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RESEARCH ARTICLE

PULMONARY ARTERY PRESSURE PROFILE IN ISOLATED ATRIAL SEPTAL DEFECT (ASD) PATIENTS IN SOUTHERN RAJASTHAN

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ABSTRACT

Objective: The aim of this study was to calculate the incidence of pulmonary hypertension and its age distribution in isolated atrial septal defect (ASD) patients in our population.
Methods: A total of 124 ASD (secundum type) patients were included in the study. The diagnosis was made with echocardiography. Pulmonary artery systolic pressure was obtained by Doppler echocardiography. Mean pulmonary artery pressure (mPAP) was estimated with the relation of MPAP to PASP as (mPAP = 0.61×PASP + 2 mm Hg).
Results: Severe PA hypertension (mean pressure > 40 mm Hg) was found in 12 patients (9.67%), age range was neonate to 60 years but most of them were less than 30 years old.
Conclusion: It was seen that pulmonary pressure increases with age.

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INTRODUCTION

ASD (Lange, 2013) is a relatively common acyanotic congenital heart disease with a birth prevalence of 1.6 per 1000 live births, and a probability of survival into adulthood of 97 % (van der Linde, 2011 and Moons, 2010). Different types of ASDs exist, and the secundum type, located at the fossa ovalis, is the most common (75 %) (Webb, 2006). An ASD is characterized by a left-to-right shunt with volume overload of the right heart and pulmonary overcirculation. This might result in arrhythmias, right heart failure, and pulmonary arterial hypertension. The frequency of pulmonary hypertension can be expected to increase with age (Khoury, 1967). As many as 30% of adult patient with ASD have this finding (Gault, 1968). The majority of symptomatic adults beyond the age of 40 have mild to moderate pulmonary hypertension, that develops in presence of persistent large left to right shunt (Saksena, 1970 and Craig, 1968). Significant pulmonary hypertension seldom develop before third decade (Evans, 1961; Mark, 1963 and Perloff, 1987). Many factors have been implicated as the cause of pulmonary hypertension, such as pulmonary emboli, progressive vascular changes, persistence of fetal type of pulmonary vessels and recurrent pulmonary infections. Eisenmenger's reaction occurs in less than 10% of patients with Atrial Septal Defect (Chemla, 2015). This study was done to see the pulmonary pressure profile of isolated ASD patients in our population where echocardiography done as a screening tool for suspected congenital heart disease after birth and in early childhood.

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MATERIALS AND METHODS

This study was carried out in the Department of Cardiology, R.N.T. Medical College, Udaipur district in Rajasthan (India). During the period from January 2016 to December 2017. A total of 124 patients with a wide age range as neonate to 60 years were selected of which 62 were male and 62 were female. Those patients were selected who were clinically suspected as ASD and echocardiography demonstrated interatrial septal (IAS) defect and colour doppler showed flow through IAS defect. Patients of ASD with pulmonary stenosis, cleft mitral valve, ostium primum ASD and Sinus venosus ASD as well as ASD associated with other congenital heart defects were excluded from the study. Pulmonary artery systolic pressure was obtained by Doppler echocardiography. Mean pulmonary artery pressure (mPAP) was estimated with the relation of MPAP to PASP as (mPAP = 0.61×PASP + 2 mm Hg) (Grossman, 1991).

Table 1. Pulmonary Artery (PA) Mean Pressure Distribution (n=124)

AGE	PA PRESSURE (mmHg)				SEX	
	≤20	21-29	30-39	≥40	Male	Female
<1 month	24	4	6	4	15	23
1 month -1 year	25	2	3	1	20	11
1-10 years	16	1	2	2	14	7
10-30 years	11	6	1	2	10	10
>30 years	1	5	5	3	3	11
TOTAL	77 (62.09%)	18 (14.51%)	17 (13.70%)	12 (9.67%)	62	62

Table 2. Distribution of raised PA mean pressure (n=47)

Age (years)	Pa Pressure (mmHg)			TOTAL
	21-29	30-39	≥40	
UP TO 30	13	12	9	34 (72.34%)
ABOVE 30	5	5	3	13(27.65%)

Table 3. Distribution of Severe (>40 mm Hg) PA Mean Pressure (n=12)

Age (Years)	Male	Female	Total
UP TO 30	3	6	9(75%)
ABOVE 30	1	2	3(25%)

Table 4. Distribution of Normal PA Pressure (n = 77)

Age (years)	Male	Female	Total
Up to 30	41	35	76(98.7%)
Above 30	1	0	1(1.3%)

The pulmonary artery mean pressure was classified into normal, mild, moderate and severe when mean pressure (in mm Hg) was up to 20, 21-29, 30-39 and 40 or more respectively (Evans, 1961).

RESULTS

The mean PAP was <20 mm Hg at 77 (62.09%), between 21-29 mm Hg at 18 (14.51%), between 31-39 mm Hg at 17 (13.7%) and >40 mm Hg at 12 (9.67%) cases (Table I). Total 47 patients showed elevated pulmonary pressure of which 34 (72.34%) were < 30 years of age and13 (27.65%) were above 30 (Table III). Among patients with severe pulmonary artery hypertension (mean pressure >40 mm Hg.) there were 8 female and 4 male with two peaks of distribution, one was a neonate group (less than 1 month) and another peak was after 30 years of age (Table III). In 77 patients PA mean pressure was normal (< 20 mmHg). 76 (98.7%) of them were < 30 years of age (Table IV).

DISCUSSION

In our study, among all the patients mild to moderate pulmonary hypertension was seen in 28.2% and severe pulmonary hypertension was seen in 9.67% cases. 98.7% of the normal pulmonary pressure profile was seen in those who were less than 30 years of age as mean pulmonary pressure is mainly related with age and high pulmonary artery pressure is seen in the third decade and onward, which correlates well with other previous studies (Dave, 1973 and Besterman, 1961) Beller et al, (Beller, 1966) commented that 30 to 50 % of patients develop pulmonary hypertension sometime after the age of 20 years, Kelly and Lyons (Kelly, 1958), have reported pulmonary hypertension in 7 of 19 who were more than 45 years of age.

Although in our study, 10.52 % patients of group of neonates were also having high pulmonary artery pressure profile.

Conclusion

So this study shows that patients of Atrial septal defect in our population develop pulmonary hypertension in the third decade and onward, like other populations, but severely increased pulmonary artery pressure profile in a subgroup of neonates also observed probably due to persistence of increased pulmonary artery pressure of birth with gradual normalization as most of them were of low birth weight.

Limitations of the study: In this study a maximum number of patients are of less than 30 years, so the prevalence of pulmonary hypertension in ASD of the younger age group was well studied but lesser patients of older age group was limitation of our study. Sinus venosus and Ostium primum ASD are not included and sample size is small. So to make a firm comment a larger study with all types of ASD is needed.

Conflicting Interest: There are no conflicts of interest.

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