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Case Report

Eumycetoma on histopathology presenting at unusual site: A rare entity

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Abstract

Mycetoma, an uncommon chronic infection of skin and subcutaneous tissues; commonly seen in tropical and subtropical countries. It is caused by true mycetes named eumycetoma and filamentous bacteria belonging to group actinomycetes. The incidence is more common in agricultural workers walking in bare foot. Foot is most commonly affected. Other less commonly affected sites includes hand, knee, chest and head and neck region. Both forms of mycetoma present as a progressive, subcutaneous multiple nodular swelling with discharging sinuses containing black colour granules. The treatment of these two etiologies is entirely different, a definite diagnosis after histopathological examination is mandatory. We here by present a case of eumycetoma affecting knee joint.

Keywords: Eumycetoma, Discharging Sinus, Knee.

1. Introduction

Mycetoma is a chronic progressive infectious disease involving skin and subcutaneous tissue. Mycetoma has worldwide distribution and endemic in tropical and subtropical regions. It prevails in mycetoma belt that includes Sudan, Somalia, Senegal, India, Mexico, Venezuela and others [1]. The organisms are usually present in the soil as saprophytes in different forms. They are implanted into the host tissue after traumatic inoculations of causative organism. Mycetoma can be caused by true fungi or by filamentous bacteria and hence it is classified as eumycetoma and actinomycetoma respectively. Mycetoma in general involves those parts of the body that come in contact with soil during daily activities, commonly seen in agricultural workers and in barefoot walkers in dry and dusty areas.

The foot is the most affected site and this is seen in 70% of patients. The hand is the next commonest site which occurs in 12% of patient. Less frequently knee, arm, head and neck, thigh, chest and the perineum are involved [1]. It is a slow growing infection presenting with characteristic symptom of swelling with ulcer, draining sinuses and extrusion of characteristic coloured grains in the exudates [2]. The grains discharged from the sinuses vary in size, colour and consistency. Dark grains are characteristic of eumycotic mycetoma. It may spread to involve the deep structures and bone resulting in destruction, deformity and loss of function. Since the treatment of these two etiologies is entirely different, a definite diagnosis after histopathological and microbiological examination is mandatory [3-5]. Here, we report an isolated case of eumycetoma of the knee joint. The disease was identified only after surgical excision and biopsy.

2. Case description

A 27 year male, farmer by occupation presented with multiple nodular swelling of right knee since 2 year, gradually increasing for last six months. He used to work in paddy field in kneeled down position. On examination of right knee, swelling was present in infrapatellar region with tumefaction, multiple discharging sinuses with purulent exudates and black pigment granules. There was no tenderness or deformity. FNAC done was suggestive of "Bursitis." USG and MRI also suggest "Bursitis". Deeper

Excisional biopsy was sent for histopathological examination. Grossly, a flap like irregular capsulated soft tissue specimen of size 9x6cm received .Cut surface shows multiple cystic spaces of size ranging from 0.2 to 0.4cm and filled with blackish material.Microscopic examination revealed club shaped organism surrounded by fibrous tissue [Figure 1a]. There were multiple branching septate fungal hyphae embedded in cement like material with secretion of brown black pigment and eosinophilic structure and adjacent areas of abscess formation [Figure 1b]. Special stain showed delineated 4-5µm thick fungal hyphae highlighted by special stains Periodic Acid Schiff (PAS) [Figure 2b] and Gomori Methenamine Silver (GMS) [Figure 3a]. Gram stain was negative [Figure 3b]. So Eumycetoma was considered according to histomorphological features. As the lesion was only in the subcutaneous tissue, not affecting the underlying bone, improvement of the wound was seen. Advice was given for culture of fungal organisms, but the wound was already healed.

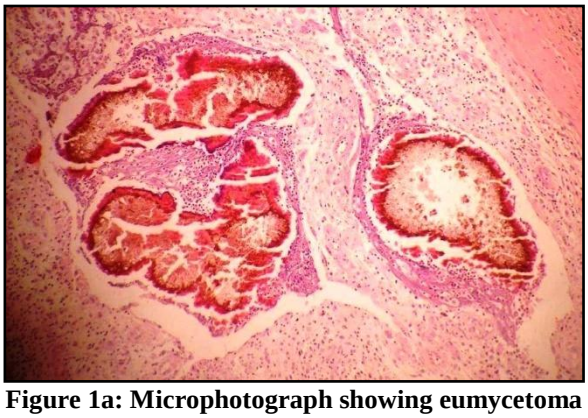

Figure 1a: Microphotograph showing eumycetoma surrounded by fibrous tissue (H & E stain 100 X)

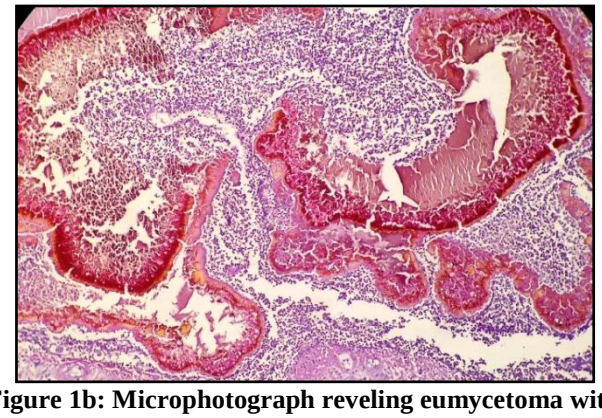

Figure 1b: Microphotograph reveling eumycetoma with adjacent areas of dense neurtophilic collection. There is brown-blackish pigment embedded in cement like material (H & E stain 200 X)

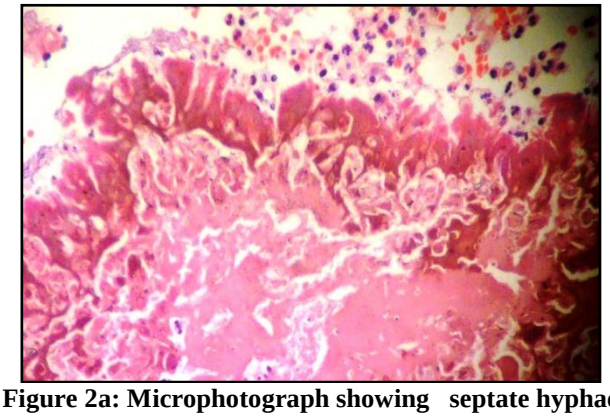

Figure 2a: Microphotograph showing septate hyphae of eumycetoma (H &E, 400X).

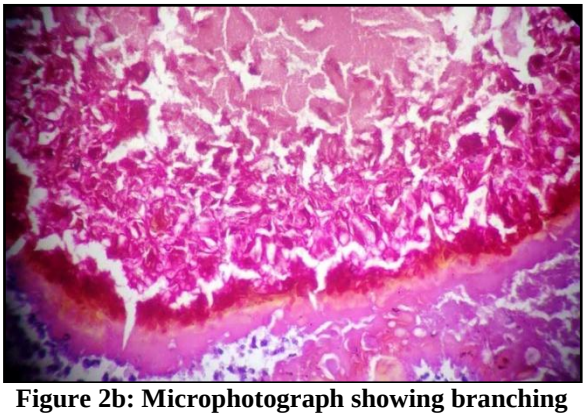

Figure 2b: Microphotograph showing branching septate hyphae highlighted by PAS Stain. (400X)

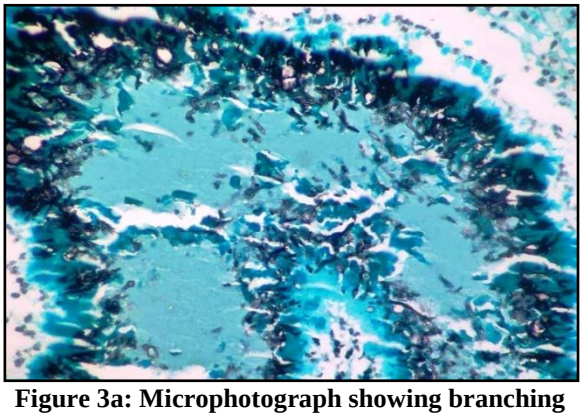

Figure 3a: Microphotograph showing branching septate hyphae highlighted by Gomori Methenamine Silver Stain (400X)

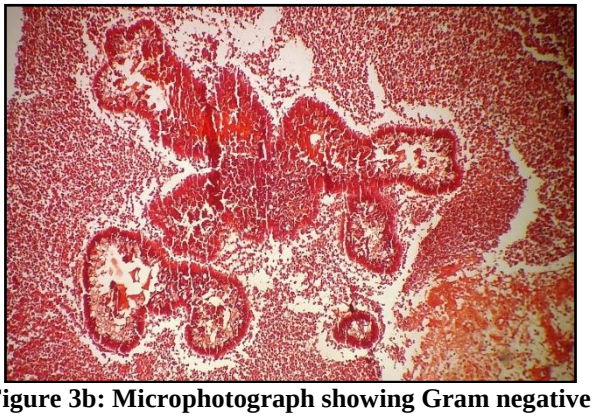

Figure 3b: Microphotograph showing Gram negative club shaped structure with interlacing branching hyphae. (Gram's stain; 200X)

3. Discussion

Mycetoma is endemics in dry tropics and sub-tropic region, although , it can also be found in natives of Central and South America and the Middle East between latitudes 15°S and 30°N. It generally affects agricultural workers and people who walk Barefooted in dry and dusty environment. [6,7]. Pathogens are founds in the soil and are introduced through skin wounds during minor trauma. Infection presents as firm nodular swelling but it may be soft, lobulated and rarely cystic which grows in skin and subcutaneous tissue. The swelling can ruptures forming discharging sinus tracts exuding characteristic coloured grains [4]. The granules vary in size, colour and consistency depending on the etiological species. These grains are the hallmark of mycetoma [6].

The two main etiological groups of mycetoma - actinomycetic mycetoma and eumycetic mycetoma are caused by a number of species. Over 30 species have been identified to cause mycetoma [7,8].

Actinomycotic mycetoma is caused by aerobic species of actinomycetes belonging to the genera Nocardia, Streptomyces and Actinomadura. Eumycotic mycetoma is caused by a group of fungi with thick, septate hyphae, including *Madurella mycetomi, Madurella griesia, Allescheria boydii* and *Acremonium species* [6,9].

Dark (black) grains are found only among the eumycotic mycetoma. The pigment is a melanoprotein or related substance. The characteristic features of nodular soft tissue swelling of foot along with grain discharging from multiple sinuses can be used for rapid provisional identification of the etiological agent. Some sinuses heal with scarring with simultaneous appearance of fresh sinuses in the proximal areas. The incubation period varies from several weeks to months. Sinuses develop after 6-12 months and extend to involve the underlying fascia, muscle and bone is common. In eumycotic mycetoma, there may be multiple punched out lytic lesions in bones. Actinomycotic mycetoma is characterized by both osteolytic and osteosclerotic lesions [6,7,10].

Rarely there is lymphatic dissemination to regional lymph nodes [11]. Actinomycetic mycetomas expand faster, are more invasive and have more sinuses than eumycotic variants. Histopathological examination proves useful in differentiating actinomycetoma from eumycetoma.

In cases of Madura foot, biopsy material stained with Haematoxylin and Eosin shows grains or colonies with or without surrounding granulomatous reaction. Eumycotic colonies are frequently surrounded by fibrotic tissue [7,12]. A Gram stain is of considerable value in distinguishing between actinomycetoma and eumycetoma.

The granules of actinomycetoma consists of fine branching filaments, only about 1um thick are gram positive, whereas the grains of eumycetoma are gram negative [10]. Eumycotic grains are composed of 4-5µm thick septate hyphae and are demonstrated by PAS (periodic acid-Schiff) and GMS (Gomori methenamine silver) stains [13].

Confirmation of diagnosis and exact identification of the species requires culture. Malt extract, Sabouraud's and Glucose nutrient agars are the commonest types of media used in cultures of Mycetoma organisms. The culture technique is practically difficult and time consuming with chances of false negative [4, 14].

The common sero-diagnostic techniques in use are counter-immuno-pheresis and ELISA. These tests are tedious, need purified antigens and hence it is time consuming with cross reactivity between the different organisms commonly occurring [1,15].

Molecular detection and identification of the causative organism is important to understand the disease aetiology, and epidemiology. A specific PCR tests is not readily available at all centers [12]. Thus histology along with special stain has a beneficial role and remains the only option in culture negative cases. Imaging studies are useful in defining the extent of disease [7].

The main differential diagnosis in patients presenting with chronic discharging sinuses in extremities include are chronic bacterial osteomyelitis, tuberculosis, deep fungal infections like blastomycosis, coccidiodomycosis and also leishmaniasis, yaws and syphilis should be considered. Other differential diagnosis of mycetoma includes Kaposi's sarcoma, malignant melanoma, Thorn and Foreign body granuloma [7,14,16].

Differentiation between actinomycetoma and eumycetoma is important because of the different responses to treatment. Surgery is indicated in mycetoma for small localized lesions, resistance to medical treatment or for better response to medical treatment in patients with massive disease. The surgical options range from wide local and debulking excisions to amputations. Surgical debridement, followed by appropriate combination of antibiotic therapy Amikacin Sulfate and Co-trimoxazole for several months is required for actinomycetoma, where as Many other drugs such as Amoxicillin-Clavulanic Acid, Rifampicin, dapsone, Sulphonamides, Gentamicin, and Kanamycin were tried as a second line of treatment for actinomycetoma in patients with resistant cases or who developed serious drug side effects [14].

Eumycetomas are only partially responsive to anti-fungal therapy but can be managed by Surgery in combination with azole groups (Ketoconazole/ Itraconazole) for the duration of nine to twelve months treatment is the recommended .Amputation is indicated in advanced mycetoma with severe secondary bacterial infections not responding to medical treatment, emphasizing the importance of early and definite diagnosis [1,5,14,16].

4. Conclusion

Though Eumycetoma of knee is a rare site, it should always be considered in differential diagnosis of knee swelling with discharging sinuses containing black granules. The morbidity caused by mycetoma is massive and enormous resulting into deformities, septicemia and recurrences which subsequently necessitate amputation of the affected site. So, increased awareness and emphasis on correct diagnosis after clinical assessment and histological study with use of special stain is required.

References

[1]. Fahal AH. Mycetoma: A thorn in the flesh. *Trans R Soc Trop Med Hyg.*, 2004; 98(1): 3- 11.

[2]. Jadhav D. S, Paul A. U, Baste B. D, Valand A. G. The Madura Foot: A case of eumycotic mycetoma on histopathology. *Trop J Path Micro* 2017; 3(3):309-312.

[3]. Van de Sande WW, de Kat J, Coppens J, Ahmed AO, Fahal A, Verbrugh H *et al*.; Melanin biosynthesis in *Madurella mycetomatis* and its effect on susceptibility to itraconazole and ketoconazole. *Microbes Infect.* 2007; 9(9): 114-123.

[4]. Mohammad N, Arif C, Ruksana P, Rokon U, Abdur R, Moydul H; The Madura foot - A Case Report. *N Dermatol Online*, 2011; 2(2): 70-73.

[5]. Alam K, Maheshwari V, Bhargava S, Jain A, Fatima U, Haq EU; Histological diagnosis of Madura foot (Mycetoma): a must for definitive treatment. *J Glob Infect Dis*., 2009; 1(1): 64- 67.

[6]. Iffat H, Abid K. Mycetoma Revisited. *N Dermatol Online*, 2011; 2(3): 147-150.

[7]. Magana M. Mycetoma. *Int J Dermatol*., 1984; 23(4): 221-236.

[8]. Negroni R, Lopez Daneri G, Arechavala A, Bianchi MH, Robles AM; Clinical and microbiological study of mycetomas at the Muniz Hospital of Buenos Aires between 1989 and 2004. *Rev Argent Microbiol*., 2006; 38(1): 13-18.

[9]. Barnetson R, Milne LT. Mycetoma (review). *Br J Dermatol* 1978; 99:227-30.

[10]. Pilsczek FH, Augenbraun M; Mycetoma fungal infection: Multiple organisms as colonizers or pathogens. *Rev Soc Bras Med Trop.*, 2004; 40(4): 463-465.

[11]. Mahgoub ES. Mycetoma. *Semin Dermatol* 1978; 99:227-31.

[12]. Chufal SS, Thapliyal NC, Gupta MK; An approach to histology based diagnosis and treatment of Madura foot. *J Infect Dev Ctries*, 2012; 6(9): 684-688.

[13]. Taraklakshmi VV, Pankoyalakshmi VV, Arumugani S, Subramanian S; Mycetoma caused by *Madurella mycetomii* in Madras. *Aust J Dermatol.*, 1978; 19(3): 125-129.

[14]. Ahmed Hassan Fahal; Mycetoma. *Khartoum Medical Journal*, 2011; 4(1): 514 – 523.

[15]. Ahmed AO, van Leeuwen W, Fahal A, van de Sande W, Verbrugh H, van Belkum A. Mycetoma caused by *Madurella mycetomatis*: a neglected infectious burden. *Lancet Infect Dis*. 2004; 4:566- 74.

[16]. Fahal AH, Mycetoma: Clinico-pathological Monograph, University of Khartoum Press. 2006, pp 23-30.