

Efficacy of Fine Needle Aspiration Cytology in the Diagnosis of Sporotrichosis

Priakshi Barua Chowdhury¹, Mala Mukherjee¹, Nikhil Era², Shatavisa Mukherjee³

ABSTRACT

Introduction. Definitive diagnosis of sporotrichosis at any site requires the isolation of *S schenckii* in a specimen culture from a normally sterile body site. The present study tried to assess the efficacy of fine needle aspiration cytology as a diagnostic procedure over histopathological examination in the definitive diagnosis of this disease.

Material and Methods: Suspected cases were clinically examined and processed for both cytological and histopathological examinations. Specimens from the patients had been collected by aspirating the pus, infected tissue or by scraping.

Results: The most common clinical presentation involved was of lymphocutaneous variant. Aspirates were majorly of purulent type. Ulceration of epidermis, presence of giant cells, epithelioid granuloma, neutrophilic abscess and lymphocytic infiltrate were observed in most cases. All the suspected cases showed positive results in fine needle aspiration cytology followed by fungal culture after which they were also sent for histopathological examinations.

Conclusion: Efficacy of fine needle aspiration cytology as a diagnostic procedure is of prime importance as the process is relatively painless, rapid, and cheaper than histopathological examinations.

Keywords: Sporotrichosis, Fine Needle Aspiration Cytology, Histopathological Examinations

Clinical presentation suggests that the average incubation period is around three weeks though the exact incubation period is unknown. Most common sites being skin and surrounding lymphatics leading to development of small indurated, progressively enlarging papulo-nodule at the inoculation site which may ulcerate without causing systemic symptoms. Sporotrichosis is presented in three main clinical types- lymphocutaneous, fixed cutaneous and disseminated form.

- Lymphocutaneous form is the most common variety and accounting for 70-80% and most frequently affects the extremities. A nodulo-ulcerative lesion at the site of inoculation with presence of string of similar nodules along proximal lymphatics with or without adenopathy characterizes this form. These secondary lesions along lymphatics have different morphology of erythematous papules, nodules, plaques and may even ulcerate discharging seropurulent material.⁴
- Fixed cutaneous form is less common and characterized by localized lesion at the site of inoculation. Facial involvement more frequently seen than in other variant.
- Disseminated form is rare and characterized by greater than or equal to lesions involving two different anatomic sites.

Clinical suspicion being the key for early diagnosis, is followed by other relevant investigation to differentiate from cutaneous tuberculosis, cutaneous leishmaniasis etc. Definitive diagnosis of sporotrichosis at any site requires the isolation of *S schenckii* in a specimen culture from a normally sterile body site. The organism can be recovered with fungal culture from sputum, pus, subcutaneous tissue biopsy, synovial fluid, synovial biopsy, bone drainage or biopsy, and cerebrospinal fluid (CSF). The concentration of organisms in synovial fluid and, particularly, CSF is often low. Therefore, repeated large-volume cultures may be necessary for diagnosis of sporotrichosis. Occasionally, *S schenckii* (cigar-shaped yeast) can be visualized in biopsied tissue specimens that are stained with periodic acid-Schiff, Gomori methenamine-silver, or immunohistochemical stains. Granulomatous inflammation is common; this is occasionally accompanied by the presence of an asteroid body, but this picture is not specifically diagnostic for sporotrichosis. The

INTRODUCTION

First described by Schenck in 1898 hence known as Schenck's disease or Rose gardener's disease, Sporotrichosis is a subacute or chronic infection caused by the saprophytic dimorphic fungus *Sporothrix schenckii*. Global incidence though unknown, it occurs worldwide with focal areas of hyperendemicity in tropical and subtropical areas, and temperate zones with warm, humid climate favoring the growth of saprophytic fungus but large outbreaks have occurred in other parts as well.¹ Most frequent occurrences have been encountered in Japan, China, Australia, Central and South America and India (along the Sub-Himalayan region).²

Sporotrichosis is manifested as chronic granulomatous subcutaneous mycotic infection caused by *Sporothrix schenckii*, a dimorphic fungus found as a saprobe from dead or senescent vegetation, like thorns, hay, straw, wood and also in soil. Thus sporotrichosis is largely associated with outdoor activities by farmers, florists, leisure gardener etc. No age, gender or race is spared as the occurrence depends on the presence of fungus in the environment and its portal of entry.² In most of the reported cases there has been male preponderance due to higher exposure risk. Exposed body parts in particular extremities are involved more frequently due to obvious reason of traumatic inoculation. Zoonotic transmission has been reported from insect bites, fish handling, and bites of cats, birds etc.³

¹Assistant Professor, Department of Pathology, MGM Medical College, Kishanganj, Bihar, ²Post Graduate Trainee, ³Research Scholar, Department of Clinical and Experimental Pharmacology, School of Tropical Medicine, Kolkata, West Bengal, India

Corresponding author: Shatavisa Mukherjee, Department of Clinical and Experimental Pharmacology, School of Tropical Medicine, Kolkata, West Bengal, India

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present study tried to assess the efficacy of fine needle aspiration cytology as a diagnostic procedure over histopathological examination in the definitive diagnosis of sporotrichosis in a tertiary care teaching hospital in eastern India.

MATERIAL AND METHODS

The study was conducted in the department of pathology in a tertiary care teaching hospital with 27 clinically suspected cases referred from department of dermatology of the same unit over a period of 2 years. Suspected cases were clinically examined and processed for both cytological and histopathological examinations. Clinical details such as age, sex, occupation and other exposure risk, site and duration of lesions, history of trauma, mode of spread, presence of ulceration, personal history and HIV status and any other pertinent data were collected and duly analyzed. Specimens from the patients had been collected by aspirating the pus, infected tissue or by scraping. For Fine needle aspiration cytology, the site was prepared and with help of 10 ml syringe fitted to 23 gauze needle material was aspirated and smears were divided to be stained by May-Grünwald-Giemsa (MGG) and leishman-giemsa stain (Figures 2, 3). Whenever the lesion was clinically suspected to be of fungal aetiology, special fungal stain that is lactophenol cotton blue (LPCB) was used for evaluating the presence of epithelioid granuloma, asteroid body. Direct smear examination of pus

using lactophenol cotton blue was done, where *Sporothrix schenckii* appeared as delicate branching septate hyphae with slender, short, conidiophores with tapering tips and surrounding pear shaped conidia with moist leathery colonies (Figure 4). All the cases were sent for histopathological examination for presence of ulceration of epidermis, epidermal hyperplasia, granuloma formation, and presence of nonspecific inflammatory infiltrate consisting of lymphocytes, plasma cells, presence of neutrophilic abscess.

STATISTICAL ANALYSIS

Microsoft office 2007 was used for the statistical analysis. Descriptive statistics like mean and percentages were used to interpret the data.

RESULTS

Out of 27 clinically referred cases of sporotrichosis assessed, there were 16 cases (59.3%) male, while rest female. The site of lesion was majorly in upper extremities (55.6%) (Figure 1), followed by 37% reporting with lesions in lower extremities and 7.4% involving face. Sporotrichosis is classified into 4 clinical categories: (i) lymphocutaneous, (ii) fixed cutaneous, (iii) multifocal or disseminated, and (iv) extra-cutaneous. The most common clinical presentation involved was of lymphocutaneous variant, with 16 reported cases (59.3%). History of trauma was found to be present in 11 cases (40.7%).

Aspirates were majorly of purulent type (51.9%, n=14) while there were 13 cases of hemorrhagic nature. 48.1% specimens



Figure-1: Lymphocutaneous type of lesion – noduloulcerative lesion appears along lymphatics

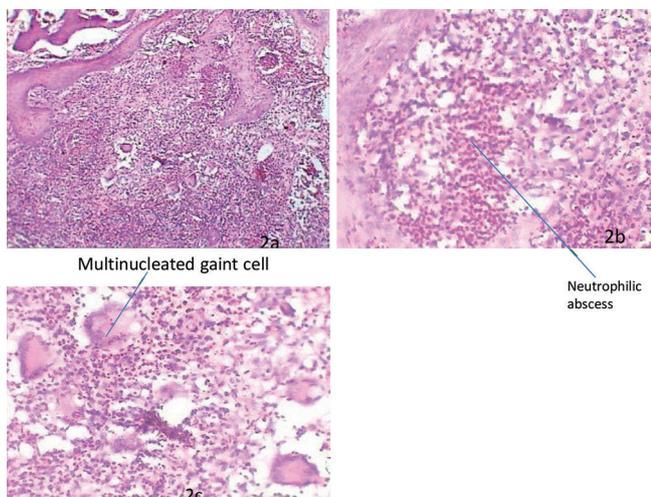


Figure-2: (a) 100X shows unremarkable epithelium with dense dermal infiltrate compose of mostly neutrophils forming neutrophilic abscess, few plasma cells; (b) 400X shows neutrophilic abscess; (c) 400X shows multinucleated gaint cells

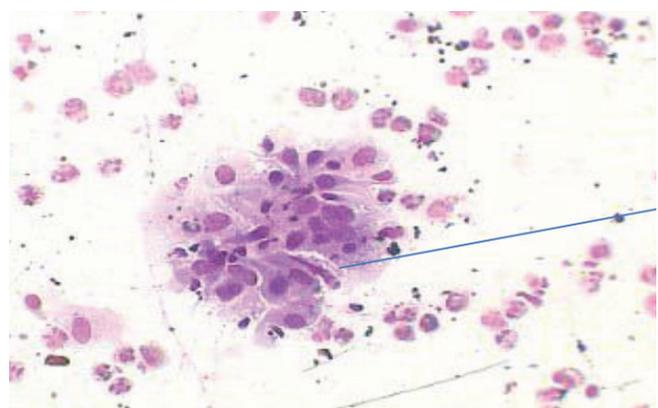


Figure-3: on FNAC Granuloma in between suppurative background.



Figure-4: Fungal culture; (a) Moist leathery colonies; (b) Long slender septate hyphae; (c) Pear shaped conidia

were of high cellularity, with 29.6% cases moderate and rest low. 16 cases (59.3%) presented with ulceration of epidermis and presence of giant cells. Epithelioid granuloma was present in 70.4% cases (n=19), neutrophilic abscess in 37% (n=10) cases and lymphocytic infiltrate in 48.1% cases (n=13). Polymorphonuclear leukocytes along with granular debris and histiocytes were present in 63% cases (n=17).

DISCUSSION

Sporothrix schenckii, the fungus that causes sporotrichosis, occurs worldwide growing saprophytically on plant matter such as sphagnum moss, rose bushes, hay, or wood. The microscopic fungus can enter the skin through small cuts or scrapes. In rare cases, breathing in the fungus can cause pulmonary infection. It is still unclear which climatic conditions exactly facilitate the growth of *Sporothrix schenckii*.

Though anyone can come in contact with the disease, outbreaks have mostly occurred in nursery workers since it is an occupational disease of farmers, leisure gardeners. Sporotrichosis is not contagious and can't spread from person to person. The disease can be however transmitted by bites of insects and scratches/bites of animals such as cat, dog etc.⁵

Various predisposing conditions of the host such as have been pointed out such as alcoholism, diabetes mellitus, haematological malignancies, chronic obstructive pulmonary disease, and long term treatment with corticosteroids, chemotherapy drugs, transplant recipients and patients with AIDS.⁶

Clinical suspicion is the key for early diagnosis and cutaneous lesions needs to be differentiated from cutaneous tuberculosis, cutaneous leishmaniasis, nocardiosis, chromoblastomycosis, blastomycosis, paracoccidioidomycosis, and atypical mycobacteriosis.⁷ Ulcerating lesions can mimic pyoderma gangrenosum. Definitive diagnosis of sporotrichosis at any site requires the isolation of *S. schenckii* in a specimen culture from a normally sterile body site. The organism can be recovered with fungal culture from sputum, pus, subcutaneous tissue biopsy, synovial fluid, synovial biopsy, bone drainage or biopsy, and cerebrospinal fluid (CSF). Thus diagnosis involves different modalities like fine needle aspiration cytology, histopathology, fungal culture etc.

Fine needle aspiration cytology from a lesion, particularly in extracutaneous or disseminated forms, may occasionally show epithelioid cell granuloma, asteroid bodies, and/or yeast cells and cigar shaped bodies when stained with certain stains. Subsequent culture of the strain in artificial media remains gold standard in diagnosis.⁸ In the present study all the suspected cases were sent for histopathological examination for presence of ulceration of epidermis, epidermal hyperplasia, granuloma formation, presence of nonspecific inflammatory infiltrate consisting of lymphocytes, plasma cells, presence of neutrophilic abscess. Histopathological examination is usually nonspecific and mimics other granulomatous diseases. The histologic features varies from acute on chronic inflammation with characteristic zonation to chronic epithelioid cell granuloma with foreign body or Langhans' giant cells at both ends and nonspecific chronic granulomatous inflammatory cell infiltration of the dermis in the middle of the spectrum. The major histopathological features of fixed cutaneous sporotrichosis include central ulceration of epidermis, hyperkeratosis at the edge, acanthosis,

and epidermal hyperplasia that may vary to the extent of pseudoepitheliomatous hyperplasia. Neutrophilic abscesses may be seen in the dermis and/or epidermis. There is usually dense cellular infiltrate comprising lymphocytes plasma cells and variable number of epithelioid histiocytes, giant cells, and eosinophils (mixed granulomatous cellular infiltrate) in upper- and middermis with or without fibrocapillary proliferation. Nodules of lymphocutaneous sporotrichosis characteristically show 3 concentric zones; the central necrotic zone contains amorphous debris and polymorphonuclear leukocytes (zone of chronic suppuration); the middle tuberculoid zone is composed of epithelioid cells, giant cells (predominantly Langhans' type), and the outer zone comprising numerous plasma cells, lymphocytes, and fibroblasts with prominent capillary hyperplasia and proliferation (syphilitic zone). In the present study aspirates were majorly of purulent type, majorly being of high cellularity. 59.3% cases presented with ulceration of epidermis and presence of giant cells. Epithelioid granuloma was present in 70.4% cases, neutrophilic abscess in 37% cases and lymphocytic infiltrate in 48.1% cases. Polymorphonuclear leukocytes along with granular debris and histiocytes were present in 63% cases.

Amongst various forms of this disease, lymphocutaneous presentation is the commonest clinical form, where a primary lesion develops at the site of inoculation in immunocompetent hosts with its frequencies ranging from 46 to 92%, followed by the fixed cutaneous type (0 to 54%). In this present study the most common clinical presentation involved was of lymphocutaneous variant, with 16 reported cases (59.3%). There appears to be no relationship of gender preponderance to sporotrichosis. Many reports have suggested higher prevalence in men, while some have some nearly equal ratios for both genders. Our study revealed males being more effected than females.

The present study tried to assess the efficacy of fine needle aspiration cytology as a diagnostic procedure over histopathological examination in the definitive diagnosis of this disease. All the suspected cases showed positive results in FNAC followed by fungal culture after which they were also sent for HPE. Efficacy of FNAC as a diagnostic procedure is thus of prime importance as the process is relatively painless, rapid, cheaper than HPE. The higher sensitivity and specificity of FNAC, along with its low risk complications and easy repeatability in comparison to HPE makes it a very important modality in diagnosis of sporotrichosis as an early initiation of treatment is possible with FNAC as a diagnostic process in contrast to HPE.

CONCLUSION

The present study demonstrated the efficacy of fine needle aspiration cytology followed by fungal culture as a rapid and more definitive modality of diagnosis with more specificity and sensitivity in comparison to histopathological examinations which would be more time consuming leading to latency of treatment initiation for the disease.

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