The Expanding Repertoire of Non Tuberculous Mycobacterial Infections: Focus on Rapidly Growing Mycobacteria Bloodstream Infections

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Non tuberculous mycobacteria (NTM) were discovered soon after M. tuberculosis. and include species other than M. tuberculosis complex and M. leprae. Today, more than 150 species of NTM have been described and these mycobacteria are known to cause opportunistic infections in humans. These mycobacteria are different from other bacteria. Ubiquitous in the environment, various species exhibit differences in growth rates, pigmentation and antimicrobial susceptibility. The lung is by far the most frequent target of the slowly growing mycobacterial NTM infections; the disease may be as severe as tuberculosis but even more problematic to treat. In countries where M. tuberculosis (MTB) overshadows NTM, the exact magnitude and prevalence of NTM is difficult to predict. Due to the protean and overlapping manifestations with tuberculosis, systematic reporting of NTM is not done and notification is not compulsory. Furthermore, in resource limited settings, laboratory infrastructure is limited and culture sometimes does not even form a routine part of diagnosing even tuberculosis. These acid fast bacilli are difficult to distinguish from MTB on either by Ziehl Neelsen smears or biopsy. Even when culture for MTB is performed, most laboratories usually only identify MTB and do not pursue accurate identification and species identification of NTM as the priority in TB endemic countries is invariably focussed only on tuberculosis. These acid fast bacilli are difficult to distinguish from MTB on either by Ziehl Neelsen smears or biopsy. Even when culture for MTB is performed, most laboratories usually only identify MTB and do not pursue accurate identification and species identification of NTM as the priority in TB endemic countries is invariably focussed only on tuberculosis. Liquid blood culture methods are useful in diagnosing these infections not only in HIV infected patients, and transplant patients but also in individuals who are apparently normal immunologically. Molecular based methods as multiplex PCRs, DNA probes and sequencing are rapid and make identification of NTMs less ambiguous than the phenotypic tests.

In India, over the past decade, an increasingly important group of NTM infections affecting skin and soft tissue are ascribed to the rapidly growing mycobacteria (RGM). Unlike the slow growing mycobacteria, these RGM grow within 7 days on agar plates. Additionally, the ability to form a protective biofilm layer is an important attribute in their survival in the environment and particularly in aquatic habitats as water distribution systems and tap water. Nosocomial infections with these RGM are becoming an increasing problem in healthcare. About 20 species of rapidly growing mycobacteria are capable of infecting humans. The clinical disease spectrum caused by the most common clinically relevant rapidly growing mycobacteria (M. fortuitum, M. chelonae and M. abscessus) varies. They usually cause infection primarily by direct inoculation, including primary skin and soft tissue infections, surgical wound infections, and catheter-related sepsis. Differences in species’ susceptibility patterns and inherent resistance to the first line anti tuberculous drugs pose a huge therapeutic challenge. Also, among physicians, awareness and standardised criteria to define and treat RGM is somewhat lacking. Unfortunately these infections are often managed either with the first line anti tubercular drugs or these drugs are added to the specific RGM regime creating toxicity and needless drug interactions that compromise their efficacy. The majority of M. fortuitum respiratory isolates are
found in individuals with other underlying pulmonary diseases, such as bronchiectasis, and represent colonisation or transient infection.

RGM infections are an important issue that warrant special mention especially in laparoscopic surgeries, herniorrhaphies with mesh repair, cosmetic surgery, arthroscopies, etc. Surgical source control and debridement / removal is often required for successful management. In this issue of the Journal, two key articles bear testimony to the diverse nature of infections caused by these essentially low virulence organisms that have serious consequences when they seed the blood stream. The article entitled “Intravascular stent related endocarditis due to rapidly growing mycobacteria: a new problem in the developing world” by R Soman et al describes a new and infrequently recognised form of RGM infection in the form of intravascular infections that occured weeks to months post percutaneous transluminal coronary angioplasty or renal artery stenting. The index procedures were performed in various cities / towns across the State and patients were then subsequently referred to the author for assessment of low grade fever, anaemia etc. As removal of the stent and thus source control was apparently not a viable option, these indolent infections in the blood stream took on a new “avatar” with ominous and invariably fatal consequences. Clearly related to substandard infection control practices, these RGMs survive the inadequate disinfecting procedures that reused cardiac catheters and balloons are subjected to after the initial tap water rinse. India offers modern and state of the art medical treatment, but quality healthcare comes at daunting costs to patients who pay out of pocket. Reuse of expensive single use devices in developing countries is mired in controversy. The proponents for this practice maintain that in order to offer health care at affordable costs, reuse is unavoidable. Skill and technical expertise in performing procedures is the prime focus in the medical community, yet at the same time, scant attention is sometimes paid to sterilisation of these devices. The “high level disinfection” that is performed by soaking the catheters in disinfectants is not acceptable for these critical vascular devices as they traverse the vascular endothelium. These microorganisms are notoriously resistant to standard disinfectants as chlorine, organomercurials and alkaline glutaraldehydes. Ideally, reuse of single use devices is not advised. If justified for whatever reasons, serious life threatening blood stream infections with these disinfectant resistant organisms are just waiting to happen, without stringent guidelines in place on how to actually sterilise these critical disposable devices, at the very least.

The second case report is entitled “Fatal disseminated Mycobacterium chelonae infection in an immunocompromised host – a unique presentation.” In this case, there did not appear to have been any breach in infection control practices, but lack of host defence factors due to systemic lupus erythematosus and its immuno suppressive management seemed to have played a pivotal role in the dismal outcome. Both these articles present contemporary and different perspectives in the pathogenesis, diagnosis, management and outcome of infections with these rapidly growing mycobacteria - the new challenge we have to confront.

References