Systolic Murmur Due to Systolic Gradient Across Moderator Band

SR Mittal

Abstract
A 14 years asymptomatic male was evaluated for a grade 3/6 systolic murmur along lower left parasternal region. Color Doppler evaluation revealed turbulent systolic flow across moderator band with a peak systolic gradient of 127.2 mm Hg. There was no other abnormality. This anomaly should be considered in differential diagnosis of systolic murmur in tricuspid area.

Introduction
Systolic murmur in tricuspid area can be due to tricuspid regurgitation, ventricular septal defect or left ventricular-right atrial shunt. We are reporting a case in whom systolic gradient across moderator band produced clinically audible systolic murmur in tricuspid area.

Case Report
A 14 years male was referred for evaluation of a systolic murmur. He was born of full term normal delivery. Mother denied any history of exposure to drug or radiation during pregnancy. Patient was asymptomatic with normal effort tolerance. Pulse was regular at a rate of 76/minute. Respiratory rate was 18/minute. Blood pressure was 100/70 mm Hg. Jugular venous pressure and pulse wave from were normal. Apical impulse was normal. There were no abnormal pulsations, palpable sounds or thrill. Auscultation revealed a grade 3/6 harsh systolic murmur best audible in tricuspid area. There was no appreciable variation with respiration, Valsalva manoeuvre, prompt standing, squatting or handgrip. Electrocardiogram was unremarkable. Echocardiography revealed thick moderator band separating right ventricular inflow portion from RV apex (Figure 1). Color Doppler evaluation revealed turbulent flow across moderator band (Figure 2). Continuous wave Doppler evaluation of turbulent flow revealed peak systolic gradient of 127.2 mm Hg across moderator band (Figure 3). Detailed echocardiographic evaluation did not reveal any other abnormality.

Discussion
Our patient did not have any clinical or echocardiographic evidence of tricuspid regurgitation, ventricular septal defect or left ventricular-right atrial shunt. Significant systolic gradient across moderator band was the only abnormal finding on echocardiography. This was the cause of clinically audible systolic murmur in tricuspid area. This congenital anomaly should be considered in differential diagnosis of an otherwise unexplained systolic murmur in tricuspid area.

To the best of our knowledge, this cause of systolic murmur in tricuspid area is not described. This condition should be differentiated from “double chambered right ventricle” in which right ventricular cavity is separated from right ventricular outflow by a thick muscle bundle.1 Systolic murmur is audible in pulmonary area. There is no gradient within the right ventricular cavity and ventricular septal defect is usually associated anomaly.2

Differential Diagnosis of Systolic Murmur in Left Lower Sternal Border3,4
i. Tricuspid regurgitation: Murmur

Fig. 1: Apical 4 chamber view showing thick moderator band (arrow) separating right ventricular inflow (RV1) from right ventricular apex (RV2). LA- left atrium, MV- Mitral valve, TV- Tricuspid valve, LV- Left ventricle

Fig. 2: Color doppler evaluation showing turbulent flow across the moderator band (arrow). LA- left atrium, LV- left ventricle, RA- right atrium, RV1- right ventricular inflow, RV2- right ventricular apex, TV- tricuspid valve

Fig. 3: Continuous wave doppler evaluation of turbulent flow showing peak systolic gradient of 127.2 mm Hg across moderator band

Department of Cardiology, Mittal Hospital & Research Centre, Ajmer, Rajasthan
Received: 14.09.2015; Revised: 06.04.2016; Accepted: 26.04.2016
of tricuspid regurgitation increases on inspiration and radiates towards right sternal border. It is accompanied by prominent V wave in jugular venous pulse.

ii. **Ventricular septal defect** : It produces harsh pan systolic murmur along left mid lower sternal border. Murmur increases on expiration and is usually accompanied by a thrill. Jugular venous pulse is normal. Large shunt is accompanied by hyperdynamic apical impulse, pulsations in left second space and a third sound over apex.

iii. **Left ventriculo right atrial shunt** : Murmur resembles that of a restrictive VSD except that it is best audible in left lower sternal border, radiates to right sternal border and is accompanied by prominent V wave in jugular venous pulse.

iv. **Still’s murmur** : It is a low frequency, mid systolic murmur best audible along left mid sternal border during expiration. There is no other abnormality on cardiovascular examination and echocardiography. Murmur is almost always less than grade 3 in intensity. It is common in children and usually disappears by puberty.

In conclusion, this congenital anomaly should be considered in the differential diagnosis of otherwise unexplained systolic murmur in tricuspid area.

**References**