Balloon Mitral Valvuloplasty

HARDWARE & TECHNIQUES

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BALLOON MITRAL VALVULOPLASTY

Background:
Until the early 1980s, surgery was the only possible treatment for mitral stenosis; then, a new alternative appeared: percutaneous balloon mitral valvuloplasty.

PMV has had a significant impact on the treatment of MS and its successful results has led to increasing use world-wide.
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**Background:**

K. Inoue and colleagues were the first to perform percutaneous mitral commissurotomy (PMC) in 1982. The good results obtained by the technique have led to its increasing worldwide use and its positioning as the second most important technique in the field of interventional cardiology.

**Mechanism of PMV**

PMV relieve mitral stenosis by splitting fused commissure, which is similar to surgical commissurotomy.
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Techniques of PMV

• Transvenous or Antegrade Approaches:
  – The Inoue balloon technique.
  – The double balloon technique.
  – The Multitrack technique.
  – The metallic dilator (Cribier).

• Transarterial or Retrograde Techniques:
  – Babic et al.
  – Stefanadis technique.

Inoue Balloon Technique

The instruments used consist of:

- Balloon catheter
- Accessories:
  . 80-cm metal tube
  . 70-cm polyethylene dilator
  . 180-cm stainless steel guide-wire with coiled floppy tip
  . 80-cm 0.038-inch J-tipped spring wire stylet
  . 30-ml plastic syringe and connecting tube
  . Caliper.
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1. Perform Trans-septal Left Heart Cath. (most crucial step and the key to safe and successful BMV).
2. Mullin Sheath is Advanced into LA.
3. The Patient is Heparinized (100 IU/Kg. max 5000 IU IV).
4. Pigtail in LV.
5. Measure LA-LV Gradient.
6. Insert Spiral Guide Wire Into LA.
7. Dilate Femoral Vein Access Site and Interatrial Septum With 14 F Dilator.
8. Introduce Appropriately Sized ((Pt. Ht. in cm)/10 + 10) Inoue Balloon Into LA.
9. Cross Mitral Valve With Balloon.

10. Inflate Distal Portion of Balloon and Retract to Inferior Portion of Mitral Valve.

11. Fully Inflate Balloon to 4 mm Less Than Target Diameter of Final Inflation.

12. Retract Balloon Into LA.

13. Assess Mobility of Valve and Severity of MR by Echo.

14. If MR is no worse Than Baseline Increase Diameter of Balloon by 1 mm and Repeat Above Steps.

15. Once Valve is Suitably Dilated, Repeat Hemodynamics, Echo and Perform LV gram to assess Residual Stenosis and Presence and Severity of MR (If Present) (Inoue and Hung; 1994).
Balloon Mitral Valvuloplasty

Balloon Mitral Valvuloplasty
The double-balloon technique is effective but demanding and carries the risk of left ventricular perforation by the guidewires or the tip of the balloons.
The Multi-Track system

Although it has proven to be efficient, the DB technique is practically no longer used due to the greater complexity and potential higher morbidity of the procedure. The Multi-Track system, devised by Bonhoeffer et al. in 1995, simplifies the DB technique.

With this system, one of the balloons is a rapid exchange balloon, while the other has a conventional design, enabling both to be aligned in the mitral valve orifice over a single guidewire.
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**The Multi-Track System**

– Shares the advantages of the traditional double balloon technique
– It is safer reducing the risk of accidental balloon displacement.
– The procedure is easier to perform and procedure times are reduced.
– The system is versatile and can be used in other indications
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The Multi-Track System
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The Multi-Track System

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The Metallic Valvulotome

(The Cribier Metallic Dilator)

Cribier et al introduced the metallic commissurotomy, which uses a device similar to the Tubbs dilator used during closed surgical commissurotomy. Its efficacy is similar to that of balloon commissurotomy, but the risk of hemopericardium seems higher. The potential advantage of metallic commissurotomy is that the dilator is reusable, which reduces the cost of the procedure.
**Balloon Mitral Valvuloplasty**

**Metallic Valvulotome**

The system is made of four components:

1. The metallic dilator

2. The catheter with a diameter of 13-Fr and a length of 170 cm

   Proximal end of the catheter and activating pliers
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3- The metallic guidewire has a length of 270 cm and a diameter of 0.035 inch

4- The activating pliers attached to the proximal end of the catheter shaft

Position of the metallic valvutome across the mitral valve in the closed and the opened position (40 mm).
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Major points: BMV

- Percutaneous mitral commissurotomy is the therapy of choice for most patients with predominant mitral stenosis.
  - Randomized comparisons with surgery show no advantages to surgical commissurotmy.
- No significant difference in hemodynamic results between different techniques of PMV.
- Inoue technique is faster and less cumbersome.

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Major points: BMV

- The multi-track system is associated with a higher incidence of bilateral commissural splitting compared to the Inoue balloon.
- Inoue technique associated with less fluoro time.
- The risk of hemopericardium seems to be higher with metallic valvutome than balloon techniques.
- The Inoue balloon is easier to position and hold position across the mitral valve.
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Major points: BMV

- Inoue technique allows simple upsizing without withdrawing balloon from the left atrium.
- The important advantage of the Multi-track system is its lower cost, not only regarding the balloon, but also it can be reused after resterilization.
- Inoue technique may be responsible for slightly more MR.

**THANK YOU**
See You in

Department of Cardiology

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