Research Article

Pattern of rheumatic heart disease in Bareilly

Manmohan Krishna Pandey[1], Shamshad Hussain Ansari[1], Purnima Mittra[2]

[1]Department of Medicine, Rohilkhand Medical College, Bareilly, Uttar Pradesh, India, [2]Department of Pathology, Mayo Institute of Medical Sciences, Barabanki, Uttar Pradesh, India

Correspondence to: Manmohan Krishna Pandey, E-mail: drmkp12@gmail.com

Received: January 05, 2017; **Accepted:** March 10, 2017

ABSTRACT

Background: Valvular heart disease is a leading cause of morbidity and mortality in India. Echocardiography (ECHO) remains the gold standard for diagnosis and periodic assessment of patients with valvular heart disease. This study was conducted to illustrate the pattern of rheumatic heart disease (RHD) among the patients attending the tertiary care center in Bareilly (India). **Objectives:** The objectives of the study was to study type and severity of valvular heart disease attending the tertiary care center in Bareilly (India). **Materials and Methods:** The present cross-sectional study was conducted in 1345 patients of RHD between 10 and 70 years of age. The type and degrees of valvular involvement on transthoracic ECHO were defined according to the American College of Cardiology/American Heart Association 2006 guidelines. **Results:** Majority of the patients had mitral regurgitation (705 [52.41%]) followed by tricuspid regurgitation (595 [44.23%]). Mitral stenosis was found in 343 (25.50%), aortic stenosis in 19 (0.014%), and transferrin saturation in 9 (0.0067%) patients. Valvular regurgitation was more than valvular stenosis. Mixed valvular disease was most prevalent in the mitral valve in (314 [23.33%]), followed by aortic (40 [2.99%]) and tricuspid valves (5 [0.371%]). Juvenile RHD (patients <20 years of age) was seen in 181 patients including 93 males and 88 females. **Conclusion:** The high prevalence and severity of RHD in rural India need effective prophylactic measures to ensure a symptom-free life span for the patient. Recurrences of rheumatic fever are higher in patients with RHD and further episode further damages the heart. ECHO plays an important role for early detection of RHD and monitoring of medical therapy.

KEY WORDS: Rheumatic Heart Disease; Mitral Stenosis; Valvular Disease

INTRODUCTION

Rheumatic heart disease (RHD) affects more than 15 million people in the world and cause about 250,000 deaths every year.[1] The RHD is caused by an autoimmune response due to molecular mimicry between the M-protein on the group A beta hemolytic streptococci cell membrane and cardiac myosin leading to valvular damage.[2] Diagnosis of RHD includes history, clinical examination, and echocardiography (ECHO) which constitutes the basis of diagnosis of any disease but an accurate history of RHD is difficult to obtain and it cannot be single criteria for the diagnosis.[3] Two-dimensional color Doppler ECHO is the current gold standard for identifying and quantifying the type and severity of valve involvement in RHD.[4-7] Information regarding valve morphology and function, chamber size, wall thickness, ventricular function, pulmonary and hepatic vein flow, and estimate of pulmonary artery pressures can be readily integrated with the help of an ECHO.[8] Timely intervention in valvular heart disease increases the survival rate of the patient, and for this, the severity of valvular lesions in RHD is very important.[3] This study was done to estimate the pattern and severity of valve involvement in patient attending the tertiary care center in Bareilly region on the basis of ECHO.

Access this article online	
Website: http://www.ijmsph.com	**Quick** Response code
DOI: 10.5455/ijmsph.2017.0100210032017	

MATERIALS AND METHODS

This cross-sectional study was conducted in the Medicine Department of Tertiary Care Center in Bareilly (India) with the Approval of Medical College Ethical Committee and after consent of the patients or their guardian if the patient was a minor from November 2010 to October 2012. Patients between 10 and 70 years of age were included in this study. All patients presenting with symptom such as chest pain, palpitation, anxiety, breathlessness, edema and the one whose history and examination was suggestive of heart disease had undergone transthoracic ECHO. The data of the 1345 patients having RHD on ECHO were used in this study. The heart diseases other than RHD were excluded from the study. The type and degrees of valvular involvement were defined according to the American College of Cardiology/ American Heart Association guidelines (Tables 1-3).[9]

Table 1: Criteria for severity of AR and AS

Criteria	Mild	Moderate	Severe
AR			
Qualitative			
Color Doppler jet	<25% of LVOT	25%-65% of LVOT	>65% LVOT
Doppler vena contracta width (cm)	<0.3	0.3-0.6	>0.6
Quantitative (cath or ECHO)			
Regurgitant volume (ml/beat)	<30	30-59	≥60
Regurgitant fraction (%)	<30	30-49	≥50
Regurgitant orifice area (cm^2)	<0.10	0.10-0.29	≥0.30
AS			
Indicator			
Jet velocity (m/s)	<3.0	3.0-4.0	≥4.0
Mean gradient (mm Hg)*	<25	25-40	≥40
Valve area (cm^2)	≥1.5	1.0-1.5	<1.0
Valve area index (cm^2/m^2)			<0.6

AR: Aortic regurgitation, AS: Aortic stenosis, ECHO: Echocardiography

RESULTS

The total of 1345 patients including 710 (52.78%) males and 635 (47.2%) females of 11-70 years of age with RHD were included in the study. The maximum population under study were between the age group of 21 and 30 years followed by 31-40 years (Table 4).

Majority of the patients had mitral regurgitation (MR) (705 [52.41%]) followed by tricuspid regurgitation (TR) (595 [44.23%]). Mitral stenosis (MS) was found in 343 (25.50%), aortic stenosis (AS) in 19 (0.014%), and transferrin saturation in 9 (0.0067%) patients. Valvular regurgitation was more than valvular stenosis. Mixed valvular disease was most prevalent in the mitral valve (MV) in 314 (23.33%), followed by aortic (40 [2.99%]), and tricuspid valves (5 [0.371%]). MS was found in 178 (13.21%) and MR in 355 (26.38%) in males. Mixed MV disease was seen in 165 (12.26%) of the male patients. In females, MS was found in 165 (12.25%) and MR in 340 (25.27%). Mixed MV disease was seen in 149 (11.07%) of the female patients. Among males, 188 (13.97%) had aortic valve (AV) involvement. Some degree of AS was seen in only 11 (0.0081%) male patients. Aortic regurgitation (AR) was detected in 180 (0.133%) in males. Mixed AV disease was seen in 18 (1.63%) males. In females, 168 (12.49%) had AV involvement. AS was seen in 8 (0.006%) and AR in 163 (12.11%) females. 607 (45.13%) of the patients were seen with the tricuspid valve involvement where tricuspid stenosis was seen in only 5 patients. TR was seen in 595 (44.23%) patients. Mixed tricuspid valve disease was seen in 5 patients (0.37%). The left-sided valvular lesions were fairly common (Table 5).

Majority of the male patients with the moderate and severe MS were seen between the age group of 41 and 50 years. The highest number of male patients with severe MR and mixed MV disease were seen between the age groups of 21-30 and 31-40 years, respectively. Majority of the female patients were

Table 2: Criteria for severity of MR and MS

Qualitative	Mild	Moderate	Severe
MR			
Color Doppler jet width	Small, central jet (<4 cm^2 or<20% LA area)	Signs of MR greater than mild present but no criteria for severe MR	Vena contracta width>0.7 cm with large central MR jet (area<40% of LA area) or with a wall-impinging jet of any size, swirling in LA
Doppler vena contract a width (cm)	<0.3	0.3-0.69	≥0.70
Quantitative (cath or ECHO)			
Regurgitant volume (ml/beat)	<30	30-59	≥60
Regurgitant fraction (%)	<30	30-49	≥50
Regurgitant orifice area (cm^2)	<0.20	0.20-0.39	≥0.40
MS			
Mean gradient (mm Hg)*	<5	5-10	>10
Pulmonary artery systolic pressure (mm Hg)	<30	30-50	>50
Valve areia (cm^2)	<1.5	1.0-1.5	<1.0

MR: Mitral regurgitation, MS: Mitral stenosis, ECHO: Echocardiography

with moderate and severe MS. Severe MR and mixed MV disease were seen between the age group of 21 and 30 years. There were only a small number of AS patients in the whole study population, and severe AS was mostly seen in the older patient between the age group of 41 and 60 years. The highest number of patients with severe AR were seen between the age groups of 21 and 30 years for males and females both, whereas the largest number of patients with mixed AV disease were seen in the age groups of 31-40 years for both males and females. Juvenile RHD (patients <20 years of age) was seen in 181 patients including 93 males and 88 females. The severe MR, severe AR and severe TR were commonly found between the age group of 21 and 30 years (Table 6).

DISCUSSION

The RHD has continued to be major health-care concern in the developing countries. The prevalence of rheumatic fever (RF)/RHD in India among school children is 2-11 per 1000 with a mean of 6 per 1000.[10] Among the adults, the average ranged between 123 and 200 per 100,000 population.[11] Low socioeconomic status, poor hygiene, overcrowding, and close person-to-person contact account for the high RHD incidence.[12-14] Approximately, 25% of all patients with RHD have pure MS, and an additional 40% have combined MS and MR.[15-17]

Table 3: Criteria for severity of TS and TR

Right-sided valve disease	Characteristics
Severe tricuspid stenosis	Valve area<1.0 cm^2
Severe TR	Vena contracta width>0.7 cm and systolic flow reversal in hepatic veins

TS: Tricuspid stenosis, TR: Tricuspid regurgitation

The most common lesions seen in RHD in this study were of regurgitant type predominantly involving MV followed by tricuspid and AVs. It was supported by previous studies.[3,18,19] TR due to the rheumatic involvement is uncommon but is always associated with MV disease.[20] The mixed mitral, aortic and tricuspid valve lesions was found to be more common than their respective stenotic valve lesions.[18,21] Juvenile RHD (patients <20 years of age) was seen in 181 patients including 93 males and 88 females. The severe MR, severe AR and severe TR were commonly found in the age group of 21-30 years. The data were supported by earlier study.[22]

This study had its own limitation. It was the hospital based study and not an epidemiological study. Since it was done in tertiary care center, it includes most of the

Table 4: Age and sex distribution of study population

Sex	11-20 (%)	21-30 (%)	31-40 (%)	41-50 (%)	51-60 (%)	61-70 (%)
Male	110 (8.17)	222 (16.50)	184 (13.68)	102 (7.58)	56 (4.16)	36 (2.67)
Female	102 (7.58)	195 (14.49)	170 (12.63)	96 (7.13)	46 (3.42)	26 (1.93)
Total	212 (15.76)	417 (31)	354 (26.31)	198 (14.72)	102 (7.58)	62 (4.60)

Table 5: Sex distribution of valvular diseases

Valvular disease	Male (%)	Females (%)	Total (%)
Mild MS	57 (4.23)	38 (2.82)	95 (7.06)
Mod MS	20 (1.48)	15 (1.11)	35 (2.60)
Severe MS	101 (7.50)	112 (8.32)	213 (15.83)
Mild MR	195 (14.49)	175 (13.01)	370 (27.50)
Mod MR	95 (7.06)	110 (8.17)	205 (15.24)
Severe MR	65 (4.83)	55 (4.08)	130 (9.66)
Mild AS	2 (0.148)	1 (0.074)	3 (0.002)
Mod AS	1 (0.074)	2 (0.148)	3 (0.002)
Severe AS	8 (0.594)	5 (0.371)	13 (0.009)
Mild AR	36 (2.67)	50 (3.71)	86 (6.39)
Mod AR	124 (9.21)	91 (6.76)	215 (15.98)
Severe AR	20 (1.48)	22 (1.63)	42 (3.12)
Mild TR	85 (6.31)	65 (4.83)	150 (11.15)
Mod TR	175 (13.01)	175 (13.01)	350 (26.02)
Severe TR	45 (3.34)	50 (3.71)	95 (7.06)
Mixed MV disease	165 (12.26)	149 (11.07)	314 (23.34)
Mixed AV disease	22 (1.63)	18 (1.33)	40 (2.97)
Mixed TV disease	2 (0.148)	3 (0.223)	5 (0.37)

MR: Mitral regurgitation, MS: Mitral stenosis, AS: Aortic stenosis, AR: Aortic regurgitation, TR: Tricuspid regurgitation, MV: Mitral valve, AV: Aortic valve, TV: Tricuspid value

Table 6: Age and distribution of valvular disease

Valvular disease	Males (in years)	Females (in years)
Severe MS	41-50	21-30
Severe MR	21-30	21-30
Severe AS	51-60	41-50
Severe AR	21-30	21-30
Severe TR	21-30	21-30
Mixed MV disease	31-40	21-30
Mixed AV disease	31-40	31-40
Mixed TV disease	31-40	21-30

MR: Mitral regurgitation, MS: Mitral stenosis, AS: Aortic stenosis, AR: Aortic regurgitation, TR: Tricuspid regurgitation, MV: Mitral valve, AV: Aortic valve, TV: Tricuspid value

patients who were referred from peripheral health center in advanced stage and critical condition. For the actual burden of the disease in Bareilly region, an epidemiological population-based study with follow-up with ECHO is needed in future.

CONCLUSION

The high prevalence and severity of RHD in rural India needs effective prophylactic measures to ensure a symptom free life span for the patient. Recurrences of RF are higher in patients with RHD and further episode further damages the heart.[23] ECHO plays an important role for early detection of RHD and monitoring of medical therapy because RHD at initial stage would warrant lifelong prophylaxis.[24] Therefore, ECHO should be a routine screening tool for investigation of RHD and also for follow-up to guide in the early intervention for severe valvular lesions.

REFERENCES

1. Carapetis JR, Steer AC, Mulholland EK, Weber M. The global burden of group A streptococcal diseases. Lancet Infect Dis. 2005;5(11):685-94.
2. Carapetis JR, McDonald M, Wilson NJ. Acute rheumatic fever. Lancet. 2005;366(9480):155-68.
3. Khan MH, Tasneem H, Khan SZ, Sharieff S. Echocardiogram: Screening for valvular heart disease in an out-patient clinic. Med Today. 2005;3(3):133-6.
4. Aronow WS, Kronzon I. Correlation of prevalence and severity of valvular aortic stenosis determined by continuous-wave Doppler echocardiography with physical signs of aortic stenosis in patients aged 62 to 100 years with aortic systolic ejection murmurs. Am J Cardiol. 1987;60(4):399-401.
5. Grayburn PA, Smith MD, Handshoe R, Friedman BJ, DeMaria AN. Detection of aortic insufficiency by standard echocardiography, pulsed Doppler echocardiography, and auscultation. A comparison of accuracies. Ann Intern Med. 1986;104(5):599-605.
6. Meyers DG, McCall D, Sears TD, Olson TS, Felix GL. Duplex pulsed Doppler echocardiography in mitral regurgitation. J Clin Ultrasound. 1986;14(2):117-21.
7. Vargas-Barron J, Bialostozky D, Attie F, Pop G, Keirns C, Gil-Moreno M, et al. Differential diagnosis of various causes of systolic-diastolic murmurs using pulsed Doppler echocardiography. Am Heart J. 1984;108(6):1507-13.
8. Bhandari S, Subramanyam K, Trehan N. Valvular heart disease: Diagnosis and management. J Assoc Physicians India. 2007;55:575-84.
9. American College of Cardiology/American Heart Association Task Force on Practice Guidelines; Society of Cardiovascular Anesthesiologists; Society for Cardiovascular Angiography and Interventions; Society of Thoracic Surgeons, Bonow RO, Carabello BA, et al. ACC/AHA 2006 guidelines for the management of patients with valvular heart disease: A report of the American college of cardiology/American heart association task force on practice guidelines (Writing committee to develop guidelines for the management of patients with valvular heart diseases). Developed in collaboration with the society of cardiovascular anesthesiologists: Endorsed by the society for cardiovascular angiography and interventions and the society of thoracic surgeons. Circulation. 2006;114(5):e84-e231.
10. Padmavati S. Rheumatic fever and rheumatic heart disease in developing countries. Bull World Health Organ. 1978;56(4):543-50.
11. Mathur KS, Wahal PK. Epidemiology of rheumatic heart disease-A study of 29,922 school children. Indian Heart J. 1982;34(6):367-71.
12. Padmavati S. Present status of rheumatic fever and rheumatic heart disease in India. Indian Heart J. 1995;47(4):395-8.
13. Eisenberg MJ. Rheumatic heart disease in the developing world: Prevalence, prevention, and control. Eur Heart J. 1993;14(1):122-8.
14. Thakur JS, Negi PC, Ahluwalia SK, Vaidya NK. Epidemiological survey of rheumatic heart disease among school children in the Shimla hills of northern India: Prevalence and risk factors. J Epidemiol Community Health. 1996;50(1):62-7.
15. Dare AJ, Harrity PJ, Tazelaar HD, Edwards WD, Mullany CJ. Evaluation of surgically excised mitral valves: Revised recommendations based on changing operative procedures in the 1990s. Hum Pathol. 1993;24(12):1286-93.
16. Waller B, Howard J, Fess S. Pathology of aortic valve stenosis and pure aortic regurgitation. A clinical morphologic assessment-Part I. Clin Cardiol. 1994;17(2):85-92.
17. Schoen EJ, St. John SM. Contemporary pathologic considerations in valvular heart disease. In: Virmani R, Atkinson JB, Feuglio JJ, editors. Cardiovascular Pathology. Philadelphia, PA: WB Saunders Co.; 1991. p. 334.
18. Danbauchi SS, Alhassan MA, Wammanda R. Spectrum of rheumatic heart disease in Zaria, Northern Nigeria. Ann Afr Med. 2004;3:17-21.
19. Reddy A, Jatana SK, Nair M. Clinical evaluation versus echocardiography in the assessment of rheumatic heart disease. Med J Armed Forces India. 2004;60(3):255-8.
20. Blaustein AS, Ramanathan A. Tricuspid valve disease. Clinical evaluation, physiopathology, and management. Cardiol Clin. 1998;16(3):551-72, x.

21. Marcus RH, Sareli P, Pocock WA, Barlow JB. The spectrum of severe rheumatic mitral valve disease in a developing country. Correlations among clinical presentation, surgical pathologic findings, and hemodynamic sequelae. Ann Intern Med. 1994;120(3):177-83.
22. Reddy CR, Jagabandhu N. Rheumatic heart disease in Kurnool. A clinico-pathological study. Indian Heart J. 1968;20(2):149-56.
23. Mason T, Fisher M, Kujala G. Acute rheumatic fever in West Virginia. Not just a disease of children. Arch Intern Med. 1991;151(1):133-6.
24. Narula J, Chandrasekhar Y, Rahimtoola S. Diagnosis of active rheumatic carditis. The echoes of change. Circulation. 1999;100(14):1576-81.

How to cite this article: Pandey MK, Ansari SH, Mittra P. Pattern of rheumatic heart disease in Bareilly. Int J Med Sci Public Health 2017;6(6):1081-1085.

Source of Support: Nil, **Conflict of Interest:** None declared.