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ORIGINAL ARTICLE

Management of Prosthetic Valve Thrombosis and its Clinical Profile in the Cardiac Center of Pakistan

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ABSTRACT

Background: The one of the highly known life threatening complication of the post valve replacement surgeries is prosthetic valve thrombosis. The poor anticoagulation status is the reason behind this thrombotic complication.

Objective: The study aimed to study the management of prosthetic valve thrombosis in the teaching hospital of our institute. The clinical profile of the patients was also evaluated.

Study design: It is an observational study aided with the statistical approaches, conducted in cardiology department of Rehman Medical Institute Peshawar.

Material and Methods: The study was conducted at the cardiology department of our hospital. The 40 patients who attended the cardiology department from May 2021 to May 2022 were selected for the study. According to the inclusion criteria the patients diagnosed with the PV thrombosis were selected for further study. The demographic profile and clinical parameters of each patient was recorded. The in hospital outcomes were also analyzed.

Results: The diagnosis was further confirmed by using fluoroscopy. The age group of the patients suffering from PV thrombosis was from 10 to 68 years with an average age of 35 years. Out of 40 patients added in the study, majority were female participants (60%). Among all the patients chosen for study, there were 88% that were admitted to the hospital after 1 week of symptoms. The shortness of breath and related symptoms were reported in 95% of the patients. The most common sort of treatment used for all the patients was thrombolysis, it was carried out for 93% of the patients.

Conclusion: The PV thrombosis is a clinical emergency and it is linked with high mortality rate. Low socio-economic status results in poor compliance of the anti-coagulation treatment. The treatment guidelines for PV thrombosis are updated on daily basis, so for better drug compliance, proper follow-up of the disease is needed. For the management of prosthetic valve thrombosis the thrombolysis is considered as a useful option.

Keywords: fluoroscopy, Prosthetic valve thrombosis, sub-therapeutic INR and valve thrombolysis.

INTRODUCTION

The more than 100 million people around the globe are affected by the valvular heart diseases. The higher mortality and morbidity rates are associated with this disease. In the recent years, the degenerative valve disease prevalence has been substantially increased1-2. The 2.5% is the calculated prevalence of mitral valvular heart diseases. The prevalence of these pathologies is estimated to be rise exponentially in the upcoming years. The surgical valve replacement is the first line of the treatment for the patients diagnosed with valvular diseases, however from the past 10 years the transcatheter technologies are highly used as an alternative to the surgeries3-4. The annual percentage of PV thrombosis incidence range from 0.1 to 5.7.

The established treatment options for the patients diagnosed with aortic stenosis are the trancatheter valve therapies. The thrombus formation with the subsequent prosthetic valve dysfunctions are observed in the pathological entity known as prosthetic valve (PV) thrombosis5-6. It is one of the highly observed complication of the heart valve surgery. The higher mortality rates are observed in the developing countries. The higher risks of thromboembolic events are associated with the patients having mechanical heart valves. These are more commonly present in the mitral position. The PV thrombosis and bleeding are the mainly observed complications associated with the valve replacement. Different studies suggest the different treatment options for the PV thrombosis, but which treatment is best, it's still remain controversial7.

The thrombus size, its location and many other factor such as clinical condition of patients highly effect the choice of treatment. The patients with rhumetic disease and post valve thrombosis simultaneously, poses the more challenging conditions for the cardiac surgeons. Because of the lack for infrastructure for regular monitoring of the PT/INR the disease is most commonly observed in the rural and remote areas8. The most common therapy used for treatment of such patients is thrombolytic therapy. The majority of the population in the developing countries like Pakistan is poor. Therefore thrombolytic therapy is highly used as it is considerably cost effective than the other therapies.

The clinical profile management strategies and short-term outcomes associated with the patients presented with PV thrombosis at the hospital were evaluated in this research9-10.

MATERIAL AND METHOD

This study was conducted at the cardiology department of our institute teaching hospital. The 40 patients who attended the cardiology department from May 2021 to May 2022 were selected for the study. The ethical and review board committee of the hospital approve the study. The informed consent was taken from all the patients that willingly participated in the study.

According to the inclusion criteria the patients diagnosed with the PV thrombosis were selected for further study. The demographic parameters, echocardiography reports and clinical profile of each patients were recorded. The in hospital complication and outcomes were also analyzed. The complaints and complications of the patients were also recorded. The participated patients were followed up for the 6 months durations. The SPSS was used for the statistical analysis. Different tests were performed for analyzing the data. The significance level was 0.05. The standard deviation and mean was expressed as continuous variables while percentage and number was used to express categorical variables.

The success of the thrombolysis lay on the fact that the cross valve must be reduced by 50% with the significant improvements in the hemodynamic. The TT failure were considered to be failure of the surgery.

RESULTS

This study is based on 40 data from 40 patients that were admitted in the tertiary care unit with confirmed case of PV thrombosis. All patients were clinically examined by the physician and echocardiogram was used to make the diagnosis of the patients. the diagnosis was further confirmed by using fluoroscopy. The age group of the patients suffering from PV thrombosis was from 10 to 68 years with an average age of 35 years. Out of 40 patients added in the study, majority included female participants (60%). Among all the patients chosen for study, there were 88% that were

admitted to the hospital after 1 week of symptoms. There was a long duration between the time the patients went through surgery and presentation of the symptoms. The average age of the presentation was 60 months, and the earliest case reported among all this data was at 2 months. There were 95% patients that reported shortness of breath and related symptoms. There were only 2 patients that reported about chest pain.

The most common sort of treatment used for all the patients was thrombolysis, it was carried out for 93% of the patients. while there were 3 patients that were subjected to surgery directly. There were 86% patients that received prosthetic mitral valve sort of thrombosis. it was observed that in case of 13% patients there was isolated aortic valve thrombosis present. The average gradient that was built across the prosthetic mitral valve was from 14 to 31 mmHg with an average of 21± 5.3 mmHg.

Table 1: Demographic features of the patients

Characteristics	Total patients n=40
Gender	
Male	16 (40)
Female	24 (60%)
Age	
Max	68 years
Min	10 years
Average age	34.5 ±6.8

Table 2: Clinical features of the patient

Features	No. of patients (%)
Symptoms	
Shortness of breath	38 (40%)
pain in the chest	2 (5%)
NYHA Class	
CII	2 (5%)
CIII	30 (75%)
CIV	9 (22%)
ECG (rhythm)	
Sinus	21 (52%)
Atrial fibrillation	19 (46%)
Pacing	1 (2%)
Hypertension	2 (5%)
Physical examination	
DMC	30 (75%)
DMC along with crepitation	10 (25%)
Value of INR	
Sub-therapeutic	26 (65%)
Maximum	12 (30%)
Supra level	2 (5%)
Complications	
Serum sickness	8 (20%)
Mortality	5 (12%)
Bleeding	2 (5%)

DISCUSSION

In this study there were 40 patients admitted for PV thrombosis in the hospital. Written consent was taken from all patients and they were fully aware of the studies. The average age of the patients was 35 years with maximum patients from female gender. As per studies shown by Hiranchan et. al similar female dominance was seen in the data of their retrospective study. and the average age used in their analysis was also 35 years11-12.

However, there were some international studies that reported a mean age higher than 40, and in some cases average age of 50 was used for the retrospective analysis. And similar female majority was seen in those results as well, but according to studies carried out in India there were more male than female present in their data and the average age was 40 years in that case13.

As per previous studies the frequency of mitral PV thrombosis as compared to the aortic prosthesis and this change is frequency was found to be 2 to 3 times higher in that study, similar studies were also found in our analysis as well as the most frequent valve that was associated with the thrombosis was mitral valve, and in only 13% cases it was aortic valve. These findings were in accordance with the results by Gupta et al., 14 that showed that the PVT episodes included 87% patients in case of mitral position.

The complete thrombolysis or the successful case of completion was found in case of 83% patients which was significant achievement15. These findings were similar to the results by previous studies where they found that the streptokinase was the enzyme used as agent for thrombolysis. However, according to the studies carried out by Feng et al, urokinase was the protein used for the purpose of thrombolysis. And complete success ratio was found in case of 70% of the patients.

In case of this study the mortality ratio came out to be 13% among all the patients that had undergone TT, which can be 155 of the overall TT cohort16-17. This rate of mortality was known to be quite less than the many other studies carried out in the same region. However, as per other studies same mortality rate was observed ranging from 13-17% of the TT patients.

Poor compliance of the drug was one of the features reported by many patients of our group, this was predicted by a less INR value just in the duration of presentation, as it was found that the majority of the patients has sub-therapeutic INR. Such cases were mostly found in the developing countries where there are poor social and economic conditions18.

As per studies carried out related to INR values, it was observed that the poor drug compliance along with sub-optimal anticoagulation were some of the reasons for PV thrombosis. There was great variation present in the duration of surgery and the PV thrombosis and it largely depends on the socio-economic status of the population. It was found to be ranging from 2 months to 145 months in our study as the average came out to be 60 months from surgery to the PV thrombosis.

Not only incomplete anticoagulation but also the occurrence of atrial fibrillation was found to be playing role in the development of thrombosis (PV). In this study the patients that reported AF were 46%, which was just according to the studies carried out before. However, in some cases there was high prevalence of PV thrombosis19.

As per studies carried out by Karthikeyan, there was not any prominent variations found in the results like improvements in the pressure gradient of transvulvula and other related serious issues in between the duration of surgery and thrombolysis. However, it was advised by physicians that an emergency check-up by the doctors and a proper surgical intervention is preferred other than thrombolysis20.

As per studies carried out by Sabahattin et al, it was shown that the mortality ratio was as high as 70% in case of surgery, and it was as high as 16% in case of TT. Due to limited availability of surgical items and high rates21, most of the patients become reluctant to re-do the surgery. One of the limitations of this study can be that the study only comprised of data from a single center, it data from multiple centers was compiled then it would be easier to interpret the results22-23.

CONCLUSION

In this study it was found that the PV thrombosis is indeed a clinical emergency and it is linked with high mortality rate. Low socio-economic status results in poor compliance of the anti-coagulation treatment. The treatment guidelines for PV thrombosis are updated on daily basis, so for better drug compliance, proper follow-up of the disease is needed.

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