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Case Report Open Access

A Case Report of Osteomyelitis Caused by *Ewingella*

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Abstract

We present a case of osteomyelitis due to *Ewingella americana* in a patient admitted to a teaching hospital in Riyadh, Saudi Arabia due to an infected ulcer on the tip of a finger. The patient was admitted to electively with Raynaud's phenomenon. *Ewingella americana* was isolated from the hand ulcer on multiple occasions.

Keywords: *Ewingella americana*; Raynaud's phenomenon; Osteolmyelitis

Introduction

Ewingella americana is a rare gram negative, facultative anaerobic bacillus. It was first discovered in 1983, as a novel species of Enterobacteriaceae. Its origin is unknown, but it was first recognized from a clinical specimen in the Americas. It is composed of a single DNA that is similar to other Enterobacteriaceae groups by 79% [1]. It has rarely been identified as a cause of infection in people, although it has been isolated from diverse clinical samples around the world. The specimens were collected from different body fluids including sputum [2], blood [3-6], wound [7], and peritoneal fluid [8]. Nonhuman sources have been identified as well: mushrooms [9], packaged meat [10], and the intestinal contents of snails [11]. A cross-sectional study was published in 2018 after the research was done among five hospitals in South Africa in order to identify hospital pathogens. In addition, *E. americana* was found in one of these samples [12]. We present a case of osteomyelitis of the hand precipitated by Raynaud's phenomenon.

Case Report

A 51 years old lady known to have Systemic sclerosis for five years, scleroderma associated interstitial lung disease and recurrent bouts of Raynaud's phenomenon. She is on azathioprine and had received six cycles of cyclophosphamide in the past.

She was admitted electively from clinic complaining of left ring finger break in the skin over the past two months, which worsened over the past two weeks in the form of getting bigger, affecting the whole pulp, and being progressively painful especially when out in cold weather. Initially she was prescribed cloxacillin for fourteen days, with no significant improvement. Ten days prior to her current presentation her left 2nd toe started to have the same problem with oozing of small amount of pus. Upon admission she appeared well, her Temperature was 36.8, blood pressure 90/60 mmHg, pulse 60 bpm, respiratory rate 12 breaths per minute. She appeared well, no rash over face, her hands were normal in color, normal temperature, the tip of the 4th finger showed a small superficial break in the skin less than 2 mm in length, with minimal pus. No underlying bone was probed (Figure 1). She was started on Amlodipine 5 mg and Sildenafil 25 mg twice a day.

Doppler ultrasound showed decreased arterial flow at the left foot and no flow of the left thumb, index, middle and ring fingers.

MRI of her left hand showed mild increase signal intensity of the distal end of the middle and ring finger with minimal soft tissue swelling and minimal corresponding postcontrast enhancement. With deformity and erosion of the distal tuft of the 4th finger. *Magnetic resonance imaging* (MRI) of her left foot was normal (Figure 2).

Her erythrocyte sedimentation rate (ESR) was 31 and C Reactive Protein (CRP) 7.1. More labs are shown in Table 1. Bacterial culture from left ring finger ulcer was inoculated on both 5% sheep blood and MacConkey agars, within 24 h 2 mm grey mucoid colonies grew on the MacConkey agar aerobically (Figure 3), gram stain showed it to be gram negative bacilli. Phenotypically it was lactose-fermenter, oxidase negative, and catalase positive. And was identified as *Ewingella americana*.

WBC	5.300 × 10^9/L
ANCA:	0.263888889
ANCA Pattern:	C ANCA
Baso Auto #:	0.00 × 10^9/L
Baso Auto %:	0.20%
Eos Auto #:	0.20 × 10^9/L
Eos Auto %:	4.20%
Lymph Auto #:	1.2 × 10^9/L
Lymph Auto %:	23.40%
Mono Auto #:	0.4 × 10^9/L
Mono Auto %:	7.30%
Neutro Auto #:	3.5 × 10^9/L
Neutro Auto %:	64.90%
NRBC:	0
Platelet:	303.0 × 10^9/L
Hgb:	127.0 gm/L
MCH:	24.4 pg

MCHC:	325.0 gm/L
MCV:	75.2 fL
RBC:	5.2 × 10^12/L
RDW:	15.20%
ESR:	37 mm/hr
Procalcitonin:	0.036 ng/mL

Table 1: Complete blood count (CBC) of the patient.

Microscan walk away automated system found it to be fully susceptible to amoxicillin/clavulanate, ciprofloxacin, gentamicin, and trimethoprim/sulfamethoxazole (TMP-SMX). The minimal inhibitory concentration and susceptibility are shown in Table 2.

Antibiotic	MIC* value mcg/ml (mg/L)	Interpretation
Meropenem	≤ 0.25	S
Amp	≥ 32	R
Amox/Cla	4	S
Pip/ Taz	≤ 4	S
Cefal	8	S
Cefep	≤ 1	S
Cefox	16	I
Ceftaz	≤ 1	S
Ceftri	≤ 1	S
Lmi	≤ 0.25	S
Amik	≤ 2	S
Gent	≤ 1	S
Cipro	≤ 0.25	S
Tgc	≤ 0.5	S
Nitro	64	I
SXT	≤ 20	S

*MIC=Minimum Inhibitory Concentration; Amp: Ampicillin; Amox/Cla: Amoxicillin and Clavulanic; Pip/Taz: Piperacillin/Tazobactam; Cefal: Cefalexin; Cefep: Cefepime; Cefox: Cefoxitin; Ceftaz: Ceftazidime; Ceftri=Ceftriaxone; Amik: Amikacin; Gent: Gentamicin; Cipro: Ciprofloxacin; Tgc: Tigecycline; Nitro: Nitrofurantoin; SXT: Trimethoprim/Sulfamethoxazole

Table 2: Minimal inhibitory concentration and susceptibility for different antibiotics.

She was started on TMP-SMX 960 mg 2 Tablets every 12 h, fourteen days after starting it her finger ulcer completely healed, with no more drainage, she continued a four week course. The culture was repeated after eight days from the previous culture, and there was no growth of any organism. The patient did well with no recurrence six months after follow up. No surgical intervention was carried out, due to improvement in the clinical picture with only use of antibiotics.

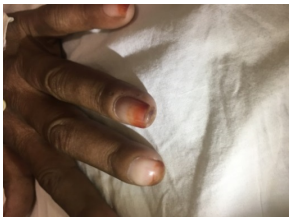

Figure 1: Ulcer of the ring finger.

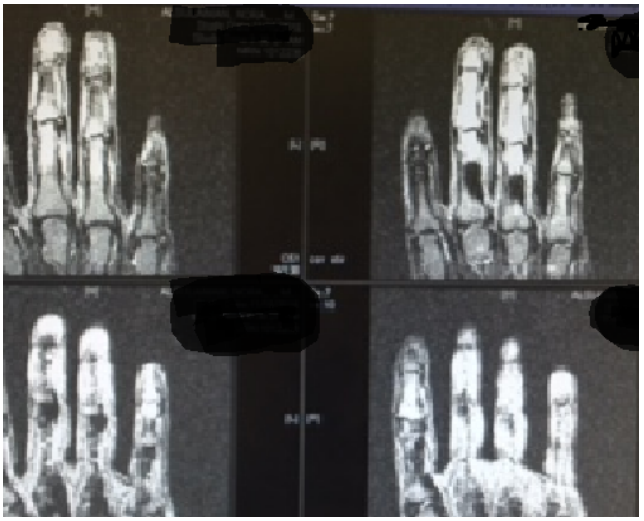

Figure 2: MRI.

Increased signal intensity of the distal end of the middle and ring fingers of the left hand. Minimal soft tissue swelling with minimal corresponding postcontrast enhancement. Mild enhancement of the soft tissue, and deformity and erosion of the distal tuft of the index and middle fingers.

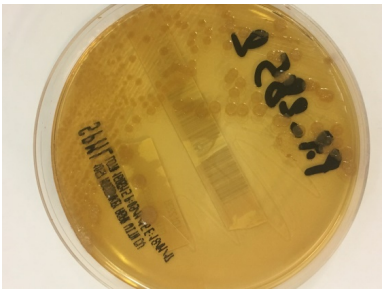

Figure 3: MacConkey agar with small mucoid colonies.

Discussion

Our patient is known to have systemic sclerosis, scleroderma associated with interstitial lung disease, nonspecific interstitial pneumonia and recurrent Raynaud phenomenon who presented with

finger ulcers. The wound culture over the tip of her left ring fingers grew *Ewingella americana* no other organisms were isolated.

Ewingella americana, named after William Ewing, who made many contributions to the microbiology of Enterobacteriaceae. It is an extremely rare cause of nosocomial bacteremia, peritonitis associated with peritoneal dialysis, and conjunctivitis. Most isolates have been highly sensitive to antibiotics.

At first when *E. americana* was discovered, its clinical importance as a pathogen was uncertain [13]. Subsequently, various reports have shown its relation to pathogens among random cases around the word. An example of this is how relevant *E. americana* was causing a clinical manifestation of keratoconjunctivitis in a previously healthy woman from Brazil [14,15]. An osteomyelitis case report in the United States in a previously healthy man, who only had a history of drug abuse [16]. There has been a clear correlation between this bacteria and immunocompromised patients [4]. Since several studies report *E. americana* as the primary cause of peritonitis, pneumonia, and bacteremia, it was seen in only immunocompromised patients. In addition, a nosocomial outbreak was reported in the Intensive Care Unit by Dr. Pein, who identified that the ice bath was used for the reserve of syringes, thus becoming the source of *E. americana* contamination [6].

In 2007 a Multi-drug resistant *Ewingella americana* was reported in Makkah in an Indonesian pilgrim in Saudi Arabia that was isolated from tracheal aspiration whom later died due to complicated pneumonia. [17].

Our case is the second reported case in Saudi Arabia, and the first to be described as a case of osteomyelitis due to Raynaud's phenomenon.

Conclusion

Though it is unusual for these bacteria to cause significant diseases, our patient is known to have systemic sclerosis, scleroderma associated with nonspecific interstitial lung disease. We know that several case reports have been reported mainly in patients with suppressed immunity.

As far as we know, this is the first osteomyelitis case in Riyadh, Saudi Arabia; the previous case was reported in Makkah City. It was a pneumonia case with multidrug resistant *E. americana* organism. The second case of osteomyelitis which had ever been reported (in the previous case report) was complicated with septic arthritis of the shoulder joint. The patient presented with shoulder pain for four days, since he was also a drug abuser. Culture of the synovial fluid showed *E. americana*.

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