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Non-tuberculous cutaneous mycobacterial infections

by Brooks David Kimmis, MD

Organism	Clinical features	Histopathology	Laboratory evaluation	Treatment	Comments
M. ulcerans (Buruli Ulcer)	Firm, non-tender, mobile, subcutaneous nodule that eventually forms a painless ulcer Ulcer can expand extensively, even as much as 15 cm in diameter Often on legs Can involve nearby and underlying structures	Extensive necrosis and obliteration of nerves and vasculature Granulomas can develop during healing Ziehl-neelsen shows acid fast bacteria in clumps	PCR Culture at 32°C	Surgical excision for ulcers is treatment of choice if feasible Local heating to 40° C Hyperbaric oxygen WHO recommended antibiotic regimen: Rifampicin and clarithromycin for 8 weeks (streptomycin if clarithromycin unavailable)	Transmission mode unknown (related to exposure to river mud or water, ponds, or swamps)
M. marinum (Fish Tank Granuloma)	Single erythematous nodule or pustule at the site of inoculation which can ulcerate, form an abscess, or develop verrucous epidermal changes Can undergo sporotrichoid spread (of all atypical mycobacterial infections, M. marinum is most likely to have sporotrichoid distribution)	Nonspecific histology findings Acute or chronic inflammatory and infiltrative changes +/- granulomas Fibrinoid or caseation necrosis can occur Organisms difficult to find in immunocompetent individuals	PCR Culture at 31°C (must notify lab if suspicious for this organism, because most mycobacteria are cultured at 37°C)	Empiric treatment with clarithromycin while awaiting sensitivities For severe infection: clarithromycin + rifampin or ethambutol	Inoculation often seen resultant from a combination of trauma and **aquatic exposure** (fish tank, natural body of water, etc) Sporotrichoid spread mnemonic CAT N SPLAT • Cat scratch • Atypical mycobacteria • TB • Nocardia • Sporotrichosis • Phaeohyphomycosis or other deep fungal • Leishmaniasis • Anthrax • Tularemia

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M. kansasii	Verrucous plaques, nodules or ulcers Can have sporotrichoid spread	Similar to TB (tuberculoid granulomas)	PCR very helpful, difficult to grow on culture	IDSA guidelines for pulmonary infections (no specific cutaneous guidelines exist): Rifampicin, ethambutol, and isoniazid or macrolide for at least 12 months (in the past it was recommended 12 months after negative sputum culture)	Inoculation is usually traumatic Lung is major site of infection
Fortuitum Complex (Includes M. fortuitum, M. chelonae, M. abscessus)	Most common cutaneous pattern is multiple subcutaneous nodules on distal limbs Can show sporotrichoid distribution Less commonly: cellulitis, abscesses, papulopustules, sinus formation, ulceration	Neutrophilic microabscesses and granuloma formation +/- necrosis	Culture is very helpful (unlike other mycobacteria, these organisms grow within 7 days and can also grow on routine bacterial culture media, such as sheep blood or chocolate agar) PCR	Often resistant to anti-TB drugs Often clarithromycin-sensitive +/- excision	These organisms are grouped together due to similar clinical presentations Cutaneous infection uncommon Cutaneous infection usually results after surgeries, procedures (Botox, fillers, liposuction, others) trauma, implant placement, or tattoos
M. avium complex (Includes M. avium and M. intracellulare)	Systemic symptoms are very common (fever, night sweats, bone pain, weight loss) Papulopustules and purulent leg ulcers Can have sporotrichoid spread	Macrophages with phagocytosed bacilli Macrophages may have spindle cell transformation Can resemble lepromatous leprosy or spindle cell neoplasm	PCR Culture (skin, blood, or lymph node)	IDSA pulmonary infection guidelines recommend 3-drug regimen with macrolide (azithromycin> clarithromycin) and ethambutol. Third drug variable but may include rifampin	Most frequently seen in patients with AIDS M. avium and M. intracellulare are closely related and cause similar clinical findings Traumatic inoculation is possible, but dissemination in an **immunocompromised host** is more common

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M. haemophilum	Single blue-red, tender pustule, papule, or plaque which can form an abscess or ulcer Can also be multiple lesions, favoring skin overlying joints In children, the infection usually manifests as lymphadenitis	Suppurative and granulomatous inflammation Globi may be present similar to lepromatous leprosy	Culture (from tissue or synovial fluid) requires source of iron and temperature between 30-32°C PCR	Rifampin and clarithromycin (Resistant to many anti-TB medications other than rifampin and rifabutin) +/- Excision	Generally, is an infection of immunosuppressed individuals (more than half reported in patients with AIDS) but may also affect healthy children, or following tattooing/ acupuncture
M. scrofulaceum	Local lymphadenitis, slowly enlarging lymph nodes that ulcerate and drain with fistula formation Can be sporotrichoid in distribution	Abscess formation in lymph nodes or skin May be difficult to distinguish from Scrofuloderma Bacilli can be found within involved lymph nodes	Culture of skin, sputum, or lymph nodes	Excision of lymph node is preferred +/- Isoniazid and rifampin	Typically infects children via inhalation or ingestion Primary cutaneous disease is rare

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