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To Correlate the Cardiac Complications in Children with Congenital Heart Defects having ECG and Clinico-Radiological findings

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Abstract: This prospective observational study was conducted in the Department of Pediatrics, Amaltas Institute of Medical Sciences, Dewas between March 2016 to August 2017. Patients were classified on the basis of detailed history, clinical examination, ECG record, chest x-ray, Weight-for-Height, age of diagnosis, follow up and other relevant investigations pertaining to the case. The correlation among the clinical examination, ECG & chest x-ray findings were studied. The predictive values of development of complications during the follow-up period by these 3 parameters were observed. Sex distribution, age of diagnosis, clinical examination, ECG, chest x-ray, weight for height, types of VSDs and development of complication on follow up of these patients were analyzed and classified accordingly. The complications of VSD are biventricular hypertrophy, congestive cardiac failure, Pulmonary hypertension, Eisenmenger Syndrome, aortic insufficiency, infective endocarditis& heart block (rare). In our study group 24/56 (42.8%) patients presented with biventricular hypertrophy & all of them were large sized VSDs. Out of25 large sized VSDs, 20 (35.7%) patients had congestive cardiac failure. 35 out of56 had pulmonary hypertension (62.5%), as evident by ECG (P pulmonale in lead II), clinical examination (palpable P2 & loud P2 on auscultation) & chest x-ray (enlarged Pulmonary Artery segment). 1 Patient out of 56 developed Eisenmenger Syndrome (1.7%). 1 Patient out of 56 developed infective endocarditis (1.7%). Prospective Observational Study. A detailed clinical history, clinic-radiological profile and ECG are very helpful in assessing severity and development of complications. Early diagnosis is required to aid the physician in referral of the patient to a specialized center for early surgery. Early diagnosis, proper referral as discussed above & management will help in preventing the associated complications, thereby reducing the mortality and morbidity in these children and improve their quality of life.
Keywords: ECG, Clinic-Radiological, X-Ray, Eisenmenger & Endocarditis.

INTRODUCTION

With a believed incidence rate of 6-8 per 1000 live births; nearly 180,000 children are born with heart defects each year in India. Of these, nearly 15-20% are ventricular septal defects. Approximately 10% of present infant mortality in India may be accounted for by congenital heart diseases alone. In this way, every year a large no of children are added to the total pool of cases with congenital heart disease [1].

Rapid advances have taken place in the diagnosis and treatment of congenital heart defects over the last six decades. There are diagnostic tools available today by which an accurate diagnosis can be made even before birth. With currently available treatment modalities, over 75% of infants born with critical heart diseases can survive beyond the first year of life and many can lead near normal lives thereafter [2].

However, this privilege of early diagnosis and timely management is restricted to children in developed countries only. Unfortunately, majority of children born in developing countries and afflicted with congenital heart disease do not get the necessary care, leading to high morbidity and mortality. Several reasons exist for this state of affairs including inadequate number of cardiologists, cardiac surgeons, specialized cardiac centersespecially at or near remote areas etc [3, 4].

MATERIALS & METHODS

This prospective observational studywas conducted in the Department of Pediatrics, AmaltasInsitute of Medical Sciences, Dewas between March 2016 to August 2017.

This study was conducted in 56 children in age group of02 months to 14 years withEchocardiographically provedVentricular Septal Defect, overa period of 1 and a halfyear, 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 2 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.

ECG and clinico-radiological findings were correlated with the age of the subject, (as an ECG in a large VSD may be normal at 1 month of age, but will present with chamber hypertrophy at 1 year of age).ECG and clinic-radiological findings was confirmed with previous Echocardiographic findings of each patient.

Patients were classified on the basis of detailed history, clinical examination, ECG record, chest x-ray, Weight-for-Height, age of diagnosis, follow up and other relevant investigations pertaining to the case. The correlation among the clinical examination, ECG & chest x-ray findings were studied. The predictive values of development of complications during the follow-up period by these 3 parameters were observed. Sex distribution, age of diagnosis, clinical examination, ECG, chest x-ray, weight for height, types of VSDs and development of complication on follow up of these patients were analyzed and classified accordingly.

Patients with age less than 2 months, or with a single ventricle, atrio-ventricular canal defect, VSD associated with pulmonary stenosis & transposition of great vessels etc. and those not giving consent were excluded from this study. Data was analyzed by Pearsons Chi square test & Fischer Exact Test.

RESULTS

Correlation of complications in study group with their ECG and clinico-radiological profile

- The complications of VSD are biventricular hypertrophy, congestive cardiac failure, Pulmonary hypertension, Eisenmenger Syndrome, aortic insufficiency, infective endocarditis & heart block (rare).
- In our study group 24/56 (42.8%) patients presented with biventricular hypertrophy & all of them were large sized VSDs.
- Out of25 large sized VSDs, 20 (35.7%) patients had congestive cardiac failure.
- 35 out of56 had pulmonary hypertension (62.5%), as evident by ECG (P pulmonale in lead II), clinical examination (palpable P2 & loud P2 on auscultation) & chest x-ray (enlarged Pulmonary Artery segment).
- 1 Patient out of 56 developed Eisenmenger Syndrome (1.7%).
- 1 Patient out of 56 developed infective endocarditis (1.7%).

Table-1: Complications of VSD in study group

COMPLICATIONS	NO. OF CASES (N=56)
Biventricular Hypertrophy	24 (42.8%)
Congestive Cardiac failure	20 (35.7%)
Pulmonary Hypertension	35 (62.5%)
Eisenmenger Syndrome	1 (1.7%)
Infective Endocarditis	1 (1.7%)

DISCUSSION

This observational study was planned to correlate the clinical findings, chest radiograph and ECG findings in echo proved Ventricular Septal Defect in children. In this study, 56 patients between 2 months to 14 years of age group were included. This study was conducted in Department of Pediatrics at Amaltas Institute of Medical Science, Dewas. All children included in this study underwent a thorough clinical examination, chest radiograph and ECG records were obtained.

According to study by Mukul Misra *et al.*, most common congenital heart defect is VSD in India (28.3%) [5, 6].

COMPLICATIONS

The complications of VSD are biventricular hypertrophy, congestive cardiac failure, Pulmonary hypertension, Eisenmenger Syndrome, aortic insufficiency, infective endocarditis & heart block (rare).

In our study group 24/56 (42.8%)patients presented with biventricular hypertrophy & all of them were large sized VSDs. 35 patients (62.5%)had pulmonary hypertension. 1 patient(1.7%) developed infective endocarditis and 1 patient (1.7%) with large VSD evolved into Eisenmenger's Complex. Thus, pulmonary hypertension (62.5%) was most common complication observed. Study by Choudhry *et al.*, & Baro *et al.*, also found severe pulmonary hypertension

to be the most common complication associated with Large VSD [7].

In a study conducted by A. Saxena in Nov 1993 on 410 patients, 6 cases (1.4%) developed infective endocarditis and 3 (0.7%) patients developed Eisenmenger's Complex.

Hence, a regular follow up is essential to prevent development of complications like Eisenmengerisation.

Out of 25 large sized VSDs, 20 (35.7%) patients had congestive cardiac failure. 35 out of56 had pulmonary hypertension (62.5%), as evident by ECG (P pulmonale in lead II), clinical examination (palpable P2 & loud P2 on auscultation) & chest x-ray (enlarged Pulmonary Artery segment). 1 Patient out of 56 developed Eisenmenger Syndrome (1.7%).

1 Patient out of 56 developed infective endocarditis (1.7%). Infective endocarditis was more commonly associated with severe aortic regurgitation. However, since only 1 patient in our study group developed infective endocarditis without aortic regurgitation, nothing more can be commented in this area.

CONCLUSION

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.

A detailed clinical history, clinic-radiological profile and ECG are very helpful in assessing severity and development of complications. Early diagnosis is required to aid the physician in referral of the patient to a specialized center for early surgery. Early diagnosis, proper referral as discussed above & management will help in preventing the associated complications, thereby reducing the mortality and morbidity in these children and improve their quality of life.

REFERENCES

1. Van Praagh, R., Geva, T., & Kreutzer, J. (1989). Ventricular septal defects: how shall we describe, name and classify them?. *Journal of the American College of Cardiology*, *14*(5), 1298-1299.
2. Abbott, M. E. (1931). Congenital Heart Disease, Nelson's Loose-Leaf Medicine. *New York*.
3. Mitchell, S. C., Korones, S. B., & Bernards, H. W. (1971). Congenital heart diseases in 56,100 children. Incidence and natural history. Circulation; 43:323.
4. Hoffman, J. I., & Christianson, R. (1978). Congenital heart disease in a cohort of 19,502 births with long-term follow-up. *American journal of cardiology*, *42*(4), 641-647.
5. Minette, M. S., & Sahn, D. J. (2006). Ventricular septal defects. *Circulation*, *114*(20), 2190-2197.
6. Misra, M., & Mittal, M. (2009). Prevalence and pattern of congenital heart disease in school children of Eastern Uttar Pradesh. *India Heart Journal*; 61: 58-60.
7. Chaudhry, T. A., Younas, M., & Baig, A. (2011). Ventricular septal defect and associated complications. *JPMA*, *61*(10), 1001-1004.