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Case Report

Delayed Diagnosis of Right-Sided Infective Endocarditis with Septic Pulmonary Emboli in a Dextrocardia Patient During the COVID-19 Pandemic

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Abstract

An adolescent IDU presented with persistent fever and cough. Echocardiography revealed dextrocardia, severe tricuspid regurgitation, and vegetation on the tricuspid leaflet. CT pulmonary angiography identified multiple pulmonary infarcts, and blood cultures confirmed Staphylococcus aureus infection. The patient was diagnosed with right-sided infective endocarditis (IE) complicated by septic pulmonary emboli. She was treated with antibiotics followed by cardiac surgery. While the role of dextrocardia in IE is not well established, it significantly affects the surgical management approach. The diagnosis of right-sided IE and septic pulmonary embolism was delayed during the COVID-19 pandemic due to overlapping symptoms with respiratory infections. Early recognition and prompt investigation in high-risk patients are crucial to address this diagnostic challenge.

Keywords: right-sided infective endocarditis, septic pulmonary emboli, dextrocardia, COVID-19

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INTRODUCTION

Infective endocarditis (IE) is a cardiac disorder often missed at the first medical contact. Right-sided infective endocarditis (IE), although similar to left-sided IE, has distinct manifestations. Right-sided IE is infrequent, accounting for 5-10% of all IE cases, predominantly involving the tricuspid valve, and most commonly occurring among injecting drug users (IDUs) [1,2]. Diagnosing right-sided IE is challenging due to often unheard right-sided murmurs, the absence of peripheral stigmata of IE, and frequent misdiagnosis as respiratory tract infections. The COVID-19 pandemic further complicates diagnosis as it contributes to delays in diagnosing diseases mimicking respiratory tract infections. Delay in diagnosing right-sided IE can postpone antimicrobial therapy, potentially leading to severe complications [3].

Vegetation on the tricuspid valve can embolize to the lungs, causing septic pulmonary emboli, which manifest as pulmonary infarctions and abscesses [3]. Septic pulmonary embolism often mimics respiratory tract infection, leading to delayed diagnosis. A high index of suspicion and reliance on chest imaging are required to prevent missed diagnosis. Unlike common pulmonary embolism management, septic pulmonary embolism requires a different approach [4].

Most right-sided IE cases (70-85%) can be managed conservatively, with the remainder managed surgically. Unlike left-sided IE, which has clear surgical management guidelines, right-sided IE lacks well-defined indications for surgery [5]. Diagnosing and managing right-sided IE is particularly challenging in patients with dextrocardia, a rare congenital anomaly where the heart is positioned in the right thoracic cavity [5]. The role of isolated dextrocardia as a predisposing factor for right-sided IE among IDUs has not been investigated. The abnormal heart position complicates the surgical approach for right-sided IE [5].

We present a case of a patient with isolated dextrocardia and situs inversus who was an IDU and developed right-sided IE with septic pulmonary emboli. The challenges in diagnosing right-sided IE and its complications during the COVID-19 pandemic, as well as the management approach in a dextrocardia patient, make this case worth discussing.

CASE PRESENTATION

Patient information: A 17-year-old female presented to Hasan Sadikin General Hospital with a 10-day history of continuous fever and a productive cough. She denied symptoms of sore throat or breathlessness. The patient had a five-year history of heroin use, which she had stopped three months prior. She was homeless and had poor oral hygiene. There was no history of congenital heart disease.

Clinical findings: Physical examination revealed a temperature of 38°C, anemic conjunctiva, and dextroposition of the heart, with the point of maximal impulse palpated at the 6th intercostal space of the right midclavicle.

Heart sounds were obscured over the normal area but clear and loud on the right side of the chest, with a pansystolic murmur at the lower right sternal border and a positive Carvallo sign.

No signs of infective endocarditis, such as Janeway lesions or Osler nodes, were observed. Electrocardiography showed extreme right axis deviation with poor R-wave progression, suggesting dextrocardia (Figure 1). A chest X-ray showed dextrocardia with cardiomegaly and bilateral pulmonary infiltrates.

Figure 1: Electrocardiography presented extreme right axis deviation with poor R-wave progression suggesting dextrocardia

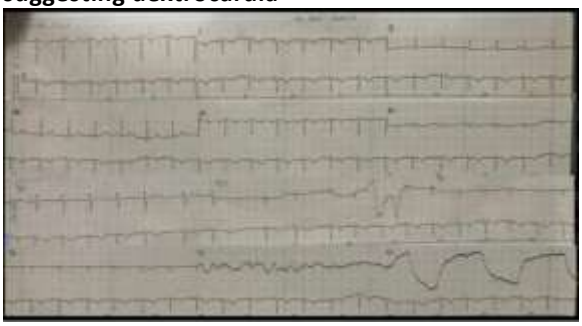
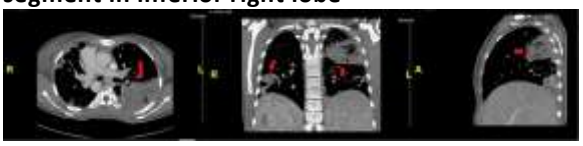


Figure 2: Transthoracic echocardiography revealed vegetation (red arrow) sized 16x10 mm at anterior tricuspid leaflet

Timeline

- **Day 1:** Patient presented with continuous fever and productive cough.
- **Day 3:** COVID-19 PCR swab obtained; patient admitted to COVID-19 isolation ward.
- **Day 14:** Consecutive X-ray showed worsened infiltrates and Hampton hump.
- **Day 17:** Laboratory results showed anemia, leukocytosis, low thrombocyte count, elevated C-reactive protein, positive blood culture for Staphylococcus aureus, and microscopic hematuria.
- **Day 18:** Transthoracic echocardiography revealed dextrocardia with situs inversus, severe tricuspid regurgitation, and vegetation on the anterior tricuspid leaflet (Figure 2). High-resolution CT scan detected pulmonary artery enlargement and multiple pulmonary infarcts (Figure 3).

Figure 3: CT Pulmonary Angiography detected pulmonary hypertension and multiple pulmonary infarcts (red arrow) at apicoposterior segment in superior left lung lobe and at basal anteromedial segment in inferior right lobe



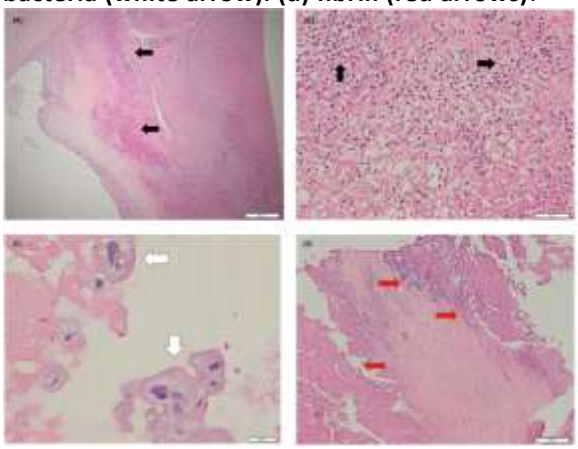
Diagnostic assessment: Initial diagnosis was community-acquired pneumonia due to suspected COVID-19. A delay in PCR results delayed further investigations. After COVID-19 was ruled out, additional examinations revealed severe tricuspid regurgitation and vegetation on the anterior tricuspid leaflet. Blood cultures were positive for Staphylococcus aureus. High-resolution CT pulmonary angiography showed multiple pulmonary infarcts, indicating septic pulmonary embolism.

Therapeutic intervention: The patient received IV Ceftriaxone 1 gram twice daily and IV Gentamicin 165 mg daily for four weeks. Blood cultures turned negative after five days of antibiotic administration, but symptoms persisted. Due to Staphylococcus aureus etiology, cardiac surgery was performed to evacuate the vegetation and repair the tricuspid valve.

The surgery revealed dextrocardia with situs inversus and vegetations on the tricuspid valve leaflets. The surgeons adjusted their position due to the mirror-image anatomy. The vegetations were evacuated, and an annuloplasty ring was implanted. Pathology of the valve showed massive inflammatory cell infiltration and bacterial colonies (Figure 4).

Follow-up and Outcomes: Post-surgery, the patient received a full course of IV Ceftriaxone 1 gram twice daily for 21 days. She was discharged in good condition and advised to join a drug rehabilitation program to prevent future reinfections.

Figure 4: Pathology examination of the excised tricuspid valve revealed (a-b) massive infiltration of inflammatory cells of lymphocytes, neutrophils and histiocytes (arrows), (c) colonies of cocci bacteria (white arrow). (d) fibrin (red arrows).



DISCUSSION

The COVID-19 pandemic has complicated the timely diagnosis of diseases mimicking respiratory tract infections, such as right-sided infective endocarditis (IE). Right-sided IE shares symptoms with respiratory infections, pericarditis, and myocarditis, making early diagnosis challenging [6]. A high index of suspicion is essential for patients with risk factors for IE, particularly IDUs presenting with persistent fever, heart murmur, septic pulmonary emboli (manifested as chest pain, dyspnea, cough, hemoptysis, and multiple pulmonary infiltrates on chest X-ray), and bacteremia [1,3]. Right-sided IE often presents with the 'tricuspid syndrome,' which includes pulmonary manifestations, anemia, and microscopic hematuria.

The diagnosis of right-sided IE relies heavily on blood cultures and imaging findings. In this case, the patient's blood culture revealed Staphylococcus aureus, the most common pathogen in right-sided IE.

Transthoracic echocardiography (TTE) showed severe tricuspid regurgitation and large vegetation on the anterior tricuspid leaflet, the primary echocardiographic finding in right-sided IE.

Right-sided IE can lead to cardiac and pulmonary complications. Initially, the patient's chest X-ray showing multiple pulmonary infiltrates was mistaken for pneumonia [7]. However, the observation of Hampton's hump—a radiographic sign of pulmonary embolism—prompted further evaluation. CT pulmonary angiography detected pulmonary hypertension and multiple pulmonary infarcts, indicating septic pulmonary embolism. Septic pulmonary embolism is diagnosed through imaging and criteria including focal or multifocal pulmonary infiltrates, an embolic source from extrapulmonary infection, unexplained lung infiltrates, and infiltrates diminishing with appropriate antimicrobial therapy [8].

The treatment of septic pulmonary embolism focuses on eradicating the causative organisms through antibiotic therapy or surgery, rather than anticoagulation, which increases the risk of bleeding [9]. In this case, the patient received IV Ceftriaxone and Gentamicin, followed by cardiac surgery to evacuate vegetation and repair the tricuspid valve. The pathological examination confirmed the presence of right-sided IE with typical features such as purulent inflammation, fibrin, and bacterial colonies [10].

Surgical management of right-sided IE is less clearly defined than for left-sided IE. However, indications for surgery in right-sided IE include infection with S. aureus, large vegetation size (>10 mm), severe tricuspid valve destruction, and complications such as septic pulmonary embolism. Surgery aims to remove vegetations and infected tissues, repair or replace damaged valves, and eliminate valve regurgitation [11]. In IDUs, surgical management should minimize the use of artificial materials to improve long-term survival. Tricuspid valve repair is preferred over replacement due to better outcomes, although bioprosthetic valves are favored over mechanical ones to avoid long-term anticoagulation [12].

Dextrocardia, a rare congenital anomaly where the heart is positioned in the right thoracic cavity, poses additional challenges in the diagnosis and treatment of cardiac diseases [13]. While the relationship between dextrocardia and IE is unclear, the abnormal heart position complicates surgical management [14]. Surgeons must adapt to the mirror-image anatomy during procedures. Despite these challenges, the surgery in this case was successful, with no residual vegetation found on follow-up.

Right-sided IE generally has a more favorable outcome than left-sided IE due to less hemodynamic consequence and systemic embolization [15,16]. However, IDU patients have lower long-term survival rates due to poor postoperative compliance, reluctance to undergo drug rehabilitation, and high recurrence rates of IE. S. aureus infections are particularly associated with worse outcomes.

CONCLUSION

This case highlights the challenges in diagnosing and managing right-sided IE with complications during the COVID-19 pandemic, especially in a patient with dextrocardia. Early recognition and appropriate management are crucial to prevent severe complications. This case underscores the importance of considering IE in IDUs presenting with respiratory symptoms and the need for tailored surgical approaches in patients with anatomical anomalies like dextrocardia.

AUTHORS' CONTRIBUTION

BBT, CPI, AS, BMD, RN, and RI: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. BBT, CPI, AS, BMD, RN, and RI: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

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REFERENCES

1. Shmueli H, Thomas F, Flint N, Setia G, Janjic A, Siegel RJ. Right-Sided Infective Endocarditis 2020: Challenges and Updates in Diagnosis and Treatment. J Am Heart Assoc. 2020;9(15):e017293.
2. Delgado V, Ajmone Marsan N, de Waha S, Bonaros N, Brida M, Burri H, et al. 2023 ESC Guidelines for the management of endocarditis. Eur Heart J. 2023;44(39):3948-4042.
3. Arthur J, Havyarimana J, Norse AB. Emergency Department Diagnosis of Septic Pulmonary Embolism due to Infectious Endocarditis Using Bedside Ultrasound. J Emerg Med. 2018;55(3):378-82.
4. Song XY, Li S, Cao J, Xu K, Huang H, Xu ZJ. Cardiac septic pulmonary embolism: A retrospective analysis of 20 cases in a Chinese population. Medicine (Baltimore). 2016;95(25):e3846.
5. Darbari A, Singh D, Patil PL, Kumar B. Emergency mitral valve replacement in dextrocardia with situs inversus totalis: Surgeon's dilemma of mirror image. Heart and Mind. 2021;5(1):19-22.
6. Akinosoglou K, Apostolakis E, Marangos M, Pasvol G. Native valve right sided infective endocarditis. Eur J Intern Med. 2013;24(6):510-9.

7. Bonow RO, Mann DL, Zipes DP, Libby P. Braunwald's heart disease e-book: A textbook of cardiovascular medicine. Elsevier Health Sciences; 2011 Feb 25.
8. Kaptein FHJ, Kroft LJM, Hammerschlag G, Ninaber MK, Bauer MP, Huisman MV, et al. Pulmonary infarction in acute pulmonary embolism. Thromb Res. 2021;202:162-9.
9. Cook RJ, Ashton RW, Aughenbaugh GL, Ryu JH. Septic pulmonary embolism: presenting features and clinical course of 14 patients. Chest. 2005;128(1):162-6.
10. Akinosoglou K, Apostolakis E, Koutsogiannis N, Leivaditis V, Gogos CA. Right-sided infective endocarditis: surgical management. Eur J Cardiothorac Surg. 2012;42(3):470-9.
11. Yanagawa B, Elbatarny M, Verma S, Hill S, Mazine A, Puskas JD, et al. Surgical Management of Tricuspid Valve Infective Endocarditis: A Systematic Review and Meta-Analysis. Ann Thorac Surg. 2018;106(3):708-14.
12. Rosai J. Rosai and Ackerman's surgical pathology e-book. Elsevier Health Sciences; 2011 Jun 20.
13. Muñoz P, Bouza E, Marín M, Alcalá L, Rodríguez Créixems M, Valerio M, et al. Heart valves should not be routinely cultured. J Clin Microbiol. 2008;46(9):2897-901.
14. Sullivan A, Shrestha P, Basnet S, Herb R, Zagorski E. A rare case of Whipple's disease with endocarditis in a patient with dextrocardia. SAGE Open Med Case Rep. 2020;8:2050313X20936952.
15. Weber C, Gassa A, Eghbalzadeh K, Merkle J, Djordjevic I, Maier J, et al. Characteristics and outcomes of patients with right-sided endocarditis undergoing cardiac surgery. Ann Cardiothorac Surg. 2019;8(6):645-53.
16. Goodman-Meza D, Weiss RE, Gamboa S, Gallegos A, Bui AAT, Goetz MB, et al. Long term surgical outcomes for infective endocarditis in people who inject drugs: a systematic review and meta-analysis. BMC Infect Dis. 2019;19(1):918.