

A Case of Comorbidity of Complicated Infective Endocarditis and Severe Pneumonia Due to *Legionella Pneumophila*

Running Title: *Legionella Pneumophila* Pneumonia

Nazmi Gultekin¹, Emine Kucukates², Ilker Inan Balkan³ and Ismail Haberal⁴

1. Department of Cardiology, Istanbul University-Cerrahpasa Cardiology Institute, Istanbul 34096, Turkey

2. Laboratory of Clinical Microbiology, Istanbul University-Cerrahpasa Cardiology Institute, Istanbul 34096, Turkey

3. Department of Infectious Diseases, Istanbul University-Cerrahpasa Cerrahpasa Medical Faculty, Istanbul 34096, Turkey

4. Department of Cardiovascular Surgery, Istanbul University-Cerrahpasa Cardiology Institute, Istanbul 34096, Turkey

Abstract: *Legionella pneumophila* infection can cause Legionnaires' disease, a severe form of pneumonia. Extrapulmonary manifestations of *Legionella* infections include myocarditis, pericarditis, and endocarditis. We present a rare case of pneumonia caused by *Legionella pneumophila* with a possible etiologic link to a recently recovered culture-negative infective endocarditis.

Key words: Legionellosis, infective endocarditis, *Legionella pneumophila*.

1. Introduction

Legionella pneumophila was firstly recognized as the causative agent of Legionellosis after its isolation from patients in an outbreak of fatal pneumonia (Legionnaires' disease) at an American Legion Conference in Philadelphia in 1976. It is often categorized as being a community, travel, and hospital-acquired based on the type of exposure. *L. pneumophila* are aerobic Gram-negative, motile, rod-shaped bacteria. *L. pneumophila* and other members of the genus are found within biofilms and fresh and industrial water systems worldwide [1-3]. We present firstly the case of pneumonia caused by *L. pneumophila* with a possible etiologic link to a recently recovered culture-negative infective endocarditis.

2. Materials and Methods

A 53-year-old male patient that often travels abroad

was admitted to our unit with high fever, excessive sweating, weakness, edema, ascites, orthopnea, hepatomegaly, venous fullness, and crepitant rales up to the middle zones in both hemithorax. He has been under follow up with diabetes mellitus and ascending aorta dilatation for three years in our clinic. He underwent coronary angiography at another center. In TTE and TEE examination, in the mitral valve, vegetation that adhering to both leaflets was observed that it was 2.5 x 2 cm in the amorphous structure, but not clear in diameter that enters and exits into the left ventricle. It had caused the third degree of mitral regurgitation (Fig. 1). Blood cultures were obtained in endocarditis protocol and remained negative for a seven-day incubation period. Also, sputum cultures were examined and did not grow. He was accepted as infective endocarditis and treated empirically with vancomycin, ceftriaxone, gentamicin in combination. Routine therapy was given for heart failure. He was unresponsive to anti-bacterial treatment. Consequently, he underwent surgery for mitral valve replacement,

Corresponding author: Emine Kucukates, Dr, Assoc. Prof., research field: clinical microbiology.

tricuspid annuloplasty, and aortic valvuloplasty due to refractory fever and heart failure (Fig. 2A). Blood cultures were repeated and extirpated mitral valve with operation sent microbiological examination. Both of them microorganisms did not grow. We could not detect the agent of infective endocarditis. On the postoperative 12th day, the patient who had shortness

of breath was revised and the hematoma was evacuated. After 10 days, the pleural effusion of him was drained with pleurocan device. The patient's complaints persisted and fixation of persistent opacity was detected on the chest X-ray and thorax CT was performed on the PA chest X-ray appearance (Figure. 2B).

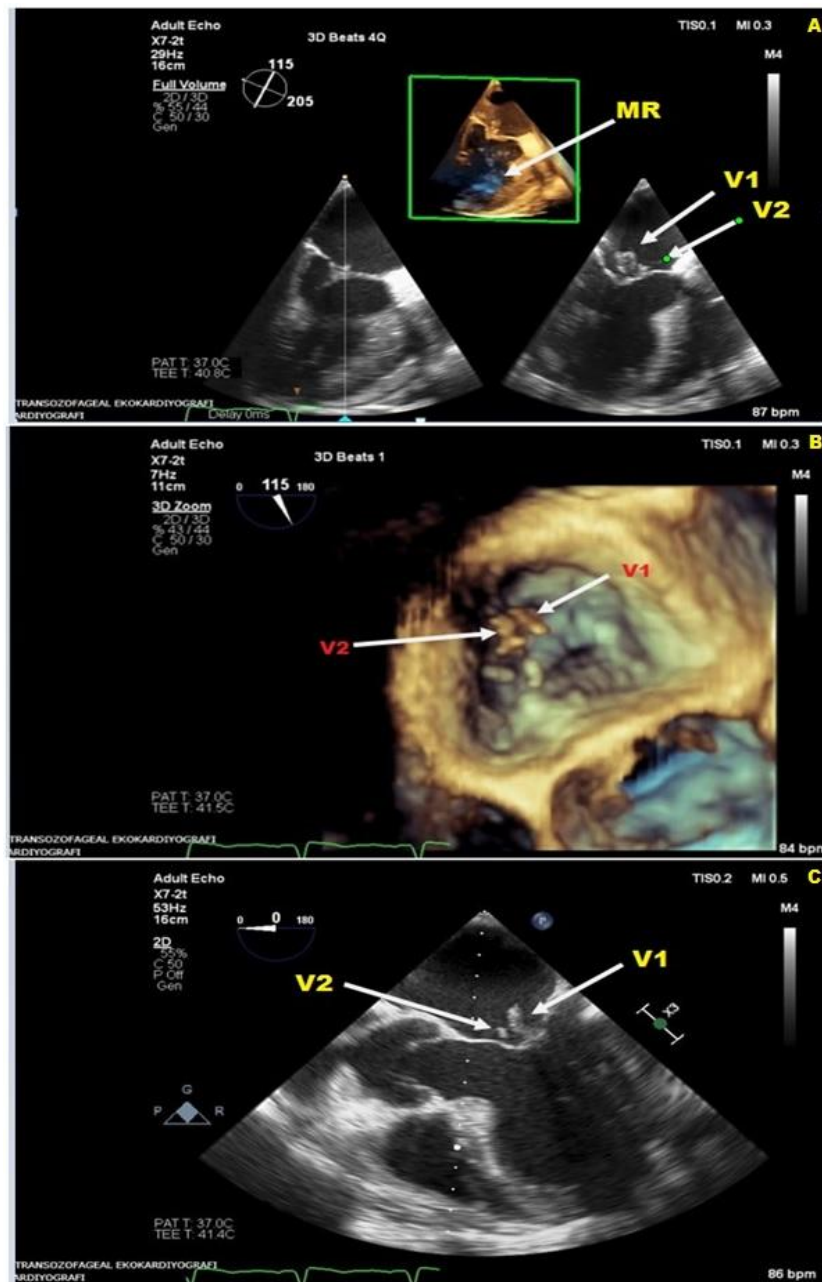


Fig. 1 A: Transesophageal Echocardiography (TEE), and 3-Dimensional echocardiographic (3-D) examination. A mobile vegetation with an amorphous structure of 2.5 x 2 cm on diameter in the mitral valve was observed adhering to both leaflets (MR: mitral regurgitation; V1 arrow depicts the first leg of vegetation; V2 arrow depicts the second leg of vegetation). B: 3-D echocardiographic examination of the same vegetation. C: Subcostal view of the same vegetation in TEE.

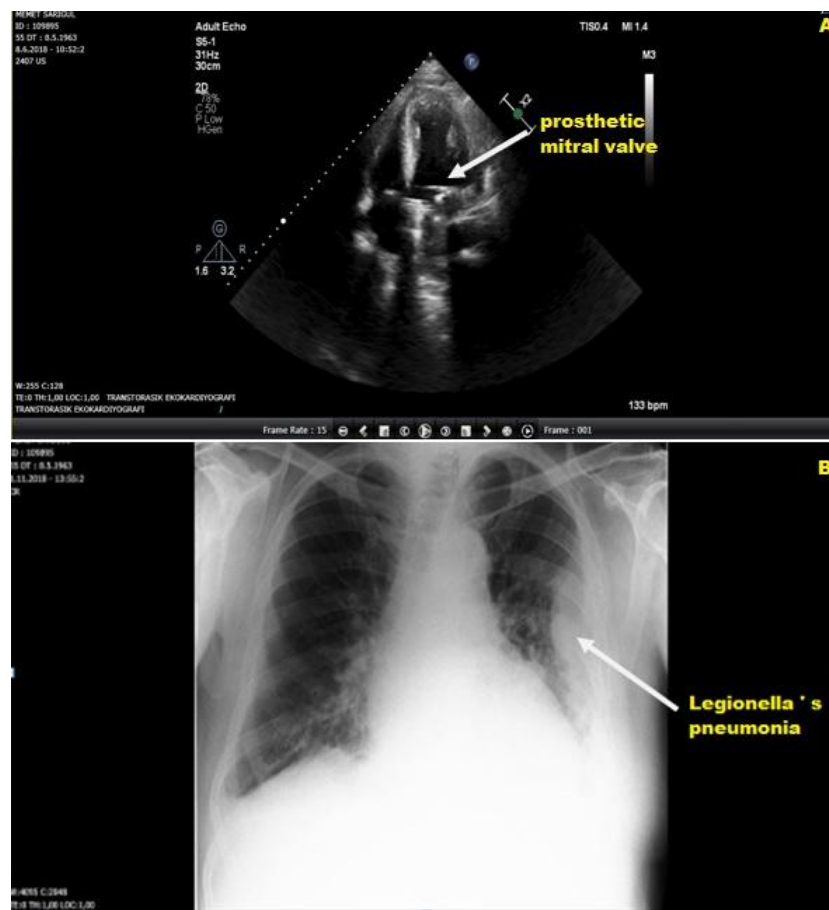


Fig. 2 A: Prosthetic mitral valve, B: Arrow depicts severe Legionella pneumonia on the chest x-ray.

Decortication was performed with Video-Assisted Thoracoscopic Surgery (VATS) operation on left pleural thickening. The patient's complaints persisted. The patient's symptoms were thought to be related to amlodipine in the form of anasarca edema and weight gain and this drug has been removed from therapy. The patient rapidly recovered and was sent home with routine treatment. Afterward, the patient applied to the department of infectious diseases with complaints such as cough, severe dyspnea, fever, cough, and side pain after the new travel abroad (Fig. 2B). He was showing a severe pneumonia symptoms. Legionella Urinary Antigen Test in the diagnosis of *Legionella pneumophila* was made and detected positive and levofloxacin + piperacillin/tazobactam was administered. Partial improvement was observed and he was discharged home with oral antibiotherapy

(Cefixime 400 mg). Currently, the patient is alive in good condition.

3. Result and Discussion

Legionella pneumophila has been increasingly recognized as a cause of community-acquired pneumonia and important public health problem worldwide. In recent years, new diagnostic tests such as urinary antigen test and polymerase chain reaction and in antibiotic therapies; third-generation fluoroquinolones, and newer macrolide for *Legionella pneumonia* have become available [1]. In the United States and Europe, *L. pneumophila* is responsible for 95% of cases of Legionnaires disease [4]. In the United States, an analysis of Legionnaires disease between 1980 and 1998 showed that an average of 20% of legionellosis cases was travel-associated [5]. The

United States Center for Disease Control and Prevention and the European Working Group for Legionella infections have identified numerous cases of travel-associated Legionnaires disease; the most commonly identified source of infection has been contaminated water in hotels [5].

Our patient travels abroad very often due to his job. He was hospitalized with endocarditis and pneumonia. We did not firstly consider *Legionella pneumonia*, although sputum cultures were negative. We started empirically antibiotherapy, and also routine therapy was given for heart failure. But, he was unresponsive to treatment and he was operated. Later, the patient applied to the infection clinic with the same complaints after his abroad travel. He recovered after diagnosing and treating *Legionella pneumonia* at the infection clinic.

Legionella pneumonia is difficult to diagnose clinically and universal broad-spectrum antibiotic therapy may not be the answer. Legionella urinary antigen test can be used to diagnose infections with *L. pneumophila* serotype 1, it is not sensitive for the diagnosis of infections caused by other Legionella species [1].

The incidence of infective endocarditis worldwide is estimated at 30/100.000 cases per year. Staphylococcus and Streptococcus species are the cause for endocarditis in about 80%, another 10% are caused by Enterococcus species and/or bacteria of the HACEK group. Negative blood cultures often result from previous antimicrobial therapy or fastidious bacteria such as *Coxiella burnetii*, *Bartonella* spp., and *Tropheryma whippeli*. Legionella species are very rarely found as infective endocarditis; only 3 patients with involvement of a native valve are mentioned in literature so far. Legionella mostly causes pneumonia by direct inhalation of contaminated aerosol. Extrapulmonary manifestations of Legionella infections include myocarditis, pericarditis, and endocarditis [6-8]. Compain et al [9] reported in a case of chronic endocarditis caused by Legionella Anisa in

the bioprosthetic aortic valve. Also, Pearce et al [10] described in native aortic valve endocarditis due to Legionella species.

Initially, we did not think that *L. pneumophila* could be the cause of pneumonia and endocarditis. Therefore, serological, culture-based, and molecular tests for *L. pneumophila* were not performed. Legionella endocarditis is extremely rare but has been reported in the literature. The patient recovered with the diagnosis and treatment *L. pneumophila* pneumonia placed at the infection clinic and his complaints remained. We do not know the cause of endocarditis and also, what is the cause of first pneumonia.

4. Conclusions

We present the first case of severe pneumonia due to *L. pneumophila* following an Episode of Complicated Infective Endocarditis.

L. pneumophila can very rarely be a cause of endocarditis and should be ruled out before defining the case as “culture-negative”. We think that this case may be a probable etiologic link to a recent episode of endocarditis, which was treated with surgical resection.

Conflict of Interest

None to declare.

References

- [1] Viasus, D., Di Yacovo, S., Garcia-Vidal, C. et al. 2013. “Community-acquired Legionella pneumophila pneumonia a single-center experience with 214 hospitalized sporadic cases over 15 years.” *Medicine* 92: 51-60.
- [2] Chien, M., Morozova, I., Shi, S. et al. 2004. “The genomic of the accidental pathogen Legionella pneumophila.” *Science* 305: 1966-8.
- [3] Wingfield, T., Rowell, S., Peel, A. et al. 2013. “Legionella pneumonia cases over a five-year period: a descriptive, retrospective study of outcomes in a UK district hospital.” *Clinical Medicine* 13: 152-9.
- [4] Whiley, H., Bentham, R. 2011. “Legionella longbeachae and legionellosis.” *Emerg Infect Dis* 17: 579-83.
- [5] Guyard, C., Low, D. E. 2011. “Legionella infections and

48 **A Case of Comorbidity of Complicated Infective Endocarditis and Severe Pneumonia Due to *Legionella Pneumophila***

travel associated legionellosis.” *Travel Med Infect Dis* 9: 176-86.

- [6] Samuel, V., Bajwa, A. A., Cury, J. D. 2011. “The first case of *Legionella pneumophila* native valve endocarditis.” *Int J Infect Dis* 15: e576-7.
- [7] Baumgartner, V., Eich, G., Chmiel, C. 2016. “*Legionella* native valve endocarditis case report and review of the literature.” *Int Arc Med* 9: 1-6.
- [8] Massey, R., Kumar, P., Pepper, J. R. 2003. “An innocent victim of a localized outbreak: legionella endocarditis.” *Heart* 89: e16.
- [9] Compain, F., Bruneval, P., Jarraud, S. et al. 2015. “Chronic endocarditis due to *Legionella Anisa*: a first case difficult to diagnose.” *New Microbe and New Infect* 8: 113-5.
- [10] Pearce, M. M., Theodoropoulos, N., Noskin, G. A. et al. 2011. “Native valve endocarditis due to a novel strain of *Legionella*.” *J Clin Microbiol* 49: 3340-2.