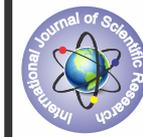


## PERCUTANEOUS TRANSVENOUS MITRAL COMISSUROTOMY USING OVER THE WIRE BALLOON TECHNIQUE IN JUVENILE MITRAL STENOSIS



### Cardiology

#### KEYWORDS:

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### ABSTRACT

*Percutaneous Transvenous mitral commissurotomy using INOUE/ACCURA balloon is an effective procedure for management of patients with rheumatic mitral stenosis. [1] Inability to cross mitral valve is one of the important reasons of procedural failure. Juvenile MS is defined as rheumatic mitral stenosis before the age of 20 years according to Roy et al.[2] Juvenile MS is one subset of population where conventional method of BMVs may not give us suitable post procedural outcome. We describe series of four patients in which over the wire technique has been used to cross the mitral valve.*

### INTRODUCTION:

BMV using Inoue and Accura balloon has long been considered effective treatment modality especially in cases with favorable valve morphology, it provides suitable hemodynamic improvement. In cases of unfavorable morphology it postpones need for surgical mitral valve replacement. In juvenile subset of populations the subvalve is thick and the stenosis is more often at subvalvular level. Also the appropriate size of Inoue or Accura required in such patients is commonly not available. Thus we have opted for over the wire technique. We are describing four such cases using over the wire technique. [3],[4]

### LV.

- 6x2 Tyshak balloon taken across the septum over the 018 GW to dilate IAS adequately.
- 018 GW exchanged with 035 GW (with the help of JR catheter, parked into LV)
- 20x4 Tyshak balloon advanced over 035 GW across mitral valve and inflated. No adequate give away of commissure in 1<sup>st</sup> inflation.
- 2<sup>nd</sup> inflation given across the mitral valve resulted in medial commissure split. Post PTMC MVA was 1.1/1.2, the MR remained of moderate grade and MVG fallen down from 24/16 to 12/6.

**Table1. Pre PTMC baseline characteristics:**

	Case 1	Case2	Case3	Case4
Age	9 years	13years	11years	12years
Height	131cm	148cm	124cm	128cm
Weight	18kg	22kg	24kg	22kg
MV area	0.4/0.6	0.5/0.5	0.4/0.5	0.6/0.7
MVG	24/16	33/18	19/12	32/18
MV annulus	20mm	22mm	20mm	22mm
MR	Moderate	Mild	Mild	Mild
TR	Trivial	Severe	Mild	Mild
PH	None	severe	Mild	Mild

### CASE 1:

9 year old male came with exertional palpitations and effort intolerance. His height was 131cm. His 2D echo showed MVA of 0.4/0.6, MVG of 24/16. We chose single balloon technique in this case as appropriate sized Inoue balloon was not available. The suitable size in this case was assessed by mitral valve annular size. The BMV in this case was done with single balloon technique using Tyshak balloon.

- 5F pigtail parked into ascending aorta.
- Mullins Sheath over the 032 GW parked into SVC.
- 032 GW exchanged with TSP needle covered with Mullins sheath.
- Trans septal puncture done. Mullins sheath with dilator parked in LA with hemaquet at distal end to prevent excess blood loss. Dilator removed sheath kept in situ.
- Springer wire parked in LA.
- Mullins sheath advanced into LV over springer wire
- Springer wire exchanged to 018 DL Jtip GW which is parked into

### HAEMODYNAMIC FINDINGS

	Pre-BMV	Post-BMV
LA	28/20	24/18
LVEDP	12	10
Trans-mitral gradients	18/10	12/6
Aorta	110/67	112/71

### CASE 2:

13 year male c/o effort intolerance since 6 months. His 2D echo showed RHD with severe MS, MVA of 0.5/0.5, MVG of 33/18. He has undergone procedure in similar manner as that of case 1, except the Tyshak balloon size used is 22x4 and two inflation one of 20ml and 2<sup>nd</sup> of 22ml were given. Post PTMC echo showed MVA of 0.6/0.7, gradient fallen down from 38/16 to 25/16, No MR.

### HAEMODYNAMIC FINDINGS

	Pre-BMV	Post-BMV
LA	42/37	12/8
LVEDP	10	8
Trans-mitral gradients	41/30	4/0
Aorta	110/60	

### CASE 3:

11 year female came with complaints of exertional palpitations and effort intolerance. 2D Echo s/o MVA of 0.4/0.5, MVG of 19/12, Her height was 124cm, weight of 24kg. Patient was selected for over the wire technique, due to non availability of appropriate sized Inoue balloon. After achieving General Anesthesia,

1. Venous access taken and 0.32 SLJtip wire places in the SVC
2. Arterial access taken and through the 5F Arterial access 5F pigtail passed overran 0.35 SLJtip in the aorta
3. Mullins Sheath advanced the 0.32 wire and followed by Transeptal puncture needle in Lateral position in fossa ovalis
4. Now mullins sheath with dilator assembly was advanced till the IAS and 0.18 DL Jtip wire was advanced into the LA .A 7F sheath was wedged into the Proximal end of Mullins sheath and dilator acting as a Hemaquet.
5. Through the assembly over the 0.18 wire Tyshaq II 6x2x4x4x70x 0.021 advanced over the wire and inflated with 0.5 ml
6. Septum was thus dilated
7. A special bend is given to AN 0.35 DL J tip wire at the junction of its hard and soft part neat to the J tip end .
8. After this one 0.35 DL J tip wire passed through 5F JR 3.5 through the mullins sheath and dilator assembly
9. The JR is advanced through IAS into the LA through mitral valve and the wire was advanced through it into the Left Ventricle .
10. JR was withdrawn and another wire (0.35 DL J tip was given a J shape at the junction of its soft and hard end and fed into the 5 F JR and similarly the assembly was advanced through the Mullins dilator sheath assembly and placed into LV as described previously
11. Both the wires were now placed in LV and the moment the wires were placed in LV there was a queer observation wherein q waves in II ,III and avF
12. The mullins sheath assembly was withdrawn and one at a time two Tyshaq II 's 12x4x6x6x90x0.35 were advanced one by one across the mitral valve having effective diameter of 20 mm
13. A waist was formed and there was a giveaway on inflation It was decided not to take intraop transmitral gradients and rely on post cath Echo Post PTMC echo s/o MVA 1/1, MVG of 7/4, lateral commissure fully split. The size of Tyshaq balloon was estimated by measuring mitral valve annulus.

#### HAEMODYNAMIC FINDINGS

	Pre-BMV	Post-BMV
LA	29/13	18/12
LVEDP	10	8
Trans-mitral gradients	36/24	22/10
Aorta	110/62	

#### CASE 4:

12 year male RHD with MS, with height of 128cm, weight of 28kg. 2D echo s/o MVA of 0.6/0.7, MVG of 32/18, mild TR, mild PH. The procedural details were same as case 3, however the two Tyshaq balloons used were 14x4mm and 8x4mm so that effective size of diameter was 22mm. Post PTMC echo s/o MVA of 1.1/1.2, MVG of 18/6, medial commissure fully split with no MR and no PH. Appropriate size of balloon was determined by mitral valve annulus.

#### HAEMODYNAMIC FINDINGS

	Pre-BMV	Post-BMV
LA	34/18	22/12
LVEDP	12	10
Trans-mitral gradients	38/26	24/12
Aorta	118/58	

#### Discussion:

Juvenile mitral stenosis is still a prevalent phenomenon in developing nations like India.[5],[6],[7]. The common obstacle while treating this entity is the non availability of appropriate size balloon and the hardware. Over the wire single and double balloon technique which were routinely used previously are now used rarely as this procedure required several catheter changes, and was technically demanding and time-consuming. The use of the Inoue balloon has gained widespread acceptance, is widely acknowledged as the preferred technique for treating symptomatic patients of rheumatic mitral stenosis, and is applicable to patients of all ages.[8]

However appropriate size of Inoue balloon for juvenile subgroup is not easily available. Though there are few guidelines about the optimal size of balloon to be used in children, it seems appropriate to follow the strategy of inserting an Inoue balloon sized at 2 to 4 millimeters less than the size recommended on the basis of height. In our study we have used size of balloon according to mitral valve annulus.[9],[10]. Another method to estimate the size of the balloon will be body surface area. In our cases the post PTMC results are optimum. In one of our case though, the post PTMC area has not been increased by >50% but it is successful in terms of other parameters like mitral valve gradient and commissural split.

As the over the wire balloon technique is not routinely performed and requires multiple wires the procedural time and fluoroscopy time for these procedures is more. However this time can be easily reduced by pre planning of the procedure.

#### Conclusion:

Over the wire balloon technique is not the first choice for the management of mitral stenosis in any age group. However, due to no easy availability of appropriate size of balloon in juvenile age group, the above described technique can be considered as suitable alternative for management for such cases. As in our case series it has shown promising results.

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