

Case Report

## Molecular evidence of *Legionella pneumophila* associated lower respiratory tract infection in a COVID-19 suspected patient in Sri Lanka - A Case Report

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### Abstract

*Legionella pneumophila* is commonly found in aquatic environments. *L. pneumophila* is a causative agent of severe community acquired pneumonia and the infection is acquired through inhalation of aerosols containing the bacteria. In Sri Lanka, serologically confirmed cases of *L. pneumophila* infection in patients have been reported. However, there are no published reports on legionellosis in humans with evidence of polymerase chain reaction (PCR) based molecular confirmation in Sri Lanka. We report a PCR confirmed case of *L. pneumophila* associated lower respiratory tract infection in a 16-year-old monk who presented to a District General Hospital in the Central Province of Sri Lanka during the COVID-19 pandemic.

**Keywords:** *Legionella pneumophila*, Lower respiratory tract infection, COVID-19, real time PCR, Sri Lanka

### Introduction

*Legionella pneumophila* was first identified in 1976 in the USA in an outbreak of acute pneumonia. More than 50 *Legionella* species have been identified, 24 of which are associated with human disease.<sup>1,2</sup> The severity of the disease varies from Pontiac fever to legionnaires disease.<sup>3</sup> Pontiac fever is a mild febrile illness and legionnaires disease is a fatal form of pneumonia.<sup>4</sup> *L. pneumophila* contains 15 serogroups, of which serogroup 1 is responsible for over 84% of cases worldwide.<sup>5</sup> *L. pneumophila* is found in both natural environments and man-made water systems such as cooling towers, evaporative condensers, humidifiers, decorative fountains and shower heads.<sup>2</sup> *Legionella* infection occurs through inhalation of aerosolized bacteria by susceptible persons.<sup>6</sup>

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So far, there is no molecular evidence of *L. pneumophila* associated respiratory illness or pneumonia reported in Sri Lanka. A single study on *L. pneumophila* in the environment and three studies in patients have been published in the local literature. In the latter, molecular evidence of *L. pneumophila* infection was not tested in patients. In 1993, two serologically confirmed cases of *L. pneumophila* infection were reported by Wickramasinghe.<sup>7</sup> Here we report a molecular confirmed case of *L. pneumophila* associated lower respiratory tract infection in a 16-year-old monk admitted to a Sri Lankan hospital during the COVID-19 pandemic.

## Case report

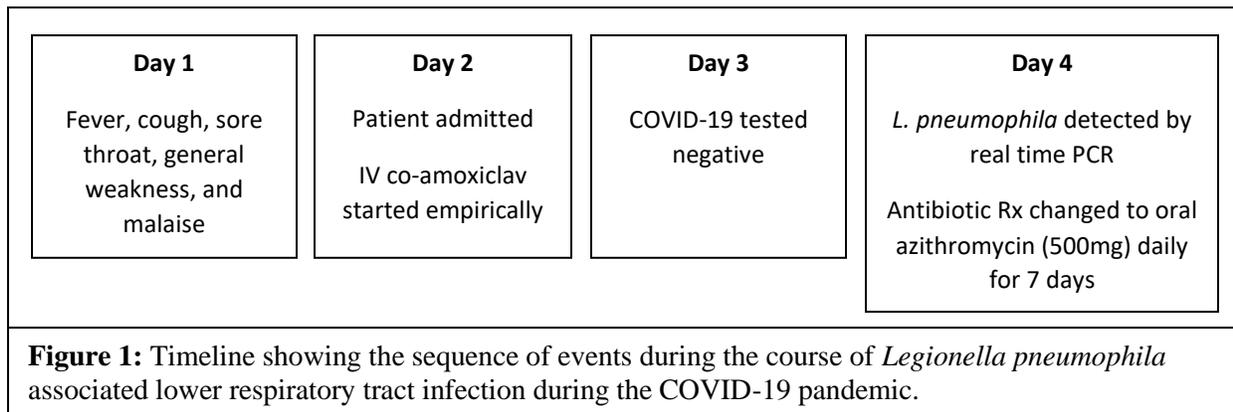
A 16-year-old monk presented to a District General Hospital in the Central Province of Sri Lanka with 2 days of fever, cough, sore throat, general weakness, and malaise. He had no significant past medical or surgical history, and he was not on any medications. He lived with four other monks in a temple situated in the Central Province for nearly two years. The monk denied associating with any sick person and also did not report recent visits to other places. On examination, he was febrile to touch, and mildly dyspnoeic. However, the oxygen saturation was maintained on air. He was not pale, plethoric, or icteric and no rashes were noted on his body. There were no enlarged cervical lymph nodes, although evidence of pharyngitis was noted on examination.

On examination, his respiratory rate was 20 breaths per minute. Lung auscultation revealed bilateral fine crepitations at the lung bases. Examination findings of other systems were unremarkable. Routine chest x-ray did not show any abnormalities. The basic haematological investigations including full blood count and biochemical investigations including serum electrolytes, serum creatinine and blood urea were within the normal range. Inflammatory markers such as C-reactive protein levels were not performed due to limited resources.

Nasopharyngeal and oropharyngeal swabs was obtained for COVID-19 PCR with a clinical suspicion of COVID-19. Nucleic acid was extracted using the QIA symphony viral nucleic acid extraction system and tested with a commercially validated PCR kit (Bioneer) at the Regional Virology Laboratory, National Hospital, Kandy. The sample had no molecular evidence of SARS-CoV-2 infection.

The nucleic acid extract was then subjected to real time PCR (Respifinder<sup>R</sup>2SMART, Catalog No: PF2600-2S (Netherlands) targeting 22 other medically significant respiratory pathogens including *L. pneumophila*. The sample was only positive for *L. pneumophila*, and no other respiratory pathogens were detected. The results were immediately made available to the relevant clinicians. On admission, intravenous co-amoxiclav was started empirically and following the detection of *L. pneumophila*, changed to oral azithromycin 500mg daily for 7 days. The patient improved with supportive care and antibiotic therapy and was discharged from hospital with unremarkable recovery (Figure 1).

Timeline of the patient's illness is shown in Figure 1.



## Discussion

The patient presented in this case report was hospitalized with symptoms and signs of lower respiratory tract infection during the COVID-19 pandemic. His respiratory specimen was therefore first tested for SARS-CoV-2 on suspicion of COVID-19. After excluding COVID-19, the nucleic acid extract was further tested for other respiratory pathogens using the RespifinderR 2SMART PCR kit and the test was positive for *L. pneumophila*.

Although the patient had fever, cough, and sore throat in addition to bilateral fine crepitations at the lung bases, detection of *L. pneumophila* in this patient was an incidental finding. He had no clinical, biochemical, or radiological evidence of pneumonia. He had a mild *L. pneumophila* infection and recovered completely with supportive care and antibiotic therapy. Detection of *L. pneumophila* and starting azithromycin could have prevented disease progression to severe lower respiratory tract infection.

This is the first molecular confirmation of a case of *L. pneumophila* infection by real time PCR in Sri Lanka. There are four previous studies on *L. pneumophila* in Sri Lanka, only one of which confirmed the presence of *L. pneumophila* in two patients serologically.<sup>7</sup> A study done by Wahala *et al* in 2000 isolated *L. pneumophila* in water samples taken from cooling towers.<sup>1</sup> In 2016, Dissanayake *et al* studied the aetiology of community acquired pneumonia in a tertiary care hospital in the Central Province. *L. pneumophila* was not identified in their study population.<sup>8</sup> A study done by Kottahachchi *et al* in the Western Province of Sri Lanka also did not identify *L. pneumophila* in a sample of patients with atypical pneumonia.<sup>9</sup>

According to the results of these studies *L. pneumophila* has been reported from the environment and humans. Since the first serologically confirmed case of *L. pneumophila* infection in 1993, no positive cases have been detected in the past three decades. As PCR based genomic detection methods are more sensitive, laboratory investigations using such methods need to be carried out to exclude *L. pneumophila* infection in community acquired respiratory tract infections in Sri Lanka. Testing for *L. pneumophila* in diagnostic respiratory screening in high risk groups with co-morbidities like diabetes mellitus will be helpful for clinicians in further management of patients with respiratory tract infections.

During the pandemic, laboratory diagnosis for other respiratory infections was not performed due to the high suspicion of COVID-19 in symptomatic patients and exhaustion of human resources. Moreover, laboratory reagents and consumables for testing for different respiratory pathogens were also not widely available. However, we have been testing for the infective aetiology in a sample of symptomatic patients with respiratory symptoms who were COVID-19 negative during the pandemic. *L. pneumophila* infection was identified in one patient who responded to the antibiotic therapy with a complete recovery. Hence it is important to identify the aetiology to manage patients appropriately as we may be dealing with a treatable infection.

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Laboratory Analysis: SA;  
Collection of data: TT, CH, RM;  
Literature Search: SA, TT;  
Conceptualization: RM, FN;  
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