

# Role of Surgery in the Management of Mycetoma Foot

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**Abstract:** *Background:* Mycetoma is a chronic suppurative granulomatous infection of skin, subcutaneous tissue and bones caused by filamentous fungi or bacteria. It is classified into two broad categories, Eumycetoma and Actinomycetoma based on the etiological agent. Eumycetoma is caused by true fungi and actinomycetoma is caused by higher filamentous bacteria. The affected area will become edematous, hyperpigmented and once the bone is involved it will lead to deformity. Most commonly foot is involved but actinomycetoma can occur in cervicothoracic region, abdominal wall and perineum. The classic clinical trial of mycetoma is painless soft tissue swelling, draining sinus and extrusion of grains. Imaging like 1. X ray and 2. MRI is useful to know the involvement of bone and to know the extent of the disease. *Methods:* Prospective clinical study analysis of outcome of 30 patients with fungal infection of foot were evaluated on basis of their surgical management. *Results:* Patients with mycetoma foot in the given period whose diagnoses were confirmed with histopathological and microbiological examination were recruited. *Conclusion:* Mycetoma foot is a rare chronic infection which can lead to permanent deformity and needs high index of clinical suspicion for early diagnosis.

**Keywords:** mycetoma, fungal infection, foot, surgical management, early diagnosis

## 1. Introduction

Mycetoma is a chronic suppurative granulomatous infection of skin, subcutaneous tissue and bones caused by filamentous fungi or bacteria. It is classified into two broad categories, Eumycetoma and Actinomycetoma based on the etiological agent. Eumycetoma is caused by true fungi and actinomycetoma is caused by higher filamentous bacteria. This condition is seen most commonly in men and in agricultural workers who have a tendency to walk bare feet and exposed to soil. The traumatic inoculation of these organism into the subcutaneous tissue will lead to this disease. Following inoculation, there is a nonspecific inflammatory initial response which later becomes more organized and cellular. At an early phase it forms a nodule, abscess or induration which can rupture into fascial planes resulting in deep penetration of disease or it can rupture externally forming sinuses which discharge granules. The affected area will become edematous, hyperpigmented and once the bone is involved it will lead to deformity. Most commonly foot is involved but actinomycetoma can occur in cervicothoracic region, abdominal wall and perineum. The classic clinical trial of mycetoma is painless soft tissue swelling, draining sinus and extrusion of grains. Imaging like 1. X ray and 2. MRI is useful to know the involvement of bone and to know the extent of the disease.

Deep surgical biopsies under aseptic conditions are needed to obtain tissue and grains for histopathological and microbiological confirmation. Surgery is an integral component in the diagnosis and treatment of mycetoma. Surgical options include wide incision biopsy, excision of nodule, debridement or amputation. As medical therapy plays a major role, indications of surgery are limited which include biopsy for diagnosis, debridement for extensive infections which has failed medical therapy or with secondary bacterial infections, amputation for secondary

bacterial infection with sepsis or extensive bone involvement. Response to medical treatment is defined as clinically disappearance of the swelling or nodules, healing of sinuses, skin changes returned to normal, absence of grains in needle aspirates and radiological improvement consists of absorption of the sclerotic bone and reappearance of the normal trabecular pattern as well as bone density.

## 2. Materials and Methods

A retrospective study conducted in department of general surgery in mahatma Gandhi medical college and hospital. The study period was from march 2022 to march 2023. Patients who were diagnosed to have mycetoma foot and managed in our general surgery department in the given study period were recruited. 30 patients with mycetoma foot who underwent surgical procedures like biopsy, debridement and amputation with a confirmed tissue diagnosis of mycetoma only were included. Patients with negative culture or biopsy report for mycetoma or patients with mycetoma at different anatomical location were excluded. All the 30 patients were followed up for a minimum duration of 9 months. The data was collected from the hospitals electronic database and patient follow up was done from the outpatient charts and telephonic follow up was also performed. Demographic data, clinical presentation, imaging, histopathology and culture report, surgery performed, and medical therapy given with a follow up data for treatment response were tabulated and analyzed. The treatment response was based on clinical examination and radiological findings. The data analyzed were presence of osteomyelitis, etiological agent of mycetoma, medical therapy which includes antibiotic and antifungal based on the etiological agent, duration of medical therapy, types of surgical procedure performed and its indication.



**Figure:** Left foot swelling with multiple discharging sinuses in a patient with mycetoma foot (A) involving of plantar and medial aspect, (B) involvement of dorsal aspect

**3. Result**

Thirty patients with mycetoma foot in the given period whose diagnoses were confirmed with histopathological and microbiological examination were recruited. Out of 30 patients, 27 were male (87.5%) and 3 was female (12.5%). The mean age group of patients in the study group was 52 years. 50% of the patients were farmers by occupation and four patients had history of thorn prick in the bare foot preceding the infection. six patients were diabetic, and four patient was on immunosuppressants following renal transplant. All the 24 patients had a clinical presentation of foot swelling with discharging sinuses. Eight patients had grains noted in the discharge. The duration of symptoms varied from 2 years to 5 years. 4 patients had biopsy done at another centre and started on antifungal for mycetoma foot prior coming to authors' centre.

given period whose diagnoses were confirmed with histopathological and microbiological examination were recruited. Out of 30 patients, 27 were male (87.5%) and 3 was female (12.5%). The mean age group of patients in the study group was 52 years. 50% of the patients were farmers by occupation and four patients had history of thorn prick in the bare foot preceding the infection. six patients were diabetic, and four patient was on immunosuppressants following renal transplant. All the 24 patients had a clinical presentation of foot swelling with discharging sinuses. Eight patients had grains noted in the discharge. The duration of symptoms varied from 2 years to 5 years. 4 patients had biopsy done at another centre and started on antifungal for mycetoma foot prior coming to authors' centre. Osteomyelitis was noted in 15 patients (50%). Surgical procedures performed were 3 biopsies (37.5%), 8 debridement (37.5%) and 4 amputations (25%). 4 patients with osteomyelitis showed good response with medical therapy. two patient with osteomyelitis on medical therapy.

Imaging was performed for all patients, X ray foot for 12 patients and MRI for Thirty patients with mycetoma foot in the



**Figure:** X RAY Images – (A) before treatment (B) after treatment

Sex	No. of Patients (20)	Diabetic Patients	On Immunosuppewssant Following Renal Transplant	Foot Swelling with Sinus Discharge	Grains Noted in Discharge
Male	27	3	2	24	3
Female	3	0	0	2	1

Imaging	NO. of Patients
X RAYS	22
MRI	8

Surgical Procedure	Biopsy Perfomed in	Debridment	Amputation	Osteomyelitis with Medical Therapy
No. of Patients	9	9	6	6



**Figure:** IMAGING (A) MRI – before treatment FIG. . Osteomyelitis involvement  
(B) X RAY after medical therapy →underwent amputation

#### 4. Discussion

Mycetoma is a chronic suppurative granulomatous infection of skin, subcutaneous tissue and bones caused by traumatic inoculation of either filamentous fungi or bacteria. In present study group, we had male predominance and it was most commonly seen in farmers as described in the literature. Eumycetoma and actinomycetoma had equal distribution and all patients presented with swelling of foot and discharging sinuses which should raise high index of clinical suspicion. Bone involvement was noted in 50% of the patients as described due to the natural pathogenesis of the disease which can spread deeply into fascial planes and can involve bone. If not diagnosed early, it can lead to permanent deformity due to extensive bone involvement. All studied patients had diagnosis confirmed with histopathological and microbiological examination of tissues either following biopsy or debridement. As mentioned in literature deep tissue biopsy with grains are mandatory to confirm the diagnosis. Medical therapy was the first line of treatment in all 20 patients in present study group which is comparable with the literature. Standard medical therapy like Itraconazole for Eumycetoma and Welsh regimen for actinomycetoma showed a good response except in four patients with Eumycetoma who had failed medical treatment with disease progression and secondary bacterial infections. So, surgery is performed only for selected indications as mentioned in the literature. In present study group, surgical procedures like open incision biopsy and limited debridement were performed for tissue diagnosis and amputation was performed for failed medical therapy with progression of disease in patients with eumycetoma.

#### 5. Conclusion

Mycetoma foot is a rare chronic infection which can lead to permanent deformity and needs high index of clinical suspicion for early diagnosis. Diagnosis is confirmed by histopathological and microbiological examination. Medical therapy is the standard protocol and surgery is indicated only in few complications like secondary bacterial infections and failed medical therapy with progression of disease (most often seen with eumycetoma). Osteomyelitis is not a

contraindication for medical therapy. Radical surgery like amputation can be avoided if diagnosed early.

#### References

- [1] Mycetoma laboratory diagnosis: Review article. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5570215/>. Accessed 15 Nov 2018
- [2] Suleiman SH, Wadaella ES, Fahal AH. The Surgical Treatment of Mycetoma. *PLoS Neglected Trop Dis.* 2016 Jun 23; 10 (6).
- [3] Welsh O, Al - Abdely HM, Salinas - Carmona MC, Fahal AH. Mycetoma medical therapy. *PLoS Neglected Trop Dis.* 2014 Oct 16; 8 (10): e3218.
- [4] Bitan O, Wiener - Well Y, Segal R, Schwartz E. Mycetoma (Madura Foot) in Israel: Recent Cases and a Systematic Review of the Literature. *Am J Trop Med Hyg.* 2017 Jun; 96 (6): 1355 - 61.
- [5] The Mycetoma Knowledge Gap: Identification of Research Priorities. Available at: <https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0002667>. Accessed 24 Nov 2018.
- [6] Rao AG. Mycetoma. *Indian Dermatol Online J.* 2016 Jul; 7 (4): 353 - 5