

Frequencies of Different Morphological Types and Clinical Presentation of Atrial Septal Defect (ASD) Undergoing Surgical Repair in Bangladesh

Ratna Rani ROY¹, Khondker Manzare SHAMIM², PK SAHA³, Md. Abdullah YUSUF⁴

¹Assistant Professor, Department of Anatomy, Dr. Sirajul Islam Medical College, Dhaka, Bangladesh; ²Chairman & Head of the Department of Anatomy, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; ³Associate Professor, Department of Surgery, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh; ⁴Assistant Professor, Department of Microbiology, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh

[Received: 1 July 2015; Reviewed: 19 September 2015; Accepted: 7 December 2015; Published: 1 January 2016]

Abstract

Background: Atrial septal defect (ASD) is one of the important congenital anomaly. **Objective:** The present study is designed to determine how the different morphological types of ASD are distributed among Bangladeshi Bengali patients undergoing surgical repair and to see the clinical features of the above patients. **Methodology:** This cross-sectional descriptive study was carried out on the 50 ASD patients undergoing surgical repair at the National Institute of Cardiovascular Diseases (NICVD) or the National Heart Foundation and Research Institute (NHF & RI) in Dhaka, during the period of July 2010 to June 2011 to explore different morphological types and clinical presentation. The morphological types of ASD were revealed by echocardiography and confirmed preoperatively. **Result:** A total number of 50 patients were recruited in this study of which ostium secundum type was found in 96% cases and sinus venosus type in 4% cases. Evaluation of patients showed that 14% of the patients were asymptomatic and they were detected incidentally. The most common symptoms were palpitation, dyspnea, recurrent RTI, fatigue, failure to thrive and chest pain. The commonest signs at diagnosis included loud S1, wide and fixed splitting S2, systolic murmur, tachycardia, shifting of the apex beat and left parasternal lift. Surgical closure has been the mainstream of treatment. **Conclusion:** In conclusion ostium secundum is the most common type of ASD. [*Journal of Current and Advance Medical Research 2016;3(1):6-9*]

Keywords: Atrial septal defect (ASD); morphological types; clinical presentation; echocardiography; ostium secundum; sinus venosus

Corresponding author: Dr. Ratna Rani Roy, Assistant Professor, Department of Anatomy, Dr. Sirajul Islam Medical College, Dhaka, Bangladesh; Email: pksaha2@yahoo.com; Cell No.: +8801711248109

Cited as: Roy RR, Shamim KM, Saha PK, Yusuf MA. Frequencies of Different Morphological Types and Clinical Presentation of Atrial Septal Defect (ASD) Undergoing Surgical Repair in Bangladesh. *Journal of Current and Advance Medical Research*, 2016;3(1):6-9

Conflict of Interest: Authors have declared no conflict of interest.

Contributions to authors: RRR and KMS have contributed in protocol preparation to manuscript writing. PKS & MAY have prepared & revised the manuscript.

Introduction

Congenital heart disease is a gross structural abnormality of the heart or great vessels that is actually or potentially of functional significance¹. The incidence of CHD is estimated at 8 to 10 per 1000 live births based on studies carried out in

different centres worldwide¹. Atrial septal defect (ASD) is the commonest of the congenital heart diseases. ASD is a hole of variable size in almost any location in the interatrial septum². In Bangladesh, among the hospitalized children with CHD, the largest share (70%) is occupied by left to right shunt anomalies. Among them, ASD comes as

the second in the picture as left to right shunt anomalies among the children admitted with CHD in hospital. The incidence of ASD among CHD in the live born is 7.4%³. A study was carried out in the Combined Military Hospital (CMH) in Dhaka, Bangladesh, over a period of 3 years (2004-2006) on the 5,668 live births and found that lesions among these babies were ASD (26.0%), ventricular septal defect or VSD (16.9%), patent ductus arteriosus or PDA (18.0%) and tetralogy of Fallot or TOF (14.0%)¹. It may be noted that atrial septal defect (ASD) is a common cardiovascular malformation that affects over 1 in 1000 live births; thus ASD accounts for 10% of congenital heart defects⁴. A total of 1442 surgical procedures were done at the National Heart Foundation (NHF) in Dhaka, Bangladesh in 2010. Among them, 172 dealt with ASD. ASD diagnosis depends on symptoms, signs, noninvasive and invasive investigations. Now a days ASD is detected earlier due to the wide use of echocardiography. ASD may present with complications like pulmonary hypertension, congestive heart failure and arrhythmia. As ASD may be of different types by their physical characteristics, their functional/dysfunctional characteristics as well as the surgical corrective measures might also vary. However, there is no adequate reporting on the morphological types of ASD in the Bengali population of Bangladesh. Organized records of the clinical features are lacking. Considering the above points, the present study is designed to determine how the different morphological types of ASD are distributed among Bangladeshi Bengali patients undergoing surgical repair and to see the clinical features of the above patients.

Methodology

This cross-sectional descriptive study was carried out on the 50 Bangladeshi ASD patients which was diagnosed by registered cardiac surgeons of either sex undergoing surgical repair through convenience sampling technique at the National Institute of Cardiovascular Diseases (NICVD) or the National Heart Foundation and Research Institute (NHF & RI) in Dhaka. The study period spanned from July, 2010 to June, 2011. An informed consent was taken from patients or one of the parents in case of minors. Examinations of hospital records of patients were used for identifying the morphological types of ASD which was determined by the type at echocardiography and clinical presentation of ASD which was diagnosed by the registered cardiac surgeons. Peroperative photographs of the defect were taken from the above patients. The

classification was also confirmed preoperatively by the registered cardiac surgeons.

Results

The mean age of the study sample of the 50 ASD patients was 19.9±11.16 years (mean ± SD), with an age range of 2 months to 45 years. There were 19(38%) males and 31(62%) females and male-female ratio was 1:1.9 (Table 1).

Table 1: Age and sex distribution of patients (n= 50)

Age Group	Male	Female	Total	Male : Female Ratio
0- 10 yrs	3	9	12(24.0%)	1:3
11 - 20 yrs	4	7	11(22.0%)	1:1.7
21 - 30 yrs	9	10	19(38.0%)	1:1.1
31 - 40 yrs	2	3	5(10.0%)	1:1.5
41 - 50 yrs	1	2	3(6.0%)	1:2
Total	19	31	50(100%)	1:1.9

Among the 50 patients, only two morphological types of ASD were identified (Figures 1). They were fossa ovalis (ostium secundum) type was found in 48 (96%) cases and sinus venosus type was found in 2(4%) cases. Considering the various manifestations it was found that dyspnea was observed in 36(72.0%) patients. Palpitation was complained by 42(84%) patients and fatigue by 13(26.0%) patients. History of recurrent RTI was found in 15(30.0%) patients. Seven (14.0%) patients were asymptomatic and diagnosed incidentally. Only few of the patients also presented with non-specific chest pain (Figure 8). Regarding the signs, no patient was presented with oedema or clubbing in this study.

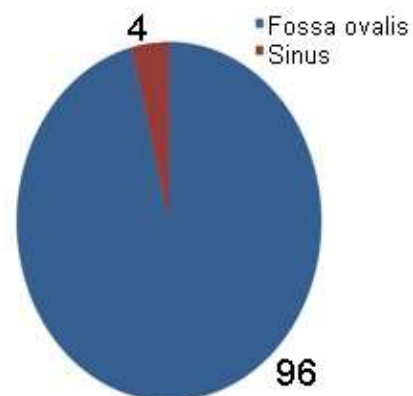


Figure 1: Frequencies of different morphological types of ASD found in the patients (n= 50)

On auscultation, wide and fixed splitting of 2nd heart sound (S2) and ejection systolic murmur (EJM) were present in all cases. The 1st heart sound was loud in tricuspid area in 29(58%) cases. Apex beat was shifted in 11(22%) cases. No scar mark on the chest wall and no irregularity of pulse were present in this series. Features suggestive of congestive cardiac failure such as engorged neck vein, enlarged tender liver and dependent oedema were not noted in any patient (Figure 3).

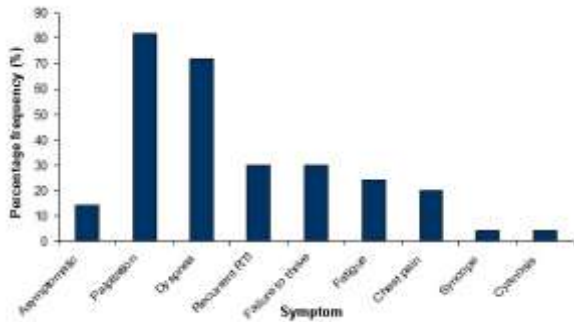


Figure 2: Showing frequencies of different symptoms of ASD in the patients (n= 50)

Discussion

In the present study, the commonest age of presentation was second and third decade⁵. In the present study female and male ratio was 1.9:1⁶⁻⁸. The obvious preponderance of the ostium secundum type is almost universal^{4,8-10}. In the United States, Carr noted that about 15.0% to 30.0% of the healthy adults had an unfused foramen ovale in which the valve function normally⁸. Webb and Gatzoulis¹¹ observed that sinus venosus ASD constituting 5.0% to 10.0% of all ASDs in their study. Bezold¹² reported on a study in the United States, less than 1.0% cases were of the coronary sinus type.

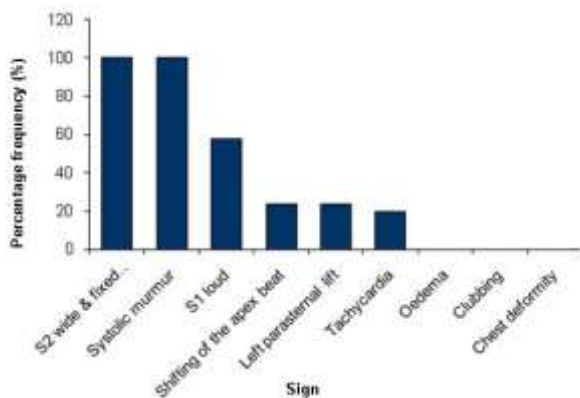


Figure 3: Showing frequencies of different signs of ASD in the patients (n= 50)

In the present study, it has been found that 14.0% of the patients were asymptomatic and diagnosed incidentally. Most children are asymptomatic for many years¹³. A significant number of ASDs close spontaneously within the first few years of life, but spontaneous closure after age 3 to 4 is rare¹⁴. The most common symptoms of the patients were palpitation, dyspnea, fatigue, recurrent respiratory tract infection and failure to thrive which correlates well with other studies^{8,11,15}.

In the physical appearance, no distinctive extra cardiac features reflecting any typical chromosomal or genetic abnormality were evident in this series. On physical examination, common findings were wide and fixed splitting of the second heart sound, loud first heart sound in the tricuspid area, ejection systolic murmur over the second intercostal space at the upper left sternal border, shifting of the apex beat due to cardiac enlargement in transverse diameter and left para-sternal lift^{8,11,15}. In 32.0% of them, those who suffered from repeated recurrent respiratory tract infection, in infancy and early childhood presented with a poor weight gain and, to a lesser extent, a retarded height. Most individuals with an uncorrected secundum ASD do not have significant symptoms throughout the early adulthood. About 70.0% develop symptoms by the time they are in their 40s¹⁴. Libby et al¹⁵ mentioned that the development of pulmonary hypertension can occur at an early age. Carr⁸ found that pulmonary hypertension is unusual before 20 years of age and it is seen in 50% of individuals above the age of 40. According to Webb and Gatzoulis¹¹, the age at which symptoms appear is highly variable and is not exclusively related to the size of the shunt. They also mentioned that exercise intolerance in the form of exertional dyspnea or fatigue is the most common initial presenting symptom. They also noted that presence of cyanosis may lead to the diagnosis of interatrial communication.

Conclusion

In conclusion this present study permits to conclude that ostium secundum is the most common type of ASD. The most common symptoms are palpitation, dyspnea, recurrent RTI, fatigue, failure to thrive and chest pain. The commonest signs at diagnosis are loud S1, wide and fixed splitting S2, systolic murmur, tachycardia, shifting of the apex beat and left parasternal lift.

References

1. Fatema NN, Chowdhury RB & Chowdhury L. Incidence of congenital heart disease among hospital live birth in a

- tertiary hospital of Bangladesh. *Cardiovascular Journal* 2008;1(1):14-20
2. Kouchoukos NT, Blackstone EH, Doty DB, Hanley FL, Karp RB. *Kirklin/Barratt-Boyes cardiac surgery*. Vol. 1, 3rd edn. Churchill Livingstone, USA, 2003
 3. Mahmood M, Haque S KHMS, Ahmed QS, Siddique MA & Ahmed CM. Doppler evaluation of left to right shunt (QP/QS) in patient isolated septal ASD. *Chest Heart Journal* 2005;29(1):26-31
 4. Sarkozy A, Conti E, Neri C, Agostino RD, Digilio MC, Esposito G, et al. Spectrum of atrial septal defects associated with mutations of NKX2.5 and GATA4 transcription factors. *Journal of Medical Genetics* 2005;42(2):48-52
 5. Shah D, Azhar M, Oakley CM, Cleland JGF & Nihoyannopoulos P. Natural history of secundum atrial septal defect in adults after medical or surgical treatment: a historical prospective study. *British Heart Journal* 1994;71(3):224-228
 6. Fuster V, Alexander RW, O'Rourke RA (eds). *Hurst's the heart*. Vol.1 & 2, 10th edn. McGraw Hill, USA, 2004
 7. Campbell M & Polani PE. Factors in the aetiology of atrial septal defect. *British Heart Journal* 1961;23(5):477-493
 8. Carr MR. *Pediatric atrial septal defects*. Medscape, 2010
 9. Doherty GM (ed). *Current diagnosis and treatment*. 13th edn. McGraw Hill, USA, 2010
 10. Markham LW. *Atrial septal defect*. Medscape, 2010
 11. Webb G, Gatzoulis MA. Atrial septal defects in the adult. *Circulation of American Heart Association* 2006;114(15): 1645-1653
 12. Bezold LI. *Atrial septal defect, coronary sinus*. Medscape, 2008
 13. Colledge NR, Walker BR & Ralston SH (eds). *Davidson's principles & practice of medicine*, 21st edn. Churchill Livingstone, Elsevier, USA, 2010
 14. Sellke FW, Del Nido PJ & Swanson SJ (eds). *Sabiston & Spencer surgery of the chest*. Vol. 2, 8th edn. Elsevier Saunders, Philadelphia, USA, 2010
 15. Libby P, Bonow RO, Mann DL & Zipes DP (eds). *Braunwald's heart disease: a textbook of cardiovascular medicine*. 8th edn. Saunders Elsevier, Philadelphia, USA, 2008