

## Sporotrichosis infection in pregnant mare: The first report in Al Muthanna governorate Iraq

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### Abstract

*This study intends to document the first report of Sporotrichosis in pregnant mare in Al Muthanna governorate/ Iraq. Seven years old, a pregnant Arabian mare was presented with signs of multiple exudative subcutaneous small nodules on the hind quarters, neck, and other parts of the body. Classical lymphangitis form was not seen. *Sporothrix schenckii* was isolated from the lesion and identified. The mare was treated by local application of povidone-iodine and systemic antifungal Itraconazole (10 mg/kg/day) mixed with sodium iodide (NaI) at 5 mg/kg for 4 weeks. The mare was provided with omega-3 fatty acids, vitamin E, selenium, and probiotics to support the immune system. The mare revealed recovery after the treatment course. Other aspects of Sporotrichosis, especially zoonotic risk, are also discussed.*

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### Introduction

Sporotrichosis is caused by saprophytic dimorphic fungus the *Sporothrix schenckii*, and related species belong to the *Sporothrix* genus. It is a subcutaneous acute or chronic granulomatous mycosis distributed worldwide in vegetation, decaying organic matter, *Sphagnum* moss, and soil (Morgad *et al.*, 2022). The disease has been described in man and many animal species. The earlier reports of Sporotrichosis were reported in the USA in 1898 in man, Brazil in 1907 in rats and Madagascar in 1909 in mules and horses (Ainsworth & Austwick, 1973). Later, several sporotrichosis cases were reported frequently in the horses ( Jones and Maurer, 1944, Davis & Worthington, 1964, Thorold, 1951). Sporotrichosis is not a notifiable disease in most countries; therefore, its actual occurrence is hard to estimate (Gremião *et al.*, 2015). The conventional method of transmission of the causative fungus agent occurs via traumatic inoculation of fungus in the plant, soil, or organic matter containing *Sporothrix* spp. conidia into skin tissue, while the disseminated disease caused by inhalation of spore is rare (Orofino-Costa *et al.*, 2017). Sporotrichosis was reported in cats, dogs, horses, cows,



camels, dolphins, goats, mules, birds, pigs, rats, armadillos, and zoonotic infections can occur in man. However, the cat is the species with the most significant zoonotic potential, and its transmission to people appeared without proof of trauma. Insect bites, fish handling, and bites from cats and birds are the common method of zoonotic transmission (Barros *et al.*, 2011). Sporotrichosis occurs in 3 forms: lymphocutaneous, cutaneous, and disseminated. The most common form is lymphocutaneous, which is characterized by the development of 1-3 cm in diameter small, fixed dermal to subcutaneous nodules. The infection rises along the lymphatic vessels and lead to the cording and development of new nodules. These lesions tend to ulcerate and release serohemorrhage exudate. The cutaneous form is localized at the inoculation site and can be multicentric. In contrast, the disseminated form is sporadic but fatal and may develop from non-treated neglected cutaneous and lymphocutaneous forms (Ramírez Soto, 2015). In equine, the disease mainly affects the skin and cutaneous tissue with or without the involvement of lymphatic vessels. It occurs in the chronic nodular dermal and subdermal infection with alopecia, ulceration, and scab development (Priakshi *et al.*, 2017). Many previous researchers focus on the policy used in treating equine Sporotrichosis using local and parenteral formulations with different degrees of success (Ainsworth & Austwick, 1973, Evans, 1994, Nadalian *et al.*, 1997, Burke *et al.*, 1983). The fungicidal antibiotic Itraconazole has been used to treat ringworm in horses with encouraging results (Mahajan, 2014, Kauffman *et al.*, 2007 ).

A review of the literature revealed no reports on equine Sporotrichosis in Al Muthanna governorate / Iraq. Consequently, this study is to document the first case report of equine Sporotrichosis in Al Muthanna governorate / Iraq.

## Case report

A seven-year-old pregnant Arabian mare with a skin infection was presented to Al Muthanna veterinary teaching hospital early October 2019. According to the owner, the mare suffered from lameness, loss of appetite, emaciation, and multiple exudative subcutaneous small nodules on the hind quarters, neck, and other parts of the body. Clinical examination revealed small subcutaneous nodules with alopecia and crust formation. No obvious involvement of the lymphatic vessels was seen. The nodules opened, ulcerated, and oozed serohemorrhage exudate ( Figure. 1 A, B, C, D ). Exudate aspirated, crusts, skin, and hair were collected aseptically from the lesions and transferred to the clinical pathology laboratory for further investigation. The samples were mounted in 20% KOH, and Giemsa stain smears were prepared and examined under a light microscope. The samples were also inoculated on Sabouraud dextrose agar and blood agar and incubated at 26°C-28°C. Each culture was examined daily for colonies' descriptions, and observations were reported. The lesions were cleaned with water. The mare was treated by local application of povidone-iodine and systemic antifungal Itraconazole (10 mg/kg/day) and sodium iodide (NaI) at 5 mg/kg for 4 weeks.



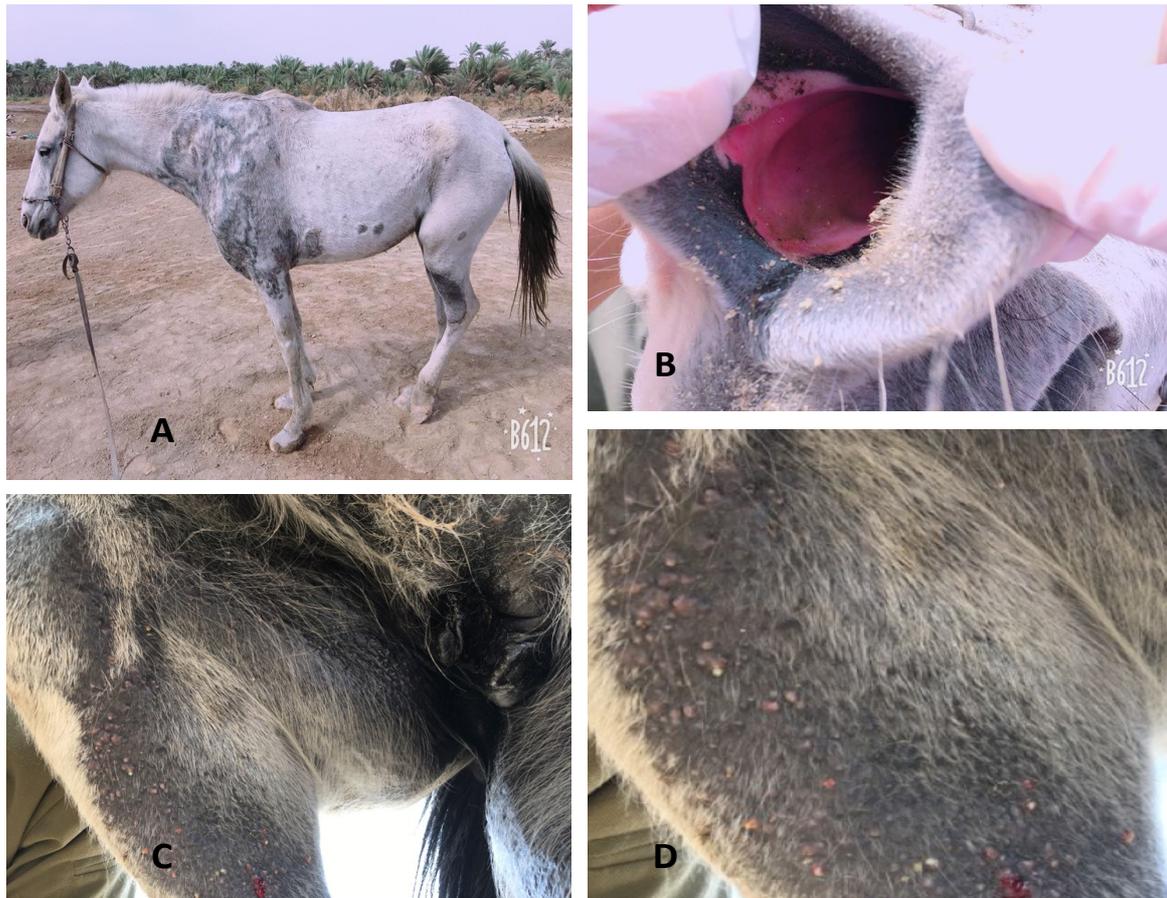


Figure. 1: shows 7 years old pregnant mare suffered from: A. from lameness and skin lesions distributed over all the body. B. Clinical examination of nasal cavity to excluded the glanders nasal lesions. C. multiple exudative subcutaneous small nodules. D. Open nodules, ulcerated and oozing serohemorrhage exudate.

## Results

Examination of the direct smear of exudate revealed the presence of yeast-like structures ( Figure.2). After 25 days, white convoluted leathery colonies appeared on Sabouraud dextrose agar and blood agar ( Figure.3 A). The microscopical examination of smear from culture stained by lactophenol blue solution showed the filamentous mycelia form with thin hyaline, septate and branching hyphae with right-angled conidiophores producing at their apices forming small, hyaline or dark, oval, globose or pyriform conidia, arranged in clusters resemblance of a flow- rosette (Figure. 3 B). According to a direct smear of exudate examination, morphological culture features, clinical signs and response to the treatment regime, the isolate was identified as *Sporothrix schenckii*.

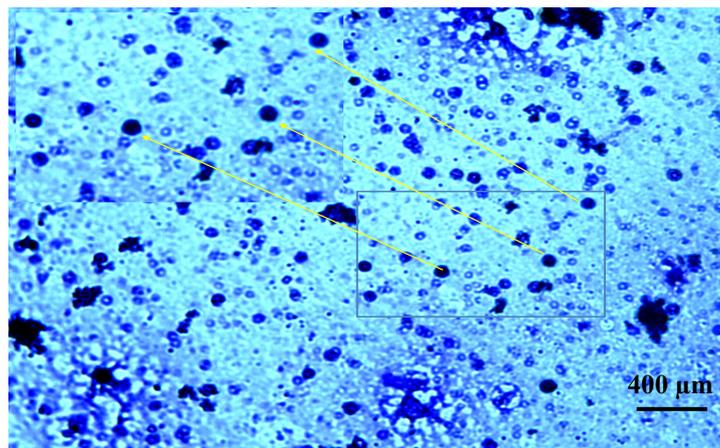


Figure. 2: Shows direct smear from exudates revealed the presence of yeast-like structures (Giemsa stain. 10X 40= 400 μm).

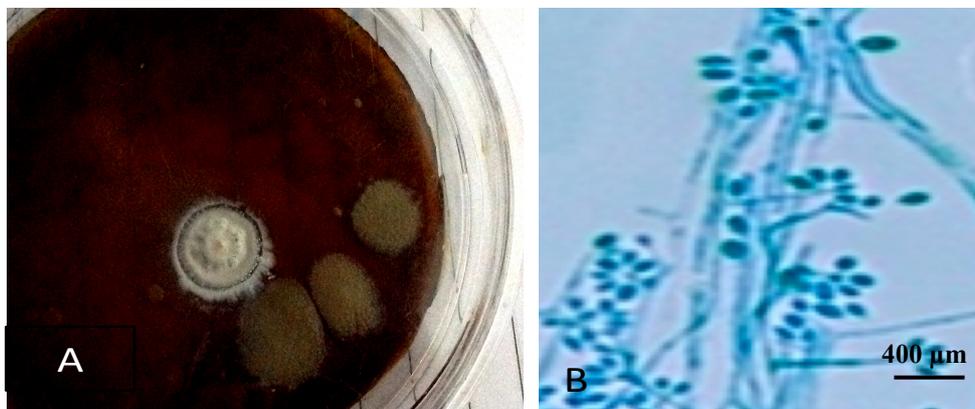


Figure. 3: A. Shows the sides of a colony of *Sporothrix* sp. grown at 28 °C for 26 days on blood agar. B. Shows filamentous mycelia form with thin hyaline, septate and branching hyphae with right angled conidiophores (Lactophenol blue stain. X 400).

## Discussion

Sporotrichosis is an uncommon disease, affecting animals and humans and distributing globally. Paige first reported the occurrence of Sporotrichosis in mules and horses in the united states, and identified a sporotrichum from the ulcerative lesions of horses and mules. However, Pearson suspected these cases as epizootic lymphangitis (Morgado *et al.*, 2022, Boechat *et al.*, 2021). Horses infected by Sporotrichosis suffer from multiple ulcerated wounds and are covered with scabs and slightly elevated plaques or nodules that might occur along limb lymphatic chains and can be unique and located (Morgado *et al.*, 2022).

This study reported the first Sporotrichosis in a pregnant mare in Al Muthanna governorate/ Iraq. The affected mare suffered from a poor health conditions, lameness, and loss of appetite. The pregnant mare can also suffer from system-wide inflammation under stressful conditions due to possibly interfering with the maintenance of pregnancy and negatively affecting fetal survival and growth. All these factors accompanied by

pregnancy exhausted the immune status and encouraged the invasion of the causative agent (Javier *et al.*, 2016). Clinical signs showed no lymphatics or regional lymph nodes involvement, though the lesions were localized. These clinical presentations described in the current case are compatible with previous cases reported by other researchers (Andrews *et al.*, 1983). They described multifocal skin lesions and generalized hemorrhagic infections of the internal organs, probably caused by *S. schenckii* in dairy cows (Andrews *et al.*, 1983). The current study approved that the animal did not show generalized disseminated infection. The animal also recovered after treatment and improved of immune status through omega-3 fatty acids, vitamin E, selenium, and probiotics. Before treatment, the mare worsened, and this observation supports the previous report that mentioned nonspontaneous recovery of Sporotrichosis ( Al-Dughaymand Fadlelmula, 2003).

This mare was kept at an open stable during day time and moved to the closed area at night. The area's weather is hot and humid during autumn, encouraging fungus to multiply saprophytically in vegetation. Horses may contact the fungus when walking through vegetation or mud containing the fungus. However, abrasion and nicks on the legs encourage fungal spores to enter the skin. The fungus can also transmit from animal to animal or infected human to animals by direct contact with discharges from nodules. The lesions may persist on animals for months, which play an important role in the epidemiology of the disease. *S. schenckii* has been isolated from soil (Emmons, 1953) and plant debris (Mackinnon *et al.*, 1969). The presence of local cats with skin lesions, especially on the nose at mare stable, might be the source of infection. The researcher mentioned other types of the spread of infection, such as bites and scratches from a diseased cat that effectively disseminate the fungus. Other routes of infection begin by affecting the skin locally with the development of a nodular ulcerated lesion and finally extend out from the site of trauma through the lymphatic system and cause damage to other organs of the warm-blooded host ( Rodrigues *et al.*, 2022, Bonifaz *et al.*, 2013, Silva-Vergara *et al.*, 2012). In this case report, the treatment regime included local and systemic treatment was effective and safe. This treatment regime was selected to prevent the disseminated infection as the mare was suffered from emaciation and poor immune system. These results are compatible with previous studies in man and animals that used the oral administration of potassium or sodium iodide effectively in treating Sporotrichosis (Boscarato *et al.*, 2016, Ainsworth & Austwick, 1973, Evans, 1994). However, Nadalian *et al.*, (1997) reported a case of Sporotrichosis in a horse treated with oral potassium iodide at a dose of 10g daily for two months; the complete recovery was not achieved, probably because of the chronic state of the case.

In conclusion, this is the first report that presented a case of Sporotrichosis in a pregnant mare. The diagnosis was done according to typical clinical signs, presence of yeast-like structures in exudates direct smear and fungal isolation. Further epidemiological surveys are needed for Sporotrichosis in other domestic animals.

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