

## TO CORRELATE ECG CHANGES AND CLINICO-RADIOLOGICAL FINDINGS WITH THE SEVERITY OF VSD.

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### Abstract

**Background & Method:** This study was conducted in 56 children in age group of 02 months to 14 years with Echocardiographically proved Ventricular Septal Defect, over a period of 01 and a half year, after taking consent from the parents and explaining them the purpose and method of this study.

**Result:** Out of these 27 patients in 2 to 6 months age group, 11 were large VSDs, 16 were moderate VSDs and 2 were small VSDs. Out of 17 patients in age group 6 to 12 months, 10 patients were large VSDs, 5 patients had moderate VSDs and 3 patients were with small VSDs.

Among patients with moderate VSDs only 4 out of 25 patients had signs of right ventricular hypertrophy (16%). Left ventricular hypertrophy was evident clinically in 24 patients out of 25 (96%) & obviously no patients had biventricular hypertrophy. A loud ESM was heard (grade II-IV).

**Conclusion:** Clinical examination can also suggest LVH in moderate VSD & sometimes BVH in large VSD, Palpable P2 and loud P2 are very important findings that suggest pulmonary hypertension. Pansystolic murmur is heard in small-moderate VSD and ESM in large VSD. Complications like CCF, pulmonary hypertension, malnutrition and FTT are mostly present in moderate-large VSD. Chest x-ray suggests cardiomegaly, plethora and also enlargement of PA segment in moderate –large VSD.

**Keywords:** ECG, Clinico-radiological, VSD & Severity.

**Study Designed:** Observational Study.

### Introduction:

VSD is reported in 3.3% of first degree relatives of index patients.[1] between 30-60% of siblings of index patients have ventricular septal defects, & siblings of patients have three times the incidence of VSDs compared to the general population[2].

VSD have been reported in identical twins[3] but with a high frequency of discordance[4]. A parent with a spontaneously closed VSD can have an offspring with a VSD. Birth weights are low in about 18% of full term infants with ventricular septal defects[5]. Dysmaturity is in addition to and apart from occurrence of VSD in preterm infants.

The clinical manifestation of an interventricular, ventricular left-to-right shunt largely are dependent on the size of the defect and the pulmonary and systemic vascular resistances. With small defects, the volume of the left-to-right shunt is limited by the resistance of small defect.[58] With larger defects, the volume of the left-to-right shunt depends upon the relative pulmonary and systemic vascular resistances.[61]

### Material & Method

This prospective observational study was conducted in the Department of Pediatrics, Index Medical College Hospital and Research Centre, Indore from Nov 2019 to Oct 2020.

This study was conducted in 56 children in age group of 02 months to 14 years with Echocardiographically proved Ventricular Septal Defect, over a period of 01 and a half year, after taking consent from the parents and explaining them the purpose and method of this study.

### Inclusion and exclusion criteria

Patients with echo proved isolated Ventricular Septal Defect, of more than 02 months to 14 years of age were included in this study. Well informed and written consent was obtained for participation in this study.

Patients with a single ventricle, atrio-ventricular canal defect, VSD associated with pulmonary stenosis & transposition of great vessels etc, were excluded from this study.

A detailed clinical history and clinical examination was obtained for each patient. Recent ECG record and chest x-

ray along with previous medical record (if any) was obtained for each patient.

## Results

**Table 1:** Correlation of Age with Size of VSD in study group

AGE (IN MONTHS)	LARGE VSD	MODERATE VSD	SMALL VSD	TOTAL
>2 TO 6	11	16	2	27
>6 TO 12	10	5	3	17
>12	4	4	1	12
TOTAL	25	25	6	56

Out of these 27 patients in 2 to 6 months age group, 11 were large VSDs, 16 were moderate VSDs and 2 were small VSDs.

Out of 17 patients in age group 6 to 12 months, 10 patients were large VSDs, 5 patients had moderate VSDs and 3 patients were with small VSDs.

**Table 2:** Correlation of Size of VSD with Clinical Findings

	RVH (%)	LVH (%)	BVH (%)	PALPABLE P2 (%)	MURMUR
LARGE	100	100	100	96	ESM
MODERATE	16	96	NIL	36	PSM
SMALL	NIL	NIL	NIL	NIL	PSM

Among patients with moderate VSDs only 4 out of 25 patients had signs of right ventricular hypertrophy (16%). Left ventricular hypertrophy was evident clinically in 24 patients out of 25 (96%) & obviously no patients had biventricular hypertrophy. A loud ESM was heard (grade II-IV).

**Table 3:** Correlation of Size with chest x-ray (A)

SIZE	NO. of Patients (N=56)	CHEST X-RAY
LARGE	25	Increased PVM (100%), cardiomegaly (96%), Enlarged PA segment (100%)
MODERATE	25	Increased PVM (100%), cardiomegaly (33.33%), Enlarged PA segment (37.5%)
SMALL	6	Increased PVM (16%), Cardiomegaly (Nil), enlarged PA segment (Nil)

## Discussion

The maximum no. of children were less than 6 months of age (48.2%). According to a study conducted in Odisha, India by Dr Mahapatra A. *et al*<sup>[9]</sup>, this is the most common congenital heart disease in India accounting for 36.3%.

91% (51 cases) patients in this study group had increased pulmonary vascular markings in their chest x-ray which is very characteristic in ventricular septal defect as pulmonary blood flow is increased in VSD. Out of these 51 patients, 25

were large (100%), 25 were moderate (100%) and 1 was small VSD (16%). In the study conducted by Smita *et al*, 41% patients had normal cardiac contour, 41% had LV enlargement & increased lung perfusion was seen in 59% in their study. Keith *et al*<sup>[10]</sup>, Campbell *et al* & Devis *et al* also observed.

In this study, Perimembranous VSD are more common type which 87.5% (49 patients) followed by Muscular VSD – 7.1% (4 patients). This is comparable to the study conducted by Joseph Perloff where he mentions that 80% of VSD are perimembranous. In a study conducted in India by Suraj W. Nagre, Perimembranous VSD was 73.3%, followed by muscular VSD which was 6.66%<sup>[11]</sup>. Similar study by L Baro *et al* showed 24.3% perimembranous, 22.9% muscular only 2.9% subarterial type. Chaudhry *et al* in their study showed the same.

## Conclusion

Clinical examination can also suggest LVH in moderate VSD & sometimes BVH in large VSD, Palpable P2 and loud P2 are very important findings that suggest pulmonary hypertension. Pansystolic murmur is heard in small-moderate VSD and ESM in large VSD. Complications like CCF, pulmonary hypertension, malnutrition and FTT are mostly present in moderate-large VSD. Chest x-ray suggests cardiomegaly, plethora and also enlargement of PA segment in moderate-large VSD.

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