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Original research article

Prosthetic valve thrombosis and result study and thrombolysis outcomes

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Abstract

Aims and Objectives: The study's objectives were to assess the prosthetic heart valve thrombosis's clinical presentation, underlying causes and diagnostic indicators, treatment approaches, and complications, as well as to assess the effectiveness, outcomes, and side effects of thrombolytic therapy during the hospital stay.

Methods: This study is conducted in the Department of Cardiology, Kurnool Medical College, Kurnool, Andhra Pradesh, India, for January 2020 to January 2022, with 30 sample size.

Results: Majority of the patients were in 31-40 years, most common patients were male (77%), females patients were less common (23%). Most common symptom was breathlessness, mitral valve involvement was most common (76.7%), followed by aortic (20%) least common both valves were involved (3.3%). In this study most common patients were poor adherence of either warfarin or acitrom drugs (90%), good drug compliance around (10%) of patients. In present study INR value <2.5 in 90% of patients, INR value >2.5 in 10% of patients. Most of the patients having low INR, less number of patients having INR more than 3. INR Vs NYHA class by using fisher test P value was significant.

Conclusion: Thrombolysis was done in all patients with STK in 63.3%, TNK was used in 36.8%. Success in 93.3%, failure 6.6%. In present study complications during thrombolysis embolism in 20% cases, bleeding in 10% of cases, death only 3.3% of cases. In present study success following thrombolysis (93.3%), failure of thrombolysis patients were (6.7%).

Keywords: Thrombolysis, adherence, warfarin, prosthetic heart valve.

Introduction

Over 100 million people are affected by valvular heart disease worldwide, and the condition is linked to high morbidity and mortality [1]. The frequency of valvular disorders has significantly changed over the past 50 years, with a marked decline in the incidence and prevalence of rheumatic heart disease and a significant rise in the majority of degenerative valve diseases [1]. In the United States, the prevalence of mitral and aortic valvular disease is currently estimated to be 2.5% overall (age-adjusted), with a prevalence of more than 10% in subjects over 75 years [1]. However, given the aging of the global population, the prevalence of these pathologies is expected to rise exponentially. The current standard of care for valvular heart diseases in patients with low and intermediate surgical risk is surgical valve replacement (or repair of mitral valves) [2]. A potentially fatal side effect of the mechanical valve prosthesis is prosthetic heart valve thrombosis (PHVT). When MHVs are used instead of BHVs, PVs implanted in the mitral area as opposed to the aortic area, and right-sided PVs as opposed to left-sided PVs, there is a higher risk of PV thrombosis and thromboembolic events [3]. The annual rate of PV thrombosis (PHVT) with MHVs ranges from 0.1% to 5.7%, with higher rates seen with certain valve types, early postoperatively, with MHVs implanted in the mitral and tricuspid area, and in connection with subtherapeutic anticoagulation [4]. The annual incidence ranges from 0.5% to 6.0% [4] when MHV obstruction is taken into account. The annual incidence of thromboembolic events in patients with MHVs ranges from 2.5% to 3.7% [4].

The reported incidences in the aortic and mitral areas range from 0.5% to 6% per patient-year, with the mitral area having the highest rates and up to 20% in tricuspid valve prostheses. Considering that surgical prosthetic valve replacement is associated with a significant operative morbidity and mortality rate, medical therapy (thrombolysis) has developed as an alternative method in high-risk surgical patients. The dreaded complication of prosthesis thrombosis of the heart persists despite advancements in the design of new generations of mechanical prostheses and the proper prescription of vitamin K antagonist therapy. A cardiac mechanical prosthesis's main drawbacks are thromboembolic and hemorrhagic events.

However, over the past ten years, a proliferation of transcatheter technologies has emerged that offer

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alternatives to surgery, particularly for high-risk patients. In patients who are ineligible for standard surgical treatment or who are at least moderately at risk for aortic surgery, transcatheter valve therapy for aortic stenosis and mitral regurgitation is currently an accepted treatment. Mechanical and biological surgical prosthetic heart valves are two distinct types that are based on the leaflet's content. Although more prone to thrombosis, mechanical heart valves (MHVs) are stronger. Bioprosthetic heart valves (BHVs) have more natural hemodynamic characteristics than MHV and are less prone to thrombosis, but they are less long-lasting [5]. Surgical BHVs are either made from a sheet of bovine pericardium or have porcine origins.

It is still up for debate how best to handle PHVT. Depending on the patient's clinical condition, some guidelines (such as those from the European Society of Cardiology) advise surgery, whereas others (such as those from the Society of Heart Valve Diseases) advise thrombolytic therapy for all patients barring contraindications. Due to a lack of randomized controlled trials, no class I recommendation for the management of PHVT has been made in any guidelines to date. The precise incidence of PHVT and the preferred primary treatment have not been known in India.

Material and Methods

The Department of Cardiology, Kurnool Medical College, Kurnool, Andhra Pradesh, India has been conducting this study for January 2020 to January 2022.

Method of collection of data

After receiving approval from the Institutional Ethics Committee, data collection was put into motion. The management of valve thrombosis prior to, during, and following treatment, complications, and follow-up will be documented, as well as its clinical characteristics, causes, and diagnostic features.

A pre-tested, semi-structured questionnaire and clinical assessment are used to evaluate the clinical profile and treatment outcomes. Every patient will receive standard blood tests, an electrocardiogram, and transthoracic echocardiography with PT/INR and APTT. The clinical need is taken into consideration when performing transesophageal echocardiography and fluoroscopy.

The decision to undergo thrombolysis was made after weighing the benefits and risks of each situation.

Inclusion criteria

The study included all patients over the age of 18 who were admitted to the ICU during the study period and had a history of prosthetic heart valve replacement or symptoms of prosthetic valve thrombosis.

Exclusion Criteria

Patients with native valve and degenerative valve disease

- Patients with ischemic heart disease
- Patients with Arrhythmias
- Patients with acute and chronic infections
- Patients with heart failure

Results

Table 1: Age Chart

S.No	Age	Frequency	Percent
1.	24 - 30	4	13.3
2.	31 - 40	12	40
3.	41 - 50	11	36.7
4.	51 - 60	3	10

In present study most common age group of patients were (40%) between 31- 40 years and least common age group of patients were 51- 60 years (10%).

Table 2: Gender Chart

S. No	Gender	Frequency	Percent
1.	Female	7	23.30%
2.	Male	23	76.70%

In present study most common patients were male (77%), female's patients were less common (23%).

Table 3: Type of Valves

S. No	Type of Valve	Frequency	Percent
1	Aortic	6	20
2	Mitral	23	76.7
3	Mitral & aortic	1	3.3

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In present study mitral valve involvement was most common (76.7%), followed by aortic (20%) least common both valves were involved (3.3%).

Table 4: Drug Compliance

S. No	Drug Compliance	Frequency	Percent
1	good	3	10
2	poor	27	90

In present study most common patients were poor adherence of either warfarin or acitrom drugs (90%), good drug compliance around (10%) of patients.

Table 5: INR value

S. No	INR	Frequency	Percent
1	<2.5	27	90%
2	>2.5	3	10%

In present study INR value <2.5 in 90% of patients, INR value >2.5 in 10% of patients.

INR value Vs percentage of patients.

Table 6: Warfarin Vs Acenocoumarol (anticoagulant)

S. No	Anticoagulant	Frequency	Percent
1	Acenocoumarol	27	90%
2	Warfarin	3	10%

In present study warfarin using patients only (10%) remaining (90%) patients are using Acenocoumarol.

Table 7: INR value Vs drug compliance

INR	Drug Compliance	
	Good	Poor
1	2	11
2	1	12
3	0	4

In present study most patients were poor drug adherence having INR below 3.

Table 8: NYHA class chart

S. No	NYHA class	Frequency	Percent
1	2	11	36.7
2	3	14	46.7
3	4	5	16.6

In present study NYHA class 2 patients were 36.7%, NYHA class 3 patients were 46.7%, NYHA class 4 patients were 16.6%.

Table 9: INR Vs NYHA class chart

INR	NYHA			P-value
	2	3	4	
1	9	1	3	0.01
2	2	8	1	
3	6	2	1	

Fisher extract test. P-value are highly Significant
In present study most of the patients having low INR, less number of patients having INR more than 3. INR Vs NYHA class by using fisher test P value was significant.

Table 10: Thrombolysis with STK Vs TNK chart

S. No	Thrombolysis	percentages
1.	STK	63.3%
2.	TNK	36.6%

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In present study all patients underwent thrombolysis with either STK or TNK. STK was used in 63.3% of cases, TNK was used in 36.6% of cases.

Table 11: Success Vs failure of thrombolysis

S. No	Thrombolysis	frequency	percentages
1	Success	28	93.3%
2	failure	2	6.6%

All patients underwent thrombolysis success was seen in 93.3% of patients, Failure was seen in 6.6% of patients.

Table 12: complications during thrombolysis

S. No	Complication	Frequency	Percent
1	Embolism	6	20%
2	Bleeding	3	10%
3	Death	1	3.30%

In present study complications during thrombolysis embolism in 20% cases, bleeding in 10% of cases, death only 3.3% of cases

Table 13: INR Vs embolism chart

Embolism	INR			P-Value
	1-2	2-3	>3	
Yes	6(46.2%)	0	0	<0.01
No	7(53.8%)	13(100%)	4(100%)	

Fisher exact test is used. P-value is Significant.

In present study embolism cases occur between INR value 1-2, less common with high INR values. Fisher exact test is used P value is significant.

Statistical Analysis

Continuous variables are shown as mean and standard deviation when the data has a normal distribution; otherwise, they are shown as median and range. In categorical variables, frequencies and percentages are used as representations. Chisquare and Fisher's exact tests were used to determine the statistical significance between the groups. R studio was used for the data analysis.

Discussion

Any valve position can experience an incidence of prosthetic heart valve thrombosis (PHVT) as high as 13% in the first year, and mechanical prostheses in the tricuspid position can experience PHVT as high as 20%. The incidence of the prosthesis is 0.5% to 6% per patient per year, with the mitral area having the highest incidence [6-8].

Estimates of the inadequate anticoagulation range from 1% to 4% annually. Asymptomatic non-obstructive PHVT is 50% common, and in the early postoperative period, it may increase to 10% [9]. It makes a sizable contribution to the late morbidity and mortality following heart valve surgery. The three main causes of PHVT are atrial fibrillation, poor anticoagulation, and severe LV dysfunction. Valvular thrombosis was the most prevalent prosthesis-related complication discovered at autopsy in a recent series, occurring in 23% of mechanical and 11% of bio-prosthetic valves [10].

During the study period, all patients older than 18 years with a history of prosthetic heart valve replacement and symptoms of prosthetic valve thrombosis in Kurnool were included.

Patients with ischemic heart disease, native valve and degenerative disease, patients with arrhythmias, and patients with acute and chronic infection

The study excluded patients with heart failure and those for whom thrombolysis was contraindicated. Every patient will go through standard blood tests, an electrocardiogram, transthoracic echocardiography, PT/INR, and APTT. The clinical need is taken into consideration when performing transesophageal echocardiography and fluoroscopy.

The decision to undergo thrombolysis was made after weighing the benefits and risks of each situation.

Age

In the present study of prosthetic valve thrombosis, the most common age group of patients were (40%) between 31-40 years, and the least common age group of patients were 51- 60 years (10%).

Roudaut *et al*. study showed that the mean age of patients was in 50-64 years [11].

According to Boukarroucha R *et al*. study showed that the most common age group of patients were 30-39

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years [12].
Silber H *et al*. study showed that in their study mean age of patients was 66.8+/- 19 years [13].
Carcerus lorgia H *et al*. study reported that the mean age of patients was 40.4 years [14].
The patients were 39.412.5 years old on average, according to a study by Patil S *et al*. The majority of cases affected people between the ages of 36 and 40, while the youngest age group was represented by the fewest cases [15].
Reddy YVS *et al*. study showed that in their research mean age group of patients was 30-40 years [16].
E Reyes cerezoycols *et al*.'s study showed that the mean age of patients was 47.5+/-13 years [17]
Karthikeyan *et al*. randomized trial showed that the most common age of patients 31-34 years [18].
Bade *et al*. study showed that a total number of 34 patients, among them 24 patients were <40 years (70.6%) and ten patients were >40 years (29.4%) [19].
Pradhan *et al*. study showed that a total of 16 patients with Prosthetic valve thrombosis were enrolled with a mean age of 40 ± 11.6 years [20].
Kumar Aditya *et al*. study showed that a total number of 96 patients with prosthetic valve thrombosis mean age was 36.4+/-10.6 years [21].
Kathrivel D *et al*. study showed that a total number of 47 patients with prosthetic valve thrombosis having a mean age of 33+/- 19 years [22].
Grace Huang *et al*. study showed that in their study mean age of patients was 32-61 years [23].
Inamdar *et al*. reported in their study the mean age of patients was 30.9 years [24].
Ozkan *et al*. study showed that the mean age of patients was 36+/-12 years [25].
Nawale *et al*. study showed that the mean age of patients was 35.2+/-12.2 years [26].
Vasan *et al*. study showed that men age of patients was 40.8+/-13.6 years.

Sex
In the present study, the most common patients were male (77%), females patients were less common (23%), and no pregnant females in this study.
Roudaut *et al*. study showed that among 127 cases, female patients were 63.6%, male patients were 36.4%.
Boukarroucha *et al*. females are predominant with a sex ratio of 0.25(164 women and 41 men). Twenty-eight patients had pregnancy at a different age.
Reddy YVS *et al*. study showed that 60% were female patients, 40 were male.
Patil S *et al*. study showed that the Majority of the patients were females; 68 (61.8%) and 42 (38.2%) were males.
E Reyes Cerezo Y cols *et al*. study showed that most of the patients were females 64%, Males patients were 36%
Karthikeyan *et al*. randomized control study revealed that most common in females, 24% Silber H *et al*. study showed that a total number of 17 patients among them 13 patients were women remaining four patients were male patients.
Bade *et al*. study showed that a total number of 34 patients, among them ten patients were males (29.4%), 24 patients were female patients (70.6%).
Pradhan *et al*. study showed that a total number of 16 patients, ten patients (62.5%), were females, remaining six patients (38.5%) were male patients.
Kumar Aditya *et al*. study showed that among 96 patients, male's patients were 38(39.5%), female patients were 58 (60.4%).
Kathrivel D *et al*. study showed that among 47 patients, 28 were male patients (59.6%) 19 patients were female patients (40.4%).
Grace Huang *et al*. study showed that female patients were 59% and male patients were 46%.
Inamdar *et al*. study showed that out of 15 patients, eight patients were (53%) female, and seven patients were male (46%) patients.
Ozkan *et al*. study showed that 32 symptomatic patients with mechanical heart valves male patients were 13, female patients were 19.
Nawale *et al*. study showed that among 21 patients, 62% were females, male patients were 38%.
Caceres lorgia H *et al*. study showed that in their study, males were 22%, females were 77%.
Vasan *et al*. study showed that among 16 patients, six patients were male, ten patients were female patients [27].
In the present study, rheumatic heart disease is the most common etiology for prosthetic valve replacement, i.e., almost all cases were rheumatic etiology.
Kamthornthanakarn *et al*. study showed that two-thirds of patients (70.5%) having rheumatic valve etiology, ruptured chordate (17.5%), prolapsed (11%), others (2%) [28].
Patil S *et al*. study showed that the predisposing factor leading to valve [15] the replacement was rheumatic heart disease in the Majority (93.6%) of the patients.
Ozkan *et al*. in their study reported as all 32 patients had rheumatic etiology [25].
In the present study, the most common valve involved is mitral valve involvement (76.7%), followed by

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aortic (20%) least standard valves were involved (3.3%).
Roudaut *et al*. study reported that among 127 cases, mitral valve involvement in 79 patients, aortic valve involvement in 46 patients, one case tricuspid valve, one case both mitral and tricuspid valve involvement [11].
Reddy YVS*et al* study showed that a total number of 50 cases of mitral valve involvement was (80%), Aortic valve involvement (10%), mitral and tricuspid valve involvement (10%) [16].
Patil S *et al*. study showed that mitral valve involvement (59.1%), aortic valve involvement (22.7%), mitral and aortic valve (18.2%) [15].
Karthrivel D *et al*. study showed that in their study, all prosthetic valve thrombosis cases having mitral valve thrombosis [22].
Pradhan *et al*. study showed that mitral valve involvement (68.8%) cases, aortic valve involvement in (25%) of cases, both mitral and aortic valve involvement in (6.25%) cases [29].
Grace Haung *et al*. study showed that mitral valve thrombosis (68%) of patients and aortic valve thrombosis in (21%) of patient [23].
Silber H *et al*. study showed that aortic valve involvement in 11 patients, mitral valve involvement in 6 patients [13].
Karthikeyan *et al*. study showed that mitral involvement in 68%, aortic in 23%, involvement of both aortic and mitral valve in 9% of patients [18].
Bade *et al*. study showed that all cases were stuck valves of mitral valve [19].
Carcara Loriga *et al*. in their study, showed that mitral valve involvement in (73.5%) cases, tricuspid valve involvement in (13.5%), Aortic valve involvement in (13.2%) of patients [14].
Gupta D *et al*. study reported a series of 110 patients with thrombosis of the mitral valve (96 patients), and aortic valve (14 patients) [30].
Inamdar *et al*. study showed that out of 15 patients, three patients had aortic valve thrombosis (20%), remaining all other patients had mitral valve prosthesis obstruction (80%) [24].
Ozkan *et al*. study showed that among 32 patients, 23 patients had mitral valve involvement, seven patients had aortic valve involvement, and one patient had tricuspid valve involvement [25].
Nawale *et al*. study showed that mitral involvement in 90.5%, Mitral and aortic valve involvement in 9.5% [26].
Vitale *et al*. study showed that all cases of thrombolysis 7 cases were mitral valve involvement, one case had aortic valve involvement [31].
Vasan *et al*. study showed that among 16 patients, 13 patients had mitral valve involvement, three patients had aortic valve involvement [27].

Symptoms at presentation

In the present study, the most common symptom at presentation was dyspnoea, other symptoms like pedal edema, palpitations.
In the present study, NYHA class II patients were 36.7%, NYHA class III patients were 46.7%, NYHA class IV patients were 16.6%.
Roudaut *et al*. study showed that among 127 cases, NYHA class IV in 38.6% cases, NYHA class III in 32.3% cases, NYHA class I /II patients were 29.2%
Karthikeyan *et al*. study showed that NYHA class I (19%), NYHA class (59%), NYHA class III (10%), NYHA class IV (12%) [18].
Carcerus lorgia H *et al*. study showed that among 68 patients, the presentation generally heart failure NYHA class III-IV in 94.1% of patients [14].
Bade *et al*. study showed that dyspnoea with NYHA class I-II (38.3%), NYHA class III-IV (64.5%) [19].
Silber H *et al*. study showed that four patients present with pulmonary edema, nine patients present with breathlessness, syncope in one patient, Cerebrovascular accident in one patient.44
Grace Haung *et al*. study showed that NYHA class I/II in 35% of patients, NYHA class III/IV 65% of patients [23].
Kathirvel D *et al*. study showed that all patients were presented with dyspnoea of NYHA class III or IV. The duration of dyspnoea ranges from 2 days to 2 weeks. Only two patients had a fever [22].
Pradhan *et al*. study showed that the most common symptom at presentation was dyspnoea. NYHA class III (6.25%), class I in (43.7%), class II in (25%) of patients [29].
According to the Reddy NK *et al*. study, the majority of patients (33/44) were in the New York Heart Association functional class IV, with 8 of them being in shock and 11 being in class III [32].
Study by Patil S. *et al*. revealed that NYHA class I was 1 (0.9%), class II was 46 (41.8%), class III was 48 (43.6%), class IV was 10 (9.1%), pedal edema was 3 (2.7%), and asymptomatic was 2 (1.8%) [15].
Gupta D *et al*. study showed that among 110 patients, NYHA class I patients (3.6%), NYHA class II (19.1%), NYHA class III (46.4%), NYHA class IV (24.5%), cardiogenic shock (6.4%), Atrial fibrillation in (31.8%) patients [30].
Dyspnea, congestive heart failure, and palpitation were the main clinical signs reported by Kumar Aditya *et al*. at the time of admission. NYHA III/IV was the condition of 83 patients (86.46%) with thrombosed

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mitral valve prosthesis.
NYHA class I-II 13(13.5%), NYHA class III 41 patients (42.7%), NYHA class IV patients 42 (43.7%) [21].
186 mitral valves, tricuspid valves, and 8 aortic valves and mitral-tricuspid thrombosis were found in the Boukarroucha R *et al*. study, which demonstrated that the mitral position of thrombosis predominates [12].
Inamdar *et al*. study reported as all patients have NYHA class III and class IV. 33% patients were NYHA class III, and the remaining patients were in NYHA class IV (67%) [24].
Ozkan *et al*. study showed that the most common symptom at presentation was dysnoea [25].
Nawale *et al*. study showed that all 21 patients presented with dyspnoea, NYHA class II patients were 9.5%, NYHA class III patients were 38.1%, NYHA class IV patients were 52.4% [26].
Vasan *et al*. study showed that among 13 mitral valve involvement patients, six patients had NYHA class IV, four patients had NYHA class III, only three patients had NYHA class II [27].
In the present study, all patients (30 patients) underwent both TTE. TEE is done after hemodynamic stabilization of patients. Cine fluoroscopy was done in 13 patients.
In the present study, among 30 patients st Judes valve in 14 patients, TTK Chitra valve in 13 cases, Starr Edwards valve in one patient, Medtronic valve in 2 cases.
In the present study, 90% of patients had a history of poor drug adherence with anticoagulants, only 10% of patients had a history of good drug adherence with anticoagulants.
Regarding anticoagulant usage, 10% of patients were warfarin usage, 90% of patients were using acenocoumarol.
In present study INR range1-2 in 43.3% patients, INR range 2-3 in 43.3 % patients, INR value >3 in 13.3% of patients. Most of the patients having low INR.
Roudault *et al*. study showed that among 127 patients, nearly half of patients not receiving anticoagulant therapy at the time of diagnosis of thrombosis [11].
Inamdar et study showed that poor anticoagulant drug adherence in 40% of cases [24].
Nawale *et al*. study reported that subtherapeutic INR <2.5 value in 90.5% patients [26].
Grace Haung *et al*. study showed that most of the patients having a subtherapeutic range of INR value [23].
Silbert *et al*. study showed that anticoagulation was subtherapeutic in all cases [13].
Carcerus lorgia H *et al*. study showed that adequate anticoagulation in 25% of cases, inadequate anticoagulation in 75% of cases [14].
Pradhan *et al*. study showed that subtherapeutic INR in 87.5% of patients [29].
Patil S *et al*. study showed that a total of 20.9% of patients were poorly compliant with anticoagulant [15].
Kathrivel D *et al*. study showed that INR was subtherapeutic in 90.3% of patients [22].
Inamdar *et al*. study showed that INR of all patients except two was in the subtherapeutic range [24].
Karthikeyan G *et al*. study showed that 72% of patients had inadequate anticoagulation at presentation [18].
Ozkan *et al*. study showed that all patients have subtherapeutic INR level at presentation [25].
Reddy NK *et al*. study showed that anticoagulation status was inadequate in 70% of cases [32].
Boukarroucha *et al*. study showed that the most common predisposing factor for prosthetic valve thrombosis was poor anticoagulation compliance [12]

S. No	Name of study	Adequate anticoagulation(no. of patients)	Inadequate anticoagulation(no. of patients)
1	Aoyagi *et al*. [33]	14	6
2.	Montegia *et al*. [34]	6	13
3.	Lengrel *et al*. [35]	70	15
4.	Lopez *et al*. [36]	7	8
5	Renzulli *et al*. [37]	191	48
6.	Ramoes [38]	6	11
7	Ermis *et al*. [39]	10	23
8.	Bollag *et al*. [40]	2	11
9.	Ozkokeli *et al*. [41]	15	15
10.	Lafci *et al*. [42]	5	13
11.	Toker *et al*. [43]	35	28
12.	Ahn *et al*. [44]	6	14
13.	Present study	3	27

Aditya Kumar *et al*. study showed that a total of 75 patients (79.78%) were not taking adequate anticoagulant therapy at the time of diagnosis of the valve thrombosis as noted by their INR at the time of admission [21].
In the present study, most of the patients with INR value <2.5 in 90% of cases and INR value >2.5 in only 10% of cases.
In the present study, the comparison between patient INR versus NYHA class at the presentation by using fisher t-test was significant. (P value: 0.01).
Patients having low INR values are more prone to Prosthetic valve thrombosis. This low INR mainly due to poor anticoagulant drug adherence and lack of regular follow-up of patients.

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In the present study, all 30 patients presented with the prosthetic valve thrombosis confirmed by TTE, TEE, cineflouroscopy in required cases. Then all patients have undergone thrombolysis with either STK or TNK. Thrombolysis was done in all patients with STK in 63.3%, TNK was used in 36.8%.
Thrombolysis was a success in 93.3% of patients, failure of thrombolysis in 6.6% of patients.
Complications during thrombolysis were embolism in 20% of cases, Bleeding in 10% of cases, death occurred in (3.3%) of patients.
Systemic thrombolytic therapy is currently making a leading role in the management of prosthetic valve thrombosis [45].
Silber *et al*. study showed that 83% of patients responded to thrombolysis, only two patients were failed thrombolysis. Complications during thrombolysis were one patient had a transient ischemic attack, 4 out of 12 patients had minor bleeding complications [13].
Cacerus lorgia *et al*. study showed that a total number of 68 patients were undergone thrombolysis, success in 91.2% of patients. Complications during thrombolysis embolism occurred in 7.4% of patients, and hemorrhage occurred in 4.4% of patients [14].
Karthikeyan *et al*. study showed that thrombolysis in NYHA class I/II complete clinical response in 74% of patients, complications like death, embolic stroke, and CNS embolism occurred in 13% of patients. In NYHA class III/IV patients, complete thrombolysis response in 24% of patients, complications like death, embolic stroke occurred in 24% of patients [18].
Pradhan *et al*. study showed that thrombolysis was successful in 81.25% of patients, complications like a death in 12.5% of patients [29].
Vitale *et al*. study showed that among 28 cases, eight patients were undergone thrombolysis, success in all cases. Major or minor complications and death did not occur during thrombolysis [31].
Bade *et al*. study showed that thrombolytic therapy with STK achieved an overall 91.2% cases freedom from complications, 2.9% cases embolism, 2.9% allergy, 2.9% cases death was occurred [19].
Patil S *et al*. study showed that thrombolysis was the initial treatment in 95.5% of patients, STK most commonly used (78%) cases, urokinase was used in 22% of cases. success in 90.5% cases, complications like an embolism in 8.6% cases, Major bleeding in 1.9% cases, mortality was in 6.6% of patients [15].
Gupta D *et al*. study showed that among 110 patients, STK was used in 108 patients, urokinase was used in 2 patients. Success in 81.8% of patients, partial response in 10% of cases, failure in 8.2% of cases. Complications like embolic episodes have occurred in 19.1% of cases [30].
Roudaut et's study showed that among 127 patients, STK was used for thrombolysis in 49 patients, urokinase was used in 41 patients, rtpa was used in 37 patients. Success has occurred in 70.9% of patients, partial success in 17.3% of cases, no change in 11.8% of cases. Complications like major bleeding in 4.7% of patients, embolism & stroke in 15% of cases, death have occurred in 11.8% of cases [11].
Nawale *et al*. study showed that all 21 patients were undergone thrombolysis with STK.complete success in 76.2%, partial success in 9.5% cases, mortality in 14.3% of cases, 4.8% cases had an embolism, two patients had minor bleeding [26].
Kathrivel D *et al*. study showed that among 47 patients with 52 episodes of thrombolysis, 40 patients thrombolysis with STK,12 patients thrombolysis with TNK. complete success with STK in 77.5%, partial success in 20% of cases. TNK complete success in 75% of cases, partial success in 25% of cases. Complications like minor bleeding occurred with TNK, embolic stroke (12.5%), one death occurred with STK [22].
Inamdar *et al*. study showed that a total number of 15 cases undergone thrombolysis, there was no major complications of thrombolysis except one case have bleeding per vagina [24].
Ozkan *et al*. study showed that overall success of thrombolysis in 91.6% of cases, complications like death (2.8%), coronary embolism in (2.8%), cerebral embolism in (2.8%), minor bleeding in (8.3%), one patient died [25].
Aditya Kumar *et al*. study among 86 patients with thrombolysis, complete resolution in 53.4%, partial resolution in 26.7% of cases, no change in 19.7%. Complications were observed in 27 patients death in (8.5%), major bleeding in (3.1%), systemic embolism in (9.5%) [21].
Reddy NK *et al*. study showed that overall success of thrombolysis in 88.6% of cases, complications related to thrombolysis three patients had major bleeding, one patient had minor bleeding, one patient had left hemiplegia [32].
Vasan *et al*. study showed that all 16 patients undergone thrombolysis with STK, thrombolysis was successful in all cases. only two patients had systemic embolism [27].
In the present study, thromboembolic episodes more occurred during thrombolysis was patients having low INR value.

Conclusion

The present study was done retrospectively, a total number of 30 patients with prosthetic valve thrombosis satisfied with inclusion criteria were clinically examined and 2DECHO, TTE, TEE, Flouroscopy was done. Thrombolysis was done in all patients with STK in 63.3%, TNK was used in 36.8%. Success in 93.3%, failure 6.6%. In present study complications during thrombolysis embolism in 20% cases, bleeding

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in 10% of cases, death only 3.3% of cases In present study success following thrombolysis (93.3%), failure of thrombolysis patients were (6.7%).

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