Mitralstenose

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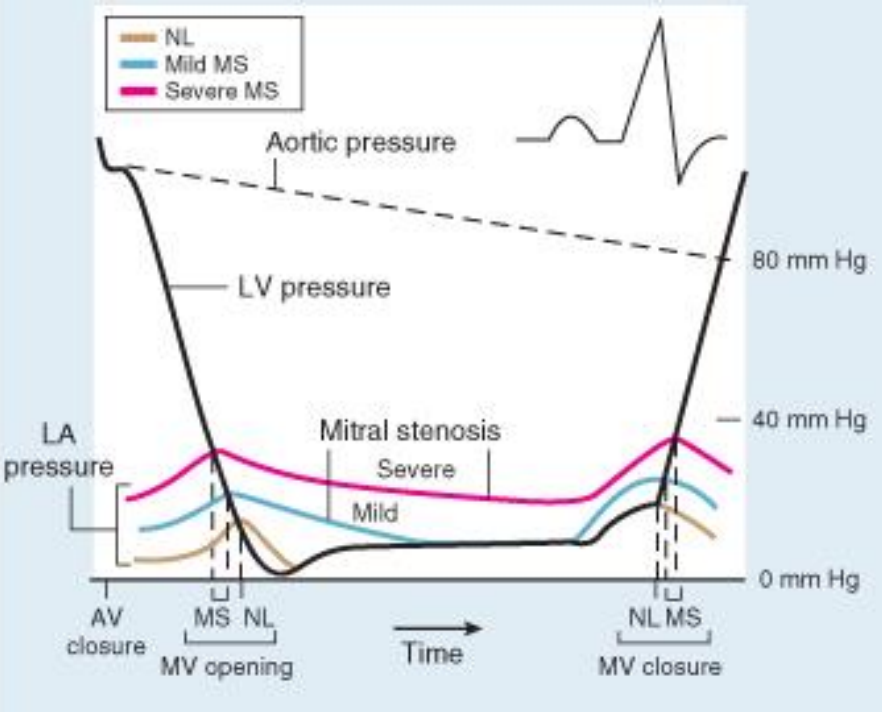
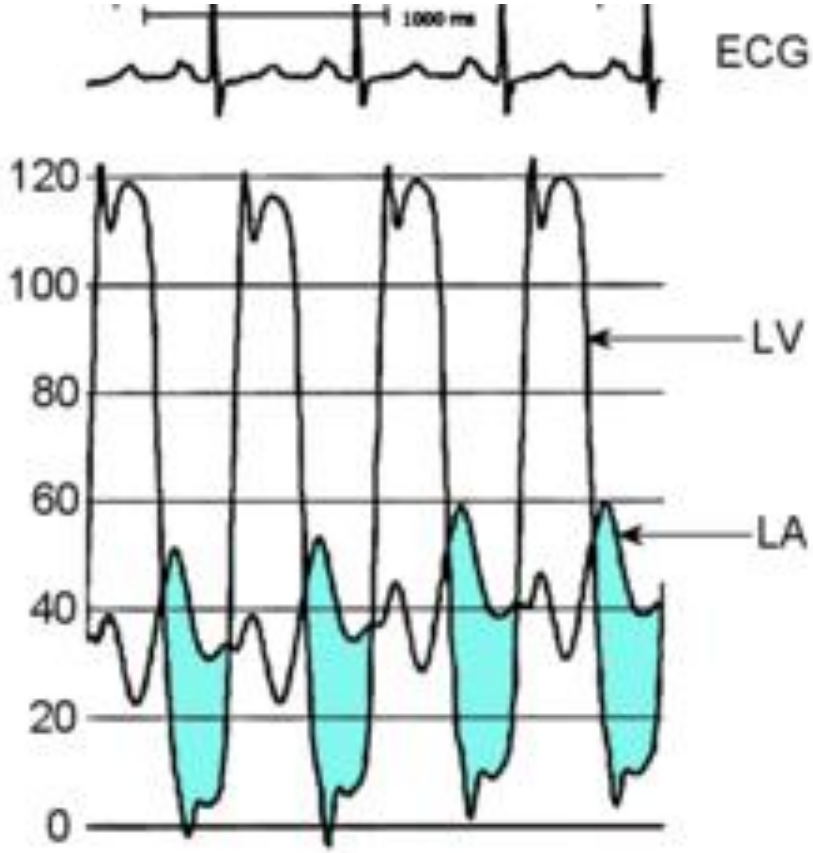
Disposisjon

- ✓ Litt om bakgrunn
- ✓ Litt fysiologi
- ✓ Ulike ekkokardiografiske metoder
  - ➢ Praktiske målinger
  - ➢ Styrker / svakheter
- ✓ Litt om behandling

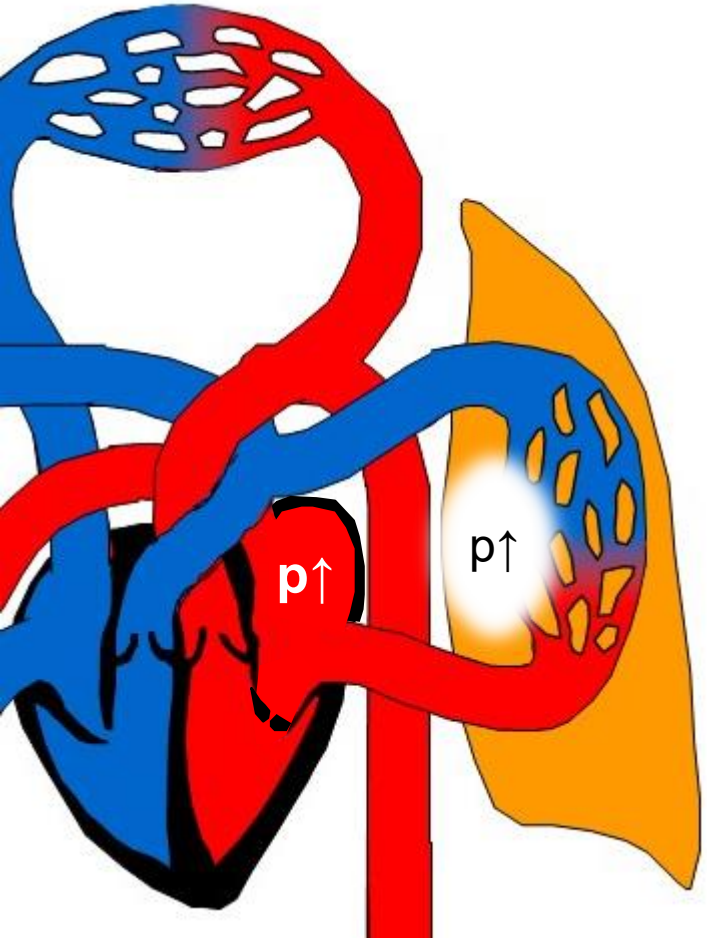
Mitralstenose - Patofysiologi

Trykk↑ i venstre atrium





Mitralstenose – Patofysiologi/klinikk



Trykkstigning i ve atrium

Økt trykk i lungekapillærer

- ❑ Stuvning
- ❑ Dyspne

Symptomer

- ❑ Funksjonsdyspne, kapasitet↓ (hemoptyse)

Komplikasjoner

- ❑ Slag/emboli, AFIB, hjertesvikt

Mitralstenose - Etiologi

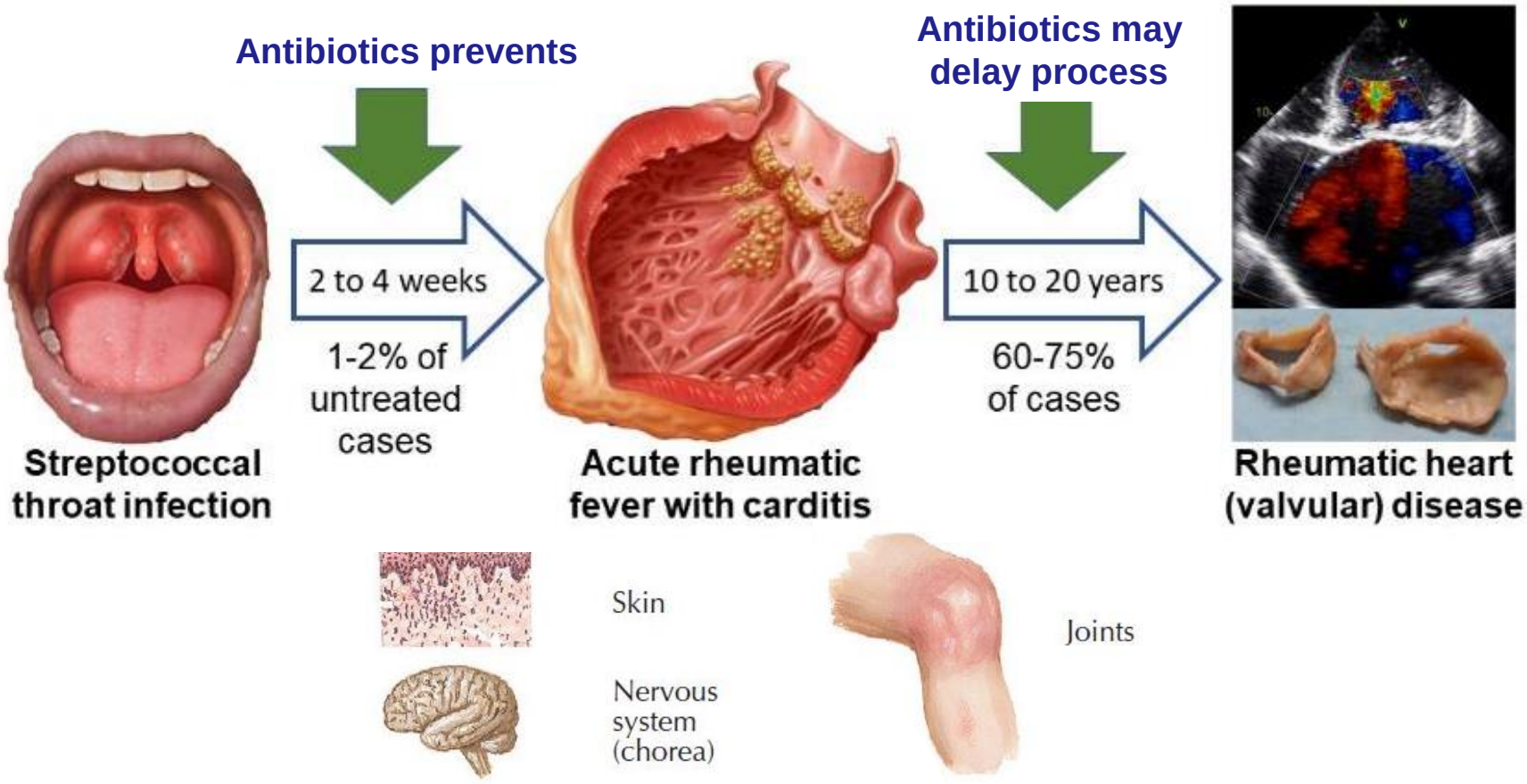
Revmatisk

- Nå kun sporadiske tilfeller i Norge
- Importsykdom (sør for Sahara, Asia)

Kongenitt

Andre (mitralringforkalkning, (tumor/masser)

Rheumatic heart disease



Revmatisk hjertesykdom

I-land	▪ Lav prevalens ▪ Drastisk reduksjon siden 60-tallet
LICs / sub-Saharan	▪ Endemisk område

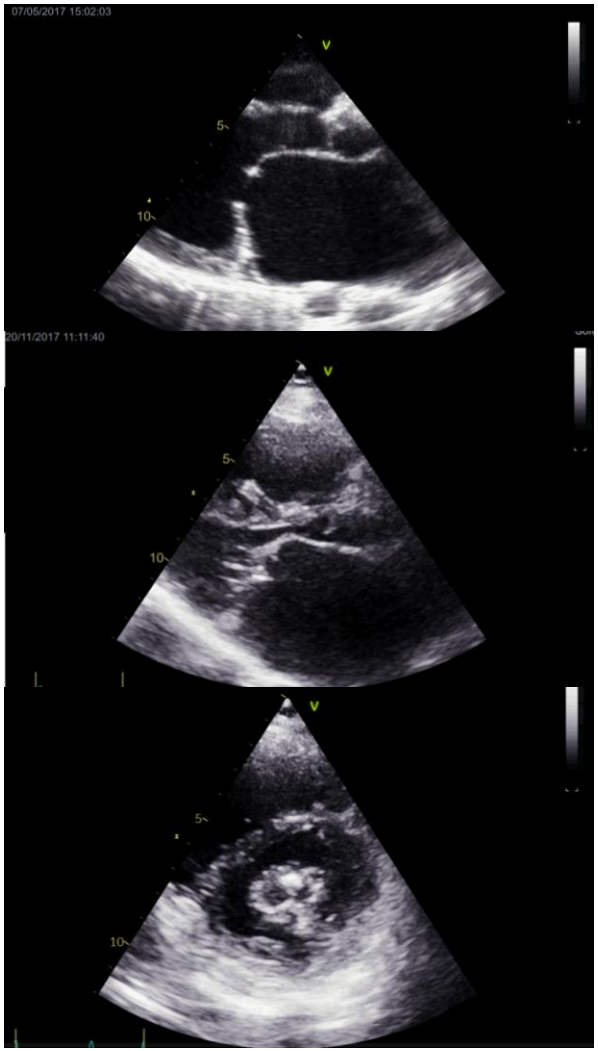
<u>WHO-estimat (2004)</u>

- Prevalens 15,6 millioner
- Årlig mortalitet nær 500.000
- Kan være vesentlige underestimater
  - UL-screening rapporterer 10X klinikk
  - Enkelte estimerer prevalens ca 70 millioner

WHO Technical Report Series 923, 2004.
Global Burden Disease. Lancet 2015; 385:117-71.
Marijon et al. NEJM 2007; 357:470-6.
P. Zilla. ESC2017.

Mitralstenose - ekkokarakteristika

- ✓ Fortykkede/kalsifiserte mitralseil
- ✓ “Flatt” segment i M-mode
- ✓ Hockeykølle-preg (fremre mitralseil)
- ✓ Immobilt bakre mitralseil
- ✓ Fiskemunn-preg (kortakse)
- ✓ Dilatert venstre atrium



Mitralstenose - Behandling

Ballongdilatasjon

- Avhengig av evt lekkasje, forkalkning, trombe, ...
- Tidligere (delvis) styrt av Wilkins' score

Klaffekirurgi

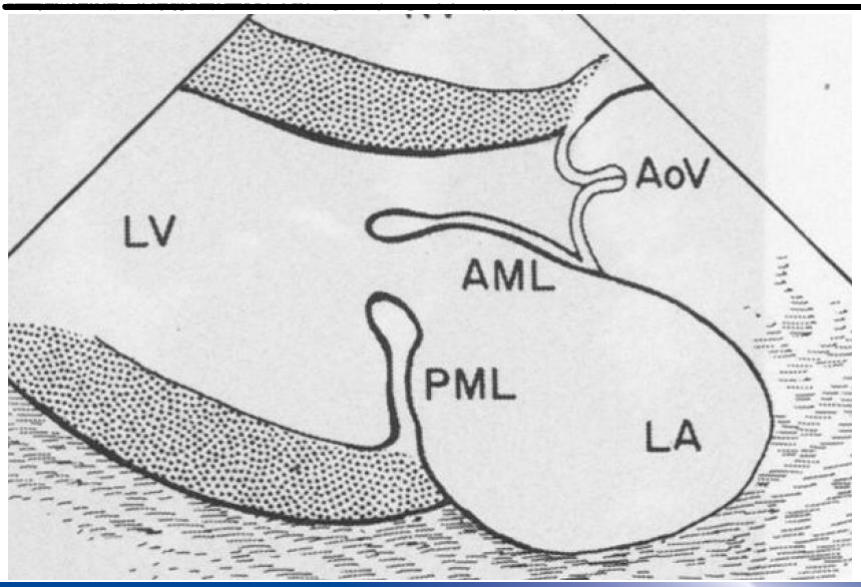
Medikamentell behandling

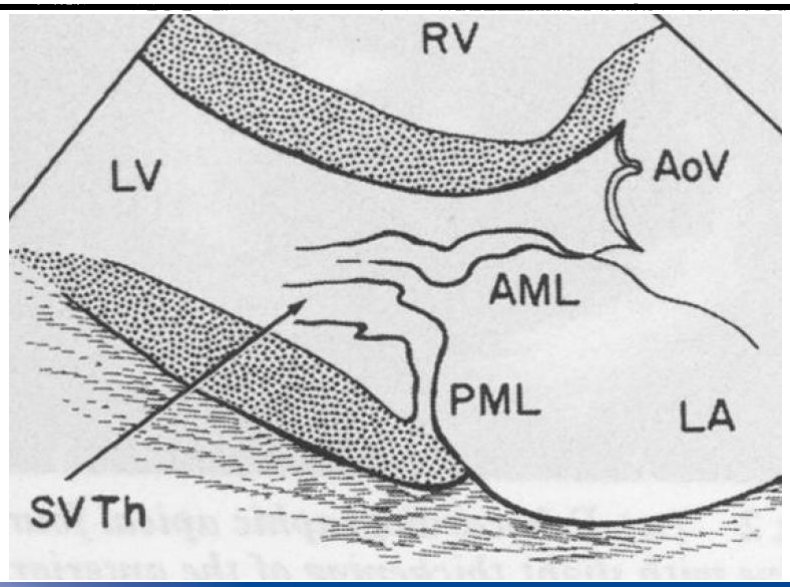
- Frekvensregulering
- Hjertesviktbehandling
- Antikoagulasjon

Br Heart J 1988;60:299–308
GERARD T WILKINS

Wilkins' score

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

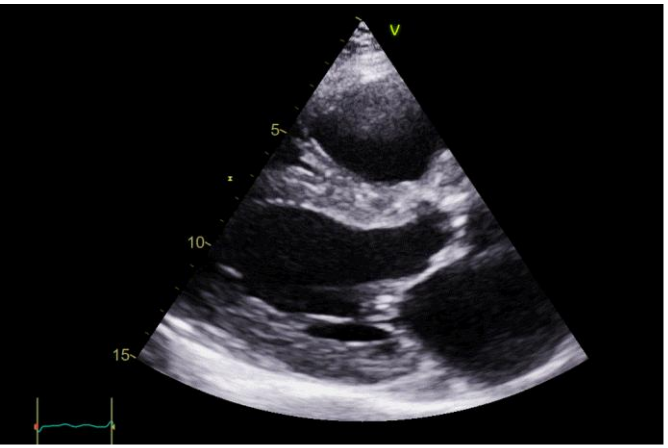


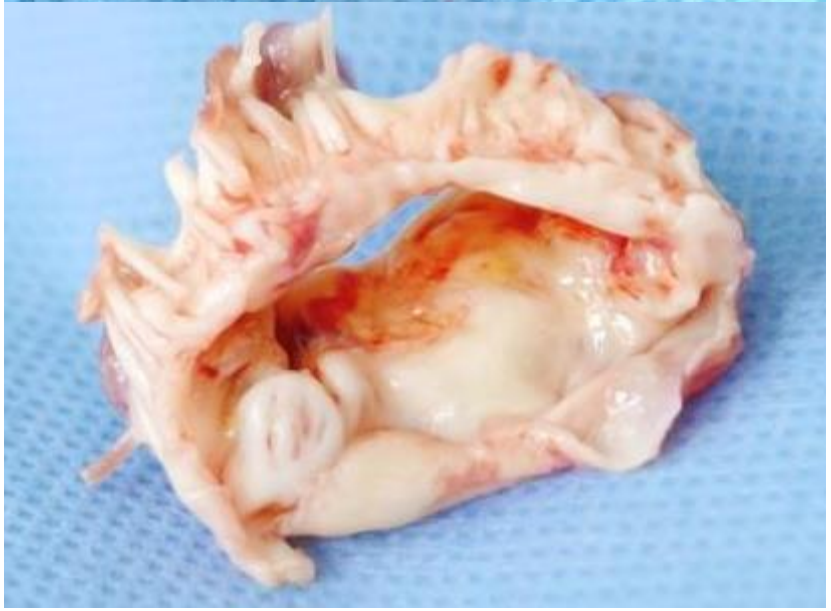


Vurdering ved mitralstenose

- Klaffeseilenes morfologi
  - ✓ Preg
  - ✓ Tykkelse
  - ✓ Kalsifisering
- Klaffeseilenes bevegelse
- Subvalvulære forandringer
- Arealberegning - gradienter
- Andre forhold
  - ✓ Venstre atrium (inkl tromber)
  - ✓ Annen klaffepatologi
  - ✓ Lungearterietrykk

Vurdering ved mitralstenose





Vurdering ved mitralstenose

- Klaffeseilenes morfologi
  - ✓ Preg
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- **Arealberegning - gradienter**
- Andre forhold
  - ✓ Venstre atrium (inkl tromber)
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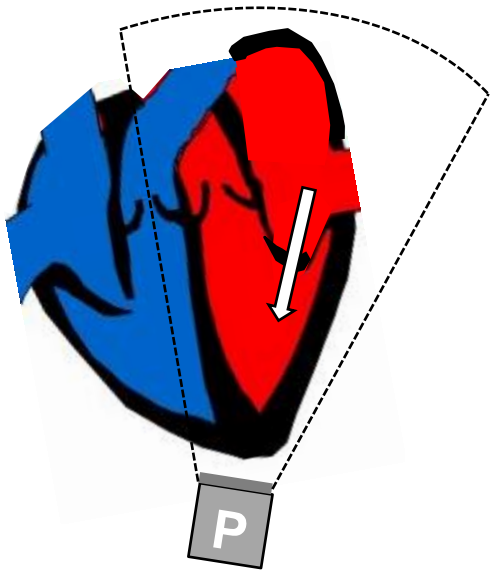
  - ✓ Lungearterietrykk

Klaffeareal - trykkhalveringstid

$$MVA = MV_{PHT} / 220$$

↑ **AI og compliance↓ øker LVEDP**
(PHT↓ ⇨ MVA overestimeres)



Forsiktighet ved:

- ❑ Aortalekkasje
- ❑ Redusert compliance
- ❑ Mitrallekkasje*

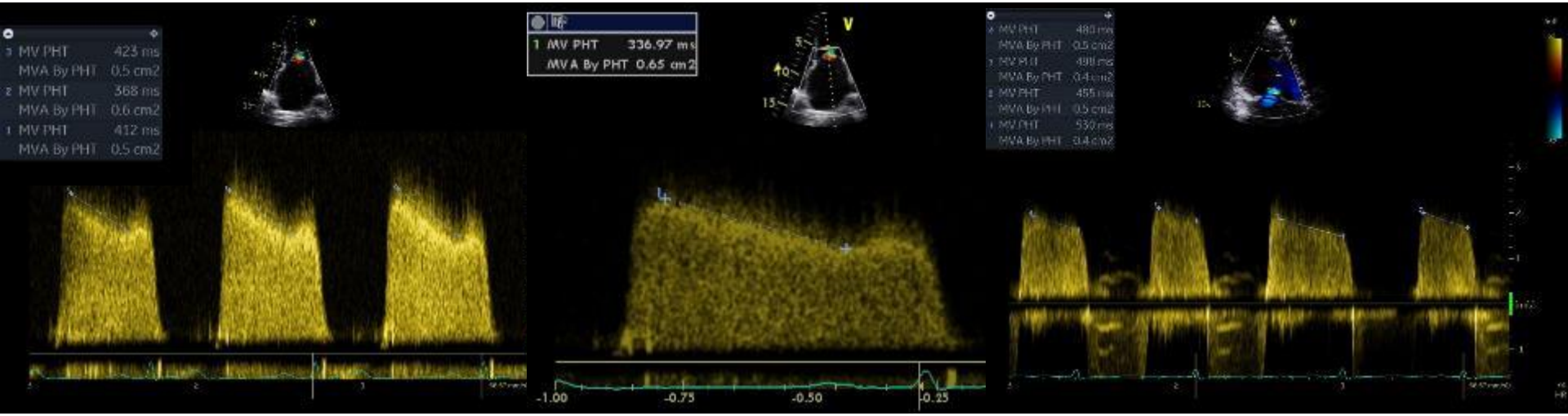
NB!

- ✓ Bruk mål med adekvat diastole (AF) (takykardi ⇨overestimert MVA)
- ✓ Midle 5-10 slag

- ✓ Forsinket relax (E-bølge oftest <1 m/s)

Klaffeareal - trykkhalveringstid

$$MVA = MV_{PHT} / 220$$



PHT 368-425
MVA 0,5-0,6 cm^2

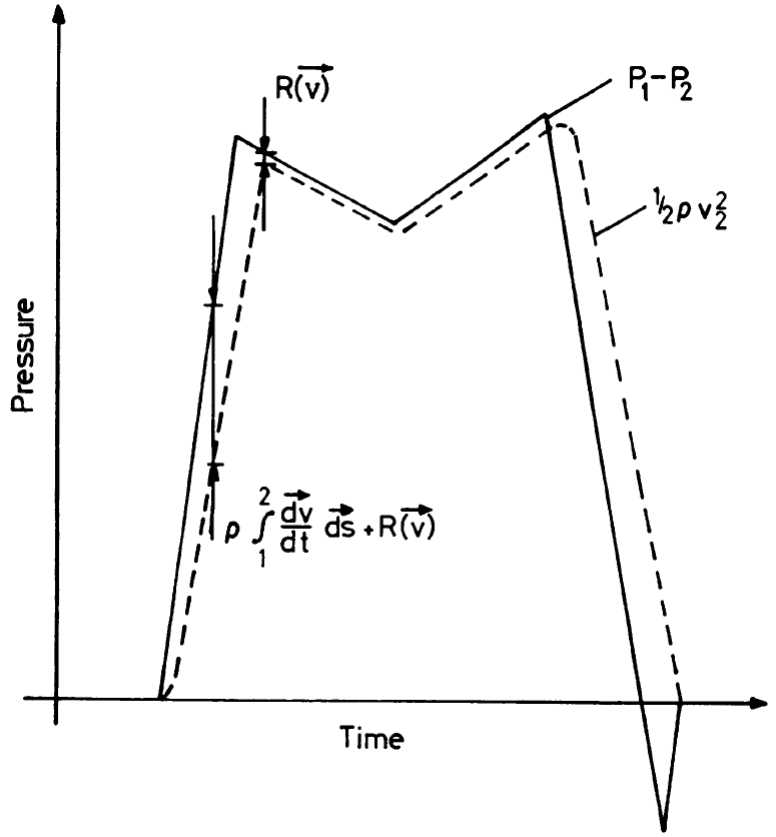
PHT 337
MVA 0,65 cm^2

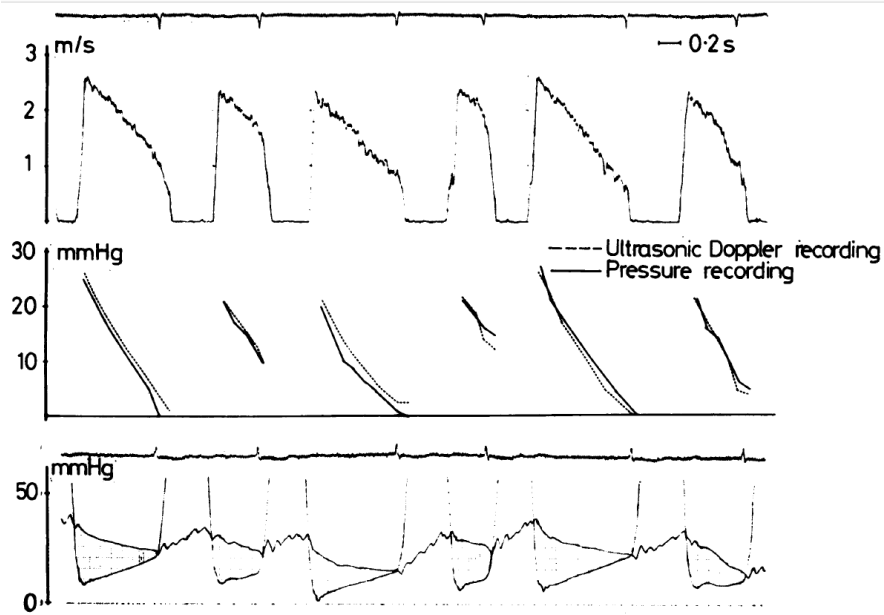
PHT 455-530
MVA 0,4-0,5 cm^2

Alignement (unngå vinkelfeil) AFIB Klaffelekkasje

Mitralstenose – trykkfall og areal

$$MVA = MV_{PHT} / 220$$





Circulation 1979;60;1096-1104

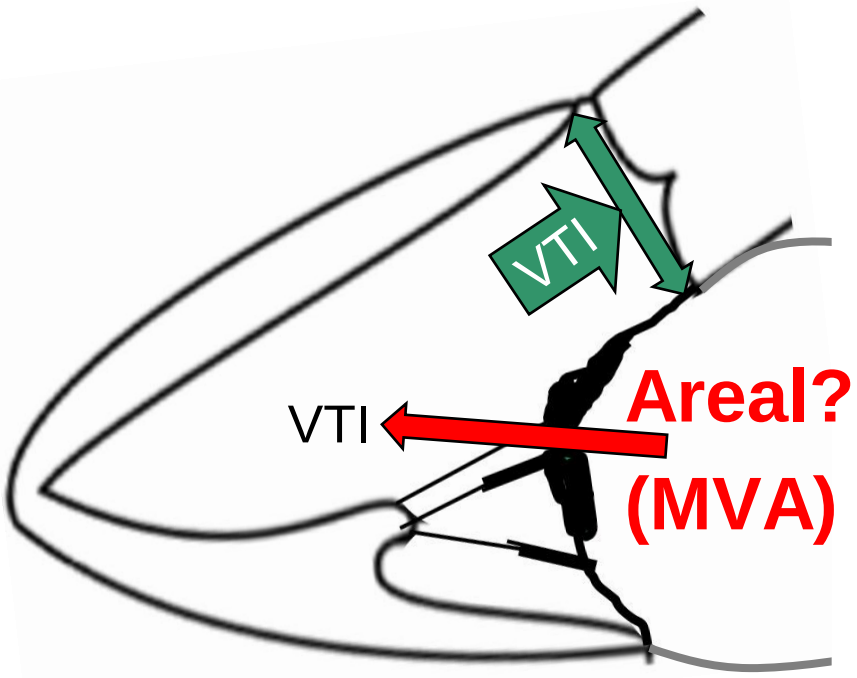
L. HATLE *British Heart Journal*, 1978, **40**, 131-140

Klaffeareal - kontinuitetslikningen

AI øker VTI

$$MVA = \frac{LVOT_{VTI} \times Areal_{LVOT}}{MV_{VTI}}$$

MI øker VTI



Forsiktighet ved

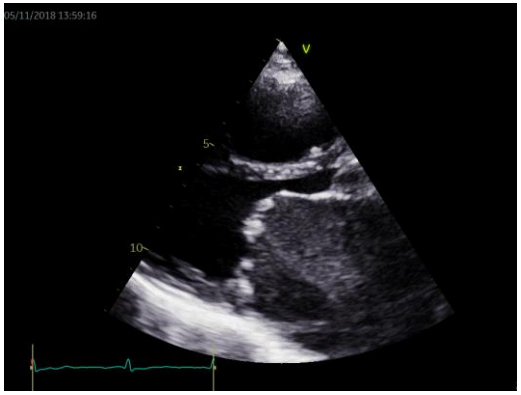
- Aortalekkasje
- Mitrallekkasje

NB! AFIB

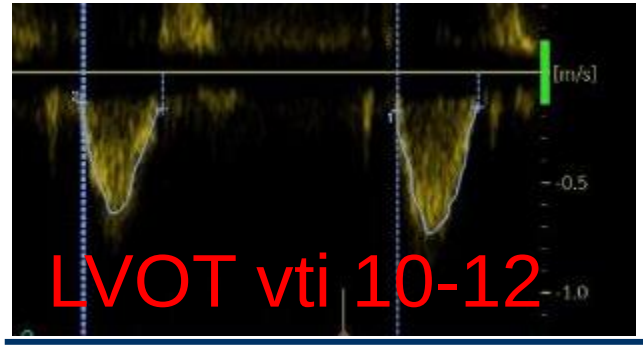
- slag-slag variasjon

Klaffeareal - kontinuitetslikningen

$$MVA = \frac{LVOT_{VTI} \times Areal_{LVOT}}{MV_{VTI}}$$

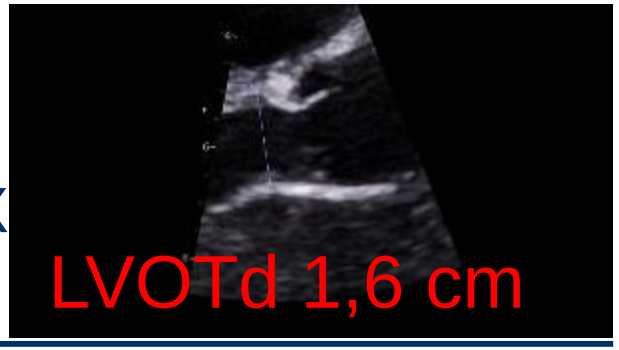


MVA 0,3-0,4 cm^2 =

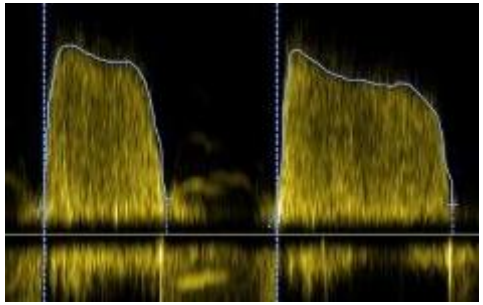


LVOT vti 10-12

X



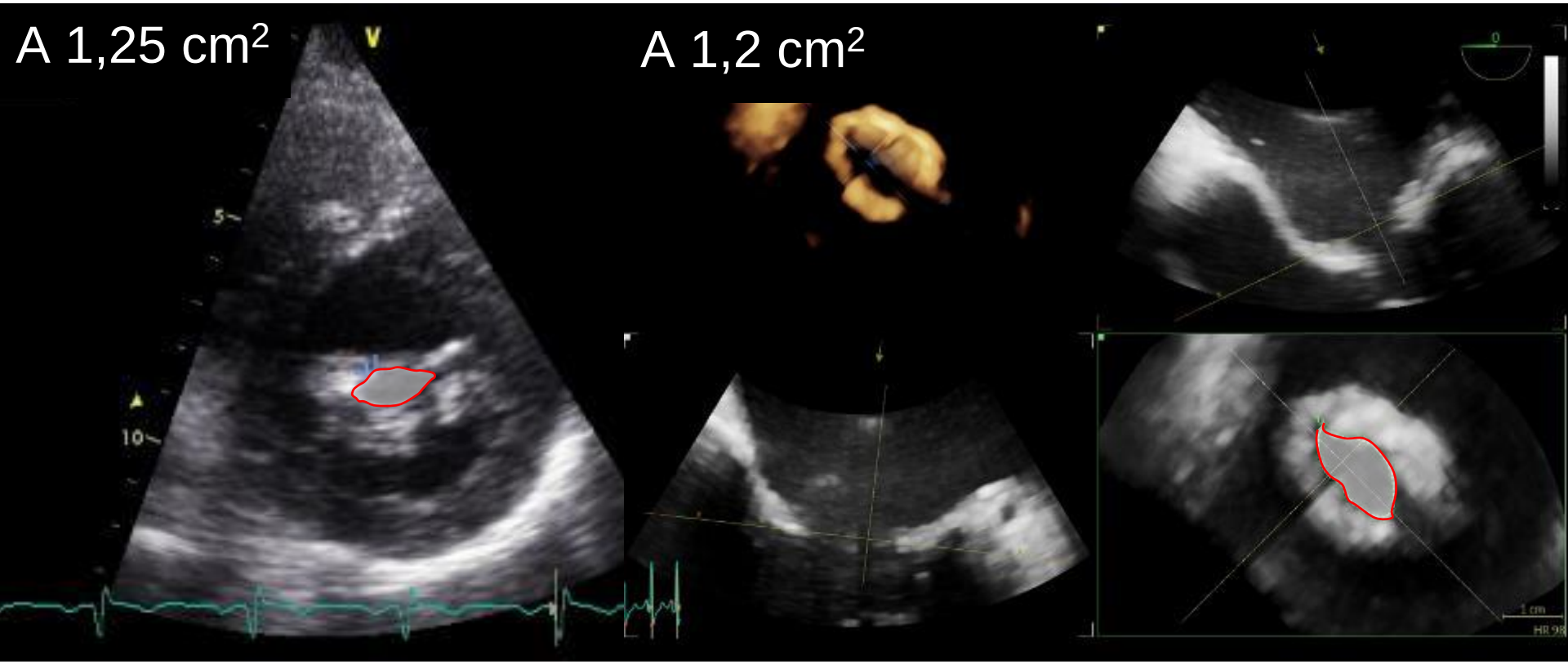
LVOTd 1,6 cm



MV vti 65-80

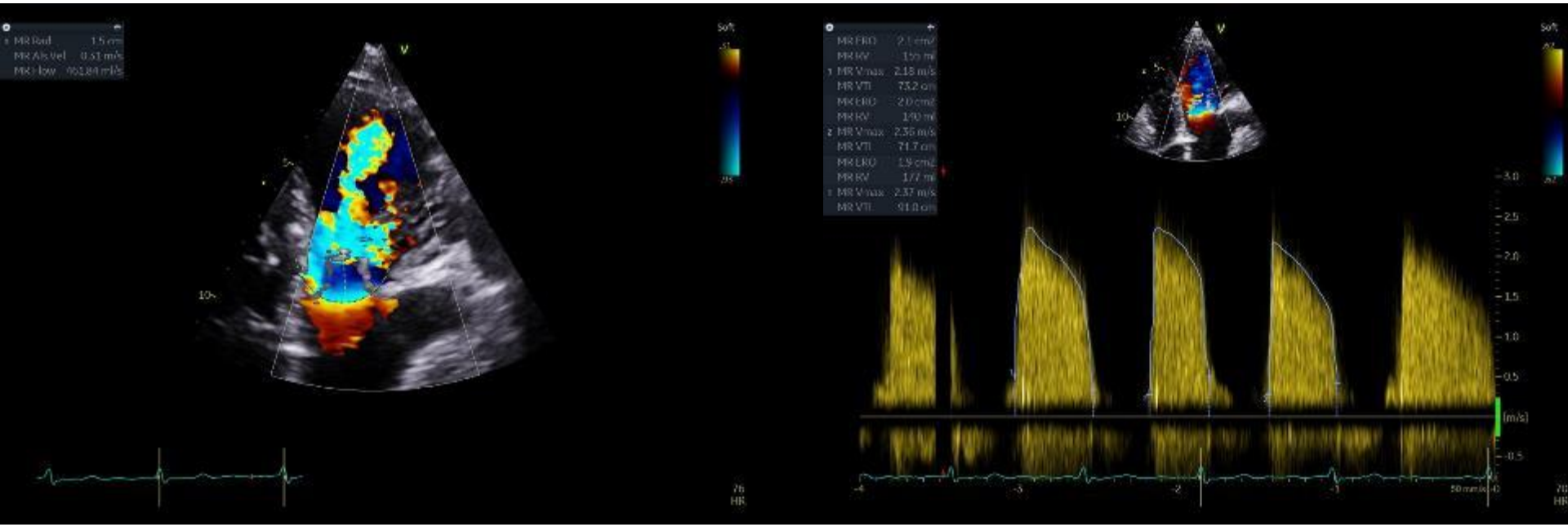
Alignement (unngå vinkelfeil) LVOTd

Klaffeareal - planimetri



NB! Gain-innstilling og korrekt lokalisering

Klaffeareal - PISA



- PISA	cm^2	$MVA = \pi(r^2)(V_{aliasing}) / peak\ V_{Mitral} \cdot \alpha/180°$

Echocardiographic Assessment of Valve Stenosis: EAE/ASE Recommendations for Clinical Practice

Gradering av mitralstenose

Areal	Tradisjonelt	AHA/ACC
>1,5 - 2 cm^2	Mild	Progressive
>1 – 1,5 cm^2	Moderat	Severe
≤1 cm^2	Alvorlig	Very severe

Table 9 Recommendations for classification of mitral stenosis

	Mild	Moderate	Severe
Mean gradient (mmHg)[a]	<5	5–10	>10
Pulmonary artery pressure (mmHg)	<30	30–50	>50

Vurdere intervensjon når areal <1,5 cm^2

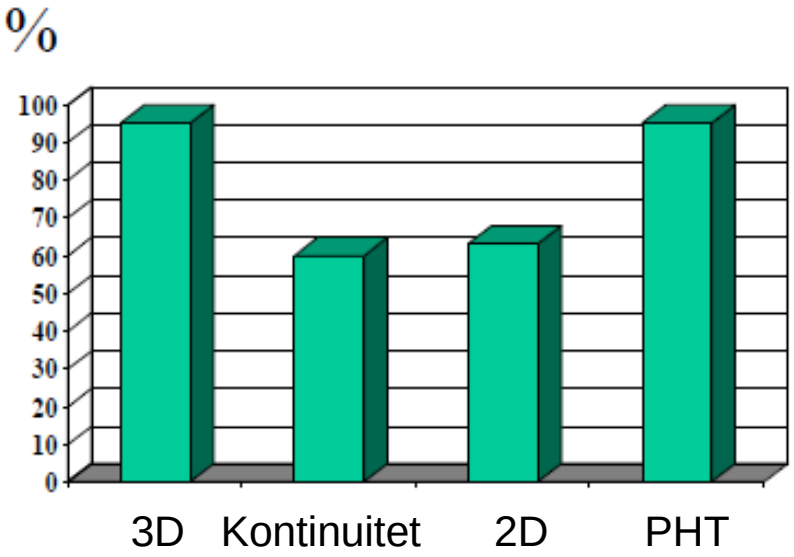
middelgrad >10 mm Hg

Gradienter

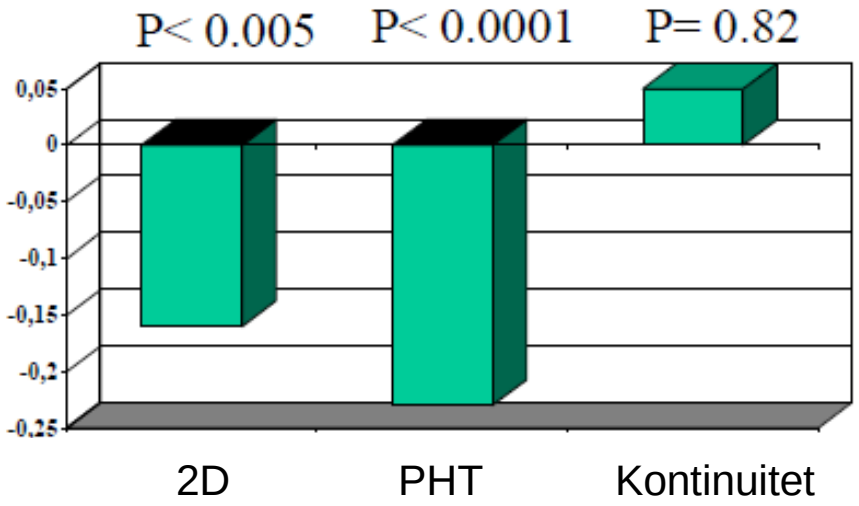
Areal	Tradisjonelt	AHA/ACC
>1,5 - 2 cm^2	Mild	Progressive
>1 – 1,5 cm^2	Moderat	Severe
≤1 cm^2	Alvorlig	Very severe

Vurdere intervensjon når areal <1,5 cm^2

Mitralstenose – 3D versus andre



Gjennomførbarhet



Forskjell (snitt) vs andre (cm^2)

MVA – transøsofageal ekko

Utelukke trombe (ballongdilatasjon)

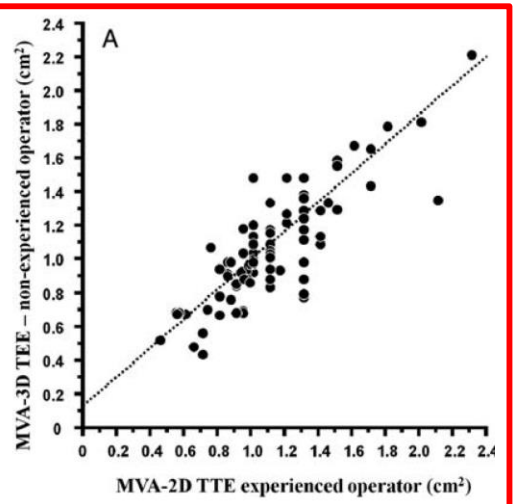
Preoperativ vurdering

Guide intervensjon

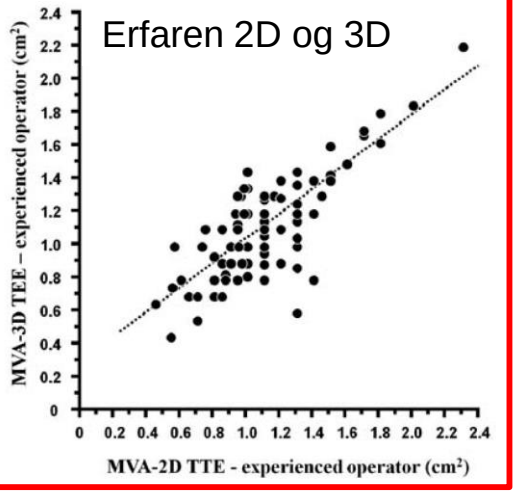
I tilfeller med manglende avklaring transthorakalt for diagnostisk kartlegging

MVA – TEE 3D (brukers erfaring)

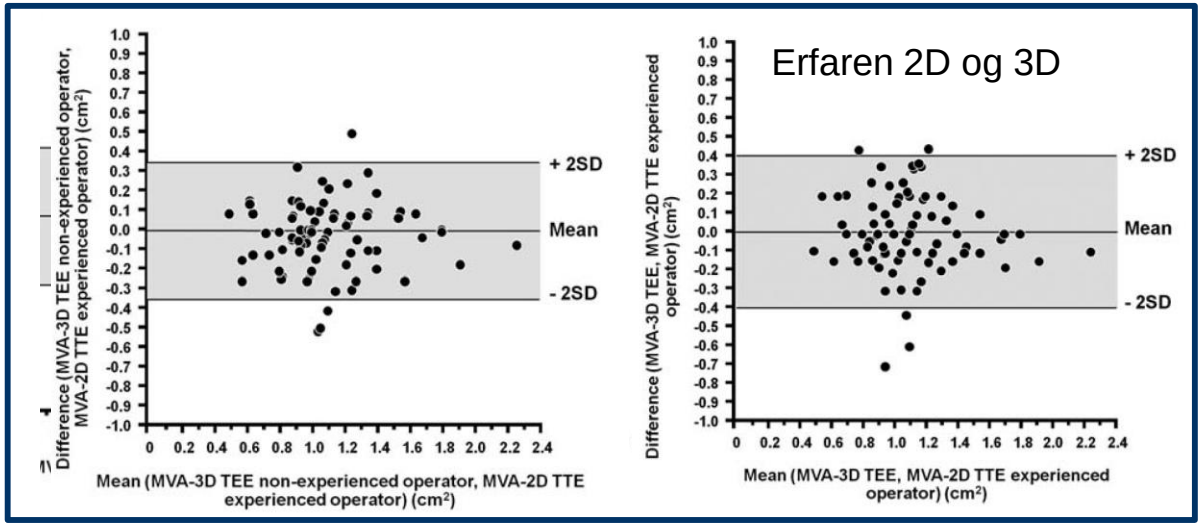
Uerfaren (3D) vs erfaren (2D)



Erfaren 2D og 3D



Uerfaren (3D) vs erfaren (2D)



Planimetri ved 3D transøsofagus akseptabel for erfarne og mindre erfarne

Ekko anbefalinger

- MVA – Planimetri (2D)
- MVA - Trykkhalveringstid
- Gradienter

Level 1: Hos alle

EAE/ASE anbefaling

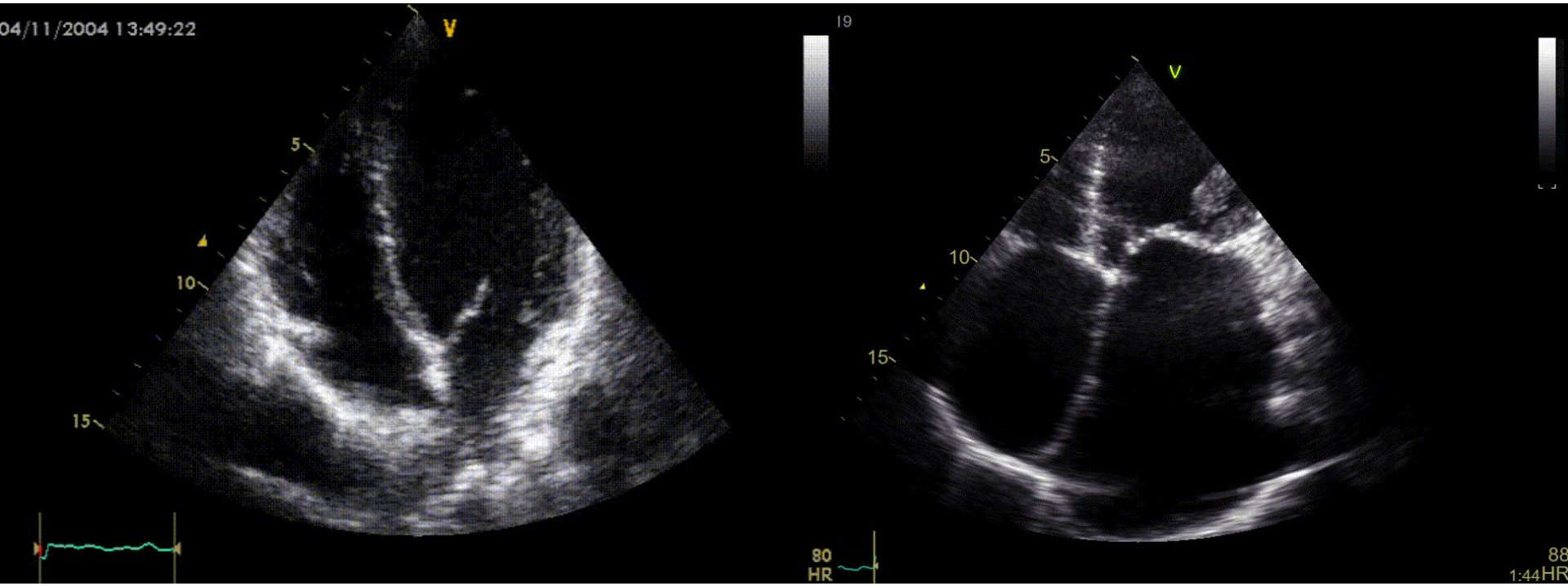
- MVA - Kontinuitetsligning
- MVA - PISA

Level 2: Hos utvalgte

Vurdering ved mitralstenose

- ❑ Klaffeseilenes morfologi
  - ✓ Preg
  - ✓ Tykkelse
  - ✓ Kalsifisering
- ❑ Klaffeseilenes bevegelse
- ❑ Subvalvulære forandringer
- ❑ Arealberegning - gradienter
- ❑ **Andre forhold**
  - ✓ Venstre atrium (inkl tromber)
  - ✓ Annen klaffepatologi
  - ✓ Lungearterietrykk

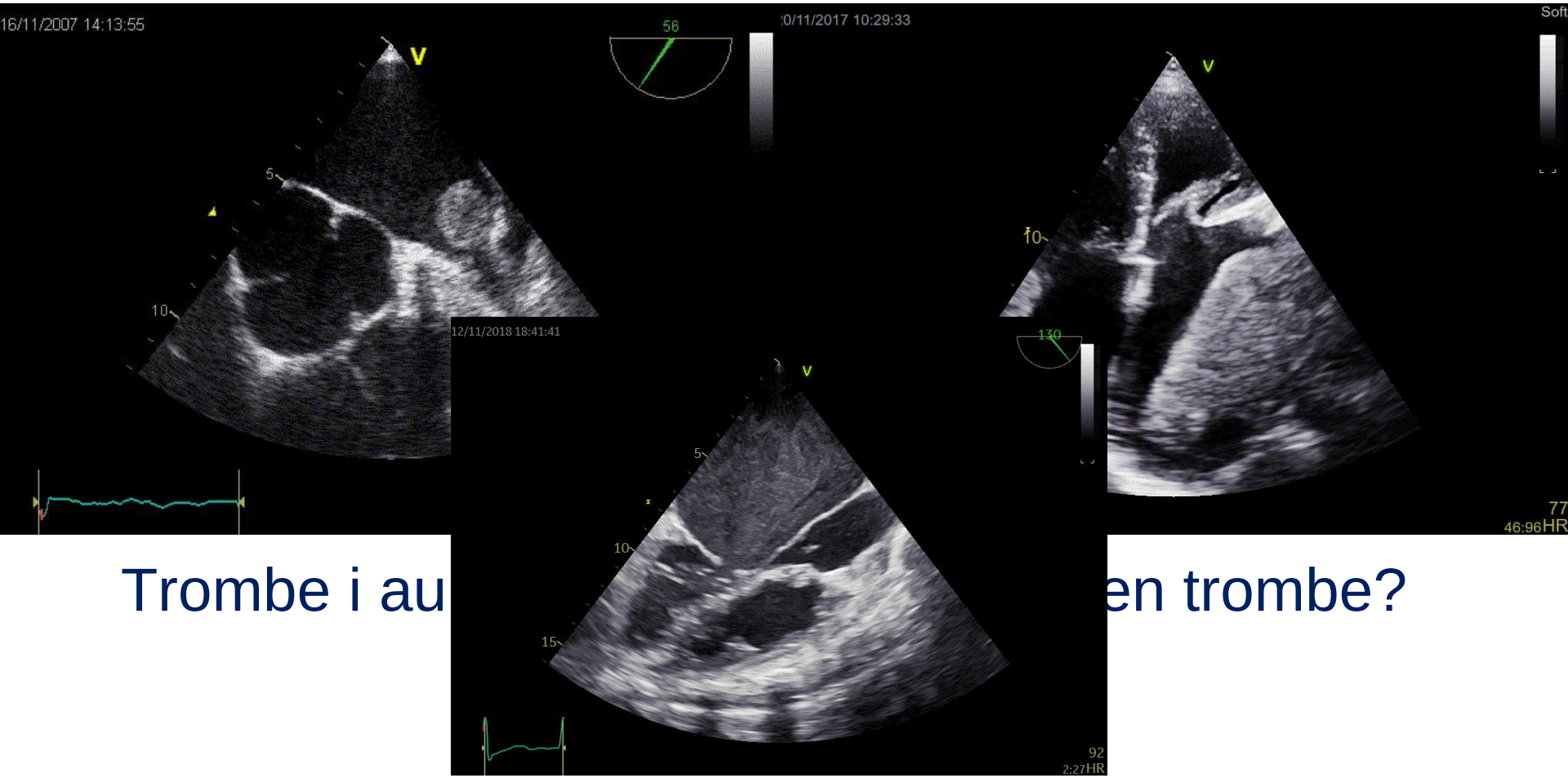
Mitralstenose – venstre atrium



Mål venstre atriums volum

Indekser for kroppsstørrelse

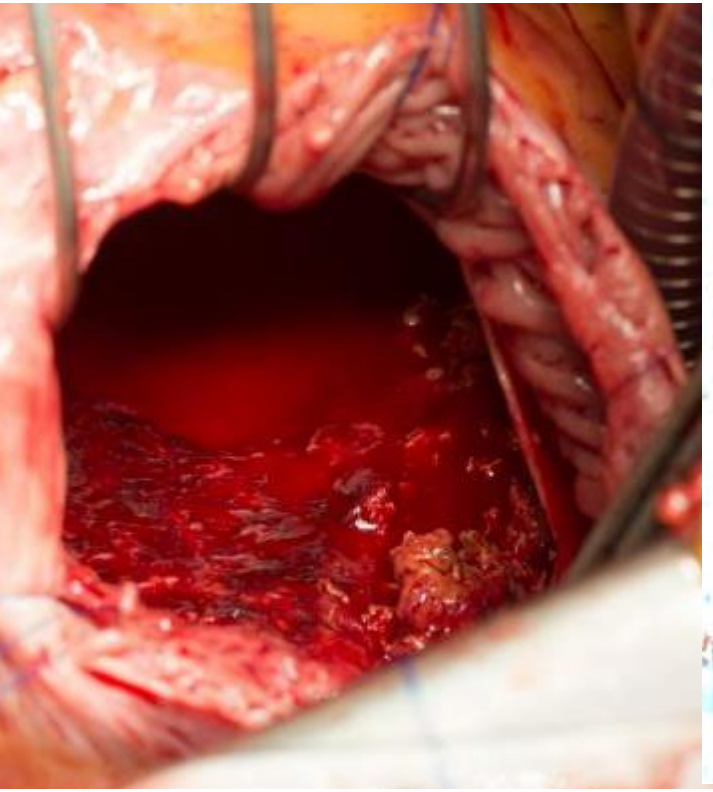
Mitralstenose – tromboemboli



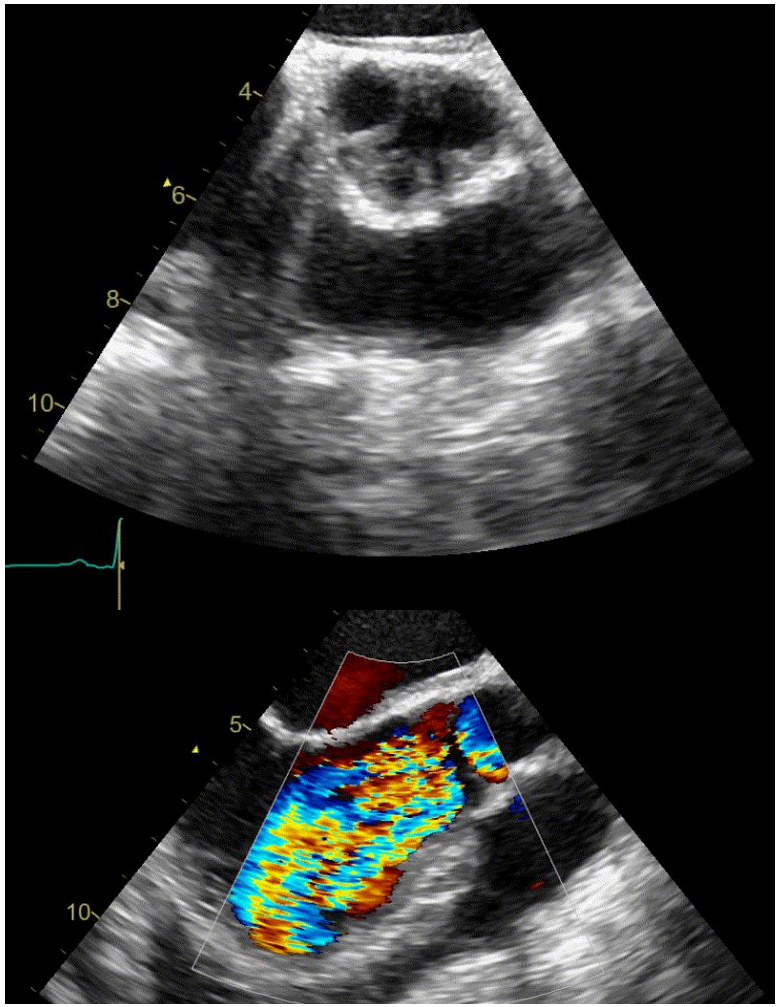
Trombe i au en trombe?

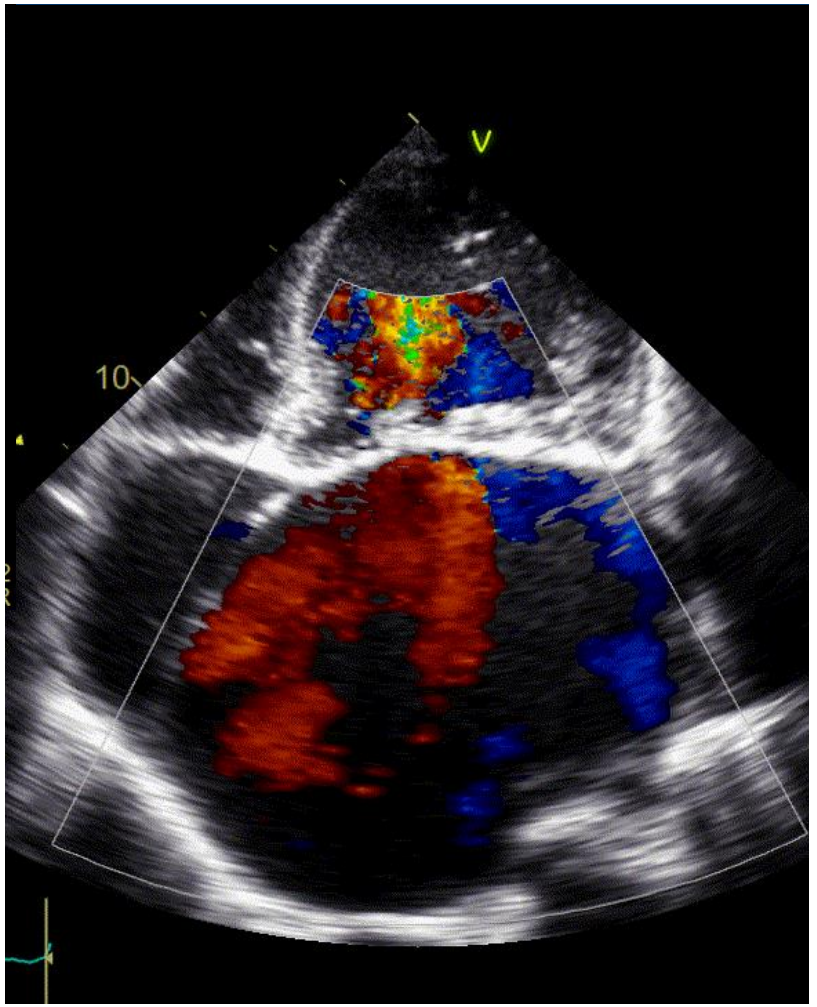
Mitralstenose øker risikoen for trombosering

Mitralstenose – tromboemboli

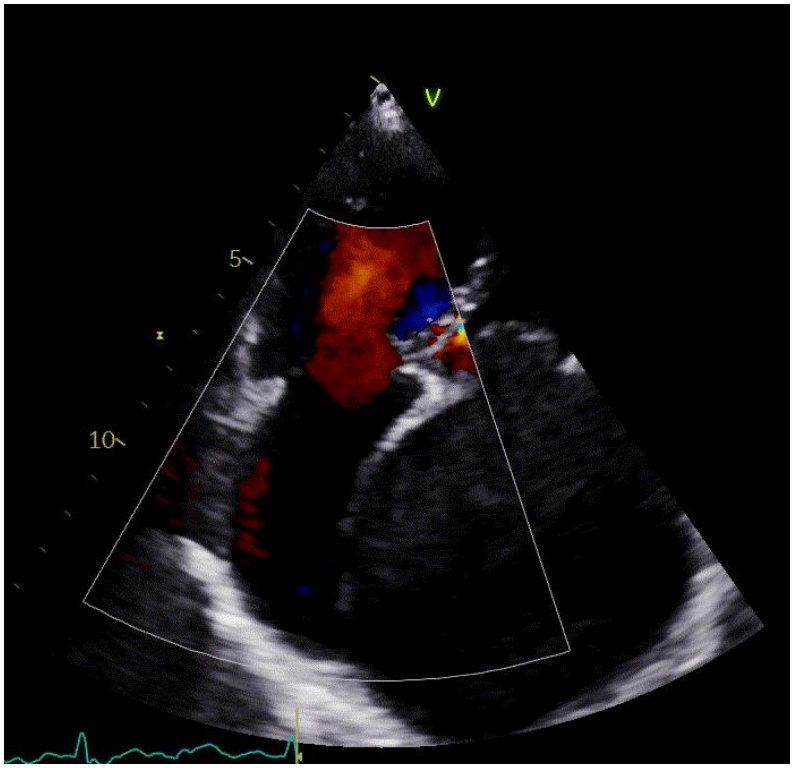


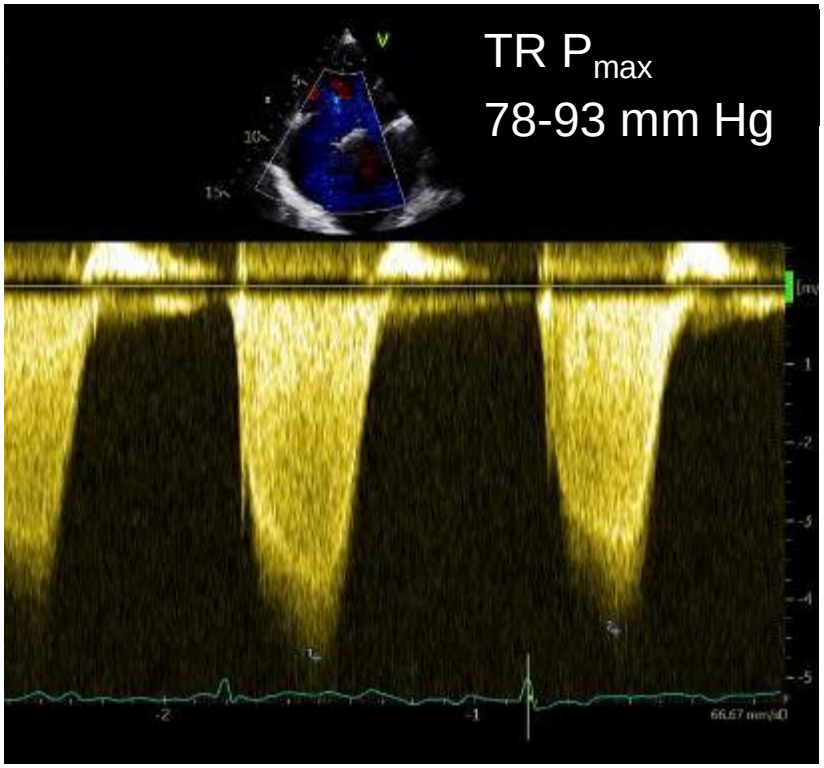
Mitralstenose – Annen klaffesykdom





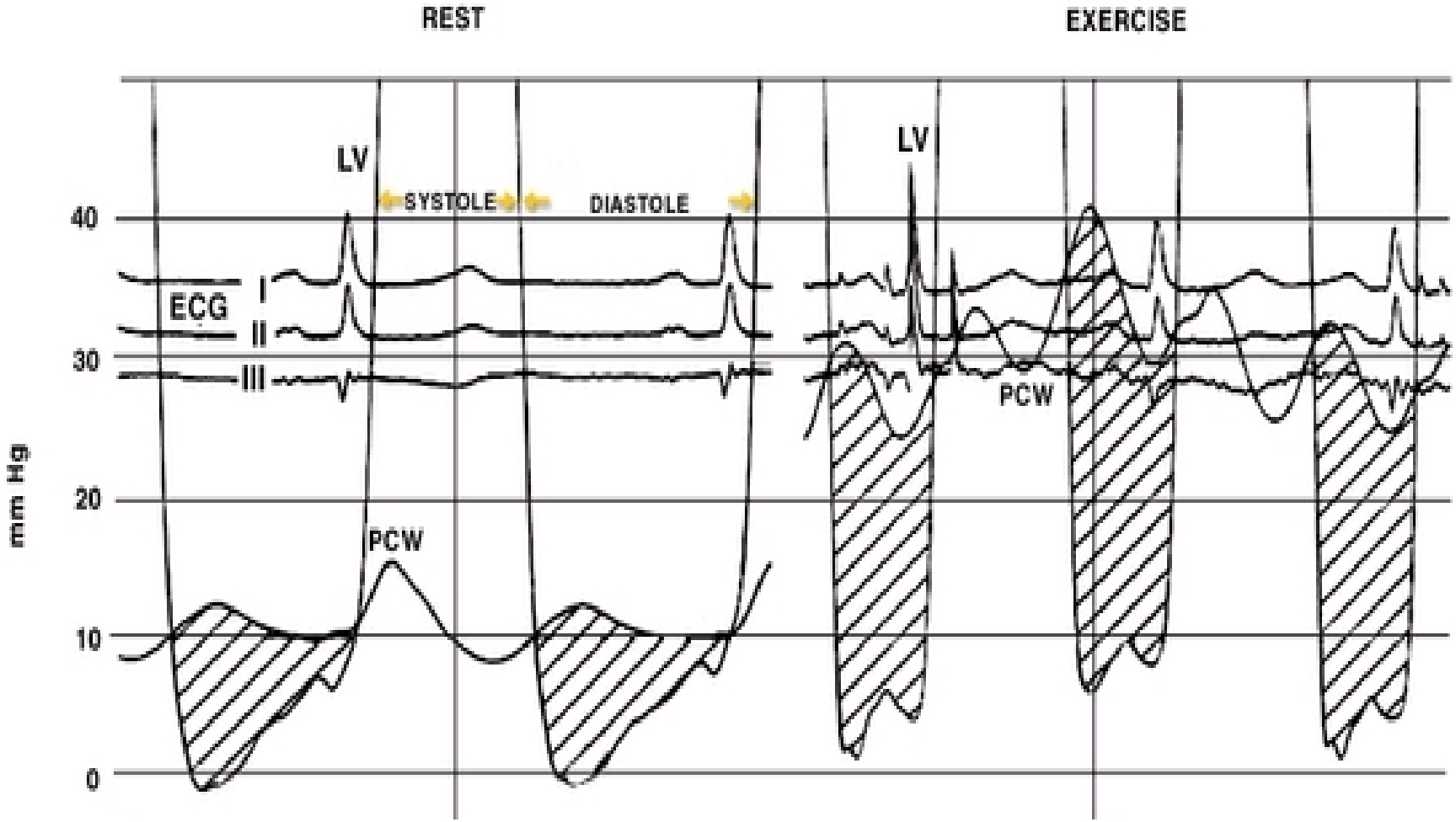
Mitralstenose – lungearterietrykk





Trikuspidallekkasje oftest funksjonell

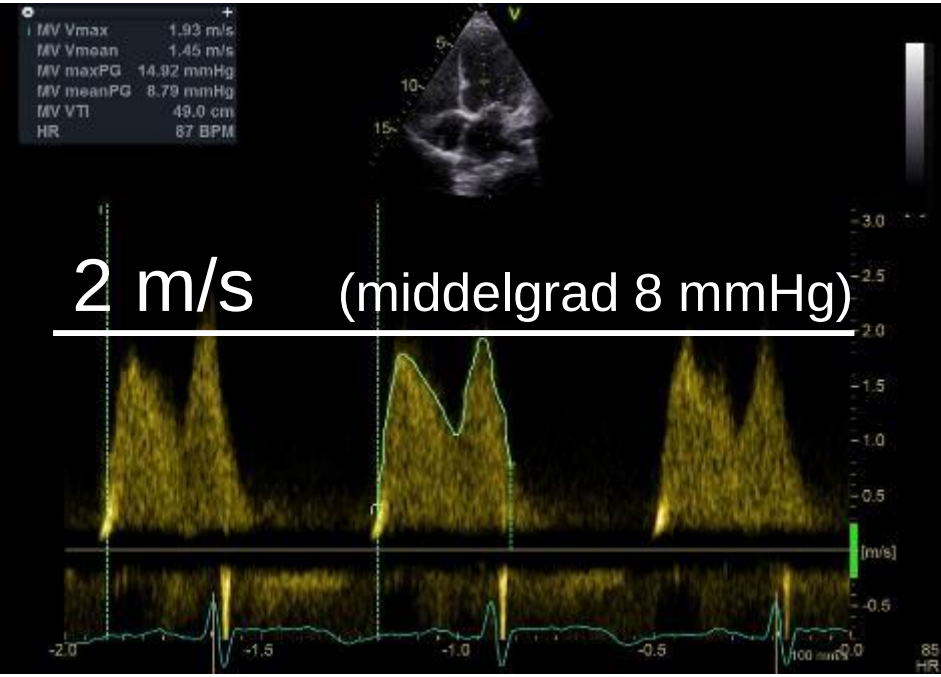
Mitralstenose - Patofysiologi

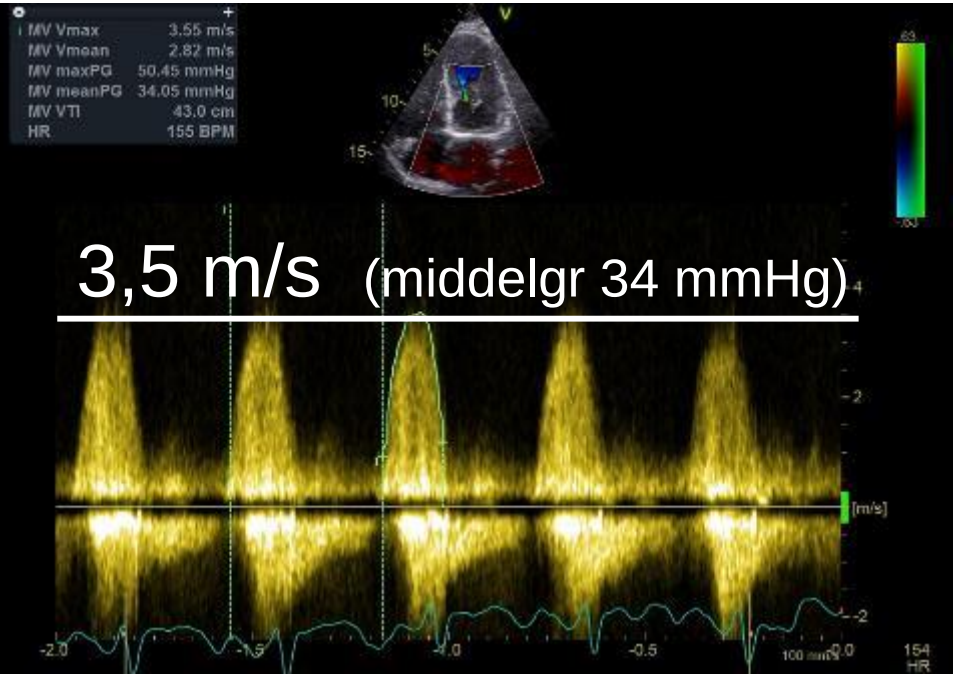


Mitralstenose - Viktig poeng

- ✓ Gradient frekvensavhengig
- ✓ Tachykardi øker gradient

Trikuspidallekkasje?





85 bpm

154 bpm

Evalueringen må avklare

- Alvorlighetsgrad
- Egnethet for ballongdilatasjon?
- NB! Ta hensyn til styrker og svakheter med metodene (kart og terreng må stemme!)
- Vurder
  - Andre klaffelidelser og pulmonaltrykk
  - Alder / Rytme / Funksjonsklasse
  - Forventet risiko ved intervensjon/kirurgi