
Ecocardiografía transesofágica en cirugía NO cardíaca

Alejandro Madrid Crespo (FEA)
Jorge González Gómez (MIR3)

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- Introducción: generalidades.
- Ecocardiografía transesofágica (ETE): utilización en la práctica clínica.
- ETE perioperatorio.
- ETE área fuera de quirófano.
- Complicaciones.
- Desventajas.
- Conclusiones.
- Bibliografía.

Introducción

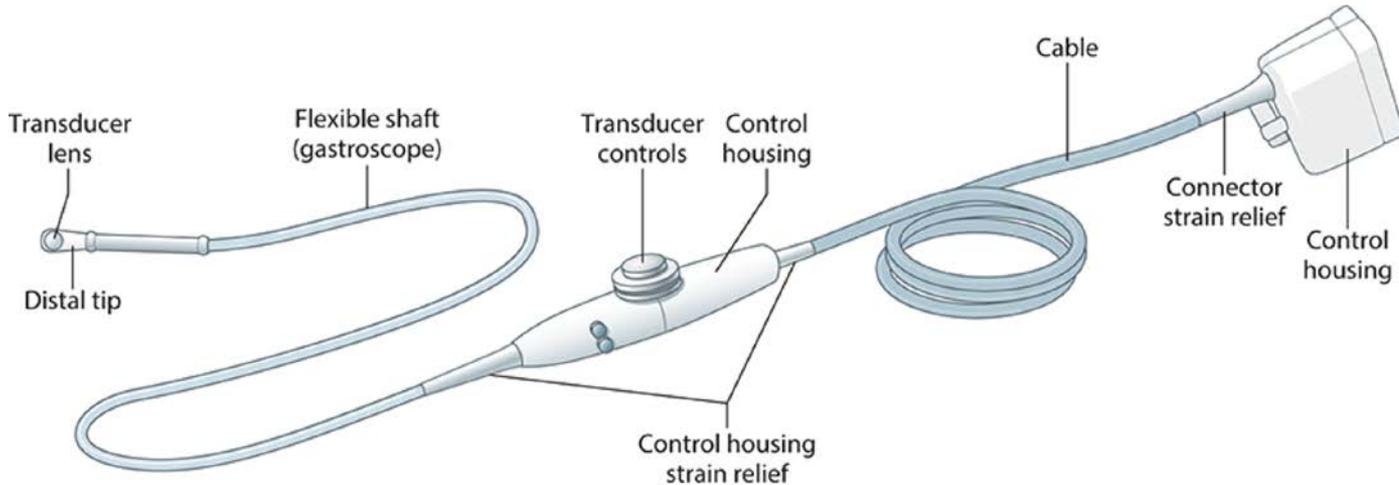
- ✓ Se introdujo clínicamente en los EE.UU en 1987, tras los estudios de Matsumoto en 1980.
- ✓ Ha cambiado la estrategia diagnóstica y terapéutica en múltiples enfermedades, por la calidad de sus imágenes y la baja tasa de complicaciones asociadas a su utilización.
- ✓ En la década de los 90s presenta numerosos avances en cuanto al la tecnología del transductor, llegando al mercado la primera sonda 3D ETE en 2006.
- ✓ En la última década ha venido a incorporarse al POCUS en la UCI y PACU.



Generalidades

- ✓ Permite visualizar en tiempo real la dinámica cardíaca.
- ✓ Método directo para obtener tamaño de cavidades cardíacas y grandes vasos.
- ✓ Precaución “INVASIVO”.

Generalidades



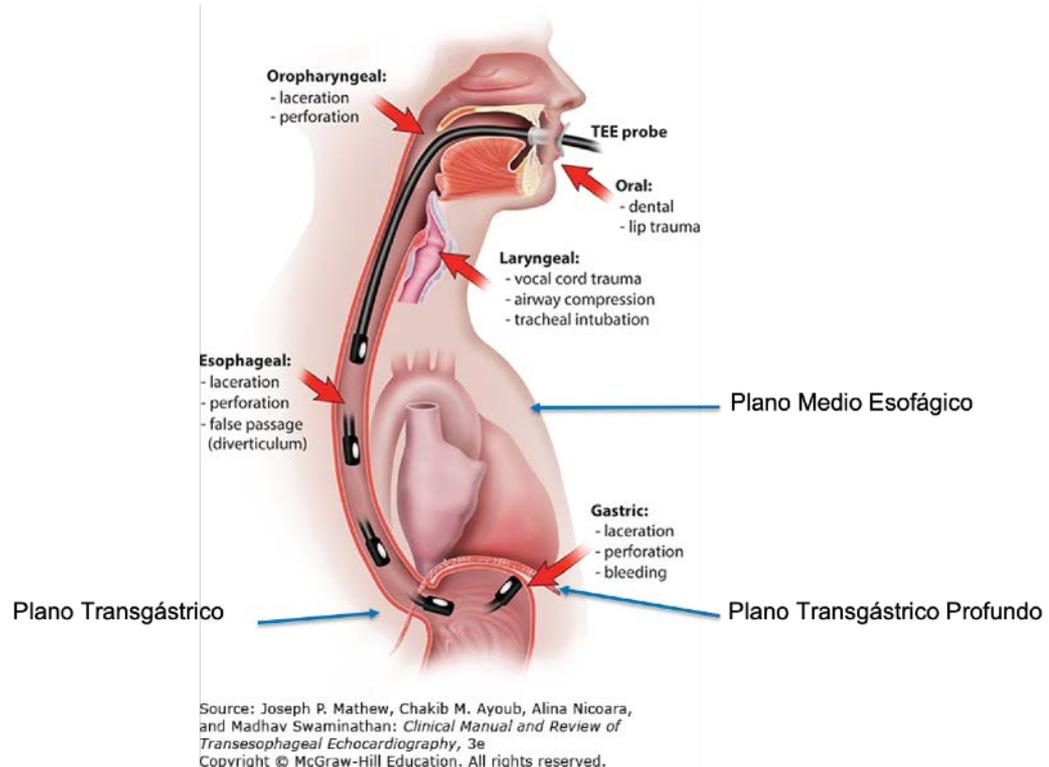
Source: Joseph P. Mathew, Chakib M. Ayoub, Alina Nicoara, and Madhav Swaminathan: *Clinical Manual and Review of Transesophageal Echocardiography*, 3e
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Generalidades

Sonda multiplanar ETE



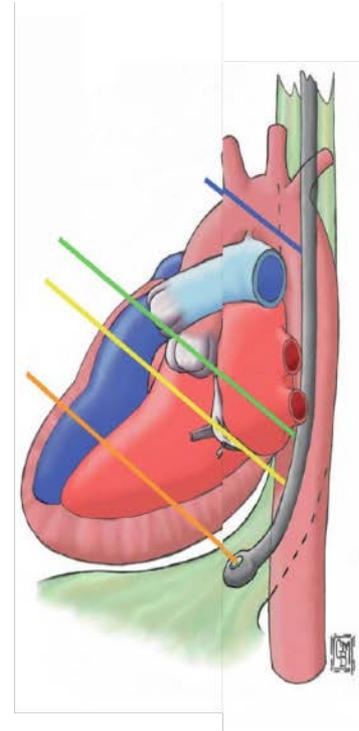
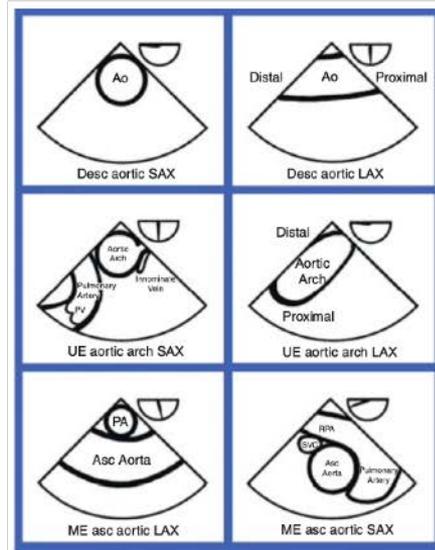
Generalidades



Generalidades

PLANOS

- Esofágico Alto

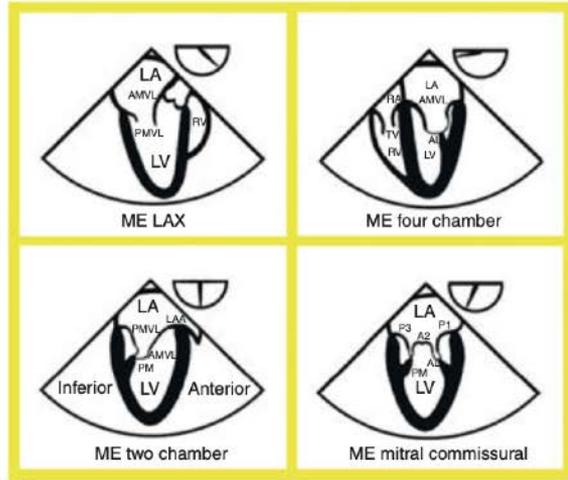


Cortesía
Perioperative Two-Dimensional
Transesophageal Echocardiography
Annette Vegas U. Toronto

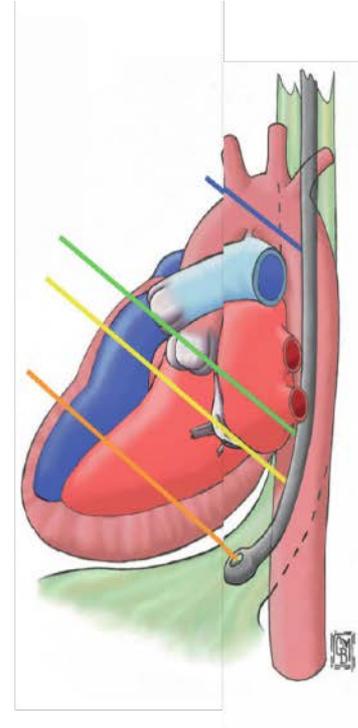
Generalidades

PLANOS

- Medio Esofágico



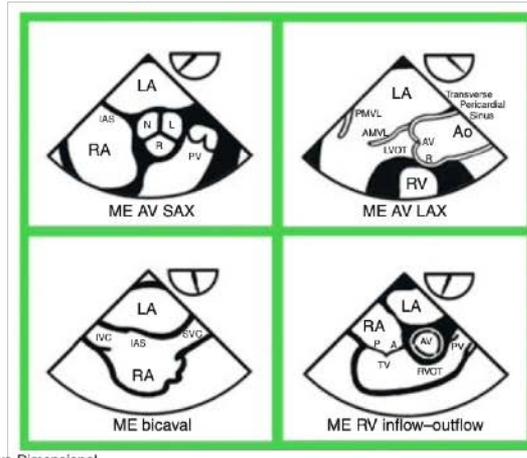
Cortesía
Perioperative Two-Dimensional
Transesophageal Echocardiography
Annette Vegas U. Toronto



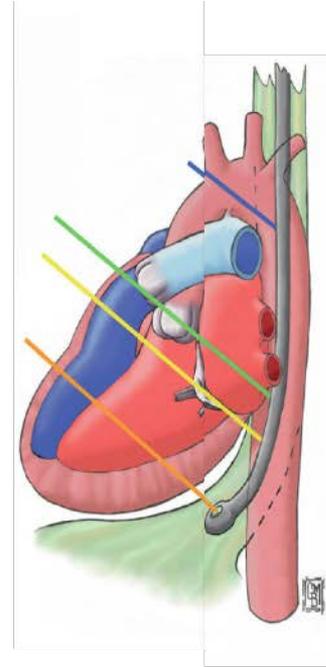
Generalidades

PLANOS

- Medio esofágicos complementarios



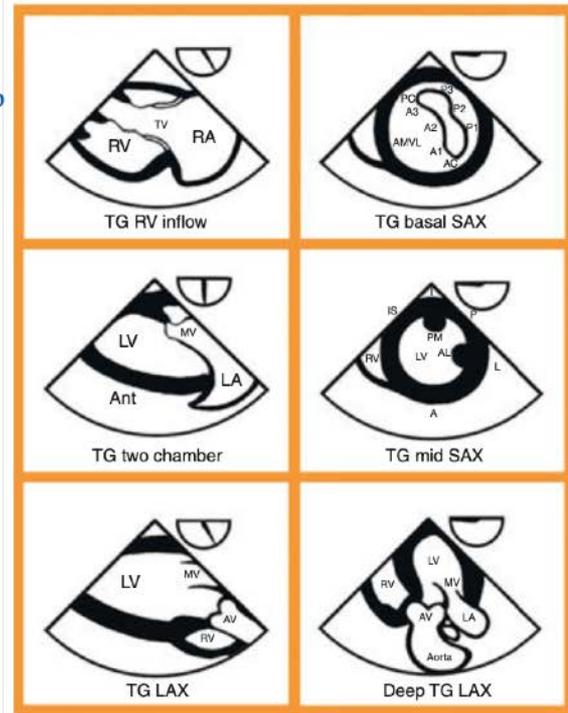
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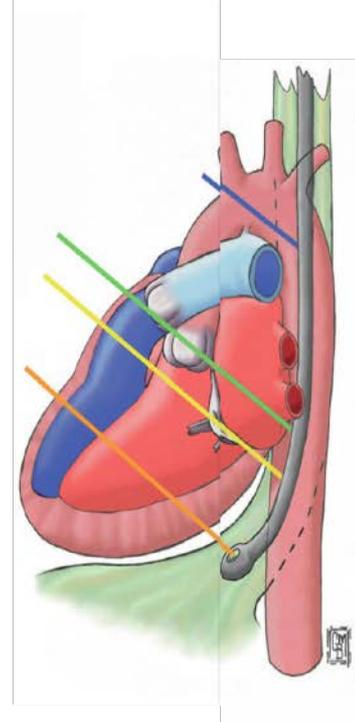
Generalidades

PLANOS

- Transgástrico

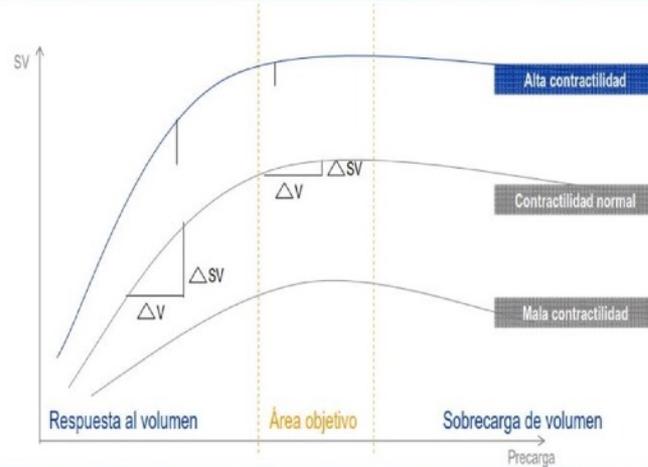


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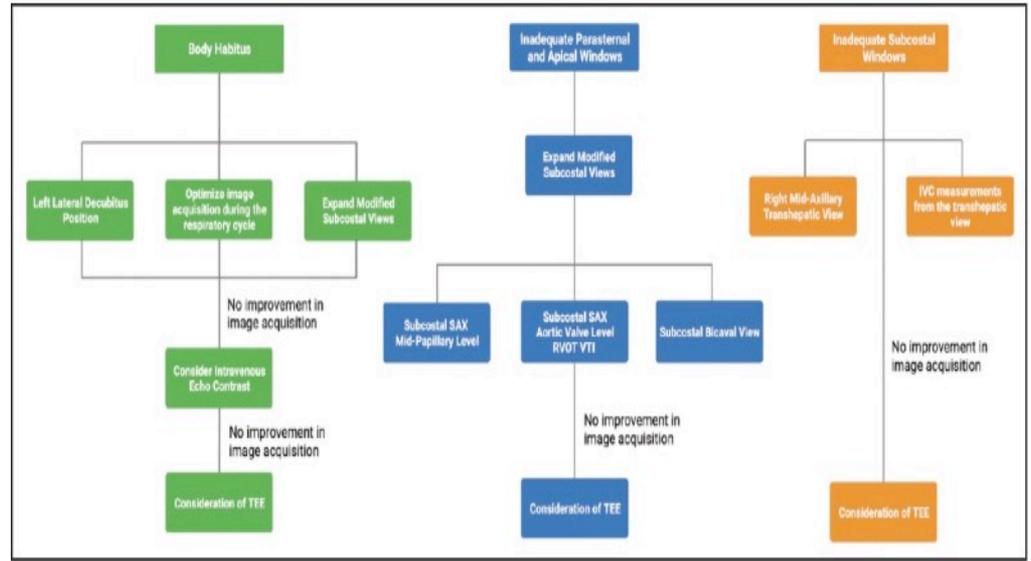
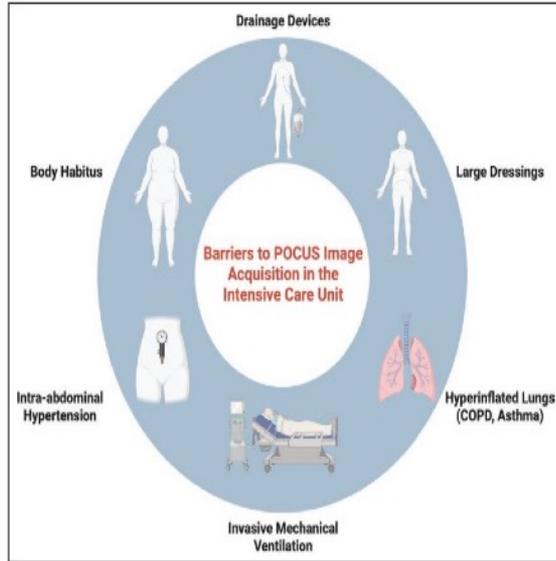
Generalidades

Precarga, GC y Ley de Frank - Starling



Para optimizar el gasto cardiaco se debe medir y conocer la precarga

ETE: utilización en la práctica clínica



Grotberg JC, McDonald RK, Co IN. Point-of-Care Echocardiography in the Difficult-to-Image Patient in the ICU: A Narrative Review. Crit Care Explor. 2024 Jan 11;6(1):e1035.

ETE: utilización en la práctica clínica

Masas ocupantes/trombos auriculares

- Coágulo en el apéndice de la aurícula izquierda
- Contraste espontáneo en el apéndice de la aurícula izquierda
- Coágulo en el cuerpo de la aurícula izquierda
- Trombo en la aurícula derecha
- Masa ocupante/trombo sobre el cable de un marcapasos transitorio o el cable de un marcapasos definitivo

Válvula mitral

- Mecanismo exacto de la regurgitación mitral
- Estimación refinada de la conveniencia de una valvulotomía en la estenosis mitral grave
- Caracterización de los jets excéntricos
- Funcionamiento de la prótesis valvular

Aorta

- Detección / caracterización de una disección
- Detección de un ateroma

Traumatismo aórtico / disección

Cámaras

- Refinamiento de las características de un foramen oval permeable menor

Monitorización en línea

- Tamaño y función del ventrículo izquierdo durante la cirugía
- Monitorización de procedimientos de intervención
 - Septostomía auricular
 - Valvuloplastia con balón
- Intervenciones en la vena pulmonar o la aurícula izquierda

Endocarditis

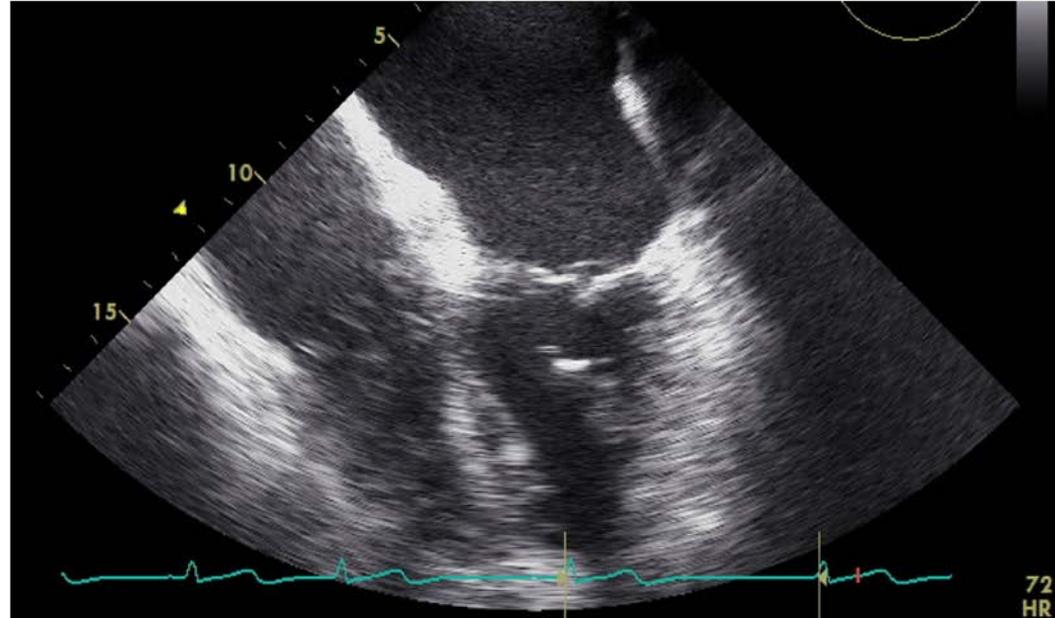
- Detección de abscesos aórticos
- Identificación de vegetaciones pequeñas

ETE: utilización en la práctica clínica

Standard exam views	Focused exam views
Midesophageal AV short-axis (rotation: 30°-45°)	Midesophageal 4-chamber (rotation: 0°)
Midesophageal AV long-axis (rotation: 120°-135°)	Midesophageal AV long-axis (rotation: 120°-135°)
Midesophageal bicaval (rotation: 0° and 90°)	Midesophageal bicaval (rotation: 0° and 90°)
SVC M mode (rotation: 90°)	Transgastric midpapillary short-axis (rotation: 0°)
Midesophageal 4-chamber (rotation: 0°)	
Midesophageal long-axis (rotation: 90-120°)	
Transgastric midpapillary short-axis (rotation: 0°)	
Transgastric long-axis (rotation: 120°)	
Midesophageal ascending aorta short-axis (rotation: 0°)	
Thoracic aorta (rotation 0-90°)	

ETE: utilización en la práctica clínica

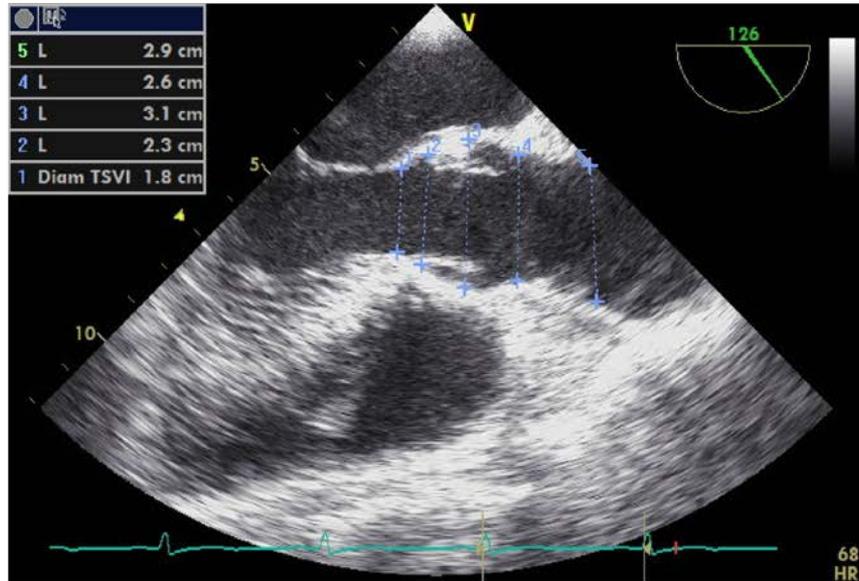
ME
4 CÁMARAS



ETE: utilización en la práctica clínica

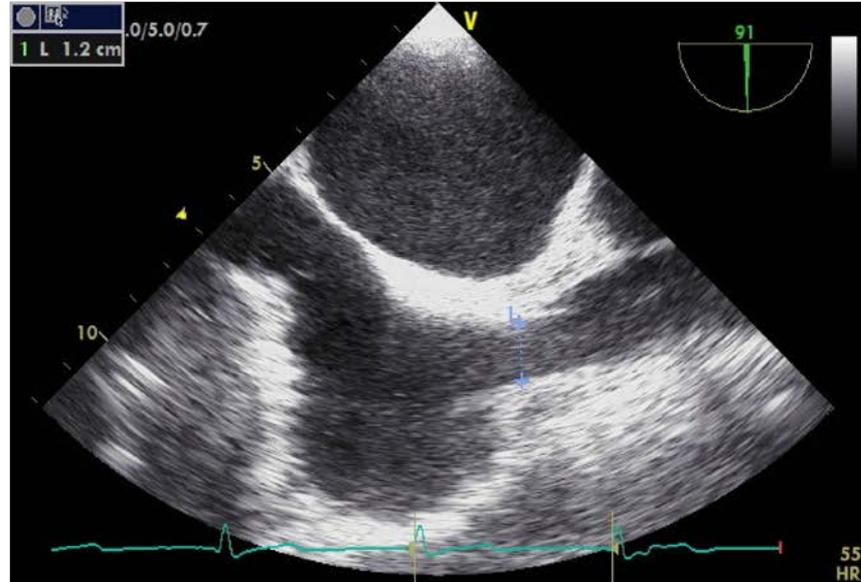
ME

PLANO LARGO



ETE: utilización en la práctica clínica

PLANO BICAVA



ETE: utilización en la práctica clínica

PLANO
TRANSGÁSTRICO

NIVEL M.
PAPILARES



ETE perioperatorio

Preoperatoria

- ✓ Pacientes con alto riesgo cardiovascular.
- ✓ Sospecha de inestabilidad hemodinámica intraoperatoria.
- ✓ Procedimientos especiales. (TEVAR)
- ✓ Trauma abdominal y/o torácico severo.
- ✓ Disección aórtica.



ETE perioperatorio

Intraoperatoria y Postoperatoria

- ✓ Hipotension y/o hipoxemia persistentes inexplicadas.
- ✓ Bajo gasto cardiaco o insuficiencia cardiaca.
- ✓ Requerimientos elevados de DVA.
- ✓ Isquemia miocárdica.
- ✓ Parada cardiorrespiratoria.

Review > [Can J Anaesth](#). 2018 Apr;65(4):381-398. doi: 10.1007/s12630-017-1017-7.
Epub 2017 Nov 17.

Perioperative transesophageal echocardiography for non-cardiac surgery

Ashraf Fayed ¹, Sasha K Shillcutt ²

Affiliations + expand

PMID: 29150779 PMCID: [PMC6071868](#) DOI: [10.1007/s12630-017-1017-7](#)

ETE perioperatorio



**Debe ser realizado por personal
entrenado, experto y certificado!!!**

3.14 When should intraoperative echocardiography be performed?

Consensus recommendations

- Echocardiography should be performed in patients with haemodynamic instability not responding to initial treatment, especially when the cause of haemodynamic instability is unclear.
- Echocardiography may be considered to guide haemodynamic therapy.
- Echocardiography images and results should be saved in the patient's medical records.

ETE perioperatorio

Review

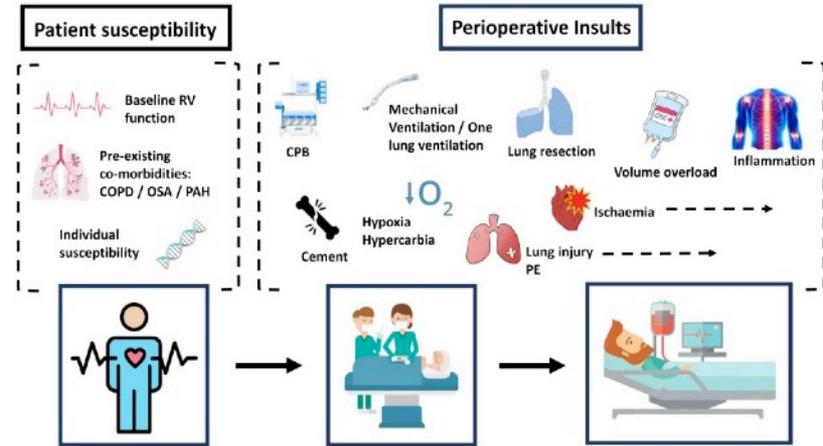
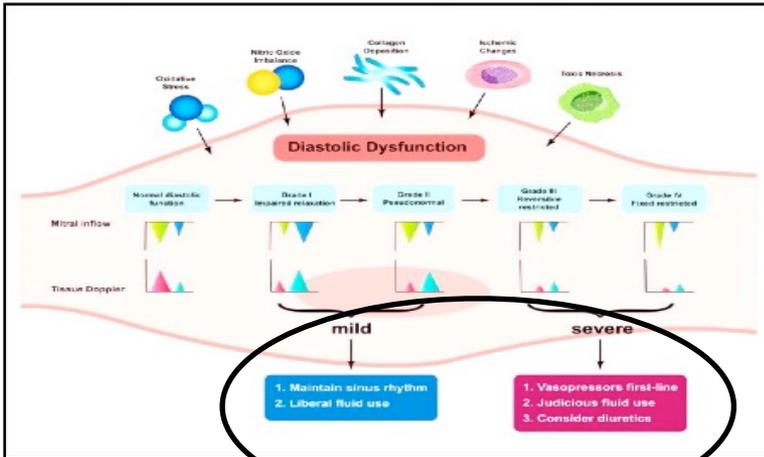
Managing Diastolic Dysfunction Perioperatively

Seminars in Cardiothoracic and Vascular Anesthesia
 2023, Vol. 27(1) 42-50
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 DOI: 10.1177/10892332231142441
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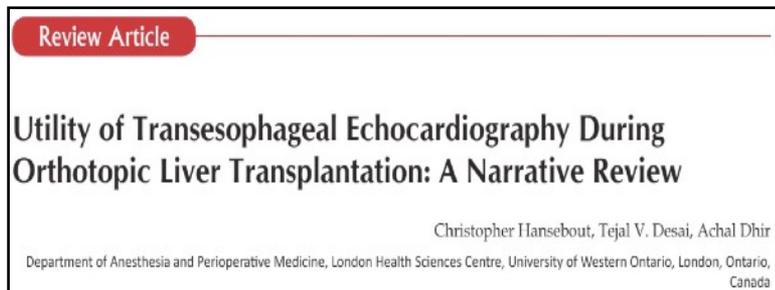
Theodore J. Cios, MD, MPH, FASA, FASE¹,
 John C. Klick, MD, FCCP, FASE, FCCM², and
 S. Michael Roberts, DO, FASE¹



Incidencia: 4-24%

Hazzard ratio: 1,78-3,58

ETE perioperatorio



- ✓ Desde los 80s se utiliza ETE para OLT.
- ✓ Encuesta en USA (2008) hasta en el 86% de los casos se realizó ETE y solo el 12% de los operadores estaban certificados.
- ✓ En 2018: miembros con certificado avanzado (54%) y básico (64%) de los hospitales.



- ✓ **Fase preanhepática:** función cardíaca basal (incluyendo GC), volemia, derrames y correcta posición de catéteres.
- ✓ **Fase anhepática:** volemia, resistencias vasculares y contractilidad miocárdica.
- ✓ **Fase neohepática:** síndrome de reperfusión, posibles embolismos aéreos y disfunción diastólica.

ETE perioperatorio

Review > Clin Transplant. 2022 Oct;36(10):e14643. doi: 10.1111/ctr.14643.

What is the optimal anesthetic monitoring regarding immediate and short-term outcomes after liver transplantation?—A systematic review of the literature and expert panel recommendations

Thomas M A Fernandez ^{1, 2}, Nick Schofield ³, Claus G Krenn ⁴, Nicole Rizkalla ⁵,
 Michael Spiro ^{3, 6}, Dimitri Aristotle Raptis ^{6, 7}, Andre M De Wolf ⁸, William T Merritt ^{5, 9};
 ERAS4OLT.org Working Group ¹

Collaborators, Affiliations + expand

PMID: 35262975 PMCID: PMC10077907 DOI: 10.1111/ctr.14643

- ✓ 16 estudios de baja calidad.
- ✓ ETE herramienta diagnostica efectiva.
- ✓ ETE se puede utilizar en varices esofágicas tratadas.

(Quality of Evidence Low, Grade of Recommendation Strong)

Abbreviated TEE protocol adapted for liver transplantation ⁴⁰	
Diagnosis	OLT TEE protocol (five views)
LV or RV dysfunction	Mid-esophageal 4-Chamber
Hypovolemia	
Tamponade	
SAM/LV outflow tract obstruction	Mid-esophageal LV Long-Axis
Patent Foramen Ovale	Mid-esophageal Bicaval
Pulmonary Embolism	
RV Dysfunction	Mid-esophageal RV inflow/outflow
Intracardiac Thrombus	
Pulmonary Embolism	
Hepatic Vein Stenosis	Hepatic Vein

ETE perioperatorio



- ✓ ETE para correcta colocación de catéter de ECMO.
- ✓ ETE para evaluación hemodinámica.
- ✓ **ETE para evaluación de venas y arterias pulmonares.**



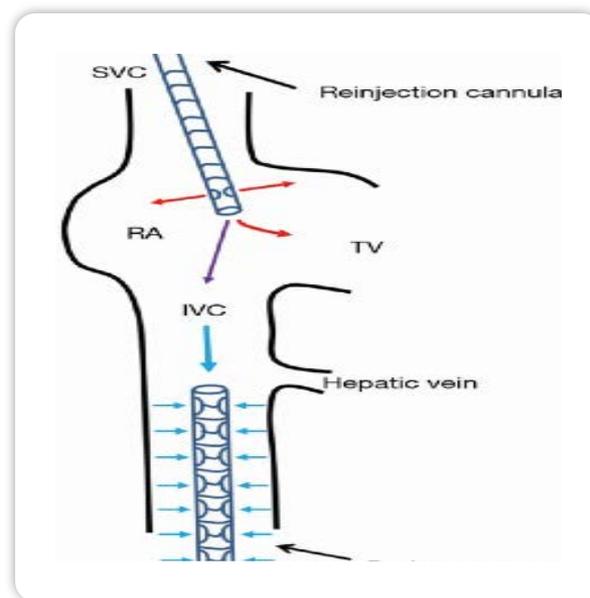
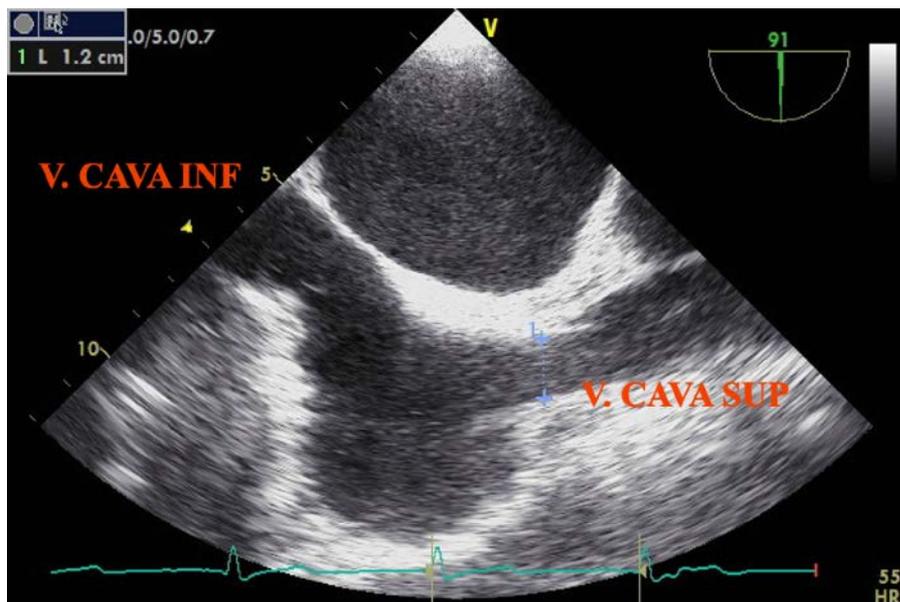
- ✓ 41 estudios, 2022.
- ✓ ETE intraoperatorio para guiar el reposicionamiento mediastinal, mediante prótesis.

ETE perioperatorio

ETE esencial para comprobar correcta
posición de la cánula!!!



ETE perioperatorio



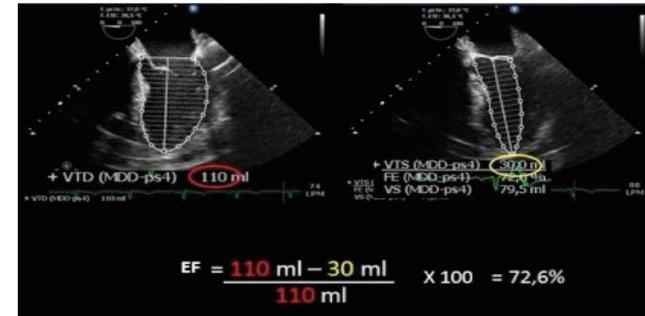
ETE perioperatorio

Anesth Pain Med. 2023 June; 13(3):e136524. <https://doi.org/10.5812/aapm-136524>
Published online 2023 June 14. Review Article



Veno-venous Extracorporeal Membrane Oxygenation: Anesthetic Considerations in Clinical Practice

Kimberly L. Skidmore ¹, Alireza Rajabi ^{2,*}, Angela Nguyen ³, Farnad Imani ⁴ and Alan D. Kaye ¹



- ✓ ETE util para determinar el correcto llenado del VI, así como la contractilidad.

ETE perioperatorio

Preoperatorio

- ✓ Función sistólica del ventrículo derecho.
- ✓ Regurgitación tricúspidea.

Intraoperatorio

- ✓ Estatus cardíaco y presiones pulmonares.
- ✓ Llenado del VI y posición de la cánula del dispositivo.
- ✓ Adecuada des-aireación del VI.
- ✓ Exclusión de regurgitación aórtica.

Review > [Ann Transl Med.](#) 2020 Jul;8(13):830. doi: 10.21037/atm-20-2527.

Perioperative management of patients with undergoing durable mechanical circulatory support

[Nikolai Hulde](#)¹, [Andreas Koster](#)¹, [Vera von Dossow](#)¹

Affiliations + expand

PMID: 32793675 PMID: [PMC7396234](#) DOI: [10.21037/atm-20-2527](#)

Evaluación dinámica!!!

ETE perioperatorio

Current Anesthesiology Reports (2022) 12:210–216
<https://doi.org/10.1007/s40140-022-00526-0>

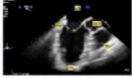
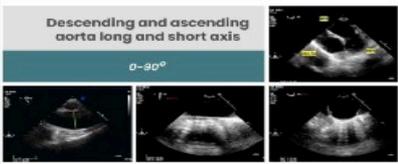
ANESTHESIA FOR TRAUMA (TE GRISSOM, SECTION EDITOR)



Is There a Role for Transesophageal Echocardiography in the Perioperative Trauma Patient?

Laura Girón-Arango^{1,2} · Pablo Pérez D'Empaire³

- ✓ Shock hemorrágico.
- ✓ Trauma torácico.
- ✓ Grandes quemados.
- ✓ PCR.

TEE Views	Clinical Application
Mid-esophageal 4 chamber 0–10° 	LV/RV function, wall motion abnormalities, pericardium
Mid-esophageal long axis 120–140° 	LV function, wall motion abnormalities, pericardium, CPR quality
Trans-gastric short axis 0–20° 	LV function and size, pericardium
Mid esophageal bicaval 90–110° 	Procedure guidance (central venous access), volume assessment
Descending and ascending aorta long and short axis 0–90° 	Aortic injuries

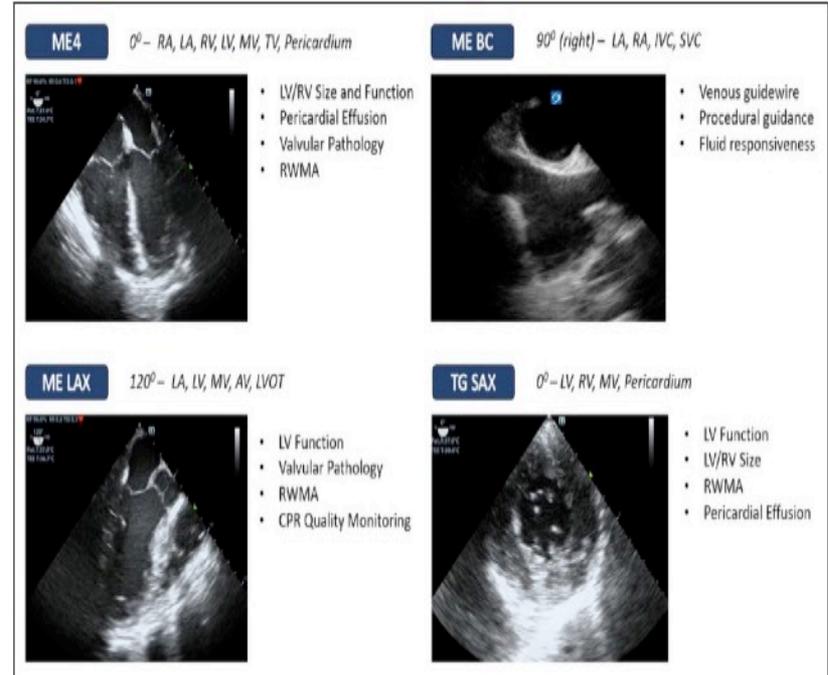
ETE fuera de quirófano

1. Paciente crítico.
2. Endocarditis infecciosa.
3. Disección aórtica.
4. Enfermedad cerebrovascular.
5. Previo a cardioversión eléctrica.
6. Parada cardiorrespiratoria.
7. Valoración de Donantes

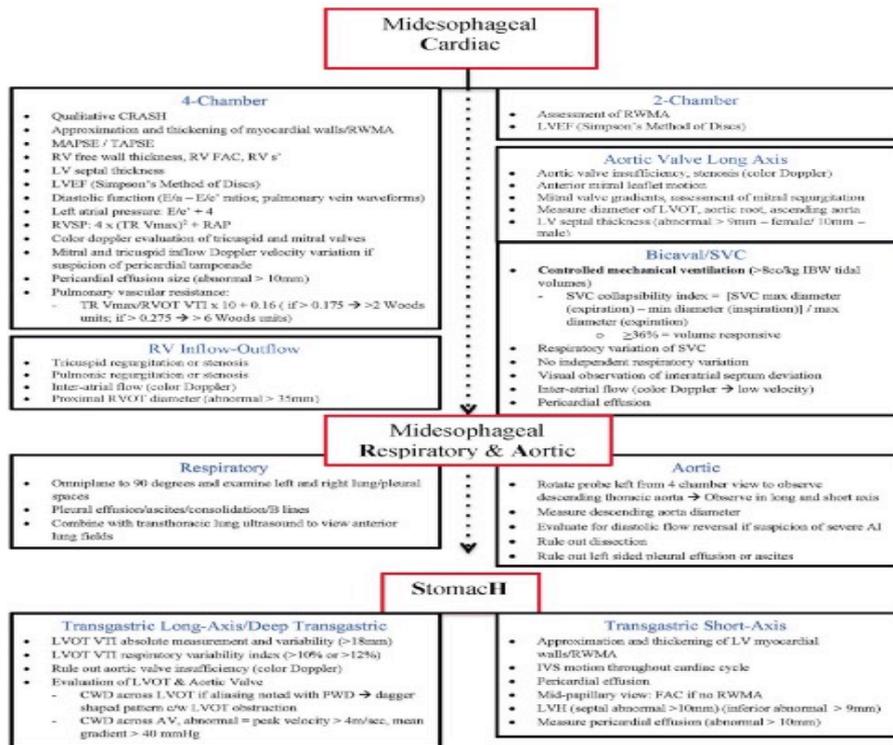
Paciente crítico



- ✓ 108 estudios con más de 6700 pacientes.
- ✓ ETE logra un cambio en el diagnóstico en el 52%-78% de los casos.
- ✓ ETE logra un cambio en el manejo en el 32%-79% de los casos.



Paciente crítico



Review > Semin Ultrasound CT MR. 2024 Feb;45(1):74–83. doi: 10.1053/j.sult.2023.12.008. Epub 2023 Dec 6.

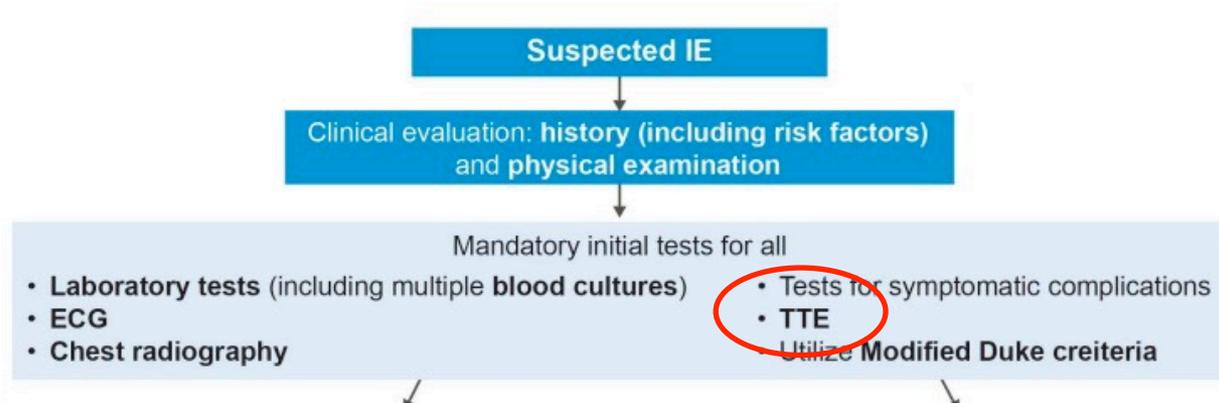
An Echocardiographic Approach for the Management of Shock: The Subcostal to Apical, Respiratory to Parasternal-Cardiac to Respiratory, Aortic to Stomach Protocol

Sara Nikravan ¹, Nibras Bughrara ², John Klick ³, Michael J Lanspa ⁴, Lisa Rapoport ⁵, José Díaz-Gomez ⁶

Protocolo CRASH

- ✓ Protocolo para definir fenotipos de shock.
- ✓ Alternativa ETE al Protocolo STARS.
- ✓ Evalúa función cardíaca, respuesta a fluidos y tolerancia a los mismos.
- ✓ Necesita evaluación ecográfica pulmonar complementaria.

Endocarditis infecciosa



Review > Life (Basel). 2023 Feb 25;13(3):639. doi: 10.3390/life13030639.

Contemporary Review of Multi-Modality Cardiac Imaging Evaluation of Infective Endocarditis

Aro Daniela Arockiam ¹, Ankit Agrawal ¹, Joseph El Dahdah ¹, Bianca Honnekeri ¹, Tahir S Kafil ¹, Saleem Halablab ¹, Brian P Griffin ¹, Tom Kai Ming Wang ¹

Endocarditis infecciosa

Review > *Curr Probl Cardiol.* 2024 Jan;49(1 Pt C):102151. doi: 10.1016/j.cpcardiol.2023.102151. Epub 2023 Oct 20.
Echocardiographic assessment in infective endocarditis: Transthoracic or transesophageal echocardiography, or both?: Echocardiography in endocarditis
 Hävard Ödinger ¹, Stig Urheim ², Stina Jordal ³, Sahral Saeed ⁴

✓ Aún con ETT positivo se recomienda ETE para descarte de complicaciones locales.

✓ Sensibilidad en diagnóstico de (EI) superior en ETE: válvula nativa 96% contra 70%, válvula protésica 92% contra 50%.

Review > *Pak J Med Sci.* 2022 Mar-Apr;38(3Part-I):736-742. doi: 10.12669/pjms.38.3.5139.
Comparing the diagnostic accuracy of computed tomography vs transoesophageal echocardiography for infective endocarditis - A meta-analysis
 Liqin Jing ¹, Yanchun Song ²

Characteristics	CCT	TEE	P value
Vegetation			
Sensitivity	0.80 (0.69 to 0.82) N=12	0.91 (0.84 to 0.97) N=11	0.019
Specificity	0.80 (0.71 to 0.90) N=8	0.80 (0.62 to 0.94) N=7	1
Peri-annular complications (abscesses and pseudoaneurysms)			
Sensitivity	0.88 (0.82 to 0.94) N=11	0.74 (0.65 to 0.84) N=10	0.015
Specificity	0.86 (0.79 to 0.93) N=5	0.89 (0.80 to 0.97) N=5	0.59
Leaflet Perforation			
Sensitivity	0.46 (0.24 to 0.68)	0.76 (0.70 to 0.81)	0.010
Specificity	-	0.88 (0.76 to 1) N=3	-
Fistula			
Sensitivity	0.79 (0.32 to 1) N=2	0.91 (0.73 to 1) N=2	0.52
Specificity	0.98 (0.96 to 1) N=2	0.98 (0.97 to 1) N=2	1

Endocarditis infecciosa

2023 ESC Guidelines for the management of endocarditis

Recommendations	Class ^a	Level ^b
A. Diagnosis		
TOE is recommended in all patients with clinical suspicion of IE and a negative or non-diagnostic TTE. ^{166,178,179}	I	B
TOE is recommended in patients with clinical suspicion of IE, when a prosthetic heart valve or an intracardiac device is present. ^{166,178,179}	I	B
TOE is recommended in patients with suspected IE, even in cases with positive TTE, except in isolated right-sided native valve IE with good quality TTE examination and unequivocal echocardiographic findings. ^{165,166,179}	I	C
B. Follow-up under medical therapy		
TOE is recommended when patient is stable before switching from intravenous to oral antibiotic therapy. ^{43,180}	I	B

Diseció aórtica

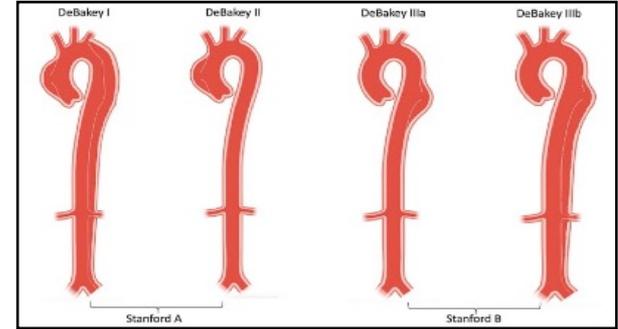
Review > Front Cardiovasc Med. 2024 Jan 10;10:1283703. doi: 10.3389/fcvm.2023.1283703.
 eCollection 2023.

Comparison between transthoracic echocardiography and transoesophageal echocardiography in the diagnosis of acute aortic dissection from an emergency perspective. A systematic review and meta-analysis

Hany A Zaki ¹, Bilal Albaroudi ¹, Eman E Shaban ², Baha Hamdi Alkahlout ¹, Yavuz Yigit ^{1,3},
 Wael Elnabawy ¹, Kaleem Basharat ¹, Nood Dhafi Almarri ¹, Aftab Mohammad Azad ⁴

Affiliations + expand

PMID: 38268852 PMCID: PMC10806094 DOI: 10.3389/fcvm.2023.1283703

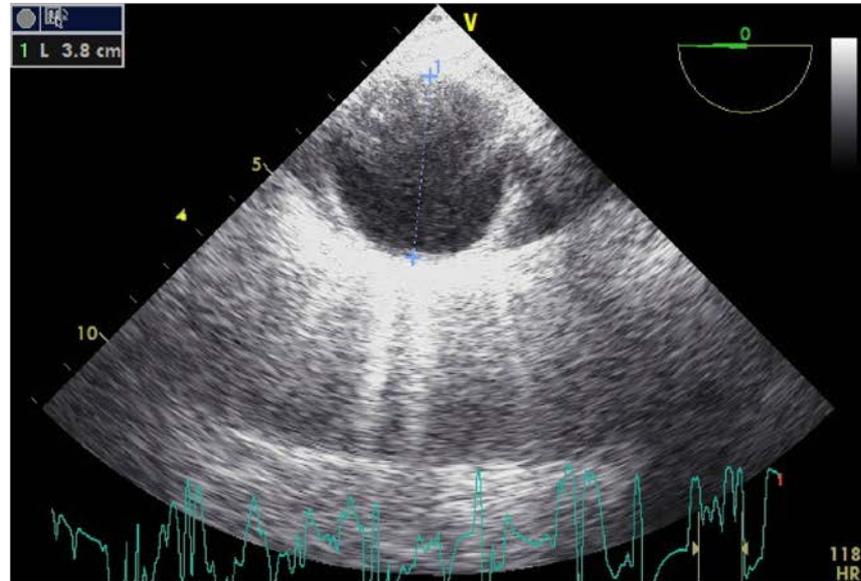


- ✓ 11 estudios con más de 3000 pacientes en total.
- ✓ ETE es mas favorable que ETT para el diagnóstico de AAD.
- ✓ ETT contrastada ofrece similares resultados que ETE.

Index test	Number of studies	Event rate	95% CI
TTE			
False negatives	4	0.286	0.087-0.629
False positives	4	0.186	0.051-0.492
TOE			
False negatives	3	0.024	0.11-0.049
False positives	4	0.043	0.016-0.111

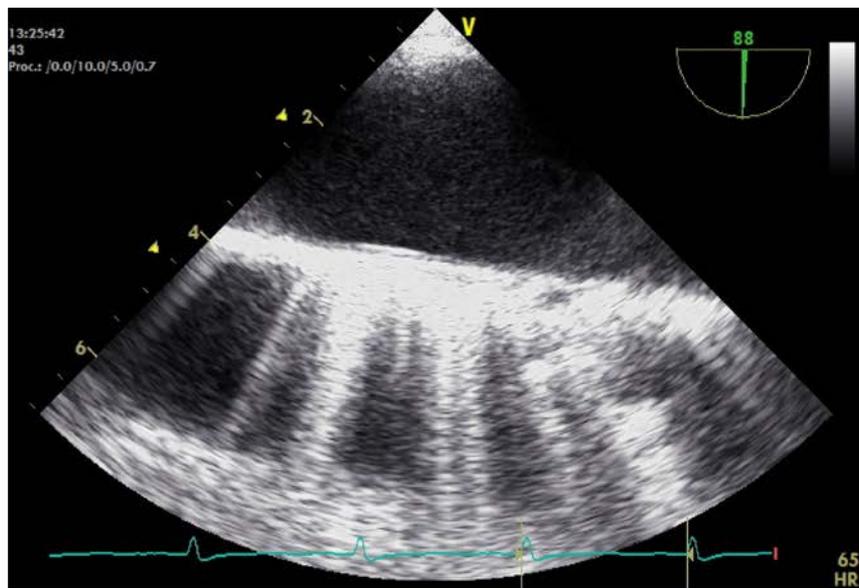
Dissecció aòrtica

AORTA TORACICA EJE CORTO



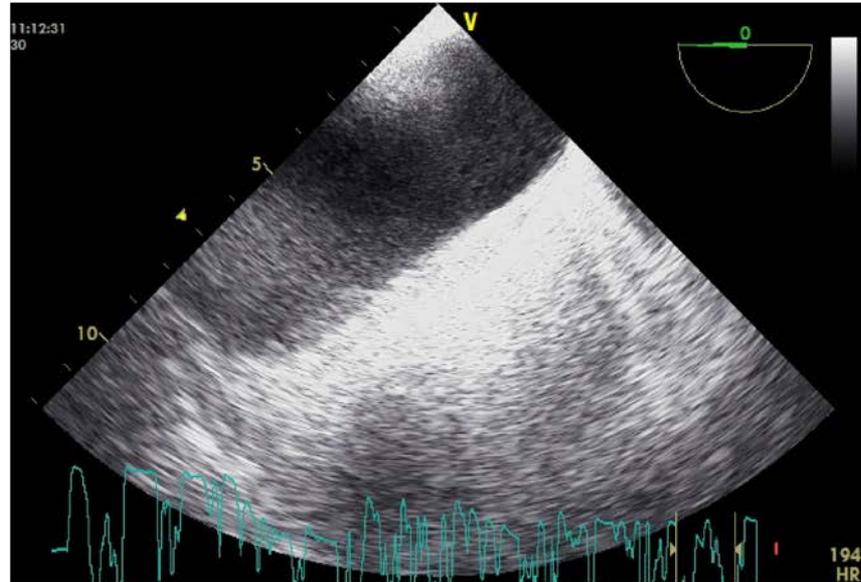
Dissecció aòrtica

AORTA TORACICA EJE LARGO



Dissecció aòrtica

CAYADO AORTICO



Enfermedad cerebrovascular

Journal of Neurology (2020) 267:1793–1801
<https://doi.org/10.1007/s00415-020-09766-8>

ORIGINAL COMMUNICATION



CT angiography vs echocardiography for detection of cardiac thrombi in ischemic stroke: a systematic review and meta-analysis

Nina-Suzanne Groeneveld¹ · Valeria Guglielmi¹ · Mariska M. G. Leeflang² · S. Matthijs Boekholdt³ · R. Nils Planken⁴ · Yvo B. W. E. M. Roos¹ · Charles B. L. M. Majoie⁴ · Jonathan M. Coutinho¹ 

- ✓ 14 estudios con más de 1500 pacientes.
- ✓ **CTA fue superior a ETE en la identificación de trombo intracavitario.**
- ✓ Estudio muy heterogéneo.

Front Neurol. 2021 Jul 30;12:699838. doi: 10.3389/fneur.2021.699838. eCollection 2021.

Cardiovascular MRI Compared to Echocardiography to Identify Cardioaortic Sources of Ischemic Stroke: A Systematic Review and Meta-Analysis

Thomas R Meinel¹, Angela Eggimann¹, Kristina Brignoli¹, Kerstin Wustmann², Eric Buffle², Felix G Meinel³, Jan F Scheitz⁴ ⁵ ⁶, Christian H Nolte⁴ ⁵ ⁶, Christoph Gräni², Urs Fischer¹, Johannes Kaesmacher⁷, David J Seiffge¹, Christian Seiler², Simon Jung¹

- ✓ 27 estudios con más de 2500 pacientes.
- ✓ **CV MRI y ETE tienen similar capacidad diagnóstica.**
- ✓ ETE mejor para de foramen oval persistente.

Enfermedad cerebrovascular



SARTD-CHGUV Sesión de formación continuada
Valencia, 12 de noviembre de 2024

Previo a cardioversión eléctrica

Review > Cureus. 2023 May 30;15(5):e39702. doi: 10.7759/cureus.39702.

eCollection 2023 May.

Transesophageal Echocardiogram Before Cardioversion in Atrial Fibrillation Patients

Victor O Adedara ¹, Vagisha Sharma ², Hassan Nawaz ³, Jonathan Reyes-Rivera ⁴, Sumera Afzal-Tohid ⁵, Patel T Pareshbhai ⁶, Sri P Boyapati ⁷, Alireza Sharafshah ⁸

- ✓ 20 estudios.
- ✓ ETE con contraste mejora el diagnóstico de trombo auricular izquierda (AI).
- ✓ La CVE guiada por ETE es cada vez más utilizada por sus beneficios.

Review > Cureus. 2023 Nov 2;15(11):e48149. doi: 10.7759/cureus.48149.

eCollection 2023 Nov.

Effectiveness of Transesophageal Echocardiography in Preventing Thromboembolic Complications Before Cardioversion: A Narrative Review

Prateek Jain ¹, Vishwesh Patel ², Yashaswi Patel ³, Jawairiya Rasool ⁴, Siddharth Kamal Gandhi ², Priyansh Patel ⁵

- ✓ 36 estudios.
- ✓ ETE juega un papel vital en la prevención de tromboembolismo durante la CV de la FA.
- ✓ ETE alta sensibilidad en detección de trombo intracardiaco, en especial en la orejuela de AI.

Parada cardiorrespiratoria



HIGHLIGHTS

- Focused TEE overcomes some of the difficulties of performing surface echocardiography during cardiac arrest resuscitation.
- TEE can provide reliable, high-quality cardiac images regardless of any patient-related or external factors.
- Continuous TEE images during cardiac arrest allow feedback on the quality of CPR.
- Like TTE, TEE allows identification of reversible pathologies and can provide prognostic information.

TABLE 1 Clinical Applications of Focused TEE Views in Cardiac Arrest

Focused TEE View	Cardiac Structures	Applications
ME4C	All cardiac chambers Pericardium LV/RV walls Mitral and tricuspid valves	Rule out tamponade Assess cardiac activity Identify intracardiac thrombus Assess LV/RV size and function Detect fine VF
MELAX	LV, LA, and RV chambers LV outflow tract Aortic root Mitral and aortic valves	Assess ascending aorta for dissection/injury Determine AMC during CPR
TGSAX	All LV walls and septum	Assess cardiac activity LV/RV size and function, cardiac filling status, presence of tamponade
Bicaval	IVC, RA, and SVC	Procedural guidance (ECMO, CVC) Volume responsiveness in post-arrest, intracardiac thrombus
DTA LAX	Descending aorta	Procedural guidance (ECMO)

Parada cardiorrespiratoria

Journal of
Clinical Medicine MDPI

Review
Physiology-Guided Resuscitation: Monitoring and Augmenting Perfusion during Cardiopulmonary Arrest

Samuel Bernard , Raymond A. Pashun , Bhavya Varma and Eugene Yuriditsky 

- ✓ ETE menores pausas para control del pulso.
- ✓ ETE identifica mejor causas reversibles de PCR.
- ✓ ETE ideal para determinar el área de máxima compresión.

diagnostics MDPI

Review
Echocardiography in Cardiac Arrest: Incremental Diagnostic and Prognostic Role during Resuscitation Care

Alfredo Mauriello ^{1,2} , Gemma Marrasso ², Gerardo Elia Del Vecchio ^{1,2}, Antonia Ascrizzi ¹, Anna Selvaggia Roma ¹, Adriana Carrera ³, Francesco Sabatella ², Renato Gioia ², Alfonso Desiderio ², Vincenzo Russo ¹  and Antonello D'Andrea ^{2,*} 

- ✓ ETE diagnostica en el 78% de los casos.
- ✓ ETE influye en la decisión terapéutica en el 67% de los casos.
- ✓ ETE útil en los cuidados post-resucitación.

West J Emerg Med. 2024 Mar;25(2):166-174. doi: 10.5811/westjem.18440.

Performance of Intra-arrest Echocardiography: A Systematic Review

Yi-Ju Ho ¹, Chih-Wei Sung ^{1 2}, Yi-Chu Chen ³, Wan-Ching Lien ^{1 4}, Wei-Tien Chang ^{1 4}, Chien-Hua Huang ^{1 4}

- ✓ 27 estudios, 16 de ETE con 568 pacientes.
- ✓ ETE identifica mejor causas de PCR que ETT.
- ✓ ETT identifica mejor signos de ROSC.

Complicaciones

PROCEEDINGS: UNIV MED CENT
 2023;36(6):729-733
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<https://doi.org/10.1000/U99937FD.2023.29433H>

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Transesophageal echocardiography–associated gastrointestinal injuries: systematic review and pooled rates of gastrointestinal injuries

Manesh Kumar Gangwani, MD^a, Abeer Aziz, MD^b, Dushyant Singh Dahiya, MD^b, Rehmat Ullah Awan, MD^d, Muhammad Aziz, MD^a, Anooja Rani^f, Amir Humza Sohail, MD^g, Hazim Hakmi, MD^g, Hassam Ali, MD^h, Umar Hayat, MDⁱ, Wade Lee-Smith, MLS^j, Faisal Kamal, MD^a, and Sumant Inamdar, MD^k

Table 2. Comparing different patient and setting parameters affecting outcomes

Patient cohort	Total complications
Critically ill patients	9/818 (1.1%)
Patients undergoing cardiac procedures	173/25,687 (0.67%)
Liver transplant patients	16/1177 (1.35%)
In-hospital TEE	9/818 (1.1%)
Intraoperative TEE	189/26,864 (0.7%)

TEE indicates transesophageal echocardiography.

Table 1. Total complications and their incidence in each study

Adverse event	Total adverse events (213)	Individual adverse events
Bleeding	80 (37.6%)	80/46,196 (0.17%) (95% CI 0.1% to 0.3%, $I^2 = 75.7%$)
Hematoma	17 (7.9%)	17/262 (6.5%) (95% CI -13.7% to 43%, $I^2 = 94.9%$)
Lacerations	36 (16.9%)	36/30,524 (0.12%) (95% CI -0.1% to 0.5%, $I^2 = 92.3%$)
Dysphagia/odynophagia	41 (19.2%)	41/15,274 (0.27%) (95% CI -0.1% to 0.5%, $I^2 = 89.3%$)
Esophageal tear/perforation	20 (9.4%)	20/37,998 (0.05%) (95% CI 0.0% to 0.1%, $I^2 = 46.3%$)
Vocal cord paralysis	10 (4.7%)	10/8096 (0.12%) (95% CI 0.1% to 0.2%, $I^2 = 0$)
Dental injury	9 (4.2%)	9/13,225 (0.07%) (95% CI 0.0% to 0.1%, $I^2 = 69.5%$)

Complicaciones

Meta-Analysis > Aliment Pharmacol Ther. 2022 May;55(9):1088-1098. doi: 10.1111/apt.16860. Epub 2022 Mar 28.

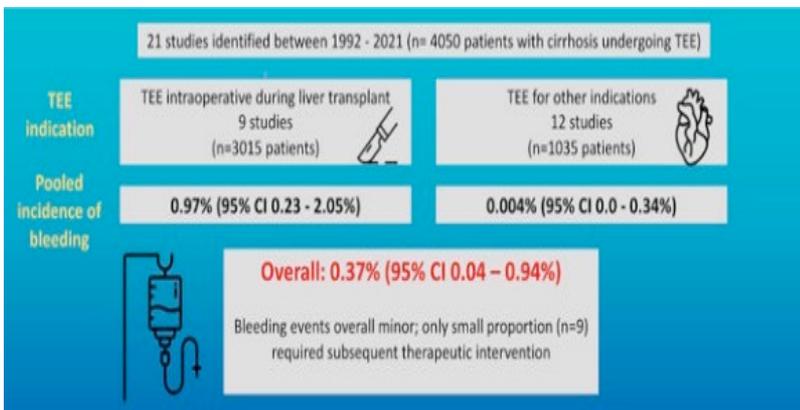
Systematic review with meta-analysis: incidence of variceal hemorrhage in patients with cirrhosis undergoing transesophageal echocardiography

Mobolaji Odewole ^{1, 2}, Ahana Sen ^{1, 3}, Ehiamen Okorwu ⁴, Sarah R Lieber ¹, Thomas G Cotter ³, Anh D Nguyen ⁵, Arjmand Mufti ¹, Amit G Singal ^{1, 6}, Nicole F Rich ^{1, 6}

Review > Front Cardiovasc Med. 2024 Jun 28;11:1410594. doi: 10.3389/fcvm.2024.1410594. eCollection 2024.

Transesophageal echocardiography related complications

Linyue Zhang ^{# 1 2 3}, Yuji Xie ^{# 1 2 3}, Zhaoli Ren ^{1 2 3}, Mingxing Xie ^{1 2 3}



	Severity	Prevention	Treatment	Time to resolve
Oropharyngeal				
Lip bruising	+	Use a bite guard and laryngoscope	Apply an ice pack	1-2 days
Lip laceration	++	Lubricate the probe properly	Stitches to close wound	3-5 days
Tooth defect	+	Use a bite block to keep the probe midline	Dental filling or crown	3-5 days
Loose tooth	++	Assess the oral cavity and operate gently	Periodontal therapy/dental replantation	5-7 days
Pharyngeal laceration	++	Place the probe under direct visualization	Restricted oral intake and intravenous antibiotics	3-5 days
Perforation of the hypopharynx	+++	Avoid keeping the probe in a flexed and locked position	Operative suturing or reconstruction surgery	1 month
Accidental tracheal intubation	+++	Place the probe under direct visualization	Refraining from insertion	1-2 days
Esophageal				
Odynophagia	+	Reduce unnecessary operations, freeze image when probe is not being used	Resolve on its own or with medication	3-5 days
Dysphagia	++	Reduce unnecessary operations, freeze image when probe is not being used	Medicine or esophageal dilation	3-5 days
Laceration/perforation	+++	Avoid forceful placement and manipulation of the TEE probe	Operative suturing or reconstruct surgery	3-5 weeks
Mallory-Weiss tear	+++	Refraining from insertion if resistance is met	Endoscopic hemostasis	10 days
Gastric				
Laceration/perforation	+++	Avoid forceful placement and manipulation of the TEE probe	Emergency surgery to prevent acute peritonitis	1-2 months
Hemorrhage	++/+++	Minimize depth manipulation	Observation/stanching medicine with antibiotics/ surgery is considered if bleeding is not self-limiting	1 month

Riesgo de sangrado post procedimiento bajo en cirróticos, siendo la la ETE segura!!!

Desventajas

- ✓ Requiere entrenamiento específico.
- ✓ Observador dependiente.
- ✓ Equipo de elevado coste.
- ✓ En situaciones críticas la introducción y disposición de la sonda no siempre es posible.
- ✓ Invasivo con potencial de iatrogenia.

Conclusiones

- ✓ La ecocardiografía a probado tener cabida en el manejo hemodinámico de los pacientes sometidos a cirugía no cardiaca. Y el ETE aporta valor adicional.
- ✓ El desarrollo de la ETE ha supuesto un cambio significativo en el adecuado proceso diagnóstico-terapéutico.
- ✓ Es interesante fomentar la formación continuada y certificada en ETE en anesthesiólogos de distintas áreas asistenciales.
- ✓ La aplicación de un protocolo ETE en cirugía NO cardiaca como en pacientes críticos (REA) , constituye una herramienta adicional util en situaciones y pacientes con comorbilidad compleja.

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Gracias.

SARTD-CHGUV Sesión de formación continuada
Valencia, 12 de noviembre de 2024