Case Report

Erysipelothrix Rhusiopathiae Bacteremia without Endocarditis Associated With Psoas Abscess: The First Case Report in Thailand

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The authors report a patient with a rare manifestation of invasive septic Erysipelothrix rhusiopathiae infection without endocardial involvement. Our patient presented with progressive paraparesis and subacute fever for ten days. He had underlying diabetes mellitus and alcoholic cirrhosis. Magnetic resonance imaging (MRI) of the lumbosacral spine showed a psoas abscess with vertebral osteomyelitis and discitis at level of L_{2-3} of the lumbar spine. His blood culture grew E. rhusiopathiae. Transthoracic echocardiography demonstrated normal endocardium. Surgical drainage and debridement with concomitant intravenous antibiotics administration resulted in clinical improvement, including neurological status. MRI showed resolution of the psoas abscess and osteomyelitis. Erysipelothrix infection should be considered as a causative pathogen of musculoskeletal infection in immunocompromised patients. To our knowledge, this is the first case report of psoas abscess caused by E. rhusiopathiae in Thailand.

Keywords: *Erysipelothrix rhusiopathiae, Bacteremia, Psoas abscess, Abscesses in paravertebral space, Epidural abscess, Osteomyelitis*

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Erysipelothrix rhusiopathiae is a gram-positive bacillus that is infrequently responsible for the cause of infections in humans. Although disease severity may vary, one of the most serious manifestations is an invasive septic form, which is usually associated with endocarditis. *E. rhusiopathiae* is known to cause infections following exposure to decaying organic matter or animals colonized with the organism such as swine and fish. The majority of human infections fall into three categories: a mild cutaneous form (erysipeloid), a generalized cutaneous form, and an invasive septic form (infections of the blood and/or other sterile sites). Invasive infections with this organism are unusual and are manifested primarily as infective endocarditis. The authors describe herein a rare case of invasive infection caused by *E. rhusiopathiae* bacteremia without endocardial involvement presenting with a psoas abscess, vertebral osteomyelitis and discitis at the lumbosacral region.

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Case Report

A 62-year-old male farmer from the Northeast of Thailand presented with fever and low back pain for 10 days. He had underlying diseases of type 2 diabetes mellitus and alcoholic cirrhosis. Five years ago, he was diagnosed with an epidural abscess at level L_{2-3} of the lumbar region, with bilateral psoas abscess. He underwent laminectomy and drainage of the psoas abscess, from which pus cultures grew *Klebsiella pneumoniae*. Intravenous cefepime (4 grams/day) was administered for 20 days, followed by oral cefdinir (300 mg/day). Total duration of treatment was approximately 3 months and he had full neurological recovery.

Ten days prior to admission, he presented with intermittent low-grade fever with low back pain, localized at the midline lumbar region, and subsequently developed weakness and numbness in bilateral lower extremities. Working as a farmer, he is frequently exposed to chicken, pigs, and fish without wearing any gloves. He denied a history of back injury, direct exposure to tuberculosis, intravenous drug use, or

recent traveling.

Physical examination showed body temperature of 38.0°C, heart rate 90/min, blood pressure 134/80 mmHg and respiratory rate 18/min. Musculoskeletal examination revealed tenderness and warmth at the lower lumbar spine area and stepping at the L_{3-4} vertebra level. Neurological examination revealed impaired pinprick sensation below L_2 vertebra level and paraparesis of lower extremities (motor power grade II-III). Cardiovascular examination revealed normal heart sounds and no murmurs. No peripheral stigma of infective endocarditis was detected. Dermatological examination was normal.

Complete blood counts revealed hemoglobin 11.4 g/dl, WBC 8,970 cells/mm^3 (PMN 73.8%, L 15.4%, Mo 5.2%), platelet count 302,000/mm^3. Renal function test was normal. Urine examination was negative for dysmorphic red blood cells. Inflammatory markers were elevated; ESR104 mm/hr and CRP 59.48 mg/L. Anti-HIV test was non-reactive. A transthoracic echocardiography revealed no vegetation. A MRI scan of the lumbosacral spine revealed vertebral osteomyelitis and discitis at L_{2-3} levels, with adjacent soft tissue inflammation, and a small abscess at the left L_4 level paravertebral area, 4.7x4x5 cm in size.

Surgical drainage of the abscess was achieved by lumbar retroperitoneal approach. Intraoperative finding revealed 2 ml of pus with granulation tissue at the left psoas muscle, necrotic tissue at intervertebral disc L_{3-4} level. Tissue biopsy was performed. Gram-stain of the tissue and pus did not show any organisms. Bacterial, fungal, and mycobacterial cultures failed to grow any organism. Histopathological examination was negative for granuloma and malignancy.

Two sets of blood culture were performed and empirical intravenous ceftriaxone (2 grams/day) was administered. Two days later, the blood cultures grew slightly curved, gram-positive rods (Fig. 1A). Culture on blood agars revealed an alpha-hemolytic pattern (small, circular colonies with transparent and smooth glistening surface and edge) (Fig. 1B). The organisms in the triple sugar iron media demonstrated production of hydrogen sulphide (Fig. 2A). Oxidase, catalase, motility (Fig. 2B), indole, Voges-Proskauer and methyl red test were negative.

Due to clinical improvement, intravenous ceftriaxone was continued. Finally, five days after blood cultures were taken, *E. rhusiopathiae* was confirmed. However, after seven days of treatment, ceftriaxone was substituted with intravenous levofloxacin (750 mg/day), which exhibited a better tissue and bone penetration compared to a beta-lactam. Because our patient easily developed phlebitis, the authors did not switch to penicillin, which requires multiple infusions

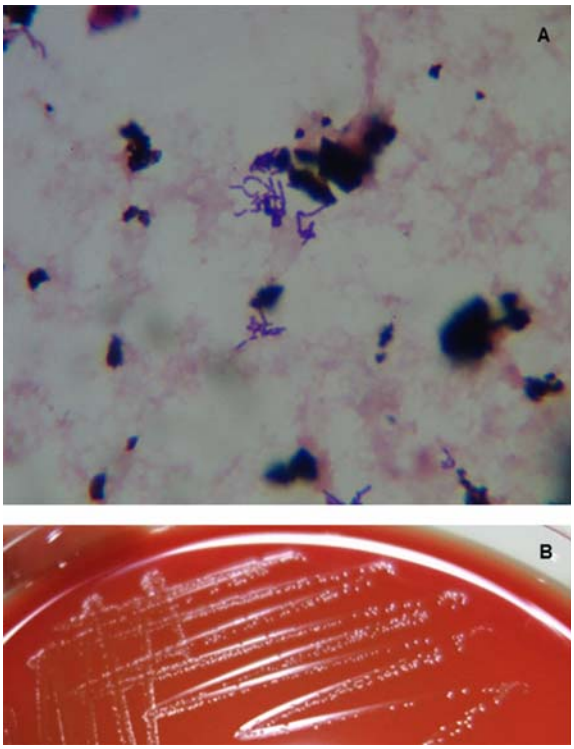

Fig. 1 Gram stain from blood culture broth demonstrated slightly curved, gram-positive rods (A). Blood agar showed alpha-hemolytic small colonies (B).

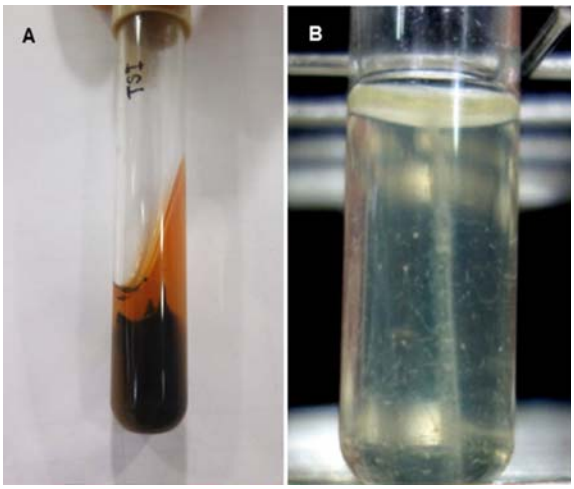

Fig. 2 Organisms produced hydrogen sulphide on triple sugar iron media (A) and were non-motile in the motility test (B).

per day. Blood cultures taken seven days after antibiotic therapy were negative. Fever subsided after surgery with gradual improvement of leg weakness. Four weeks after surgery, intravenous antibiotics were discontinued, patient was switched to oral levofloxacin (750 mg/day) and he was discharged from the hospital. He could walk by using a four-point gait aid. After completion of antibiotic treatment for a total duration of 12 weeks, MRI of the lumbosacral spine demonstrated no evidence of active infection and he had achieved full neurological recovery. The patient has been free from symptoms for 12 months.

Discussion

E. rhusiopathiae belongs to the genus *Erysipelothrix*. It is a gram-positive, non-acid fast organism that has a slightly curved or straight shape. It does not produce spores and is facultatively anaerobic. Blood agars usually reveal alpha-hemolytic pattern[1,2]. In the 18th century, this organism was isolated for the first time. It has been known to cause infections in animals, such as wild and domestic animals, birds and fish. The bacterium is an uncommon cause of infection in humans, especially those who are exposed to infected animals or animals products[3-5]. The incubation period ranges from 2 to 7 days. Transmission among humans has not been reported. Predisposing factors include chronic liver disease and heavy alcohol drinking, both of which were found in our patient[2].

E. rhusiopathiae infections may present with three main clinical manifestations. Patients may have diffuse skin infections or localized skin infections called erysipeloid. These cutaneous infections are more common than blood-stream infections[6]. Fever is found in most patients, while distinctive skin lesions are found in nearly half of patients with the septicemic form. The skin lesions may be found before or concurrent with the blood stream infection. Among patients with bacteremia, endocarditis is frequently found[7]. However, endocardial involvement may not occur in immunocompromised individuals, as presented in our patient.

Confirmation of blood stream infection is by positive blood cultures, which usually detects the organism in two to three days. However, one should be aware that *Erysipelothrix* might be misidentified as *Lactobacillus* or *Enterococcus* species[8].

The colonies of *E. rhusiopathiae* on blood agar exhibit alpha hemolysis patterns similar to other Gram-positive bacteria. However, Gram staining can be used to differentiate *Enterococcus,* which are Gram positive cocci in pairs, from *Erysipelothrix and Lactobacillus,* which are both Gram positive rods. The H_2S test can be used to further differentiate *E. rhusiopathiae* from *Listeria monocytogenes*, *Lactobacillus,* and *Corynebacteria* in that *E. rhusiopathiae* produces the H_2S gas while the latter three do not[2]. *E. rhusiopathiae* tests negative for catalase, oxidase, indole, Voges-Proskauer and methyl red[9].

Results from in vitro susceptibility tests have shown that *E. rhusiopathiae* is most susceptible to penicillin and imipenem, followed by piperacillin, cefotaxime, ciprofloxacin, and clindamycin. However, vancomycin, teicoplanin, daptomycin, trimethoprim-sulfamethoxazole, gentamicin, and netilmicin should not be used due to poor or absent activity[10]. Thus, *E. rhusiopathiae* infection should be suspected in cutaneous or systemic gram-positive infections that fail to respond to vancomycin.

Selection of antibiotics should be based on clinical manifestations and susceptibility results. The drug of choice for treatment of *E. rhusiopathiae* infection is penicillin[11]. Oral penicillin V should be given for seven days for patients with localized skin infection. Ciprofloxacin or clindamycin may be used in case of penicillin allergy. For patients with diffuse skin infection or septicemia, intravenous penicillin G should be administered. Ceftriaxone, imipenem or fluoroquinolones may also be given as alternatives[3].

Due to lack of data from clinical trials, duration of antibiotic use should be based on clinical response. For patients having bacteremia with endocarditis, antibiotics should be continued for four to six weeks. However, these patients have also been treated successfully with two weeks of intravenous medication followed by two to four weeks of oral therapy[12]. For patients having bacteremia without endocarditis, duration of antibiotics depends on clinical improvement[2,3].

In conclusion, the authors report a rare case of invasive *E. rhusiopathiae* infection following occupational exposure to animals. The patient developed bacteremia, paravertebral abscess, and vertebral osteomyelitis without endocarditis. *Erysipelothrix* bacteremia without endocarditis is uncommon, but can be found in immunocompromised patients.

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Potential conflicts of interest

None.

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การติดเชื้อแบคทีเรียอีริซิเพโลทริกซ์ในเลือดที่สัมพันธ์กับฝีกล้ามเนื้อโซแอสในผู้ป่วยที่ไม่มีภาวะการติดเชื้อที่เยื่อบุหัวใจร่วมด้วย: รายงานผู้ป่วยรายแรกในประเทศไทย

ประสิทธิ์ อุพาพรรณ, เมธี ชยะกุลคีรี

แบคทีเรียอีริซิเพโลทริกซ์ (Erysipelothrix rhusiopathiae) เป็นแบคทีเรียทรงแท่งแกรมบวก ที่พบเป็นสาเหตุได้ไม่บ่อยในการติดเชื้อในมนุษย์ ความรุนแรงของการติดเชื้อนี้มีหลายรูปแบบโดยการติดเชื้อที่มีอาการแสดงที่รุนแรงคือ การติดเชื้อแบคทีเรียชนิดลุกลามเข้าเลือด ซึ่งมักสัมพันธ์กับภาวะการติดเชื้อที่เยื่อบุหัวใจ ผู้นิพนธ์ได้รายงานโรคที่พบได้น้อยจากการติดเชื้อแบคทีเรียอีริซิเพโลทริกซ์ในเลือด ที่ไม่พบว่ามีการติดเชื้อที่เยื่อบุหัวใจร่วมด้วย ซึ่งเป็นรายแรกในประเทศไทย โดยผู้ป่วยมีโรคประจำตัวเป็นโรคเบาหวานและโรคตับแข็งจากแอลกอฮอล์ ผู้ป่วยมาพบแพทย์ด้วยอาการไข้ร่วมกับขาทั้งสองข้างอ่อนแรง ผลการตรวจเอกซเรย์คลื่นแม่เหล็กไฟฟ้าที่กระดูกสันหลังบริเวณสะโพก (Magnetic resonance imaging) พบมีฝีหนองที่กล้ามเนื้อโซแอส (Psoas abscess) และการติดเชื้อที่กระดูกสันหลังแต่การตรวจหัวใจด้วยคลื่นเสียงความถี่สูงผ่านผนังทรวงอก (Transthoracic echocardiography) ไม่พบความผิดปกติที่เยื่อบุหัวใจหรือการติดเชื้อที่ลิ้นหัวใจ ผู้ป่วยได้รับการวินิจฉัยจากผลการเพาะเชื้อจากเลือด ขึ้นเชื้อแบคทีเรียอีริซิเพโลทริกซ์ ผู้ป่วยอาการดีขึ้นภายหลังการรักษาด้วยการผ่าตัดร่วมกับยาปฏิชีวนะชนิดฉีด และภายหลังการรักษาพบว่ารอยโรคจากการตรวจพบจากเอกซเรย์คลื่นแม่เหล็กไฟฟ้าดังกล่าวดีขึ้นชัดเจน กล่าวโดยสรุปการติดเชื้อแบคทีเรียอีริซิเพโลทริกซ์ จัดเป็นการติดเชื้อที่พบได้น้อยแต่กลับพบมากขึ้นในผู้ป่วยที่มีภาวะภูมิคุ้มกันบกพร่อง