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A RETROSPECTIVE CROSS SECTIONAL OBSERVATIONAL STUDY OF SHORT TERM MORTALITY AMONG DIFFERENT SURGICAL VALVE REPLACEMENTS IN A TERITARY CARE CENTRE

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ABSTRACT

Background: The main aim of the study is to investigate the etiology of different valvular pathologies , surgical approaches(minimally invasive vs open sternotomy). within 30 day mortaility among different surgical valve replacement groups

Methods: The present study is a retrospective cross sectional observational study with data from august 2016 to December 2021 undertaken in government general hospital Kurnool. The data considered includes the age echo reports, angiographic data, surgery details and post surgery status. The study included total 126 patients undergone surgical valve replacement. The patients who were undergone aortic valve replacement surgery were 10 cases (7.9%), patients who were undergone mitral valve replacement were 79 (62.7%) and double valve replacement were 37 (29.4%) .(figure 1) of these 2 AVR cases and 1 MVR case had undergone cabg with valve replacement

Results: The The mean age of patients was 40.3 ± 12.07 years with maximum age of 68 years and minimum age of 13 years The distribution of male population was male 57 (45.2%) and female population was 69 (54.8%) The persons with congenital heart disease are 6(4.8%) ,chronic rheumatic heart disease are 117 (92.9%), degenerative valvular heart disease are 3 (2.4 %). The mean ejection fraction of the patients were
58.66 ± 6.2 with highest ejection fraction noted was 63 and lowest was 35. Patients with EF in the range of > 40 are 123 (97.6%), < 40 are 3 (2.4%) Out of 126 patients 7(5.5%) patients undergone minimally invasive surgery and 119(95.5%) patients undergone open surgical approach. Among 126 patients undergone procedure 12 patients died.

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Of the 12 patients 3 cases(25%) belong to AVR group , 4 cases (33.3%) belong to MVR group and 5 case(41.7%) belong to DVR group. Among 7 patients who underwent minimal invasive surgery non had mortality.
The distribution of valve groups are 2 AVR cases and 5 MVR cases . Among age matched minimal access surgery mvr group and open surgical group no significant difference found

Conclusion : The most common etiologies among valve replacement surgeries is chronic rheumatic heart disease.Double valve replacement had higher mortality followed by mitral valve replacement and then the aortic valve replacement.The patients who undergone minimally invasive surgery had no mortality but when compared to age matched and valve replacement match individuals no significant mortality difference found but had less hospital stay

INTRODUCTION

Valvular heart disease (VHD) is one of the most important cardiovascular diseases which it prevalence differs regarding age; gender an different societie[(1))] There are various etiologies o VHD including rheumatic, degenerative, traumatic, congenital, and infectious heart diseases.[(1)] VHD remains common in developing countries, because the increase in prevalence of rheumatic heart diseases[(1)] The prevalence of VHD has been also increased during the past years in industrialized countries due to increase in prevalence of degenerative valve diseases.[(1)] Heart valve replacement is the second most common type of heart surgery after coronary artery bypass graft[(1)] In past studies, the rate of mortality following heart valve replacement was reported from 4.3% to 14%. So the present study investigates the different etiologies of valvular lesions and short term mortality post surgery

METHODS

The present study is a retrospective cross sectional observational study with data from august 2016 to December 2021 undertaken in government general hospital Kurnool. The data considered includes the age , echo reports, angiographic data, surgery details and post surgery status. The study included total 126 patients undergone surgical valve replacement. Who satisfies the inclusion and exclusion criteria

Inclusion criteria

Age >10 years
Patients with symptomatic severe valvular heart diseases

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Exclusion criteria

Age < 10 years
Pregnant women
Mentally incompetent person
With terminal illness

Data analysis

Data analysed using statistical package SPSS from IBM

OBSERVATION AND RESULTS :

The study included total 126 patients undergone surgical valve replacement. The patients who were undergone aortic valve replacement surgery were 10 cases (7.9%), patients who were undergone mitral valve replacement were 79 (62.7%) and double valve replacement were 37 (29.4%) .(figure 1) of these 2 AVR cases and 1 MVR case had undergone cabg with valve replacement

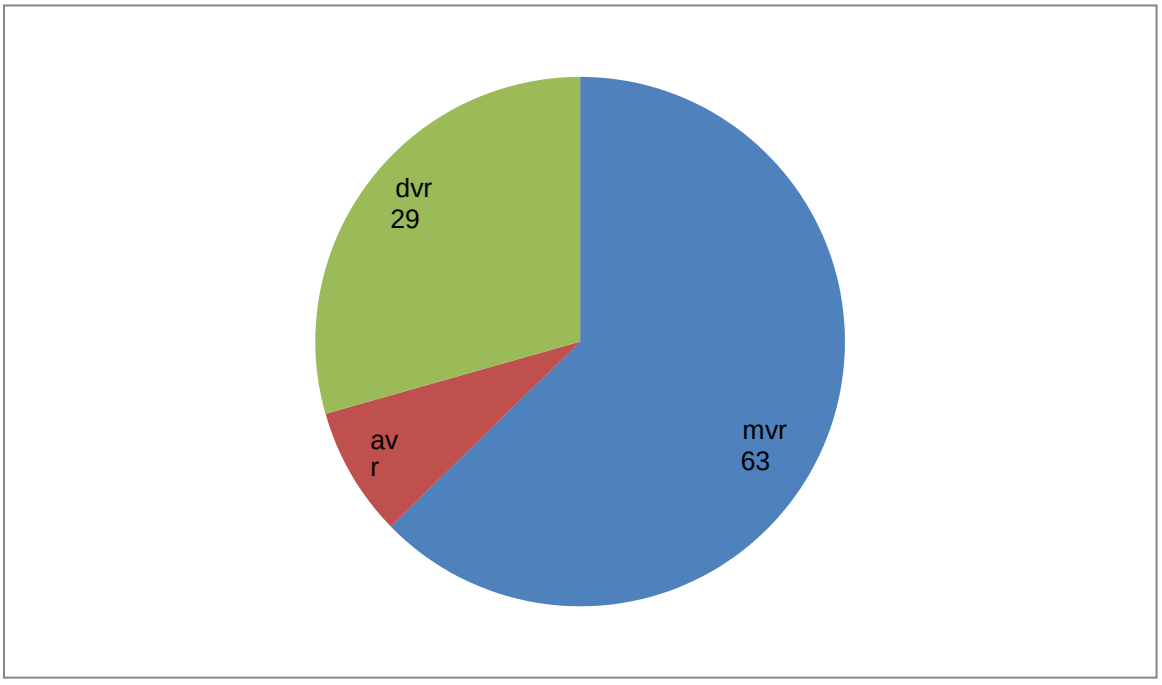

FIGURE 1 Distribution of number of AVR, MVR, DVR cases

AGE

The mean age of patients was 40.3 ± 12.07 years with maximum age of 68 years and minimum age of 13 years. The persons belonging to the age group of 10-19 years are 8 (6%) , 20-29 years 13(10%) , 30-39

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years 39 (31%) , 40 to 49 years 41 (32%), 50 to 59 years 14 (11%) , 60 to 69 years 11 (9%),. (figure 2)

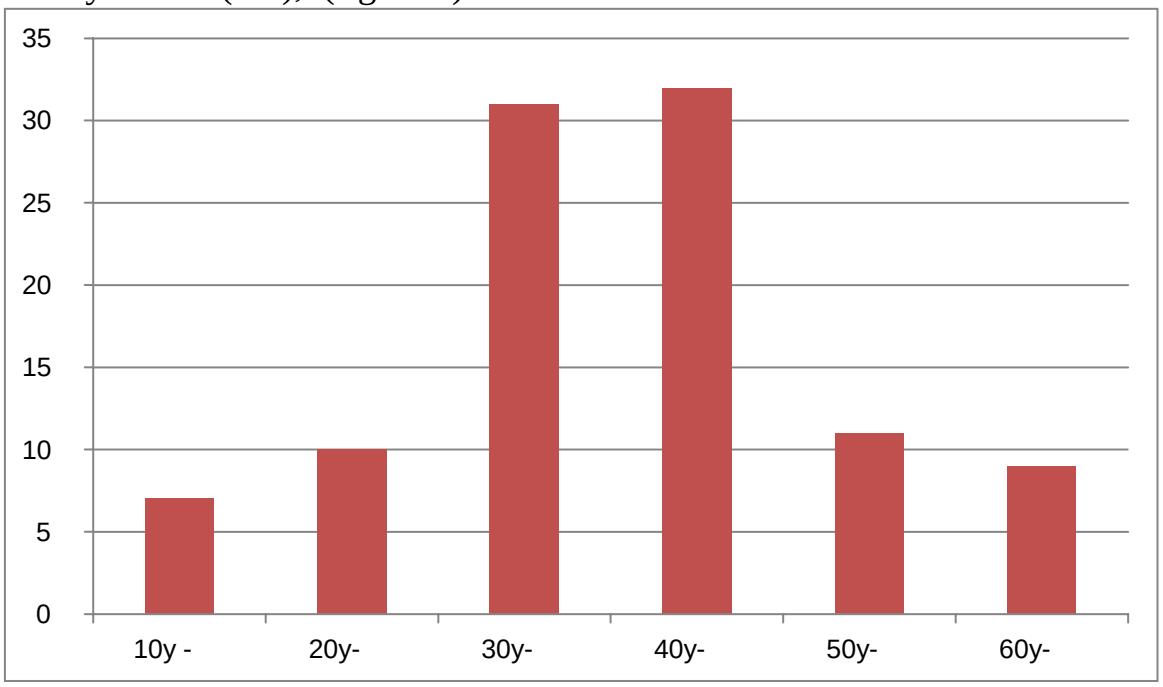

FIGURE 2 Distribution of different age groups

GENDER

The distribution of male population was male 57 (45.2%) and female population was 69 (54.8%)(figure 3)

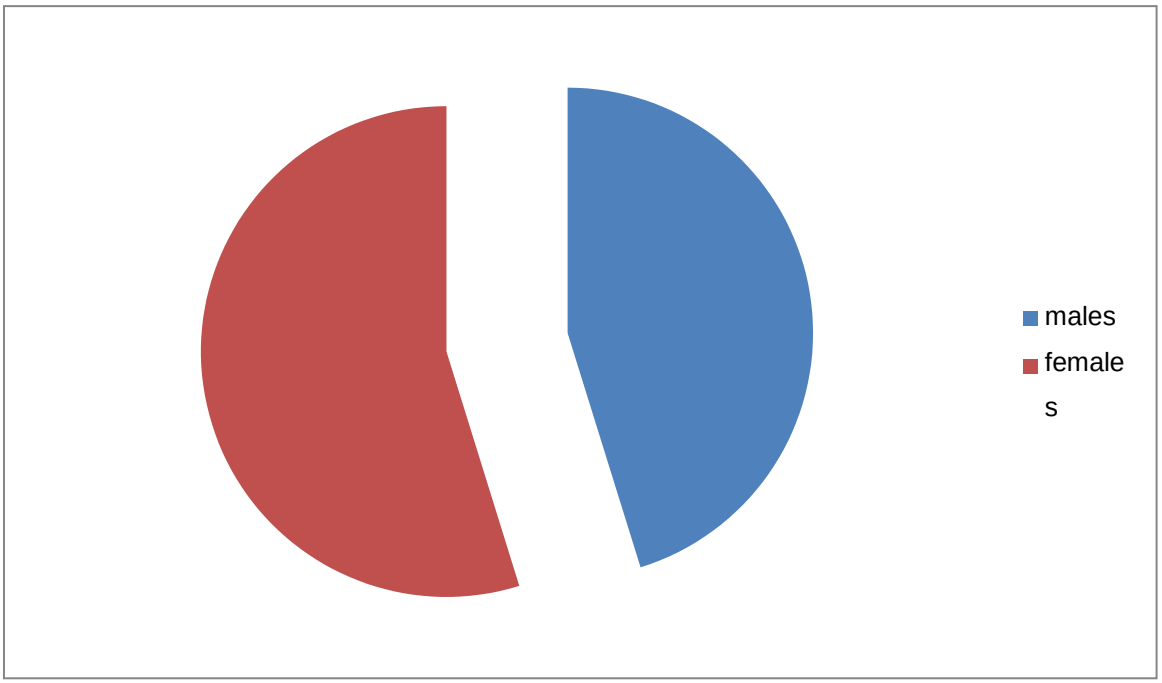

FIGURE 3 Distribution of gender

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ETIOLOGY

The persons with congenital heart disease are 6(4.8%) ,chronic rheumatic heart disease are 117 (92.9%), degenerative valvular heart disease are 3 (2.4 %) , (figure 4)

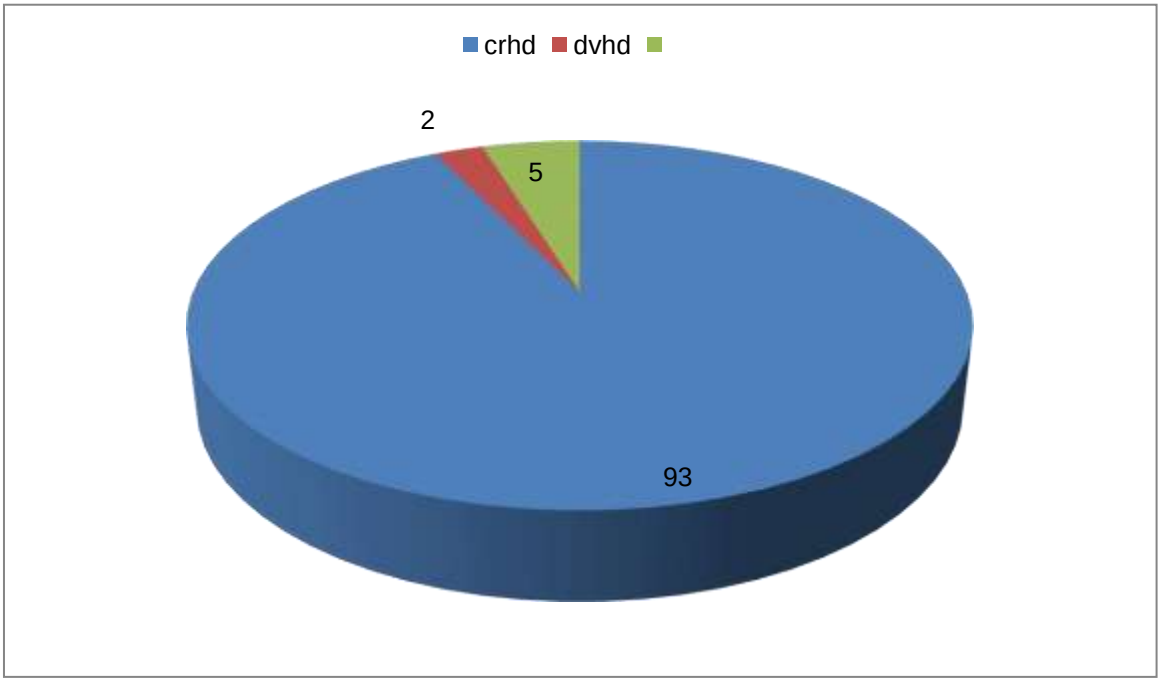

FIGURE 4 Distribution of Etiology

EJECTION FRACTION (EF)

The mean ejection fraction of the patients were 58.66 ± 6.2 with highest ejection fraction noted was 63 and lowest was 35. Patients with EF in the range of > 40 are 123 (97.6%), < 40 are 3 (2.4%)(figure 5)

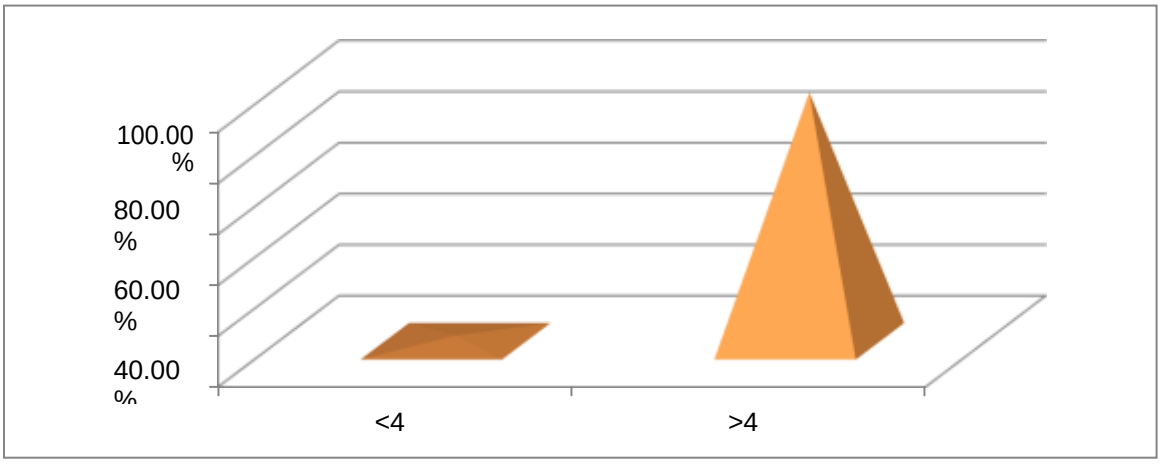

FIGURE 5 Distribution of different groups of ejection fractions

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SURGICAL APPROACH

Out of 126 patients 7(5.5%) patients undergone minimally invasive surgery and 119(95.5%) patients undergone open surgical approach. (figure 6)

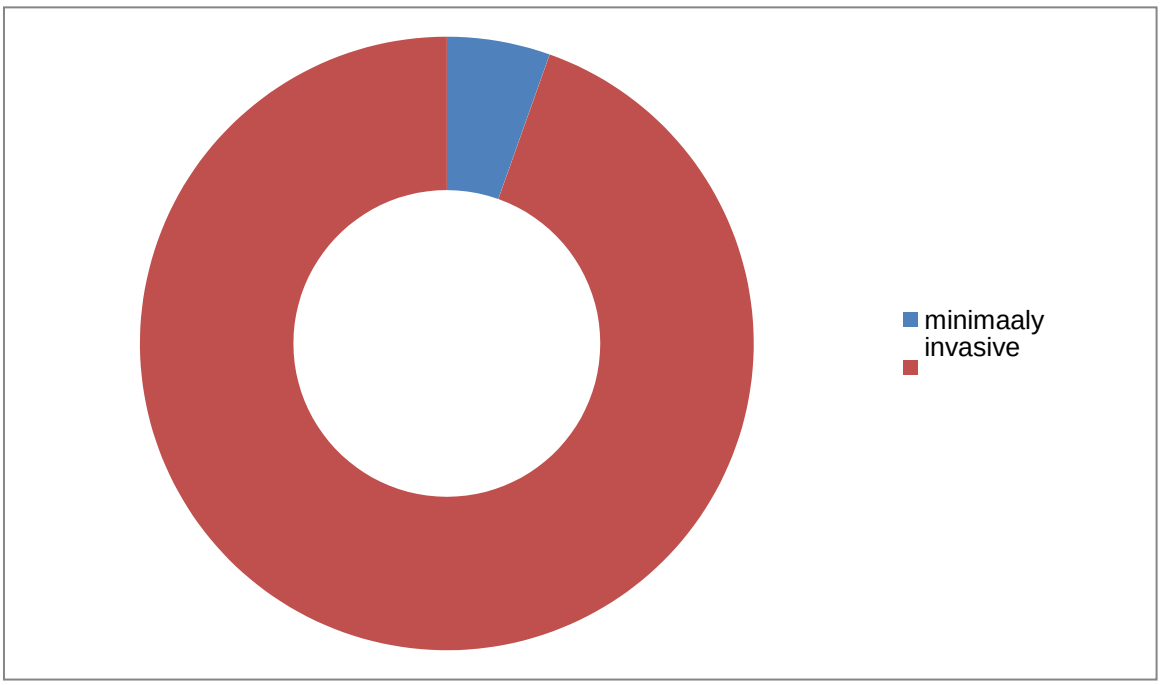

FIGURE 6 Distribution of surgical approaches

COMPARISON OF MORTALITY AMONG DIFFERENT VALVE REPLACEMENTS

Among 126 patients undergone procedure 12 patients died. Of the 12 patients 3 cases(25%) belong to AVR group , 4 cases (33.3%) belong to MVR group and 5 case(41.7%) belong to DVR group. The patients who have undergone valve replacement with cabg had 1 mortality and patients among minimally invasive group had no mortality.(figure 7)

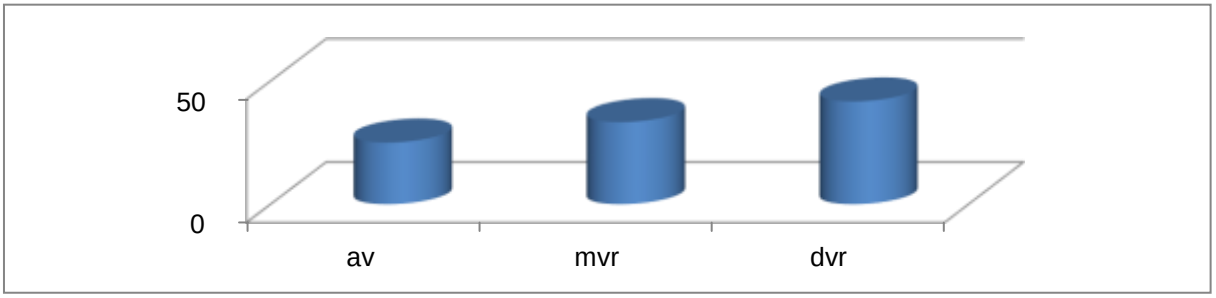

FIGURE 7 comparison of different valve replacement mortality groups

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COMPARISON OF MORTALITY AMONG DIFFERENT VALVE REPLACEMENT GROUPS WITH DIFFERENT AGE GROUPS

Out of 3 patients died in AVR group 1 patient belong to 30- 30 year age group 1 case belong to 50 to 59 year age group and 1 case belong to 60- 69 year age group and no much significant difference found. Out of 4 patients died in MVR group 1 patient belong to 10 to 19 year age group
, 1 patient belong to 30 to 39 year age group and 2 patients belong to 40- to 49 year age group with higher in this group. Out of 5 patients in DVR group 2 cases belong 20 to 29 year age group , 1 case belong to 30 to 39 year age group , 1 case belong to 40 to 49 year age group and 1 case belong to 50 to 59 year age group , showing higher in young age group.(figure 8)

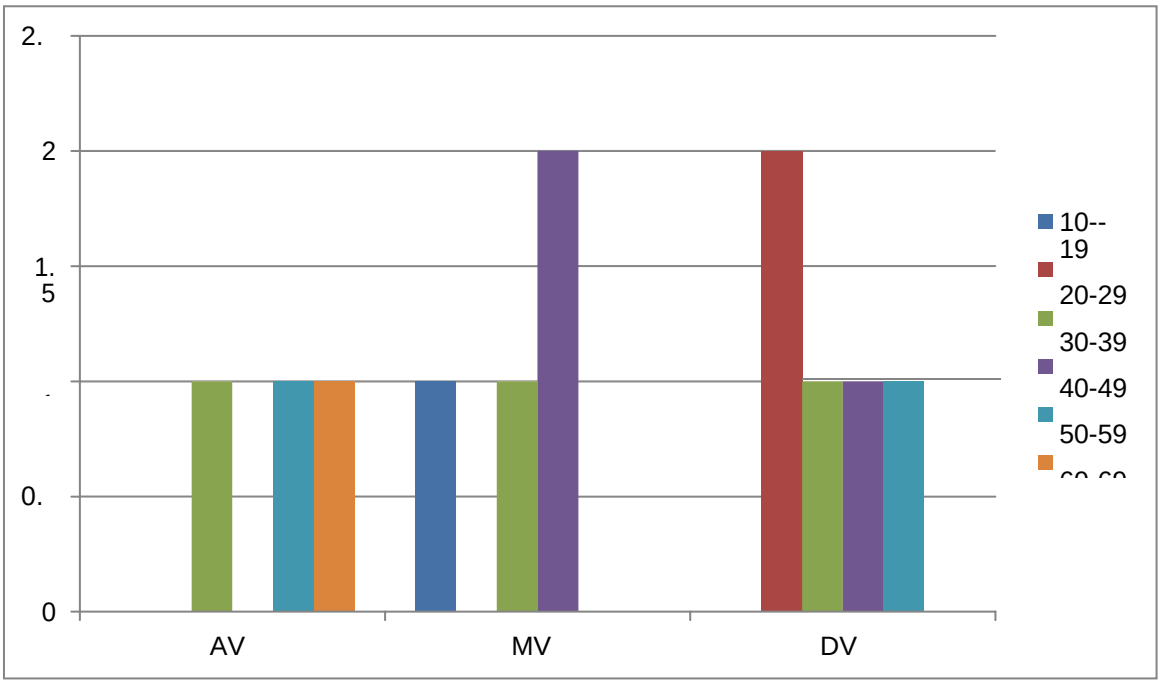

FIGURE 8 figure showing mortality among age groups in different valve replacement groups

COMPARISON OF MORTALITY AMONG DIFFERENT VALVE REPLACEMENT GROUPS WITH DIFFERENT GENDERS

Among 3 patients of AVR group who died all belong to the male population . Among 4 cases of MVR group 1 case belong to the male population and 3 cases belong to the female population. Among 5 cases of DVR group 2 cases belong to the male population and 3 cases belong to the female population. Although total deaths among males and

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females are same but female population had higher deaths in DVR and MVR group than male population(figure 9)

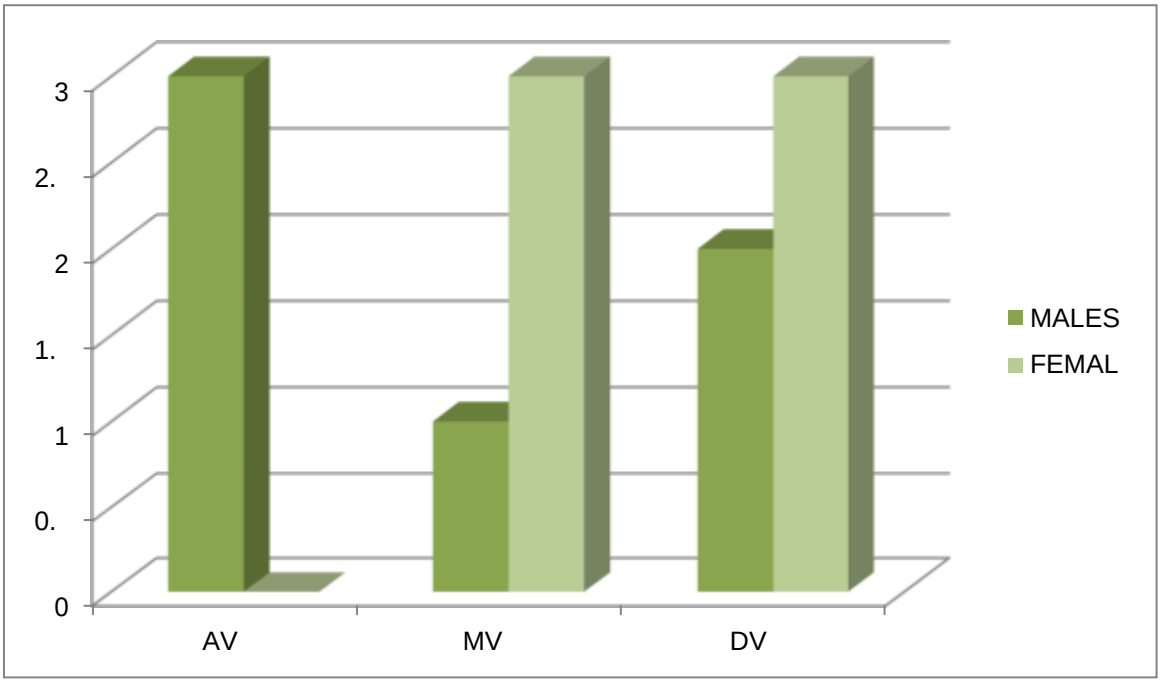

FIGURE 9 figure showing distribution of mortality among different sex group among different valve replacement groups

COMPARISON OF MORTALITY AMONG DIFFERENT ETIOLOGY GROUPS

Among 12 patients died 1 patient belong AVR group had congenital bicuspic aortic valve and 1 case has degenerative valvular heart disease and remaining cases belong to chronic rheumatic heart disease

COMPARISON OF MORTALITY AMONG MINIMAL INVASIVE SURGERY GROUP AMONG DIFFERENT VALVE REPLACEMENT GROUP

Among 7 patients who underwent minimal invasive surgery non had mortality. The distribution of valve groups are 2 AVR cases and 5 MVR cases(figure 10) . Among age matched minimal access surgery mvr group and open surgical group no significant difference found

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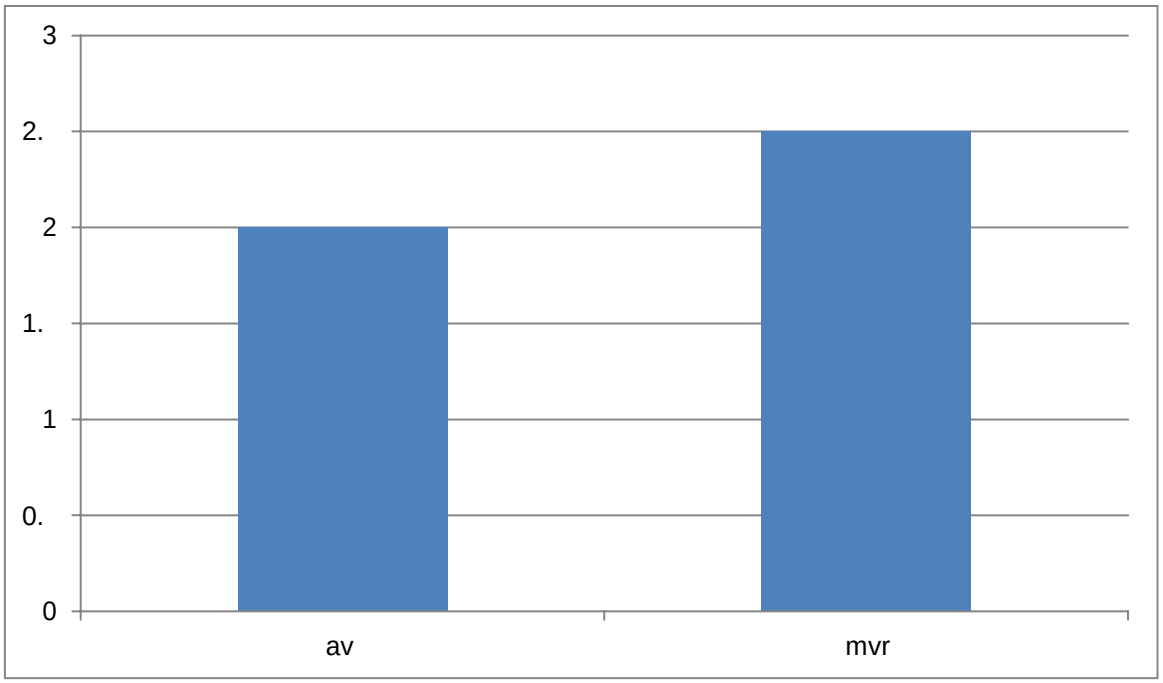

FIGURE 10 DISTRIBUTION OF VALVE REPLACEMENT AMONG DIFFERENT MINIMAL ACCESS GROUP

DISCUSSION

The mean age of presentation of the valve replacement groups of our study is 40.3 ± 12.07 years which is similar to Fernandez et al 2014[2], samei et al 2013[3], but less than siergar et al 2014[4]

The male population in the valve replacement group of our study is 45.2% and female population is 54.8% . In comparison to siergar et al 2014[4],59.5% males and 40.5% females, the male population is less and female population is less. In comparison to samei et al 2013[3].males 41.9% and females 58.1%, the male population is more and female population is less. In comparison to Fernandez et al 2014[2],49.6% males and 50.4% females, the male population ismore and female population is less

In the present study most of the cases are below 50 years of which the most common etiology for valvular disease causing replacement seems to be chronic rheumatic heart disease. This is correlating with other studies of Ribeiro et al 2012[5] , Boudoulas et al 2013[6], Aluru et al 2022[7].

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In the present study the mortality of double valve replacement is higher compared AVR and MVR. This is correlating with Edwards et al[8], siergar et al 2014[4] ,pillai et al 2021 [9] but Fernandez et al 2014[2] and samei et al 2013[3] are against to the present study. most of the cases of minimally invasive surgery where belong to mitral valve replacement group. The cases had no mortality but as per matched individuals there is no significant difference in mortality but less hospital stay found correlating with sundermann et al 2015[10]

CONCLUSION

The present study concludes that

- The most common etiologies among valve replacement surgeries is chronic rheumatic heart disease
- Double valve replacement had higher mortality followed by mitral valve replacement and then the aortic valve replacement
- The patients who undergone minimally invasive surgery had no mortality but when compared to age matched and valve replacement match individuals no significant mortality difference found but had less hospital stay

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