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Research Article

Prevalence and Evaluation of Complications in Valvular Heart Disease Patients In Tertiary Care Hospital

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ABSTRACT

Background: One of the major outcomes of valvular heart disease have been chronic complications that in turn have led to the reduced quality of life of patients. These complications have indeed caused immense burden on the health care system and has led to increased mortality rate. **Objective:** To determine prevalence rate and to evaluate complications of valvular heart disease patients**. Methods:** This is a cross sectional-based study carried out in a single hospital in Hyderabad, India. The survey was carried out over a year in India. The source of data collection was through case sheets and lab reports. **Results:** Of the total 102 subjects, valvular diseases were more prevalent in the age group of 51-60 and females were found to be more affected than males. Complications were less or equal to no after the procedure of valve replacement was performed in patients with severe cases though some patients showed complications even after surgery, but were stable after a long time of monitoring. 1% of valve prolapse cases were seen and 3% deaths due to the disease. St.jude mechanical valve of different sizes, 19 EPR biological valve and aortic valve implants were majorly used for valve replacement procedure. **Conclusion:** The study concludes that valvular diseases are more prevalent in the age group 51-60, and females were more affected by valvular diseases than males. Hypertension and diabetes mellitus were found to be the major comorbidities in valvular heart disease patients.

Keywords: Valve prolapse, Cardiac arrests, St.jude mechanical valve, EPR biological valve, Hypertension, Diabetes mellitus.

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INTRODUCTION:

Valvular heart condition also called heart valve disease is any heart related disease or disorder involving one or more of the four valves of the heart (the aortic and mitral valves on the left side of heart and therefore the pulmonic and tricuspid valves on the proper side of heart). These conditions occur largely as a consequence of ageing,[1] but may additionally be the results of congenital (present from birth) abnormalities or specific disease or physiologic processes including rheumatic heart condition and pregnancy.[2] Anatomically, the valves are a part of the dense heart tissue called the cardiac skeleton and are accountable for the regulation of blood flow through the heart to the entire body(fig.1). Valvular failure or valve dysfunction may occur in diminished heart functionality, though the particular consequences are hooked into the type and severity of valvular disease.

Classification of Valvular Heart Disease:

Valvular heart disease occurs when one or more than one valves of the heart are damaged due to which they cannot open or close properly. If more than one heart valve is involved then it is called "multiple valvular heart disease"(fig.2).

- Stenosis- It occurs when the opening of the valve is narrowed and that leads to restricted blood flow
- Prolapse- It's when the valve moves out of place or when the valve's flap or leaflet do not close properly
- Regurgitation occurs when blood flows backward or leaks backward through the valve, it may be sometimes due to prolapsed.

Valvular heart disease can be classified as mild, moderate or severe. It can lead to cardiomegaly or heart failure

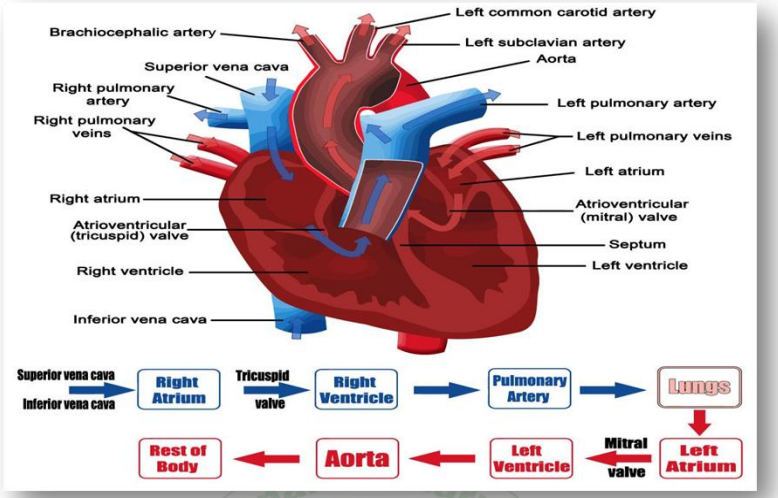

Figure 1: Heart's Anatomy

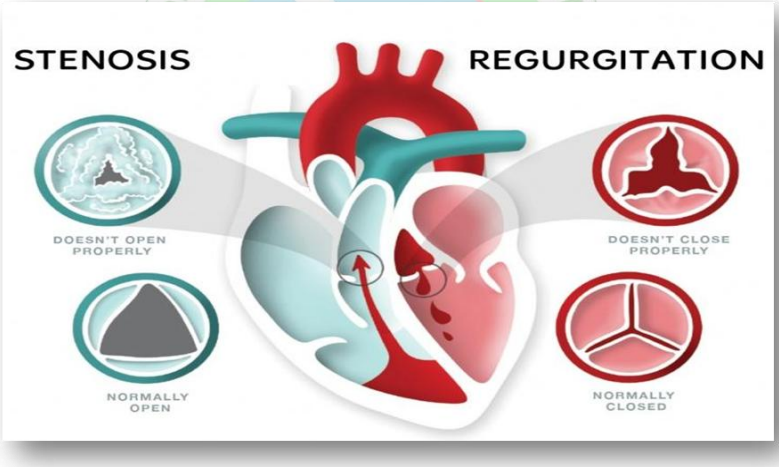

Figure 2: Stenosis and Regurgitation Visual Presentation

In between every step, the valve closes to prevent blood from flowing or leaking backwards, this prevents the mix up of oxygenated and deoxygenated blood. The blood flows throughout the body in a one-way direction[3] Due to disease valves becoming "leaky" or they lose the ability to fully close this condition is called regurgitation. When this happens, blood flows back into the chamber that it came from and then the heart cannot pump enough blood forward[4] If the heart valves are damaged due to certain diseases, the heart cannot pump blood efficiently throughout the body and has to work harder to pump the blood. These conditions can lead to sudden cardiac arrest, heart failure, stroke or in severe cases may cause death of the patient[5] The prevalence of Rheumatic heart disease(RHD) has greatly reduced in developed countries; however, increasing life expectancy and atherosclerotic related risk factors has contributed to increase the risk of acquiring age-related degenerative valvular heart disease (VHD). Although the patterns of valvular heart disease differ among these countries, but the burden of valvular heart disease continues unabated across the world[6][7][8]Symptoms of valvular disorder may vary depending on the severity of the disease. Usually the presence of symptoms indicates that the heart valve disorder is affecting blood flow. Many patients with mild or moderate heart valve disorder may not experience any symptoms. However, signs and symptoms may include: Shortness of breath (Dyspnea), Heart palpitations, Fatigue, Chest pain, Dizziness, Fainting, Headaches, Cough, Water retention (edema), which can cause swelling in the lower

extremities and abdomen, Pulmonary edema, which is caused by excess fluid in the lungs. [9-11]

MATERIALS AND METHODS:

Study Site: This study is conducted in the care hospital, Banjara hills, Hyderabad. It is a retrospective observational study conducted for 6 months with sample size of 102 Patients.

Study Criteria: We have included Adults (patients of either sex, above 12 years of age), Patients suffering from valvular diseases, Patients with a history of certain infections that affect the heart, Congenital heart disease patients. We have excluded Pediatrics, Pregnant and lactating women, Patients without any heart problem, Patients on dialysis

Data Collection: The study was started after approval from IRE committee Care hospital. Inpatient case forms were collected which complied the inclusion and the exclusion criteria of the study. The data will be collected using a patient profile form which was designed to include all the variables which are required for the study. The data was collected for 6 months which includes inpatient cases from the last year. (January 2020- Dec 2020).

Statistical Analysis: Statistical analysis will be carried out utilizing Microsoft Excel and Statistical Package for Social Services (SPSS) 20 version. P value less than 0.05 was considered as statistically significant at 5% level of significance with confidence interval of 95%. All outcomes were presented using descriptive statistics; normally distributed data by the mean and standard deviation (SD). Binary and categorical variables were presented using counts and percentages. The results were analysed by the chi-square test.

RESULTS AND DISCUSSION:

Prevalence Based On Age: There has been a significant impact of valvular disease related morbidity and mortality and understanding the importance of epidemiology and prevalence of valvular diseases affecting health care sources (table.1). The present study exclusively targeted valvular disease patients in the region of Hyderabad.

Table:1 Distribution Based on Age

Age Interval (Years)	Frequency	Percentage
21-30	7	7
31-40	8	8
41-50	15	15
51-60	31	30
61-70	16	16
71-80	18	17
81-90	7	7

Of the total 102 subjects, 7(7%) were in the age group of 21-30, 8 (8%) were in the age group of 31- 40, 15(15%) were in the age group of 41-50, 31(30%) were in the age group 51-60, 16 (16%) were in the age group 61-70, 18 (17%) in the age group 71-80, 7(7%) In the age group 81-90. Hence it was seen that valvular diseases are more prevalent in the age group 51-60(fig.3).

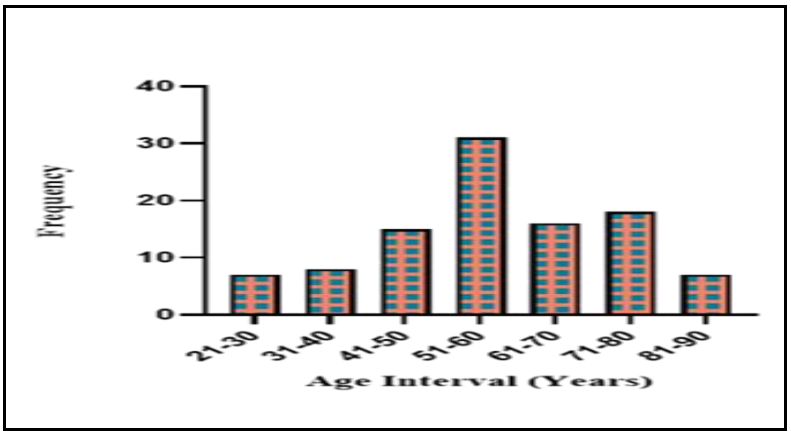

Figure 3: Distribution Based on Age

Prevalence Based On Gender

45 of them (44%) were found to be male and 57 (56%) were found to be female which indicates prevalence is more in females (table 2) and (fig.4)

Table: 2 Distributions Based on Gender

Gender	Frequency	Percentage
Male	45	44
Female	57	56

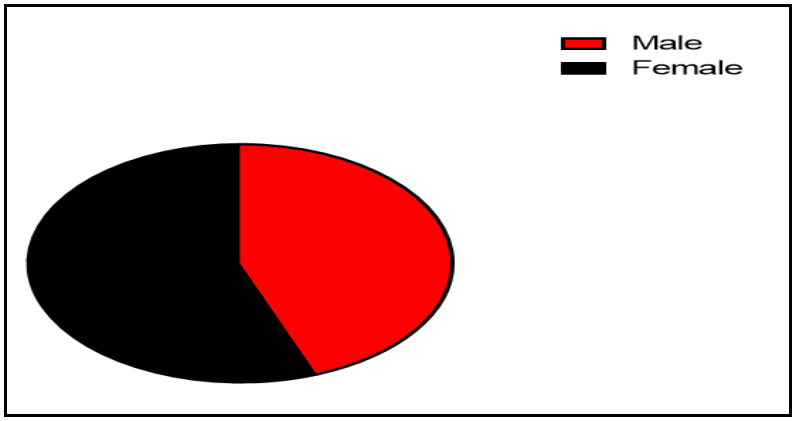

Figure: 4 Distribution Based on Gender.

Comorbidities: The study found that 50 subjects (49%) had Hypertension and 47 (46%) had Diabetes mellitus as major comorbidities, Psoriasis, asthma, obesity, hypothyroidism, epilepsy, hyperlipidaemia, chronic kidney disease, respiratory tract infection, urinary tract infection, and anaemia, were the other comorbidities seen.(2%,4%,2%,7%,1%,1%,1%,1%,4%,4% respectively)(table.3) and (fig.5)

Table 3: Comorbidities Wise Distribution

Comorbidity	Frequency	Percentage
Hypertension	50	49
Diabetes mellitus	47	46
Psoriasis	2	2
Asthma	4	4
Obesity	24	24
Hypothyroidism	7	7
Epilepsy	1	1
Hyperlipidemia	1	1
Chronic kidney disease	11	11
Respiratory tract infection	1	1
Urinary tract infection	1	4
Anemia	4	4

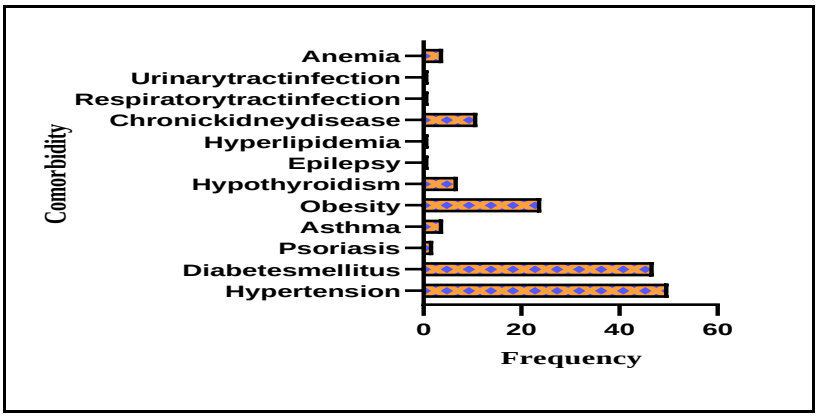

Figure 5: Comorbidities Wise Distribution

DIAGNOSIS OF STUDY POPULATION: Among the total subjects studied ,the primary diagnosis seen were chronic rheumatic heart disease (37%),aortic regurgitation(4%), pulmonary atrial hypertension(6%), tricuspid valve regurgitation(2%), mitral stenosis(28%), decompensated heart failure(11%), atrial fibrillation with CVR (5%),heart failure (18%), dilated cardiomyopathy (3%),valve thrombosis(1%), aortic stenosis(24%),mitral regurgitation (10%) contributing to the study. (Table.4 and fig.6)

Table: 4 Diagnosis of Study Population

Diagnosis	Frequency	Percentage
Chronic rheumatic heart disease	38	37
Aortic regurgitation	4	4
Pulmonary atrial hypertension	6	6
Tricuspid valve regurgitation	2	2
Mitral stenosis	29	28
Decompensated heart failure	11	11
Atrial fibrillation with CVR/FVR	5	5
Heart failure	18	18
Dilated cardiomyopathy	3	3
Valve thrombosis	1	1
Aortic stenosis	24	24
Mitral regurgitation	10	10

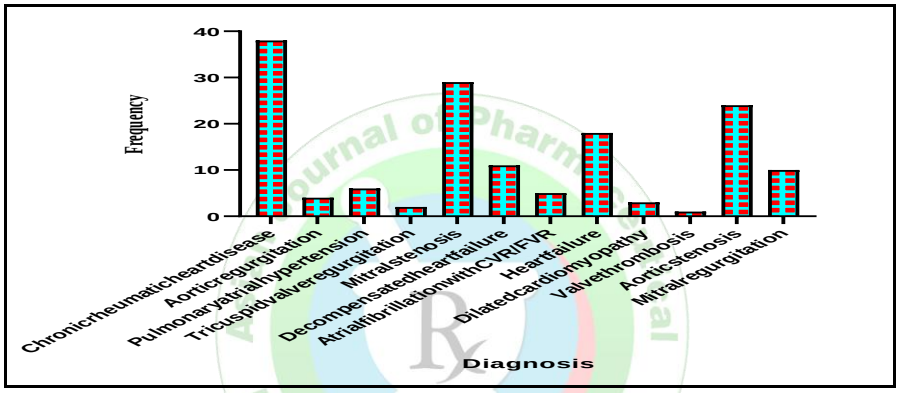

Figure: 6 Diagnosis of Study Population

Study on Severity of The Condition:

The study shows the severity of valvular diseases to be 48% (49), 8% moderate (8) and 48% mild (44) (Table.5 and fig.7) we found that age between 51-60 are higher with disease prevalance and females are found greater number than males in Severity.

Table: 5 Severity of Disease

Severity	Frequency	Percentage
Mild	45	44
Moderate	8	8
Severe	49	48

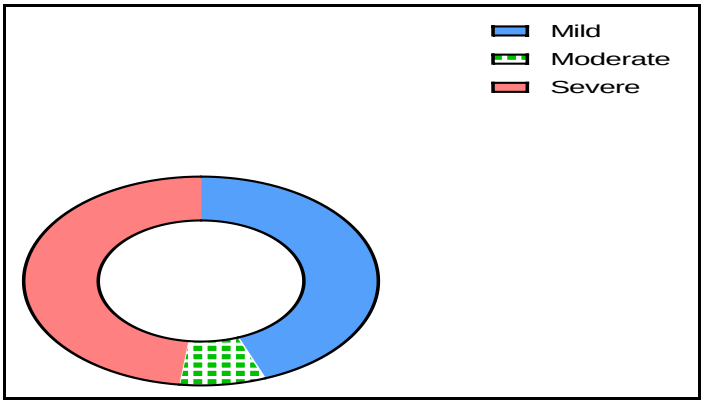

Figure:7 Severity of Disease

REQUIREMENT OF SURGERY: It was found that not all subjects require surgery, out of 102, 58% (59) required surgery and the rest 42% (43) could be managed with medical treatment. (Table.6 and fig.8)

Table: 6.Surgery

Surgery	Frequency	Percentage
Yes	59	58
No	43	42

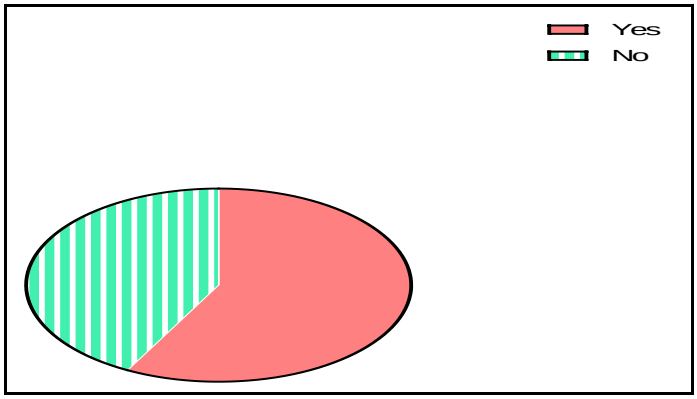

Figure: 8 Surgery

VALVES USED IN THE STUDY POPULATION: Among the 58% (59) who required valve replacement, the main valve used ,was found to be 27 SJ mechanical valve (14%), 29 SJ mechanical valve 8%(8), 31 SJ mechanical valve 8% (80),25 SJ mechanical valve ,19 EPR biological valve 2% (2), aortic valve implant 5% (5) (Table 7 and fig.9)

Table 7: Valves Used in Surgical Procedure

Valve	Frequency	Percentage
19 EPR biological valve	2	2
25 SJ mechanical valve	2	2
27 SJ mechanical valve	14	14
29 SJ mechanical valve	8	8
31 SJ mechanical valve	8	8
Aortic valve implant	5	5
Not used	63	61

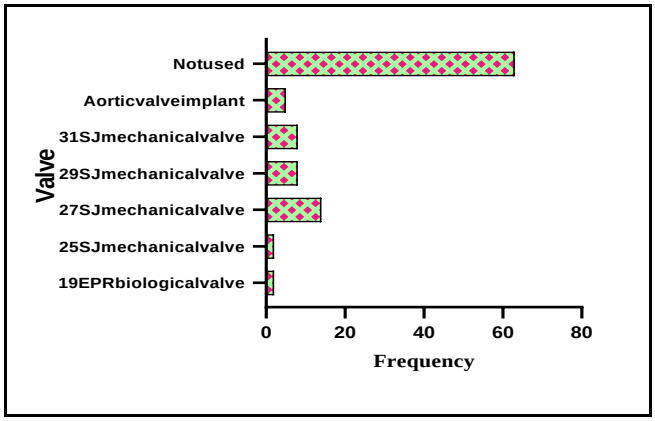

Figure: 9 Valves Used in Surgical Procedure

Complications before Surgery: Complications that were seen in patients before surgery were majorly shortness of breath 77% (79), cough 31% (32), palpitation 20% (20), chest pain 20% (20). Orthopnea, sweating, difficulty in walking, fever, pedal oedema, drowsiness, generalised weakness, chest discomfort, vomitings were seen as other complications (8%, 5%,1%,2%, 7%,3%,3%,5%,5% respectively). (Table.8)

Table: 8 Complications before Surgery

Complications	Frequency	Percentage
Shortness of breath	79	77
Palpitation	20	20
Orthopnea	8	8
Sweating	5	5
Chest pain	20	20
Difficulty in walking	1	1
Fever	2	2
Cough	32	31
Swelling of feet (pedal edema)	7	7
Drowsiness	3	3
General weakness	3	3
Chest discomfort	5	5
Vomiting	5	5

Outcomes of The Surgery: The outcome of surgery was found to be fairly good as 92% (94) were found to be stable after the surgery. While some patients dealt with shortness of breath, arm pain, stent thrombosis, hypotension, hypertension (1%,1%,1%,1%,1%, respectively and death seen in 3% (3). (Table.9)

Table: 9 Outcome of Surgery

Outcome	Frequency	Percentage
Stable and discharged	94	92
Shortness of breath	1	1
Arm pain	1	1
Stent thrombosis	1	1
Hypotension	1	1
Hypertension	1	1
Death	3	3

Outcome Based on Disease Severity: Most Severe cases were discharged with very few complaints, out of 49 Severe cases 47 were Stable, 1 patient had Hypotension and 1 patient was found dead. (Table.10) and (fig.10)

Table: 10 Outcome of Surgery Based on Disease's Severity

Outcome	Severity		
	Mild	Moderate	Severe
Stable and discharged	40	7	47
Shortness of breath	1	0	0
Arm pain	1	0	0
Stent thrombosis	0	1	0
Hypotension	0	0	1
Hypertension	1	0	0
Death	2	0	1

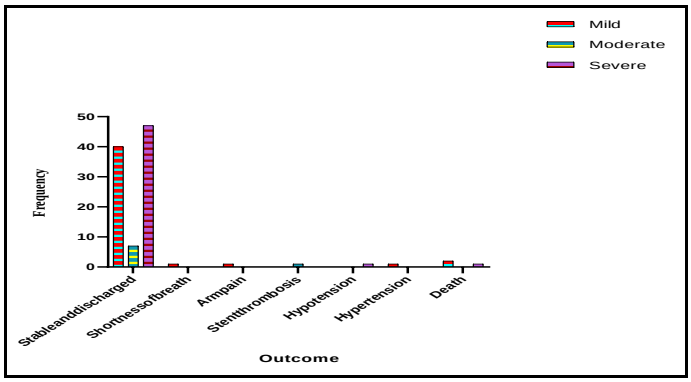

Figure: 10 Outcome of Surgery Based on Disease Severity

CONCLUSION:

Complications are less or equal to no after the surgery is performed in patients and future efforts are to be directed towards improving early diagnosis and minimise complications caused and reduce the mortality rate. The study concludes that valvular diseases are more prevalent in the age group 51-60, and females were more affected by valvular diseases than males. Hypertension and diabetes mellitus were found to be the major comorbidities in valvular heart disease patients. Mitral stenosis, aortic stenosis, mitral regurgitation, chronic rheumatic heart disease were the majorly diagnosed conditions among the samples. The valvular diseases were either mild which could be managed with medication or very severe which needed surgery. Very few moderately severe cases were seen. St. jude mechanical valve (sizes 25,27,29,31) aortic valve implant , 19 EPR biological valves were used for surgeries. Shortness of breath, palpitation, chest pain ,and cough were the major complications seen in such patients which were fairly resolved after the procedure while some patients dealt with a few complications even after the surgery.

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CONFLICTS OF INTEREST:

The authors declare that there is no conflict of interest.

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