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| JUNIL FOR RESEARCE              | Original Research Paper  | Anatomy                         |
|---------------------------------|--|---------------------------------|
| International                   | AGE-WISE VARIATIONS IN THE DIMENSIONS OF LEFT AT<br>LEFT VENTRICLE IN 100 APPARENTLY HEALTHY INDIVI  | RIUM AND<br>DUALS               |
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ABSTRACT Introduction: The study on the measurements of the chambers of the heart is very important, which gives details of anatomy, physiology and also pathological conditions of the heart. This knowledge also helps in diagnosis, treatment and follow-up of cardiovascular diseases.

Materials & methods: The present study was conducted on 100 apparently normal people attending Out-patient and In-patient sections in Cardiology Department at Osmania General Hospital and CARE hospitals, Hyderabad from October 2012 to September 2013.

**Results & conclusion:** In the present study it was found that the dimensions of left atrium and left ventricle increased with increase in age, which falls in line with previous studies performed on the same criteria.

**KEYWORDS :** 2Dimensional Echocardiography (2D Echo), Left atrium systole dimensions (LA s), Left atrium diastole dimensions (LA d), Left ventricle systole dimensions (LV s), Left ventricle diastole dimensions (LV d).

# **INTRODUCTION:**

Cross sectional Echocardiography can give details of Anatomy in the living patients/ population. By correlating Echocardiographic images with Anatomical specimens we can develop understanding of the lesions in the clinical setting.

In view of the morbidity and mortality in the population which occurs due to heart diseases (both congenital and acquired heart diseases), the present study on measurements of dimensions of heart chambers is carried out in normal population in Telangana state. The study on chambers of the heart gives details of normal and abnormal findings regarding structure and function of the heart which helps in diagnosis, treatment and also follow up of any cardiac pathology. Congenital heart diseases can also be handled aptly via Echocardiography by early detection, counselling, health education, proper care, treatment and follow up. More than 32 million patients are suffering with coronary heart disease in India (Shah and Mathur<sup>(1)</sup> - 2010 ICMR New Delhi).

### AIM:

- To study anatomic dimensions of the Left atrium and left ventricle of heart by 2Dimensional Echocardiography.
- To observe the dimensions of Left atrium and left ventricle of heart in normal people in various age groups.
- Analysis of the Echocardiographic dimensions of Left atrium and left ventricle of heart to note normal variations in healthy people.

### MATERIALS & METHODS:

The present study was done on imaging of heart (Echocardiography) on apparently healthy people attending Department of cardiology, **Osmania General Hospital**, Afzalgunj, **Hyderabad** and **CARE Hospitals**, Banjara Hills, Hyderabad, for regular health check-ups during a period of one year from October 2012 to September 2013 as out-patient and in-patient. Sample size being 100.

The study group was screened by 2-Dimensional Echocardiographic study, to determine the dimensions of all the chambers of the heart. The heart and its performance were measured in terms of dimensions in specific planes. Details were recorded as per the proforma. Informed consent was obtained from patients after explaining to them the purpose and method of the study in their mother tongue / language of fluency.

**Statistical method:** Basic statistical analysis for various parameters using such as Percentage, Mean, Standard Deviation and p-value were calculated.

**Observations:** In age wise distribution of Left atrial and Left ventricular systolic and diastolic dimensions, Mean and Standard deviation (S. D.) were studied between 21 to above 71 years in the study population. The observations are listed in the table no. 01.

# Table No.01: Age wise distribution of LA and LV dimens I ons in the total population( $n\!=\!100)$

| Age in   | LA s (cm) | LA d (cm)       | LV s (cm)       | LV d (cm)       |
|----------|-----------|-----------------|-----------------|-----------------|
| years    | Mean±S.D. | Mean±S.D.       | Mean±S.D.       | Mean± S.D.      |
| 21 – 30  | 2.87      | $3.27 \pm 0.28$ | $2.95 \pm 0.17$ | $4.6 \pm 0.31$  |
| Total=4  | ±0.34     |                 |                 |                 |
| 31 - 40  | 2.58      | $3.19 \pm 0.35$ | $2.85 \pm 0.26$ | 4.65 ± 0.29     |
| Total=12 | ±0.25     |                 |                 |                 |
| 41 – 50  | 2.69      | 3.31± 0.33      | 2.81 ±0.29      | $4.40 \pm 0.52$ |
| Total=50 | ±0.32     |                 |                 |                 |
| 51 – 60  | 2.70      | $3.29 \pm 0.32$ | 2.88 ±0.26      | $4.43 \pm 0.49$ |
| Total=23 | ±0.31     |                 |                 |                 |
| 61 – 70  | 2.76      | 3.37 ±0.55      | 2.8 ±0.16       | 4.48 ±0.36      |
| Total=8  | ±0.56     |                 |                 |                 |
| >71      | 2.46      | 3.13 ±0.55      | $2.86 \pm 0.40$ | $4.66 \pm 0.49$ |
| Total=3  | ±0.35     |                 |                 |                 |

Chart No. 01: Age wise distribution of LA and LV dimensions in the total population



In the group of 21 to 30 years, the LA s and LA d dimension was found to be 2.87 and 3.27cm respectively, and the LV s and LV d was 2.9 and 4.6 cm. In the 31 - 40 years group, the LA s, LA d, LV s and LV d dimension was 2.66 and 3.28, 2.92 and 4.78 cm respectively. The least LA s and LA d were 2.46 and 3.13 cm were in above 71 years. Highest LA s 2.87 cm was found in the age group of 21 - 30 years. 3.37 cm LA d was the highest in 61 - 70 years of age group. LV s was highest in the age of above 71 years and least 4.40cm in the age group of 41 - 50 years.

## DISCUSSION:

Risk of cardiovascular diseases is more in elderly people because of physiological and pathological changes which occur in the heart and treated accordingly. Aging did not affect left ventricular cavity dimension. Aging in the normal individuals is associated with altered left ventricular diastolic filling, increased Aortic root diameter and left ventricular hypertrophy but little change in contractile ability in the resting state. Harrison and associates<sup>(2)</sup> found that the isovolumetric relaxation in man is increased by 40% between third and ninth decade.

In the present study 100 normal individuals comprising of 60 men with the mean age of 48.42, SD =  $\pm$  11.56 and 40 women with mean age of 49.18 SD =  $\pm$  8.430 were included. The age range is 25-82 years for males and 34-75 years for females.

Table No. 02: The observations of the authors on the dimensions of Left Atrium and Left Ventricle

| S.no. | Author   | Studied        | LA        | LV        |
|-------|--|----------------|-----------|-----------|
|       |  | characteristic |           |           |
| 1.    | Gardin J.M.Henry<br>(1979) <sup>(3)</sup>          | Age            | Increases | Increases |
| 2.    | R S Valdez (1979) <sup>(4)</sup>                   | Age            | Increases | decreases |
| 3.    | W L Henry (1980) <sup>(5)</sup>                    | Age            | Increases | Increases |
| 4.    | Voogd P J (1984) <sup>(6)</sup>                    | Age            | Increases | Increases |
| 5.    | Paulo Roberto<br>Schvartzman (2000) <sup>(7)</sup> | Age            | Increases | Increases |
| 6.    | T Sang T S (2003) <sup>(8)</sup>                   | Age            | Increases | Increases |
| 7.    | Nidorf SM (1992) <sup>(9)</sup>                    | Age            | Increases | Increases |
| 8.    | The present study<br>(2013)                        | Age            | Increases | Increases |

Gardin J. M. Henry et al (1979)<sup>(3)</sup> noticed in a study on normal subjects in different age groups by Echocardiography LA dimensions increases with age and also observed a decrease in the systolic Left Ventricular (LVs) and the diastolic Left Ventricular (LVd) dimensions.

RS Valdez et al (1979)<sup>(4)</sup> in a study observed that the LÅ d and LÅ s dimensions were significantly affected by age and found to be in direct proportion to the age. They also opined that transducer placement can affect the measurements of LV dimensions and position of the body can also influence the measurements as well. The LV s and LV d dimensions decreases with age. LV dimensions were higher in males than females but under reference range.

W L Henry et al (1980) <sup>(5)</sup> stated that dimensions of the heart increase as age advances from infancy to old age. They have observed that the Left Atrial (LA) and Left Ventricular (LV) dimensions are increased by the age.

Voogd PJ et al (1984)<sup>(6)</sup> observed that an increase in the LA and the LV dimensions with the increase of the age.

Paulo Roberto Schvarzman, et al (2000)  $^{(7)}$ , in a study on 114 healthy adult subjects in an age group of 44 years in both the genders. Cardiac dimensions LV, were increased in males.

T. Sang TS et al (2003)<sup>(8)</sup> have observed in a study of the

normal patients with the mean age of 40 years, the LA dimensions were increased with the age.

Nidorf SM (1992)  $^{\scriptscriptstyle (3)}$ , in a study of normal 268 individuals from 6 days to 76 years that the growth of LV shows uniformity, reaching 50% of their adult dimension at birth, 75% by 5 years and 90% by 12 years. LA dimensions also increased with age.

W Bommer et al (1979)<sup>(10)</sup> in his study of normal individuals with age group of 18-70 years with mean age of 40 years were having a Mean Right Atrial (RA) dimensions of 3.6 cms by Two Dimensional Echocardiography and the mean Right Ventricular (RV) dimensions were 2.8 cm. This helps to differentiate the normal from the dilated chambers.

In the present study the LA and LV dimensions were increased with advancing age. The LV dimensions were increased due to age-related changes in the myocytes of the cardiac muscle. The present study is consistent with the studies of W L Henry, Voogd P J, T Sang and Gardin J M.

## CONCLUSION:

The present study is a preliminary step to know the dimensions of the chambers of the heart in normal individuals. If we study the normal dimensions in detail in various age groups any deviation from normal dimensions of chambers can be detected. This aids in detecting the underlying pathology. This helps in proper management and follow up of cases. In the present study cardiac dimensions in general increased as the age advances.

# REFERENCES

- Shrenik Shah, Niraj Yadav. Current Status of Tropical Heart Disease in India and its Prevention. Postgraduate medicine; Volume XXVII: 506-511, 2013.
  Kasper, Dennis L., et al. Harrison's Principles of Internal Medicine. 19th
- Kasper, Dennis L., et al. Harrison's Principles of Internal Medicine. 19th edition. New York: McGraw Hill Education, 2015.
- Gardin J M, Henry W L, Savage DD Echocardiographic measurements in normal subjects: Evaluation of an adult population without clinically apparent heart disease J. Clini. Ultrasound; 7: 439-47, 1979.
- R. S. Valdez, J A Motta, E London Evaluation of the Echocardiography as an epidemiologic tool in an asymptomatic population. Journ. of Amer. Heart Asso. Circulation; 60: 921-929, 1979.
- W L Henry, J M Gardin, J H Ware –Echocardiographic measurements in normal subjects from infancy to old age. Journal of the American heart Asso.; 62: 1054-1061,1980.
- Voogd P J, Rijsterborch H, Lubsen J. et al Reference ranges of Echocardiographic measurements in The Dutch population – Eur. Heart jour; 5:762-770,1984.
- Paulo Roberto Schvartzman, Alex Gules Mello, Mario Schvartzman. Arq Bras Cardiol, Volume 75 (n° 2), 111-114, 2000.
- Tsang TS, Barnes M E, Gersh BJ, et al Prediction of risk for first age related cardiovascular events in an elderly population: the incremental value of echocardiography – J.Am coll. Cardiol; 42:1199–205, 2003.
- Nidorf SM, Picard MH, Triulzi MO et al New perspectives in the assessment of cardiac chamber dimensions during development and adulthood Journal Am. Coll. Cardiol. ; 19:983-8, 1992.
- Bommer W, Weinert L, Neumann A, et al; Determination of right atrial and right ventricular size by 2-Dimensional Echocardiography. Circulation; 60: 91-100, 1979.