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ORIGINAL RESEARCH ARTICLE

A CLINICAL STUDY OF PATIENTS WITH MITRAL VALVULAR HEART DISEASE IN OSMANIA HOSPITAL

Dr Jampla Jarpula[1], Dr B Krishna Kishore[2*]

[1]Assistant Professor, Department of Cardiothoracic Surgery, Osmania Medical College and Hospital, Hyderabad, Telangana, India

[*2]Assistant Professor, Department of Cardiothoracic Surgery, Osmania Medical College and Hospital, Hyderabad, Telangana, India.

Corresponding Author: Dr B Krishna Kishore, Assistant Professor, Department of Cardiothoracic Surgery, Osmania Medical College and Hospital, Hyderabad, Telangana, India. Email: kishore69medico@gmail.com

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ABSTRACT

Background: Mitral valvular heart disease (MVHD) encompasses a spectrum of pathologies affecting the mitral valve, including mitral stenosis (MS), mitral regurgitation (MR), and combined lesions. Understanding the clinical presentation, epidemiology, and surgical outcomes of MVHD is crucial, especially in tertiary care centres managing complex cases. **Objective:** To study the clinical presentation, epidemiology, and surgical outcomes of patients with MVHD attending Osmania General Hospital (OGH) over 18 months.

Methods: This prospective observational study included 25 patients with MVHD treated at OGH between April 2020 and December 2021. Clinical, radiological, and surgical data were collected using a structured proforma. Echocardiography and relevant diagnostic tests assessed disease severity, while outcomes were analyzed using statistical methods.

Results: The mean age of the patients was 25.6 ± 10.5 years, with a slight female predominance (52%). MS was observed in 52% of patients, MR in 36%, and combined MS+MR in 12%. Atrial fibrillation (AF) was prevalent in 80% of cases, and pulmonary arterial hypertension (PAH) was present in 40%. Surgical intervention, primarily mitral valve replacement using mechanical prostheses, demonstrated a high success rate, with most patients achieving symptomatic relief.

Conclusion: Rheumatic heart disease remains a major contributor to MVHD in this cohort. Timely surgical intervention, alongside appropriate pre- and post-operative management, significantly improves outcomes. Emphasis on early detection and management of complications like AF and PAH can further enhance surgical success rates.

Keywords: Mitral Stenosis, Mitral Regurgitation, Rheumatic Heart Disease, Atrial Fibrillation, Pulmonary Hypertension, Mitral Valve Replacement, Osmania Hospital

INTRODUCTION

Mitral valvular heart disease (MVHD) remains a significant contributor to morbidity and mortality globally, with varying etiologies and presentations influenced by geographic, socioeconomic, and healthcare access factors[1]. MVHD encompasses a spectrum of pathologies affecting the mitral valve, including mitral stenosis (MS), mitral regurgitation (MR), and combined lesions, leading to significant hemodynamic consequences. In severe cases, MVHD

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can precipitate pulmonary arterial hypertension (PAH), atrial fibrillation (AF), and heart failure, profoundly impacting the quality of life and increasing the risk of mortality[2]. In India, rheumatic heart disease (RHD) remains the predominant cause of MVHD, unlike in industrialized nations where degenerative and ischemic etiologies are more prevalent[3]. Delayed diagnosis and suboptimal treatment of streptococcal infections, compounded by limited access to healthcare, have contributed to the high prevalence of RHD in resource-constrained settings[4]. Consequently, the disease often manifests in younger individuals, creating a disproportionate burden on the working-age population and straining both families and healthcare systems[5].

Mitral stenosis, a hallmark of RHD, leads to restricted blood flow from the left atrium to the left ventricle, resulting in increased atrial pressure, atrial enlargement, and complications such as thromboembolism[6]. Mitral regurgitation, on the other hand, causes volume overload in the left atrium and ventricle, leading to left ventricular dysfunction and heart failure. The coexistence of MS and MR in some patients further complicates management, necessitating a nuanced understanding of the disease spectrum[7].

Surgical intervention, particularly mitral valve replacement (MVR), has become the cornerstone of management for severe MVHD[8]. This procedure aims to restore normal hemodynamics and alleviate symptoms while preventing disease progression. Advances in surgical techniques, such as the use of mechanical and bioprosthetic valves, have improved outcomes, particularly in patients presenting with advanced disease[9]. However, success rates vary based on factors such as age, disease severity, coexisting conditions like anemia or chronic obstructive pulmonary disease (COPD), and the presence of complications like PAH and AF.

Osmania General Hospital (OGH), a major tertiary care center in India, serves as a referral hub for complex cardiac cases, particularly those related to MVHD. This study evaluates the clinical and demographic characteristics of patients with MVHD attending OGH, focusing on the role of early diagnosis, surgical outcomes, and factors influencing prognosis[10]. By analyzing the clinical presentation, epidemiology, and surgical outcomes of these patients, the study aims to provide a comprehensive understanding of MVHD and identify strategies to enhance patient care. Additionally, it highlights the unique challenges faced by healthcare providers in managing advanced MVHD in resource-limited settings, emphasizing the importance of multidisciplinary care and timely intervention[11].

Through this study, the goal is to contribute to the existing knowledge base regarding MVHD and underline the critical need for robust screening, optimized surgical management, and effective postoperative care to improve outcomes. By focusing on patients treated at OGH, this research provides valuable insights into the burden of MVHD in a population significantly affected by RHD and aims to inform future strategies for managing this complex condition.

MATERIALS & METHOD

This study was conducted at Osmania Medical College and Osmania General Hospital, Hyderabad, a tertiary care hospital. The observational study spanned 18 months, from April 2020 to December 2021, and aimed to evaluate the clinical presentation and surgical outcomes of patients with mitral valvular heart disease (MVHD). A total of 25 patients were included based on specific inclusion criteria.

Inclusion and Exclusion Criteria

Patients included in the study presented with mitral valvular heart disease requiring surgical intervention. The inclusion criteria encompassed clinical presentations such as murmurs, shortness of breath, left atrial enlargement visible on radiological studies, and a history of

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rheumatic fever with penicillin prophylaxis. Patients with other valvular diseases were excluded from the study.

Patient Enrollment

Patients of either sex admitted to the Cardiothoracic Surgery Department were enrolled after obtaining informed consent. The clinical history and examination findings were documented using a structured proforma. A detailed physical examination was followed by diagnostic tests to confirm mitral valve pathology and assess associated conditions.

Diagnostic and Laboratory Evaluations

The following investigations were conducted for all patients:

- **Chest X-ray:** To evaluate cardiac chamber enlargement.
- **Electrocardiogram (ECG):** A 12-lead ECG was used to detect right and left ventricular enlargements and atrial abnormalities.
- **2D Echocardiography (2D-ECHO):** This was the primary modality for assessing valvular pathology, severity of stenosis or regurgitation, and other cardiac abnormalities.
- **Coronary Angiography:** Conducted to rule out concurrent coronary artery disease.
- **Carotid Doppler:** Used to detect obstructions in the carotid arteries.
- **Laboratory Tests:** Hemoglobin levels, coagulation profiles, renal function tests, and thyroid-stimulating hormone levels were evaluated to ensure surgical readiness.

Study Groups

Patients were classified into three groups based on their clinical and diagnostic findings:

1. **Group 1:** Patients with isolated mitral stenosis (MS).
2. **Group 2:** Patients with isolated mitral regurgitation (MR).
3. **Group 3:** Patients with combined MS and MR.

Statistical Analysis

All collected data were analyzed using SPSS software (version 20). Descriptive statistics were employed to summarize demographic and clinical parameters. Continuous variables were expressed as mean ± standard deviation, while categorical variables were reported as percentages. Non-parametric tests were applied wherever appropriate.

RESULTS

This prospective observational study evaluated 25 patients with mitral valvular heart disease (MVHD) attending Osmania General Hospital between April 2020 and December 2021. The clinical presentations, epidemiological patterns, and surgical outcomes were analyzed in detail, and the findings are summarized as follows:

Demographic Distribution

The study population consisted of 25 patients, of whom 52% (13 patients) had mitral stenosis (MS), 36% (9 patients) had mitral regurgitation (MR), and 12% (3 patients) had combined MS and MR. The mean age of the participants was 25.6 ± 10.5 years, reflecting a relatively young cohort. Females predominated in the MS group, while males were more common in the MR group. Overall, the study included 13 females and 12 males.

Clinical Presentation

Most patients presented with advanced symptoms at the time of admission. The following symptom distribution was observed:

- Shortness of breath was the most common complaint, reported by 90% of patients.
- Fatigue and chest pain were observed in a significant number of cases, while only 10% of patients were asymptomatic and diagnosed incidentally.

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- Atrial fibrillation (AF) was noted in 80% of patients, particularly in those with MS or combined lesions.
- Pulmonary arterial hypertension (PAH) was present in 40% of cases, with varying severity.

Age and Gender Distribution

The age distribution was as follows:

- 8 patients (32%) were aged between 20 and 30 years.
- 15 patients (60%) were aged between 31 and 45 years.
- 2 patients (8%) were aged between 46 and 60 years.

Females presented earlier, with a mean age of 25 ± 10 years, compared to males, who presented with a mean age of 35 ± 11 years.

Surgical Interventions

All 25 patients underwent mitral valve replacement (MVR) using mechanical prostheses (St. Jude's valves). The following surgical observations were made:

- Left atrial clot was identified in 25% of patients and managed with left atrial ligation to prevent postoperative cerebrovascular accidents (CVAs).
- Subchordal fusion was a common finding, necessitating chordal repair in several cases.
- ICU stay ranged from 3 to 7 days, with a mean of 5 ± 3 days.

Outcomes

The surgical outcomes were favorable, with symptomatic relief achieved in the majority of patients. The following observations were noted postoperatively:

- The International Normalized Ratio (INR) was maintained between 2 and 3 in all patients using anticoagulation therapy with Acitrom.
- Only 6 patients experienced minor complications such as hemoptysis or vague abdominal pain, all of which were managed conservatively.
- One patient developed a cerebrovascular accident (CVA) despite preoperative carotid Doppler screening.

Key Insights

- Rheumatic fever was identified as the predominant cause of MVHD in this cohort.
- The extent of mitral valve damage correlated with the development of complications such as PAH and AF.
- Preoperative optimization, including treatment for anemia, renal insufficiency, and chronic obstructive pulmonary disease (COPD), contributed to better surgical outcomes.

These findings highlight the critical importance of early diagnosis, comprehensive preoperative care, and timely surgical intervention in managing MVHD.

Distribution of the study population into 3 groups: Out of the 25 patients enrolled in the study 52% patients were in group 1, 44% patients were in group 2, and 4% patients were in group 3. There were 10 Females and 3 males in group 1, 2 female and 7 males in group 2, & 3 males in group 3 **(Figure 1)**.

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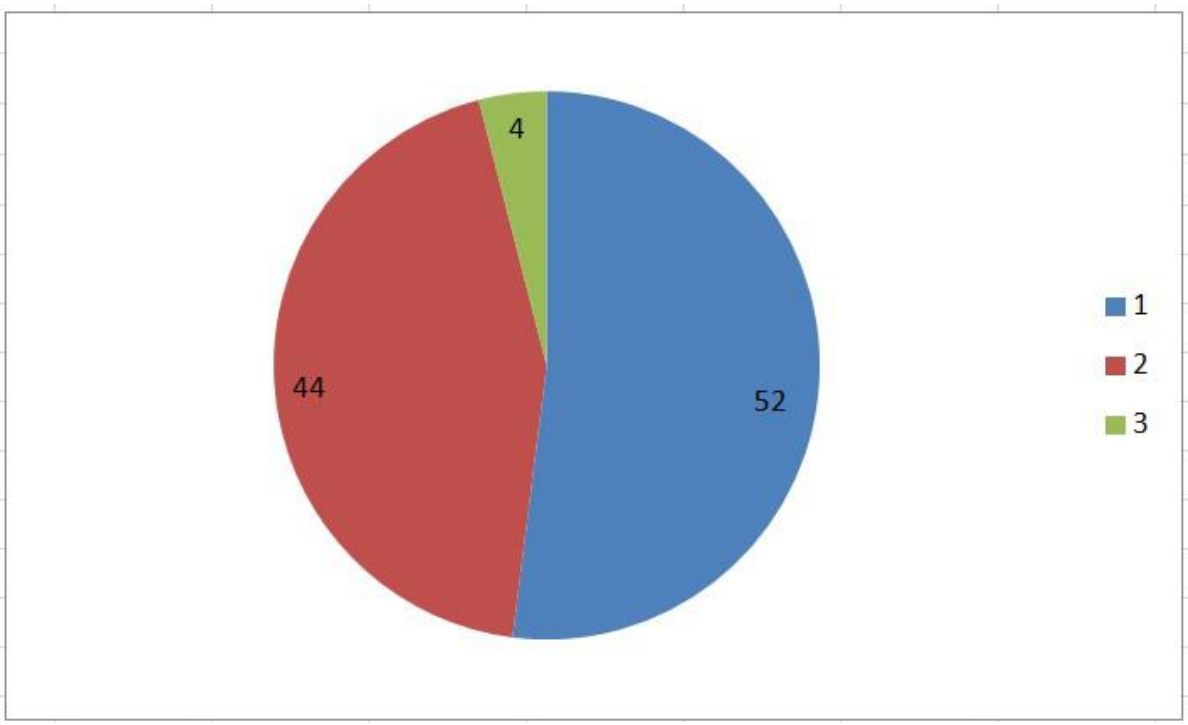

Figure 1: distribution of the study population into 3 groups

Age distribution among the 3 groups: Out of 25 patients 8 were between 20 and 30 years 15 were between 31 and 45 years, 2 were between 46 and 60 years **(Figure 2).**

Mean age 25.6±10.5
Patients with MR 9 (36%)
Patients with MS 13 (52%)
MR + MS cases 3 (12%)

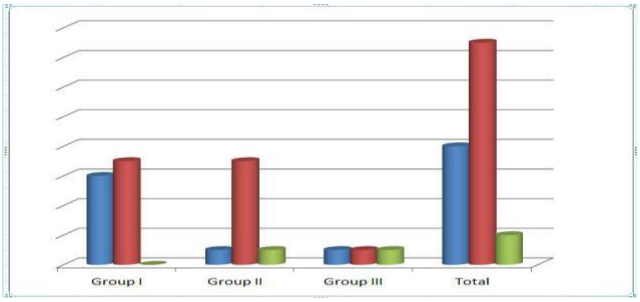

Figure 2: Age Distribution among 3 groups

Out of 25 cases included in the study 13 were females of all 3 groups & 12 were males of 3 groups **(Figure 3).**

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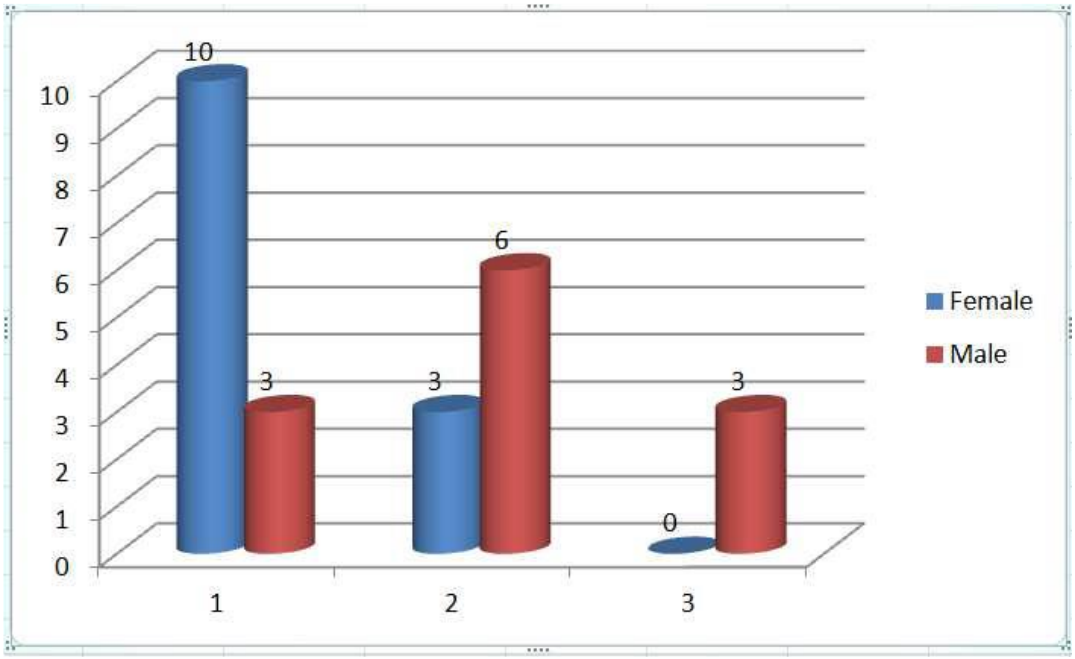

Figure 3: sex distribution among 3 groups

Of the total 25 cases, Females presented with a mean age of 25 ± 10 years in group 1 & males presented with mean age of 35±10 years in a group 1. In group 2 females presented with a mean age of 35 and males with a mean age of 40 ±11 years **(Figure 4).**

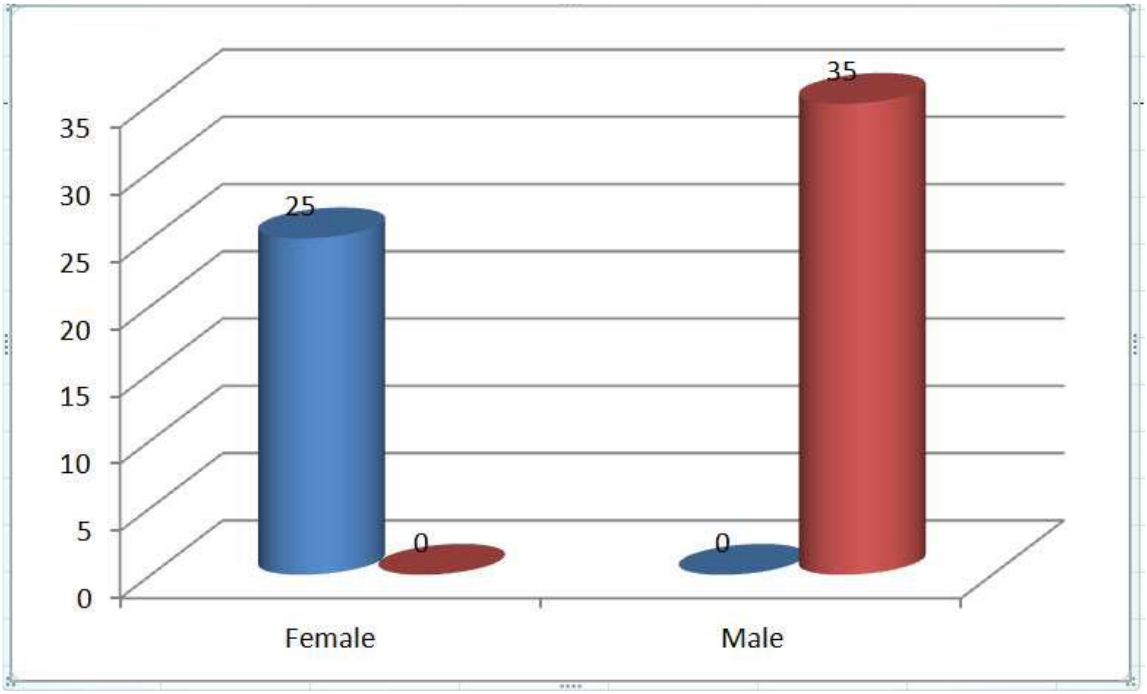

Figure 4: mean age of presentation

In the study 90% of patients presented with symptoms and 10% were detected accidentally to have the lesion **(Figure 5).**

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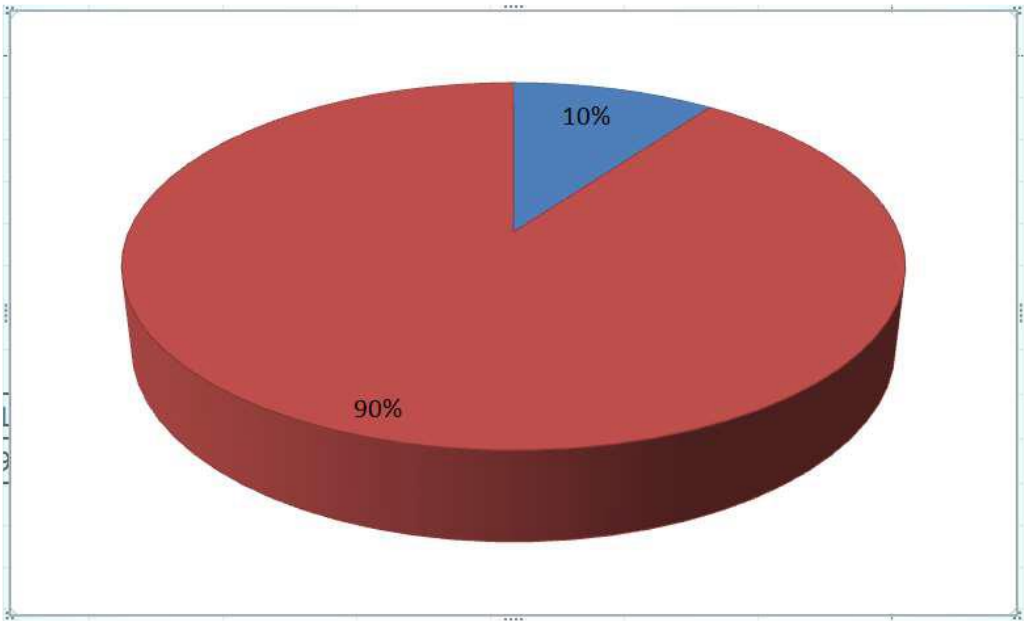

Figure 5: distribution according to symptoms in all groups.

Of the 25 cases, 19.6(79%) patients presented with severe symptoms **(Figure 6).**

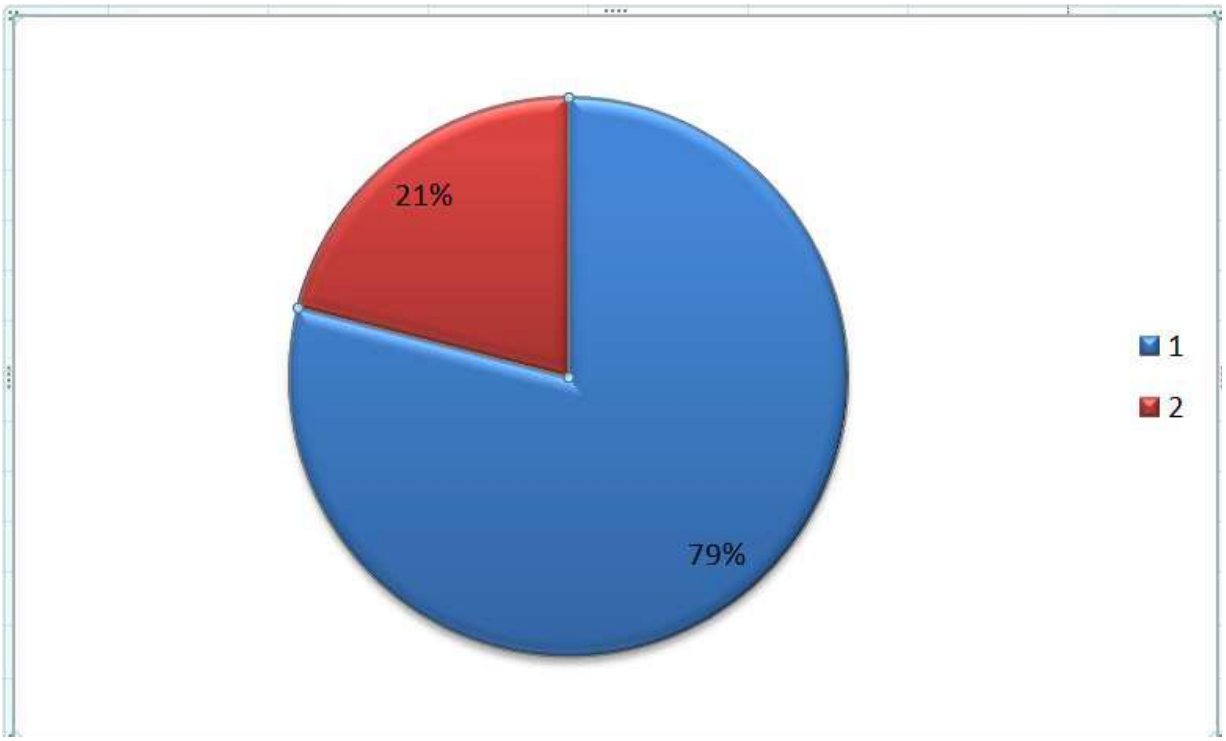

Figure 6: Distribution according to Severity of symptoms.

Out of the 25 patients enrolled in the study all patients were in group treated with mechanical prosthesis **(Figure 7).**

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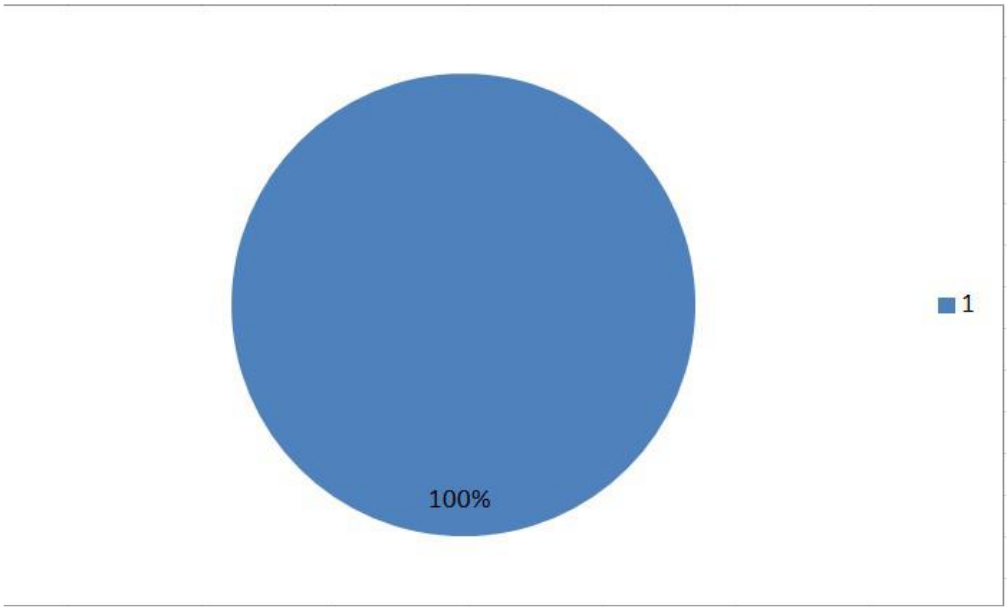

Figure 7: Distribution of Mechanical and Bio Prosthesis

Out of the 25 patients 80% that is 20 patients presented with AF **(Figure 8).**

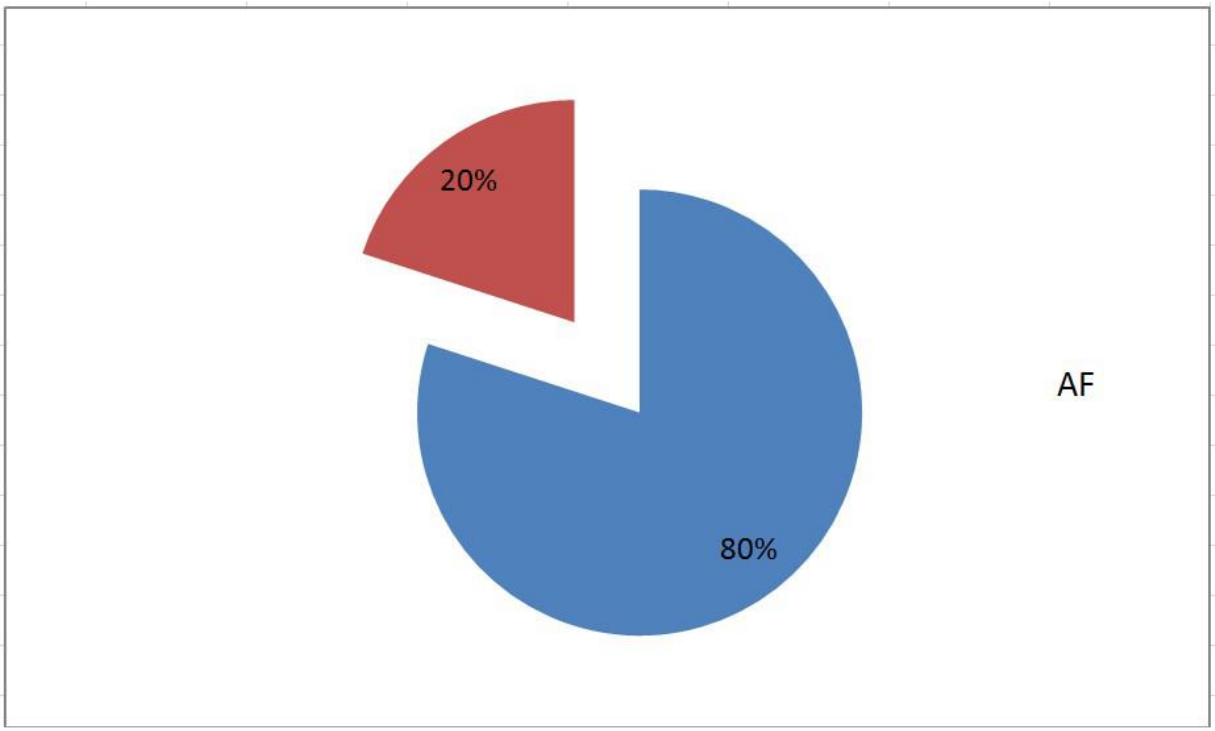

Figure 8: Distribution of Atrial Fibrillation

Out of the 25 patients 40% that is 10 patients presented with pulmonary artery hypertension **(Figure 9).**

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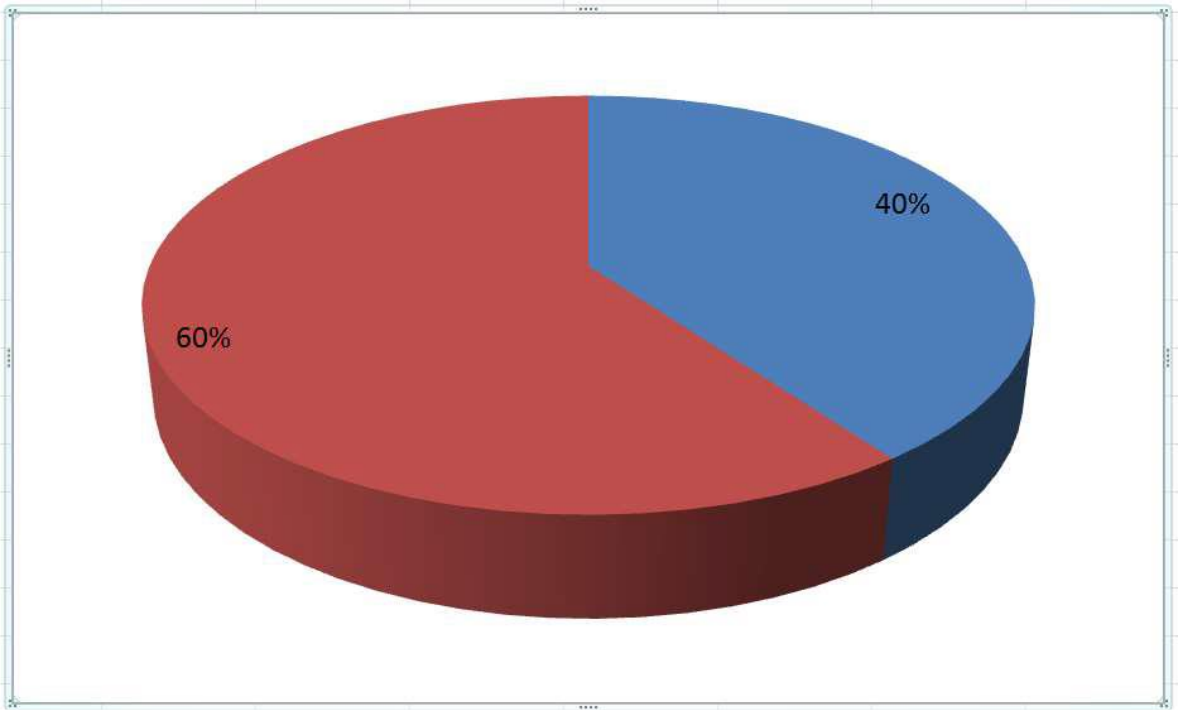

Figure 9: Distribution according to PAH

Out of the 25 patients that is 13 patients were females and 12 were male **(Figure 10).**

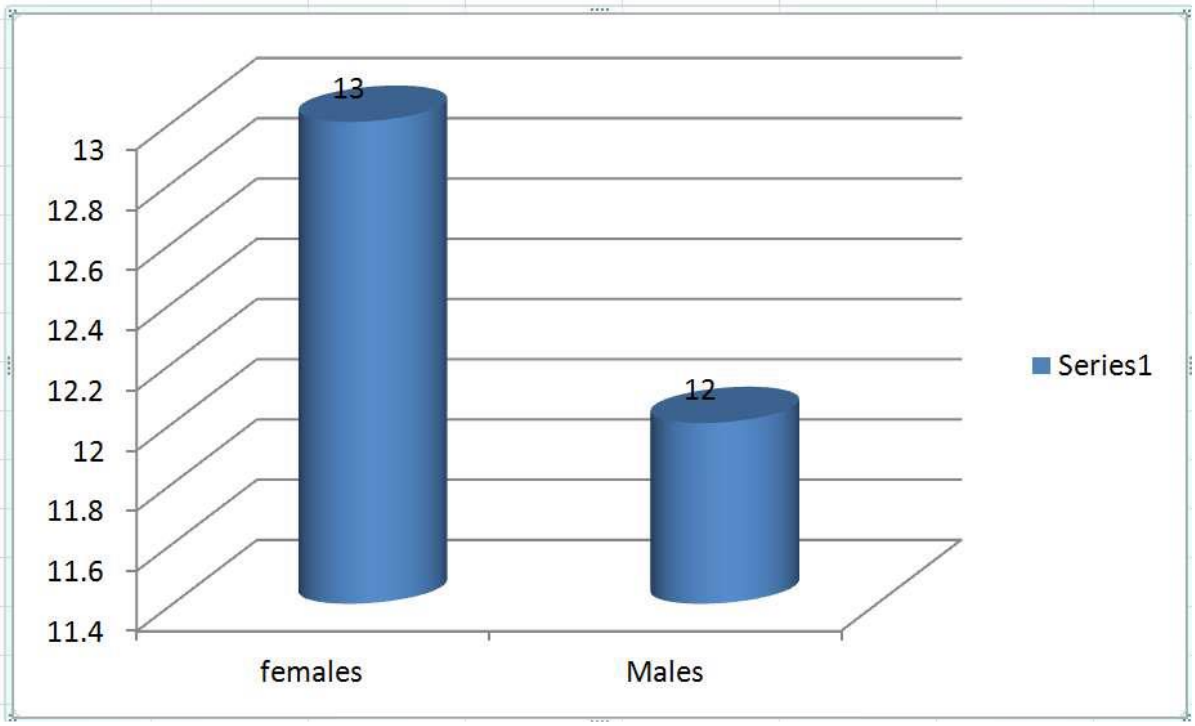

Figure 10: Distribution according to SEX

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DISCUSSION

Mitral valvular heart disease (MVHD) encompasses a spectrum of pathologies that manifest variably in different populations. While the relationship between mitral valve disease and clinical presentation is complex, symptoms alone are insufficient for definitive diagnosis. This prospective observational study of 25 patients with MVHD provides insights into the demographic patterns, clinical presentations, and surgical outcomes of this condition, highlighting key factors that influence disease progression and treatment outcomes[12].

The study population had a mean age of 25 ± 11 years, with 13 females and 12 males. Interestingly, a higher proportion of females underwent surgical intervention compared to males, aligning with findings from the Kaithin and Abott study of 2015. Age played a significant role in disease presentation, with patients aged between 30 and 42 years representing the largest subgroup. These observations emphasize the relatively young age of presentation in this cohort, likely reflecting the predominance of rheumatic heart disease (RHD) as the underlying etiology[13].

Among the 25 cases studied, 14 were diagnosed with mitral stenosis (MS), while 10 had mitral regurgitation (MR). One case involved combined MR and coronary artery bypass grafting (CABG)[14]. The most common presenting symptom across groups was shortness of breath, particularly grade III dyspnea, which was reported by 14 out of 16 MS patients and 8 out of 8 MR patients. Chest pain was reported in one case of MR, while only three cases presented with hemoptysis, vague abdominal pain, or pedal edema. These findings suggest that dyspnea remains the hallmark symptom of MVHD, necessitating prompt evaluation to prevent disease progression[15].

Nutritional deficiencies and weight loss were prevalent among MS patients, highlighting the systemic impact of chronic mitral stenosis. Additionally, all MS patients reported a history of joint pain and were on penicillin prophylaxis, underscoring the critical role of RHD in the causation of mitral lesions. However, none of the MS or MR patients presented with pharyngitis, suggesting that the initial streptococcal infection may have been inadequately documented or treated in the past[16].

The study revealed a prevalence of heart disease in pregnancy of 4.3%, which is slightly higher than the commonly reported prevalence of 3.33%. This higher percentage likely reflects the referral nature of Osmania General Hospital, which serves as a tertiary care center managing complex cardiac cases. The proportion of females in group 1 (MS) was higher than in group 2 (MR), consistent with existing literature indicating a greater burden of MS among females.

Preoperative factors such as age, etiology, and comorbidities played a significant role in influencing surgical outcomes. Rheumatic fever emerged as the primary etiology in most cases, reaffirming its central role in the pathogenesis of mitral lesions. The presence of left atrial clots (laclots) was associated with cerebrovascular accidents (CVAs) in 12.5% of patients, both pre- and postoperatively, emphasizing the importance of thorough preoperative evaluation and anticoagulation management to mitigate thromboembolic risks[17].

An intriguing finding was the correlation between preoperative lung function and surgical outcomes. Patients with improved lung function through preoperative exercise demonstrated better postoperative recovery, highlighting the value of prehabilitation in optimizing surgical outcomes. This observation underscores the need for integrating exercise and pulmonary rehabilitation programs into the preoperative management of MVHD patients[18].

In conclusion, this study confirms the significant impact of RHD on mitral valvular lesions, particularly among young adults and females. It also emphasizes the importance of early diagnosis, comprehensive preoperative care, and tailored surgical interventions to improve

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outcomes. Future research should focus on larger, multicentric studies to validate these findings and explore strategies for better prevention, particularly in high-risk populations.

CONCLUSION

This study provides valuable insights into the clinical presentation, demographic distribution, and surgical outcomes of patients with mitral valvular heart disease (MVHD) treated at Osmania General Hospital. The findings reaffirm the significant role of rheumatic heart disease (RHD) as the primary etiology of mitral lesions in this population, emphasizing the need for improved strategies to address preventable causes of MVHD.

Key observations include the predominance of young adults in the study cohort, with a mean age of 25 ± 11 years, and the higher prevalence of mitral stenosis (MS) compared to mitral regurgitation (MR). Shortness of breath emerged as the most common presenting symptom, particularly in advanced cases of MS and MR. Nutritional deficiencies and a history of joint pain further underscored the systemic impact of mitral valve disease, particularly in cases with a strong association with RHD.

The surgical outcomes were favorable, with the majority of patients achieving symptomatic relief following mitral valve replacement (MVR) with mechanical prostheses. Preoperative optimization, including anticoagulation therapy and pulmonary rehabilitation, played a crucial role in enhancing recovery. However, the presence of left atrial clots (laclots) significantly increased the risk of cerebrovascular accidents (CVAs), underscoring the importance of thorough preoperative evaluation and vigilant postoperative care.

This study highlights the critical need for early diagnosis and timely surgical intervention to improve the quality of life and long-term outcomes for patients with MVHD. Additionally, promoting awareness of RHD prevention, improving access to penicillin prophylaxis, and implementing comprehensive screening programs can significantly reduce the burden of MVHD in resource-limited settings.

Future research should focus on multicentre studies with larger sample sizes to validate these findings and explore innovative approaches to the management of mitral valve disease, particularly in populations with high RHD prevalence. By addressing the root causes and optimizing surgical care, healthcare systems can make significant strides in reducing the impact of MVHD on vulnerable populations.

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