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ORIGINAL ARTICLE

Clinical Profile and Management of Prosthetic Valve Thrombosis in Tertiary Cardiac Centre

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ABSTRACT

Background and Aim: Prosthetic valve thrombosis is a potentially fatal outcome of valve replacement surgery. A proportion of patients suffer with thrombotic problems, mostly as a result of inadequate anticoagulation status and irregular INR checks. The present study aimed to investigate the clinical profile and prosthetic valve thrombosis management in tertiary cardiac centers.

Patients and Methods: This prospective study was carried out on 58 prosthetic valve thrombosis patients in AFIC, Rawalpindi and Punjab Institute of Cardiology, Lahore from January 2022 to June 2022. The study protocol was approved by the institutional research and ethical committee. All the enrolled patients provided informed written consent. Patients' demographic details, clinical profile, in-hospital complications, and outcome during one year follow-up were recorded. SPSS version 28 was used for data analysis.

Results: Of the total 58 PVT patients, there were 22 (37.9%) male and 36 (62.1%) females. The overall mean age was 32.84± 8.4 years with an age range 10-65 years. About 34 (58.6%) patients had sub-therapeutic INR values during admission time whereas 28 (48.3%) patients had atrial fibrillation. Breathing difficulties was the predominant complaint in 54 (92.8%) of the patients who came within one week after the beginning of symptoms. Approximately 51 patients (88.4%) had streptokinase thrombolysis, while four required surgery. Valve thrombosis was most prevalent in 49 (84.5%) of the individuals. In-hospital mortality was 9.8% (n=6), with no significant bleeding episodes or new strokes seen.

Conclusion: The present study concluded that PV thrombosis is a medical emergency associated with a high mortality rate. Low socio-economic level leads to poor adherence to anticoagulation medication. The prosthetic valve thrombosis patients had poor compliance and sub-therapeutic INR. Prosthetic valve thrombosis can be effectively treated with thrombolysis.

Keywords: Prosthetic valve thrombosis, Clinical profile, Thrombosis

INTRODUCTION

Prosthetic valve thrombosis is described as any blockage of the prosthesis caused by noninfectious thrombotic material or valve-related clotting that impairs valve performance [1]. Prosthetic valve blockage or trapped prosthesis refers to a variety of diseases, including pannus, thrombus, and vegetation [2]. Prosthetic thrombosis is usually a significant consequence with a high mortality rate, especially in obstructive instances, and so requires prompt identification and treatment [3]. The occurrence of PVT is affected by valve type, valve position, and anticoagulant adequacy. Patients with mechanical heart valves are at a higher risk of developing thromboembolism and prosthetic heart valve thrombosis (PHVT), with rates averaging 0.2% and 1.8% patient-year, respectively [4, 5]. Prosthetic valve thrombosis is a potentially fatal complication of cardiac valve surgery that affects 0.5% to 15% of patients and is related with significant morbidity and mortality [6, 7]. The majority of PV thrombosis might arise months or even years following the valve replacement.

PV thrombosis was more common in right-sided PVs than left-sided PVs, and mechanical heart valves were more likely to develop thromboembolic events than biological heart valves. Trans-catheter valve treatments are the proven therapy choices for individuals with aortic stenosis. The disease condition known as prosthetic valve (PV) thrombosis [8, 9] is characterized by thrombus development and subsequent prosthetic valve failure. It is a commonly encountered consequence of heart valve surgery. Higher mortality rates have been seen in emerging countries. Patients who have mechanical heart valves have an increased risk of thromboembolic events. These are more frequently found in the mitral position. The most common problems linked with valve replacement are PV thrombosis and hemorrhage. Various research indicate various therapeutic choices for PV thrombosis, however which treatment is optimal is still debatable [10, 11]. Thrombi with rheumatic illness or post-valve thrombosis pose the most challenging situations for cardiac surgeons due to their size and location, as well as the patient's clinical status. Many factors influence treatment options, including the existence of valve blockage, the size of the thrombus, the patient's clinical state, the local medical and economic level, reoperation experience, and, most crucially in our case, the patient's decision [12]. The best way to treat these individuals with prosthetic valve occlusion is debatable, with some supporting fibrinolysis and others advocating surgery. Patients frequently report with complications such as thrombotic events or bleeding, including PV thrombosis. An analysis of the clinical characteristics, short-term outcomes and management trends of PV thrombosis patients was the prime objective of the present study.

METHODOLOGY

This prospective study was carried out on 58 prosthetic valve thrombosis patients in AFIC, Rawalpindi and Punjab Institute of Cardiology, Lahore from January 2022 to June 2022. The study protocol was approved by the institutional research and ethical committee. All the enrolled patients provided informed written consent. Patient's demographic details, clinical profile, in-hospital complications, and outcome during one year follow-up were recorded. Patients with PV thrombosis were chosen for further research based on the inclusion criteria. Each patient's demographic information, echocardiography data, and clinical characteristics were documented. The patients' complaints and problems were also documented. The effectiveness of the thrombolysis was dependent on the fact that the cross valve had to be lowered by 50% with considerable hemodynamic improvements. The TT failure was seen as a surgical failure. The participants who took part in the study were monitored for 6 months. For the statistical analysis, SPSS 26 was employed. To analyze the data, various tests were run. The threshold of significance was set at 0.05. Continuous variables included the standard deviation and mean, while categorical variables included percentage and quantity.

RESULTS

Of the total 58 PVT patients, there were 22 (37.9%) male and 36 (62.1%) females. The overall mean age was 32.84± 8.4 years with an age range 10-65 years. About 34 (58.6%) patients had sub-therapeutic INR values during admission time whereas 28 (48.3%) patients had atrial fibrillation. Breathing difficulties was the predominant complaint in 54 (92.8%) of the patients who came within one week after the beginning of symptoms. Approximately 51 patients (88.4%) had streptokinase thrombolysis, while four required surgery. Valve thrombosis was most prevalent in 49 (84.5%) of the individuals. In-hospital mortality was 9.8% (n=6), with no significant bleeding episodes or new strokes seen. Figure-1 depicts the gender's distribution. The incidence of various symptoms such as chest pain and breathiness difficulties are shown in Figure-2. Different classes of American heart association (NYHA) are shown in Figure-3. Table-I represent the clinical features of PVT patients. INR values are shown in Figure-4. Various complications of PVT are shown in Figure-5. Table-II represent the valve types in PVT patient's treatment.

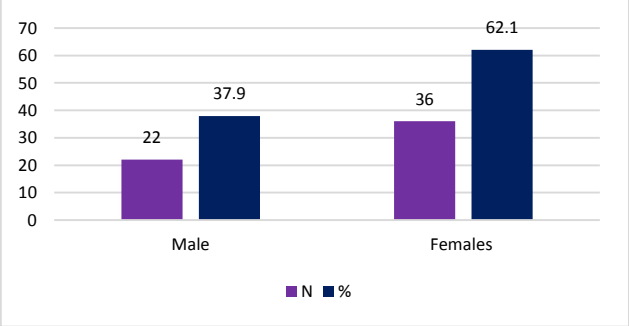

Figure-1: Gender's distribution of PVT patients (n=58)

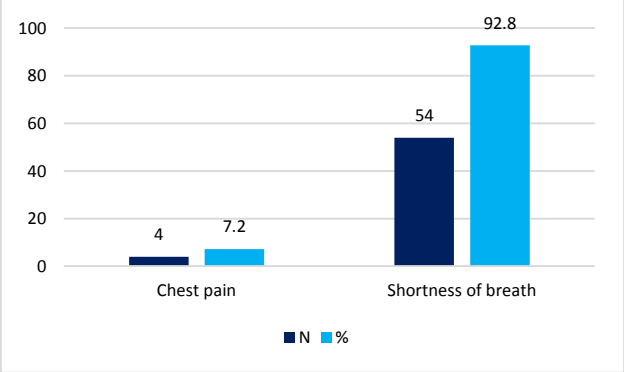

Figure-2: incidence of various symptoms such as chest pain and breathiness difficulties

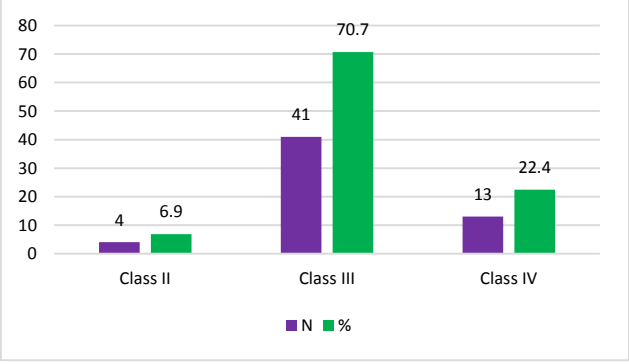

Figure-3: Different classes of American heart association (NYHA)

Table-1: PVT patient's clinical features

Variables	Frequency (N)	Percentage (%)
Symptoms onset time (days)		
<7	51	87.9
≥7	7	12.1
ECG findings		
Sinus	29	50
Arterial fibrillation	28	48.3
Pacing	1	1.7
Embolic event past history	8	13.8
Hypertension	2	3.4

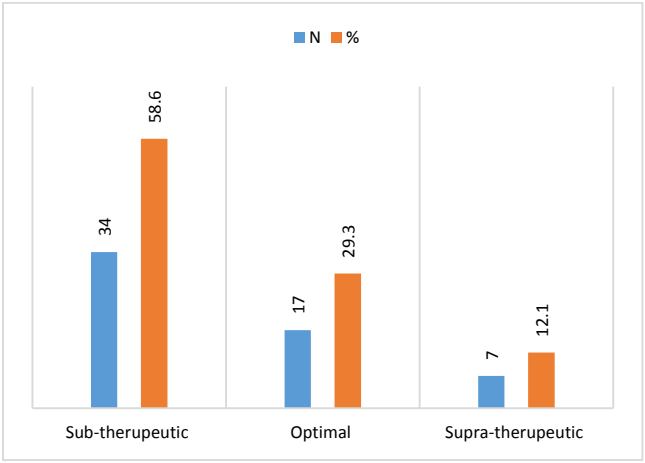

Figure-4: INR values in PVT patients (n=58)

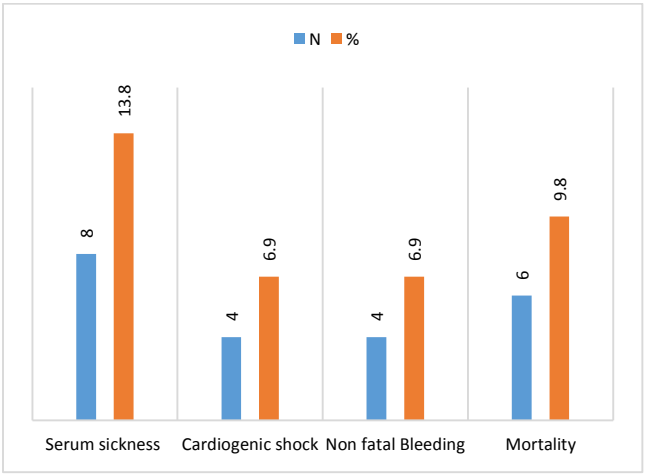

Figure-5: PVT complications (n=58)

Table-2: valve types in PVT patient's treatment

Valve types	Frequency (%)
Mitral valve	50 (86.2)
Aortic valve	8 (13.8)

DISCUSSION

The present study investigated the clinical management and profile of prosthetic valve thrombosis and found that PV thrombosis is a life-threatening medical emergency with a high death rate. Poor adherence to anticoagulant treatment is caused by low socioeconomic status. Patients with prosthetic valve thrombosis exhibited poor compliance and sub-therapeutic INR. Thrombolysis can successfully treat prosthetic valve thrombosis. During the hospitalization period, about 34 patients had sub-therapeutic INR levels, whereas 28 patients had atrial fibrillation. Breathing problems were the most common complaint in 54 of the patients who presented within one week of the onset of symptoms.

Streptokinase thrombolysis was administered to 51 patients, with four requiring surgery. Valve thrombosis affected 49 of the participants. There were no severe bleeding episodes or new strokes, therefore in-hospital mortality was 6. In several studies, mitral PV thrombosis has been compared to aortic prosthesis thrombosis in a 2-3 times greater rate, which we observed in our study, which showed that 39 patients (87%) had obstructions of the mitral valve, followed by six patients (13%) with obstructions of the aortic valve [13]. Nawale et al. [14] similar percentage of PVT episodes occurred in the mitral position.

Hirachan et al. [15] conducted a retrospective analysis at our facility a few years ago and found a similar female preponderance and mean age of 35 years [16]. Although several overseas studies indicated a greater mean age, exceeding 50 years, the findings of women being more prone to PV thrombosis were similar to ours [17, 18]. Numerous research reported that men had a little greater frequency than women, and the mean age was under 40 years [19, 20]. As with previous studies that used streptokinase as the thrombolytic agent, 83.3% of patients were successful in thrombolysis [21, 22] but Feng et al. found that complete success was slightly lower at 69.6% when urokinase was used as the thrombolytic agent.

The majority of patients in the present study had poor treatment compliance, which was represented by a lower baseline INR value at the time of presentation. This sort of situation is especially typical in underdeveloped nations, where the patients' poor socioeconomic status also plays a significant role. Many studies have demonstrated that poor treatment adherence and inadequate anticoagulation with sub-therapeutic INR are the major causes of PV thrombosis globally [23, 24].

Poor medication compliance was one of the aspects mentioned by many patients in our sample; this was anticipated by a lower INR value simply during the presentation, since the majority of the patients had sub-therapeutic INR. Such examples were usually discovered in underdeveloped nations with low social and economic conditions [25].

Incomplete anticoagulation, as well as the presence of atrial fibrillation, was discovered to play a role in the development of thrombosis (PV). In the present study, almost half of patients reported having AF, which was consistent with previous investigations. However, there was a significant frequency of PV thrombosis in some cases [26].

Showkathali et al., [27] reported that the mortality ratio in the event of surgery was as high as, while it was as high as 16% in the case of TT. Because of the scarcity of surgical products and the high rates, most patients are hesitant to have the procedure redone. One of the disadvantages of this study is that it only used data from a single site; if data from numerous centers was included, the results would be simpler to interpret [28].

CONCLUSION

The present study concluded that PV thrombosis is a medical emergency associated with a high mortality rate. Low socio-economic level leads to poor adherence to anticoagulation medication. The prosthetic valve thrombosis patients had poor compliance and sub-therapeutic INR. Prosthetic valve thrombosis can be effectively treated with thrombolysis.

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