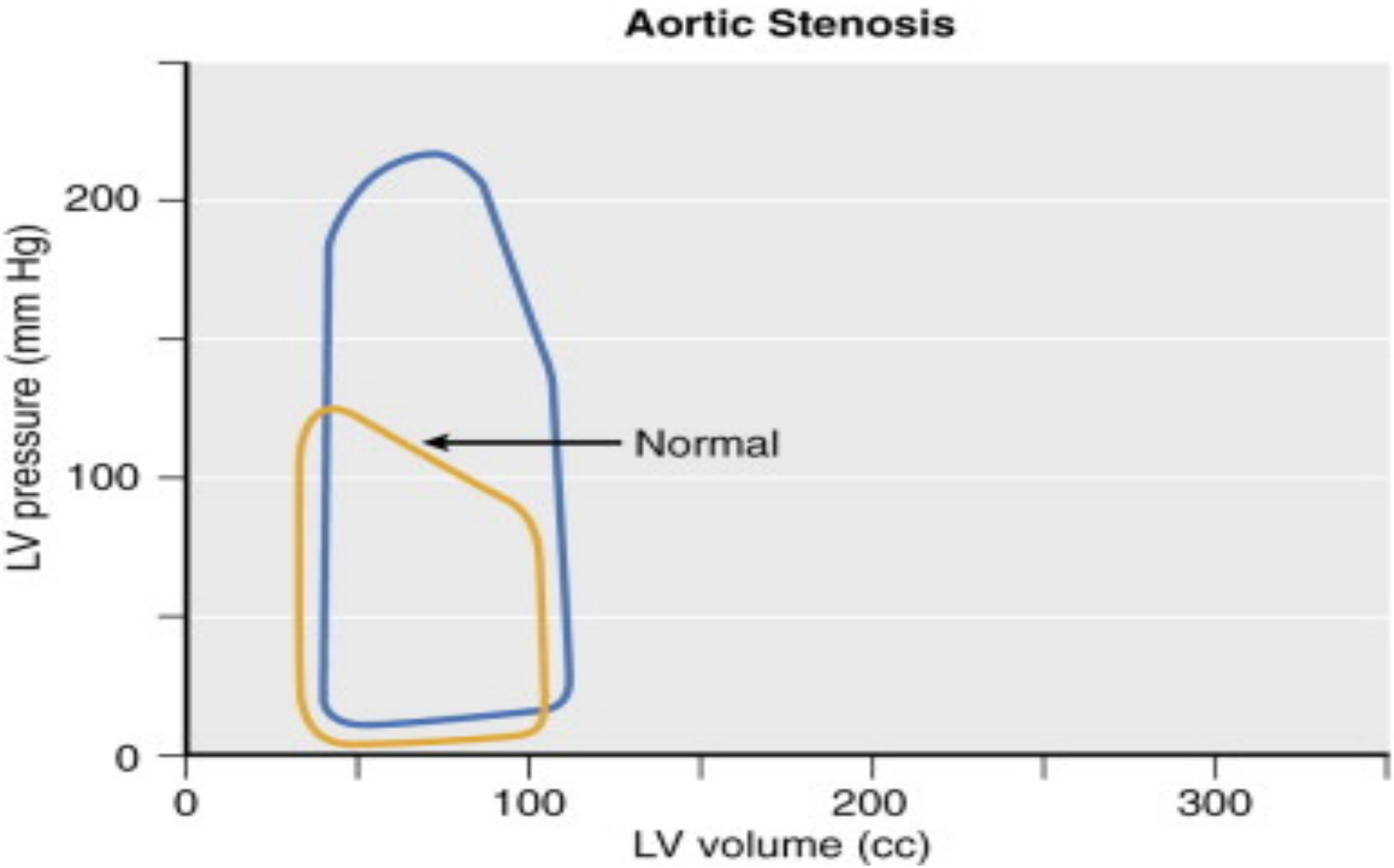
Aortic Stenosis

- Most common cardiac lesion in the US
- Congenital AS
  - 1-2% of individuals are born with bicuspid aortic valve
  - Present in mid-life
- Acquired AS
  - Age-related degeneration with sclerosis and calcification of valve
  - 2-4% of adults > 65
- High transvalvular pressure gradient → ↑ systolic LV pressures and concentric LV hypertrophy

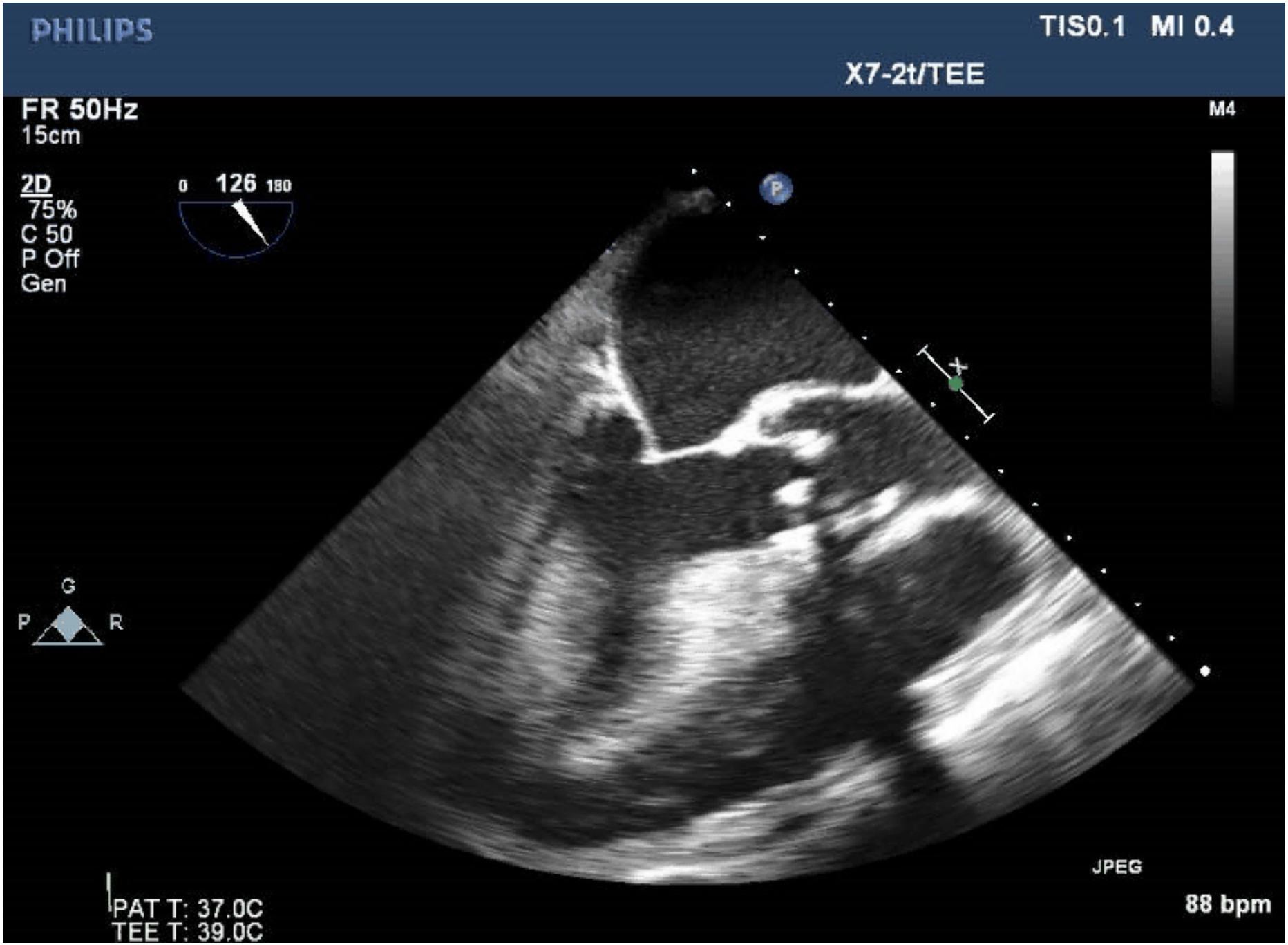


Pressure-volume loop in aortic stenosis.
(Adapted from Jackson JM, Thomas SJ, Lowenstein E: Anesthetic management of patients with valvular heart disease. Semin Anesth 1:239, 1982.)

Aortic Stenosis and Symptomology

- Classic Symptoms = angina, syncope, dyspnea/CHF

	Life Expectancy for 50% of Patients
Angina	< 5 years
Syncope	< 3 years
Dyspnea/CHF	< 2 years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M4
2D
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Gen
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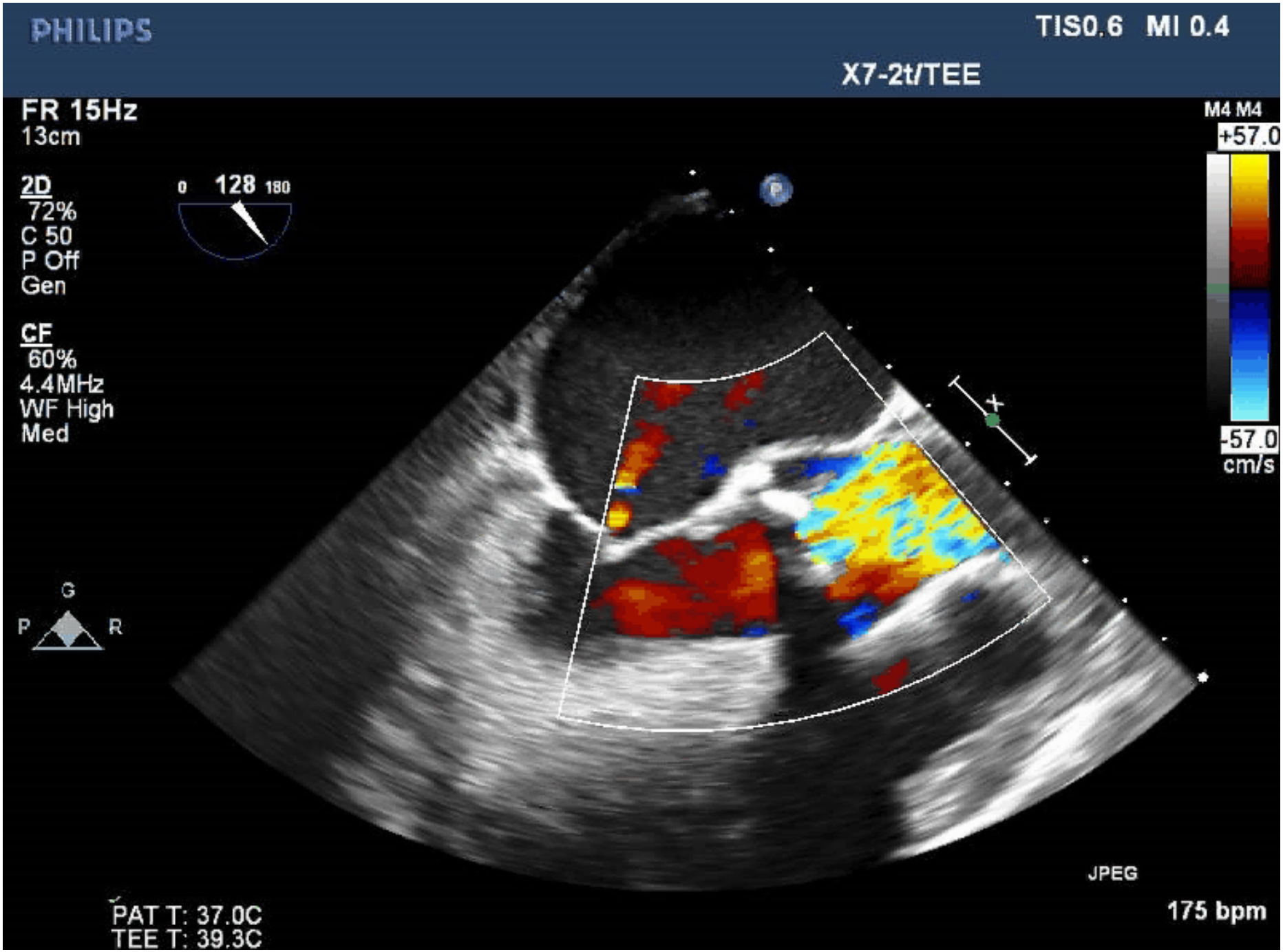
P
G
P R
JPEG
88 bpm
PAT T: 37.0C
TEE T: 39.0C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CF
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WF High
Med
0 128 180
M4 M4
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cm/s
G
P
R
JPEG
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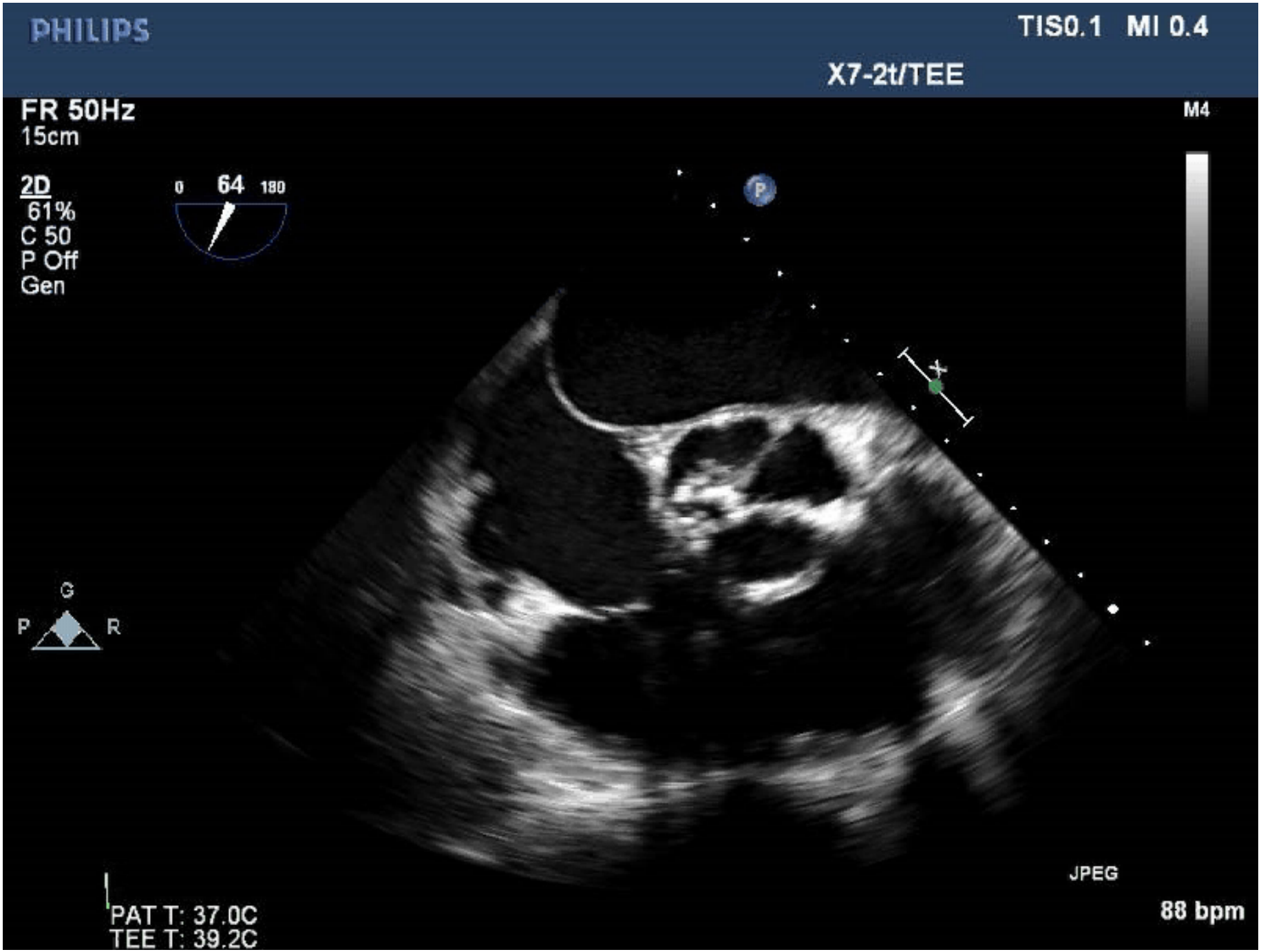
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180
P
G
P
R
JPEG
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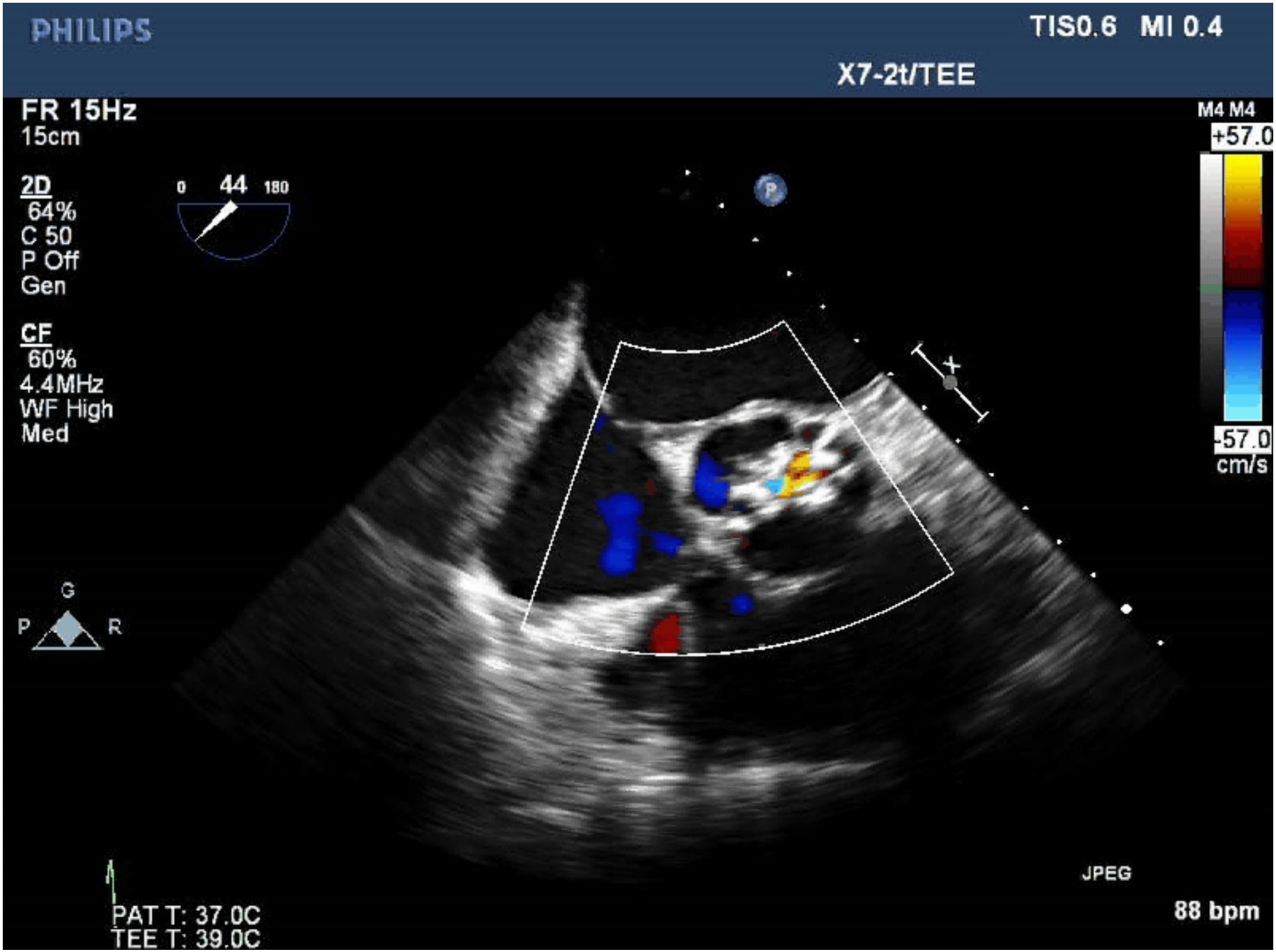
PAT T: 37.0C
TEE T: 39.2C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2D
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C 50
P Off
Gen
CF
60%
4.4MHz
WF High
Med
0 44 180
M4 M4
+57.0
-57.0
cm/s
G
P
R
JPEG
88 bpm
PAT T: 37.0C
TEE T: 39.0C

AS - Anesthetic Management

- Monitoring
  - Awake arterial line
  - Consider placing external cardioversion pads
  - CVL, PAC, TEE as appropriate
    - Care with PAC placement as to avoid arrhythmias
- Induction and Maintenance
  - Slow and controlled
  - Avoid agents that decrease SVR or contractility
  - Maintain sinus rhythm

Anesthetic Management cont.

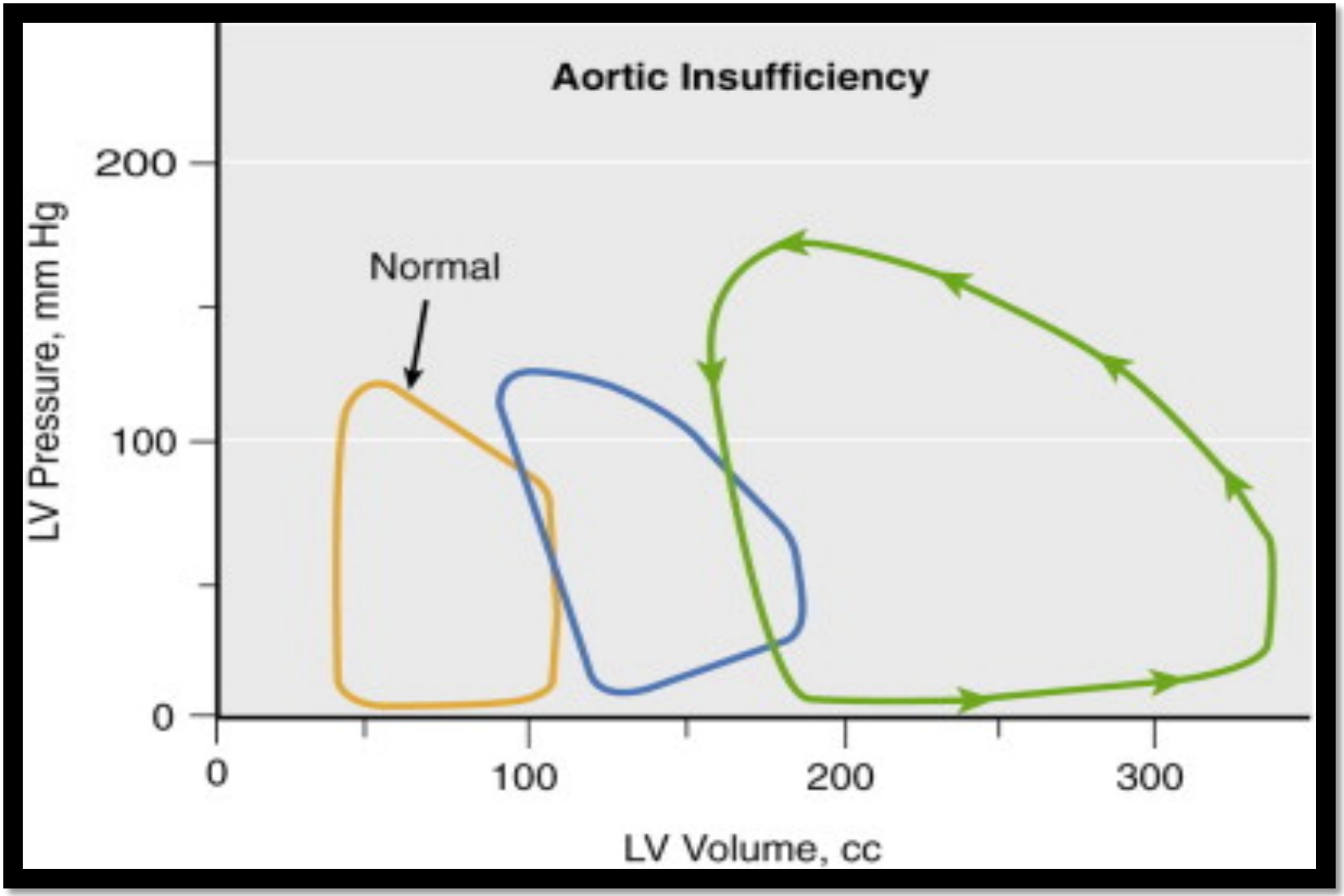
- Maintain NSR – in severe AS, 40% of CO comes from atrial kick
- Avoid tachycardia
- Avoid decrease SVR
- Avoid increase contractility
- Optimize intravascular volume to maintain LV filling
- Phenylephrine is your drug of choice

Aortic Regurgitation

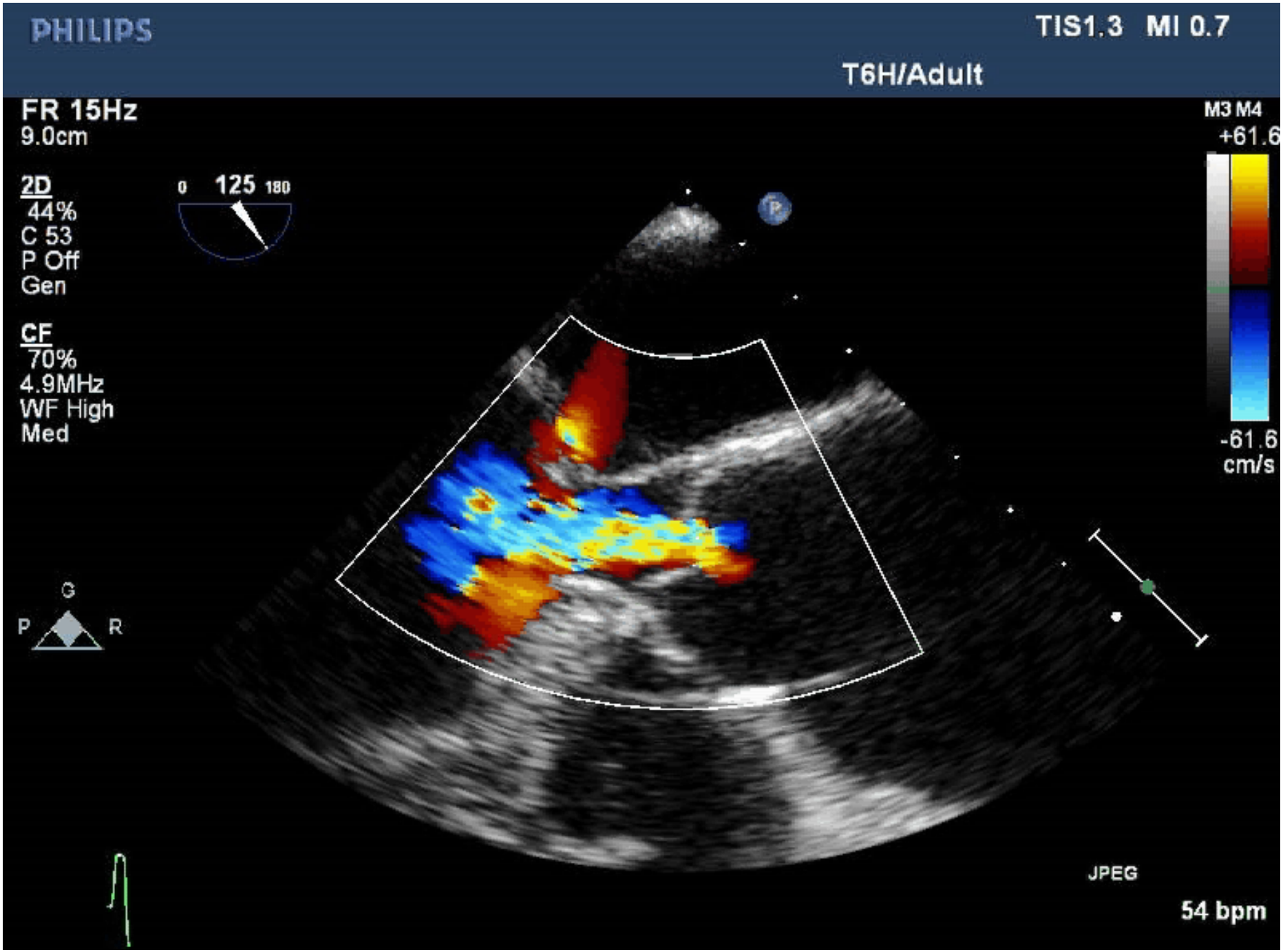
- Chronic
  - Much more prevalent compared to acute
  - Common Causes
    - Congenital
    - Rheumatic
    - Endocarditis
    - Connective tissue disease
    - Aortic root dilation
  - Asymptomatic for many years/decades
  - LV remodeling with eccentric hypertrophy and ↑ chamber size

Aortic Regurgitation

- Acute
  - Less common
  - Common Causes
    - Aortic dissection
    - Endocarditis
    - Trauma
  - LV unprepared to accommodate sudden increase in volume
  - ↑ sympathetic response ↑ SVR → ↑ AI
  - Vasodilator therapy can stabilize patient in preparation for emergency surgery



Pressure-volume loop in aortic regurgitation (AR). Acute AR, middle loop; chronic AR, right loop.
(Adapted from Jackson JM, Thomas SJ, Lowenstein E: Anesthetic management of patients with valvular heart disease. Semin Anesth 1:239, 1982.)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C 53
P Off
Gen
CF
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WF High
Med
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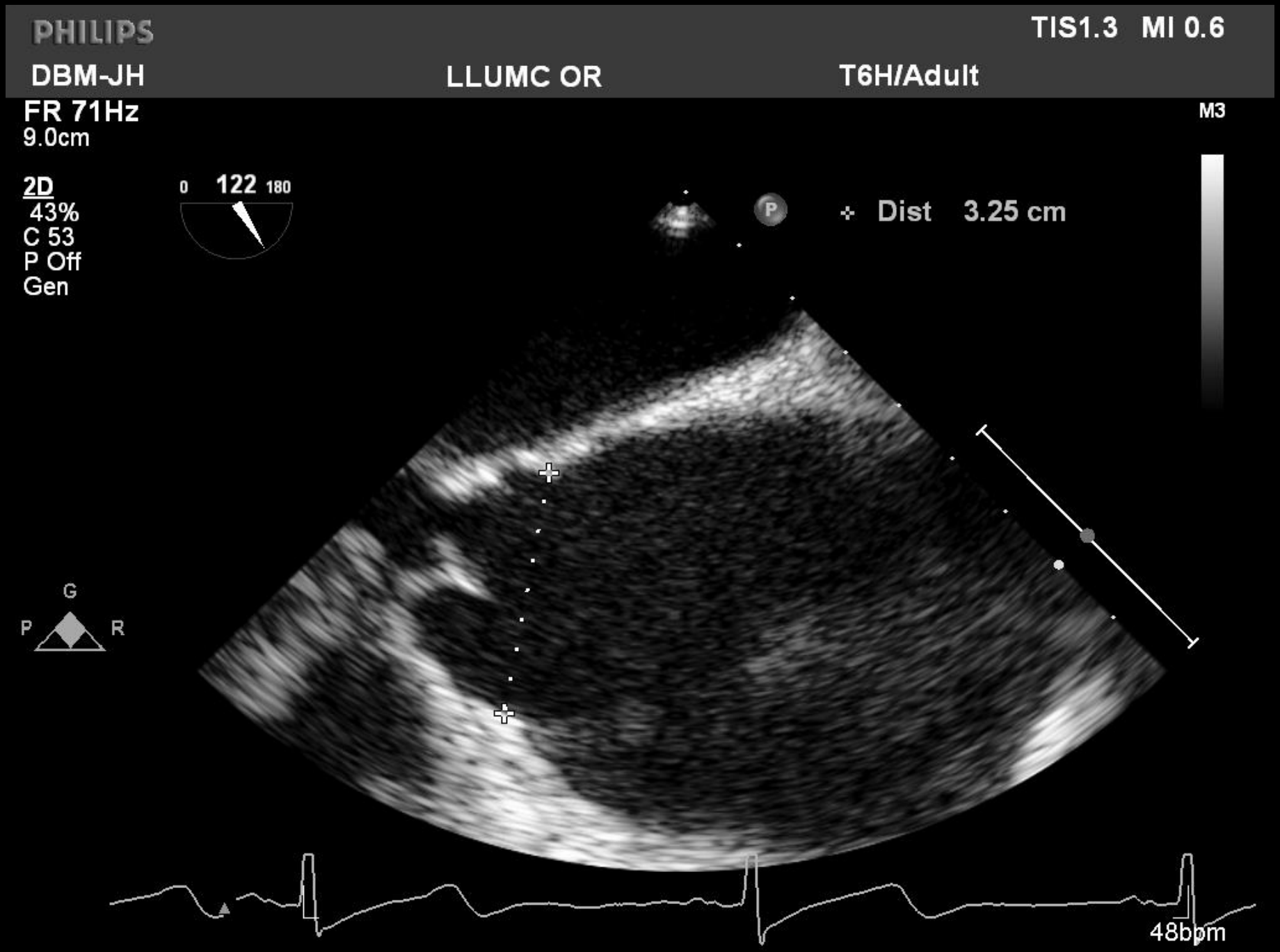
M3 M4
+61.6
-61.6
cm/s
G
P
R
JPEG
54 bpm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DBM-JH
LLUMC OR
T6H/Adult
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9.0cm
M3
2D
43%
C 53
P Off
Gen
0 122 180
P
Dist 3.25 cm
G
P
R
48bpm

AI - Anesthetic Management

- Monitoring
  - Awake arterial line
  - CVL, PAC, TEE as appropriate
- Maintenance
  - Relatively ↑ HR (90 bpm)
  - ↓ SVR
  - Maintain preload and contractility

Anesthetic Management Goals

	Preload	HR	Contractility	SVR
Aortic stenosis	↑	↓	Maintain	↑
Aortic Regurgitation	↑	↑	Maintain	↓

From Sukernik MR, Martin DE: Anesthetic management for the surgical treatment of valvular heart diseases. In Hensley FA, Martin DE, Gravlee GP (eds): A Practical Approach to Cardiac Anesthesia, 4th ed. Philadelphia, Lippincott Williams & Wilkins, 2008, pp 316-347.