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## **A rare case of paradoxical left sided endocarditis through patent foramen ovale**

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## Abstract

A 36-year-old woman IV drug abuser admitted with Right-Sided Infective Endocarditis (RSIE) as demonstrated by transthoracic echocardiogram. Patient was admitted 8 weeks later with recurrence of symptoms, moreover signs of systemic embolization were noted. Transthoracic and Transesophageal Echocardiograms revealed tricuspid valve vegetation, severe tricuspid regurgitation, left atrial mass, Patent Foramen Ovale (PFO), severely dilated right atrium and prominent Chiari's network. Systemic embolization included brain and Left iliacus abscesses. Patent Foramen ovale is the proposed mechanism leading to extensive systemic embolization in the present case.

## Keywords

Endocarditis, paradoxical, Patent Foramen Ovale

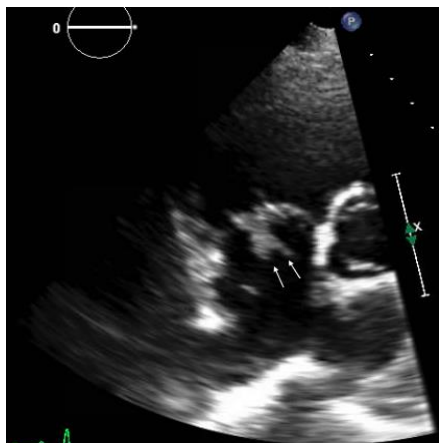
## Introduction

Right Sided Infective Endocarditis is frequently complicated by pulmonary septic emboli. Extensive systemic embolization is a rare complication of RSIE. Patent Foramen Ovale is the proposed mechanism of this complication in the present case report.

## Case presentation

A 36-year-old Caucasian female with a history of Intravenous Drug Abuse (IVDU) was admitted with chest pain, shortness of breath and generalized body aches. On examination, her heart rate was 115, blood pressure was 99/54, temperature was 98.2, and respiratory rate was 15. Also, there was a left lower sternal border grade III systolic murmur. Laboratory investigations demonstrated a white blood cell count of 14.4 (normal range 4.8-10.8 x 10<sup>9</sup>/L), Hemoglobin level of 11.1 g/dL (normal range 12.0-15.0 g/dL), platelets count of 92 (normal range 140-450 x 10<sup>9</sup>/L), and serum creatinine was 1.9 mg/dL (normal range 0.6-1.1 mg/dL). A Transthoracic Echocardiogram (TTE) revealed (Figure 1) large mobile vegetation on the tricuspid valve measuring 14x17 mm with severe tricuspid regurgitation (TR).

Figure 1: Transthoracic Echocardiogram, short axis parasternal view; demonstrating large mobile vegetation on the tricuspid valve (arrows).



Computed tomography (CT) of the chest demonstrated innumerable bilateral cavitory lesions within the lung parenchyma consistent with septic emboli. Additionally, blood cultures grew Methicillin Resistant Staph Aureus (MRSA). The patient responded to Intravenous (IV) Vancomycin one gram every twelve hours and was discharged to complete a planned outpatient course of IV antibiotics. Eight weeks later, the patient presented with similar symptoms. The patient reported relapsing to IVDU. On examination, scattered tender erythematous nodules on bilateral hands and feet were noted. Transesophageal Echocardiogram (TEE) revealed left atrial mass measuring 18mm x10 mm attached to atrial septum (Figure 2), tricuspid valve vegetation, severe TR with directed jet toward atrial septum (Figure 3), Patent Foramen Ovale (PFO), severely dilated right atrium and a prominent Chiari's network (Figure 4).

Figure 2: Transesophageal Echocardiogram demonstrating large left atrial mass (arrows).

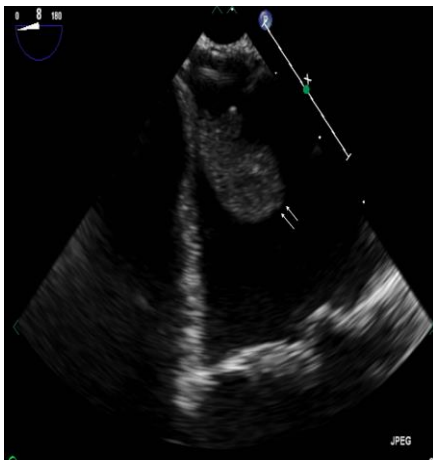


Figure 3: Transesophageal Echocardiogram demonstrating severe tricuspid regurgitation with directed jet toward interatrial septum.

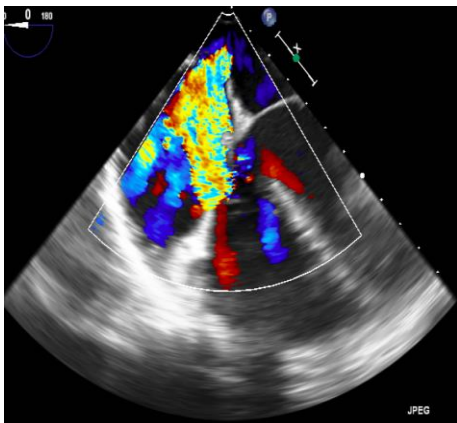
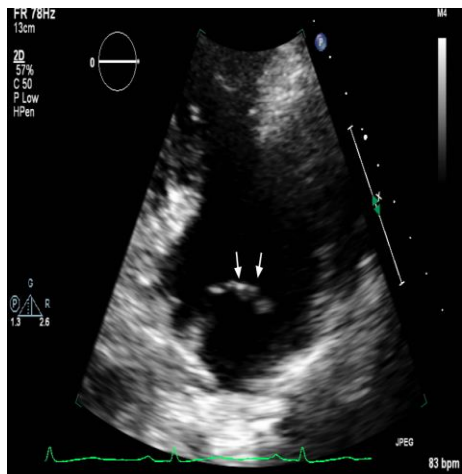
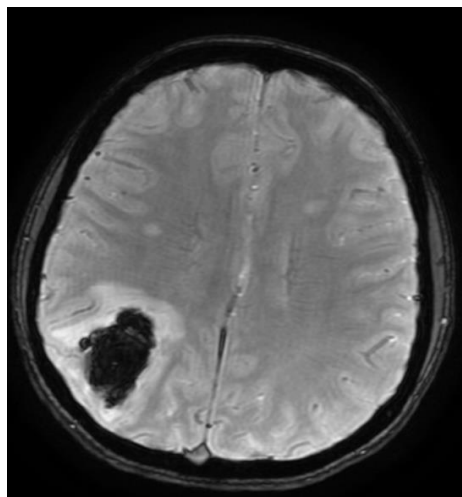


Figure 4: Transesophageal Echocardiogram demonstrating Chiari's network (arrows).



In addition, left iliacus muscle abscess measuring 35mm x 22mm was detected by CT scan of abdomen and pleviis after patient complained of persistent left hip pain. Computed Tomography guided aspiration of the left iliacus abscess was performed and culture grew MRSA. Concurrently, brain MRI showed bilateral enhancing lesions consistent with septic emboli and brain abscess (Figure 5). Patient was restarted on IV Vancomycin. TTE and TEE were repeated five weeks later, which were free from the valvular vegetation and left atrial mass.

Figure 5: Brain MRI demonstrating brain abscess



## Discussion

Right Sided Infective Endocarditis (RSIE) is commonly encountered in IVDU. A recent nationwide inpatient sample database study showed increased incidence of infective endocarditis between 2000-2011.<sup>1</sup> Pulmonary septic emboli are a frequent complication of RSIE. However, in our case, we reported a rare presentation of RSIE. In the present report, extensive systemic embolization was an additional complication due to underlying Patent Foramen Ovale (PFO). Methicillin Resistant Staph Aureus (MRSA) is the underlying pathogenic organism that is well known by its virulence. Johri et al previously reported direct extension of tricuspid valve vegetation through the PFO.<sup>2</sup> Transthoracic echocardiogram was able to directly visualize the vegetation extension through the PFO in the case presented by Johri et al. This possibility wasn't excluded in our case probably due to the timing of the echocardiogram.

Interestingly, different mechanisms by which PFO opens in the presence of tricuspid valve endocarditis have been reported.<sup>2,3,4</sup> Mechanisms include high right atrial pressure secondary to pulmonary hypertension,<sup>2</sup> right atrial dilatation with ventriculisation of right atrial pressure<sup>3</sup> and severe tricuspid regurgitation with jet direction toward atrial septum<sup>5,6</sup>. In the case described by Gans et al<sup>6</sup>, the pulmonary artery pressure was reported to be normal, which is similar to our case. Hence, severity of tricuspid regurgitation along with jet's direction toward atrial septum, and the degree of right atrial dilation are possible co-factors for reopening of the PFO in our case. Additionally, in our case, prominent Chiari's network was present. It is a congenital remnant of the right valve of the sinus venosus.<sup>7</sup> A study conducted by Schneider et al<sup>8</sup> revealed an association between Chiari's network and PFO. Moreover, significant right to left shunt and unexplained systemic embolization were noted in the Chiari's network group favoring paradoxical embolization by directing blood from inferior vena cava toward interatrial septum.

Interestingly, our case is the first describing Chiari's network and RSIE complicated systemic septic embolization. Suero et al<sup>9</sup> reported a case of solitary brain abscess with underlying isolated tricuspid endocarditis. Paradoxical embolism through a PFO was the underlying mechanism. Finally, percutaneous transcatheter mechanical vegetation debulking<sup>10</sup> has been reported before in patients with large tricuspid vegetation. Further studies need to be conducted in the future to demonstrate the applicability and efficacy of this procedure in patients with RSIE and concomitant PFO.

## Conclusion

Our case demonstrates a rare presentation of tricuspid valve endocarditis complicated by septic pulmonary emboli and extensive systemic embolization through PFO. Chiari's network illustrated in our case is an additional finding and serves as an additional possible explanation for paradoxical septic systemic embolization in RSIE. Physicians should be aware of the correlation between the right and left endocarditis in the presence of PFO. Thorough echocardiograms should be performed in RSIE.

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