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TRATAMIENTO ENDOVASCULAR DEL ANEURISMA AÓRTICO TORÁCICO DESCENDENTE ROTO

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SARTD-CHGUV Sesión de Formación Continuada
Valencia 30 de Junio del 2015

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INDICACIONES DE TRATAMIENTO ENDOVASCULAR DE LA AORTA TORÁCICA



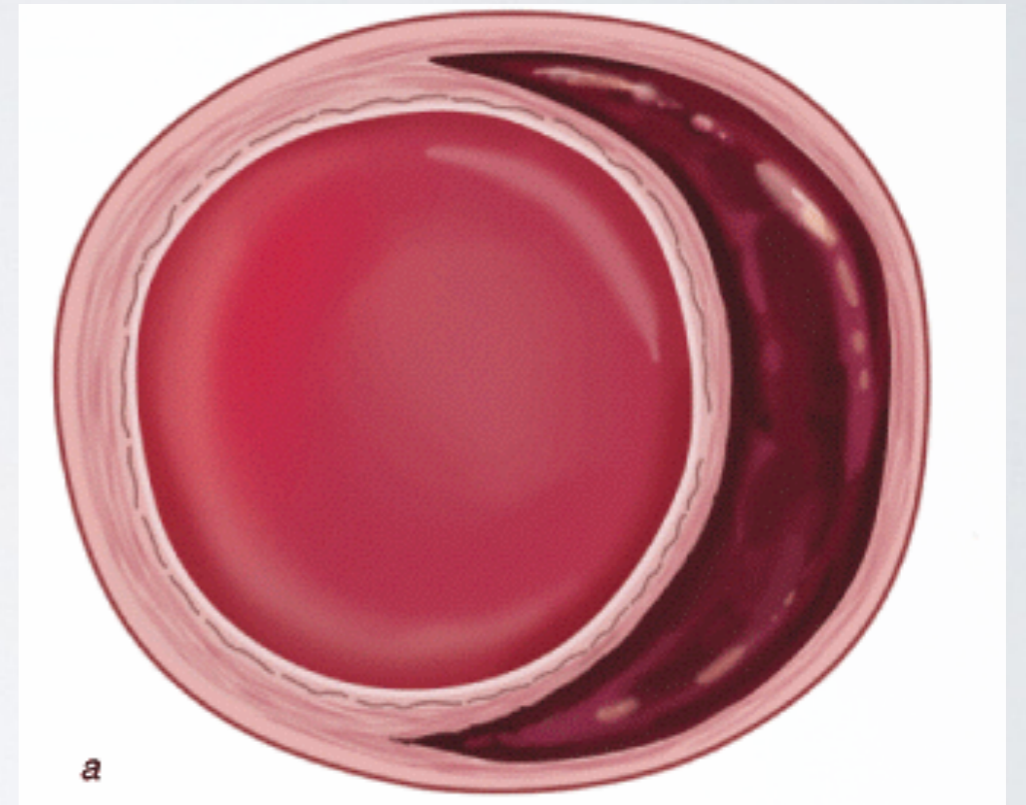
Table 10. Summary of Society of Thoracic Surgeons Recommendations for Thoracic Stent Graft Insertion

Entity/Subgroup	Classification	Level of Evidence
<u>Penetrating ulcer/intramural hematoma</u>		
Asymptomatic	III	C
Symptomatic	IIa	C
<u>Acute traumatic</u>		
<u>Chronic traumatic</u>	IIa	C
<u>Acute Type B dissection</u>		
Ischemia	I	A
No ischemia	IIb	C
<u>Subacute dissection</u>		
<u>Chronic dissection</u>		
Degenerative descending		
>5.5 cm, comorbidity	IIa	B
>5.5 cm, no comorbidity	IIb	C
<5.5 cm	III	C
Arch		
Reasonable open risk	III	A
Severe comorbidity	IIb	C
<u>Thoracoabdominal/Severe comorbidity</u>		

Reprinted from Svensson et al. (119).

HEMATOMA INTRAMURAL

- 6-10% de los SAA
- Variante de la DAC: similar presentación y complicaciones
- Hemorragia intraparietal “vasa vasorum”
Ausencia de *puerta inicial de entrada*
- Aorta descendente
- Derrame *pericárdico y pleural*
- *Evolución: rotura precoz o tardía, dilatación progresiva, DAC, reabsorción*



DIAGNÓSTICO

Técnicas de imagen:

- **ETE, TC, RM**
- **Engrosamiento parietal** regional de la aorta ($> 7\text{mm}$),
- No: ruptura de la íntima, ni flujo en la falsa luz
- TC y RM: excelentes para cuadro *inicial* y *seguimiento*
- Angiografía: solo signos indirectos



TRATAMIENTO

- Inicial: **médico**
- B-Bloqueantes no útiles en fase aguda
- **Tipo A**
 - Peor pronóstico —> Fase aguda: mortalidad de > 39%
 - **Quirúrgico y urgente** (Indicación clase I, nivel de evidencia C)
- **Tipo B**
 - Mejor pronóstico
 - **Médico**
 - **Quirúrgico** : casos de evolución desfavorable
 - **Endovascular** si indicación de tratamiento Qx en fase aguda, la técnica es un planteamiento eficaz para reducir morbimortalidad



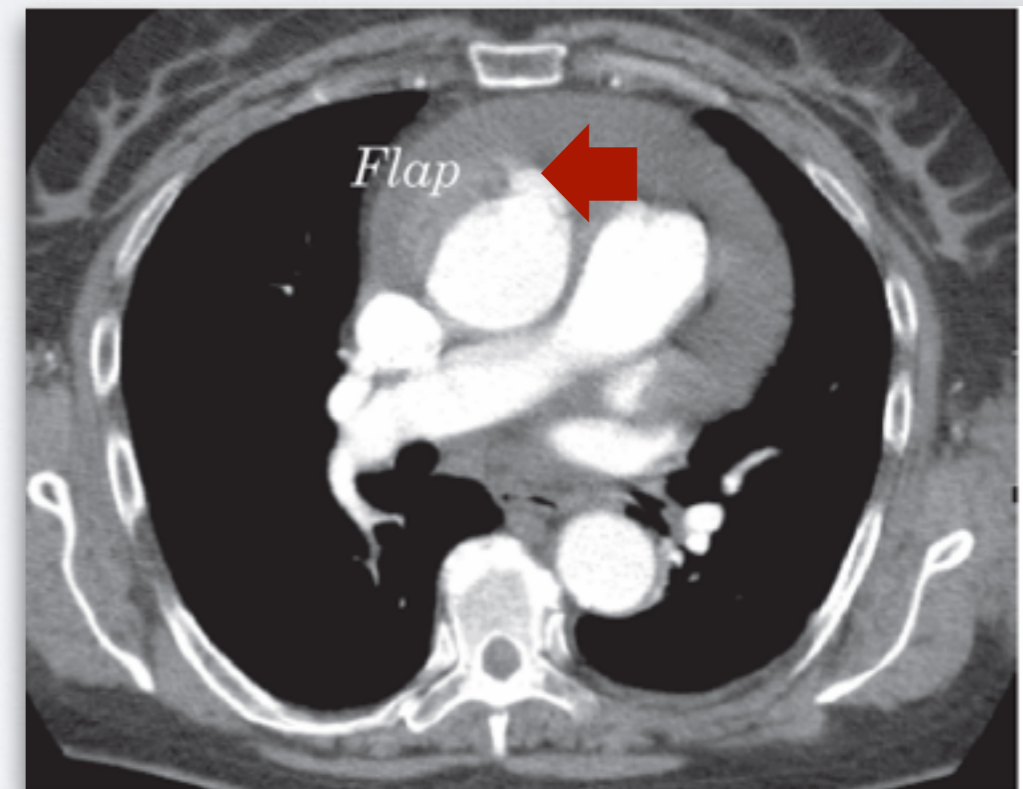
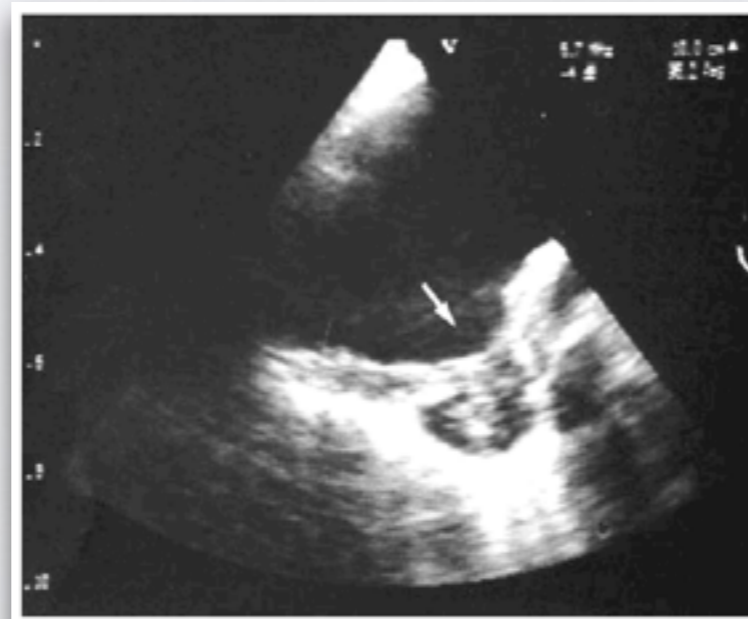
ÚLCERA PENETRANTE AÓRTICA

- Asintomática
- Ulceración pared aterosclerótica, con rotura de la lámina elástica y penetración en la media
- > riesgo rotura que DAC
- Aterosclerosis avanzada con vasculopatía multisegmentaria



DIAGNÓSTICO

- **Aortografía:** imagen en “sacabocados”
- **Rx tórax:** dilataciones focales de la aorta
- **TC y RM :** muy útiles
 - Imagen en sacabocados, engrosamientos de pared
- **ETE:** muy útil (limitaciones)
- Ojo! la impronta del ductus puede confundirse con UPA



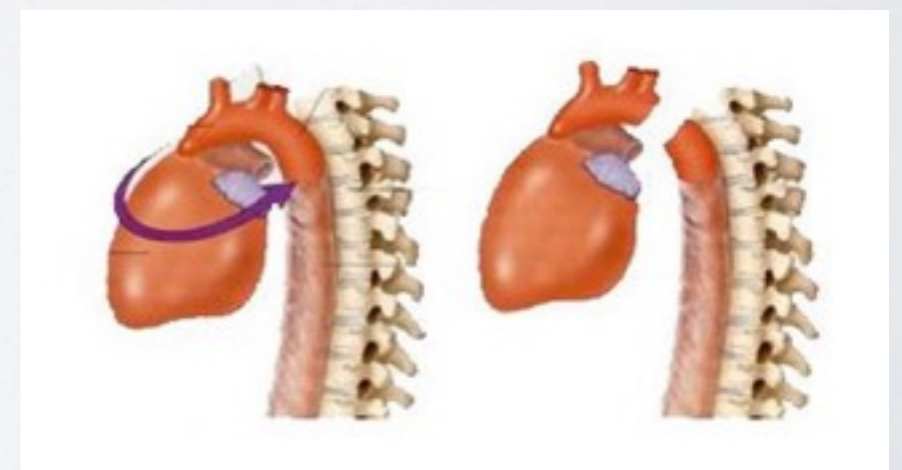
TRATAMIENTO

- **Asintomáticas:**
 - Seguimiento riguroso y control de factores de riesgo
 - B-bloqueantes
- **Sintomáticas**
 - Reducción de la fuerza de eyección del ventrículo izquierdo: B-bloque
 - Control agresivo de la presión arterial
 - **Quirúrgico** en aorta ascendente
 - **Individualizado** en aorta descendente



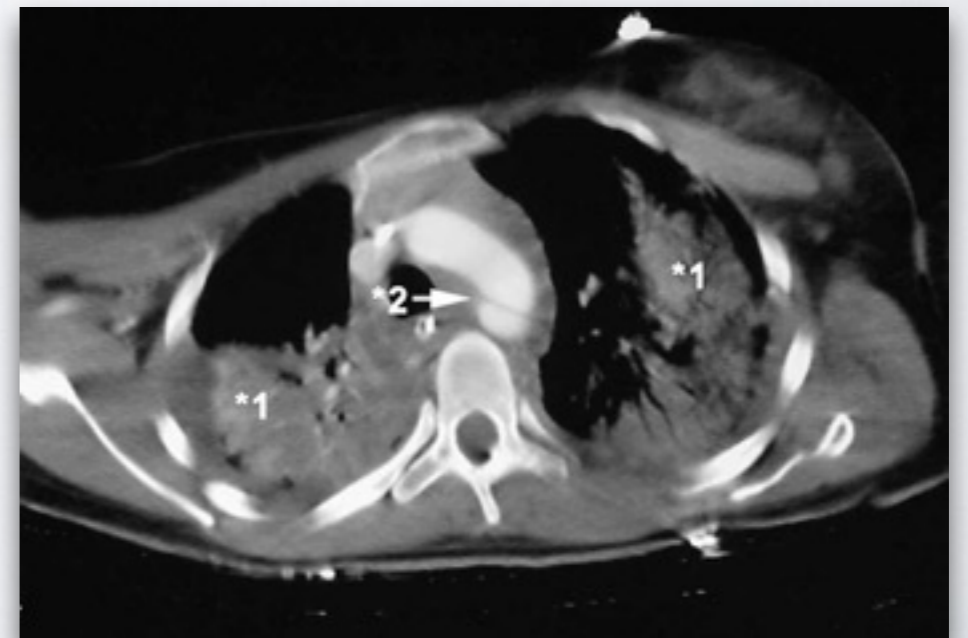
ROTURA TRAUMÁTICA DE AORTA

- Varones 1^a y 4^a década
- Causa: accidente de tráfico (85%)
- Gran mortalidad: 80% fallecen in situ
- 80-98% asocian otras lesiones graves
- Mecanismo: cizallamiento / impacto
- Segmentos afectados
 - aorta ascendente (65%)
 - arco aórtico (15%)
 - aorta distal (10%)



DIAGNÓSTICO

- Anamnesis:
 - Alto índice de **sospecha**
 - **“Síndrome de la coartación aguda”**
 - Dolor torácico, disnea o estridor
- **Radiografía de tórax**
- **TAC**
- **Ecocardiograma transesofágico (ETE)**
- **Angiografía**
- ¿RM?



TRATAMIENTO

- **Médico:** Reducir presión arterial: beta-bloqueantes
- **Quirúrgico inmediato:**
 - Hemotórax masivo, signos de rotura inminente, gran pseudoaneurisma (Indicación Clase I, nivel de evidencia C)
 - mortalidad 10-30%
 - paraplejía 10-30%
- **Quirúrgico diferido:** ruptura contenida por adventicia y tejidos circundantes
- **Endovascular** (Indicación Tipo IIA, nivel de incidencia C)
 - mortalidad < 10%
 - casi nula incidencia de paraplejía



ANEURISMA AORTA TORÁCICA

- Dilatación localizada y permanente >50%
- 6/100.000 personas/año
- Tasa de supervivencia sin tratamiento 13%-39% en cinco años.
- Degenerativos (+frec.) o genéticos

Indicación quirúrgica

Diámetro

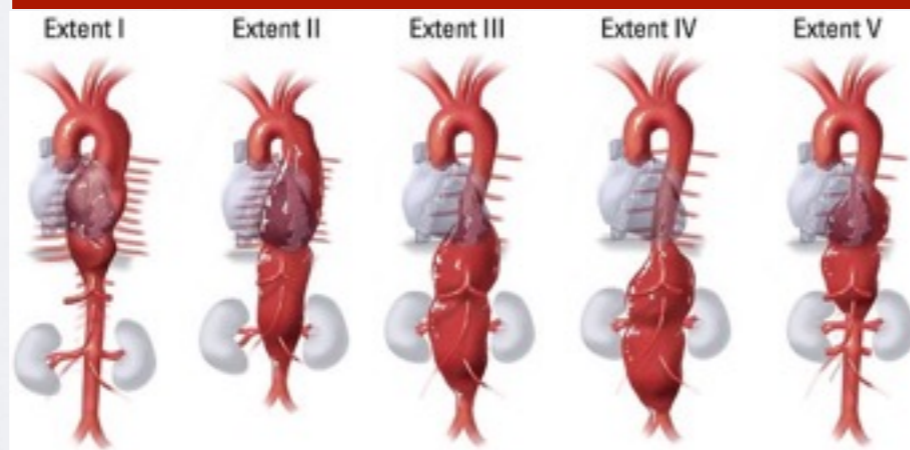
Aorta ascendente: >5,5cm
Aorta descendente: >6.5 cm

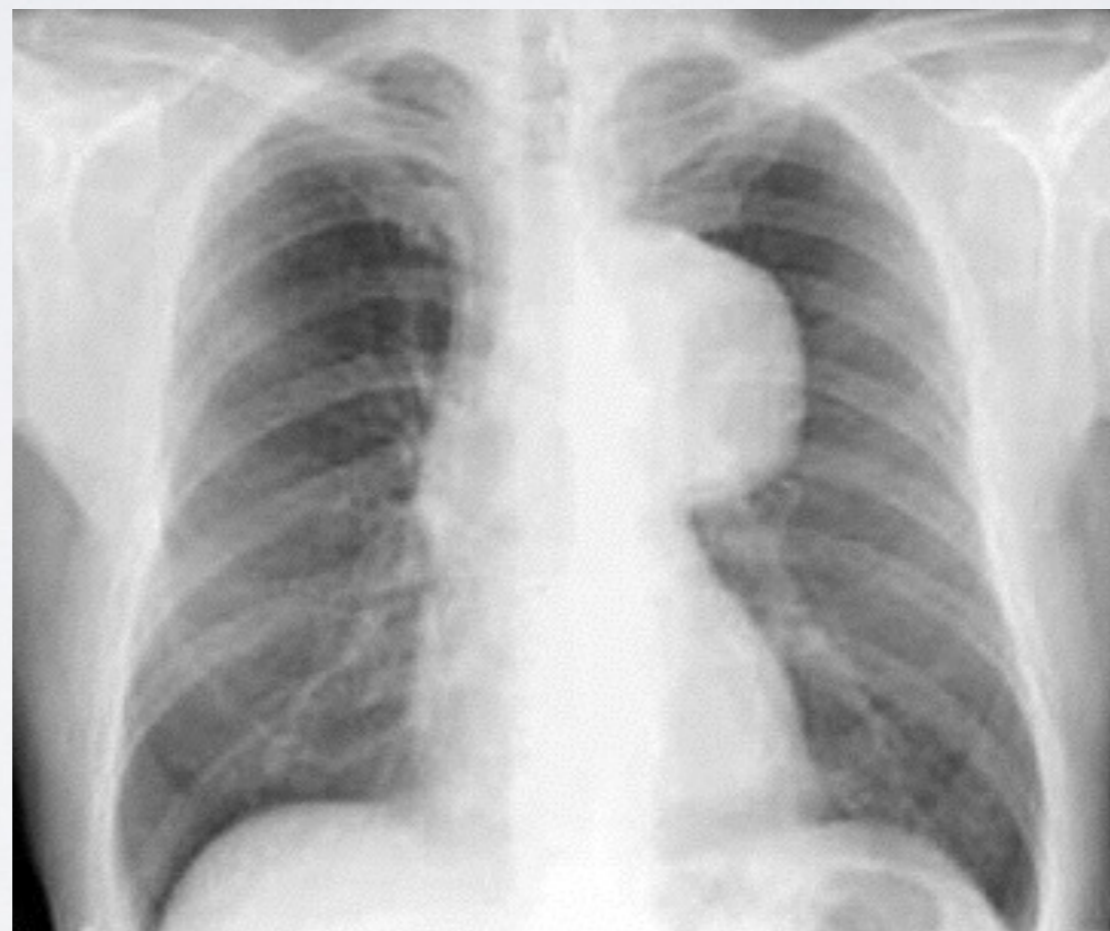
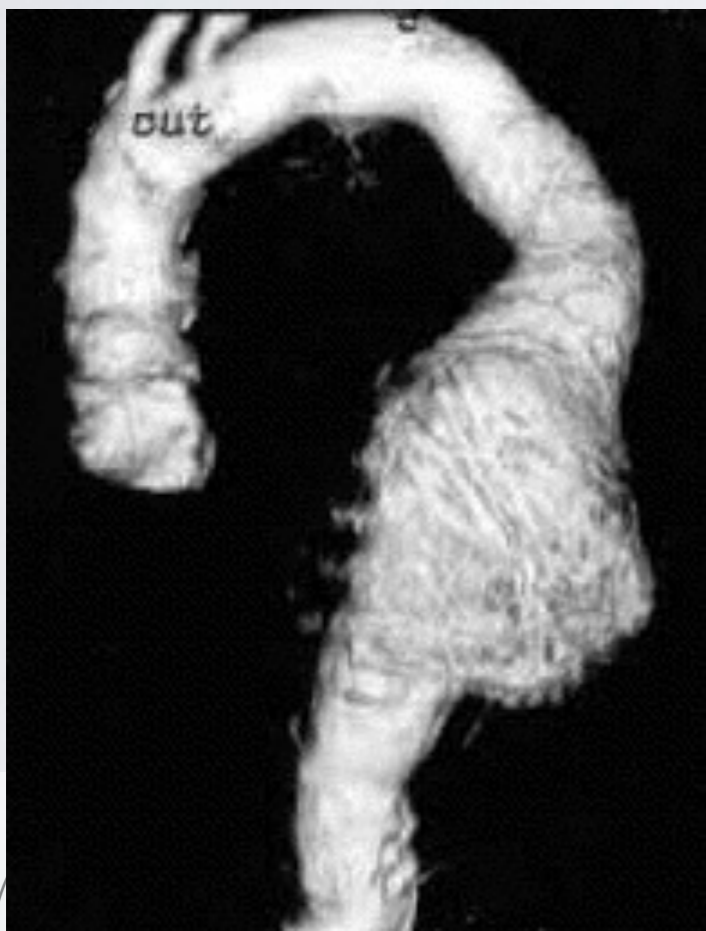
Aneurismas postcoartación

Presencia de síntomas
Dolor/Ronquera/Disfagia/
Disnea/Arritmia

Presencia de complicaciones
Rápido crecimiento/
Dissección/Ruptura

Clasificación de Crawford

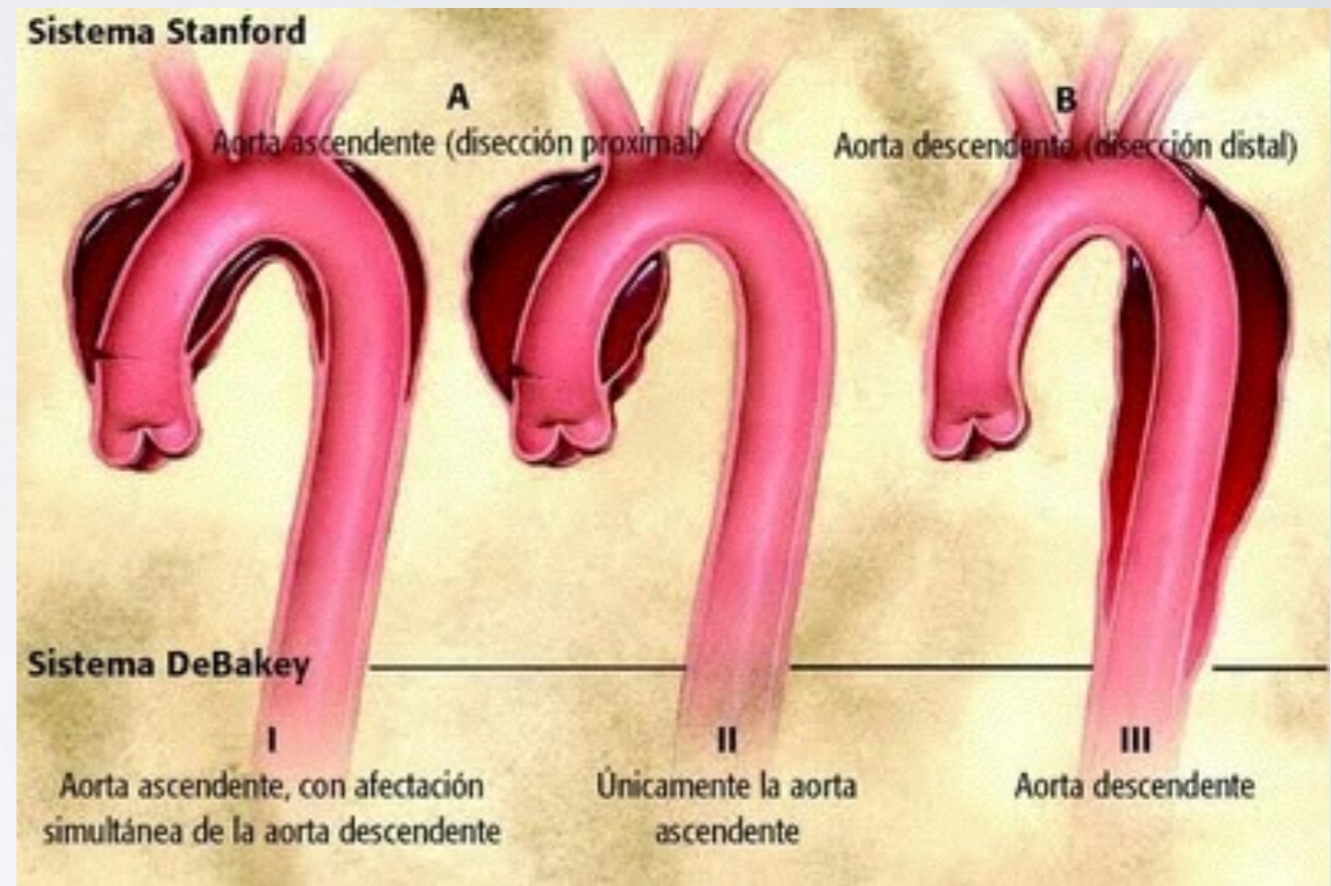




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DISECCIÓN AÓRTICA CLÁSICA

- Varones, 5^a-7^a década
- HTA (factor predisponente)
- Otros: ej. Síndrome Marfan...
- Ruptura y colgajo de la íntima “puerta de entrada”
- Progresión en sentido anterógrado
- Estabilización/rotura
- 60% afectan a aorta ascendente



DIAGNÓSTICO

- **Dolor:** agudo, muy intenso
 - Aorta ascendente: Retroesternal con irradiación a cuello/mandíbula
 - Aorta descendente: Espalda y/o abdomen
- **Radiografía**
- **Ecocardi transtorácica (ETT)**
- **Ecocardi transesofágica (ETE)**
- **Tomografía computarizada (TC)**
 - Elevados niveles de S y E
 - Inconvenientes: nefrotoxicidad del contraste, no valora posible insuficiencia aórtica, necesidad de desplazar al paciente
- **Resonancia Magnética (RM)**
 - Pocas contraindicaciones
 - Requiere tiempo de estudio largo
 - No disponibilidad urgente en todos los centros



TRATAMIENTO DAC TIPO A

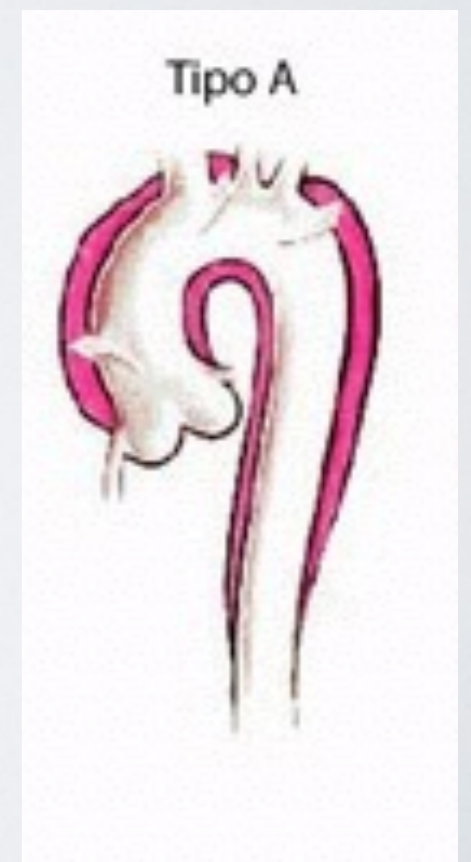
- **QUIRÚRGICO** (recomendación IB)

- Mortalidad quirúrgica 26%
- **Sin** intervención :
 - > 50% en la primeras 48h
 - 75% a la semana 2
 - 90% a los 3 meses

- *Técnica: sustitución de aorta ascendente por injerto sintético +/- resuspensión de las comisuras de la válvula aórtica.*

- Inicialmente médico:

- Reducir fuerza de eyección del VI
B-Bloqueantes
- Reducir PAS < 120 mmHg
vasodilatadores
- Tratar dolor: **mórfico**



TRATAMIENTO DAC TIPO B

- *mejor pronóstico*
- DAC B **no complicada** —> **MÉDICO**
 - * la supervivencia elevada
 - * mortalidad hospitalaria <10%
 - * excelente supervivencia a los 5 años
- DAC B **complicada** —> **QUIRÚRGICO**
 - * alta morbimortalidad en fase aguda
 - * mortalidad :26-65%
 - * paraplejia 30-35%

- Inicialmente médico:
 - Reducir fuerza de eyección del VI
B-Bloqueantes
 - Reducir PAS <120 mmHg
vasodilatadores (2)
 - Tratar dolor: **mórfico**

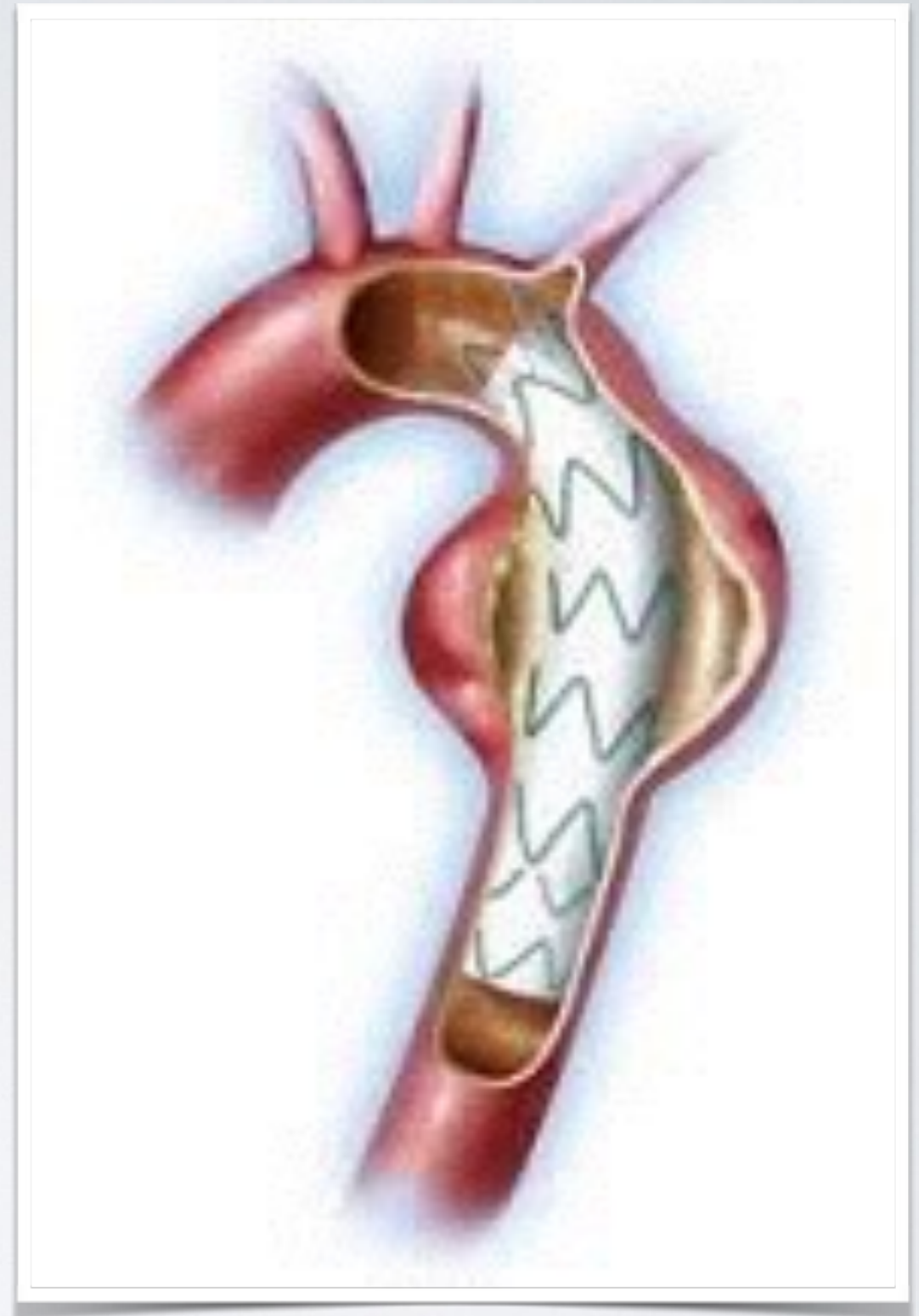
Tipo B



Cirugía **ENDOVASCULAR**

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TRATAMIENTO ENDOVASCULAR AORTA TORÁCICA



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DEFINICIONES

Tratamiento endovascular

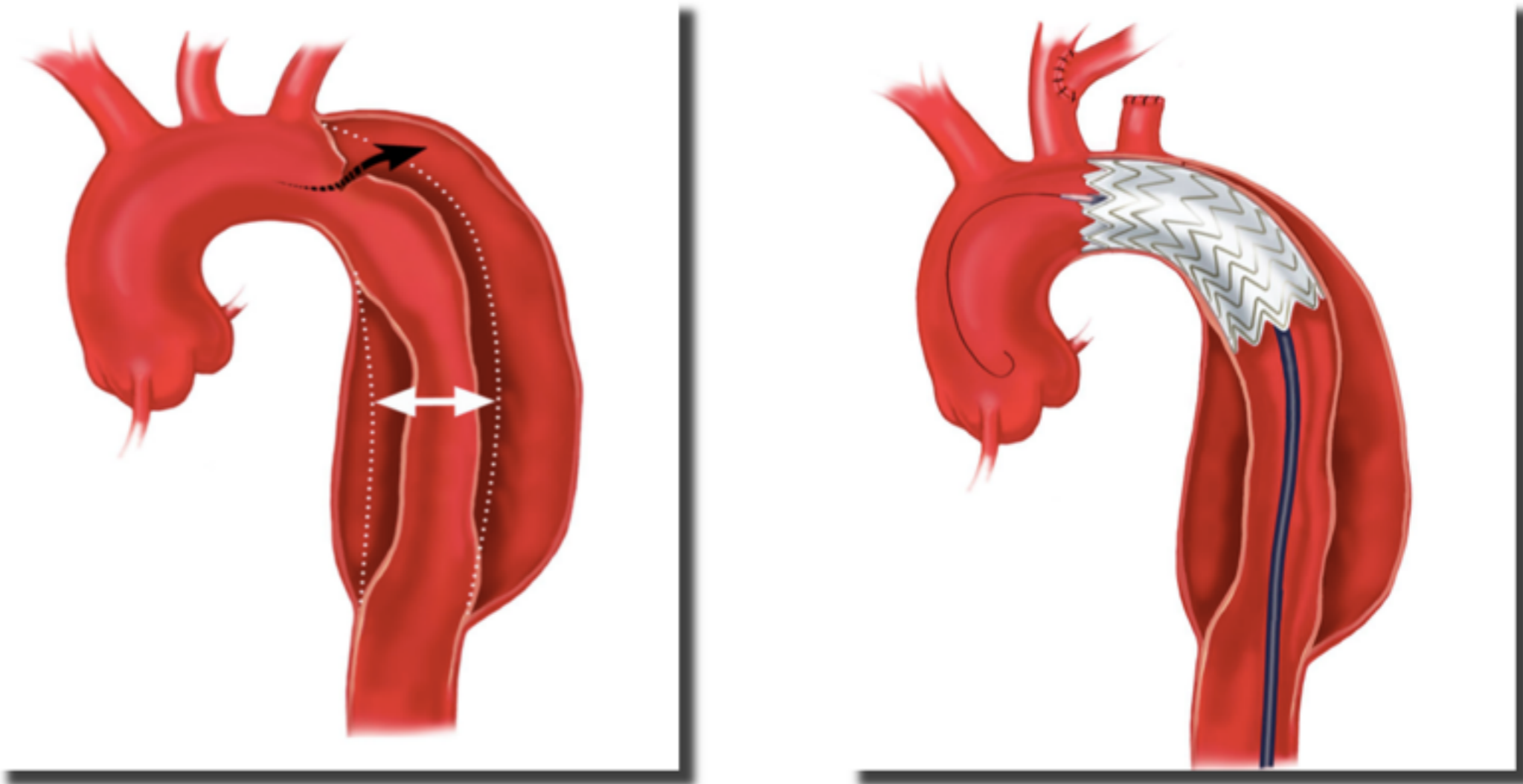
Utilización de un punto de entrada vascular remoto, percutáneo o con disección y aplicación de las técnicas de cateterismo para reparar un segmento vascular alejado, utilizando generalmente visión fluoroscópica (radioscópica) como método de control.

Endoprótesis

Prótesis endovascular que protege indefinidamente la aorta de la ruptura y permite un flujo imprescindible a través de la aorta y sus ramas



Goals of therapy → seal the entry point, improve distal perfusion, and prevent early & late complications





Aneurisma de aorta torácica descendente: reparación endovascular

Pre-endoprótesis



Post- endoprótesis



DISECCIONES TIPO B

Agudas Complicadas
Cirugía abierta vs TEVAR

Agudas no Complicadas
Trat. médico vs TEVAR

Crónicas
Cirugía abierta vs TEVAR



Acute type B aortic dissection

Aortic dissection involving the descending thoracic aorta and distal sites only and the diagnosis has to be within 14 days of onset of symptoms.

Complicated type B aortic dissection

Complicated dissections refer to aortic rupture, visceral and renal ischemia, lower extremities ischemia, or spinal cord ischemia (SCI). Expansion to the aortic arch or proximal descending aorta with a total diameter of 4.5 cm or greater is also considered a complicated dissection. However, refractory hypertension, hypertension persisting despite three different classes of antihypertensive therapy at maximal recommended or maximal tolerated doses, if not present in the clinical history before the onset of dissection, is considered a sign of instability or of renal malperfusion.

Malperfusion syndrome is the most frequent complication of type B dissection. The clinical presentation includes paraparesis or paraplegia, lower limb ischemia, abdominal pain, nausea, or diarrhea. Visceral artery malperfusion may be associated with an increase in laboratory markers (bilirubin, amylases, hepatic and intestinal enzymes). The CT angiography or magnetic resonance angiography findings



- Completed Trials
 - ▣ INSTEAD - Medtronic (Europe)
 - ▣ TAG (High Risk) - Gore (USA)
 - ▣ ADSORB – Gore (Europe)
 - ▣ CTAG – Gore (USA)
 - ▣ VALIANT - Medtronic
- Ongoing Trials
 - ▣ STABLE - Cook



INSTEAD

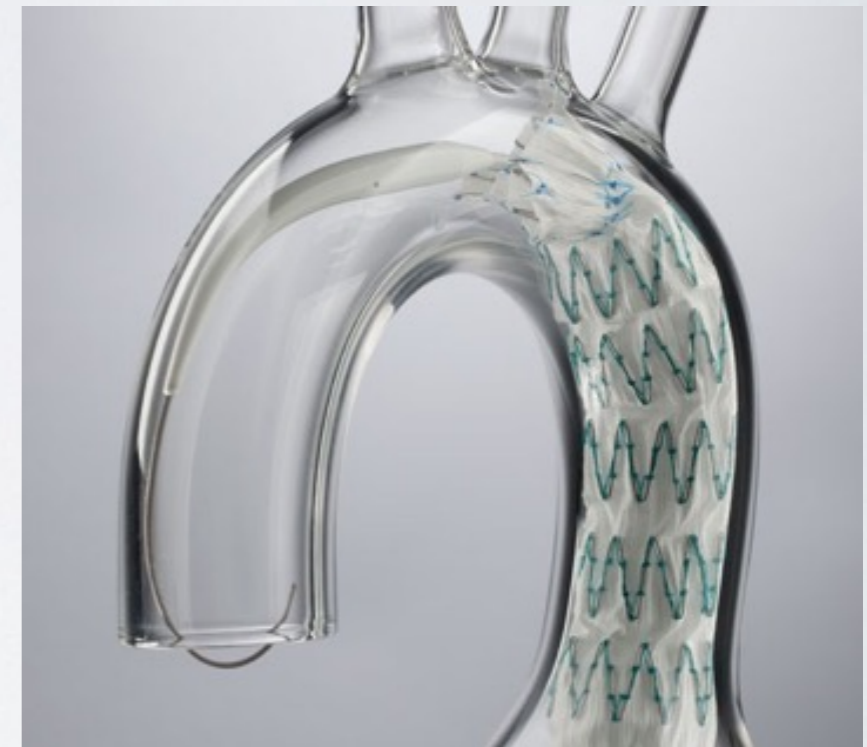
Cardiovascular Surgery

Randomized Comparison of Strategies for Type B Aortic Dissection

The INvestigation of STent Grafts in Aortic Dissection (INSTEAD) Trial

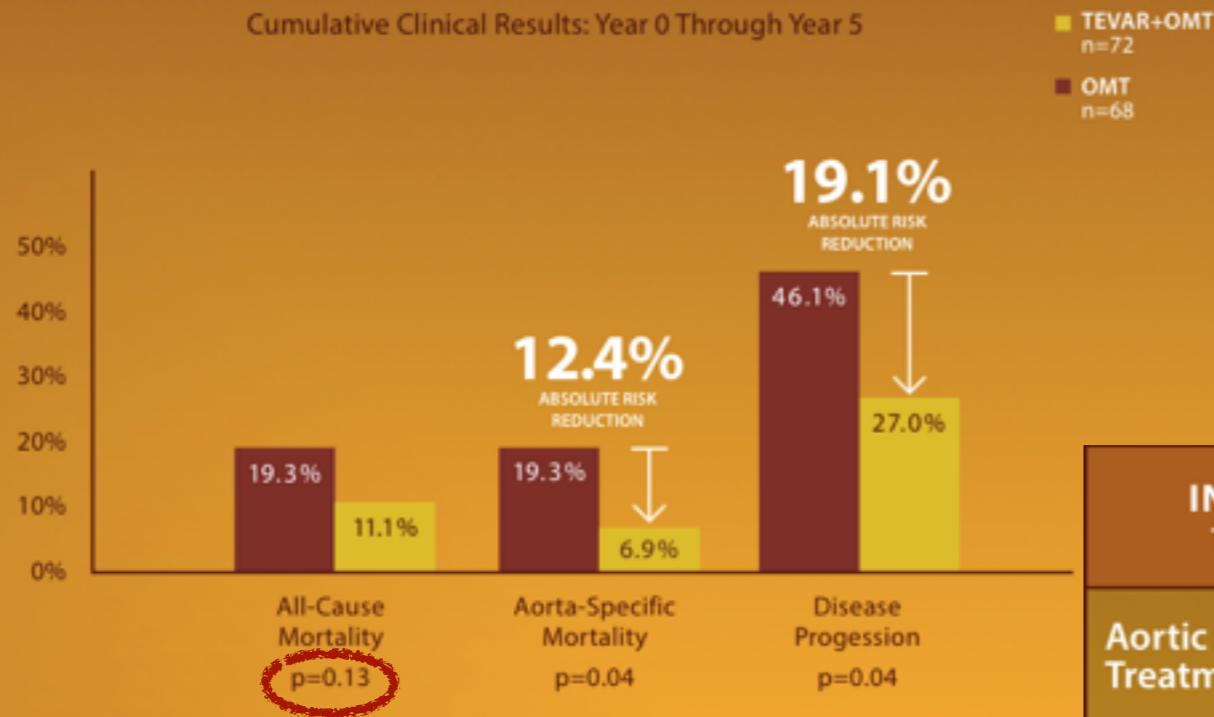
Christoph A. Nienaber, MD, PhD; Hervé Rousseau, MD, PhD; Holger Eggebrecht, MD; Stephan Kische, MD; Rossella Fattori, MD, PhD; Tim C. Rehders, MD; Günther Kundt, PhD; Dierk Scheinert, MD, PhD; Martin Czerny, MD, PhD; Tilo Kleinfeldt, MD; Burkhard Zipfel, MD; Louis Labrousse, MD, PhD; Hüseyin Ince, MD, PhD;
for the INSTEAD Trial

- Estudio prospectivo aleatorizado n=140 pacientes
- Pacientes clínicamente **estables**, **2 semanas tras** disección aórtica Tipo B
- Solo tratamiento médico (n=68)
- Tratamiento médico + Prótesis endovascular (n=72)



TEVAR FOR AORTIC DISSECTION PREVENTS LATE EXPANSION; ENCOURAGES AORTIC REMODELING

Cumulative Clinical Results: Year 0 Through Year 5



INSTEAD-XL RANDOMISED CONTROLLED TRIAL SCORECARD: TEVAR+OMT VS. OMT ALONE IN TYPE B AORTIC DISSECTIONS AT 5 YEARS

Aortic Dissection Treatment Goals	TEVAR+OMT (n=72)	OMT (n=68)
Cover Entry Tear - Redirect blood flow through the true lumen	Yes	No
Stabilise Aortic Diameter* - Minimise expansion/rupture risk	Stable aortic diameter (44.1mm vs 44.5mm)	29% increase in aortic diameter (43.6 mm vs 56.4 mm) p < 0.0001
Confirm complete false lumen thrombosis	90.6%	22% p < 0.0001
Maximum true lumen diameter—redirect blood flow to true lumen	32.6mm	18.7mm p < 0.0001
Morphological evidence of remodeling - Sealed entry - Thrombosed false lumen - Shrinking false lumen - Absence of diameter progression	79.2%	10% p < 0.0001





ADSORB

ADSORB: A Study on the Efficacy of Endovascular Grafting in Uncomplicated Acute Dissection of the Descending Aorta

J. Brunkwall^{a,*,e}, J. Lammer^{b,e}, E. Verhoeven^{c,e}, P. Taylor^{d,e}

WHAT THIS PAPER ADDS

- This is the first randomised trial on acute dissection. It compares best medical treatment (BMT) with BMT and stent grafting of the primary entry tear in patients having acute uncomplicated type B aortic dissection. Patients are randomised within 14 days of the onset of symptoms.
- The study is a multicentre European trial with a clear definition of uncomplicated dissection with a double lumen in the thoracic aorta. Patients with malperfusion, rupture, penetrating ulcer and intramural haematoma are excluded.
- The study will bring evidence as to whether stent grafting will produce thrombosis and remodelling of the false lumen with a reduction in aneurysm formation and re-intervention.

ARTICLE INFO

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Accepted 26 March 2012

Available online 9 May 2012

Keywords:

Acute dissection

Descending aorta

Best medical treatment

Stent graft

Randomised trial

Outcome

ABSTRACT

Acute dissection of the descending thoracic aorta carries a 30-day mortality of around 10% with best medical treatment (BMT). In addition, about 25% will develop an aneurysm during the following 4–5 years.

This is the first ever randomised trial on acute dissections comparing BMT with BMT and stent grafting of the proximal tear in patients having an uncomplicated acute dissection of the descending aorta. The commonly used temporal definition of acute dissection being within 14 days of onset of symptoms is applied.

A total of 61 patients will be randomised and followed at regular intervals (1, 3, 6, 12, 18, 24, 30 and 36 months) after acute dissection. Thrombosis of the false lumen, aortic enlargement and rupture are the primary end points.

The study will examine whether aortic remodelling occurs after stent grafting in acute type B dissections, and its effect on aneurysm formation, rupture and re-intervention.

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Treatment of Acute Type-B Aortic Dissection

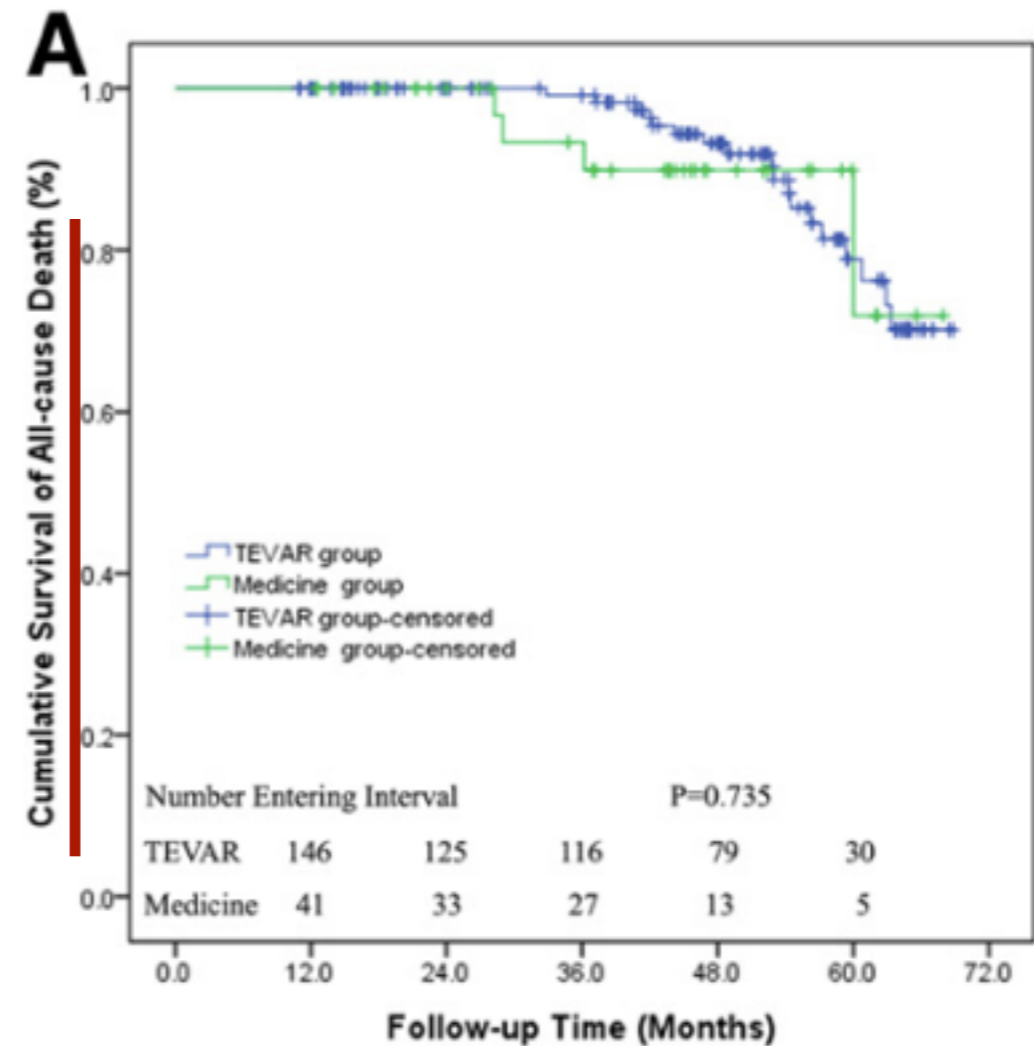
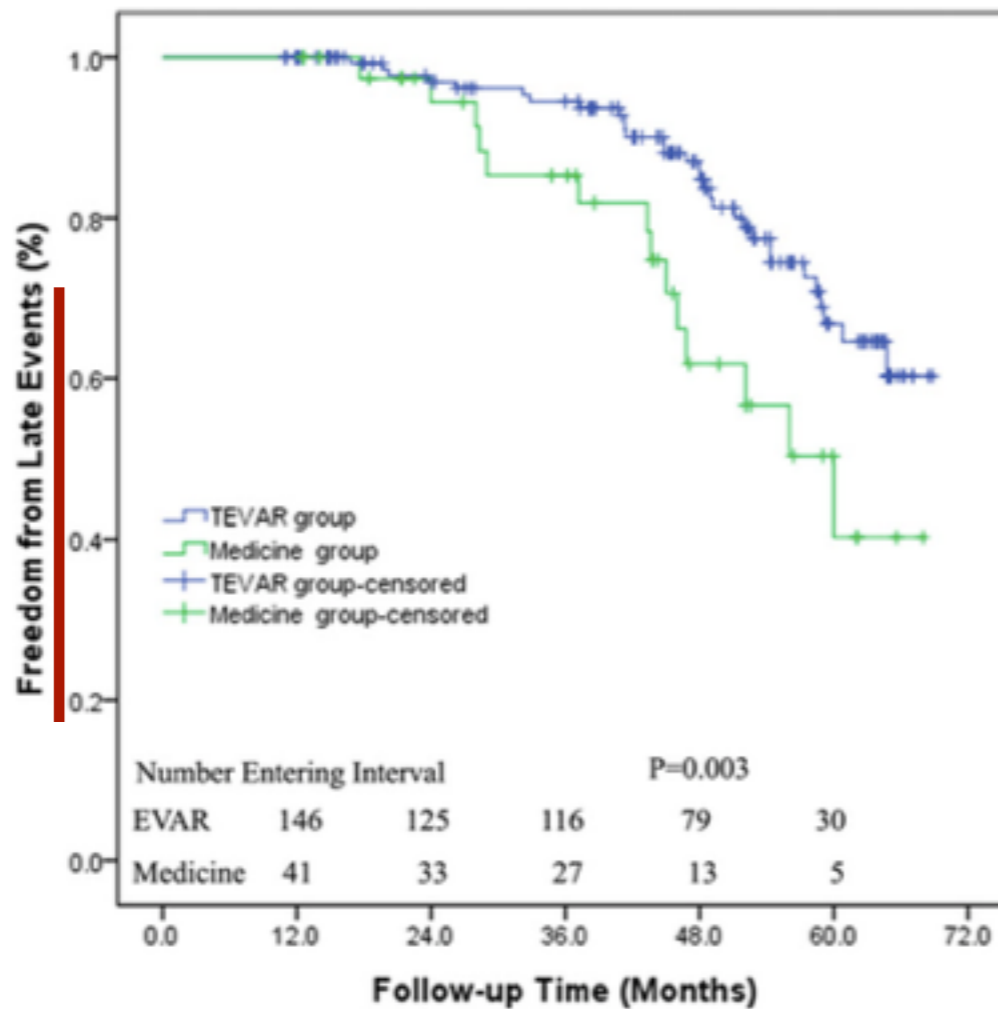
Thoracic Endovascular Aortic Repair or Medical Management Alone?

Yong-Lin Qin, MD,* Gang Deng, MD,* Tian-Xiao Li, MD,† Weiping Wang, MD,‡
Gao-Jun Teng, MD*

Nanjing and Zhengzhou, China; and Cleveland, Ohio



JACC
cardiovascular
Interventions



Management of complicated and uncomplicated acute type B dissection. A systematic review and meta-analysis

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Background: The management of acute type B dissection represents a clinical challenge. We undertook a systematic review of the available literature regarding medical, surgical and endovascular treatments of acute type B aortic dissection and combined the eligible studies into a meta-analysis.

Methods: An extensive electronic health database search was performed on all articles published from January 2006 up to November 2013 describing the management of acute type B aortic dissection. Studies including less than 15 patients were excluded.

Results: Acute complicated type B dissection: overall, 2,531 patients were treated with endovascular repair (TEVAR) and the pooled rate for 30-day/in-hospital mortality was 7.3%. The pooled estimates for cerebrovascular events, spinal cord ischemia (SCI) and total neurologic events were 3.9%, 3.1% and 7.3%, respectively. A total of 1,276 patients underwent open surgical repair and the pooled rate for 30-day/in-hospital mortality was 19.0%. The pooled rate for cerebrovascular events was 6.8%, for SCI 3.3% and for total neurologic complications 9.8%. Acute uncomplicated type B dissection: outcome of 2,347 patients who underwent conservative medical management were analyzed. The pooled 30-day/in-hospital mortality rate was 2.4%. The pooled rate for cerebrovascular events was 1%, for SCI 0.8% and for overall neurologic complications 2%.

Conclusions: Endovascular repair provides a superior 30-day/in-hospital survival for acute complicated type B aortic dissection compared to surgical aortic reconstruction. However, open repair still has a significant role as endovascular repair is not applicable in all patients and there remains concerns regarding the durability of this technique. TEVAR seems to have a more favorable outcome regarding aortic remodeling and the aortic-specific survival rate when compared with medical therapy alone. Randomized controlled trials focusing on the prognostic factors of early and late complications in uncomplicated type B dissections are needed.



En Resumen...



El tratamiento endovascular de la aorta torácica

- **Es tratamiento de elección para pacientes sintomáticos con hematoma intramural, úlcera penetrante y lesiones traumáticas.**
- **Es el tratamiento de elección para disecciones agudas TipoB complicadas.**
- Es una posibilidad en pacientes seleccionados con disecciones crónicas.
- Puede tener un papel creciente en el tratamiento de disecciones tipo B no complicadas pero se necesitan aún más datos.
- Tiene un potencial papel futuro en el tratamiento de las disecciones Tipo A.



MANEJO ANESTÉSICO DEL TRATAMIENTO ENDOVASCULAR DEL SÍNDROME AÓRTICO AGUDO



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PRACTICE GUIDELINE: EXECUTIVE SUMMARY

2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease: Executive Summary

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, American Association for Thoracic Surgery, American College of Radiology, American Stroke Association, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of Thoracic Surgeons, and Society for Vascular Medicine



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Valencia 30 de Junio del 2015



EVALUACIÓN PREOPERATORIA

Clase I:

- Estudio de imágenes
- Signos de isquemia miocárdica: estudiar posible enfermedad coronaria
- Sndr. coronario *inestable*: 1º revascularizar

Clase IIA

- Cuantificar estado de comorbilidad, establecer perfil de riesgo

Clase IIB

- No claro beneficio de la revascularización del paciente coronario estable previa a reparación aorta torácica.

CLASS I

1. In preparation for surgery, imaging studies adequate to establish the extent of disease and the potential limits of the planned procedure are recommended. (Level of Evidence: C)
2. Patients with thoracic aortic disease requiring a surgical or catheter-based intervention who have symptoms or other findings of myocardial ischemia should undergo additional studies to determine the presence of significant coronary artery disease. (Level of Evidence: C)
3. Patients with unstable coronary syndromes and significant coronary artery disease should undergo revascularization prior to or at the time of thoracic aortic surgery or endovascular intervention with percutaneous coronary intervention or concomitant coronary artery bypass graft surgery. (Level of Evidence: C)

CLASS IIa

1. Additional testing is reasonable to quantitate the patient's comorbid states and develop a risk profile. These may include pulmonary function tests, cardiac catheterization, aortography, 24-hour Holter monitoring, noninvasive carotid artery screening, brain imaging, echocardiography, and neurocognitive testing. (Level of Evidence: C)
2. For patients who are to undergo surgery for ascending or arch aortic disease, and who have clinically stable, but significant (flow limiting), coronary artery disease, it is reasonable to perform concomitant coronary artery bypass graft surgery. (Level of Evidence: C)

CLASS IIb

1. For patients who are to undergo surgery or endovascular intervention for descending thoracic aortic disease, and who have clinically stable, but significant (flow limiting), coronary artery disease, the benefits of coronary revascularization are not well established (144–146). (Level of Evidence: B)



TÉCNICA ANESTÉSICA Y MONITORIZACIÓN

Clase I

- ☑ Individualizar técnica y fármacos

Clase IIA

- ☑ Ecografía Transesofágica
- ☑ Potenciales evocados

Clase IIB

- ☑ No se recomiendan técnicas de Anestesia Regional
- ☑ No se recomienda intercambio de tubo DL de forma sistemática



CLASS I

1. The choice of anesthetic techniques and agents and patient monitoring techniques should be tailored to individual patient needs to facilitate surgical and perfusion techniques and the monitoring of hemodynamics and organ function. (Level of Evidence: C)

CLASS IIA

1. Transesophageal echocardiography is reasonable in all open surgical repairs of the thoracic aorta, unless there are specific contraindications to its use. Transesophageal echocardiography is reasonable in endovascular thoracic aortic procedures for monitoring, procedural guidance, and/or endovascular graft leak detection (147-149). (Level of Evidence: B)
2. Motor or somatosensory evoked potential monitoring can be useful when the data will help to guide therapy. It is reasonable to base the decision to use neurophysiologic monitoring on individual patient needs, institutional resources, the urgency of the procedure, and the surgical and perfusion techniques to be employed in the open or endovascular thoracic aortic repair (150,151). (Level of Evidence: B)

CLASS III

1. Regional anesthetic techniques are not recommended in patients at risk of neuraxial hematoma formation due to thienopyridine antiplatelet therapy, low-molecular-weight heparins, or clinically significant anticoagulation (152). (Level of Evidence: C)
2. Routinely changing double-lumen endotracheal (endobronchial) tubes to single-lumen tubes at the end of surgical procedures complicated by significant upper airway edema or hemorrhage is not recommended. (Level of Evidence: C)

MANEJO TRANSFUSIONAL ANTICOAGULACIÓN

Clase IIA

- Seguimiento de protocolo del centro en cuanto a terapia transfusional, antifibrinolítica y manejo de la anticoagulación

CLASS IIa

1. An algorithmic approach to transfusion, antifibrinolytic, and anticoagulation management is reasonable to use in both open and endovascular thoracic aortic repairs during the perioperative period. Institutional variations in coagulation testing capability and availability of transfusion products and other prothrombotic and antithrombotic agents are important considerations in defining such an approach (153). (Level of Evidence: C)

MANEJO DE PROTECCIÓN RENAL

Clase IIB

- Hidratación preoperatoria y manitol
- Cristaloides y transfusión concentrados de sangre

Clase III

- Evitar: furosemida, manitol y dopamina

CLASS IIb

1. Preoperative hydration and intraoperative mannitol administration may be reasonable strategies for preservation of renal function in open repairs of the descending aorta. (Level of Evidence: C)
2. During thoracoabdominal or descending aortic repairs with exposure of the renal arteries, renal protection by either cold crystalloid or blood perfusion may be considered (201–203). (Level of Evidence: B)

CLASS III

1. Furosemide, mannitol, or dopamine should not be given solely for the purpose of renal protection in descending aortic repairs (204,205). (Level of Evidence: B)



PROTECCIÓN DE LA MÉDULA ESPINAL

Clase I

- Drenaje LCR

Clase IIA

- Optimizar presión de perfusión de médula ósea
- Hipotermia sistémica moderada

Clase IIB

- Técnicas adicionales para mejoría de perfusión medular
- Monitorización neurofisiología



CLASS I

1. Cerebrospinal fluid drainage is recommended as a spinal cord protective strategy in open and endovascular thoracic aortic repair for patients at high risk of spinal cord ischemic injury (188–190). (Level of Evidence: B)

CLASS IIa

1. Spinal cord perfusion pressure optimization using techniques, such as proximal aortic pressure maintenance and distal aortic perfusion, is reasonable as an integral part of the surgical, anesthetic, and perfusion strategy in open and endovascular thoracic aortic repair patients at high risk of spinal cord ischemic injury. Institutional experience is an important factor in selecting these techniques (138,191–193). (Level of Evidence: B)
2. Moderate systemic hypothermia is reasonable for protection of the spinal cord during open repairs of the descending thoracic aorta (194). (Level of Evidence: B)

CLASS IIb

1. Adjunctive techniques to increase the tolerance of the spinal cord to impaired perfusion may be considered during open and endovascular thoracic aortic repair for patients at high risk of spinal cord injury. These include distal perfusion, epidural irrigation with hypothermic solutions, high-dose systemic glucocorticoids, osmotic diuresis with mannitol, intrathecal papaverine, and cellular metabolic suppression with anesthetic agents (193,195–197). (Level of Evidence: B)
2. Neurophysiological monitoring of the spinal cord (somatosensory evoked potentials or motor evoked potentials) may be considered as a strategy to detect spinal cord ischemia and to guide reimplantation of intercostal arteries and/or hemodynamic optimization to prevent or treat spinal cord ischemia (150,198–200). (Level of Evidence: B)

Gracias!!



SARTD-CHGUV Sesión de Formación Continuada
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