

**Case Studies: You Want What? Here is
What I can Provide in Intra-procedural
TEE/TTE During TAVR**



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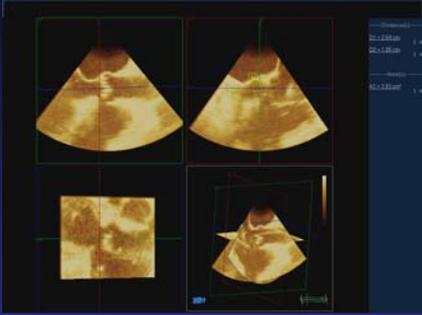


No disclosures

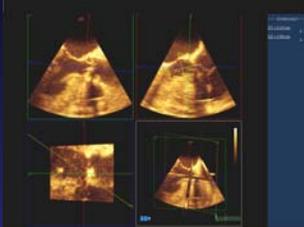


Pre-TAVR TEE

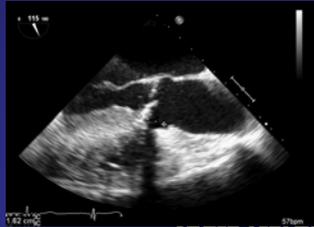
Annular Size



LM Height



RCA Height



- Confirm hemodynamics
- Evaluate LVOT anatomy
- Evaluate aortic root

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LVOT Measurements by CT vs 3D TEE

Table 1 Correlations and Differences Between Similar Measurements Made by Cross-Sectional CT* and 3D-TEE (n = 104)

Variable	r	p Value (for Correlation)	Paired Difference: CT-3D-TEE (95% CI)	p Value (for Difference)	Percentage Difference (SD)
D _{max} , mm	0.62	<0.001	2.35 (1.86-2.84)	<0.001	10.35 (11.52)
D _{min} , mm	0.60	<0.001	0.85 (0.45-1.26)	<0.001	4.63 (10.09)
D _{mean} , mm	0.69	<0.001	1.59 (1.22-2.00)	<0.001	7.48 (8.80)
Area, cm ²	0.69	<0.001	0.45 (0.32-0.58)	<0.001	12.89 (16.87)
Perimeter, mm†	0.72	<0.001	4.94 (3.85-6.03)	<0.001	7.30 (7.98)

Jilaihawi et al. J Am Coll Cardiol 2013

Grade of PAR	THV Diameter – Mean Annular Diameter (mm)	Percentage Difference Between the THV Area and Annular Area*
None/trivial	1.5 ± 1.8	14.2 ± 18.3
Mild	0.4 ± 1.8	4.3 ± 14.2
Moderate/severe	-0.7 ± 1.4	-7.0 ± 9.5
p value	<0.01	<0.01

Wilson et al. JACC Imaging 2012

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TEE During Procedure: Device Positioning

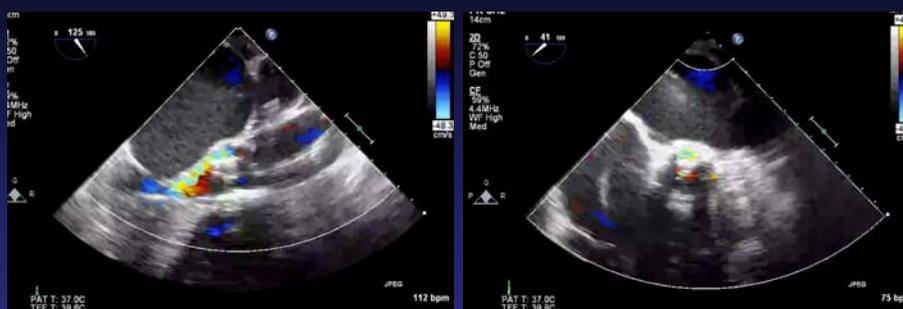


Too Ventricular



Too High

Complications: Aortic Regurgitation

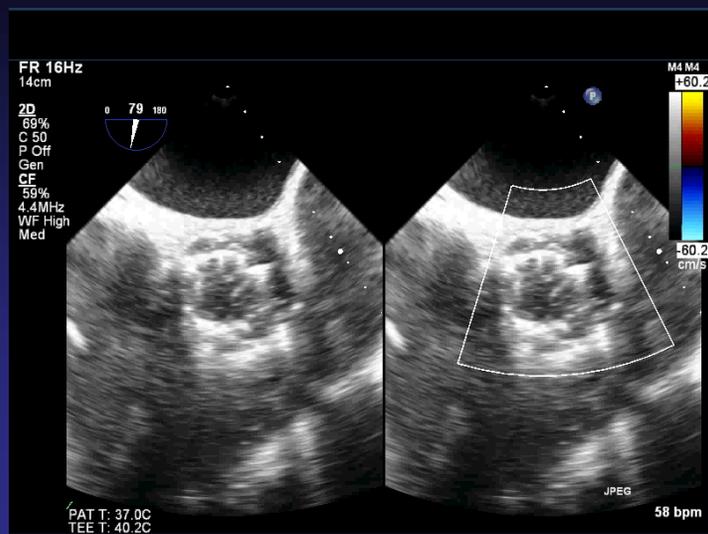


Grading paravalvular regurgitation:
 Mild: <10% of the sewing ring
 Moderate: 10% to 20%
 Severe: >20%
 Rocking of the prosthesis ~>40 dehiscence.

Pericardial Effusion



Post TAVR: AR Due to Frozen Leaflet





Echo Guidance

- 2D and 3D TEE have been essential for the success of TAVR
- Initial PARTNER trials performed with TEE
- TEE useful for:
 - Evaluating aortic annulus size and geometry
 - Aortic root geometry
 - Device selection,
 - Procedural guidance
 - Assessment of prosthetic valve function
 - Evaluation for complications

Trends

- Initially, TAVR procedures performed with general anesthesia and TEE
- General anesthesia requires intubation
- Procedural experience has increased and devices have improved
- Incidence of paravalvular regurgitation has significantly decreased
- Monitored anesthesia care (MAC or LA) now an alternative
- Transthoracic echo (TTE) now an alternative to transesophageal echo (TEE).



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CARDIOLOGY

Local and general anaesthesia do not influence outcome of transfemoral aortic valve implantation 

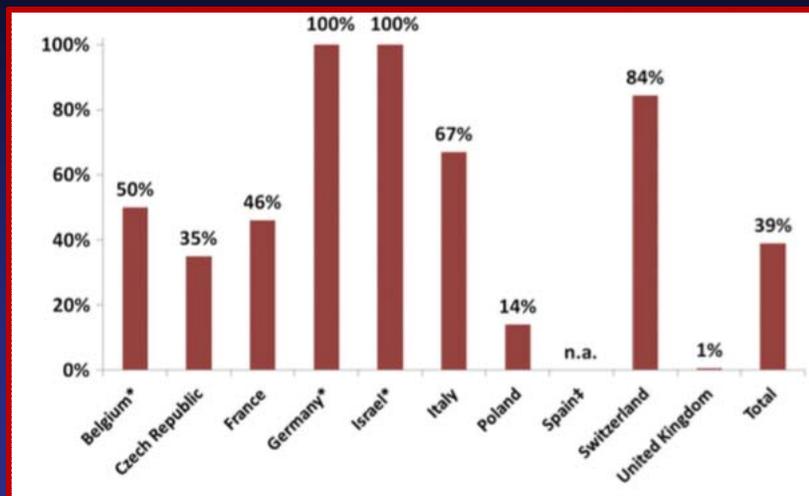
Gianni Dall'Ara^{a,1}, Helene Eltchaninoff^{b,2}, Neil Moat^{a,2}, Cécile Laroche^{c,2}, Javier Goicolea^{d,2}, Gian Paolo Ussia^{e,2}, Petr Kala^{f,2}, Peter Wenaweser^{g,2}, Marian Zembala^{h,2}, Georg Nickenig^{i,2}, Thomas Snow^{j,2}, Susanna Price^{k,2}, Eduardo Alegria Barrero^{l,2}, Rodrigo Estevez-Loureiro^{m,2}, Bernard Lung^{n,2}, José Luis Zamorano^{o,2}, Gerhard Schuler^{p,2}, Ottavio Alfieri^{q,2}, Bernard Prendergast^{r,2}, Peter Ludman^{s,2}, Stephan Windecker^{t,2}, Marel Sabate^{u,2}, Martine Gilard^{v,2}, Adam Witkowski^{w,2}, Haim Danenberg^{x,2}, Erwin Schroeder^{y,2}, Francesco Romeo^{z,2}, Carlos Macaya^{aa,2}, Genevieve Derumeaux^{ab,2}, Alessio Mattesini^{ac,2}, Luigi Tavazzi^{ad,2}, Carlo Di Mario^{ae,1}

on behalf of the Transcatheter Valve Treatment Sentinel Registry (TCVT) Investigators of the EurObservational Research Programme (EORP) of the European Society of Cardiology

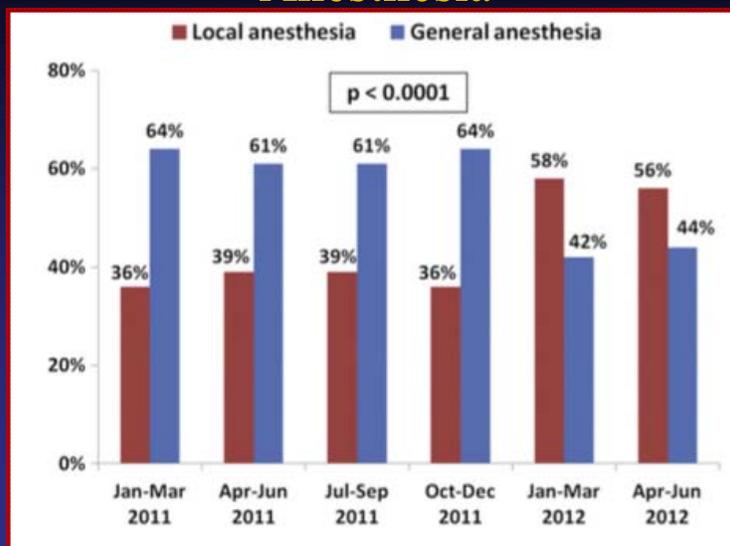
- TCVT-Registry evaluated to assess outcomes of local vs. general anesthesia
- 4571 patients underwent TAVR between January 2011 and May 2012 in 137 centers in 10 European countries.



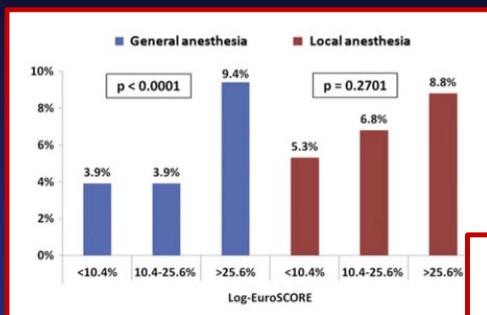
Wide Variability in Use of LA



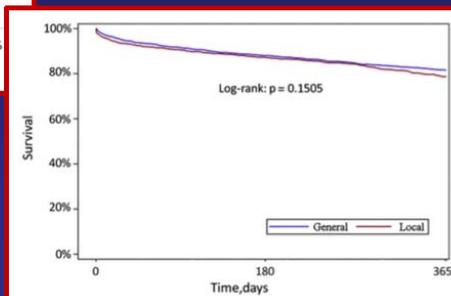
Trend in Use of Type of Anesthesia



In-hospital mortality according to anesthetic management and predicted risk



1 year survival



Structural Heart Disease

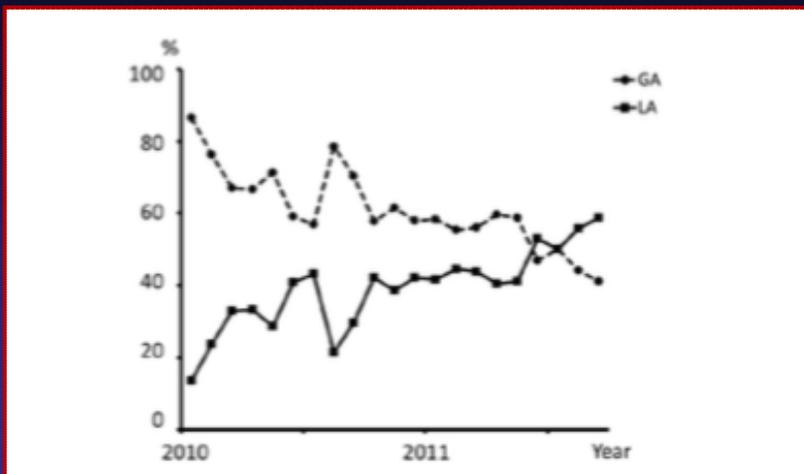
[Euro Cardiovasc Interv. 2014;10:602-610](#)

Clinical Outcomes and Safety of Transfemoral Aortic Valve Implantation Under General Versus Local Anesthesia Subanalysis of the French Aortic National CoreValve and Edwards 2 Registry

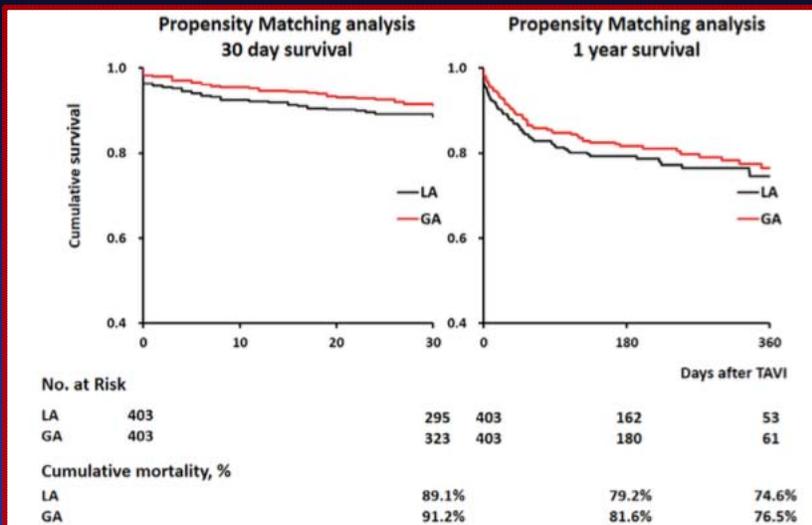
Atsushi Oguri, MD; Masanori Yamamoto, MD; Gauthier Mouillet, MD; Martine Gilard, MD; Marc Laskar, MD; Helene Eltchaninoff, MD; Jean Fajadet, MD; Bernard Jung, MD; Patrick Donzeau-Gouge, MD; Pascal Leprince, MD; Alain Leguerrier, MD; Alain Prat, MD; Michel Lievre, PhD; Karine Chevreul, MD; Jean-Luc Dubois-Rande, MD; Romain Chopard, MD; Eric Van Belle, MD; Toshiaki Otsuka, MD; Emmanuel Teiger, MD; on behalf of FRANCE 2 Registry Investigators

- Subanalysis of the FRANCE 2 Registry
- 2326 pts analyzed for differences related to the anesthetic method used: GA (n=1377) or LA (n=949)
- TEE use:
 - GA group: 76.3%
 - LA group: 19.1%

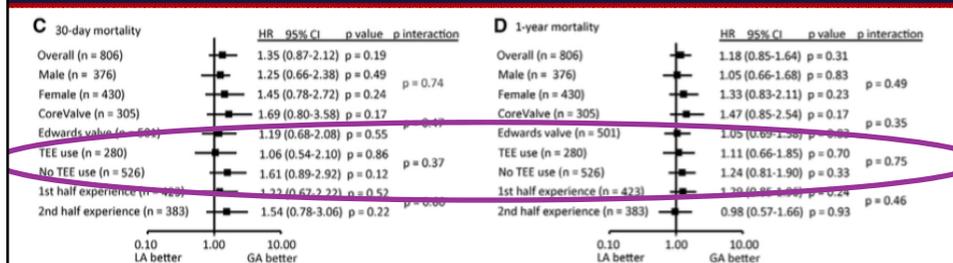
TEE trends from 2010 to 2014



Survival



Subgroup Analysis

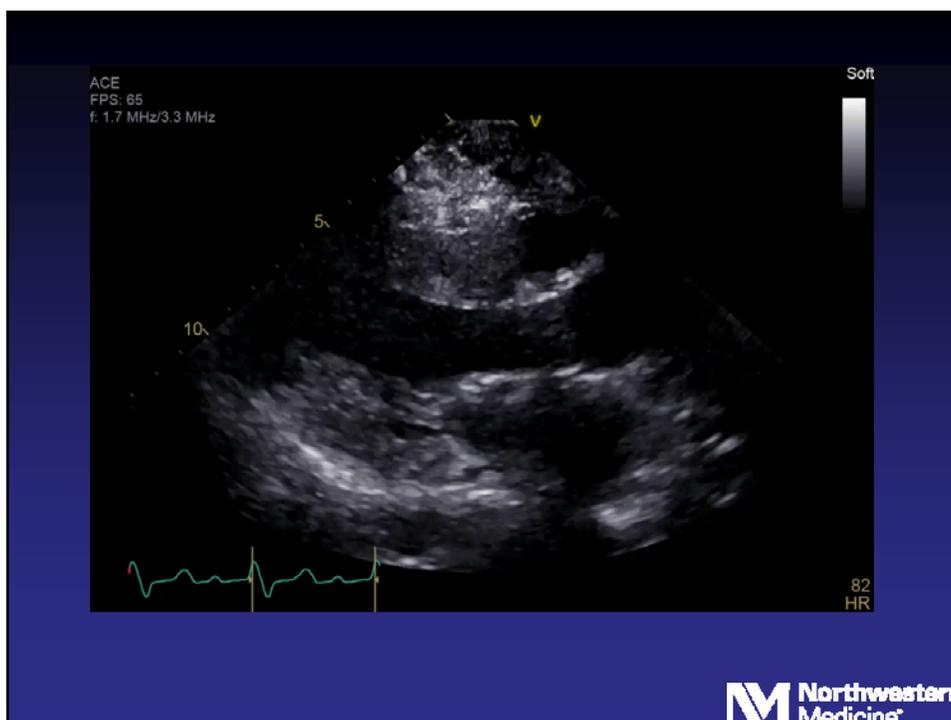


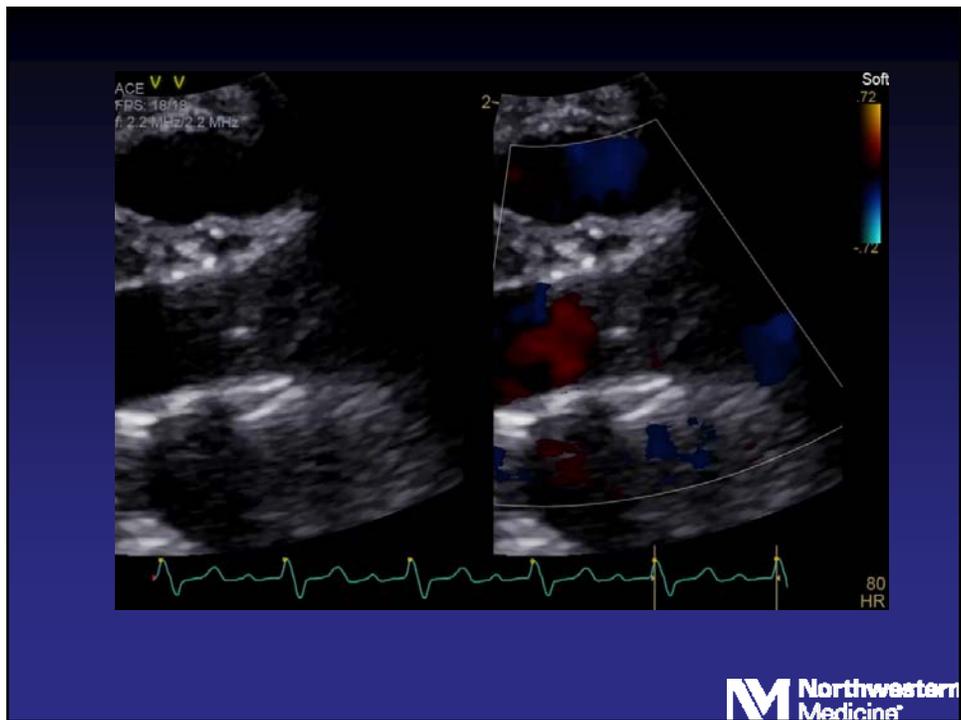
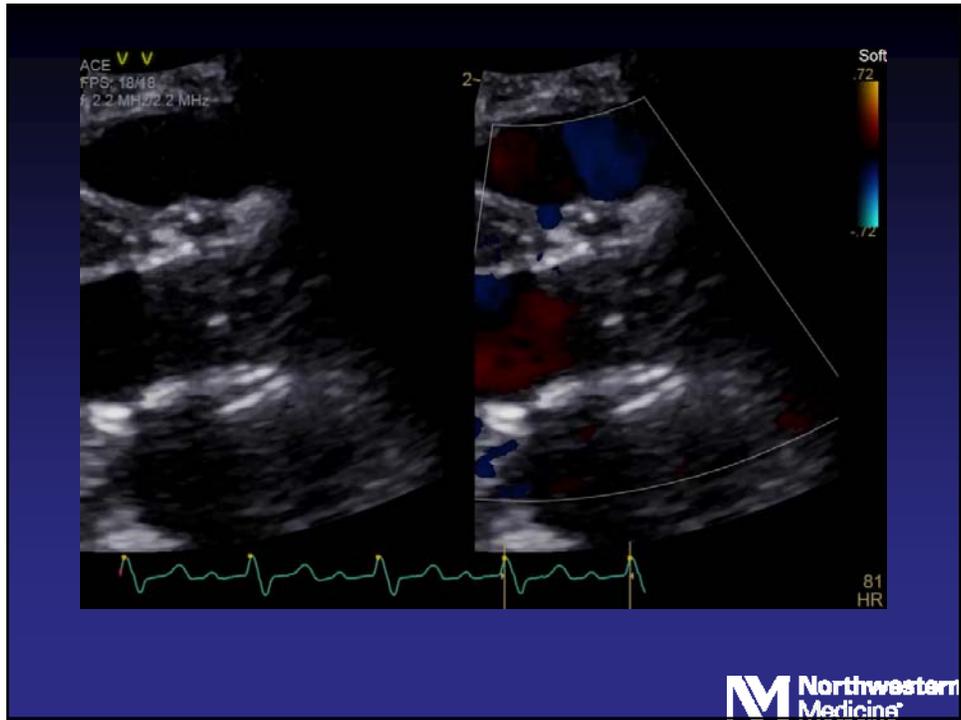
TEE Essential For:

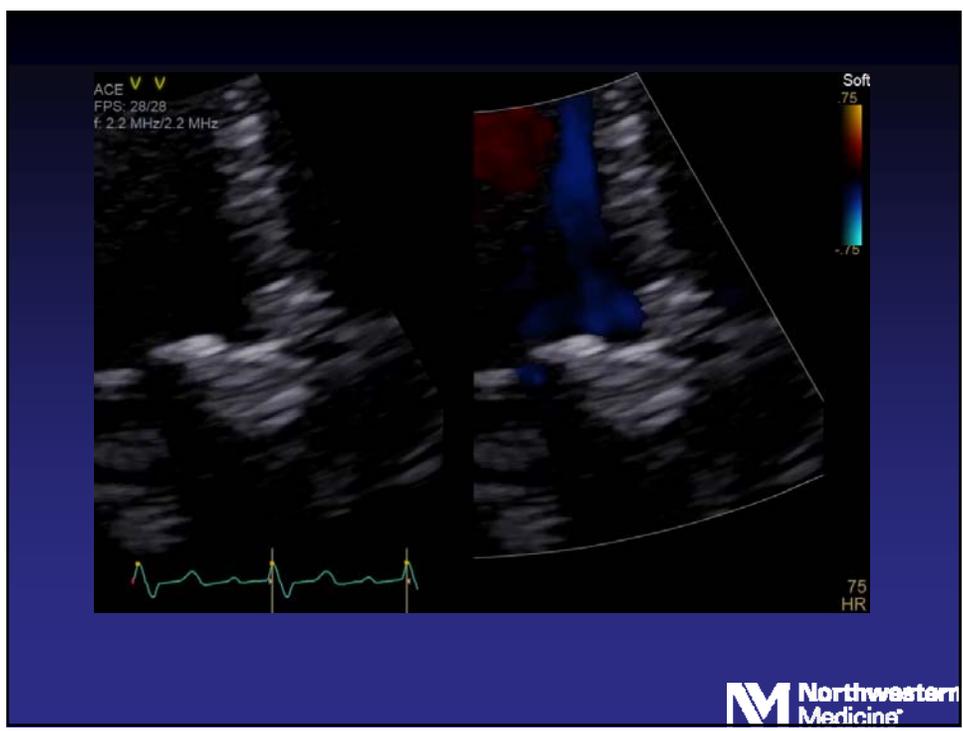
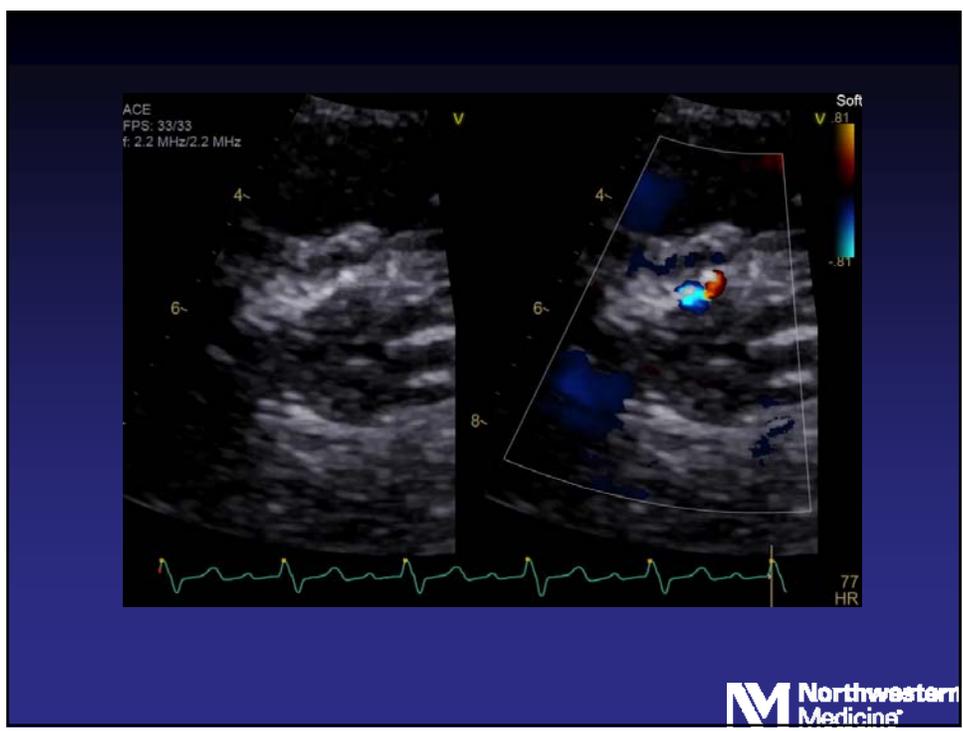
- Hospitals new to TAVR
- Very high risk patients
- Poor transthoracic windows
- TEE should always be available in case of complications
- Best for transfemoral cases

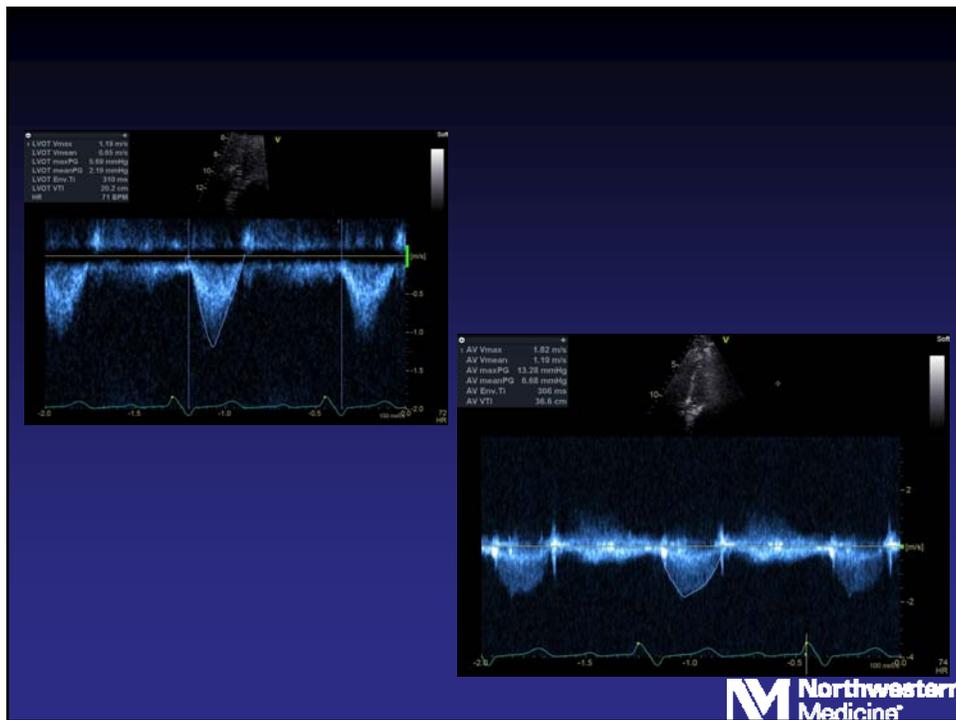
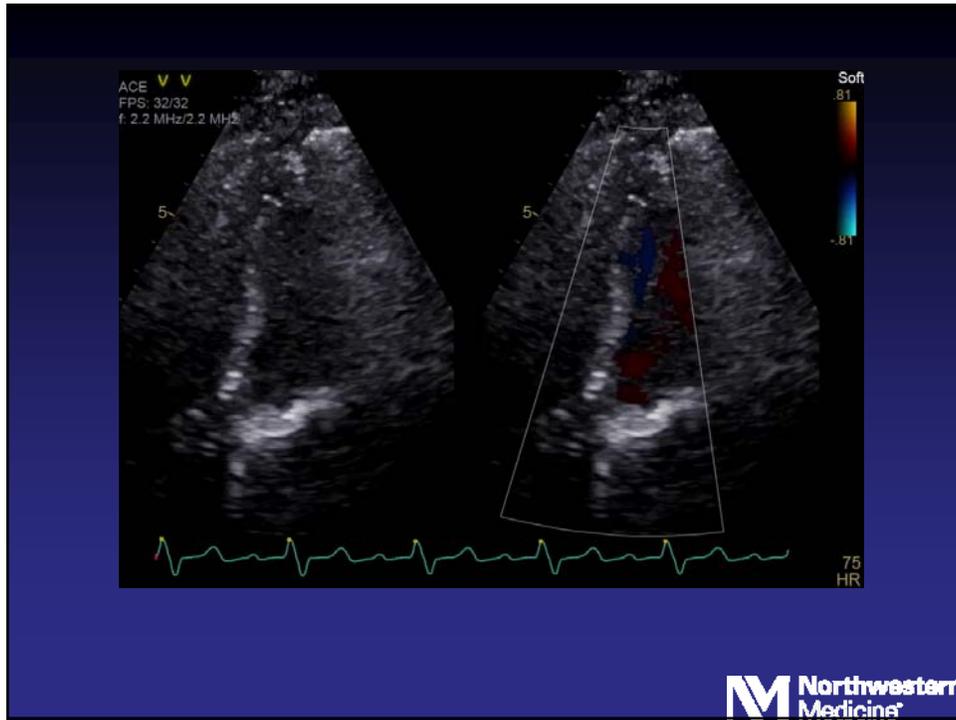
What protocol should be followed when performing a post-TAVR TTE?

- Performed in the cath lab immediately after valve deployment
- Should only be performed by experienced sonographers/physicians
- Careful sweeps of the AV in multiple views









Conclusions

- General anesthesia with TEE and MAC with TTE are both viable options for procedural guidance during TAVR
- Which procedure is best depends on
 - Level of experience and expertise of echo and interventional teams
 - Clear protocol; open communication between sonographers and cardiologists
 - Patient characteristics
 - Discussion with heart valve team
- An imaging protocol is necessary regardless of echo modality used



Thank You

