



## Case Report

# Native Valve *Legionella* Endocarditis with Devastating Neurological Complications

Meryim Poursheykhi<sup>1\*</sup>, Rajeel Imran<sup>1</sup>, Ashley Drews<sup>2</sup>, John Volpi<sup>1</sup>

<sup>1</sup>Houston Methodist Hospital, Department of Neurology, Houston, Texas, USA

<sup>2</sup>Houston Methodist Hospital, Department of Infectious Diseases, Houston, Texas, USA

\***Corresponding author:** Meryim Poursheykhi, Houston Methodist Hospital, Department of Neurology, Houston, 6560 Fannin St Suite # 802, Houston, Texas 77030, USA. Tel: +1-3462124986; Email: mpoursheykhi@houstonmethodist.org

**Citation:** Poursheykhi M, Imran R, Drews A, Volpi J (2020) Native Valve *Legionella* Endocarditis with Devastating Neurological Complications. Ann Case Report 14: 556. DOI: 10.29011/2574-7754/100556

**Received Date:** 22 September, 2020; **Accepted Date:** 06 October, 2020; **Published Date:** 12 October, 2020

### Abstract

*Legionella* is an uncommon cause of infective endocarditis and typically affects prosthetic and homograft valves without associated embolic phenomena. We present a rare case of native valve *Legionella* endocarditis in a healthy, immunocompetent 42-year-old woman who suffered from devastating neurological complications due to recurrent septic thromboembolism. Over the course of ten months, she had six embolic strokes resulting in significant disabilities as well as recurrent seizures and headaches. Serial Transthoracic (TTE) and Transesophageal Echocardiograms (TEE) as well as an intracardiac echocardiogram were inconclusive and blood cultures remained negative. Nine months after the initial presentation, a repeat TEE revealed a mitral valve vegetation. An elevated *Legionella pneumophila* IgG titer was found and treatment with levofloxacin led to prompt significant clinical improvement without recurrence of embolic events. Diagnosis of *Legionella* endocarditis is often delayed due to many factors including negative blood cultures and typically negative TEEs. This case report emphasizes the importance of maintaining a high clinical index of suspicion for atypical causes of culture-negative endocarditis for accurate diagnosis and successful treatment. In addition, it illuminates the importance of repeating diagnostic studies over time in complicated undiagnosed cases.

### Introduction

Septic thromboembolism is frequently seen with Infective Endocarditis (IE) and can lead to serious neurological complications including stroke, hemorrhage, intracranial aneurysm, meningoencephalitis, abscess, and seizures. *Legionella* as an etiology of native valve endocarditis is rare with only two previous cases reported in the literature, both without an associated embolic phenomenon. In this report, we present the first case of native valve *Legionella* endocarditis associated with recurrent embolic complications.

### Material and Methods

Case report and Literature Review

### Results and Discussion

A 42-year-old female nurse with supraventricular tachycardia status post ablation, Factor V Leiden (FVL) heterozygosity, migraine, thoracic astrocytoma at age two treated with radiotherapy, hyperlipidemia, and Barrett's esophagus presented with severe

headaches, left-sided homonymous hemianopia, and a brief episode of left arm numbness. Imaging revealed an acute right parieto-occipital infarct. Over the next ten months, she had five further cryptogenic embolic strokes with debilitating neurological deficits despite medical management with different antithrombotic agents. She also had recurrent seizures, headaches, chills, and night sweats without fevers. MR and CT angiography along with conventional angiogram did not reveal any intrinsic vascular abnormality. Extensive neuro-rheumatologic serological tests along with CSF analysis were unremarkable. Hypercoagulability markers were negative with the exception of known FVL heterozygosity. Elaborative cardiac workup with serial Transthoracic (TTE) and Transesophageal (TEE) echocardiograms as well as an intracardiac echocardiogram was initially inconclusive for intracardiac shunt, thrombus, or vegetation. However, nine months after her initial presentation, a repeat TEE revealed small, hypermobile, filamentous masses on the mitral valve. Blood cultures throughout her disease course remained negative. Ultimately, an elevated serum *Legionella pneumophila* IgG titer (1:512) was found

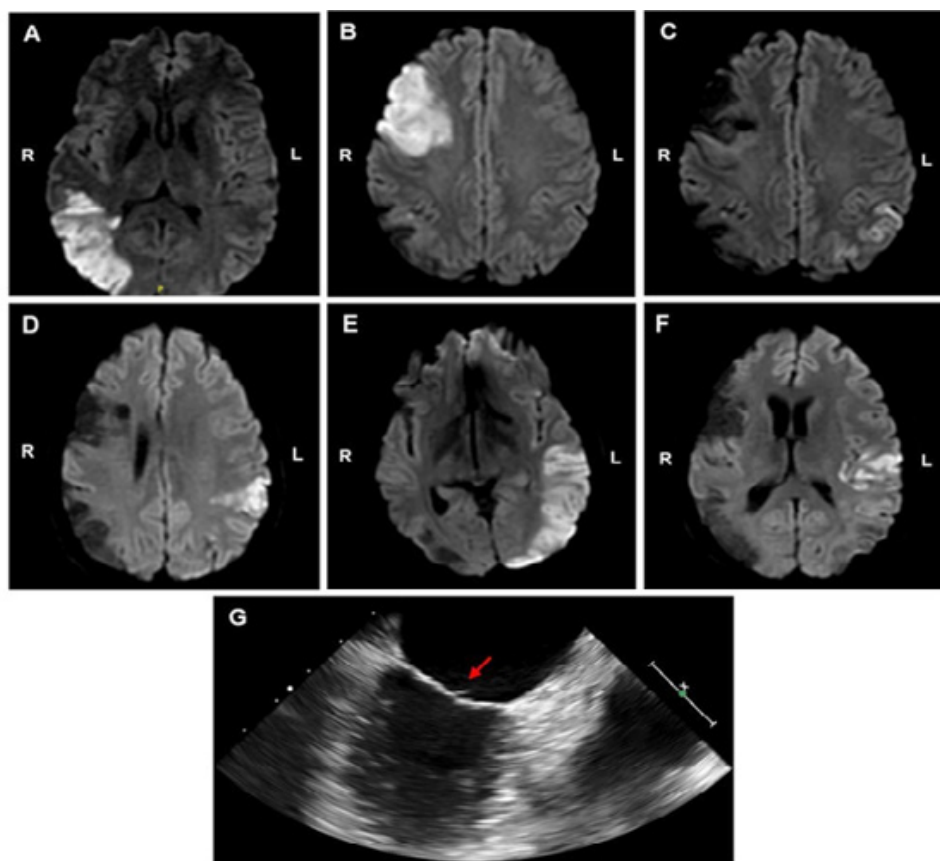
without concurrent gastrointestinal or lung disease. Treatment with levofloxacin led to prompt significant clinical improvement without recurrence of strokes, headaches, or seizures. A TEE six weeks following treatment showed reduced size of the filamentous structures and decreased *Legionella* titer (1:256).

*Legionella* are gram-negative aerobic bacilli found in natural and man-made aqueous environments that typically lead to pneumonia. Infection with *Legionella* most often results in pneumonia. *L. pneumophila* accounts for 90% of humanistic *Legionella* infections. Extrapulmonary manifestations are rare, though they can occur more frequently in immunocompromised individuals by *Legionella* species other than *L. pneumophila* [1]. These may include endocarditis, myopericarditis, meningitis, soft tissue abscesses, and septic arthritis. *Legionella*-associated IE typically affects prosthetic and homograft valves via direct inoculation with contaminated surgical equipment. To our

knowledge, there are only two case reports of native valve endocarditis secondary to *Legionella* [2,3]. *L. pneumophila* and a novel H63 strain were the causative agents reported in those cases.

Neurologic complications of septic thromboembolism occur in up to 30% of IE cases and include ischemic and hemorrhagic strokes, intracranial mycotic aneurysms, meningoencephalitis, abscess, and seizures [4]. A retrospective study revealed an increased ischemic stroke risk ranging from four months prior to diagnosis of IE up to five months after [5]. Embolic phenomena, however, have only been found associated with *Legionella* endocarditis in one immunocompromised patient with prosthetic valve endocarditis [6,7]. Our patient suffered recurrent embolic ischemic strokes in multiple vascular territories resulting in severely debilitating aphasia, dysarthria, visual impairment, paresis, and sensory deficits (Figure). Recurrent focal seizures were treated with levetiracetam. (Figure).

#### MRI demonstrating Recurrent Embolic Strokes and TEE Demonstrating Mitral Valve Vegetation.



**Figure:** (A-F) Diffusion weighted MR imaging Demonstrating six acute embolic ischemic strokes over the course of ten months. (A) Right parieto-occipital lobe infarct of right Middle Cerebral Artery (MCA). (B) Right frontal lobe infarct of right MCA. (C) Left parietal lobe infarct of left MCA. (D) Left temporoparietal lobe infarct of left MCA. (E) Left temporoparietal lobe infarct of left MCA. (F) Left insular and frontal lobe infarct of left MCA. (G) TEE Demonstrating a mitral valve vegetation (arrow). L=Left. R=Right

Diagnosis of *Legionella* endocarditis is complicated and often delayed due to many factors. As a fastidious intracellular organism, *Legionella* only grows in cultures on selective medium resulting in negative blood cultures [1]. In addition, *Legionella* endocarditis vegetations are rarely seen on echocardiography including TEEs [6]. Serology and urine antigen testing are most sensitive and specific for *L. pneumophila* [1]. Although IgG typically indicates a prior infection, the significantly elevated titer in our patient suggested an acute or more recent infection. Due to the prolonged disease course, IgM testing was not indicated. Urine antigen was negative and blood cultures sub-cultured onto buffered charcoal yeast extract agar did not yield any growth.

Extrapulmonary *Legionella* infections are typically treated with fluoroquinolones such as levofloxacin but there is no clear evidence-based treatment regimen or duration for *Legionella* endocarditis. Due to the severity of our patient's condition, we pursued a 12-week course with levofloxacin. Although anticoagulation in active IE with embolic phenomena is controversial, a multidisciplinary decision was made to continue long-term therapeutic anticoagulation initially with enoxaparin and subsequently apixaban. While the infection source in our immunocompetent patient remains unknown, we cannot exclude exposure from the preceding cardiac ablation nor a nosocomial infection given her profession as a nurse. To our knowledge, this is the first-ever reported case of native valve *Legionella pneumophila* endocarditis with devastating embolic complications. We recommend maintaining a high clinical index of suspicion for culture-negative endocarditis for accurate diagnosis and successful treatment.

## Acknowledgement

The authors thank Dr. Volpi for his mentorship.

## Financial Disclosures

Dr. Poursheykhi, Dr. Imran, Dr. Drews, and Dr. Volpi report no disclosures.

## References

1. Muder RR, Victor LY (2002) Infection Due to *Legionella* Species Other Than *L. pneumophila*. Clinical Infectious Diseases 35: 990-998.
2. Pearce MM, Theodoropoulos N, Noskin GA, Flaherty JP, Stemper ME, et al. (2011) Native valve endocarditis due to a novel strain of *Legionella*. J Clin Microbiol 49 : 3340-3342.
3. Samuel V, Bajwa AA, Cury JD (2011) First case of *Legionella pneumophila* native valve endocarditis. Int J Infect Dis 15: e576-e577.
4. Jones HR JK, Siekert RG (1989) Neurological Manifestations of Infective Endocarditis: Review of Clinical and Therapeutic Challenges. Brain 112: 1295-1315.
5. Merkler AE, Chu SY, Lerario MP, Navi BB, Kamel H (2015) Temporal relationship between infective endocarditis and stroke. Neurology 85: 512-516.
6. Brouqui P, Raoult D (2001) Endocarditis Due to Rare and Fastidious Bacteria. Clinical Microbiology Reviews 14: 177-207.
7. Fukuta Y, Yildiz-Aktas IZ, Pasculle AW, Veldkamp PJ (2012) *Legionella micdadei* prosthetic valve endocarditis complicated by brain abscess: Case report and review of the literature. Scandinavian Journal of Infectious Diseases 44: 414-418.