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Mycetoma-A Review Study

Dr. Sathyavathy K[1*], Dr. Kiran Madhusudhan[2], Dr. Chithralekha Saikumar[3]
[1]Post Graduate Microbiology, Microbiology, Sree Balaji Medical College and Hospital, Bharath University, New Agaram Road, Selaiyur, Chennai, Tamil Nadu, India
[2]Professor of Microbiology, Microbiology, Sree Balaji Medical College and Hospital, Bharath University, New Agaram Road, Selaiyur, Chennai, Tamil Nadu, India
[3]Professor and HOD Of Microbiology, Sree Balaji Medical College and Hospital, Bharath University, New Agaram Road, Selaiyur, Chennai, Tamil Nadu, India

Review Article

***Corresponding author**
Dr. Sathyavathy K

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Abstract: Mycetoma is a localized chronic, suppurative, and deforming granulomatous infection seen in tropical and subtropical areas. It is a disorder of subcutaneous tissue, skin and bones, mainly of feet, characterized by a triad of localized swelling, underlying sinus tracts, and production of grains or granules. This review article is focussed on pathophysiology, epidemiology, clinical features, diagnosis and treatment with preventive measures.
Keywords: Mycetoma, subcutaneous infection, bacterial, fungal disease, fatal.

INTRODUCTION

Mycetoma is a chronic, granulomatous, progressive, destructive, inflammatory disease usually involving subcutaneous tissue, fascia and bones most probably through post traumatic inoculation of the causative organism. Mycetoma may be caused by fungi or by bacteria classified as eumycetoma and actinomycetoma respectively [1-3]. A large variety of microorganisms from various species are capable of producing Mycetoma [4]. The triad of painless subcutaneous mass, multiple sinuses and sero-purulent discharge containing grains is pathognomic of Mycetoma. It may spread to involve the skin and the deep structures resulting in destruction, deformity and loss of function. Mycetoma commonly produces various disabilities and deformities and in many cases it is difficult to treat and can be fatal [3, 5].

PATHOPHYSIOLOGY

The body parts affected most commonly in persons with mycetoma include the foot or lower leg, with infection of the dorsal aspect of the forefoot being typical site.

The hand is the next most common site affected. However, mycetoma lesions can occur anywhere on the body.

Actinomycetes such as the following can cause mycetoma,

- Nocardia species
- Actinomadura madurae
- Actinomadura pelletieri
- Streptomyces somaliensis

ROUTE OF INFECTION

The causative organism enters through sites of local trauma (eg, cut on the hand, thorn or foot splinter). Contaminated soil and splintered thorns are the hidden culprit of this infections. A neutrophilic response initially occurs, which may be followed by a granulomatous reaction. Spread occurs through skin-facial planes and can involve the bone. Hematogenous or lymphatic spread is Human-to-human or animal-to-human transmission has not been described for Eumycetoma, but nosocomial transmission of Nocardia farcinica, one of the agents of Actinomycetoma in postoperative surgical site infections has been reported.

EPIDEMIOLOGY

Mycetoma is most common in persons aged 2 0-50 years, with a mean of 34years and male preponderance is more in ratio than females. It is endemic in tropical and subtropical areas mainly forest, savannah, Somalia, India, venezula, Mexico, Senegal, Columbia. The geographical distribution of causative organism depends on the environmental basis.

INCUBATION PERIOD

The incubation period is unknown. Disease symptoms present months to years after traumatic inoculation depending on the inoculums size, strain virulence, and the host immune response. Reporting of Mycetoma is not mandatory worldwide as incidence is unknown.

CLINICAL PRESENTATION

Mycetoma presents as a painless, slowly progressive, subcutaneous swelling commonly at the site of previous trauma. Mycetoma is a painless swelling which is the main silent feature of it. The swelling is usually soft, lobulated, firm and is often mobile. Multiple secondary nodules may occur. They may suppurate and drain through sinus tracts. Each sinus tracts close and adjacent opens respectively. They are connected with each other, with deep seated abscesses and with the skin surface. The discharge may be serous or serosanguinous or purulent. During the active phase of the disease the sinuses discharge grains, the colour of which depends on the causative organism. The grains can be black, yellow, white or red and they are of variable size and consistency. As the Mycetoma granuloma increases in size the skin over it becomes attached and stretched. The skin may become smooth and shiny. Areas of hypo or hyper-pigmentation may develop. It may be due to sympathetic over-stimulation or increased local temperature due to increased arterial blood flow caused by the chronic inflammation [6-9]. Mycetoma eventually invades the deep structures. This is usually gradual and delayed in Eumycetoma while in Actinomycetoma, it is extensive and earlier. The absence of the trophic changes is due to adequate blood supply in the mycetoma area [3, 6, 8, 9]. In the majority of patients, the regional lymphnodes are small and shotty. An enlarged regional lymphnodes is even common. Anaemia may be seen in late mycetoma.

SITES OF MYCETOMA

The most common site being the dorsum of the foot 70% followed by palmar surface hands 15% and less frequently knees, arms, head, neck and perineum. Rare site is facial bones, testes, mandible, paranasal sinuses, abdominal walls and eyes [1-3, 9].

DIFFERENTIAL DIAGNOSIS

The differential diagnosis of mycetoma includes soft tissue tumours such as lipoma, fibroma, fibrolipoma, sarcomas, and malignant melanoma, as well as chronic osteomyelitis. Further considerations include tuberculosis, Kaposi sarcoma, and other subcutaneous mycoses such as sporotrichosis and chromoblastomycosis [10, 11]. It may be wise to state that, in Mycetoma endemic areas, any subcutaneous swelling must be considered as mycetoma until proved otherwise [1, 2, 6, 7].

DIAGNOSIS

X-ray imaging shows dense shadow over affected site due to soft tissue granuloma, calcification, bone scalloping and variable amount of periosteal reaction. Periosteal new bone spicules are laid down at cortex to create sun ray appearance and codman triangle. In later cases, punched out cavities are formed through out the bones. In case of eumycetoma, cavities are larger in size, few in numbers and well defined margins, But in Actinomycetoma, cavities are small, more in number with not well defined. Chemotheraphy gives improvement by remoulding, absorption of sclerotic bones and normal trabecular pattern formation.

Ultrasonic imaging is the safest technique to diagnose the mycetoma grains, capsules and inflammatory granules. The size and the extend of the lesion is well appreciated and helpful for surgical incision and procedures.

MRI is done to evaluate any bony destruction, soft tissue involvement and periosteal reaction. The “dot-in-circle sign” is the characteristic feature of presence of grains and it may be confused with osteomyelitis, soft tissue tumour and tuberculosis of bone.

HISTOPATHALOGY is a time consuming method but accuracy should be maintained by proper collection of biopsy samples under aseptic and local anaesthetic procedure. The biopsy should be sufficient and grains (granules) to be included. Microscopic identification by haematoxylin and Eosin staining and immune-fluorescent antibody technique is applied to detect host tissue reaction against organisms.

FINE NEEDLE ASPIRATION CYTOLOGY

Being simple, rapid, sensitive and patient tolerant is mainly used to differentiate eumycetoma and actinomycetoma. Culture media used for the growth are malt extract, sabouraud and glucose nutrient agar. Even serodiagnosis like ELISA is applicable.

MANAGEMENT OF MYCETOMA

The gold standard method is of combined medical and surgical treatment depending on the site and extent of the disease. Till date, only amputation and mutilating surgical excision is practiced. Medical treatment for Actinomycetoma is Amikacin sulphate 15mg/kg twice daily for three weeks and Cotrimoxazole 1.5mg/kg twice daily five weeks. Cycles varying between five to ten till recovery. Second line drugs can be administrated if first line fails to respond drugs like Sulphonamides, Kanamycin, Rifampicin etc., can be given but with many side effects. Some are serious as Stephen Johnson syndrome. Drugs for Eumycetoma vary from the above were ketoconazole 400-800 mg/day is used but is

contraindicated during pregnancy and lactation with even more serious side effects and Itraconazole 200mg/day. These drugs has very less curative effect and only helps to localise the site of disease by increasing the size and thickness of the lesion for surgical procedure.

SURGICAL TREATMENT

With all the investigation in hand and by examining the size of the lesion, surgery is proposed. Amputation is preferred in case of failure in medical treatment as a lifesaving procedure. Recurrence may occur in case of spread of lesion during surgery. Regular follow up is must to detect if any recurrence has evolved post operatively.

CONCLUSION

Mycetoma being a fatal disease no patients are spared without proper treatment. The morbidity caused by this disease is enormous. Proper health care facilities, especially in subtropical and tropical region and people with low socio- economic status working in farms to be enlightened with health education.

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