

Multiplex PCR-based detection of *Mycobacterium tuberculosis* and *Mycobacterium avium* in a single host: One coloniser or dual infection?

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DESCRIPTION

A 65-year-old male, chronic smoker with chronic obstructive pulmonary disease on steroids, presented to the emergency services with decreased urine output and altered sensorium for a day. However, soon after admission, the patient sustained cardio-respiratory arrest and died. On autopsy, the lungs were heavy and consolidated with randomly distributed miliary nodules of 0.2–0.5 cm on the pleural and the cut surface of the lung parenchyma (figure 1). Perihilar, paratracheal and subcarinal lymph nodes were enlarged with caseous necrosis. Microscopically, these were composed of aggregates of macrophages along with neutrophilic



Figure 1 Gross photograph of lung showing miliary nodules measuring 0.3 to 0.5 cm all over the cut surface of lung parenchyma.

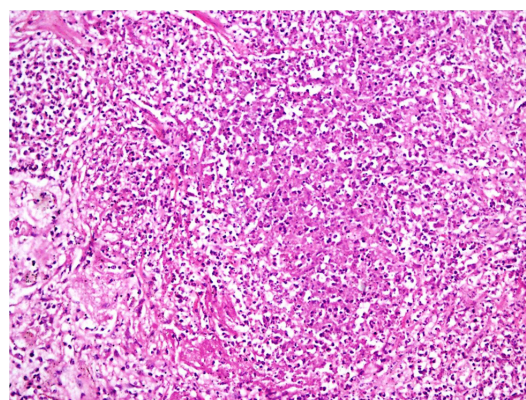


Figure 2 Microscopically, the nodules were composed of aggregates of macrophages along with neutrophilic infiltrates and nuclear debris. No well-formed epithelioid granulomas were seen.

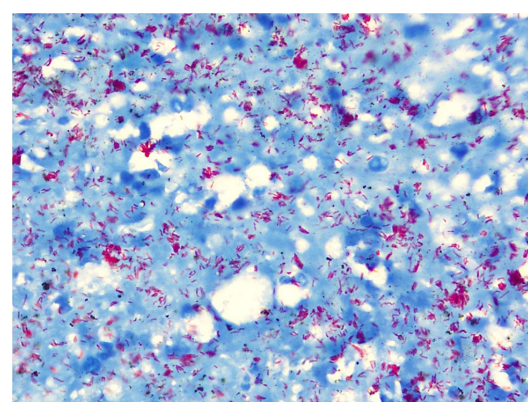


Figure 3 Numerous intracellular aggregates of acid-fast bacilli in the macrophages (ZN stain, ×1000).

infiltrates and nuclear debris (figure 2). No well-formed epithelioid cell granulomas were seen. Ziehl Neelsen stain showed numerous intracellular aggregates of acid-fast bacilli in the macrophages (figure 3). Based on histopathological features of macrophage-rich infiltrate with intracellular AFB, atypical mycobacterial infection was suspected. Multiplex PCR was performed by using IS6110 primers specific for *Mycobacterium tuberculosis* complex and dt6 primers specific for *M. avium* as described previously. The expected band size using the primers specific for *M. tuberculosis* and *M. avium* were 123 bp and 187 bp, respectively. DNA extracted from tissue samples of both lung and lymph node was positive for both *M. tuberculosis* and *M. avium* (figure 4).

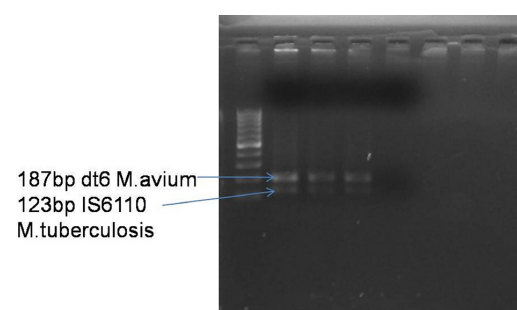


Figure 4 Multiplex PCR showing specific bands for both *Mycobacterium tuberculosis* (123 bp) and *M. avium* (187 bp). L1, 100 bp mm; L2, positive control; L3, DNA from lung; L4, DNA from lymph node; L5, negative control.



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Images in...

Identification of both *M. tuberculosis* and *M. avium* in the same host is less quoted in literature,¹⁻³ and the exact prevalence is not known, as most of these cases are treated as drug-resistant cases of tuberculosis. Debate exists regarding the significance of isolation of *M. avium complex* (MAC) from respiratory specimens, as these are ubiquitous organisms colonising the respiratory tract and are also common laboratory contaminants.³ Yet, the decisions to treat the coexistent MAC may rest on the physician, taking into account the patient's underlying predisposing condition/immune status and responsiveness to conventional antituberculosis (TB) therapy. In an immunocompromised patient setting with failure of response to anti-TB therapy,

identifying both the organisms may warrant a trial of treatment for the associated pathogen. Though treatment naive, the index case has strong histomorphological features suggesting MAC infection along with an underlying structural lung disease and a history of intake of steroids, which would possibly indicate that *M. avium* would rather be a coexisting offending agent and not just a coloniser.

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Learning points

- Clinical and histomorphological suspicion along with confirmation by ancillary techniques like PCR is required to diagnose non-tuberculous mycobacteria (NTM) coexisting with *M. tuberculosis* infections. This would help in the diagnosis of coinfections due to NTM, especially *M. avium* and would contribute to less mortality and morbidity through appropriate treatment modalities as improvement with anti-TB drugs alone may not be seen in such patients.
- Treatment of the coexisting NTM, shall be a clinical decision based on the patients pre-existing condition, immune status, histomorphological/cytomorphological clues and response to conventional anti-TB regimen.

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