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Case Report

Rapid Onset Erysipelothrix Rhusiopathiae Spondylodiscitis with Bacteraemia and Psoas Abscess – A Case Report

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Abstract

Background: Erysipelothrix rhusiopathiae *is a Gram-positive bacillus.* Human Infections occurs principally as a result of contact with animals, their products or wastes. It is of three forms, a mild cutaneous erysipeloid, a diffuse cutaneous form and a rare serious form with systemic complications, septicaemia and endocarditis. We report a 74-year-old woman presented with septic form of E. rhusiopathiae spondylodiscitis and psoas abscess. After surgical decompression, and appropriate antibiotics, patient completely resolved from the illness. Though cases of E. rhusiopathiae spondylodiscitis were previously described, our case has two unique key factors: the patient does not fit to contact with any animals and she does not have any medical co-morbidities.

Case Presentation: A 74-year-old woman presented with acute onset low back pain with high grade fever numbness, paraesthesia and radiating pain to the right lower limb. Her WBC count, ESR and CRP were high suggestive of early sepsis. MRI correlated with abscess at L2-L3 disc with significant canal stenosis and psoas abscess. She underwent spinal decompression and abscess drainage sent for culture reported as Erysipelothrix rhusiopathiae and sensitive to Ceftriaxone.

Conclusion: Erysipelothrix rhusiopathiae was under-diagnosed because of its resemblance with other infections. It is hard to clinically diagnose without the aid of laboratory testing in the absence of animal exposure and in patients without identifiable risk factors like our patient. High index of suspicion with prompt and careful microbiological investigations would help in such rare presentations.

Keywords: *Erysipelothrix rhusiopathiae, Zoonotic disease, Spondylodiscitis, Epidural abscess, Psoas abscess*

Introduction

Erysipelothrix rhusiopathiae is a Gram-positive bacillus recognized as a pathogen in animals [19]. It is ubiquitous in nature and has been reported to be a colonizer of fish, shellfish, birds and even insects [10]. In humans, infections were occupationally related, as a result of contact with animals, their products or wastes which can cause mild cutaneous (erysipeloid) or diffuse cutaneous infection [4]. Septic arthritis and serious systemic complications like septicaemia and endocarditis were reported rarely [21]. Other rare manifestations of E. rhusiopathiae infections in humans include arthralgia, septic arthritis, osteoarthritis, intra-abdominal abscess, and central nervous system involvements [29].

Human infections are still occurring as a sporadically even with advances in animal industries and sanitation decreased the incidence of E. rhusiopathiae cases, in particular for people involved in animal-related businesses [25].

Although cases of E. rhusiopathiae spondylodiscitis were previously described, our case has two unique key factors: the patient does not fit the occupational demographic typically affected by this bacterium and she does not have any medical co-morbidities. We report a 74-year-old woman presented with septic form of E. rhusiopathiae spondylodiscitis and psoas abscess without endocarditis or skin lesions. After surgical decompression, and appropriate antibiotics, patient completely resolved from the illness.

Case Presentation

A 74-year-old woman presented with acute onset low back pain with high grade fever for 2 days following next day she developed numbness, paraesthesia and radiating pain to the right lower limb. After hospitalization, she developed fever spikes up to t 39.0°C and her back pain become very intense, inability to get up or turn side to side on the bed leading to severe functional disability in spite of intravenous analgesics. No history of trauma, cough, cold and any medical co-morbidities like DM and HT. On examination, she was febrile and toxic; neurologically both lower limb motor powers were 5/5 with sensory blunting over the right L3 dermatome. Her white blood cell count was 21800 cells/ mm^3; ESR was 121 mm/h and the C-reactive protein 155 mg/ L suggestive of acute septic form of some virulent infection. Her blood culture and urine culture were negative.

X-ray of lumbosacral spine Antero-posterior and lateral view to rule out spinal pathology were not very significant. Her X –ray chest, ECG Echo and cardiorespiratory evaluation were normal. Magnetic resonance imaging (MRI) of the spine showed a T2 hyperintense signals are seen in L2 and L3 vertebral body with irregular endplate margins at L2–L3 disc level associated with epidural, prevertebral and bilateral psoas abscesses more on right side. The soft tissue collection also extends into anterior epidural space indenting thecal sac and bilateral nerve roots and causing mild secondary spinal stenosis [Figure 1a-c].

She underwent decompression and abscess drainage [Figure 2] which was sent to culture and biopsy followed by posterior spinal stabilization from T12-L5 [Figure 3]. Post operatively her pain and fever has come down and she was able to walk independently. Culture reported the growth of Erysipelothrix rhusiopathiae in Vitek 2 system and sensitive to Ceftriaxone and clindamycin. After 8 weeks of antibiotics, fever and symptoms were resolved. Additional information collected from the patient and his family revealed that she was pure vegetarian in diet and not exposed to any animals. MRI taken after 3 months showed good bone healing and resolved abscess.

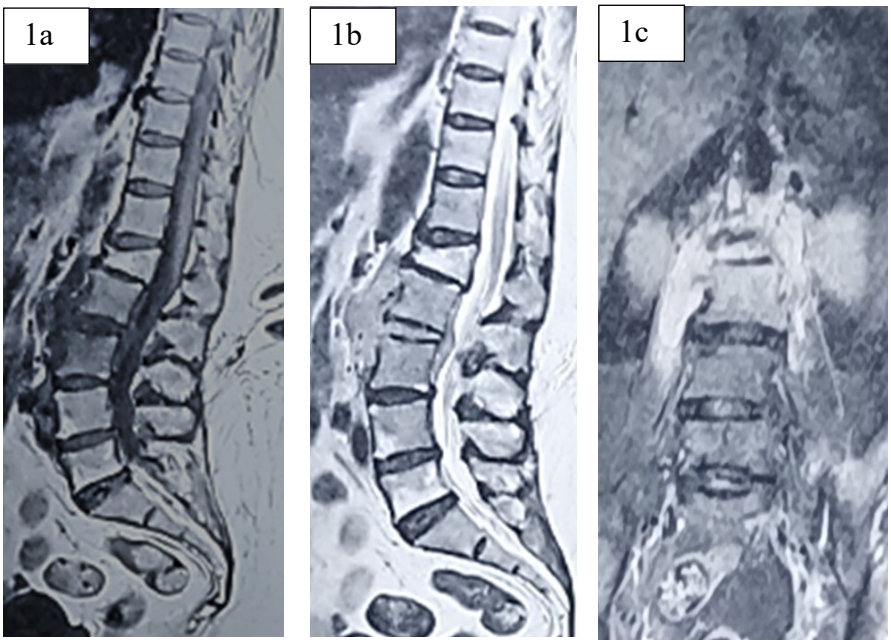

Figure 1. (1a) *MRI T1-weighted image with increased prevertebral soft tissue enhancement extending into the anterior epidural space at L2-L3.* ***(1b)*** *T2-weighted image demonstrating increased signal at L2-L3 disc space with small epidural abscess associated vertebral body edema compatible with acute discitis and osteomyelitis.* ***(1c)*** *Coronal image with bilateral psoas abscess more on the right side.*

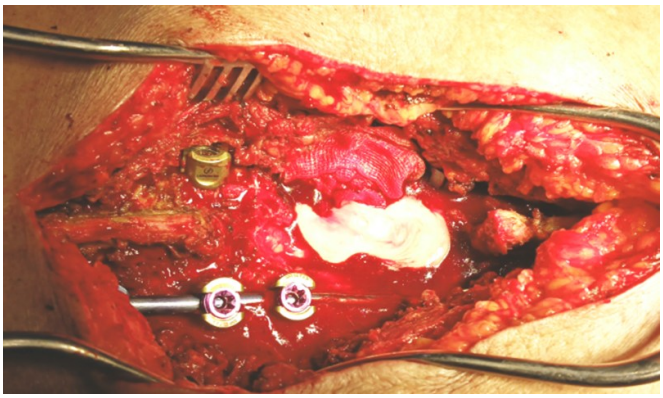

Figure 2. *Intraoperative picture showing drainage of psoas and L2-L3 disc abscess with stabilization of titanium implants.*

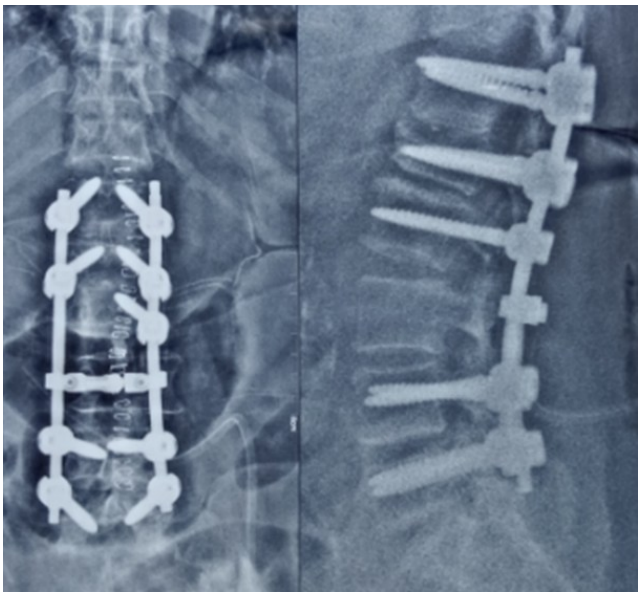

Figure 3. *Post-operative X ray AP and lateral view with posterior spinal stabilized implants from T12-L5.*

Discussion and Review of Literature

Erysipelothrix rhusiopathiae (from the Greek 'erysipelas' - a disease, 'thrix' - a hair or thread, 'rhusius' - reddish and 'pathus' - disease [31], literally 'erysipelas thread of red disease' [4] . In 1878 Koch first isolated this gram-positive bacillus and later Rosenbach in 1909 identified this as a pathogen. It is a non-motile, non-sporulating, non- acid-fast, slender gram-positive rod and the presence of a capsule and suggested a role for it in virulence [26]. E. rhusiopathiae is an occupational illness; 89% were linked to high-risk epidemiological situations [19]. E. rhusiopathiae is a remarkably resistant organism and hence the survival of the organism in the environment is an important factor in the epidemiology of disease [10].

Pathogenesis and mode of transmission: E. rhusiopathiae is ubiquitous and is commonly found in decaying nitrogenous waste [13]. In humans, it is primarily associated with occupational exposure – butchers, slaughterhouse workers, farmers and fish handlers have the highest risk of acquiring infection [12,13,14]. Infections following dog scratches and bites have also been reported [6, 2]. Two most common types of sources were aquatic animals (mostly fishes) and farm animals. Human-to-human transmission was not reported. This bacterium usually infects humans via wounds/injuries in non-protected areas of hands and feet in contact with bacterial sources. E. rhusiopathiae may presents in many environmental sources and can accidentally infect people although animal contacts appear to be the main transmission route. Hence, practicing personal sanitation and protection is also essential to prevent this infection.

Clinical Presentation: E. rhusiopathiae can cause three forms of human disease viz. erysipeloid (a localised cutaneous form), a generalised cutaneous form and a septic form often associated with endocarditis [11]. The signs and symptoms for the diagnosis of E. rhusiopathiae infection should be assessed carefully in view of its wide range of clinical manifestations.

Erysipeloid is the most common form of human infection usually occurs on the hand or fingers, reflecting the occupational nature of acquisition of the disease [17] however, lesions have been described on many areas of the body associated local swelling, and an intense itching or a severe burning or throbbing pain [33]. Systemic symptoms can occur in 10% with fever and joint ache, and lymphadenitis and lymphadenopathy. The disease is self-limiting and usually resolves in 3 -4 weeks although relapses may occur if untreated.

Diffuse cutaneous form is more generalised than erysipeloid and lesions are similar to those of the localised form, but bullous lesions can also occur [9]. Systemic symptoms are more frequent and include fever, malaise, joint and muscle pain and severe headaches [33], and polyarthritis in rare instances. The clinical course is more protracted and recurrences are more frequent than with erysipeloid. In our patient, E. rhusiopathiae not presented with any skin lesions, although fever, back pain and shoulder pain were the initial features.

A more serious manifestation of E. rhusiopathiae infection is septicaemia, to which endocarditis has almost always been linked. E. rhusiopathiae endocarditis has a mortality of 38% and presents as an acute or sub-acute form, the latter being more frequent [10]. Vertebral infections were frequently associated with endocarditis (3 of 8 with available echocardiography). Although presented with features of early sepsis and lumbar spondylodiscitis, our patient was lucky not to have any features of endocarditis confirmed by both pre and post-operative Echo.

Rare manifestations include abscess formation, septic arthritis, and osteomyelitis [8]. Previously eight cases of E. rhusiopathiae spinal infections were described [Table 1]; our case appears to be unique because of acute onset of vertebral osteomyelitis and abscesses without any history of animal contact or inoculation is particularly interesting. Thus, the source of the pathogen, the portal of entry of the organism and reason for the lack of host defences remain unclear. Furthermore, our patient had no predisposing factor for systemic disease, including no evidence of immunosuppression, chronic liver disease, or diabetes mellitus. This confirms that E. rhusiopathiae is able to cause systemic infections among healthy patients, even with or without history of an animal exposure.

Table 1. Reported cases of Erysipelothrix rhusiopathiae with Spine involvement.

Case report authors, year	Age (years), sex	Type of infection	Risk factors & comorbidities	Contact history	Diagnoses of spinal infection	Treatment
Romney et al, 2001 [27]	67, F	L3 vertebral osteomyelitis	Diabetes mellitus	Raw fish preparation	Blood culture and imaging	Penicillin-G
Andrychowski et al, 2012 [1]	62, M	T5-T6 thoracic discitis & paraparesis	Diabetes mellitus	Farming, pig bone cut	Per-op cultures and imaging	Laminectomy & Abscess drainage, Ceftriaxone and ciprofloxacin
Chayakulkeeree st al, 2014 [29]	62, M	L2-L3 discitis & osteomyelitis	Diabetes mellitus, cirrhosis	Farm house contaminant	Blood culture and imaging	Abscess drainage, ceftriaxone
Lorenz et al, 2017 [15]	48, M	L5-S1 discitis, osteomyelitis & digital skin abscess.	Spinal trauma	Puncture with sea robin fish	Per-op cultures and imaging	Discectomy & Abscess drainage,, ceftriaxone
Belmenouar et al, 2018 [3]	51, M	C5-C6 Cervical discitis	Prostate cancer	Butchering raw meat	Blood culture and imaging	Ceftriaxone and Levofloxacin
Wilson et al, 2019 [32]	71, M	L5-S1 discitis & osteomyelitis	Coronary heart disease, HT	Crab butcher	Blood culture and imaging	Ceftriaxone and ciprofloxacin
Maillard et al, 2021 [18]	51, M	L5-S1 discitis & osteomyelitis	No	fish bone pucture while cooking	Bone biopsy	Amoxicillin and ciprofloxacin
De Narvaez E et al, 2022 [7]	74, M	T5-T6 Thoracic discitis & paraparesis	Diabetes mellitus, COPD, HT	House with rats and raccoons	Blood culture and imaging	Abscess drainage, ceftriaxone
Our case, 2024	74, F	L2-L3 discitis, osteomyelitis and psoas abscess	No	No	Per-op cultures and imaging	Spinal decompression and Abscess drainage, Ceftriaxone & ciprofloxacin

Of the previously reported 8 vertebral infections, 5 were in lumbar spine, 2 involved the thoracic spine and 1 with cervical spine. Fever was more frequently described in vertebral infections (100%, including in our case). Three patients (both with vertebral infections) reported previous cutaneous erysipeloid- like lesions. When available, CRP ranged from 15 mg/L to 224 mg/L, again regardless of whether infection was acute or chronic. Spinal complications (Epidural empyema or abscesses both managed with urgent surgical drainage and decompression) occurred in 4 patients.

Laboratory Diagnosis: Setting up proper laboratory tests for accurate identification of this bacterium is essential. In vertebral infections, it was obtained from perioperative samples or biopsies and blood culture. Our patient blood and urine culture were negative. Gram stain of the drained psoas and epidural abscess showed gram positive bacilli. Bacteriological culture by Vitek 2 system grew alpha haemolytic colonies after 48 h of incubation in CO2 identified as E. rhusiopathiae. PCR method was employed for detection of organisms in human specimens in a recent study in Australia [5]. However, it is likely that a combination of culture and molecular techniques will be used for accurate diagnosis in the future.

Treatment: Based on neurological involvement, requirement of surgical decompression with antibiotics or only antibiotics will be decided. Among vertebral infections, only the 4 patients with neurological complications underwent surgical procedure. Erysipelothrix is highly susceptible to penicillin, cephalosporins, ciprofloxacin and clindamycin [28]. Most strains are resistant to aminoglycosides, trimethoprim-sulphamethoxazole, streptomycin and vancomycin. The organism is variably susceptible to tetracyclines, erythromycin, and chloramphenicol. Individuals allergic to penicillin, cephalosporins have been described as the most appropriate alternative, as clindamycin and erythromycin are only bacteriostatic towards E. rhusiopathiae [23].

Antibiotics were given for median total duration of 10 weeks (from 3 to 24 weeks). In our case, after surgical decompression and stabilization, she was managed with a single antibiotic regimen. Based on the MIC of the isolated strain, we chose to use intravenous ceftriaxone for 4 weeks followed by 4- weeks course of oral ciprofloxacin (2 daily intakes) at discharge ensuring a good bone penetration [14]. All patients in the literature were cured at the end of treatment including ours. Hence, the results suggest that E rhusiopathiae spondylodiscitis can be safely managed with an antibiotic monotherapy regimen based on either beta--lactams or fluoroquinolones.

Prevention and control of disease: Most effective means of preventing the spread of E. rhusiopathiae infection in man and animals is containment of the organism. Preventive measures include: the wearing of gloves or other protective hand wear, good hygiene - especially frequent hand washing with disinfectant soap and the prompt treatment of any small injuries [33]. Good health is considered an important factor in prevention, as a poor state of health, including alcoholism, may predispose to the serious forms of infection [10 16]. Control of animal disease by sound husbandry, herd management, good sanitation and immunisation is recommended [34].

The removal or regular disinfection of contaminated sources has been shown to be an important method of limiting the spread of the organism throughout a work environment [33]. Because of the widespread distribution, large variety of animal hosts and its ability to persist in the environment, control of reservoir populations of E. rhusiopathiae is impractical or impossible. However, the possibility of human infection can be reduced by awareness, safe work practices and sensible precautions.

Conclusion

- Erysipelothrix rhusiopathiae spondylodiscitis was under-diagnosed because of its resemblance with other infections and varying clinical presentation.
- Clinical diagnosis is difficult without the aid of laboratory testing in absence of animal exposure and in patients without identifiable risk factors.
- High index of suspicion with prompt and careful microbiological investigations would help in the etiological diagnosis of such rare presentations.

Conflicts of Interest

The authors declare no conflicts of interest.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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