Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Cardiology

Infectious Endocarditis of the Right Heart: Complication of Central Venous Catheter: About A Case

Youssra El Adlouni[1*], Joumana El Masrioui[1], Zakaria Wakrim[1], El Jamili Mohammed[1], El Karimi Saloua[1], Benzarouel Dounia[1], El Hattaoui Mustapha[1]

[1]Department of Cardiology, Mohammed VI University Hospital Center, Marrakech, Morocco

DOI: 10.36347/sjmcr.2022.v10i09.029 | **Received:** 09.08.2022 | **Accepted:** 04.09.2022 | **Published:** 30.09.2022

***Corresponding author:** Youssra El Adlouni
Department of Cardiology, Mohammed VI University Hospital Center, Marrakech, Morocco

Abstract **Case Report**

Endocarditis of the right heart is a rare pathology, affecting in most cases the tricuspid valve. It affects more patients with congenital heart disease, patients with central catheters or intra-cardiac foreign material, and is frequently seen in drug addicts, particularly in those with positive HIV serology or immunocompromised patients. There are few studies focusing solely on right heart endocarditis and these are mainly conducted in industrialized countries. We report in this observation the case of a 48-year-old patient diagnosed with infective endocarditis of the right heart related to a catheter superinfection in an immunocompromised environment. The interest of our work lies in the seriousness of this condition and the need for early therapeutic and preventive measures.

Keywords: Endocarditis, tricuspid valve, heart disease, immunocompromised environment.

INTRODUCTION

Right heart ARs account for 5-10% of all ARs and are the prerogative of patients with congenital heart disease, patients with intravascular devices, and I.V. drug users [2, 3] and involve in the majority of cases the tricuspid valve [1].

They are either associated with a left primary location (IE on inter-ventricular septal defect or complicated by perforation of the inter-ventricular septum), or exclusively located at the valve orifices of the right heart, tricuspid more often than pulmonary [4].

The prognosis is relatively benign compared to that of left AR [1].

Indications for surgery are not yet well defined in the RSIE population, while intra- and postoperative procedures are difficult, due to poor postoperative compliance and high relapse rate.

CASE REPORT

M.E, 48 years old, is followed for a Mycosis fungoides since 2019 at the tumor stage classified T4N1M0 put on Methotrexate for 2 years. As part of the management of her disease, extracorporeal photophoresis was indicated via a central venous catheter. The patient received a single session of photophoresis with subsequent removal of the catheter due to her infection.

She presented with stage II dyspnea, which had been evolving for one month and had become stage III of the NYHA for one week, associated with a febrile syndrome with chills, sweating and a fever of 39.5 C. The clinical examination revealed a normotensive patient at 120/70 mm Hg normocardium at 95 BPM polypneic at 22 cpm with a Sao2: 78% at AA 92% under 10l of O2 T°: 39 °C without signs of right or left heart failure without murmur at auscultation.

Simultaneous blood cultures on a venous line came back positive for methicillin-resistant Staphylococcus aureus sensitive to Vancomycin and Gentamycin.

The culture of the removed catheter allows isolating colonies of multi-sensitive Esherichia coli.

The biology shows an inflammatory syndrome (pro-calcitonin elevated to 12, CRP to 356 mg/l; WBC to 23870 with PNN predominance).

The electrocardiogram shows a regular sinus rhythm, a normal heart axis with a constant PR, fine QRS without repolarization disorders (fig1).

A transthoracic cardiac echocardiography was performed and showed a LV of preserved size and function without any notion of mitroaortic valve disease, a vegetation of 20/13 mm on the atrial side of the tricuspid valve which was modified with a moderate to moderate IT VR=22ml; SOR=20mm2; R pisa=6mm (fig 2).

Thoracic angioscanner performed as part of the extension workup showed no signs of proximal pulmonary embolism, thrombosis of the superior vena cava extended to the atrium with superior vena cava syndrome and multiple foci of condensation (fig3).

In this context, an antibiotic therapy initially probabilistic then secondarily adapted to the antibiogram of the isolated staphylococcus was instituted with vancomycin and gentamycin. The evolution was marked by a general and respiratory deterioration followed by the death of the patient.

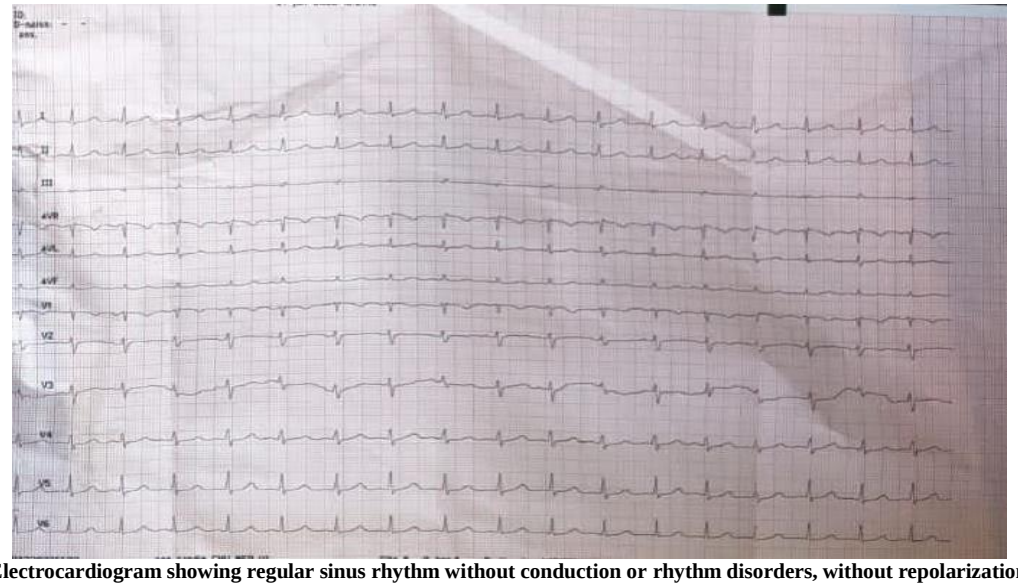

Figure 1: Electrocardiogram showing regular sinus rhythm without conduction or rhythm disorders, without repolarization disorders

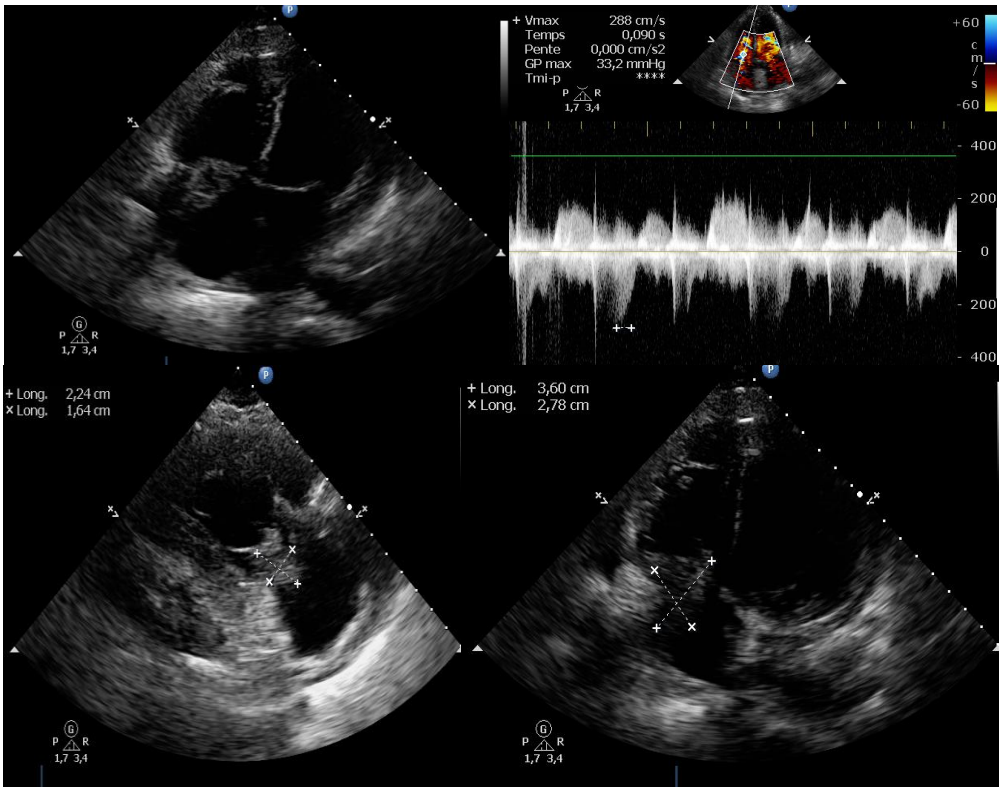

Figure 2: Echocardiography showing an image of vegetations on the atrial side of the tricuspid valve

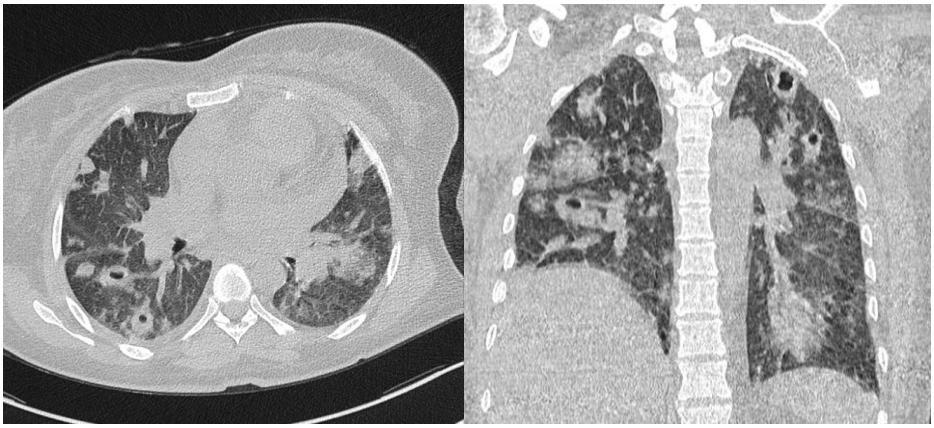

Figure 3: Parenchymal window, axial and coronal sections: multiple condensations and pulmonary nodules and micronodules at the level of the two excavated pulmonary hemifields. In relation with septic emboli

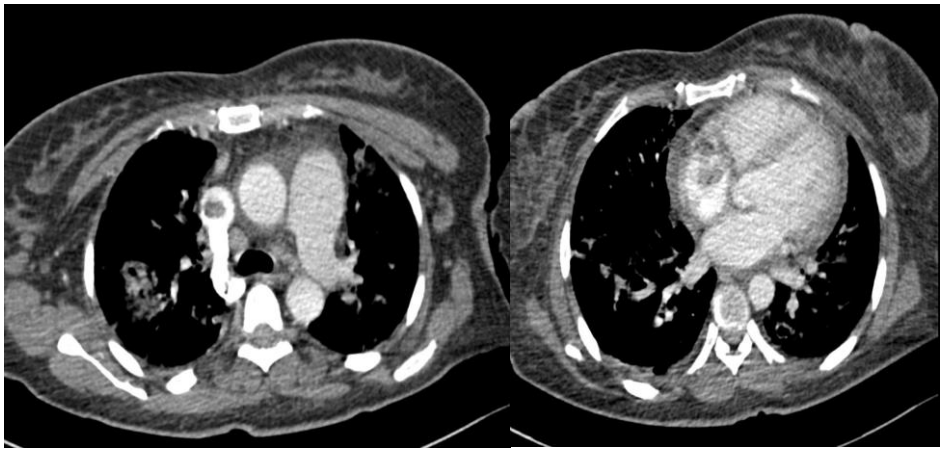

Figure 4: Mediastinal window, axial sections: opacification defect of the superior vena cava with thrombus extended to the right atrium and jugular vein

DISCUSSION

Infective endocarditis (IE) of the right heart accounts for 5-10% of endocarditis locations. It may occur in patients with pacemakers, defibrillators, central venous catheters, or congenital heart disease, but is most commonly seen in intravenous drug users, including those infected with human immunodeficiency virus and those who are immunocompromised [5, 6].

The lower incidence of right-sided IE, compared with left-sided IE, may be explained by the prevalence of pathological conditions affecting the right-sided valves, including congenital malformations, differences in the properties and vascularization of the endothelium on the right side, as well as lower pressure gradients and jet velocities across the right valves and lower stress on the right wall and reduced oxygen content in the venous blood [7, 8].

The most frequently encountered germ is staphylococcus aureus, well ahead of Pseudomonas aeruginosa, other gram-negative bacilli, fungi, or streptococci.

Fungal endocarditis, usually associated with very high mortality, accounts for about 3% of all cases of IE and rarely involves the right heart [10, 11].

History, clinical examination, and high index of suspicion remain the cornerstones of diagnosis, while advanced diagnostic modalities are improving our understanding of the natural history of ISAE.

Respiratory symptoms with fever, anemia, and microscopic hematuria predominate [12].

Although the typical Duke criteria do not distinguish between ESIL and ESIR, the diagnosis can be significantly delayed, as right-sided murmurs often go unnoticed, while peripheral stigmata are absent. In contrast to left-sided endocarditis, pulmonary embolism occurs in 75-100% of cases, especially in tricuspid cases. Especially in cases of tricuspid valve IE [13].

SEIR should be distinguished from other febrile illnesses with pulmonary symptoms, including pulmonary embolism/infarction, chemical pneumonitis (e.g., following aspiration), hypersensitivity pneumonitis, interstitial or lobar pneumonitis, regardless of the cause [13, 14].

As with SLEI, a positive blood culture, combined with clinical and echocardiographic findings, establishes the diagnosis.

Nevertheless, fastidious pathogens or previous administration of antibiotics may result in negative blood cultures in IDU or HIV-positive patients [15]. The electrocardiogram and routine blood tests are not specific.

However, chest radiography may reveal evidence of pulmonary embolism due to septic emboli from the right heart [2]. However, the chest CT scan demonstrates multiple infiltrates with cavities in both lung fields, suggesting the presence of multiple pulmonary emboli and pulmonary abscesses [13, 16].

In contrast to LSIE, transthoracic echocardiography (TTE) may be sufficient for diagnosis since transesophageal echocardiography (TOE) would not improve the diagnostic accuracy of TTE in detecting vegetations associated with heart dt IE in IVDU [17].

Transthoracic echocardiography is generally diagnostic of tricuspid IE because of the anterior location of the valve and the often large size of the vegetations, but transesophageal echocardiography performs better for analysis of the pulmonary valve, abscesses, and left heart lesions [17].

In addition to valvular vegetations, several other echocardiographic findings may be major diagnostic criteria for AR. These include the demonstration of an abscess, pseudoaneurysm, fistulas, new valve dehiscence, leaflet perforation and valve aneurysm [18].

Evidence of extra cardiac involvement by other imaging techniques, such as CT, can be used to support the diagnosis of AR. Specifically for right-sided AR, lung pathologies associated with AR, such as parenchymal opacities, nodules, cavitations, abscesses, and pleural effusions are strongly suggestive of right-sided AR [19].

Pulmonary involvement occurred in 80% of these cases and ranged from minor atelectasis to extensive.80% of these cases, ranging from minor atelectasis to large infiltrates, pleural exudates, and cavitations, usually involving the lower lobes [20].

Finally, ventilation/perfusion scans of the lungs may be useful in detecting septic pulmonary emboli in some cases [16].

The initiation of antimicrobial therapy for suspected SIR is directed at the most likely causative organisms and should be initiated immediately after adequate blood cultures are obtained.

Empirical therapy should consist of a combination of an anti-staphylococcal agent with activity against methicillin-resistant S. aureus (MRSA), such as the combination of Vancomycin and gentamicin, or Daptomycin alone. Once the results of culture and sensitivity of a microorganism identified, antibiotic therapy can be appropriately modified, up to 6 weeks [21].

Antibiotic therapy should last four to six weeks in the following situations: slow clinical or microbiological response (>4 days) to antibiotic therapy; right heart IE complicated by right heart failure, vegetation size greater than 20 mm, acute respiratory failure, metastatic infectious foci outside the lungs (including empyema), or extracardiac complications (e.g., acute renal failure) ; treatment with antibiotics other than penicillinase-resistant penicillins; intravenous drug abuse with severe immunosuppression (CD4 < 200/mm3), with or without AIDS; associated left heart IE.

Surgery is rarely necessary in exclusive right-sided involvement, which has a good immediate prognosis (3% to 5% case fatality [22].

The three most common surgical strategies for tricuspid valve IE are valve repair, valve replacement, and valvectomy [22].

Surgical techniques can also be divided into "prosthetic" (tricuspid valve replacement or annuloplasty) and "non-prosthetic" (annuloplasty, bicuspidization, vegectomy [removal of vegetation only], or valvectomy [removal of the tricuspid valve leaflet]). In cases of right AR associated with IVDU, surgical management should strive to avoid artificial hardware and focus on vegetation removal and valve repair, which are associated with better late survival [23].

In general, surgery should be avoided; however, it may be necessary in the following situations: right heart failure secondary to severe tricuspid insufficiency with insufficient response to diuretic therapy; IE due to microorganisms that are difficult to eradicate (e.g., fungi) or bacteremia persisting for at least 7 days (e.g., S. aureus, P. aeruginosa) despite adequate antibiotic therapy; vegetation on the tricuspid valve larger than 20 mm and persisting after recurrence of pulmonary embolism [21].

Right-sided IE is associated with better clinical outcomes than left-sided IE. This is probably a consequence of multiple factors, including the fact that patients with right-sided AR are younger; tricuspid valve dysfunction the tricuspid has fewer hemodynamic consequences than mitral or aortic AR; there is less systemic embolization, less abscess formation, and

fewer resistant infections and is therefore clinically better tolerated [24, 25].

Vegetation length >20 mm and fungal etiology were the main predictors of mortality in a large retrospective cohort of right-sided IVUS IEs. In HIV-infected patients, a CD4 count of less than 200 cells/mL is predictive of an adverse outcome [23].

CONCLUSION

Right-sided IE has several unique characteristics, which differ from those of left-sided IE such as the population at risk, causative microorganisms, type of complications, response to medical treatment, and prognosis.

Antibiotic therapy directed against staphylococcus aureus should be initiated early as a first-line treatment and secondarily adjusted as needed. Prevention is based on rigorous asepsis during the placement and handling of venous catheters, care of dental infections, management of congenital heart disease, and also by controlling clandestine abortions and the emergence of drug abuse.

As the prevalence of IVDU and intra-cardiac device implantation increases, clinicians are likely to encounter more patients with right-sided AR and therefore need to have a high index of diagnostic suspicion as well as knowledge of new treatment options (for example percutaneous suction devices).

BIBLIOGRAPHY

1. Chan, P., Ogilby, J. D., & Segal, B. (1989). Tricuspid valve endocarditis. *American heart journal*, *117*(5), 1140-1146.
2. Moss, R., & Munt, B. (2003). Injection drug use and right sided endocarditis. *Heart*, *89*(5), 577-581.
3. Grau, D., Vidal, N., Faucherre, V., Léglise, Y., Pinzani, V., Blayac, JP, ... & Peyrière, H. (2010). Infectious complications induced by misuse of high-dose buprenorphine (Subutex®): retrospective analysis of 42 cases. *The Journal of Internal Medicine* , *31* (3), 188-193.
4. Carozza, A., De Santo, L. S., Romano, G., Corte, A. D., Ursomando, F., Scardone, M., ... & Cotrufo, M. (2006). Infective endocarditis in intravenous drug abusers: patterns of presentation and long-term outcomes of surgical treatment. *Journal of Heart Valve Disease*, *15*(1), 125-131.
5. Cooper, H. L., Brady, J. E., Ciccarone, D., Tempalski, B., Gostnell, K., & Friedman, S. R. (2007). Nationwide increase in the number of hospitalizations for illicit injection drug use-related infective endocarditis. *Clinical Infectious Diseases*, *45*(9), 1200-1203.
6. Gebo, K. A., Burkey, M. D., Lucas, G. M., Moore, R. D., & Wilson, L. E. (2006). Incidence of, risk factors for, clinical presentation, and 1-year outcomes of infective endocarditis in an urban HIV cohort. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *43*(4), 426-432.
7. Goud, A., Abdelqader, A., Dahagam, C., & Padmanabhan, S. (2015). Isolated pulmonic valve endocarditis presenting as neck pain. *Journal of Community Hospital Internal Medicine Perspectives*, *5*(6), 29647.
8. Ramadan, F. B., Beanlands, D. S., & Burwash, I. G. (2000). Isolated pulmonic valve endocarditis in healthy hearts: a case report and review of the literature. *The Canadian journal of cardiology*, *16*(10), 1282-1288.
9. Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and by the International Society of Chemotherapy (ISC) for Infection and Cancer, Habib, G., Hoen, B., Tornos, P., Thuny, F., Prendergast, B., ... & van Camp, G. (2009). Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009) The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). *European heart journal*, *30*(19), 2369-2413.
10. Akinosoglou, K., Apostolakis, E., Marangos, M., & Pasvol, G. (2013). Native valve right sided infective endocarditis. *European journal of internal medicine*, *24*(6), 510-519.
11. Siciliano, R. F., Gualandro, D. M., Sejas, O. N. E., Ignoto, B. G., Caramelli, B., Mansur, A. J., ... & Strabelli, T. M. V. (2018). Outcomes in patients with fungal endocarditis: A multicenter observational cohort study. *International Journal of Infectious Diseases*, *77*, 48-52.
12. Martín-Dávila, P., Navas, E., Fortún, J., Moya, J. L., Cobo, J., Pintado, V., ... & Moreno, S. (2005). Analysis of mortality and risk factors associated with native valve endocarditis in drug users: the importance of vegetation size. *American heart journal*, *150*(5), 1099-1106.
13. Morokuma, H., Minato, N., Kamohara, K., & Minematsu, N. (2010). Three surgical cases of isolated tricuspid valve infective endocarditis. *Ann Thorac Cardiovasc Surg*, *16*(2), 134-8.
14. Nucifora, G., Badano, L., Hysko, F., Allocca, G., Gianfagna, P., & Fioretti, P. (2007). Pulmonary embolism and fever: when should right-sided infective endocarditis be considered?. *Circulation*, *115*(6), e173-e176.
15. Pesanti, E. L., & Smith, I. M. (1979). Infective endocarditis with negative blood cultures: an analysis of 52 cases. *The American journal of medicine*, *66*(1), 43-50.
16. Sohail, M. R., Uslan, D. Z., Khan, A. H., Friedman, P. A., Hayes, D. L., Wilson, W. R., ... & Baddour, L. M. (2008, January). Infective endocarditis complicating permanent pacemaker and implantable cardioverter-defibrillator infection.

In *Mayo Clinic Proceedings* (Vol. 83, No. 1, pp. 46-53). Elsevier.

17. Roman, J. A. S., & Vilacosta, I. (1995). Role of Transesophageal Echocardiography in Right-Sided Endocarditis. *Echocardiography*, *12*(6), 669-672.
18. Vilacosta, I., Olmos, C., de Agustín, A., López, J., Islas, F., Sarriá, C., ... & San Román, A. (2015). The diagnostic ability of echocardiography for infective endocarditis and its associated complications. *Expert Review of Cardiovascular Therapy*, *13*(11), 1225-1236.
19. yu Song, X., Li, S., Cao, J., Xu, K., Huang, H., & jun Xu, Z. (2016). Cardiac septic pulmonary embolism: a retrospective analysis of 20 cases in a Chinese population. *Medicine*, *95*(25), e3846.
20. Yuan, S. M. (2014). Right-sided infective endocarditis: recent epidemiologic changes. *International Journal of Clinical and Experimental Medicine*, *7*(1), 199-218.
21. Endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and by the International Society of Chemotherapy (ISC) for Infection and Cancer, Habib, G., Hoen, B., Tornos, P., Thuny, F., Prendergast, B., ... & van Camp, G. (2009). Guidelines on the prevention, diagnosis, and treatment of infective endocarditis (new version 2009) The Task Force on the Prevention, Diagnosis, and Treatment of Infective Endocarditis of the European Society of Cardiology (ESC). *European heart journal*, *30*(19), 2369-2413.
22. Miró, J. M., Moreno, A., & Mestres, C. A. (2003). Infective endocarditis in intravenous drug abusers. *Current infectious disease reports*, *5*(4), 307-316.
23. Akinosoglou, K., Apostolakis, E., Koutsogiannis, N., Leivaditis, V., & Gogos, C. A. (2012). Right-sided infective endocarditis: surgical management. *European journal of cardio-thoracic surgery*, *42*(3), 470-479.
24. Welton, D. E., Young, J. B., Gentry, W. O., Raizner, A. E., Alexander, J. K., Chahine, R. A., & Miller, R. R. (1979). Recurrent infective endocarditis: analysis of predisposing factors and clinical features. *The American journal of medicine*, *66*(6), 932-938.
25. Kamaledeen, A., Young, C., & Attia, R. Q. (2012). What are the differences in outcomes between right-sided active infective endocarditis with and without left-sided infection?. *Interactive CardioVascular and Thoracic Surgery*, *14*(2), 205-208.