



## STUDY OF ECG AND CHEST XRAY FINDINGS IN PATIENTS OF AORTIC VALVE DISEASES

### General Medicine

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### ABSTRACT

Aortic valve disease is the most common valvular heart disease in the developed world<sup>1</sup>.

Primary cause of Aortic valve diseases are age-associated calcific valve changes and inherited or congenital conditions (bicuspid Aortic valve or myxomatous mitral valve disease)<sup>2</sup>. 50 cases were studied to evaluate ECG and chest X-ray of patients with Aortic valve diseases. 31 cases had cardiomegaly, of which 17 cases were of Mixed Aortic Stenosis (AS) + Aortic Regurgitation (AR) (34%), 4 were Isolated AS lesions (8%), 8 were Isolated AR lesions (32%), 2 were sclerosed lesions (4%) (radiologically significant cardiomegaly i.e CTI  $\geq$  0.5).

ECG evidence of LVH was seen in 54.5% of Pure AS and 47.1% of Mixed AS + AR, 7.7% of Pure AR and 22.2% of sclerosed aortic valve.

### KEYWORDS

Aortic Regurgitation, Aortic Stenosis

### INTRODUCTION:

Aortic valve disease is the most common valvular heart disease in the developed world<sup>1</sup>.

Predominant cause of aortic stenosis in western countries is degenerative calcific disease in middle aged and elderly patients, though in tropical countries rheumatic aortic stenosis is still common. Aortic regurgitation also arises frequently from a degenerative process apart from rheumatic and congenital lesions<sup>3</sup>. In most patients with severe AS<sup>4</sup>, there is LV hypertrophy. In advanced cases, ST-segment depression and T-wave inversion (LV "strain") in standard leads I and aVL and in the left precordial leads are evident. In patients with chronic severe AR, the ECG<sup>4</sup> signs of LV hypertrophy are common. In addition, these patients frequently exhibit ST-segment depression and T-wave inversion in leads I, aVL, V5, and V6 ("LV strain").

The chest x-ray may show no or little overall cardiac enlargement for many years. Hypertrophy without dilation may produce some rounding of the cardiac apex in the frontal projection and slight backward displacement in the lateral view. A dilated proximal ascending aorta may be seen along the upper right heart border in the frontal view. Aortic valve calcification may be discernible in the lateral view. In chronic AR, there is usually cardiomegaly, the ascending aorta may be dilated, and there is aortic valve calcification. In the later stages, heart failure will be evident<sup>5</sup>. 50 cases were studied to evaluate ECG and chest X-ray of patients with Aortic valve diseases.

### MATERIALS AND METHODS

It was a Cross sectional observational study conducted from September, 2017 to August, 2019.

The study was conducted in Dr D Y Patil Medical College a tertiary care teaching hospital situated in the Pune District.

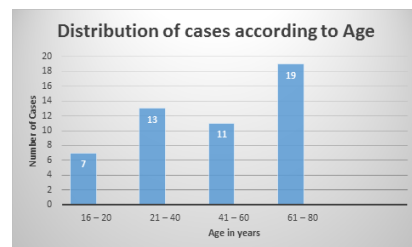
A total of 50 individuals were included in the study. Patients of age >15 years with known aortic valve disease or newly diagnosed aortic valve disease attending medicine OPD or admitted in medicine department were taken as cases. Patients either newly diagnosed or on treatment for aortic valve disease with Age >12 years were included in the study.

Patients with Valvular heart disease other than aortic valve, End stage renal disease, Immunocompromised patients, Chronic Decompensated Liver Disease were excluded from the study.

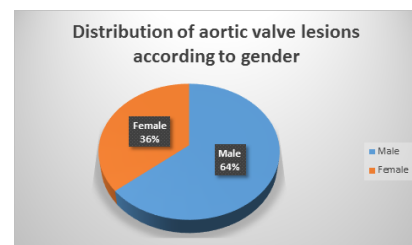
These patients were subjected to chest x-ray and ECG and were studied.

### RESULTS:

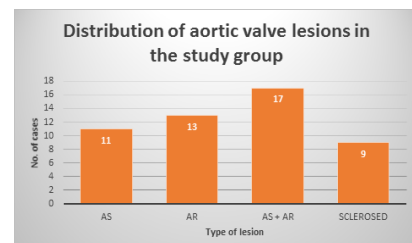
Of total 50 patients, 7 (14%) cases were in the age group of 16-20 years and 13 (26%) were in the age group of 21-40 years.



The study showed highest number of patients (38%) were in the age group of 61-80 years.



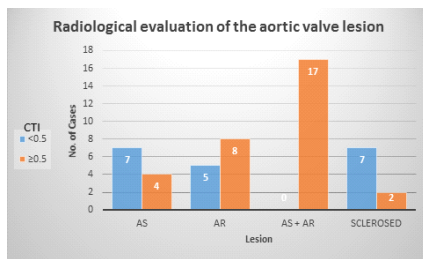
Among the 50 cases studied, 32 (64%) were male and 18 (36%) were female.



Out of 50 (n=50) cases studied, Isolated AS was found in 11 patients (22%),

Isolated AR was found in 13 patients (26%),

Mixed AS and AR was found in 17 patients (34%) and sclerosis of aortic valve was found in 9 patients (18%).



**CTI – cardiothoracic index**

There was significant correlation between lesion type and cardio megaly on chest Xray.

Significant cardiomegaly was seen in all 17 cases of Mixed AS+AR ( 34%);

4 of 11 AS lesions ( 8% ); 8 of 13 AR lesions ( 16% ).

Only 2 of 9 sclerosed lesions ( 4% ) had radiologically significant cardiomegaly.

Lesion	ECG		
	n	LVH	LAE
AS	11	6 (54.5)	3 (27.3)
AR	13	1 (7.7)	0
AS + AR	17	8 (47.1)	5 (29.4)
Sclerosed	9	2 (22.2)	0
Chi-square		7.93	7.51
P Value		0.048	0.057

LVH- Left Ventricular Hypertrophy; LAE- Left Atrial Enlargement

ECG evidence of LVH was seen in 54.5% of Pure AS and 47.1% of Mixed AS + AR, 7.7% of Pure AR and 22.2% of sclerosed aortic valve. ECG evidence of LAE was seen in 27.3% of Pure AS and 29.4% of Mixed AS + AR.

**DISCUSSION:**

A total of 50 individuals were included in the study which included 32 male subjects (64%) and 18 female subjects (36%). The ages of these individuals ranged from 16 – 80 years. The mean age was 50.62 ± 20.83 yrs.

The highest number of patients (38%) were in the age group of 61-80 years.

Among the 50 cases studied, 32 (64%) were male and 18 (36%) were female.

Isolated AS was found in 11 patients (22%), Isolated AR was found in 13 patients (26%), Mixed AS and AR was found in 17 patients (34%) and sclerosis of aortic valve was found in 9 patients (18%).

In this study among 50 cases, 31 cases had cardiomegaly, of which 17 cases were of Mixed AS+AR ( 34% ), 4 were Isolated AS lesions( 8% ), 8 were Isolated AR lesions ( 32% ), 2 were sclerosed lesions ( 4% ) (radiologically significant cardiomegaly i.e CTI ≥ 0.5). There was positive correlation between lesion type and cardiomegaly on chest X-ray and it was significant (p value = <0.0001).

This is comparable to a study by *Dr Yuranga Weerakkody<sup>6</sup>, Dr Sajoscha Sorrentino ,et al*, radiological evaluation of aortic stenosis was studied and it was observed that in early disease, the chest radiograph can be entirely normal or it may show dilatation of the ascending aorta with a normal heart size. Differentiation with hypertension can usually be made as in hypertension the entire descending aorta is enlarged. However, late in the disease, the chest radiograph may reveal valvular calcifications (if valvular aortic stenosis) and/or cardiomegaly with features of heart failure, such as pulmonary venous congestion and pulmonary interstitial/alveolar

oedema .

ECG evidence of LVH was seen in 54.5% of Isolated AS and 47.1% of Mixed AS + AR, 7.7% of Isolated AR and 22.2% of sclerosed aortic valve.

ECG evidence of LAE was seen in 27.3% of Pure AS and 29.4% of Mixed AS + AR.

**CONCLUSION :**

- Aortic valve diseases affects males more commonly than females.
- Majority (38%) of the patients usually have Mixed AS and AR.
- Chest X-ray is a useful modality and gives a clue to diagnosis of aortic valve diseases of congenital origin.
- ECG is no longer used for diagnosing aortic valve diseases but can be used for evaluation of LVH, LAE.

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