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Original Article

Prevalence and characteristics of tricuspid valve endocarditis among patients presented to Ain Shams Hospital echocardiography lab; one year study

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ABSTRACT

Background: Isolated Tricuspid valve infective endocarditis is an infrequent diagnosis, the incidence of Tricuspid valve infective endocarditis accounts for 5% and up to 15% of IE cases.

Aim: To assess the prevalence and the echocardiographic characteristics of tricuspid valve endocarditis among patients presented to the echo lab of Ain Shams hospital from 1-1-2016 to 1-1-2017.

Methods: This is a retrospective study which included all patients presented to the echo lab of Ain Shams university hospital from 1st January 2016 to 1st January 2017, the total number of patients were 8376, patients with infective endocarditis were 278, and patients with tricuspid valve endocarditis were 51 patients respectively. Complete transthoracic echocardiography was done for all patients and data was retrieved from a locally designed electronic database of cardiology department at Ain shams hospitals.

Results: The incidence of TVIE was (17.7%) of all cases of IE, and (0.67%) of all cases attending the echo lab during the study period. The mean age group in our study was (31.1 ± 7.8) and about 84.3% of patient's age was between 20 and 40 years. Higher incidence of IE was in males (90.2%) than in females (9.8%) with a ratio of 9:1. The vegetations were detected in one leaflet in 33 patients (64.7%), two leaflets in 9 patients (17.6%) and in the three TV leaflets in 7 patients (13.7). The most affected leaflet was the anterior leaflet that was affected in 38 patients constituting about 74.5% of patients. The size of vegetations was large >15 mm in 40 patients (78.4%).

Results: The most encountered echocardiographic complication was severe TR, detected in 40 patients (78.4%) and abscess formation was the least present, detected in only 2 patients (3.9%).

Conclusion: The incidence of TV IE is increasing with male gender predominance, and affects mainly young age groups. TV IE represented 0.6% of all patients, and 17.7% of IE cases. The main echocardiographic feature of TV IE is vegetations which were characterized by being large, highly mobile, and affecting mainly anterior TV leaflet. The main echocardiographic complication is severe TR, but abscess formation was infrequent.

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1. Introduction

Infective endocarditis (IE) is a disease characterized by high morbidity and mortality. Although first described in the mid-16th century, the Gulstonian lectures by Osler to the Royal College of Physicians in 1885 created the impetus for the systematic study of IE. Beginning in the early 1900s, investigators have frequently reported on the manifestations of this disease.¹ However despite advances during the past century in diagnosis, medical therapy,²

and surgical treatment.³ The in-hospital mortality rate for patients with IE is close to 20% with 1-year mortality approaching 40%.⁴ Several complications may occur during the course of IE, including embolic events, perivalvular extension, and valvular destruction causing heart failure. These main complications are the cause of the persistent high morbidity and mortality of the disease,⁵ prolonged hospitalization and also the main reasons for surgery, which is performed during the active phase of the disease (early surgery) in about half of patients with acute IE.^{4,6} The reasons why TVIE is rare are thought to be the tricuspid and pulmonary valves are not strained because of low pressure; and low oxygen saturation.⁷ Nevertheless, reports of TVIE are growing because of the increasing frequency of drug-user patients,⁸ also The recent

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exponential increase in implantable devices such as pacemakers, defibrillators, and indwelling central venous catheters may lead to an overall increase in the number of TV IE cases.⁹

2. Aim

To assess the prevalence and the echocardiographic characteristics of tricuspid valve endocarditis among patients presented to the echo lab of Ain Shams hospital from 1-1-2016 to 1-1-2017.

3. Methods

This is a retrospective study which included all patients presented to the echo lab of Ain Shams hospital from 1st January 2016 to 1st January 2017, the total number of patients were 8376, patients with infective endocarditis were 278, and patients with tricuspid valve endocarditis were 51 patients respectively. We studied the prevalence of TV IE patients and their echocardiographic characteristics. Data was retrieved from a locally designed electronic database of cardiology department at Ain shams hospitals.

Complete transthoracic echocardiography was done for all patients. All echocardiographic studies were performed with commercially available echocardiography systems equipped with a 2.5-MHz multi frequency phased array transducer (Vivid 5, GE-Vingmed, Morton, Norway). Routine digital grayscale 2-D was obtained, including mid-LV short axis views at the level of the papillary muscle and standard apical views (4-chamber, 2-chamber, and long axis). Sector width was optimized to allow for complete myocardial visualization while maximizing the frame rate. LV end-diastolic volume, end-systolic volume (ESV), and ejection fraction were obtained with the modified biplane Simpson's method from the apical 2- and 4-chamber images using the biplane Simpson's technique. Right ventricular size and function were qualitatively graded in the apical four-chamber and subcostal views. Enlargement of the RV was considered mild if the RV was greater than two-thirds of the LV but less than the LV size; moderate if the RV equaled the LV; and severe if the RV was greater than the LV.¹⁰ Right ventricular systolic function was estimated by the attending echocardiographer as normal or reduced, using the following criteria as a sign of RV dysfunction: (a) any RV wall motion abnormalities; (b) descent of base 2.0 cm.¹¹ Right atrial pressure was estimated by visualizing the inferior vena cava (IVC) and its response to respiration. Right atrial pressure was estimated as 5 mm Hg if the IVC was 2.0 cm in diameter at the junction of the right atrium, 15 mm Hg if the IVC was dilated and collapsed with respiration, and 20 mm Hg if the IVC was dilated and did not collapse with respiration. Estimated PASP was calculated as the sum of tricuspid jet gradient and estimated right atrial pressure.¹² Tricuspid regurgitation was graded qualitatively using Framingham Heart Study criteria: mild if the regurgitant jet area/right atrial area was <20%; moderate if 20–40%; or severe if >40%.¹³ Vegetation was defined as a, fixed or oscillating mass adherent to a leaflet or other cardiac structure with a distinct echogenic structure and independent motion.¹⁴ The lesion had to be visible in multiple views and detectable during the complete cycle. The measurements of vegetations were obtained in various planes, and the maximal length was used. In the presence of multiple vegetations, the largest value was used for analysis.

4. Statistical analysis

The collected data was revised, coded, tabulated and introduced to a PC using Statistical package for Social Science (SPSS 15.0.1 for windows; SPSS Inc, Chicago, IL, 2001). Data was presented and

suitable analysis was done according to the type of data obtained for each parameter. Parametric numerical data were expressed as Mean and Standard deviation (\pm SD), while non-numerical data were expressed as Frequency and Percentage.

5. Results

5.1. The prevalence of TVIE and basic demographic characters (Table 1)

Patients with TV IE were 51 patients that constitute 0.6% of all patients and 17.7% of patients with infective endocarditis. Patients with IE were 287, which constitute 3.4% of all patients. The total number of patients underwent echocardiography during the study period were 8376. The mean age of patients with TVIE was (31.1 ± 7.8) years. Patients between 17 and 20 years were 2 (3.9%), patients between 20 and 30 years were 17 (33.3%), patients between 30 and 40 years were 26 (51%), patients between 40 and 50 years were 4 (7.8%), and patients between 50 and 55 years were 2 (3.9%). Males were 46 (90.2%), and females were 5 (9.8%).

5.2. Echocardiographic measurements and cardiac chambers dilatation (Table 2)

The mean LVEDD (cm) was 4.9 ± 0.6 , the mean LVESD (cm) was 3.8 ± 3.8 , the mean IVSD (cm) was 0.8 ± 0.2 , IVSS (cm) was 1.2 ± 0.2 , the mean EF% was 61.7 ± 8.6 , and the mean RVSP (mmHg) was 44.6 ± 16.0 . Patients with right atrial dilatation were 16 (31.4%), patients with right ventricular dilatation were 15 (29.4%), patients with left atrial dilatation were 4 (7.8%), and those with left ventricular dilatation were 2 (3.9%).

5.3. Degree of tricuspid incompetence among the studied cases (Fig. 1)

It was found that tricuspid incompetence was presented in all our patients with TVIE. Mild to moderate tricuspid incompetence was presented in 11 patients (21.6%) and severe tricuspid incompetence was presented in 40 patients (78.4%).

5.4. Number of vegetations and vegetation mobility among the studied cases (Table 3)

Tricuspid vegetations were absent in 2 patients (3.9%) and presented in 49 patients (96.1%). single vegetation was present in 33 patients (64.7%), two vegetations in 9 patients (17.6%), and three in 7 patients (13.7%). Mobile tricuspid valve vegetations were

Table 1
Prevalence of TV endocarditis and demographic data.

Variable	N	%
TVIE	51	0.6 (of all) and 17.7 (of IE)
IE	287	3.4
All patients	8376	
	Mean \pm SD	Range
Age (years)	31.1 ± 7.8	17.0–55.0
Categories (years)	N	%
17–20.0	2	3.9
20.0–30.0	17	33.3
30.0–40.0	26	51.0
40.0–50.5	4	7.8
50.0–55.0	2	3.9
Sex	N	%
Male	46	90.2
Female	5	9.8

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