

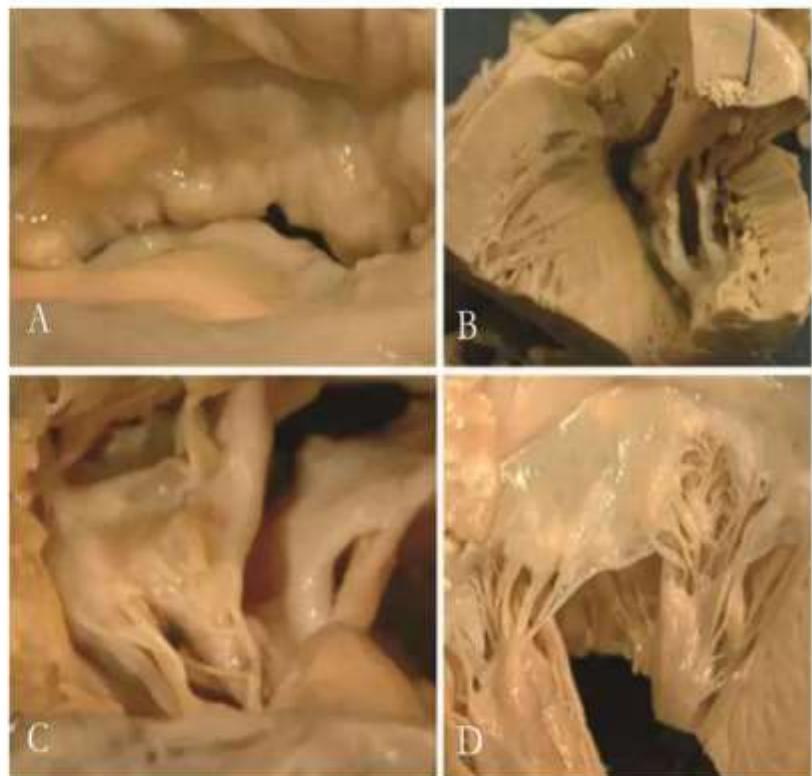
Mitral Stenosis

Causes of Mitral stenosis

- Rheumatic
- Congenital
- Carcinoid
- SLE
- mucopolysacharidosis
- Mitral annular calcification

PATHOLOGIC CHANGES OF THE MITRAL VALVE IN MS

- Thickened, rigid, nodular appearance of the mitral valve leaflets as viewed from the atria (**A**) and ventricle (**B**). The commissures are calcified and fused, thereby creating the characteristic “**fish mouth**”-shaped valve.
- **B** and **C**, The subvalvular apparatus is thickened, fused, and shortened.
- **D**, Healthy mitral valve leaflets.



From Chandrasekar Y, Westaby S, Narula J. Mitral stenosis. *Lancet* 374:1273, 2009.)



Hemodynamics

- Normal Mittal valve 4-6 cm²
- ACC 2020 Valve guidelines
- A at risk: normal transmittal flow
- B Progressive MS: > 1.5cm² area, diastolic pressure half-time<150 ms
- C Asymptomatic severe MS: <1.5 cm² area, diastolic pressure half-time >150 ms with severe LA enlargement
- D. Severe symptomatic MS: <1.5 cm² area, diastolic pressure half-time >150 ms with severe LA enlargement with decreased exercise tolerance

CLASSIFICATION OF MS SEVERITY

	Mild	Moderate	Severe
Specific findings			
Valve area (cm) ²	>1.5	1.0-1.5	<1.0
Supportive findings			
Mean gradient (mmHg)*	<5	5-10	>10
Pulmonary artery pressure(mmHg)	<30	30-50	>50

* At heart rate between 60 and 80 bpm and in sinus rhythm

STAGES OF MITRAL STENOSIS

STAGE	DEFINITION	VALVE ANATOMY	VALVE HEMODYNAMICS	HEMODYNAMICS CONSEQUENCES	SYMPTOMS
A	At risk for MS	Mild valve doming during diastole	Normal transmitral flow velocity	None	None
B	Progressive MS	Rheumatic valve changes with commissural fusion and diastolic doming of mitral valve leaflets Planimetered MVA >1.5 cm ²	Increased transmitral flow velocities MVA > 1.5 cm ² Diastolic pressure half-time <150 msec	Mild to moderate LA enlargement Normal pulmonary pressure at rest	None
C	Asymptomatic severe MS	Rheumatic valve changes with commissural fusion and diastolic doming of mitral valve leaflets Planimetered MVA ≤1.5 cm ² (MVA ≤1 cm ² with very severe MS)	MVA ≤ 1.5 cm ² (MVA ≤1 cm ² with very severe MS) Diastolic pressure half-time ≥150 msec (Diastolic pressure half-time ≥220 msec with very severe MS)	Severe LA enlargement Elevated PASP >30 mm Hg	None
D	Symptomatic severe MS	Rheumatic valve changes with commissural fusion and diastolic doming of mitral valve leaflets Planimetered MVA ≤1.5 cm ²	MVA ≤ 1.5 cm ² (MVA ≤1 cm ² with very severe MS) Diastolic pressure half-time ≥150 msec (Diastolic pressure half-time ≥220 msec with very severe MS)	Severe LA enlargement Elevated PASP >30 mm Hg	Decreased exercise tolerance Exertional dyspnea

Mechanisms

- **Forward Flow**
- Normally LAP = LVEDP
- But in MS LAP> LVEDP
- Opening snap is heard
- Isovolumetric relaxation interval shortens
- **Backward Pressure**
- In MS raised LAP -- increased PCWP-- exudation of fluids into lungs -- lung compliance reduce -- dyspnoea

- Also
- Increase in pulmo. htn -- RV systolic pressure increases -- RA pressure increases -- IVC pressure shoots up leading to Pedal edema orgnaomegaly and SVC pressure shoots up leading to raised JVP

Clinical assessment of severity of MS

- Presence of significant symptoms class 3 and 4
- Narrow A2- OS gap
- Long murmurs
- Pulm htn
- Diastolic thrill
- AF is least reliable for the severity of MS as it is present in majority of elderly MS pts

Precipitating factors

- Increases symptoms by
- Exercise
- Pregnancy
- Atrial Fibrilatiof
- Fever
- LRTI
- Decreased by - Bed rest, Beta blockers, CCB

Clinical Features

- Due to PAH- severe dyspnea, cough with frothy sputum, hemoptysis
- Due to RVH- pedal edema , fatigue, weakness
-
- Due to AF- Palpitations, Angina, syncope

Complications

- Left Atrial enlargement
- Pulmonary edema
- Tricuspid Regurgitation
- Right ventricular hypertrophy
- Right Atrial Hypertrophy
- Atrial Fibrillation
- Embolism
- Syncope

Investigation

- Xray chest - straightning of left heart border, increased heart size, pulm congestion/edema
- ECG - right axis deviation, P Mitrale, RV strain pattern
- Echo - Fish mouth orifice, thickened valves, Commissural fusion
- Severe MS- may be LA clot formation

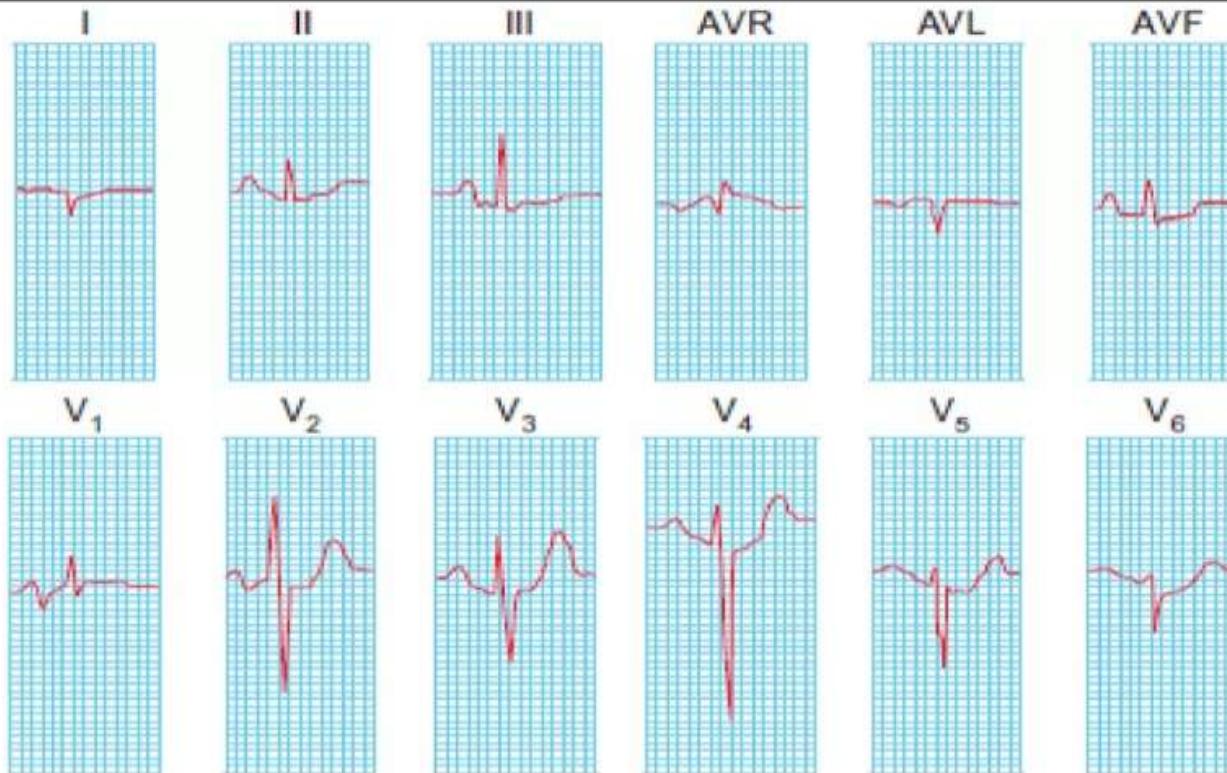
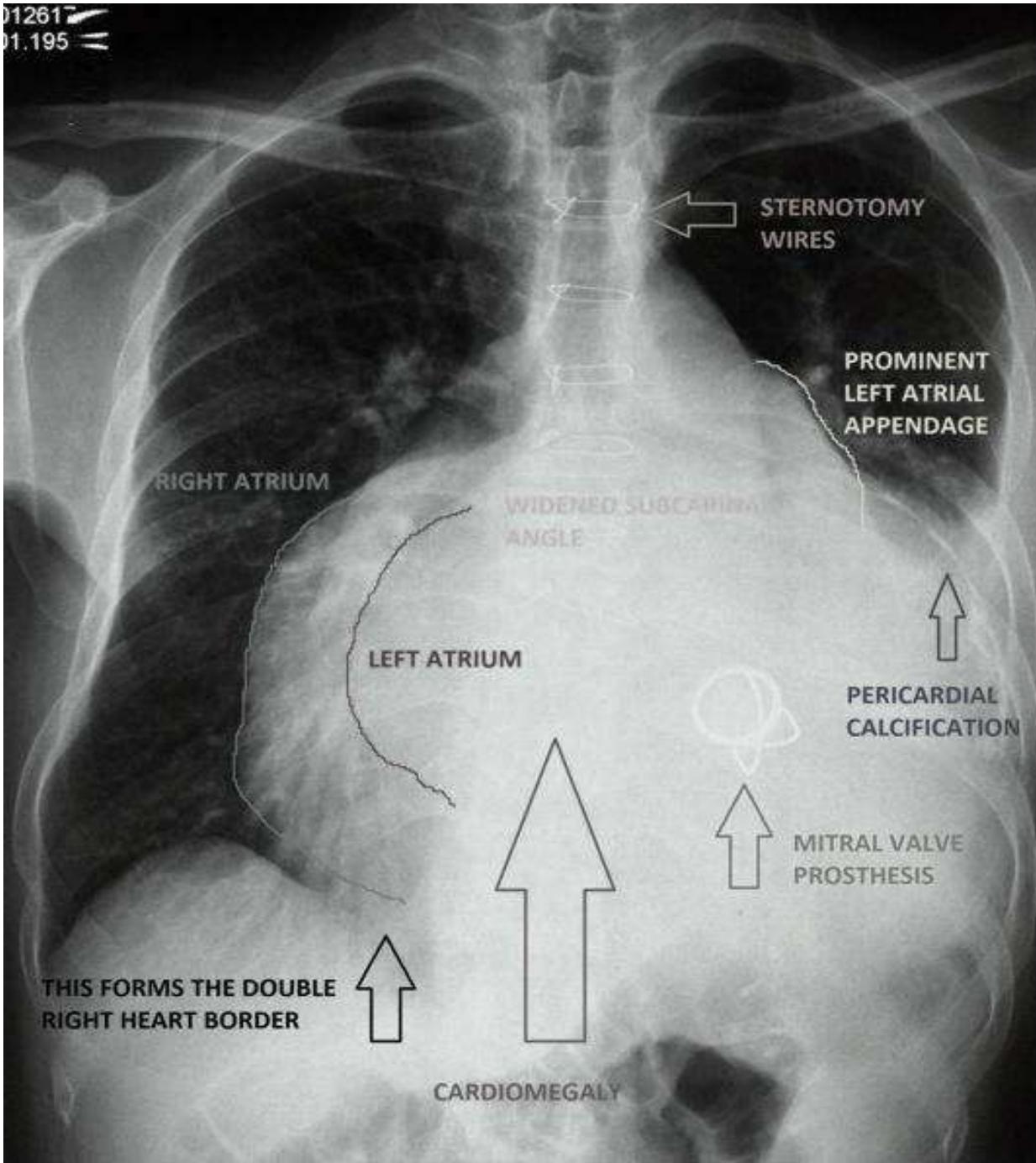


Fig. 13.79 Severe mitral stenosis shown by a 12-lead ECG. Note the right axis deviation (frontal plane axis = + 120°), the left atrial conduction abnormality (large terminal negative component of the P wave in V₁) and the right ventricular hypertrophy (R wave in V₁ and right axis deviation).

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ECHO EVALUATION OF MITRAL STENOSIS

A. Appearance of the MV & the mobility of its leaflets



ASSESSMENT OF MV ACCORDING TO THE WILKINS SCORE

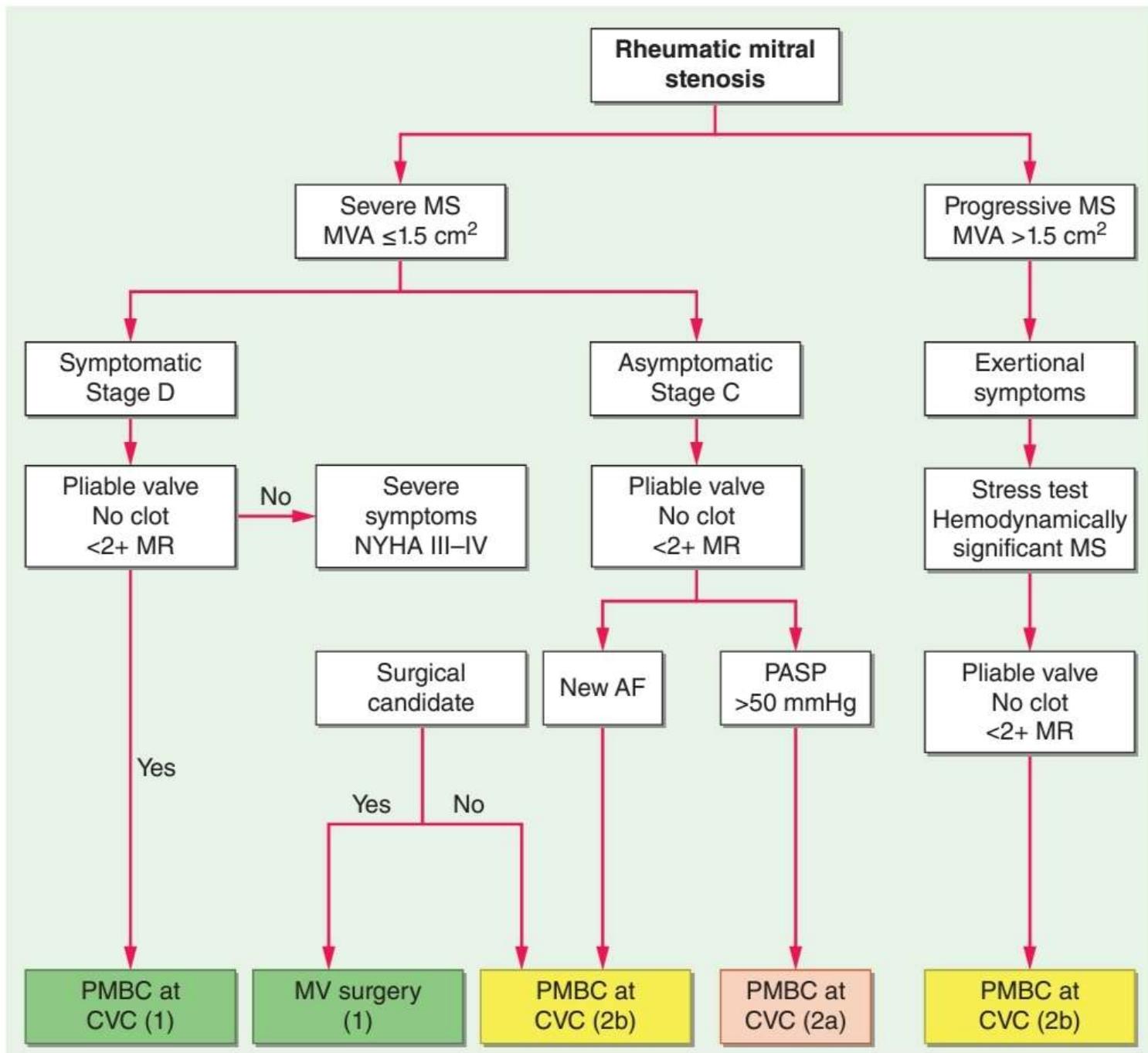
GRADE	LEAFLET MOBILITY	VALVE THICKENING	CALCIFICATION	SUBVALVULAR THICKENING
1	Highly mobile valve with only leaflet tips restricted	Leaflets near normal in thickness (4-5 mm)	Single area of increased echo brightness	Minimal thickening just below the mitral leaflets
2	Leaflet mid and base portions have normal mobility	Mid leaflets normal, considerable thickening of margins (5-8 mm)	Scattered area of brightness confined to leaflet margins	Thickening of chordal structures extending to one-third of the chordal length
3	Valve continues to move forward in diastole, mainly from base	Thickening extending through the entire leaflet (5-8 mm)	Brightness extending into mid-portions of the leaflets	Thickening of chordal structures extending to one-third of the chordal length
4	No or minimal forward movement of the leaflet in diastole	Considerable thickening of all leaflet tissue (> 8-10 mm)	Extensive brightness throughout much of the leaflet tissue	Extensive thickening and shortening of all chordal structures extending down to the papillary muscles

- Wilkins score - for MV stenosis
- Based on mobility, leaflets thickning, calcification, and sub valvular thickning
- Total 4 Grades
- Pliable valve<_8 -- suitable for BMV
- Cardiac Catheterization - when discrepancy btwn clinical synonyms and ECHO To assess PA pressure

Management

- HR reduction - Beta blockers, Diltizem, Digoxin,
- Target heart rate - 60/min
- Anticoagulation- AF/LA clot/systemic embolism - only Vitamin K antagonists
- Diuretics/ salt restriction for volume reduction
- Surgical management
 - 1) Balloon Mittal Valvotomy
 - 2)MV repair
 - 3) MV replacement

- Indications for BMV -
- NYHA class 2 , 3, 4 symptoms with MV $<1.5 \text{ cm}^2$
- Wilkins score<_8
- No LA clot
- Commissural calcification
- Successful BMV- split of one or more commissures with post BMV valave area $>1.5 \text{ cm}^2$



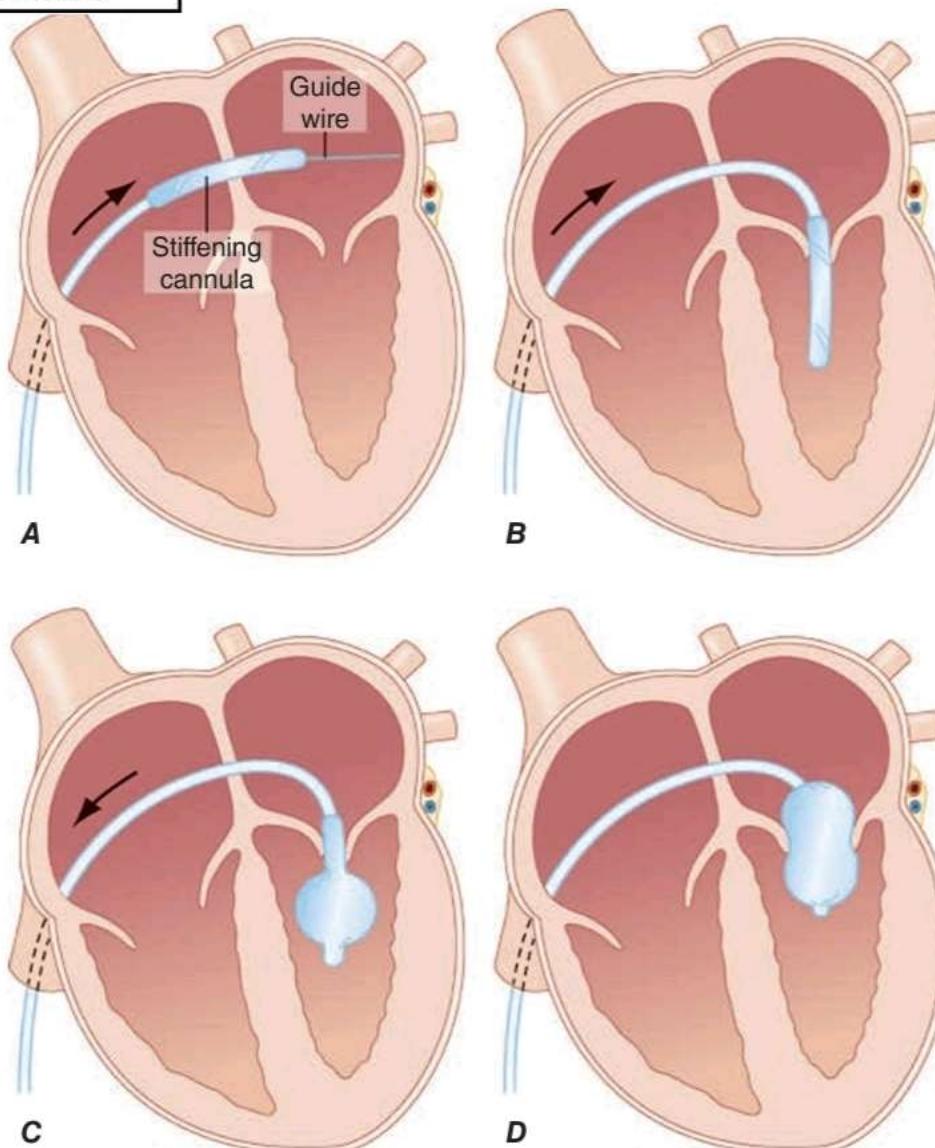


FIGURE 263-2 Inoue balloon technique for percutaneous mitral balloon commissurotomy. **A.** After transseptal puncture, the deflated balloon catheter is advanced across the interatrial septum, then across the mitral valve and into the left ventricle. **B-D.** The balloon is inflated stepwise within the mitral orifice.

Thank you

Source - Harrison 21 st edition
Up-to-date