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Clinical Presentation and Prognosis of Infective Endocarditis Prosthesis: A Retrospective Study in a Tertiary Cardiology Center

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Prosthetic valve endocarditis (PVE) is a serious infection involving the prosthetic heart valve and the endocardium. It carries high morbidity and mortality, especially in patients with mechanical valves.
Aim of the Study: To investigate the clinical, biological, bacteriological, and echocardiographic characteristics of patients with prosthetic valve endocarditis and identify the predictive factors of in-hospital mortality.

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Patients and Methods: This retrospective, descriptive study was conducted over a period of 5 years, from June 2020 to July 2024, and included 82 cases of PVE diagnosed at a tertiary cardiology center.
Results: A total of 82 patients were included, with an average age of 39.12 ± 5.6 years. All patients had mechanical valves, with the infection localized to the mitral valve in 53 cases and the aortic valve in 29 cases. Positive blood cultures were obtained in 36 patients, and Staphylococcus aureus was the most common pathogen, isolated in 26 cases (31.7%), followed by coagulase-negative Staphylococcus in 18 cases (21.95%). Transthoracic and transesophageal echocardiography revealed vegetations in 75 patients (91%), with prosthesis disinsertion in 27 cases and periprosthetic abscesses in 15 cases. The most common complications included heart failure in 17 patients, embolic events in 46 patients, and renal failure in 15 patients.
Antibiotic therapy was administered to all patients, with a total average duration of 39.26 days. Surgery was indicated in 62 patients, with an average surgery delay of 42 ± 2 days. The main surgical indications were uncontrolled heart failure (32 cases), embolic complications (17 cases), and failure to control infection with antibiotics (13 cases). The overall mortality rate was 26%. Predictive factors of mortality included heart failure, delayed surgery, and early-onset PVE.
Conclusion: Prosthetic valve endocarditis remains a challenging and life-threatening condition. Prompt diagnosis, appropriate antibiotic therapy, and timely surgical intervention are essential for improving patient outcomes. Mortality is influenced by multiple factors, including the timing of the infection and the presence of comorbid conditions.

Keywords: Infective endocarditis; prosthetic valve; prosthetic valve endocarditis; mortality in prosthetic valve endocarditis.

1. INTRODUCTION

Infective endocarditis (IE) is a rare disease associated with high morbidity and mortality. Patients with a prosthetic valve have an increased risk of presenting this condition, which evalve endocarditis occurs in approximately 1-5% of patients with prosthetic valves, though this rate can vary widely. The diagnosis of IE on a prosthesis is more difficult than the diagnosis of IE on a native valve. Clinical presentations are frequently atypical, endocardial lesions are variable and are not limited to the presence of vegetation, and finally imaging is often hampered by artifacts linked to the presence of prosthetic material. Hospital mortality is then often higher than that of an IE on native valve, ranging from 20 to 30%

The objective of our work is to study the clinical, biological, bacteriological and echocardiographic characteristics of endocarditis on prosthetic valves as well as the predictive factors of mortality in these patients.

2. MATERIALS AND METHODS

we carried out a retrospective, descriptive study spread over a period of 5 years from June 2020 to July 2024 having identified all patients hospitalized in the cardiology department of the Mohammed VI university hospital center in Marrakech. Epidemiological, clinical, biological and ultrasound data collected from patient hospitalization files.

3. RESULTS

We identified 82 cases during the study period. all patients had a mechanical valve, The average age of patients with IE was 39.12 ± 5.6 years with extremes ranging from 18 to 78 years, Endocarditis on prosthesis was localized mitral in 53 cases and aortic in 29. we found positive blood cultures in only 36 of our patients. Dyspnea was the most frequent reason for consultation which was present in 52 of our patients, followed by the alteration of the general state which was found in 32 of our patients, and 26 of our patients presented for an embolic complication while 12 of our patients are presented in a state of cardiogenic shock. The entrance door was found again in only 32 of our patients, the most common being the oral cavity.

On the biological level, all our patients benefited from a blood count which showed hyperleukocytosis in 42 of our patients and inflammatory anemia in 18 of our patients, CRP came back positive in all our patients with an average of 101.2 and procalcitonin performed in 52 of our patients which came back strongly positive.

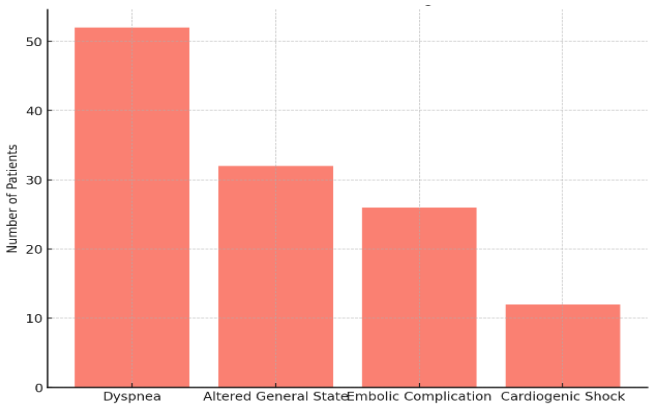

Fig. 1. Reasons for consultation among IE patients

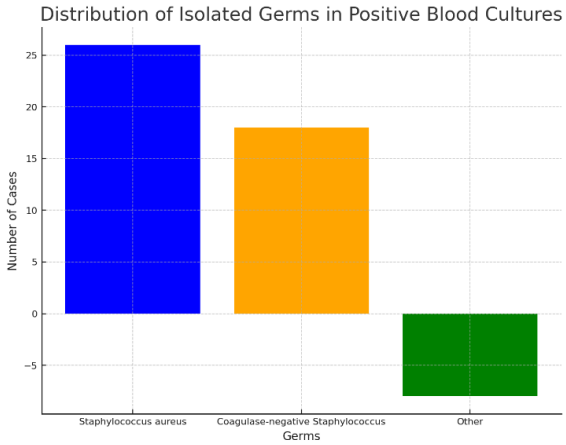

Fig. 2. The isolated germs

In all our patients multiple blood cultures were carried out but which came back positive only in 36 of our patients, prior antibiotic therapy and the sampling conditions can explain these results The isolated germs were: Staphylococcus aureus was in 26 cases (31.7%), and coagulase-negative Staphylococcus in 18 cases (21.95%).

A trans-thoracic and trans-esophageal echocardiography was systematically carried out in all our patients having demonstrated the presence of vegetations in 75 of our patients, the vegetations were located in the mitral in 42 and aortic in mitral in 33 cases.

The echocardiography also showed complications such as prosthesis disinsertion in 27 cases and a periprosthetic abscess in 15 cases.

Complications: Heart failure was present in 17 patients. A heart rhythm disturbance was noted in 15 cases. One patient presented with complete BAV requiring remote implantation of a pacemaker. A Ischemic stroke was noted in 46 cases. Renal failure acute was observed in 15 cases including 7 cases were related to glomerulonephritis acute. Arterial embolisms were found in 17 patients.

Treatment: All patients received antibiotic therapy probabilistic after taking blood cultures. This antibiotic therapy was based on ampicillin + oxacillin + gentamicin in case of AE on native valve or on late valve prosthesis (>12 months) and it was based on vancomycin + gentamycin + rifampicin in case of early AE (<12 months). The total duration of antibiotic treatment was 39.26 days.

The surgical indication was made in 62 of our patients with an average surgery time of 42+/-2 days for the surgical indication was performed in 32 of our patients for uncontrolled heart failure, and in 17 our patients for embolic complications, while 13 for our patients surgery was performed due to the non-control of the infection under antibiotics.

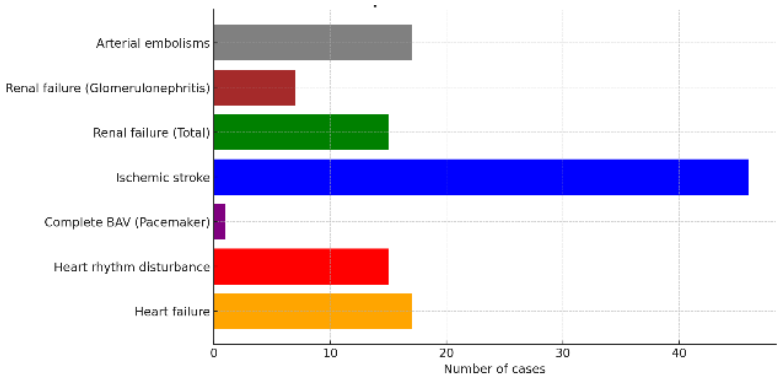

Fig. 3. Complications observed in patients

Mortality: In our series we had a total mortality of 26%. The predictive factors of mortality in our study were: the presence of heart failure, the delay of surgery and early endocarditis.

4. DISCUSSION

Prosthetic valve endocarditis (PVE) is a microbial infection of the endovascular that occurs on parts of a prosthetic valve or on the reconstructed native valve of the heart [1] PVE accounts for 20% of infective endocarditis. It is the most severe form of infective endocarditis and is associated with high morbidity and mortality [2].

Endocarditis on a prosthetic valve, also known as prosthetic valve endocarditis, can present with a range of symptoms. Including fever and chills, dyspnea, chest pains, alteration of general condition with asthenia, anorexia and weight loss. the patient may have other atypical symptoms such as arthralgia, myalgia, night sweats.

PVE is a rare disease but its frequency seems increase from 0.1 to 2.3 per patient per year [3] In the literature, wearers of mechanical prostheses are more exposed to early PVE [4,5].

PVE occurring early after valve surgery (< 1 year) are caused in approximately 20% cases caused by staphylococcus coagulase negative. Beyond one year, the bacterial epidemiology approaches endocarditis on native valves [6] our data agrees with that of the literature.

According to European recommendations relating to PVE [7], a negative TTE in PVE does not exclude the diagnosis. Although the TOE is mandatory in the event of suspicion of PVE, its diagnostic value is lower than in IE on native valve [7].

The modalities of antibiotic treatment of PVE are detailed in the ESC recommendations [7]. In the event of a high clinical probability of PVE, probabilistic intravenous antibiotic therapy must be initiated immediately after blood cultures are taken. Antibiotic therapy must then be adapted to the results of blood cultures. In addition to the antibiogram, it is essential to recover the minimum inhibitory concentration, particularly of streptococci with respect to beta-lactams, to adapt the schedule and duration of antibiotic therapy.

The duration of antibiotic therapy in patients with prosthetic valves is generally six weeks. This treatment was previously exclusively administered intravenously (IV), however, recent data show that oral relay is possible beyond 10 to 15 days of treatment [8].

Cardiac surgery is the second pillar of PVE management; approximately 50% of IEs involving prostheses are operated on [9]. The appropriateness and timing of cardiac surgery should be discussed as soon as possible after diagnosis of the infection.

PVE is associated with a poor prognosis. In literature, the overall intra-hospital mortality rate varies between 20 and 40% [10,11]. In our series, hospital mortality was 26.2%.

5. CONCLUSION

Mortality in prosthetic valve endocarditis is influenced by a complex interplay of factors related to the infection, patient's health status, and treatment response. Early identification, effective management of the infection, and addressing complications promptly are key to improving outcomes. Individual risk assessments based on these factors can help guide

therapeutic decisions and improve patient management strategies.

CONSENT

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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