Mycetoma

Mycetoma is a common health problem, endemic in many tropical and subtropical regions characterised by devastating deformities, disability and high morbidity. It is a debilitating disease, which progresses relatively silently. It has serious negative medical and socio-economic impacts on patients, families, communities and health authorities. Yet, it enjoys meagre attention across the globe and that culminated in massive knowledge gaps in various aspects of mycetoma.

Mycetoma is a chronic granulomatous subcutaneous inflammatory disease caused by true fungi (eumycetoma) and certain bacteria (actinomycetoma). It affects the poorest in poor populations in the poor and most remote areas. Typically, young adult male farmers, laborers and students between 15 and 30 years old of low socio-economic status are affected most.

To date, its true incidence and prevalence are not well characterised, however a prevalence of 14.5 per 1,000 inhabitants was reported from endemic areas recently. Likewise, the disease susceptibility, resistance and the risk factors were not well studied.

Traumatic inoculation of the causative organism into the subcutaneous tissue is a popular theory. There is a clear relationship between mycetoma and individuals who walk barefoot and are manual workers. In endemic areas, the disease is common among barefoot populations who live in rural areas but no person is exempted. No animal reservoir has been shown to be involved in transmission.
The causative organisms are isolated worldwide, but most cases of mycetoma are reported from the so-called “mycetoma belt”, which includes numerous countries such as Brazil, Chad, Ethiopia, India, Mauritania, Mexico, Senegal, Somalia, Sudan, Venezuela, Yemen, and others. The most affected geographical areas are those characterized by short rainy seasons and prolonged dry seasons.

The mycetoma clinical presentation is almost identical irrespective of the causal organism, and it is characterized by a triad of painless subcutaneous mass, multiple sinuses and discharge containing visible grains. Mycetoma usually spreads contiguously to involve the skin, deep structures and bone resulting in destruction, disfigurement and loss of function, which may be fatal. Mycetoma commonly involves the extremities, back and gluteal region but no part is immune. The patients’ late presentation is the norm and that is due to the mycetoma painless nature, the patients’ low socio-economic status, lack of health education and scarcity of medical facilities in remote area where the disease is endemic.

The diagnosis of the causative organisms is based on their identification on histopathological sections from surgical biopsies or cytological smears and the classical grains culture. Other useful molecular techniques such as DNA sequencing and
serological techniques are in use. For the disease extension, various imaging techniques such as radiology, ultrasound, MRC and CT scan can be used. However, most of the available mycetoma diagnostic tests and techniques are invasive, expensive, of low specificity and sensitivity, and not available in mycetoma endemic regions and patients need to travel to provincial hospitals for that.

It is still challenging and hard to treat patients with mycetoma in particularly eumycetoma. In order to treat eumycetoma both extensive and destructive surgery and mutilating amputation, which a social stigma in developing countries, and prolonged antifungal treatment are necessary. The available antifungals proved to be ineffective and have serious side effects. The currently available antifungals are ketoconazole and itraconazole. Recently, FDA and European Medicine Agent have restricted the use of ketoconazole due to its serious toxicity. Treatment with itraconazole, which is not curative, lasts more than two years, at a cost of approximately 5000 USD per year, which make it expensive for patients and health authorities in endemic areas. For actinomycetoma a prolong course, mean of 18 months, of combined antibiotics is mandatory with a cost of 2000 USD per year.

In general, the treatment outcome is disappointing, characterized by low cure rate (25%-35%) and high amputation (15%), high patients follow up dropout (55%) and high recurrence rates (27.5%). Many mycetoma patients due to the suboptimal management and expensive medicines and diagnostic tests, embark on traditional and alternative treatment that commonly induce massive complications. Hence, there is an urgent need for new medicines agents that are safe, effective and appropriate for use in rural settings.
There is no control or prevention or measurements programmes for mycetoma are available worldwide and that is due to knowledge gaps in its susceptibility, resistance and infection routine, hence, there is a pressing need for global epidemiological study to bridge that and to design such programmes and measurements.

The disease burden is substantial, in developing countries, the diagnosis and treatment of one patient may amount to 10000 USD per year with massive working days loss for the patient, the accompanying family member and for the community in general. Mycetoma is an important cause for education attrition. The disease due to its devasting complications is considered a social stigma in particularly among the young and females.

Mycetoma is not a notifiable disease and no surveillance systems exist. Preventing infection is difficult, but people living in or travelling to endemic areas should be advised not to walk barefoot, as wearing shoes and clothing can protect against puncture wounds.
The research and development, community advocacy and health education programmes for mycetoma are limited, there are just a handful of organisations involved in the treatment of the disease, and even fewer are trying to find a cure. Hence, there is an urgent need for more awareness and advocacy on mycetoma, to develop research and development programmes, to produce more effective, efficient medicines of short duration with less side effects and affordable by patients and health authorities in endemic areas. Likewise, there is need for simple, safe, affordable field friendly diagnostic tests of good specificity and sensitivity. Global epidemiological study is a necessity to develop a cost-effective public health strategy for the control of mycetoma however, that will require significant investment in research and development programme for prevention, diagnosis, treatment and case management. However, mobilizing necessary resources will be challenging.

Mycetoma has been officially included in the special group of the Neglected Tropical Diseases list of the WHO in 2013. However, it is not in the WHO priority list of neglected diseases yet.