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

Praveen Sharma,¹ Amanjit Bal,¹ Kusum Sharma,² Ashish Bhalla³

¹Histopathology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

²Medical Microbiology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

³Internal Medicine, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Correspondence to

Dr Amanjit Bal,
docaman5@hotmail.com

Accepted 6 May 2017

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.

To cite: Sharma P, Bal A, Sharma K, et al. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2016-218372

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.

Contributors Conception and design, acquisition of data or analysis and interpretation of data: PS, AB and KS. Drafting the article or revising it critically for important intellectual content: ABa and ABh. Final approval of the version published: ABa. We agree to be accountable for the article and to ensure that all questions regarding the accuracy or integrity of the article are investigated and resolved.

Competing interests None declared.

Patient consent Obtained from guardian.

Provenance and peer review Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

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.

REFERENCES

- 1 Ganesan S, Thirlwall A, Brewis C, *et al*. Dual infection with atypical mycobacteria and *Mycobacterium tuberculosis* causing cervical lymphadenopathy in a child. *J Laryngol Otol* 2000;114:649–51.
- 2 Sharma K, Mewara A, Gupta N, *et al*. Multiplex PCR in diagnosis of *M. tuberculosis* and *M. avium* co-infection from lymph node in an AIDS patient. *Indian J Med Microbiol* 2015;33(Suppl):151–3.
- 3 Damian JB, Coelho-D'Costa VE, Iqbal J, *et al*. A case of *Mycobacterium tuberculosis* (MTB) and *Mycobacterium avium*-complex (MAC) co-infection in an immunocompetent host: a pathogen and a colonizer or two pathogens in the same host? *Chest* 2004;126:985Sb–1–985Sb–2.

Copyright 2017 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow