

higher risk mothers we can use height and weight at cut off points of 146 cm and 43.5 kg respectively and to identify at risk mothers, 151 cm and 51 kg can be used respectively for height and weight.

Canosa observed that all women whose post delivery weight was less than 41 kg had low birth weight infants⁸. Karim and Mascie-Taylor observed that weight at term provides more predictive power for LBW than MUAC and recommended a cut off point of 50 kg at term⁹. Attained height (except adolescent) cannot be modified by any intervention. However, advice for hospital delivery can be provided so that assisted delivery (if needed) can be ensured and proper care can be given to both mother and newborn. MUAC can be used for screening but not for monitoring purpose as its change is negligible during pregnancy. Pre-pregnancy weight is the most suitable anthropometric indicator for identifying risk women, because not only we can identify them, but also have ample of time to adopt appropriate interventions (food supplementation, nutrition education etc) to increase the weight to a desirable level. Therefore, we conclude that pre-pregnancy weight or first trimester weight can be used as the best maternal anthropometric risk indicator (43.5 kg for higher risk and 51 kg for at risk women) for predicting women of delivering LBW babies.

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Outcome of 153 cases of mitral stenosis after percutaneous transvenous mitral commissurotomy

Rheumatic fever and rheumatic heart disease continue to be the major health problem in all developing countries including Bangladesh. The epidemiology of rheumatic fever/rheumatic heart disease constitutes 34% of total hospital admission of cardiovascular diseases in Bangladesh¹. Its incidence is 26 percent and ranks second among all the cardiovascular disease in our country^{2, 3}. Rheumatic mitral stenosis is a very common problem in our population having an incidence of 54 percent among rheumatic heart disease with a female preponderance of 2:1⁴.

Population survey done during late 1980 in Bangladesh showed a prevalence of rheumatic fever/rheumatic heart diseases in a mixed population of 7.5 to 7.8 per thousand².

Despite the introduction of penicillin and improvement in the standard of living and delivery of primary healthcare, rheumatic mitral stenosis remains an important medical problem in the developing countries like Bangladesh.

The challenge of percutaneous catheter based treatment of rheumatic mitral valve stenosis is to provide not only effective treatment but also equal or greater safety compared to close or open surgical commissurotomy which carries an operative mortality of 1-3 percent. The efficacy of percutaneous balloon commissurotomy for rheumatic valvular heart disease has recently been shown to be as effective as surgical commissurotomy in randomized studies^{5, 6}.

Badiuzzaman examined the immediate and short term follow-up results of percutaneous transvenous mitral commissurotomy in Bangladeshi patients⁷. One hundred nine patients underwent percutaneous transvenous mitral commissurotomy and it was observed that total mitral valve score was strongly

associated with post-percutaneous transvenous mitral commissurotomy outcome in terms of decrease in mean pressure gradient (MPG), increase in mitral valve area and occurrence of mitral regurgitation.

Chowdhury⁸ carried out a comparative study between percutaneous transvenous mitral commissurotomy and close mitral commissurotomy. Wilkins score and total commissural morphology score were found to be the most important procedural variables associated with the outcome. There is also observed that immediate outcome after percutaneous transvenous mitral commissurotomy and close mitral commissurotomy were excellent but there was no significant difference in terms of outcome between the two procedures.

From January to December 2003, 153 cases underwent the percutaneous transvenous mitral commissurotomy with moderate to severe mitral stenosis using the inoue balloon catheter in the National Institute of Cardiovascular Diseases and Hospital (NICVD), Dhaka, Bangladesh. Patients were included in this study if they fulfill the following criteria: mitral valve areas <1.5 cm², absence of more than Grade II mitral regurgitation, absence of significant calcification or subvalvular change and absence of left atrial thrombus.

Two dimensional, M-mode, spectral and color doppler studies were done in all patients both before and after percutaneous transvenous mitral commissurotomy. After taking written consent, right and left cardiac catheterization was done. Trans-septal puncture was done by Brocken Brough needle and Mullin sheath. The optimal size of the inoue balloon was decided by mathematical formula [height (in cm)/ 10 + 10]. Stepwise or graded dilatation was done. Pulmonary artery systolic pressure, left atrial means pressure and mean transmitral pressure gradient were recorded before and immediately after the mitral valve dilatation. Results were considered optimal when the increase in mitral valve area ≥ 1.5 cm² or percentage increase was $\geq 50\%$ and mitral regurgitation was grade ≤ 2 .

Among 153 cases two patients develop mitral regurgitation grade III which were medically treated and no surgical intervention needed. One patient developed moderate hemopericardium and procedure was stopped and treated conservatively. Later the patient's percutaneous transvenous mitral commissurotomy done successfully.

The procedure was successfully performed in 150 cases out of 153 (98%) cases. Technical failure occurred in one case due to inability to cross the

mitral valve and two cases developed mitral regurgitation Grade III which was treated medically and one case developed moderate hemopericardium.

There were 98 females and 55 males with mean age of 36 ± 15.34 . Thirty four (22%) had atrial fibrillation, 25 (16%) had previous commissurotomy (Table I). 80 (52%) had Grade I-II and 73 (48%) Grade III-IV NYHA functional class dyspnea and total echocardiographic (Wilkin's) score was in the range 5-10. Mean (\pm SD) of total score was 6.75 ± 0.80 . Left atrial diameter, 43.35 ± 6.80 mm and had also mitral regurgitation Grade I-II, 25 (16%).

Table I: Basic characteristics of the patients

Age (years) (mean \pm SD)	36 \pm 15
Age (years) range	12 - 60
No. of female patients	98 (64%)
NYHA class	
1-2	80 (52%)
3-4	73 (48%)
Atrial fibrillation	34 (22%)
Previous commissurotomy	25 (16%)
Echocardiographic score	6.75 \pm 0.80
Echocardiographic Range	5 - 10
Left atrium diameter (mm)	43.35 \pm 6.80
Associated mitral regurgitation (grade 1 or 2)	25 (16%)

All the data expressed as (mean \pm SD), range, percentage as applicable

Mean mitral valve area was 0.79 ± 0.18 cm². Post percutaneous transvenous mitral commissurotomy, mitral valve area was 1.86 ± 0.37 cm². Statistically significant increased in valve area ($p < 0.001$). Post percutaneous transvenous mitral commissurotomy valve area increase more in those patient had Wilkins score 5 - 7.

Mean peak pressure gradient was found 15 ± 4.72 mmHg. After percutaneous transvenous mitral commissurotomy pressure gradient across the mitral valve decreased to a mean 8.70 ± 3.83 mmHg (p value- 0.004).

Mean pressure gradient decreased significantly. It was 19.60 ± 8.94 mmHg before the procedure and 3.72 ± 3.82 mmHg after the procedure (p value- 0.001).

Pulmonary artery systolic pressure decrease significantly after the procedure. PASP (mean \pm SD) was 56 ± 24 mmHg before percutaneous transvenous mitral commissurotomy. After percu-

Table II: Pre- and post-percutaneous transvenous mitral commissurotomy hemodynamic results

	Before PTMC	After PTMC	P value
Pulmonary artery systolic pressure mmHg (PASP)	56 ± 24	39 ± 17	0.002*
Mean left atrial pressure	41.33 ± 9.31	30.56 ± 8.16	0.0001***
Peak pressure gradient (PPG)	15 ± 4.72	8.70 ± 3.83	0.004*
Mean pressure gradient	19.60 ± 8.94	3.72 ± 3.82	0.001***
Mitral valve area (cm ²) planimetry	0.79 ± 0.18	1.86 ± 0.37	0.001***

Data expressed as mean ± SD; PTMC= percutaneous transluminal commissurotomy; ns= not significant; *= significance at 0.05; ***= significance at 0.001

percutaneous transvenous mitral commissurotomy it become 39 ± 17 mmHg. It was measured 3 days after the procedure (p value- 0.002).

Patients follow up immediate after the procedures stated to have significant improvement of their symptoms especially of undue fatigue, exertional dyspnea and palpitation. More than 90% patients had NYHA functional class decreased by at least Grade I. All were assess 3 days after the procedure.

The present study documents the safety and effective hemodynamic effects of transvenous mitral commissurotomy study results were better than previous studies reported on the Inoue technique⁹⁻¹². Percutaneous transvenous mitral commissurotomy is alternatives to surgical commissurotomy for the treatment of selected patients with rheumatic mitral stenosis.

In our study series there was no emergency mitral valve replacement or closed mitral commissurotomy or open mitral commissurotomy or significant atrial septal defect. So, immediate outcome after percutaneous transvenous mitral commissurotomy was excellent.

Total Wilkins score, total commissural morphology and calcification were found to be the most important pre-procedure variable associated with the outcome.

In conclusion, percutaneous transvenous balloon mitral commissurotomy is an alternative to closed mitral commissurotomy and intervention of choice of symptomatic rheumatic mitral stenosis with suitable mitral valve morphology.

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