



Unexpected High Prevalence of *Staphylococcus aureus* infections in patients with Mycetoma

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ABSTRACT

Mycetoma is a chronic granulomatous disease of the skin and subcutaneous tissue which sometimes involves muscle, bones, and neighboring organs. It is caused by true fungi (Eumycetoma) or filamentous bacteria (actinomycetoma). Mycetoma is associated with significant morbidity in terms of gradual enlargement and deformity of the infected site. This study was set to determine the possibility that *Staphylococcus aureus* could be contributing to the severity of mycetoma as a secondary bacterial infections. *Staphylococcus aureus* is a gram positive cocci bacterium capable of fermenting mannitol and pathogenic in the form of infections or intoxications. Infections occur when the organism gains access to damaged skin, mucosal or tissue sites. It colonizes by adhering to cells evading the host defense mechanisms and multiplies causing tissue damage. Ninety four samples were obtained from patients diagnosed with mycetoma in two regions Kisii County (34 %) and 66(%) from Garissa County. After inoculation in blood agar, MacConkey agar and Mannitol salt plates, incubation was done at 37°C for 24 hours. Gram stain and biochemical tests indicated that 52(%) of the samples were positive for *Staphylococcus aureus* while 42 forty two were negative. Our findings concluded that most mycetoma patients are susceptible to secondary bacterial infections and in particular *Staphylococcus aureus* requiring investigations and antibiotic intervention. The presence of *S. aureus* may worsen the wound making treatment difficult.

KEYWORDS

Mycetoma, *Staphylococcus aureus*, Kisii, Garissa

Introduction:

Mycetoma usually presents as a slowly progressing subcutaneous nodule which increases in size and multiple secondary nodules may evolve as well (Mitaki *et al.*, 2015). The disease mycetoma is usually painless but in some cases, patients seek medical advice because of persisting pain. The pain may be produced by bone invasion or may be due to secondary bacterial infection (Fahal, 1996). Previous trauma is commonly reported by the patients followed by a slow progressive painless subcutaneous swelling. Multiple secondary nodules may evolve within the swelling with suppurate sero-sanguinous or purulent discharge (Mhomoud, 2014). The discharge is initially sterile, but later on, may become exposed to secondary bacterial infections due to poor hygiene (Ahmed *et al.*, 1998). In the case of secondary bacterial infections, diagnosis is done through bacterial cultures. Potentially pathogenic species other than the microorganisms causing mycetoma are mostly obtained from deep within the sinus tracts (abdala *et al.*, 1998). In one study, routine follow-up visits of mycetoma patients documented co-infections with *S. aureus* infection (Fahal, 2011). Eumycetoma is usually treated by antifungal agents but it is assumed that the therapeutic efficiency of these agents is complicated by the co-existence of *Staphylococcus aureus* co-infection in the sinuses. (Mhmoud *et al.*, 2014). The study was carried out to determine the significance of secondary bacterial infections in mycetoma infections.

Materials & Methods

This prospective study was carried out between January 2014-February 2015 in two hospitals namely; Kisii teaching & Referral Hospital in Western Kenya and Garissa level five hospital in Northern Kenya. The two sites represents two differ-

ent climatic regions. Ninety four patients clinically diagnosed with either eumycetoma or actinomycetoma were recruited after obtaining informed consent.

The patients were grouped into two i.e those with actinomycetoma (n=34) and those diagnosed with eumycetoma (n=60). Samples were obtained using a sterile cotton swabs inserted aseptically into the infection site to collect pus or discharge from sinus tracts. Consequently the swabs were directly inoculated onto MacConkey agar, blood agar and Mannitol salt agar plates and incubated at 37°C for 24 hours. Identification was done using Gram staining and coagulase tests.

Results & Discussion

The table below shows the specimen obtained from the two study sites with respective diagnosis and is the summary of the results in numbers and percentage of the total sample size.

Gender	Male	56/94(59.6%)
	Female	38/94(40.4%)
Age bracket	<18	0
	18-40	61/94(64.9%)
	41-60	29/94(30.9%)
	>60	4/94(4.3%)
Site	Kisii	39/94(41.5%)
	Garissa	55/94(58.5%)
Diagnosis	Eumycetoma	34/94(36.2%)
	Actinomycetoma	60/94(63.8%)
Staphylococcus Infection	Positive:	Garrissa 47/52(90.4%) Kisii 5/52(9.6%)
	52/94(55.3%)	
	Negative:	Garrissa 13/42(30.9%) Kisii 29/42(69.9%)
	42/94(44.7%)	

Fifty two (54%) out of ninety six isolates yielded *Staphylococcus aureus*. It was also established that those patients diagnosed with eumycetoma yielded forty seven of the *S. aureus* positive isolates while those with actinomycetoma were five.

Mycetoma remains a neglected disease (Chandler *et al.*, 1997) and the role of secondary bacteria infections and drug resistance not clear. This is possibly due to little attention from both the patients and the clinicians including public health authorities as the disease was only recently listed by the World Health Organization (WHO) as a neglected tropical disease (NTD) Prompted by a meeting held in Geneva on February 1, 2013, in which experts on the disease from around the world met to identify the key research priorities needed to combat the disease. (Wendy *et al.*, 2014)

Late presentation to health facilities especially in the remote locale of Garissa and the poor compliance to hospital visit schedule could be a factor in complicated cases. For example, some patients may present themselves after intolerable pain or bad odour from the wound and upon receiving medication disappeared only to reappear when the condition deteriorate due to neglecting routine clinic visits (Van de Sande, 2013)

Conclusion and recommendations: The study highlights the importance of addressing secondary bacterial infections in the routine management of mycetoma. Further research activities in the area should focus on the immune status of the patients, length of treatment and prognosis.

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