



Determinants of Severity in Patients With Functional Tricuspid Regurgitation With Pulmonary Hypertension :A Retrospective Echocardiography Based Study.

VAISHALI BHALAVI
MD-GENERAL
MEDICINE

Senior resident-Department of Medicine,Gandhi medical college,Bhopal.

RAJEEV GUPTA
DM-CARDIOLOGY.

Associate Proffesor- Department of Cardiology,Gandhi Medical college,Bhopal.

ABSTRACT

BACKGROUND:The objective in the present study is to determine the severity of functional tricuspid regurgitation with the severity of pulmonary hypertension and other variables.

MATERIALS AND METHODS:In the present study 10,000 consecutive cases undergoing echocardiography in Hamidia hospital Bhopal,MP, Central India between 1st January 2009 to July 2011 were analysed.1203 cases of functional tricuspid regurgitation(FTR) were found with the exclusion of organic tricuspid regurgitation and out of these we determine the severity of FTR with pulmonary artery systolic pressure(PASP) and other variables.

RESULTS AND CONCLUSIONS: PASP is the strong predictor of FTR severity irrespective of age and severity is also dependent on other variables.

KEYWORDS : Tricuspid regurgitation,Echocardiography,Pulmonary hypertension.

INTRODUCTION:

Tricuspid regurgitation (TR) may be due to primary intrinsic abnormalities of the tricuspid valve^{1,2} or more commonly,secondary factors that result in functionalregurgitation despite a structurally normal valve ^{3,4,5}.

Functional tricuspid regurgitation (FTR) is common in patients with left-side valve disease and left ventricular (LV) dysfunction, and depending on its severity it can considerably decrease long-term survival^{6,7}. Several echocardiographic and angiographic studies have suggested important changes in the tricuspid valve (TV) geometry in patients with functional TR, including annular dilatation and tethering of the leaflets.^{8,9,10} These TV deformations may restrict the motion of the leaflets and decrease coaptation.

For many years, the tricuspid was mostly ignored, in part due to the assumption that regurgitation, then assumed as "functional", would simply improve after correction of the mitral or aortic valve disease. However, in recent years, the so called "forgotten valve" has been claiming a progressive and deserved attention. Indeed, certain items must be kept in mind, they regard:

Impact of tricuspid regurgitation: Persistent moderate to severe secondary tricuspid regurgitation impacts functional capacity and long-term survival ¹¹ hence early surgical correction must be considered.

Enduring dysfunction after repair: In cases of severe tricuspid regurgitation, unrepaired TR may still continue to progress, even if left heart

valve function is adequately restored.¹²Whether tricuspid regurgitation will recede, remain stable or progress is impossible to predict.

Therefore, the objective of this study was to determine the severity of functional TR with the severity pulmonary hypertension and other variables. Echocardiography is the gold standard tool to diagnose TR severity and thus help in management of the patient.

MATERIALS AND METHODS:

The present study is a retrospective study on 10,000 consecutive cases undergoing echocardiography in Hamidia hospital Bhopal,MP, Central India between 1 January 2009 to July 2011 were analysed.Echocardiography was performed by consultant cardiologist using Acuson Aspen color Doppler machine following ASE guidelines.Out of 10,000 cases,1203 cases of functional tricuspid regurgitation were found in the present study with the exclusion of organic tricuspid valve diseases.

es.In the present study,we discuss the patient with functional TR associated with pulmonary hypertension(>50mmhg).Firstly,we divide FTR with pulmonary hypertension into moderate(50-69) and severe(>70) according to pulmonary artery systolic pressure(PASP).Secondly, we compare the severity of pulmonary hypertension with various degree of tricuspid regurgitation and its correlation with different variables like age,sex,mitral regurgitation,left ventricular systolic dysfunction,PASP and organic mitral valve diseases in the present study.

INCLUSION CRITERIA:

All moderate to severe MR except mild MR.

LVSD or Ejection fraction <50%

PASP>50mmhg

EXCLUSION CRITERIA:

Organic tricuspid valve diseases

PASP <50mmhg

Mild MR

RESULTS:

In the present study of 10,000 consecutive cases undergoing echocardiography 1203 case of functional tricuspid regurgitation were found without organic tricuspid valve diseases (38 cases).The distribution of TR severity with PASP is shown in figure:1In our study higher PASP was associated with progressively higher proportion of patient with moderate to severe TR and thus indicates strong association between PASP and severity of TR.

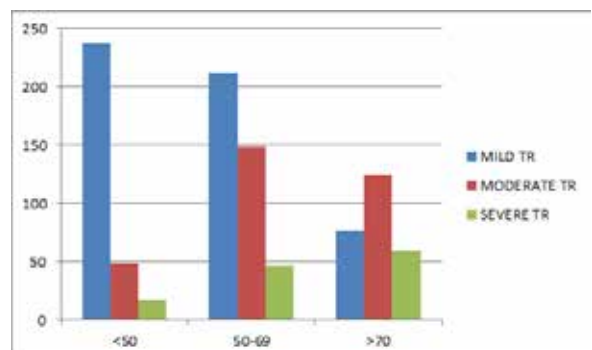


Figure:1Distribution of tricuspid regurgitation severity with PASP.

TR was mild in 51.9% with PASP 50-69mmhg and 29.5% with PASP >70mmhg.

The characteristics of patient with various degree of TR with elevated PASP >50mmhg is shown in the table:1 and 2.

SL.NO.	VARIABLES	PASP50-69mmhg(n=408)		PASP>70mmhg(n=261)	
		Mild TR	Moderate-severe TR	Mild TR	Moderate-severe TR
1	Age(>50yrs)	68±12	68±16	68±16	68±17
2	Female(%)	121(57)	109(73.1)	46(59.7)	122(59.8)
3	LVSD	27	29	5	11
4	PASP	58±9	60±9	82±10	92±18
5	MR	58	59	9	36

Table:1.Shows characteristics patients with pulmonary hypertension and various degree of TR.

SLNO.	Gender	PASP 50-69mmhg			PASP>70mmhg		
		Mild	Moderate	SevereTR	Mild TR	ModerateTR	SevereTR
1.	Male	91	66	21	31	60	22
2.	Female	121	83	26	46	65	57

Table:2.Shows sex distribution in functional TR with pulmonary hypertension

In PASP 50-69mmhg the following results found:

- 1.There was no significance difference in age (>50yrs) with various degree of TR,
- 2.Among gender predilection females were predominantly affected than males with various degree of TR severity in our study.
- 3.PASP was slightly higher with moderate to severe TR as compared with mild TR.
- 4.LVSD is slightly greater in patient with moderate to severe TR.
- 5.MR was more common in patient with greater degree of TR with PASP>50mmhg.

With PASP >70mmhg,there were only slight difference in PASP gradient with various degree of TR and the correlation with other variables like age,sex,LVSD,MR and PASP with various degree of TR were similar to PASP 50-69mmhg.

DISCUSSION:

Very few studies were found to correlate with the present study.In the present study PASP was the strong predictor of functional tricuspid regurgitation severity.In our study with PASP 50-69mmhg ,it was found to be higher with greater degree of tricuspid regurgitation(-moderate –severe TR) and with PASP>70mmhg there was no significance difference in PASP with various degree of FTR(mild,moderate and severeTR) and is similar to the study by Mutlak D.etal¹³.

In our study , with age(>50yrs)there was no significance in pulmonary hypertension with various degree of TR and is similar to the study by Mutlak D.etal¹³,Toplisky Y.etal¹⁴, Sagie A etal¹⁰.

In the present study,females were predominantly affected with various degree of TR with pulmonary hypertension as compare with other studies by Toplisky etal¹⁴ and Sagie A etal¹⁰ where males were affected more than females.In the study by Mutlak D etal¹³ no gender preponderance.

In the present study, left ventricular systolic dysfunction(LVSD) were found to be higher with moderate-severe TR with PASP>50mmhg and is similar to the study by Mutlak D etal¹³.

In our study,mitral regurgitation were more common with moderate-severe TR with PASP >50mmhg similar to the study Mutlak D etal.¹³

CONCLUSIONS:

Pulmonary artery systolic pressure(PASP) is the strong predictor for functional tricuspid regurgitation irrespective of the age but was dependent on other variables like sex,mitral regurgitation,left ventricular systolic dysfunction in the present study. Echocardiography is the gold standard tool for diagnosing severity of TR and thus helps in the management of the patient.

REFERENCES:

1. Hollmari A. The anatomical appearance in rheumatic tricuspid valve disease. Br Heart J

1957 ;19:211-6 .

2. Hauck AL Freeman DP, Ackemann DM, Danielson GK, Edwards WD .Surgical pathology of the tricuspid valve : a study of 363 cases spanning 25 years. Mayo Clin Proc 1988 ;63:851-63 .

3. Chopra P, Tandon HJ). Pathology of chronic rheumatic heart disease with particular reference to tricuspid valve involvement. Acta Cardiol 1977 ;32:423-34.

4. Braunwald E. Valvular heart disease . In: Braunwald E, editor. Heart Disease Philadelphia : Saunders . 1980;1149-53 .

5. King RN, Schaff HV, Danielson GK, et al . Surgery for tricuspid regurgitation late after mitral valve replacement . Circulation 1984;70 suppl 11 :11-193-7 .

6. Braunwald NS, Ross J, Jr., Morrow AG. Conservative management of tricuspid regurgitation in patients undergoing mitral valve replacement.Circulation. 1967; 35: 163–169.

7. Nath J, Foster E, Heidenreich PA. Impact of tricuspid regurgitation on long-term survival. J Am Coll Cardiol. 2004; 43: 405–409.

8. Tei C, Pilgrim JP, Shah PM, Ormiston JA, Wong M. The tricuspid valve annulus: study of size and motion in normal subjects and in patients with tricuspid regurgitation. Circulation. 1982; 66: 665–671.

9. Ubago JL, Figueroa A, Ochoteco A, Colman T, Duran RM, Duran CG. Analysis of the amount of tricuspid valve annular dilatation required to produce functional tricuspid regurgitation. Am J Cardiol. 1983; 52: 155–158.

10. Sagie A, Schwammenthal E, Padial LR, Vazquez de Prada JA, Weyman AE, Levine RA. Determinants of functional tricuspid regurgitation in incomplete tricuspid valve closure: Doppler color flow study of 109 patients. J Am Coll Cardiol. 1994; 24: 446–453.

11. Nath J, Foster E, Heidenreich PA. J Am Coll Cardiol 2004; 43: 405–409.

12. Predictors of residual tricuspid regurgitation after mitral valve surgery.Matsuyama K, Matsumoto M, Sugita T, Nishizawa J, Tokuda Y, Matsuo T. Ann Thorac. Surg. 2003;75:1826–1828.

13. Mutlak D, Aronson D, Lessick J, Reisner SA, Dabbah S, Agmon Y.Functional tricuspid regurgitation in patients with pulmonary hypertension:Is pulmonary artery pressure the only determinant of regurgitation severity? Chest. 2009;135:115–121.

14. Toplisky Y, Khanna A, Tourneau T L,Park S; MD, Michelena H, Suri R, Mahoney D W,Sarano M E. Clinical Context and Mechanism of Functional Tricuspid Regurgitation in Patients With and Without Pulmonary HypertensionCirc Cardiovasc Imaging. 2012;5:314-323.