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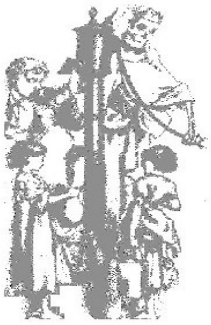
THE BROAD STREET PUMP

Sporotrichosis



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Sporotrichosis is a dermatomycosis caused by the fungus, *Sporothrix schenckii*. It was first described by B.R.Schenck in the Bulletin of the Johns Hopkins Hospital in 1898. [1] Subsequently, Hektoen and Perkins named this pathogenic fungus *Sporothrix schenckii* in 1900. [1] Infection usually presents as ulcerative skin lesions, typically on the arms or legs, arising from a site of inoculation of the fungus, usually from plant material. The lesions spread in a linear fashion along lymphatic chains, an appearance hence known as 'sporotrichoid spread'. Although the infection is readily treatable with oral antifungal agents, the diagnosis is often delayed, after antibiotics have been inappropriately prescribed. The infection is also known to relapse. Sporotrichosis occurs in geographical clusters, in warm moist climates such as in Queensland, Western Australia and northern NSW but, since it is not notifiable, the true incidence in Australia is unknown.

Global Epidemiology

Sporotrichosis is globally distributed, but the epidemiology differs in different regions. Whilst it commonly presents as a sporadic infection, it is endemic in parts of USA, Latin America, South Africa, Japan and India [2-10]. In the south central highlands of Peru, it is considered hyper-endemic with an incidence approaching 1 case per 1000 persons in children aged 7-14 years of age. [11]

In addition, there have been a number of epidemics worldwide. The largest recognised epidemic occurred in Witwatersrand in South Africa between 1941-1944 where about 3000 gold miners developed sporotrichosis through contaminated timber in the mine. [12] The largest recorded outbreak in USA was in 1988, associated with Wisconsin-grown sphagnum moss, resulting in an epidemic involving 84 patients in 15 different states. [3]

Sporotrichosis in Australia

In Australia, sporotrichosis was first reported in 1951 in a 70 year old man who contracted the infection following a gardening injury. [13] Many sporadic cases have been reported since then. All previously published literature on human *S. schenckii* infections in Australia are summarized in the table.

In addition, a recent retrospective study in mid-North-Coast-NSW including Port Macquarie, Wauchope, Kempsey, Taree and surrounds, identified 31 cases over the last 10 years, [14] highlighting the fact that sporotrichosis continues to occur in NSW.

In addition to sporadic infections, there have been 2 notable Australian epidemics. Conias and Wilson reported 16 cases of cutaneous sporotrichosis over a 9 month period in 1995 in the Darling Downs region of Queensland, where detailed exposure histories pointed to a single local produce store selling contaminated hay. [15] Feeney et al reported a cluster of 11 patients in the Busselton-Margaret River region of Western Australia from 2003 – 2004 associated with contaminated hay, with most patients coming into contact with hay during gardening. [16]

Microbiology

S. schenckii is a dimorphic fungus existing as a mold form at room temperatures ranging from 25-30℃ and as a yeast form in the host at 37℃. When suspecting sporotrichosis, material from the lesion should be cultured on Sabouraud medium, incubated at 25℃. It grows readily within days to become white to cream coloured colonies, which turn gray and finally black and wrinkled as they age. When viewed under the microscope, conidia can be observed arranged along the hyphae in a bouquet-like appearance. A tentative identification can be made if this characteristic conidia formation is noted in mold phase. However, definitive diagnosis is established through culturing the mold form on an enrichment media such as brain heart infusion or blood cysteine agar at 37℃ to show transformation to 4-6 micrometer, oval to cigar shaped yeast form. In the yeast form, *S. schenckii* reproduces by budding and does not form conidia. [17, 18]

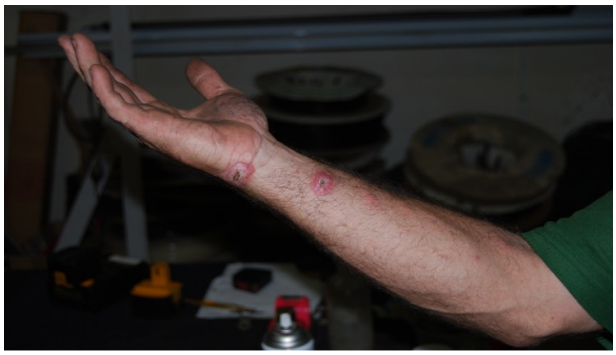

Figure: Cutaneous lesions of S.schenckii infection demonstrating sporotrichoid spread on the forearm.
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Histopatholgy

The main histological features of sporotrichosis include pseudoepitheliomatous hyperplasia, suppurative granuloma with or without intraepidermal microabscesses, epithelioid granulomas and granulomatoid areas. [19] There are varying degrees of dermal scarring and ulceration. In addition, asteroid, yeast-like forms and hyphae are three morphologically distinct fungal elements described in sporotrichosis. [19] The asteroid bodies consist of an extracellular round or budding yeast, surrounded by eosinophilic spicules, often within an area of clearing, probably representing shrinkage artifact. Asteroid bodies are characteristic for and potentially diagnostic of sporotrichosis. [19, 20] Whilst it is uncommon for organisms to be visualised on initial section, the chances of making a specific diagnosis are very high with multiple serial sections stained with H&E and PAS. Bullpitt and Weedon recommend that at least 20 serial sections should be examined if the diagnosis is suspected, as it is possible for sporotrichosis to be diagnosed histologically even in the absence of positive culture. [19]

Clinical features

S. schenckii is an ubiquitous environmental saprophyte and has been isolated in decaying vegetation, sphagnum moss, hay and wood. Given the environmental niche of *S. schenckii*, those likely to be exposed and hence at higher risk of acquiring sporotrichosis include gardeners, florists, farmers and horticulturalists. Transmission usually occurs through traumatic inoculation of the fungi through skin or subcutaneous tissue, for example, through penetrating trauma with plant thorns or wood splinters. Zoonotic transmission has also been reported; transmission from cats is an emergent problem in Rio de Janeiro, Brazil [21] and is commonly associated with armadillo hunting in Uruguay. [2]

Once the organism enters the skin and subcutaneous tissue through a minor injury, it produces a primary chancre-like lesion at the point of entry. Subsequently nodular lesions appear in linear arrangement along the regional lymphatics (See figure). Over time, these nodules become indurated and purplish, then ulcerate and discharge. They are usually painless and the patient has no systemic symptoms. [22] Exposed areas such as extremities and face are most frequently affected.

There are four clinical manifestations of sporotrichosis: fixed cutaneous, lymphocutaneous (lesions tracking along lymphatic pathway), disseminated cutaneous (widespread) and extracutaneous. [23, 24] Cutaneous disease is the usual presentation of *S. schenckii*, particularly in the immunocompetent host. Of the cutaneous forms, lymphocutaneous and fixed cutaneous forms are the most common. [25] Disseminated disease can be fatal in immunocompromised hosts. [26] The classical 'sporotrichoid spread' along lymphatics also occurs with some other pathogens, notably *Mycobacterium marinum*/*chelonae, Norcardia species* and *Leishmania* species.

Hence in the correct clinical context, infections with these organisms are important differential diagnoses. However, most commonly, cutaneous sporotrichoid infections are initially misdiagnosed as a common bacterial infection (e.g. staphylococcal), and hence correct diagnosis is often delayed.

Treatment

The Infectious Diseases Society of America (IDSA) guidelines recommend itraconazole 200mg daily given for 2-4 weeks until after all lesions have resolved, usually for 3-6 months, as the treatment of choice for cutaneous and lymphocutaneous sporotrichosis, [27] following an initial loading dose of 200mg three times daily for three days. [27] Patients with visceral involvement and those with lymphocutaneous forms experiencing treatment failure should have serum levels of itraconazole determined, aiming for levels $\geq$ 1mg/L. For those unresponsive to itraconazole, a higher dose of itraconazole (200mg bd) or terbinafine or saturated solution of potassium iodide is recommended. Fluconazole is recommended only if patients are intolerant of these first-line agents. There are no published data on treatment of sporotrichosis with the newer azoles, voriconazole and posaconazole. Local hyperthermia could be used in pregnant and lactating women with fixed cutaneous lesions where previous regimens could not be safely given. [27] Spontaneous resolution without specific antifungal or local topical agents has also been reported. [28] Amphotericin B is the treatment of choice for serious or life-threatening sporotrichosis. [27]

Reference	Year	Location	No. of cases
Robinson [13]	1951	NSW	1
Barrack and Powell [30]	1952	NSW	1
Minty et al [31]	1956	QLD	1
Mead and Ridley [32]	1957	QLD	2
Durie et al [22]	1961	NSW	1
O'Donnell [33]	1962	WA	1
Muir and Pritchard [34]	1963- 1981 (published 1984)	NSW	12
Robertson [35]	1967	QLD	2
Black and McAleer [36]	1975	WA	1
Auld and Beardmore [37]	1965-1977 (published 1979)	QLD	37
Beardmore [38]	1979	QLD	1
Bullpitt and Weedon [19]	1978	QLD	39
Conias and Wilson [15]	1998	QLD	16
Moaven [39]	1999	WA	1
Feeny et al [16]	2003-2004 (published 2007)	WA	11

Table: Australian reports of human cases of *Sporothrix schenckii [29]*

References: Please contact Lou_Orszulak@wsahs.nsw.gov.au for references relating to this article.

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