospitalization, intravenous access and vancomycin therapy.

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