The Mycetoma Research Center,
University of Khartoum
WHO Collaborating Center
on Mycetoma & Skin NTDs

Mycetoma Patients Care Pathway

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This patient care pathway outlines the stepwise approach to the clinical management of mycetoma, starting the management journey from referral to diagnosis to treatment and follow-up care. Given the differences in the causative organisms and disease progression between eumycetoma and actinomycetoma, this care pathway provides tailored therapeutic strategies for both types. For actinomycetoma, the primary treatment approach involves prolonged antibiotic therapy, while for eumycetoma, long-term antifungal and surgical treatment is necessary. In both cases, surgical intervention may be required to address tissue damage, with the extent of surgery depending on the disease progression.
Through this care pathway, healthcare providers are guided in making informed decisions on patient care, ensuring that management is individualised based on the severity of the disease and patient-specific factors. The ultimate goal is to optimise clinical outcomes, prevent complications, and improve patients' quality of life.

Mycetoma

Mycetoma is a chronic, progressive granulomatous infection that primarily affects the subcutaneous tissues but can extend deeper into muscles, bones, and even joints and the skin. The disease is classified into two main types based on the causative organism: eumycetoma, caused by fungi, and actinomycetoma, caused by filamentous bacteria (actinomycetes).

Clinical Presentation and Diagnosis

The infection initially manifests as a painless swelling that gradually increases in size. As the disease progresses, characteristic features develop, including:

- Localised painless swelling that can become massive over time.
- Skin draining multiple sinuses discharging purulent and seropurulent fluid.
- Grains which are encapsulated micro-organisms of various colours, sizes and consistency.

Differences Between Eumycetoma and Actinomycetoma

Eumycetoma

It is caused by several fungal species, frequently by *Madurella mycetomatis*. It typically progresses slowly and forms large, well-demarcated masses. The grains are typically black or pale, rarely yellow and can be seen in the discharge from sinus tracts. Eumycetoma is more challenging to treat, as antifungal therapy often needs to be prolonged and may still result in incomplete resolution.

Actinomycetoma

Bacterial species of genera like Nocardia, Streptomyces or Actinomadura cause it. Actinomycetoma tends to progress more rapidly than eumycetoma and is associated with extensive tissue destruction and bone involvement. However, it is generally more responsive to antibiotic therapy. The grains in actinomycetoma are smaller and often yellowish, white, or red.

Treatment Goals

Mycetoma Infection Control

The primary goal is to eliminate the causative organism through targeted antimicrobial or antifungal therapy.

Tissue Preservation

Surgical excision is often necessary to remove necrotic or infected tissues and prevent the further spread of the disease.

Restoration of Function

Rehabilitation, including physical therapy, is crucial to help patients regain function, especially in cases where deformity or disability has developed.

Prevention of Recurrence

Close monitoring during and after treatment is essential to detect any signs of recurrence and manage them promptly.

Psychological support

This is necessary to overcome mycetoma negative impacts on patients and families

Proper diagnosis of mycetoma is essential
as the therapeutic regimen depends on causative micro-organisms.

Diagnostic Confirmation

Clinical Interview

Inquire on:

The disease onset, progress, duration, sinus discharge, and grain colour.

History of local trauma, pain and family history of mycetoma.

Long-standing concomitant diseases and medication.

History of mycetoma treatment and surgery

Clinical Examination

Include:

General examination

Systemic examination

Local lesion and regional examinations

Imaging Assessment

Perform X-rays of the affected parts in two views

Lesion ultrasound examination

MRI examination to assess the extent of tissue and bone involvement.

Cytological and histopathological confirmation

Perform Fine needle aspiration with or without ultrasound guide

Tru-cut needle biopsy

Deep surgical biopsy

Microbiological and Histopathological Confirmation

Direct grains microscopy examination.

Culture of grains to isolate the causative organism.

Grains or culture isolates PCR-based molecular technique.

Treatment Protocol
Medical Management

Actinomycetoma

Actinomycetoma responds well to antibiotic therapy. The standard treatment protocol involves a combination of antibiotics to ensure effective coverage of aerobic actinomycetes and to reduce drug resistance.

First-line Treatment

Trimethoprim-Sulfamethoxazole (TMP-SMX): 8-10 mg/kg/day of trimethoprim and 40-50 mg/kg/day of sulfamethoxazole, divided into two doses. (Four tablets of 980mg daily).

Amoxicillin-Clavulanic acid 650 mg twice daily

Second-line Treatment

Consider alternative regimens if there is a poor response or advanced disease.

Amikacin sulphate 1.5 gram daily in two divided doses intramuscularly

Trimethoprim-Sulfamethoxazole (TMP-SMX): 8-10 mg/kg/day of trimethoprim and 40-50 mg/kg/day of sulfamethoxazole, divided into two doses.

It is given in the form of cycles, each one consists of;

Five weeks of Trimethoprim-Sulfamethoxazole and three weeks of Amikacin sulphate till a good response is observed.

Treatment will continue till clinical, imaging and histological cure.

Eumycetoma

Eumycetoma is more challenging to treat and requires prolonged antifungal therapy. Treatment should ideally be initiated as early as possible to prevent extensive tissue destruction.

First-line Antifungal Therapy:

Itraconazole: 400 mg/day orally, continued for 6 to 12 months or longer, depending on the response.

Or Fosravuconazole 200mg once weekly

Alternatively, Voriconazole can be used for resistant cases or intolerance to itraconazole.

Monitoring

Regular full blood count, liver function tests and drug levels, particularly for itraconazole, should be monitored every six weeks during treatment.

Renal and auditory function tests for Amikacin sulphate

Clinical and radiological assessment of lesion response should be done every six weeks.

Surgical Management

Surgical intervention is often needed in both eumycetoma and actinomycetoma, especially in cases with extensive local infection, tissue destruction, or when medical therapy alone is insufficient.

Indications for Surgery

Large, non-responding lesions.

Bone involvement.

To drain abscesses or excise non-viable tissue.

Deformity or functional impairment.

Life-saving procedure

Surgical Procedures:

Wide local surgical excisions

Repetitive debridement to remove the necrotic and infected tissue.

Amputation is indicated for severe cases where limb salvage is not possible, especially with advanced disease with massive bacterial infection and bone involvement.
Skin grafting is done after healing is completed to cover the skin defect.

Surgery should always be followed by continued antimicrobial or antifungal therapy to prevent recurrence.

Supportive Care

Wound Care

Regular dressing of open wounds and sinuses, ensuring sterile techniques to prevent secondary infections. Antiseptic dressing solutions are recommended, including normal saline, hydrogen peroxide, and povidone-iodine.

Pain Management

Analgesia with NSAIDs or opioids, depending on the severity of pain.

Physiotherapy

For rehabilitation post-surgery, especially in cases with muscle or bone involvement, to prevent disability.

Follow-Up

Patients require long-term follow-up due to the chronic nature of mycetoma and the high risk of recurrence. Follow-up should include:

Clinical Assessments: Regular examination of the lesion site to assess response to treatment or recurrence.

Radiological Monitoring: X-rays, ultrasound or MRI to assess for residual or recurrent disease.

Laboratory Monitoring: Ensure no development of drug toxicity (liver function tests, kidney function tests for long-term antibiotic or antifungal use).

Mycetoma Cure Evidence

The cure should be clinical, radiological, microbiological and histopathological.

Clinical: Mass disappearance, or massive size reduction, healing of sinuses and disappearance of discharge and grains

Imaging: Normal ultrasound examination or massive lesional size reduction. X-ray within normal.

Histopathological: no grains seen on cytological or histopathological tissue examination

Microbiological: No organism confirmed from microscopical or on culture examination.

Further Reading

Mycetoma Policies and Management Guidelines
(https://mycetoma.edu.sd/?page_id=4362)

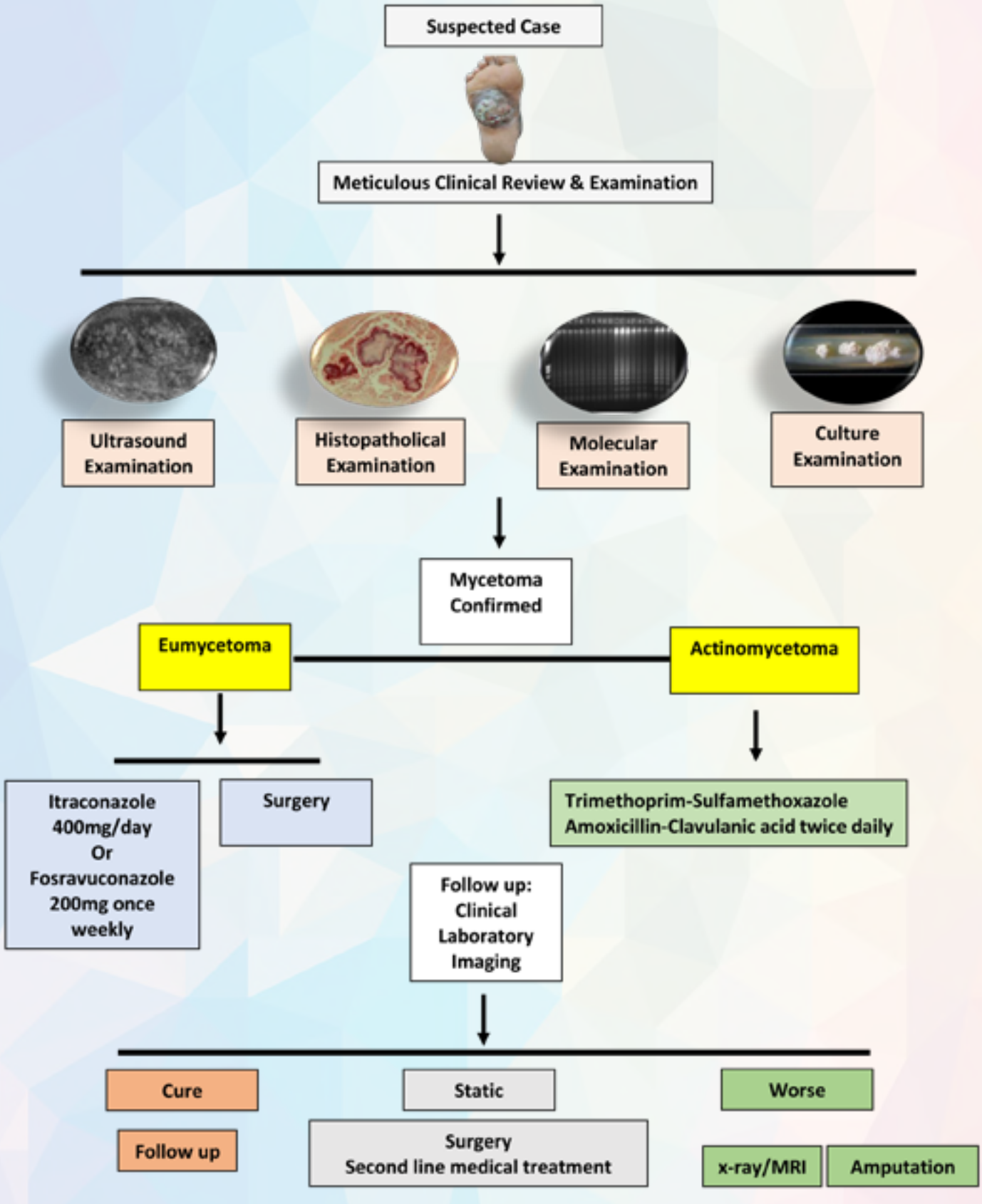
Evidence-Based Guidelines for the Management of Mycetoma Patients
(https://mycetoma.edu.sd/?page_id=4363)

The Mycetoma Nursing Guidelines
(https://mycetoma.edu.sd/?page_id=4587)

Mycetoma Good Clinical Pharmacy Practice Guidelines 2024
(https://mycetoma.edu.sd/?page_id=5072)

The Mycetoma Good Clinical Practice Guide
(https://mycetoma.edu.sd/?page_id=%205789)

The Mycetoma Patient Care Pathway Flowchart



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