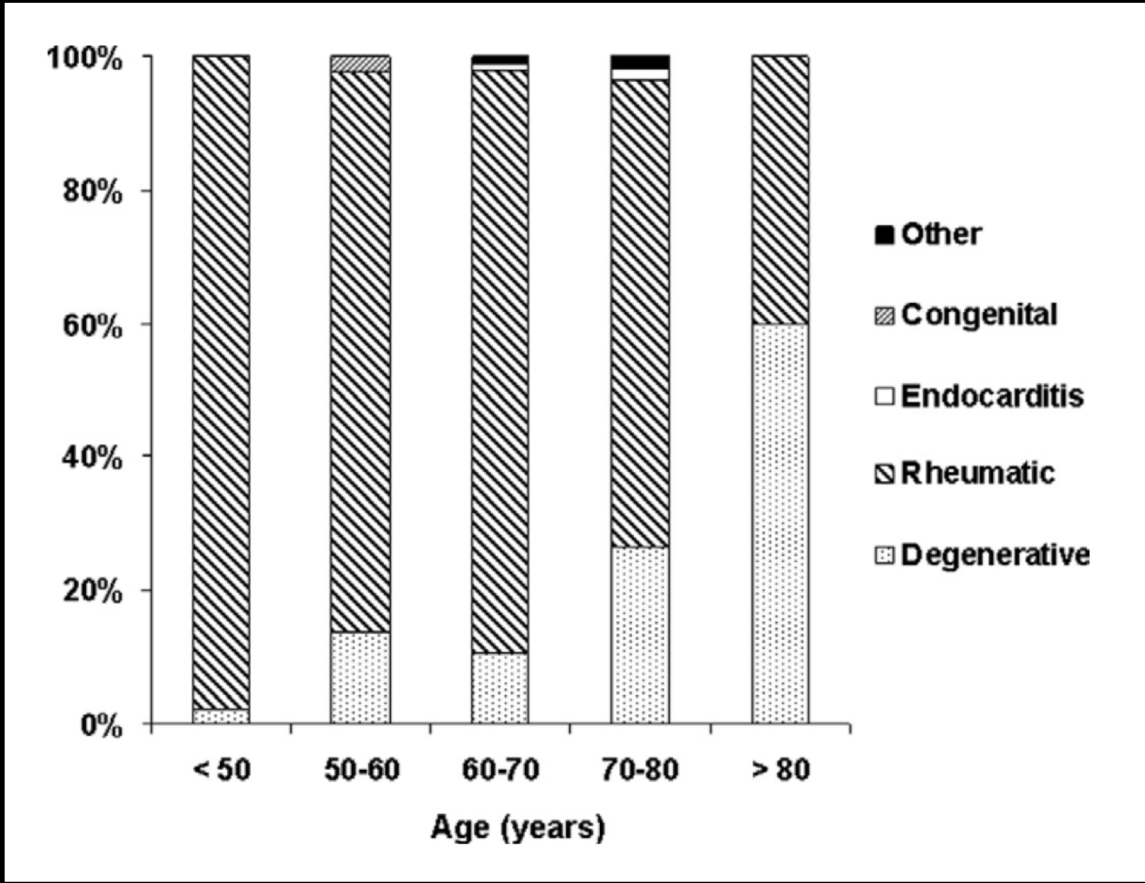
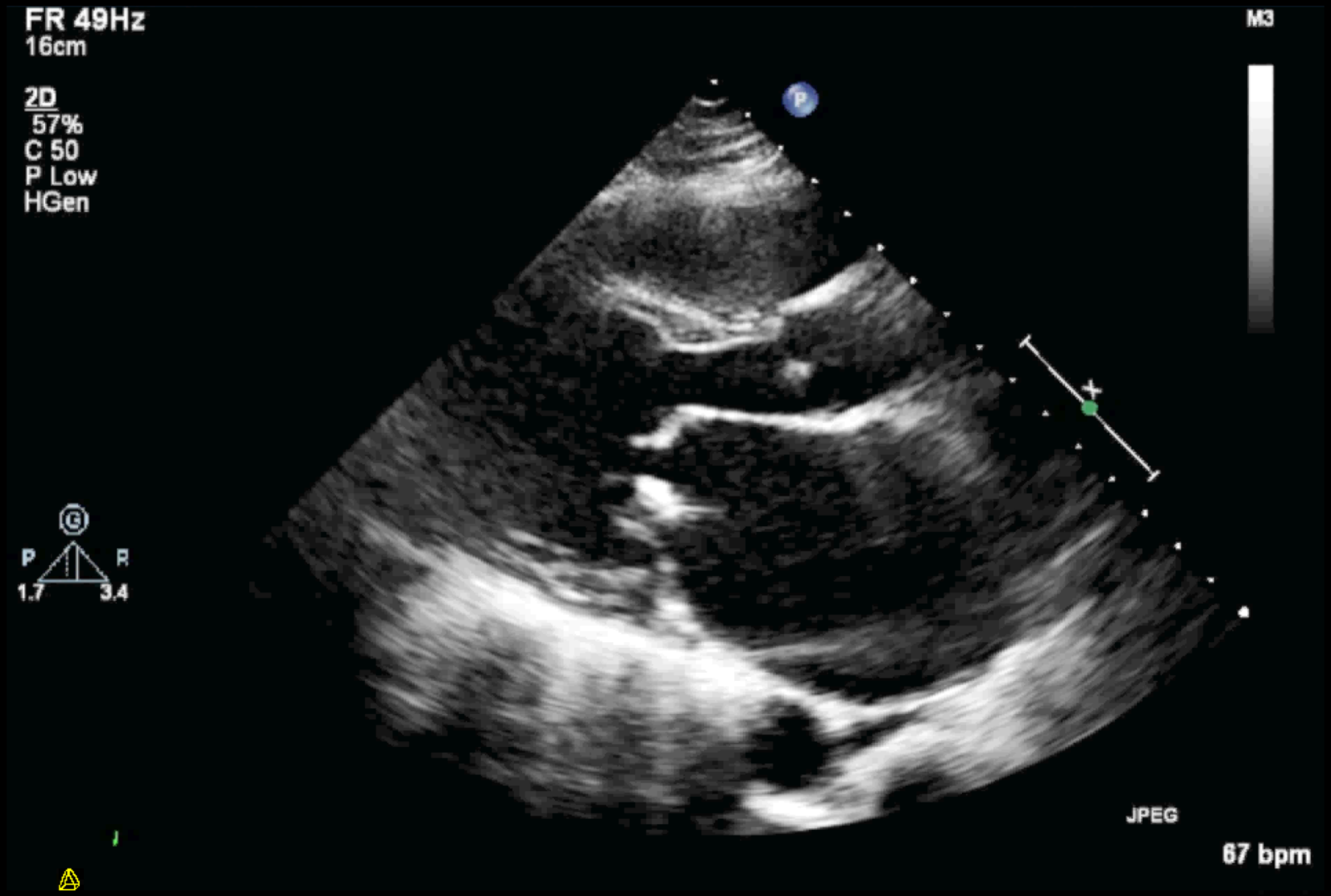
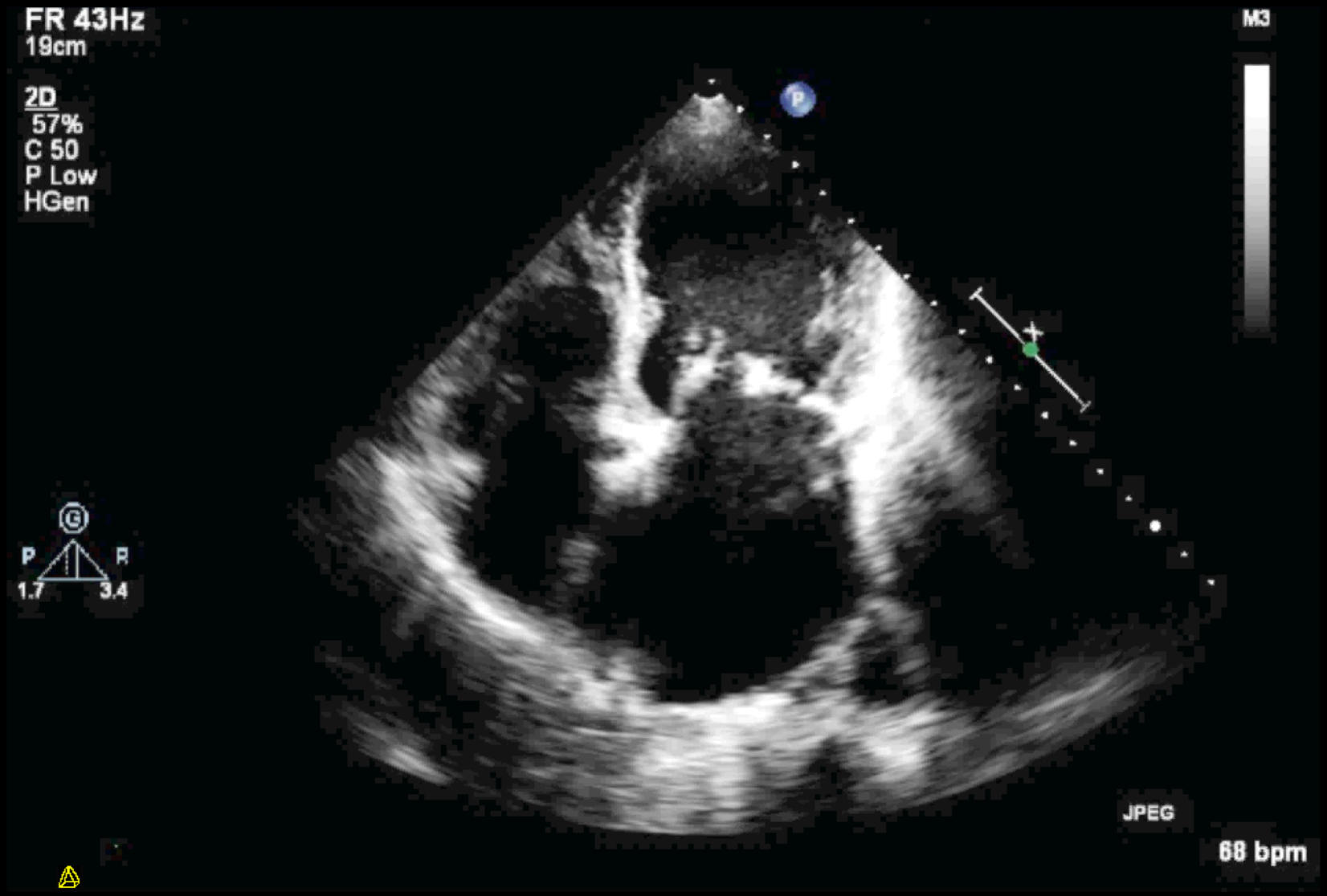
Ursachen der Mitralstenose

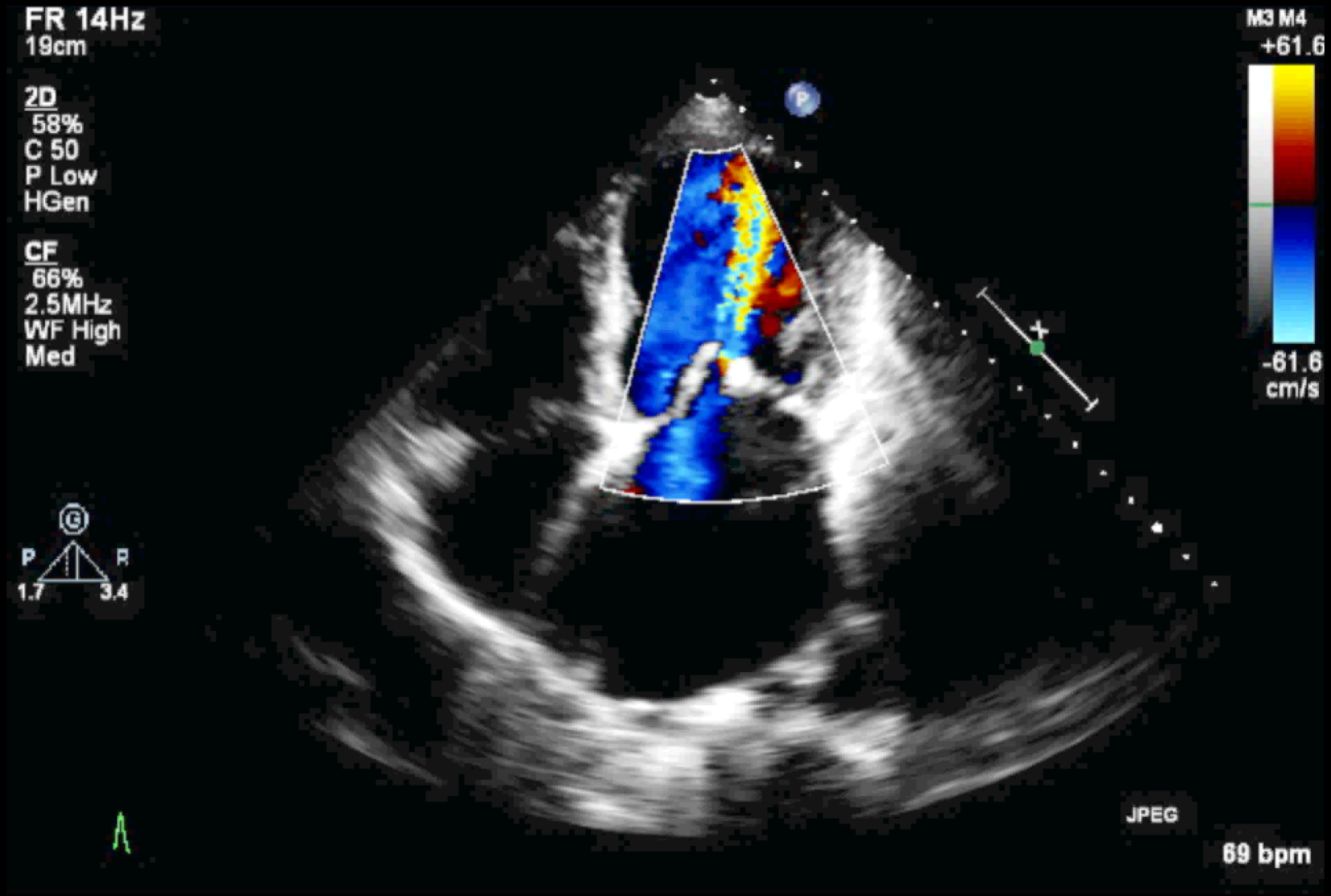
Verteilung der Ursachen nach Alter

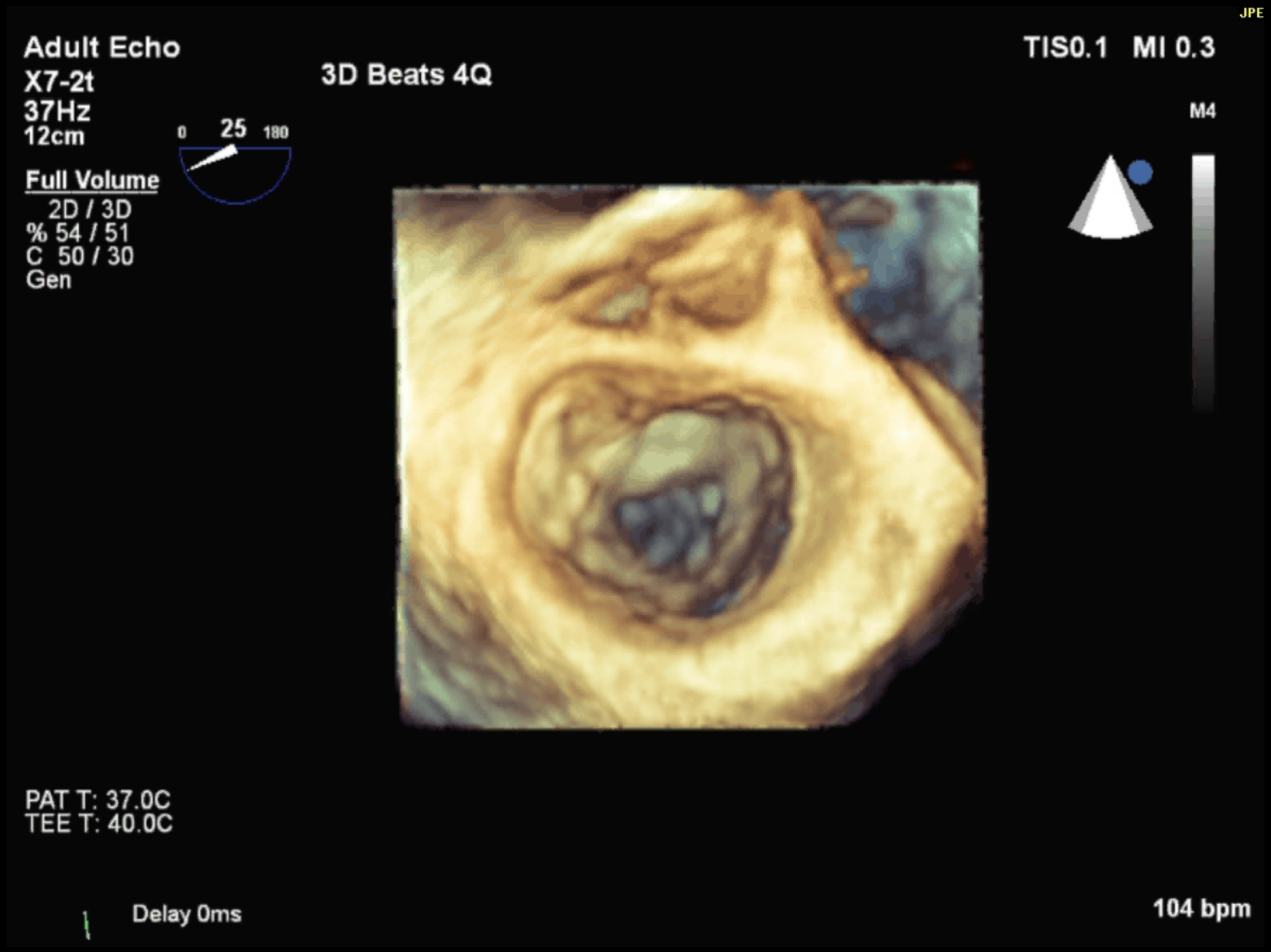


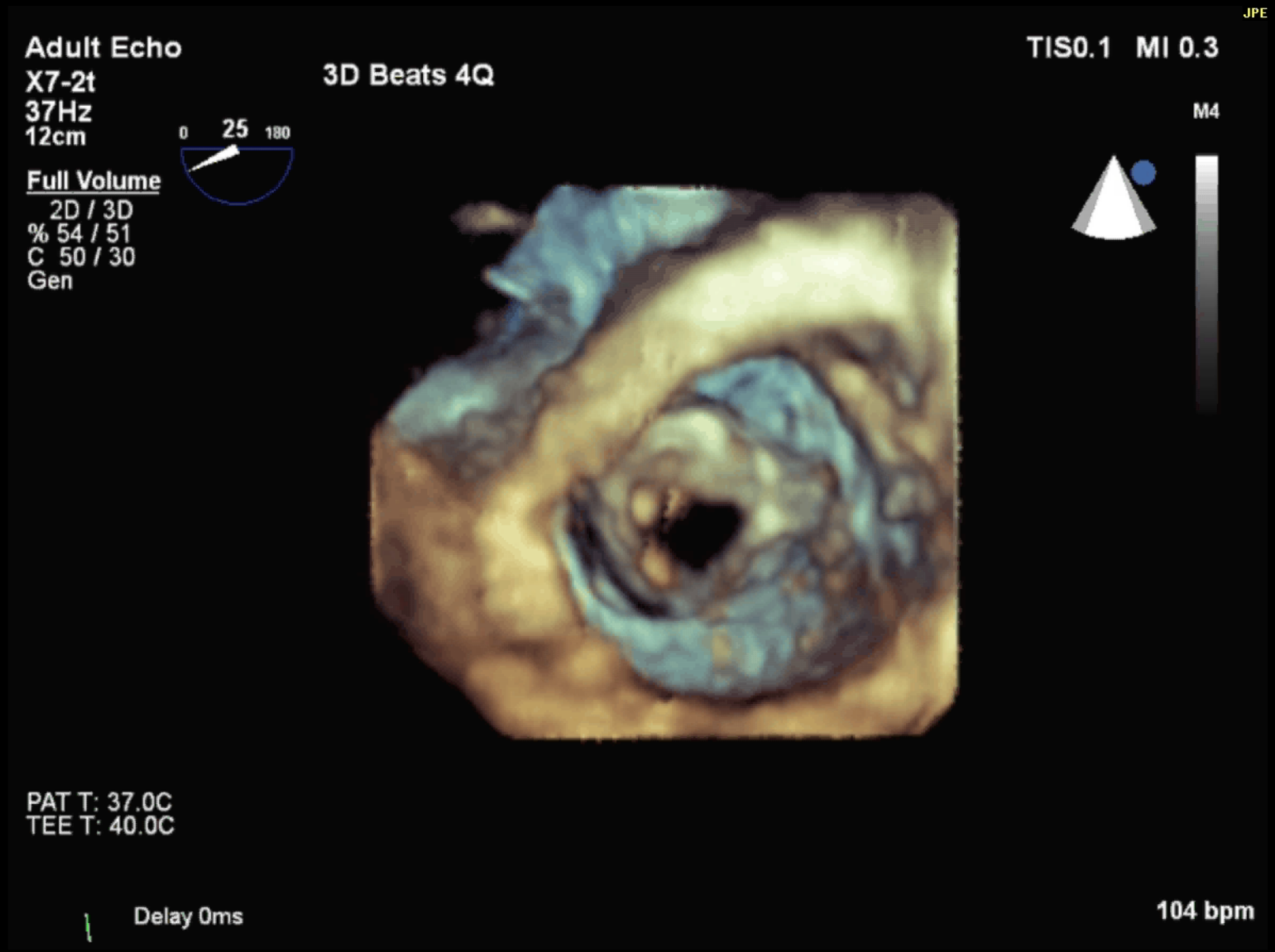
Iung et al. Curr Probl Cardiol 2007;32:609-661

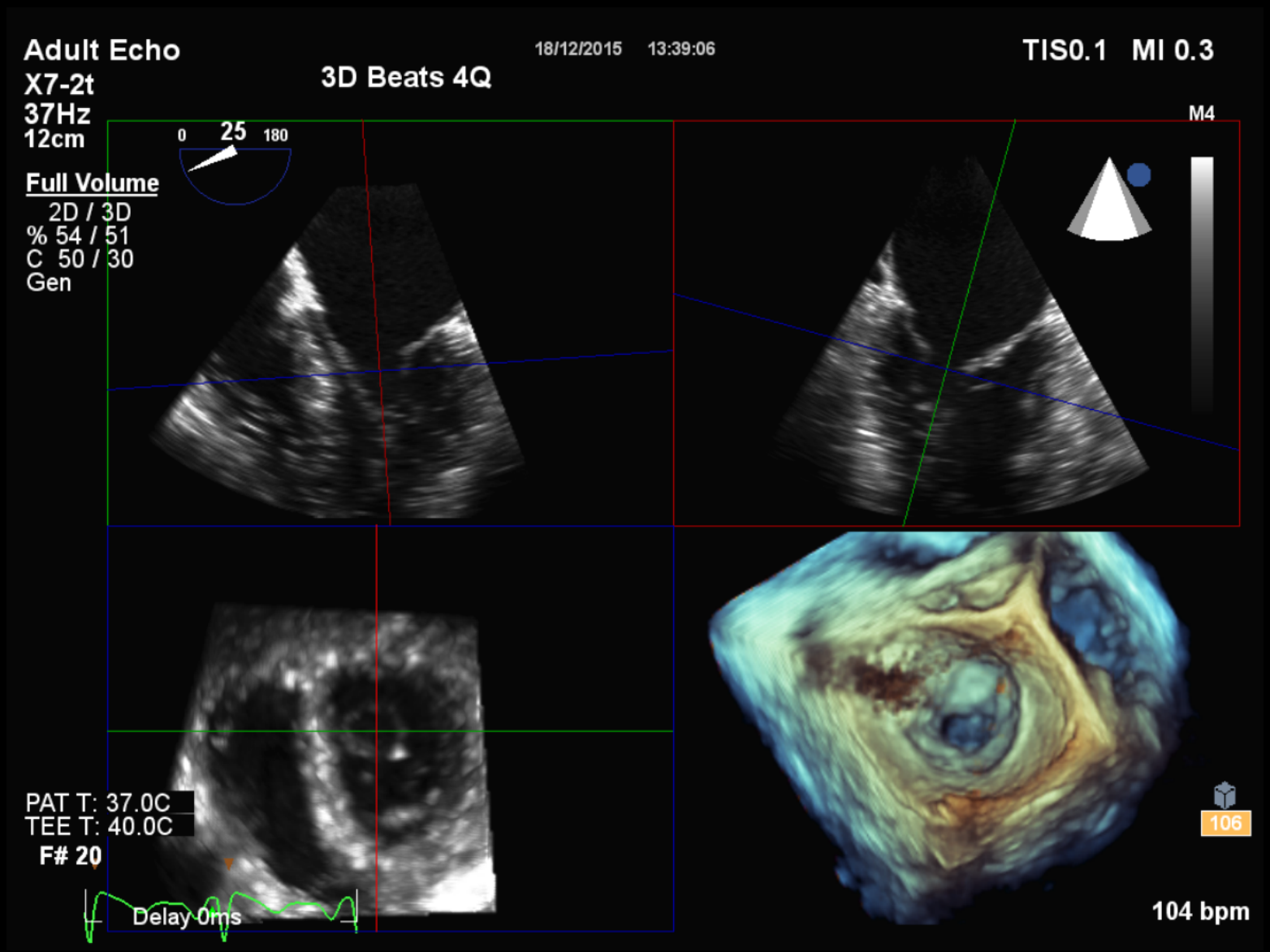

FR 49Hz
16cm
2D
57%
C 50
P Low
HGen
M3
P
G
P
R
1.7
3.4
JPEG
67 bpm

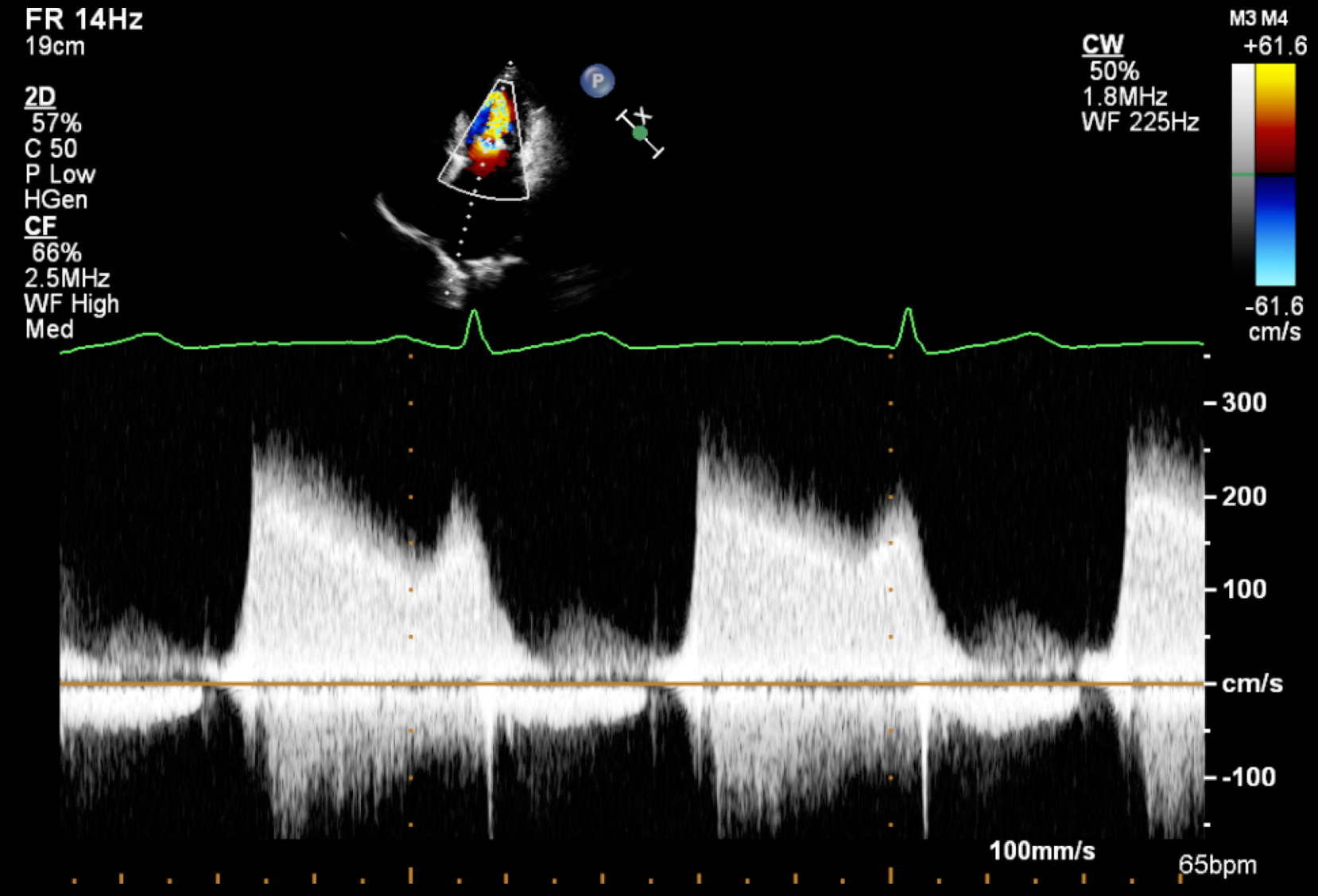

FR 43Hz
19cm
2D
57%
C 50
P Low
HGen
M3
P
G
P
R
1.7
3.4
JPEG
68 bpm


FR 14Hz
19cm
2D
58%
C 50
P Low
HGen
CF
66%
2.5MHz
WF High
Med
M3 M4
+61.6
-61.6
cm/s
P
R
1.7
3.4
JPEG
69 bpm

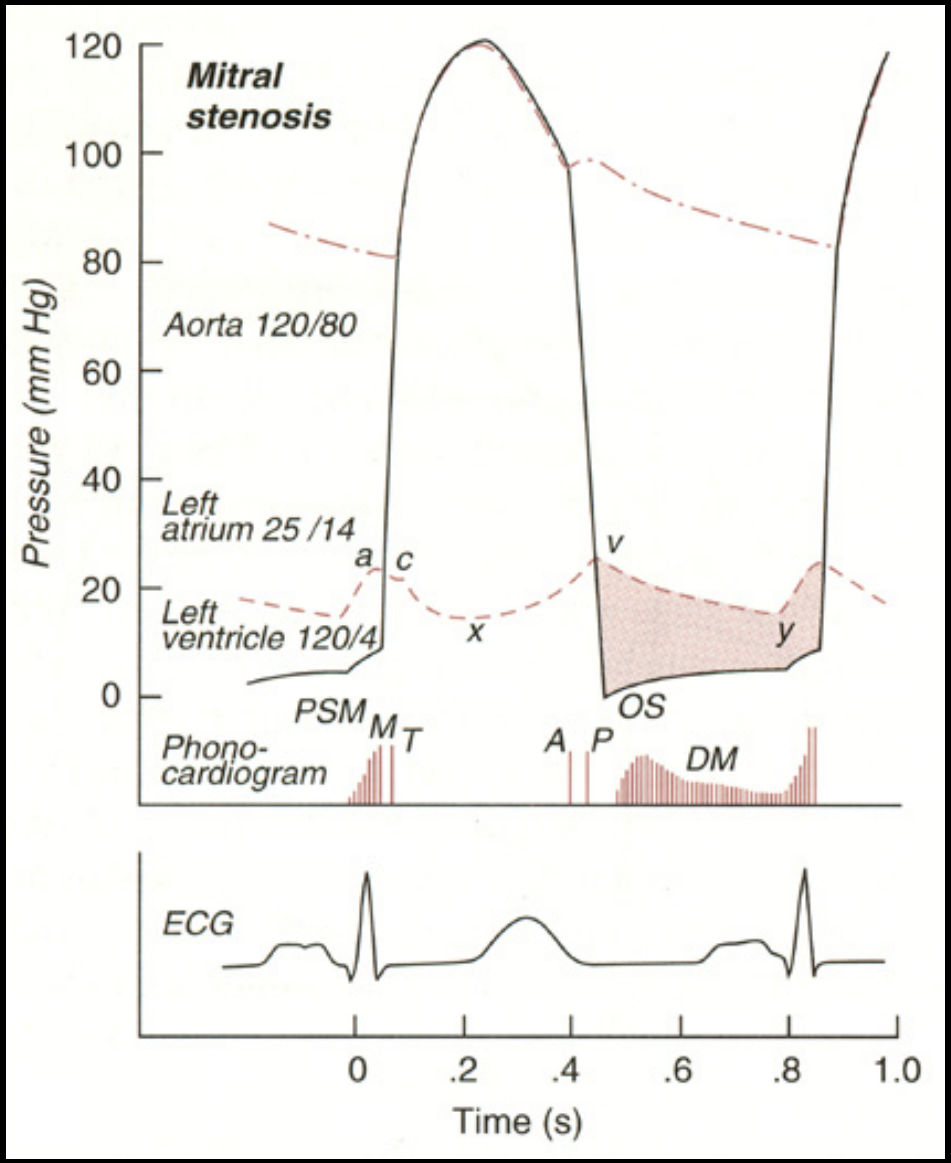

JPE
Adult Echo
X7-2t
37Hz
12cm
0
25
180
Full Volume
2D / 3D
% 54 / 51
C 50 / 30
Gen
3D Beats 4Q
TIS0.1 MI 0.3
M4
PAT T: 37.0C
TEE T: 40.0C
Delay 0ms
104 bpm

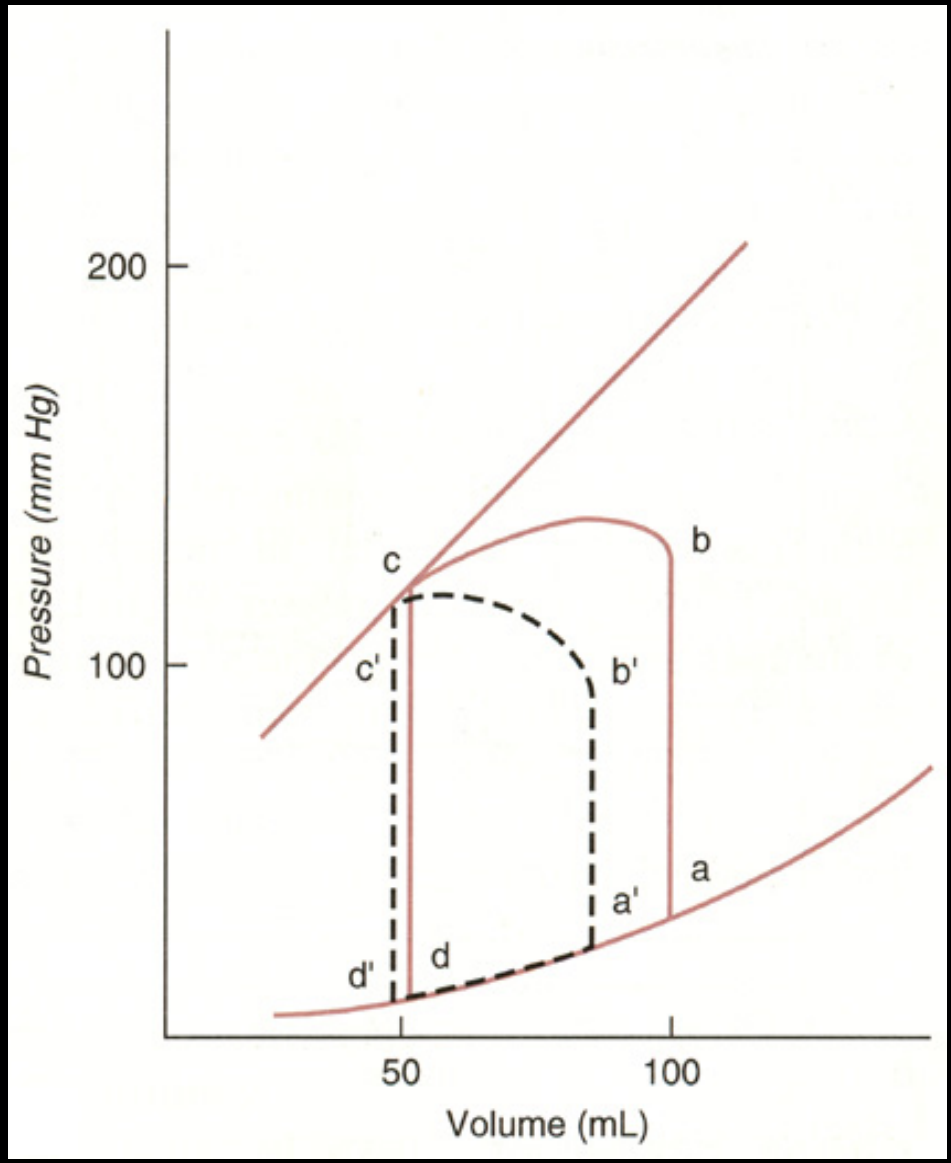

JPE
Adult Echo
X7-2t
37Hz
12cm
0
25
180
Full Volume
2D / 3D
% 54 / 51
C 50 / 30
Gen
3D Beats 4Q
TIS0.1 MI 0.3
M4
PAT T: 37.0C
TEE T: 40.0C
Delay 0ms
104 bpm


Adult Echo
X7-2t
37Hz
12cm
18/12/2015 13:39:06
3D Beats 4Q
TIS0.1 MI 0.3
M4
0 25 180
Full Volume
2D / 3D
% 54 / 51
C 50 / 30
Gen
PAT T: 37.0C
TEE T: 40.0C
F# 20
Delay 0ms
106
104 bpm

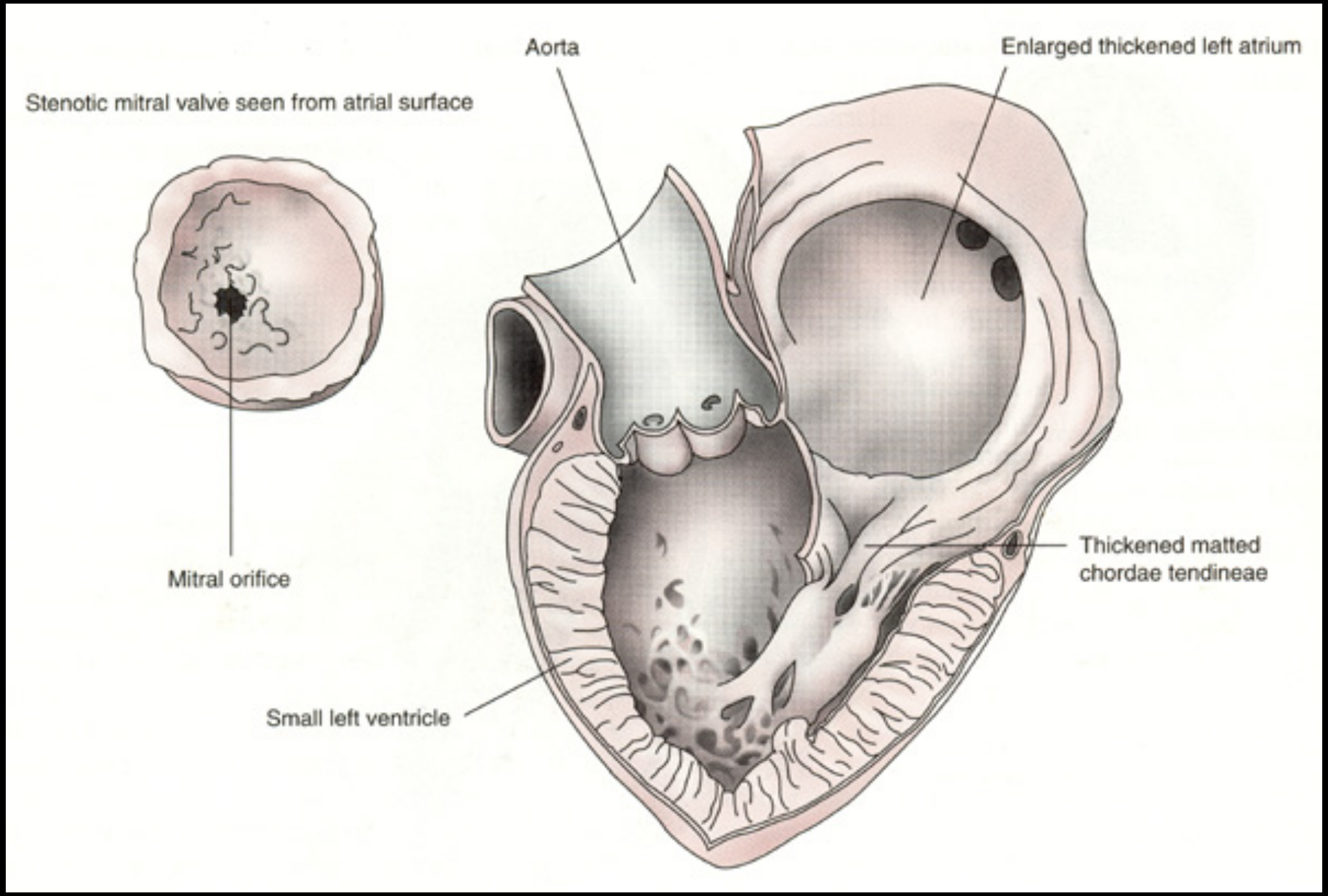

FR 14Hz
19cm
2D
57%
C 50
P Low
HGen
CF
66%
2.5MHz
WF High
Med
CW
50%
1.8MHz
WF 225Hz
M3 M4
+61.6
-61.6
cm/s
300
200
100
cm/s
-100
100mm/s
65bpm

Hämodynamik der Mitralstenose





Folgen der Mitralstenose



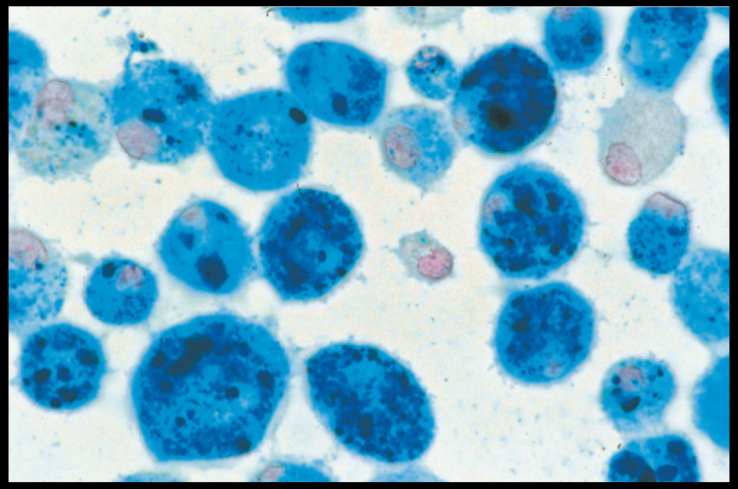
Mitralstenose und kardiale Funktion

Linker Vorhof:

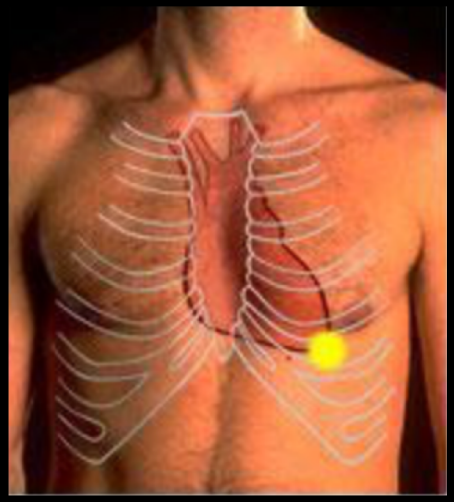
Progressive Dilatation
Atriale Arrhythmien
Atriale Thromben
Embolische Ereignisse

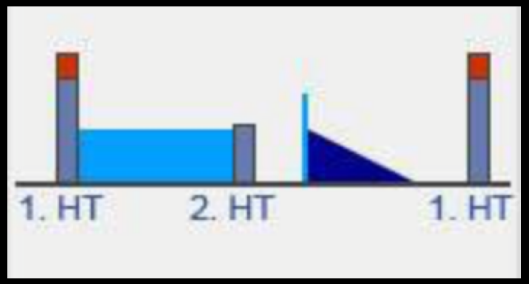
Sekundäre pulmonale Hypertonie:

Hämoptyse (‘Herzfehlerzellen‘)
Lungenödem
Rechtsherzbelastung



Mitralstenose





1: paukend
2: normal
Mesodiastolisches Geräusch, Decrescendo, rumpelnd
Ausstrahlung in Axilla, v. a. in Linksseitenlage
Häufig mit protodiastolischem Click (MOET)
Häufig kombiniert mit Mitralinsuffizienz

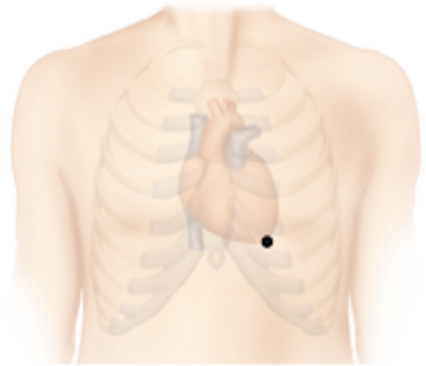
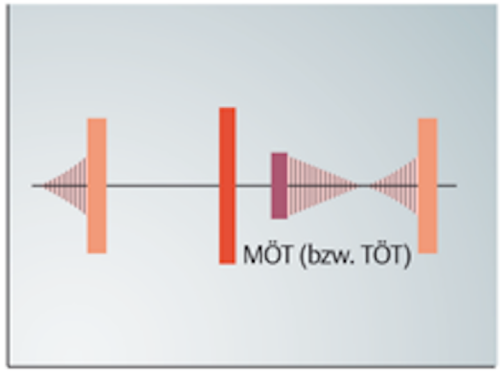
Palpation:
Herz: Eventuell Zeichen der Rechtsherzbelastung
Puls: Häufig unregelmässig wegen VHF

Arterieller Blutdruck:
Normale Amplitude

EKG:
Sinusrhythmus (VHF); Vorhofbelastung; Repolarisationsstörung

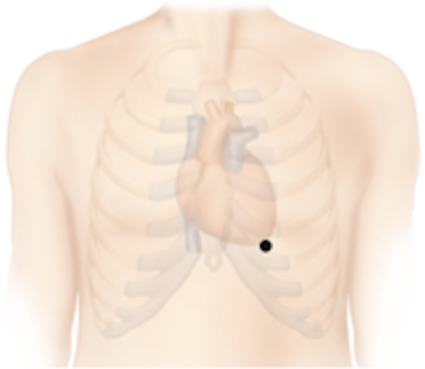
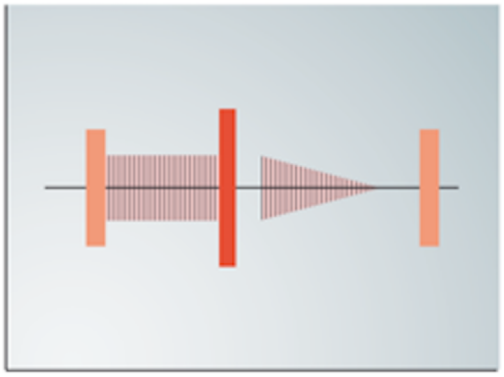
Mitralstenose

Untersuchung von Patienten mit MS

Auskultationsort	Schematische phonokardiografische Darstellung	Key point
 p.m.: Herzspitze		Herztöne: paukender 1. HT und MÖT bei MS, evtl. TÖT bei TS Extratöne: keine Herzgeräusche: tieffrequentes, diastolisches Decrescendo-geräusch, evtl. Präsystolikum

Kombiniertes Mitralvitium

Untersuchung von Patienten mit MI/MS

Auskultationsort	Schematische phonokardiografische Darstellung	Key point
 p.m.: Herzspitze	 1. HT 2. HT 1. HT	Herztöne: paukender 1. HT Extratöne: keine Herzgeräusche: *Systole*: hochfrequentes, holosystolisches bandförmiges Geräusch *Diastole*: tieffrequentes, mesodiastolisches Decrescendo

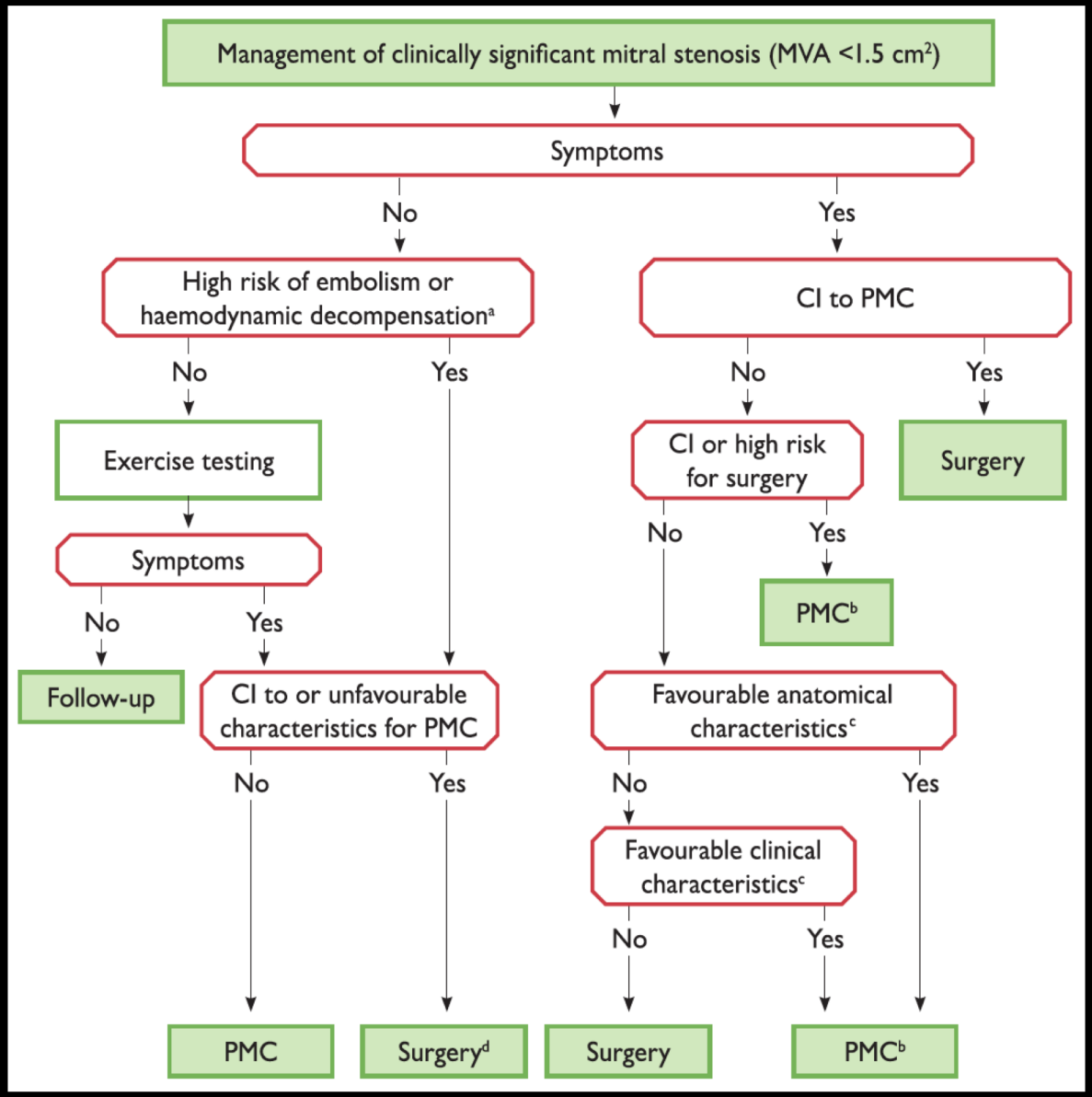
Quantifizierung der Mitralstenose

	Mitral Stenosis		
	Mild	Moderate	Severe
Mean gradient (mm Hg)*	Less than 5	5–10	Greater than 10
Pulmonary artery systolic pressure (mm Hg)	Less than 30	30–50	Greater than 50
Valve area (cm^2)	Greater than 1.5	1.0–1.5	Less than 1.0

Grade	*Mobility*	*Subvalvar thickening*	*Thickening*	*Calcification*
1	Highly mobile valve with only leaflet tips restricted	Minimal thickening just below the mitral leaflets	Leaflets near normal in thickness (4–5 mm)	A single area of increased echo brightness
2	Leaflet mid and base portions have normal mobility	Thickening of chordal structures extending up to one third of the chordal length	Mid-leaflets normal, considerable thickening of margins (5–8 mm)	Scattered areas of brightness confined to leaflet margins
3	Valve continues to move forward in diastole, mainly from the base	Thickening extending to the distal third of the chords	Thickening extending through the entire leaflet (5–8 mm)	Brightness extending into the mid-portion of the leaflets
4	No or minimal forward movement of the leaflets in diastole	Extensive thickening and shortening of all chordal structures extending down to the papillary muscles	Considerable thickening of all leaflet tissue (> 8–10 mm)	Extensive brightness throughout much of the leaflet tissue

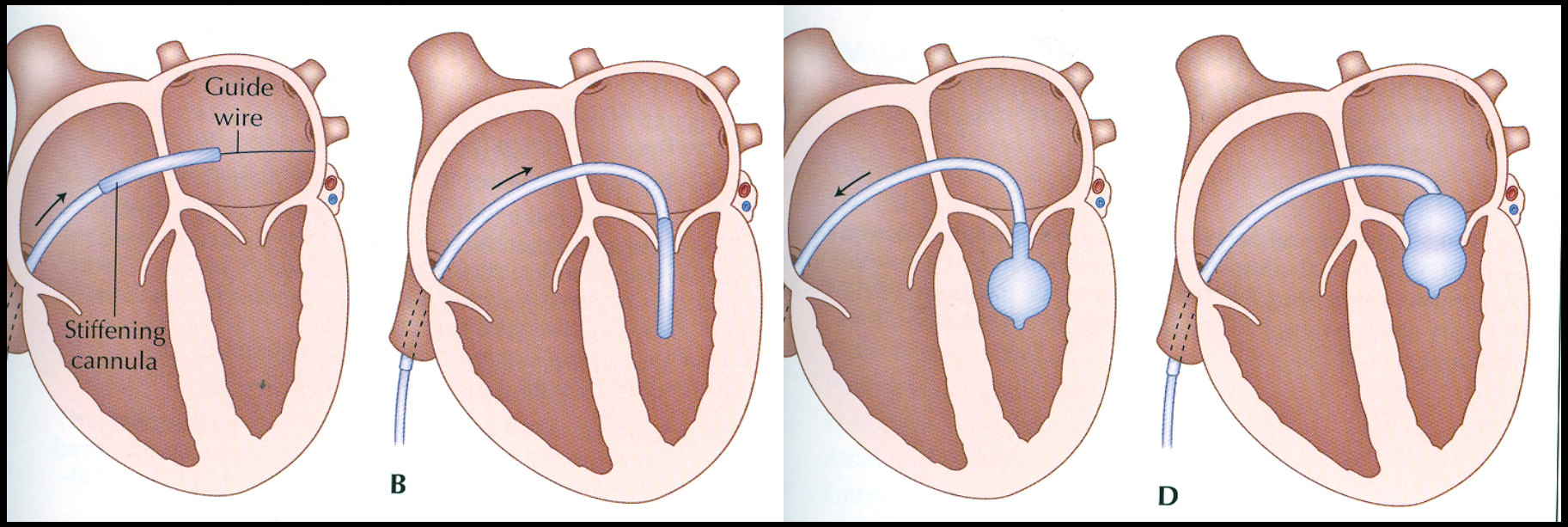
The total echocardiographic score was derived from an analysis of mitral leaflet mobility, valvar and subvalvar thickening, and calcification which were graded from 0 to 4 according to the above criteria. This gave a total score of 0 to 16.

Therapie der schweren Mitralstenose

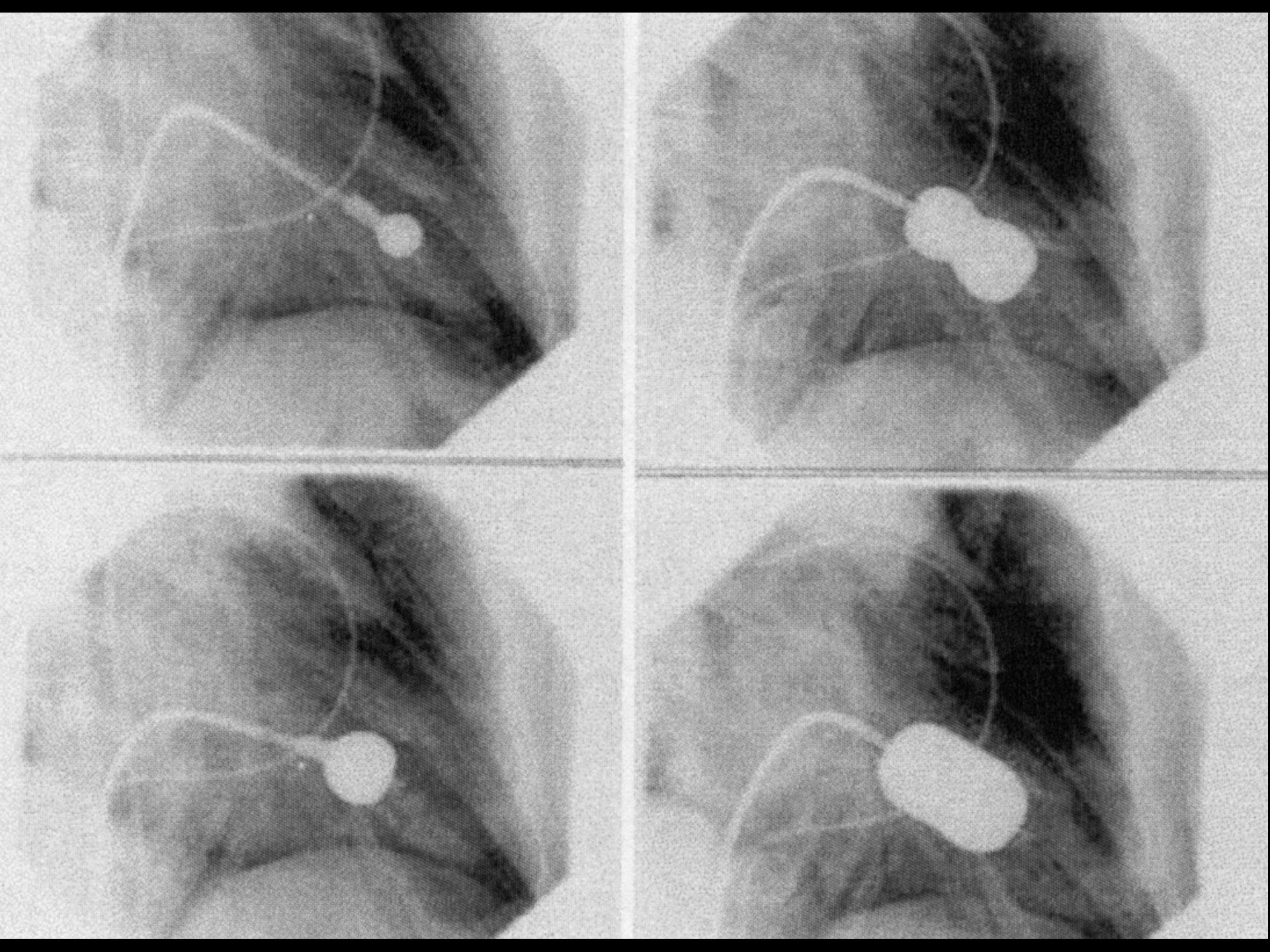


Baumgartner H. et al. Eur Heart J 2017;38:2739-2786

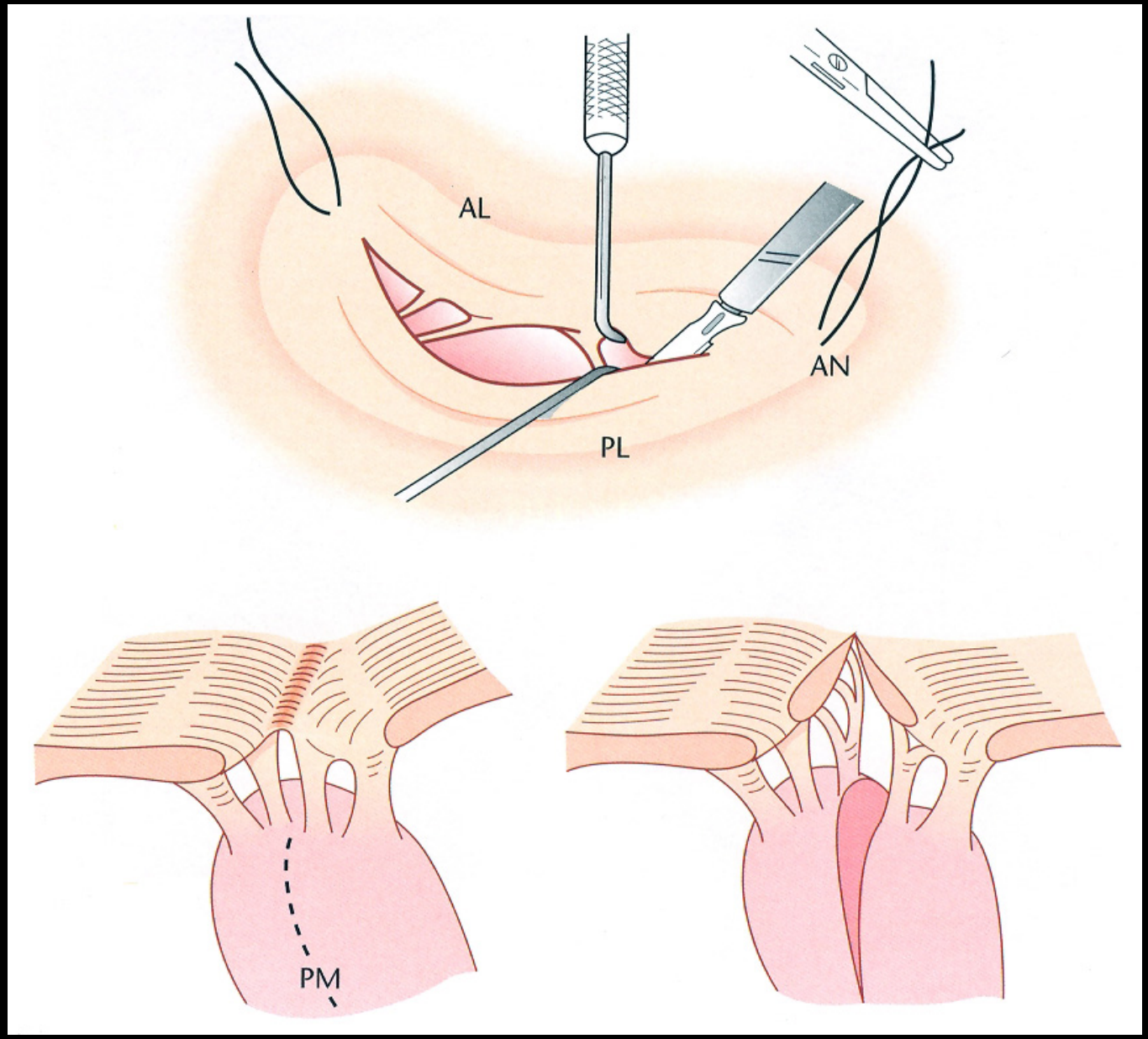
Mitralklappen-Valvuloplastie



Contra-indications
Mitral valve area >1.5 cm^{2a}
Left atrial thrombus
More than mild mitral regurgitation
Severe or bi-commissural calcification
Absence of commissural fusion
Severe concomitant aortic valve disease, or severe combined tricuspid stenosis and regurgitation requiring surgery
Concomitant CAD requiring bypass surgery

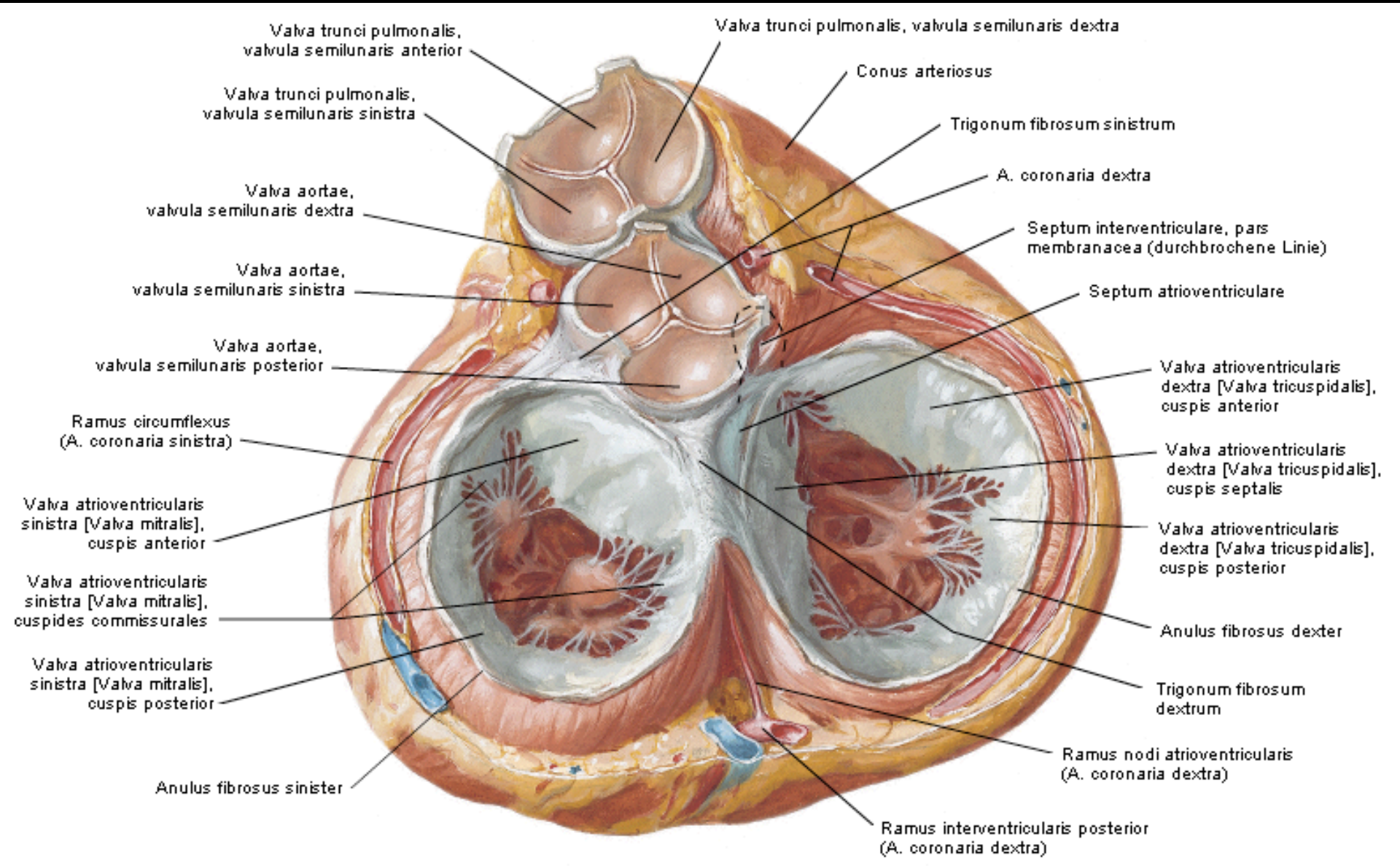


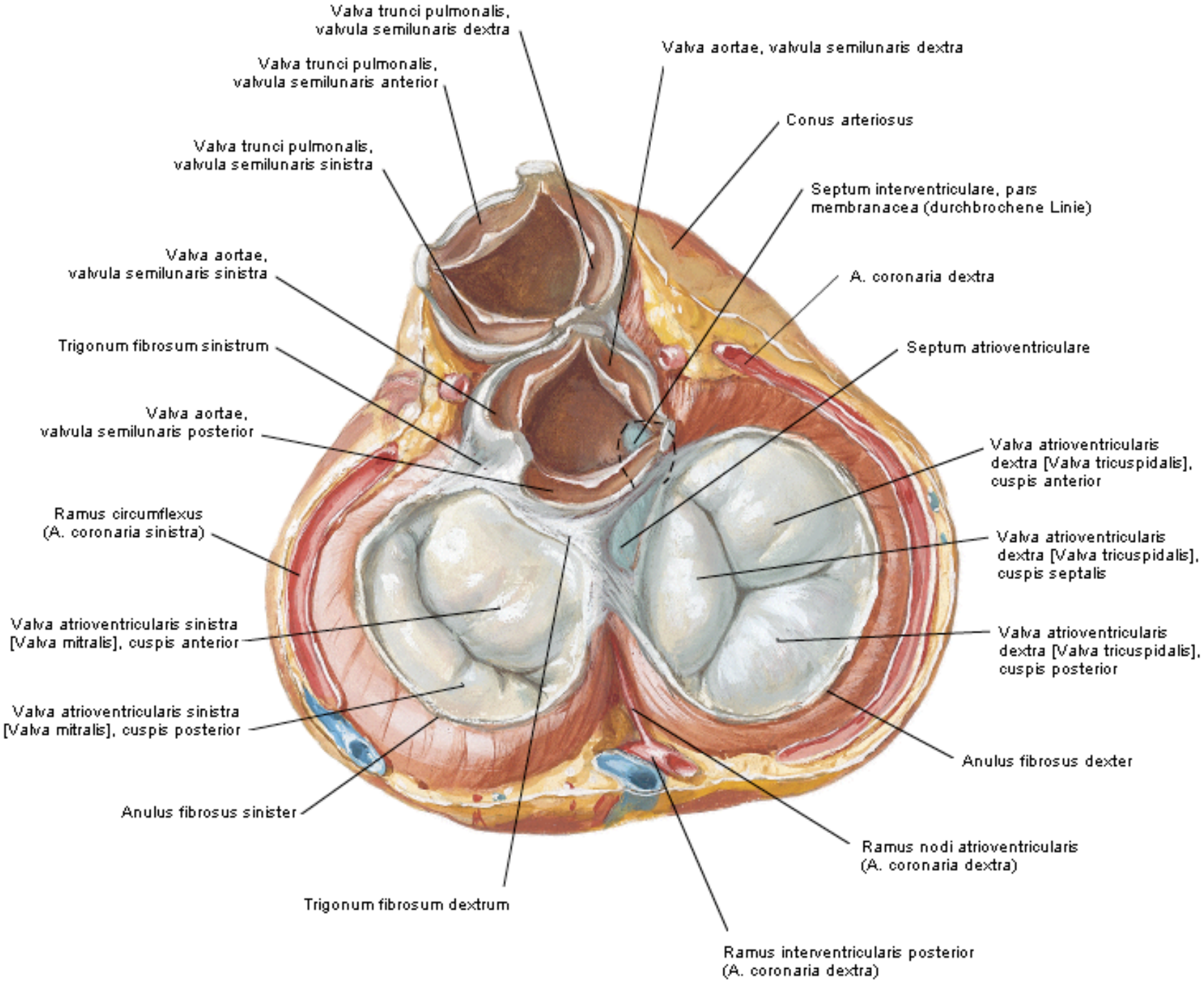
Mitralklappen-Kommissurotomie

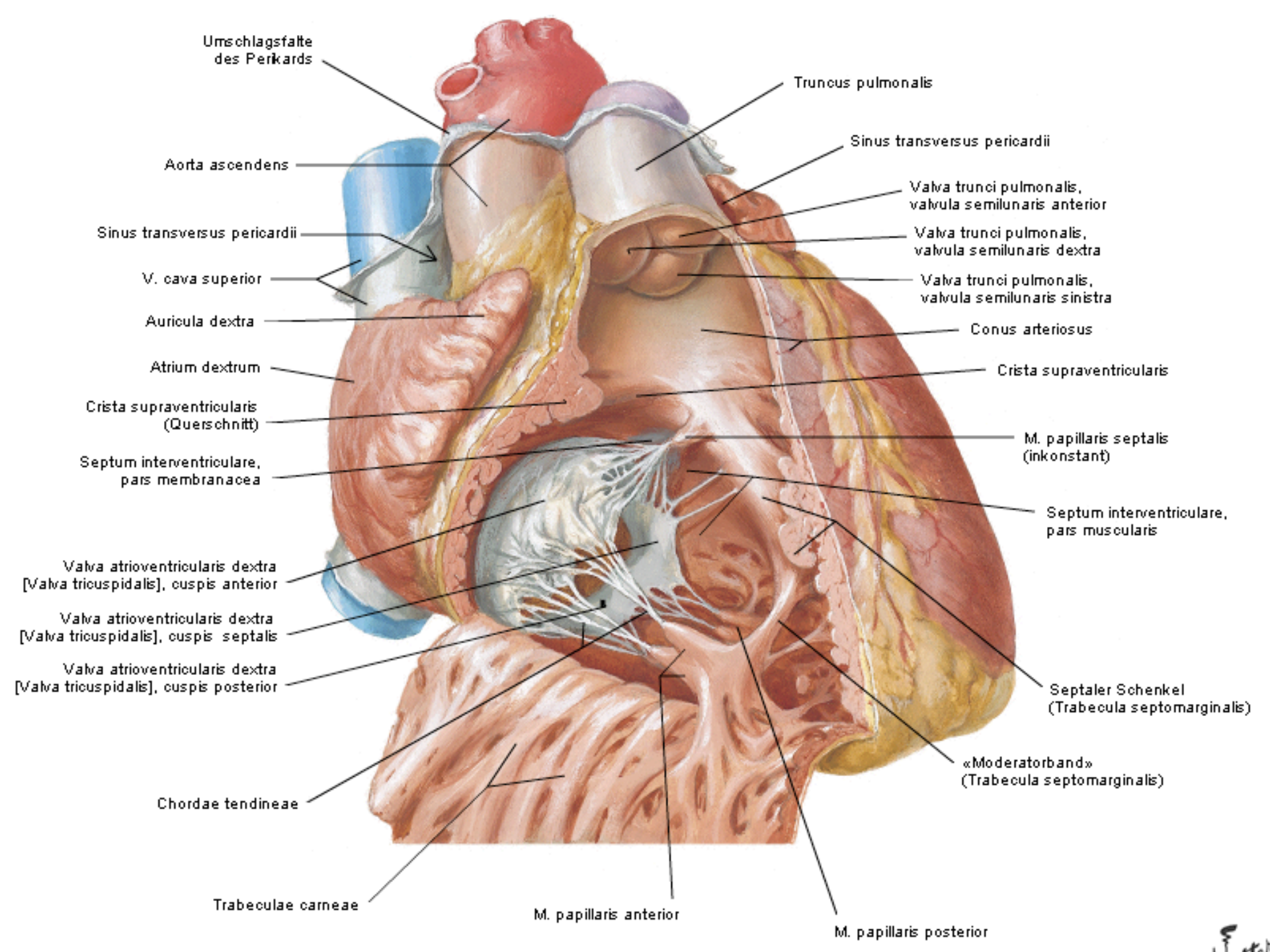


Mitralstenose und medikamentöse Therapie

- **Betablocker, Calciumantagonisten**
  ➔ Verlangsamung der HF
- **Diuretika, Nitrate**
  ➔ Vorlastsenkung
- **Antikoagulation**
  - VHF
  - St. n. Embolie
  - Thrombus /Spontankontrast im LA
  - LA-Dilatation (>60 ml/m2)

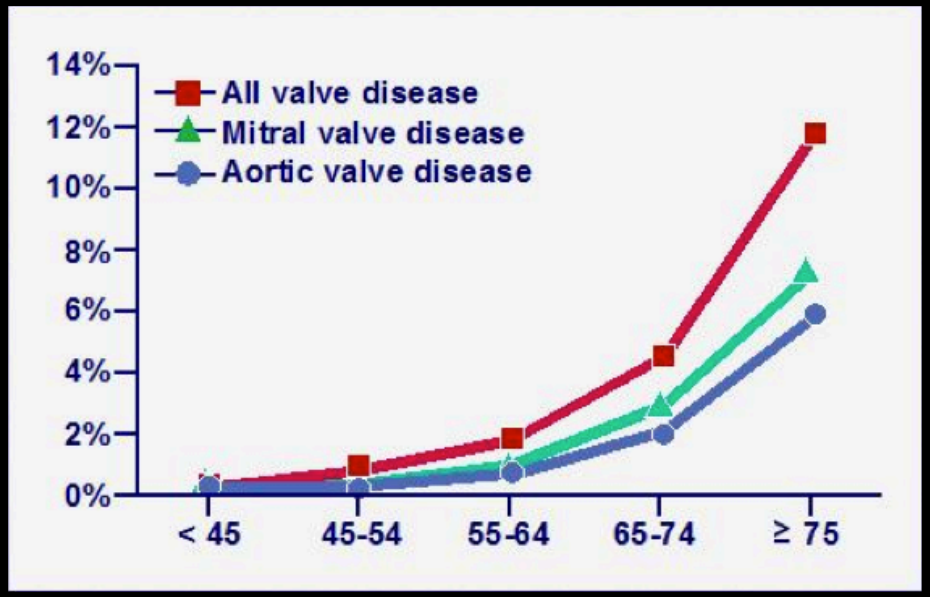

Valva trunci pulmonalis, valvula semilunaris anterior
Valva trunci pulmonalis, valvula semilunaris dextra
Conus arteriosus
Valva trunci pulmonalis, valvula semilunaris sinistra
Trigonum fibrosum sinistrum
A. coronaria dextra
Valva aortae, valvula semilunaris dextra
Septum interventriculare, pars membranacea (durchbrochene Linie)
Valva aortae, valvula semilunaris sinistra
Septum atrioventriculare
Valva aortae, valvula semilunaris posterior
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis anterior
Ramus circumflexus (A. coronaria sinistra)
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis septalis
Valva atrioventricularis sinistra [Valva mitralis], cuspis anterior
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis posterior
Valva atrioventricularis sinistra [Valva mitralis], cuspides commissurales
Anulus fibrosus dexter
Valva atrioventricularis sinistra [Valva mitralis], cuspis posterior
Trigonum fibrosum dextrum
Ramus nodi atrioventricularis (A. coronaria dextra)
Anulus fibrosus sinister
Ramus interventricularis posterior (A. coronaria dextra)


Valva trunci pulmonalis, valvula semilunaris dextra
Valva aortae, valvula semilunaris dextra
Valva trunci pulmonalis, valvula semilunaris anterior
Conus arteriosus
Valva trunci pulmonalis, valvula semilunaris sinistra
Septum interventriculare, pars membranacea (durchbrochene Linie)
Valva aortae, valvula semilunaris sinistra
A. coronaria dextra
Trigonum fibrosum sinistrum
Septum atrioventriculare
Valva aortae, valvula semilunaris posterior
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis anterior
Ramus circumflexus (A. coronaria sinistra)
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis septalis
Valva atrioventricularis sinistra [Valva mitralis], cuspis anterior
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis posterior
Valva atrioventricularis sinistra [Valva mitralis], cuspis posterior
Anulus fibrosus dexter
Anulus fibrosus sinister
Ramus nodi atrioventricularis (A. coronaria dextra)
Trigonum fibrosum dextrum
Ramus interventricularis posterior (A. coronaria dextra)

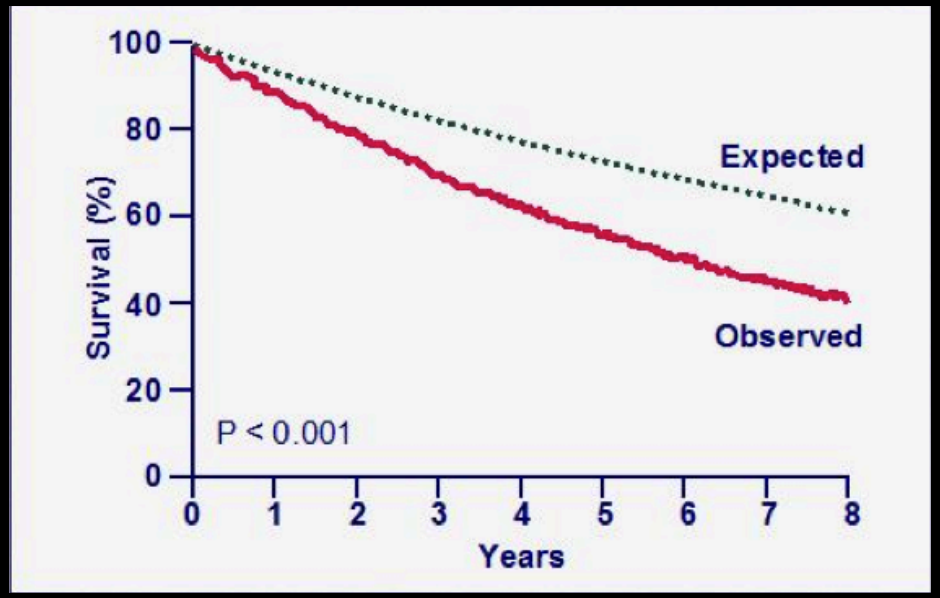

Umschlagsfalte des Perikards
Truncus pulmonalis
Sinus transversus pericardii
Aorta ascendens
Valva trunci pulmonalis, valvula semilunaris anterior
Sinus transversus pericardii
Valva trunci pulmonalis, valvula semilunaris dextra
V. cava superior
Valva trunci pulmonalis, valvula semilunaris sinistra
Auricula dextra
Conus arteriosus
Atrium dextrum
Crista supraventricularis
Crista supraventricularis (Querschnitt)
M. papillaris septalis (inkonstant)
Septum interventriculare, pars membranacea
Septum interventriculare, pars muscularis
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis anterior
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis septalis
Valva atrioventricularis dextra [Valva tricuspidalis], cuspis posterior
Septaler Schenkel (Trabecula septomarginalis)
«Moderatorband» (Trabecula septomarginalis)
Chordae tendineae
Trabeculae carneae
M. papillaris anterior
M. papillaris posterior

Klappenerkrankungen

Prävalenz



Prognose



Rechtsseitige Klappenerkrankungen:
0.8% aller nativen Klappenerkrankungen

Nkomo et al. Lancet 2006;368:1005-1011

Tricuspidalklappenerkrankungen

Tricuspidalinsuffizienz

Tricuspidalstenose

Ursachen der Tricuspidalinsuffizienz

Ursachen:

Kongenitale Herzerkrankungen

Sekundäre Tricuspidalinsuffizienz
Pulmonale Hypertonie
Endokarditis
Rheumatisches Fieber
Medikamentöse Valvulopathie
Carcinoid Syndrom

Iung et al. Curr Probl Cardiol 2007;32:609-661

Ursachen der Tricuspidalinsuffizienz

1. Primary tricuspid regurgitation

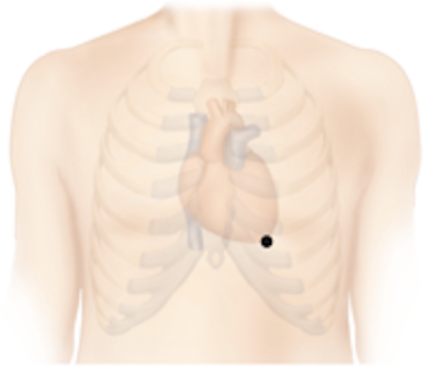
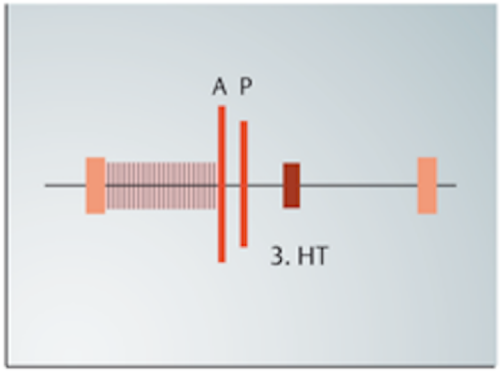
(A) Congenital	Tricuspid valve prolapse
	Ebstein's anomaly
	Tricuspid valve dysplasia (grades I–III)
	Abnormal number of leaflets
	Atrioventricular channel
	Cleft of a tricuspid leaflet
	Left sided tricuspid valve in congenitally corrected transposition of the great arteries
	Pulmonary atresia with intact ventricular septum
	Short tendinous chords
	Aberrant tendinous chords with tethering of the tricuspid leaflets
(B) Acquired	Endocarditis
	Rheumatic valve disease
	Right ventricular infarction
	Heart transplantation
	Carcinoid (or other tumours)
	Trauma
	Rheumatic arthritis
	Radiation therapy
	Papillary muscle dysfunction
	Hypereosinophilic syndrome
	Thyrotoxicosis
	Anorectic drugs

2. Secondary tricuspid regurgitation
3. Physiological tricuspid regurgitation

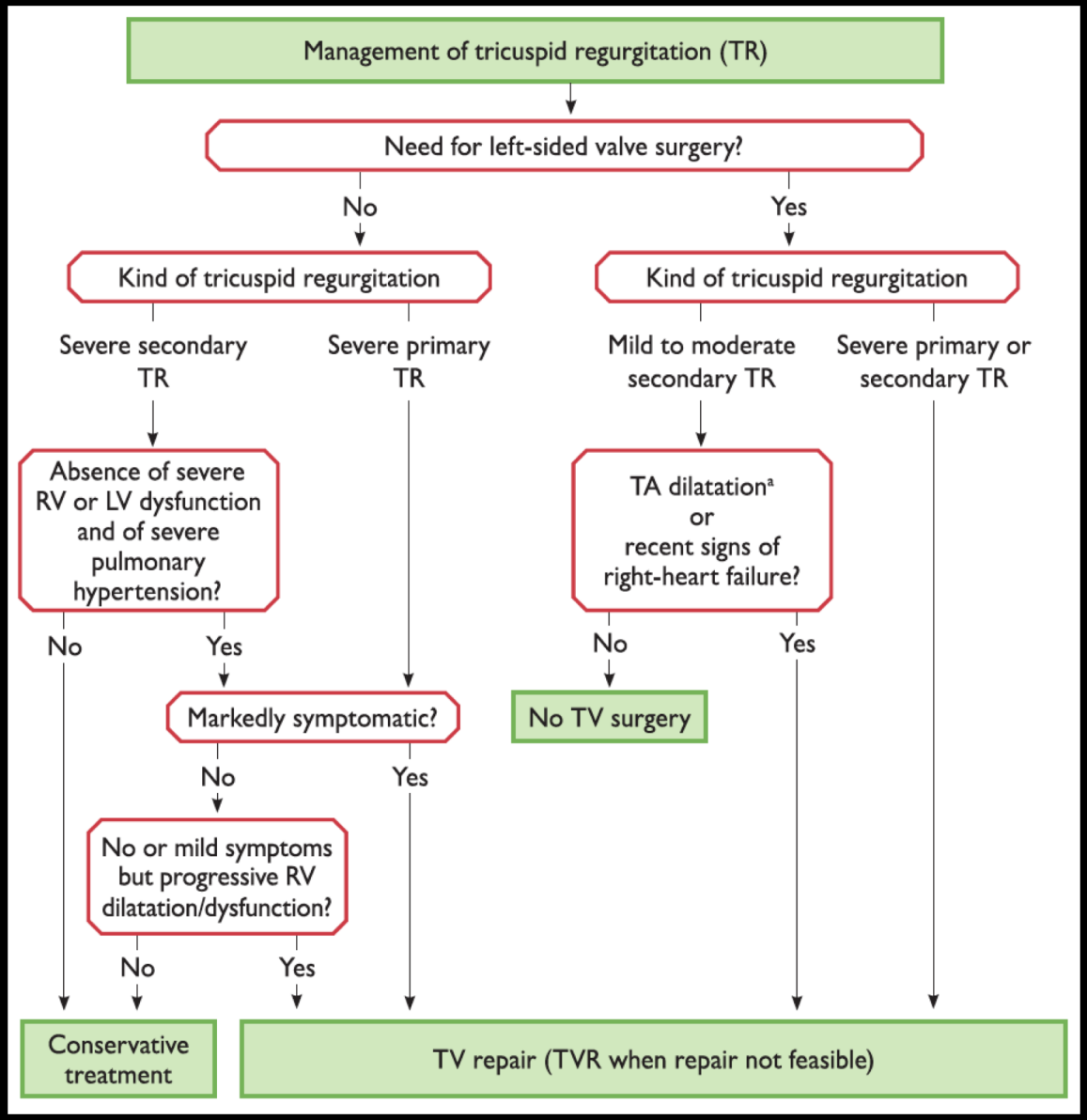
Kobza, R et al, Heart 90:319-323, 2004.

Tricuspidalinsuffizienz

Untersuchung von Patienten mit TI

Auskultationsort	Schematische phonokardiografische Darstellung	Key point
 p.m.: Herzspitze		Herztöne: 1. HT leise oder fehlend, 2. HT breit gespalten Extratöne: 3. HT Herzgeräusche: hochfrequentes, holosystolisches, bandförmiges Geräusch

Therapie der schweren Tricuspidalinsuffizienz



Baumgartner H. et al. Eur Heart J 2017;38:2739-2786

Ursachen der Tricuspidalstenose

Ursachen:

Kongenitale Herzerkrankungen

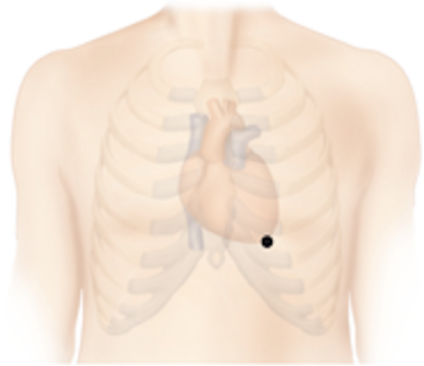
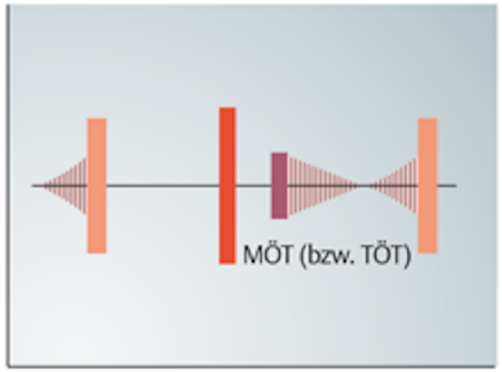
Rheumatisches Fieber
Medikamentöse Valvulopathie
Carcinoid Syndrom

Häufig kombiniert mit Tricuspidalinsuffizienz

Iung et al. Curr Probl Cardiol 2007;32:609-661

Tricuspidalstenose

Untersuchung von Patienten mit TS

Auskultationsort	Schematische phonokardiografische Darstellung	Key point
 p.m.: Herzspitze		Herztöne: paukender 1. HT und MÖT bei MS, evtl. TÖT bei TS Extratöne: keine Herzgeräusche: tieffrequentes, diastolisches Decrescendo-geräusch, evtl. Präsystolikum

Tricuspidalstenose

Patienten mit Tricuspidalstenose sollten an einem Zentrumsspital behandelt werden

Echokardiographie bei Klappenerkrankungen

Frequenz der Echocardiographien in asymptomatischen Patienten with Klappenerkrankungen und normaler linksventrikulärer Function

Stage	Valve Lesion			
Stage	Aortic Stenosis*	Aortic Regurgitation	Mitral Stenosis	Mitral Regurgitation
Progressive (stage B)	Every 3–5 y (mild severity V_{max} 2.0–2.9 m/s) Every 1–2 y (moderate severity V_{max} 3.0–3.9 m/s)	Every 3–5 y (mild severity) Every 1–2 y (moderate severity)	Every 3–5 y (MVA >1.5 cm^2)	Every 3–5 y (mild severity) Every 1–2 y (moderate severity)
Severe (stage C)	Every 6–12 mo (V_{max} ≥4 m/s)	Every 6–12 mo Dilating LV: more frequently	Every 1–2 y (MVA 1.0–1.5 cm^2) Once every year (MVA <1.0 cm^2)	Every 6–12 mo Dilating LV: more frequently

Patients with mixed valve disease may require serial evaluations at intervals earlier than recommended for single valve lesions.
*With normal stroke volume.
LV indicates left ventricle; MVA, mitral valve area; VHD, valvular heart disease; and V_{max}, maximum velocity.

Nishimura et al. J Am Coll Cardiol 2014;63:e57-185