

Pulmonary Artery Pressure Profile in Atrial Septal Defect (ASD) Patients

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Abstract:

The objective of this study was to see the incidence of pulmonary hypertension and its age distribution in atrial septal defect (ASD) patients in our population. A total of 58 ASD (secundum type) patients were included in the study. The diagnosis was done with echocardiography. Subsequently patients under went cardiac

catheterization and their pulmonary artery (PA) mean pressure was measured. It was seen that pulmonary pressure increases with age. Severe PA hypertension (mean pressure ≥ 40 mm Hg) was found in 14 patients (24.14%), age range was 10-55 years but most of them were more than 20 years old.

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Introduction:

Atrial septal defects usually go undetected in child hood. Patients usually present themselves in their middle age.¹Increasing disability in third and fourth decade of life are due to development of pulmonary hypertension and heart failure.

The frequency of pulmonary hypertension can be expected to increase with age.² As many as 30% of adult patient with ASD have this finding.² 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.^{3,4} Significant pulmonary hypertension seldom develop before third decade.^{4,5,6} 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. Mark⁷ reported that pulmonary artery pressure tend to be slightly higher in older patients. Eisenmenger's reaction occurs in less than 10% of patients with Atrial Septal

Defect.⁸ This study was done to see the pulmonary pressure profile of ASD patients in our population.

Methods:

This study was carried out in the Department of Cardiology, Dhaka Medical College Hospital, Dhaka during the period from January 2006 to December 2007. A total of 58 patients were selected from the in and out patient department of which 26 were male and 32 were female. Age range was 5-55 years. Those patients were selected who were clinically suspected as ASD and echocardiography demonstrated interatrial septal (IAS) defect in the region of fossa ovalis and colour doppler showed flow through IAS defect. Patients of ASD with pulmonary stenosis, cleft mitral valve, ostium primum ASD and Sinus venosus ASD were excluded from the study.

Cardiac catheterization was done and results determined according to the methods described by grossman.⁹ 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.¹⁰ All the data were processed and analyzed manually.

Result:

Pulmonary artery pressure study was meticulously performed. The mean pulmonary artery pressure (PAP) was 31.90 ± 20.93 mm Hg. (mean \pm SD) with the range of 10-95 mm Hg. The mean PAP was ≤ 20 mm Hg in 24 (41.38%), between 21-29 mm Hg in 13(22.41%), between 31-39

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mm Hg in 7 (12.07%) and >40 mm Hg. in 14(24.14%) cases (Table I). Total 34 patients showed elevated pulmonary pressure of which 12 (35.19%) were < 20 years of age and 22 (64.71%) were above 20 (Table III). Among patients with severe pulmonary artery hypertension (mean pressure >40 mm Hg.) there were 8 female and 6 male, age range was 10-55 years but most of them were more than 20 years old (Table III). In 24 patients PA mean pressure was normal (< 20 mmHg). Sixteen (66.66%) of them were < 20 years of age (Table IV).

Table-I
Pulmonary Artery (PA) Mean Pressure Distribution (n=58)

Age Group (Years)	PA Pressure in mm Hg.				Sex	
	≤20	21-29	30-39	≥40	Male	Female
0-10	6	-	2	1	3	6
11-20	10	5	2	2	8	11
21-30	7	6	2	6	9	12
31-40	-	2	-	4	4	2
>40	1	-	1	1	2	1
Total	24 (41.38%)	13 (22.41%)	7 (12.07)	14 (24.14%)	26	32

Table-II
Distribution of raised PA mean pressure (n=34)

Age Group (Years)	PA Pressure in mm Hg.			Total
	21-29	30-39	≥40	
Upto 20	5	4	3	12(35.19%)
Above 20	8	3	11	22(64.71%)

Table-III
Distribution of Severe (≥40 mm Hg.) PA Mean Pressure.

Age in Years	Male	Female	Total
Up to 20	2	1	3 (21.43)
Above 20	4	7	11 (78.57)

Table-IV
Distribution of Normal PA Pressure (n = 24)

Age in Years	Male	Female	Total
Up to 20	6	10	16 (66.67)
Above 20	3	5	8 (33.33%)

Discussion:

Cardiac catheterization showed mild to moderate pulmonary hypertension in 34.48% and severe pulmonary hypertension in 24.14% cases. It was seen that 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.^{8,10} Besterman ¹¹ found pulmonary hypertension in 16% of his patients. Beller et al ¹² commented that 30 to 50 % of patients develop pulmonary hypertension sometime after the age of 20 years, Kelly and Lyons ¹³ have reported pulmonary hypertension in 7 of 19 who were more than 45 years of age. So this study shows that patients of Atrial septal defect in our population develop pulmonary hypertension in third decade and onward like other populations. In this study sinus venosus and primum ASD are not included and sample size is small .Which are limitations of this study. So to make a firm comment a larger study with all types of ASD is needed.

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