ROLE OF RADIOLOGY AND IMAGING IN THE DIAGNOSIS OF VALVULAR HEART DISEASE

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ABSTRACT

The main aim of this study was to observe the various morphological changes in the heart due to different valvular heart diseases and to access the utility of various imaging techniques in diagnosing them. A comparison between chest radiography, Echocardiography and Doppler studies was made.

A total of 50 patients were selected for this study, out of which 23 (46%) were males 27 (54%) were females. Their age ranged from 7 to 55 years with the mean of 25.1 years. The study was carried out for 4 months in March - April - May - June 1994 and all the patients were collected from Punjab Institute of Cardiology, Lahore.

The study revealed that 39 (78%) patients showed involvement of the Mitral valve, 20 (40%) of Aortic valve, 29 (58%) of Tricuspid valve and only 4 (8%) of pulmonary valve either alone or in combination with each other.

INTRODUCTION

With the introduction of latest modalities i.e. Doppler Ultrasound and echhocardiographhy, diagnosis of valvular heart disease has become very precise and accurate. In echocardiography the measurements of chamber dimensions and wall thickness can be made. Also, the pattern of movement of a valve leaflet with abnormality and severity can be diagnosed. Doppler flow measurements are used to quantify pressure gradients across stenotic valves; quantify flow; measure cardiac output or left to right shunts; and detect and quantify valvular regurgitation.

MATERIAL AND METHODS

This study was conducted on patients admitted in surgical units of Punjab Institute of Cardiology, Lahore. They were referred to wards from out patients department and emergency with clinically proved diagnosis of valvular heart disease. A total of 50 patients were selected for this study, out of which 23 (46%) were males and 27 (54%) were females. Their age ranged from 7 to 55 years with the mean of 25.1 years.

Majority of the patients presented with the symptoms of shortness of breath, palpitation, joint pain, fever and a few with haemoptysis and cough, having physical findings of raised JVP, changes in character of pulse, presence of thrill, and change in intensity of heart sounds with different murmurs heard in the precordial area.

The laboratory investigations used mainly were ASO titre, throat and blood cultures to evaluate the cause of the disease.

The different imaging modalities to which the patients were subjected were Conventional PA chest Radiography, Echocardiography and Doppler Ultrasound.

RESULTS AND DISCUSSION

In this particular study of valvular heart disease, it was found that the most commonly affected age group was between 7 and 15 years and the common cause found was rheumatic heart disease. It was also observed that most of the patients (64%) had got multivalvular disease with no sex predilection. This showed that rheumatic heart disease mostly occurred under the age of 20 years and usually affected more than one valve. Involvement of more than one valve was due to the chronic pressure or volume overload produced by one valve which affected the function of the valve proximal to it, usually in the form of regurgitation.

The most commonly involved valve was the Mitral valve, 39 (78%) patients showed either solitary lesion of mitral valve or in combination with some other valve. The next most commonly involved value

was the tricuspid valve. 29 (58%) patients showed tricuspid regurgitation all being in combination with mitral valve disease. Solitary lesion of the tricuspid valve was not seen. Also tricuspid stenosis did not exist. Aortic regurgitation was also a common entity and was observed in 20 (40%) patients. Pulmonary valve lesions were very rare and only 4 (8%) patients revealed mild pulmonary regurgitation and that too in a combination with lesions of all the other three valves.

It must be noted that almost all the patients had under gone the radiological investigations of X - rays chest, echocardiography and Doppler ultrasound examinations.

Though, not always conclusive, in early stage of valvular heart disease the x - ray chest is still widely used as the preliminary examination for evaluation of valvular heart disease. X - ray chest only helped little, because changes due to valvular heart disease appeared late on chest radiography, till then the case was diagnosed clinically or otherwise.

Echocardiography and the Doppler ultrasound are non - invasive, rapid and safe, giving good detail of cardiac anatomy and physiology (size of various chambers, area of valves, flow of blood through these valves and transvalvular pressure gradient) without hazards of the ionizing radiations.

By comparing the results obtained by simple chest radiograph with that of echocardiography and Doppler ultrasound, it was revealed that both echocardiography and Doppler ultrasound were equally sensitive, most conclusive and very accurate in diagnosis of valvular heart disease. Their diagnostic utility was far greater when compared with that of conventional chest radiography.

CONCLUSION

This study showed that the most prevalent form of acquired disease affecting the valves of the heart was rheumatic heart disease, involving in majority, more than one valve.

The most commonly involved valve was the Mital valve. 39 (78%) patients showed either solitary lesion of Mitral valve or in combination with some other valve. The next most commonly involved valve was the tricuspid valve. 29 (58%) patients showed tricuspid regurgitation, all being in combination with Mitral valve disease. Solitary lesion of the tricuspid valve was not seen.

Chest radiograph only showed the morphological changes occurring in the heart due to valvular heart disease, providing some clue to the diagnosis. Whereas, echocardiography and Doppler ultrasound being non - invasive, rapid and safe, gave good detail of cardiac anatomy and physiology without hazards of ionizing radiations.

Therefore, the role of roentgenography in the diagnosis of valvular heart disease is informatory while the role of echocardiography and Doppler ultrasound is better for primary screening and follow up purpose as compared with conventional chest radiography.

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