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The Role of the Interventional Cardiologist in the Treatment of Venous Disease

(Venous Lysis, Stenting, IVC Filters, etc.)

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Chairman Interventional Cardiology
SOLACI President

Disclosure

Speacker: O Mendiz MD.

Consultant; Medtronic, Astra Zeneca, Elli Lilly.

Endovascular Interventions for Venous Disease:

- Central Venous Disease:
  - Superior Vena Cava
  - Inferior Vena Cava
  - Pulmonary Artery Disease
- Pulmonary Embolism and DVT
- A-V Fistulas
- “CCSVI syndrome”
- TIPS

Superior Vena Cava Syndrome

- First description en 1957
- Etiology:
  - Catheter related
  - Cancer (more frecuent Lung o Hodking)
  - Mediastinal fibrosis
  - Others
- Treatment:
  - Stent PTA
  - Quimiotherapy, Radiotherapy or surgery (ca).

Superior Vena Cava Syndrome

- First description en 1957
- Etiology:
  - Catheter related
- T

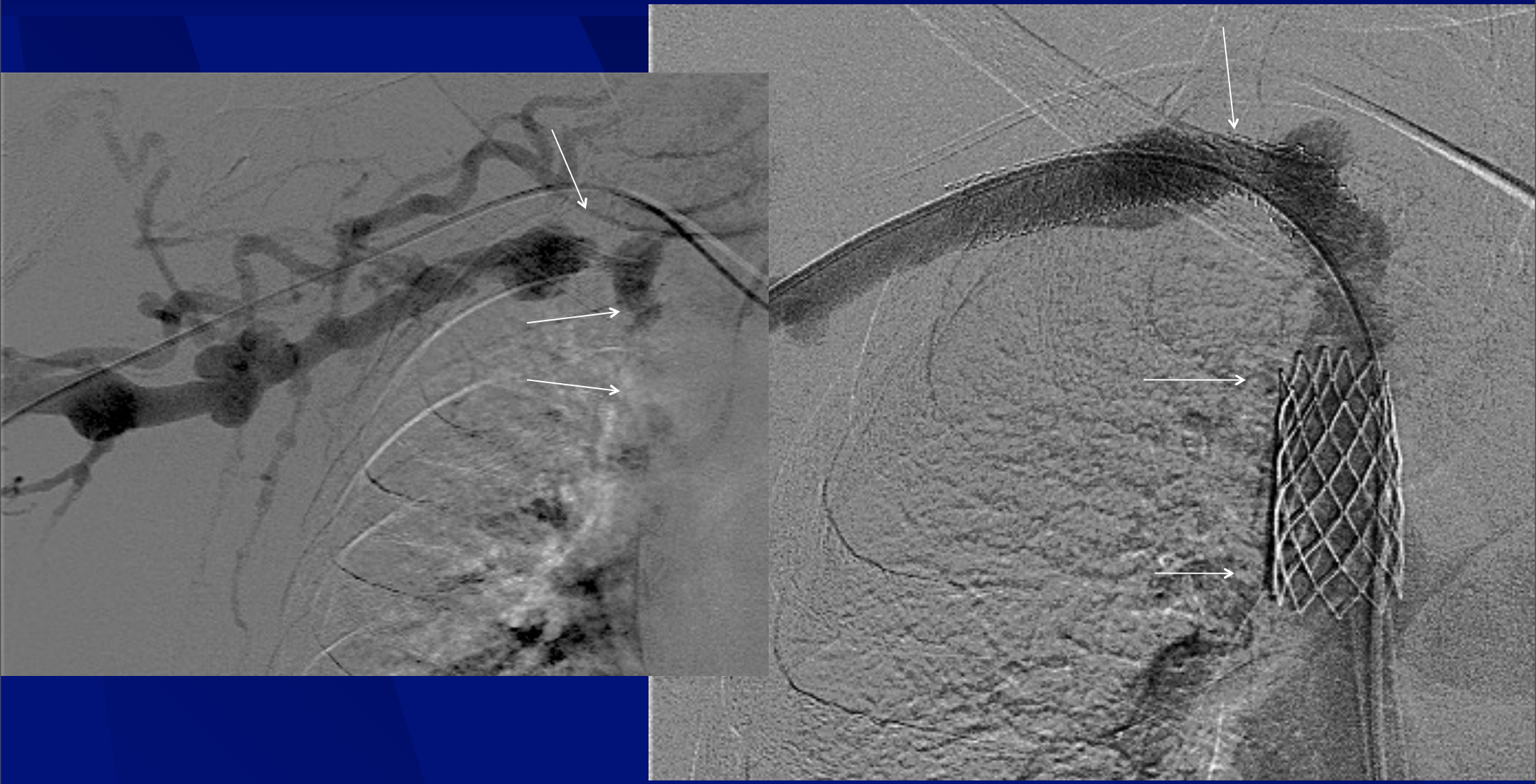
Author	Year	No. of Pts.	Primary Patency	Secondary Patency
Kishi	1993	6	83%	83%
Nicholson	1996	76	91%	91%
Chatziioannou	2003	18	100%	100%
Courtheoux	2006	20	83%	94%
Furui	1995	16	81%	N/A
Gross	1997	13	100%	100%
Hennequin	1995	14	93%	93%
Kee	1998	43	79%	93%
Lanciego	2002	52	92%	100%
Smayra	2001	16	74%	74%
Tanigawa	1998	23	74%	88%
Thony	1999	24	88%	100%
Miller	2000	23	83%	87%
TOTALS		344	87% *	93% *

Inferior Vena Cava Syndrome

- 1.5% of all cause of hospitalization (1.7-1.8/100.000 habitants)
- 15% of DVT
- 22% associated with other territory
- Frequently associated with neoplastic disease
- 30% pulmonary embolism

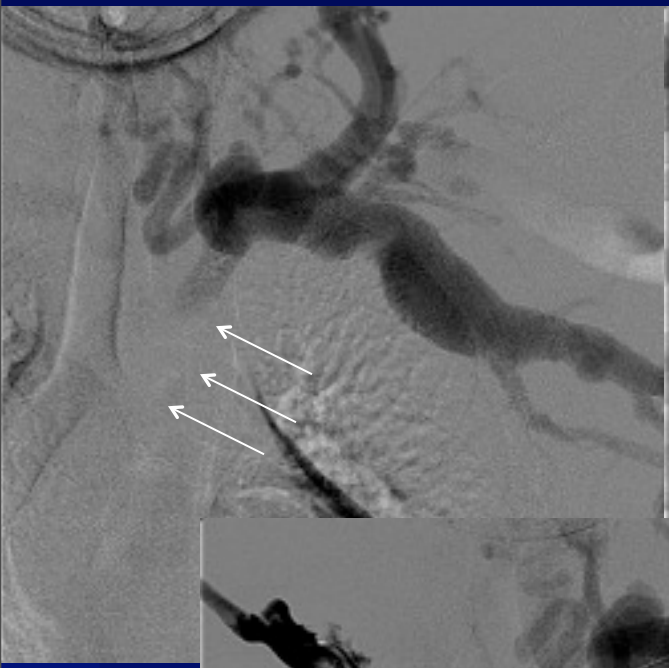
- Treatment:
  - Anticoagulation
  - Stent PTA
  - Surgery (ca)
  - Inferior vena cava filter

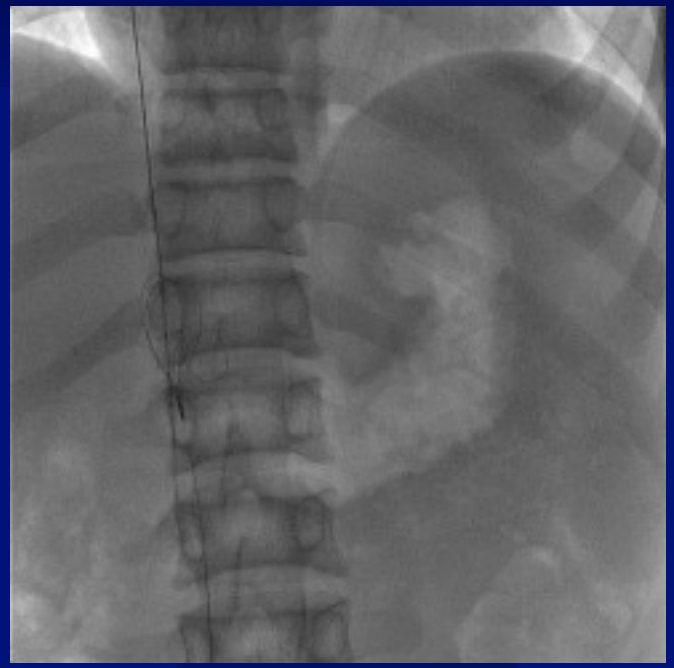
Superior Vena Cava Syndrome



Innominate Venous Trunk Stenting

Innominate Venous Trunk Stenting





Symptomatic chronic nonmalignant iliocaval occlusion

- Crockett Syndrome or May Thurner
- Retroperitoneal fibrosis
- Weber-Christian disease
- Sepsis
- Aortic Aneurism
- IVC filter occlusion

Symptomatic chronic nonmalignant iliocaval occlusion

	n	Tech Success (%)	Primary Patency 12 m (%)	Late PP (%)	Late Secondary Patency (%)
O Sullivan	20		94	-	-
Nazarian	56	92	50	50 (48m)	75 (48m)
Neglen	5			75 (36)	93 (36m)
Hurst	18	100	79	-	-
Hartung	44	96	84	73 (36m)	90 (36m)
Blatter	14	86	-	-	79
Average		(85-100)	(84-94)	50-75)	(75-93)

Hartung O, et al J Vasc Surg 2005;42:1138-44

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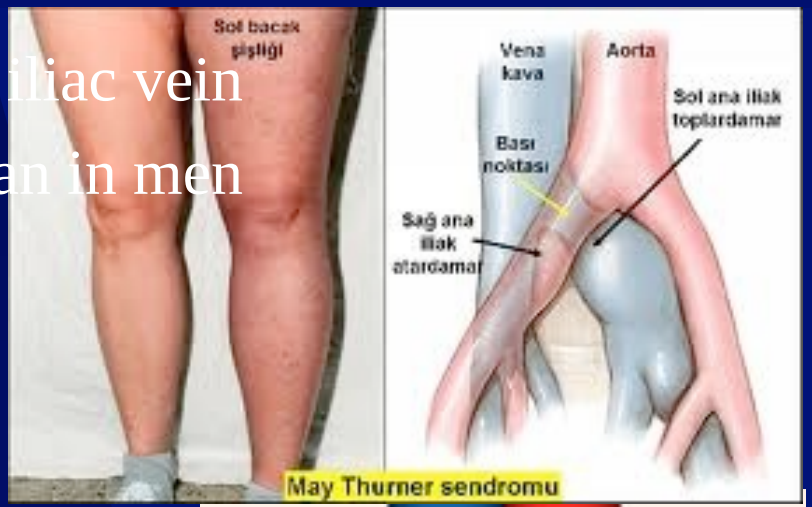
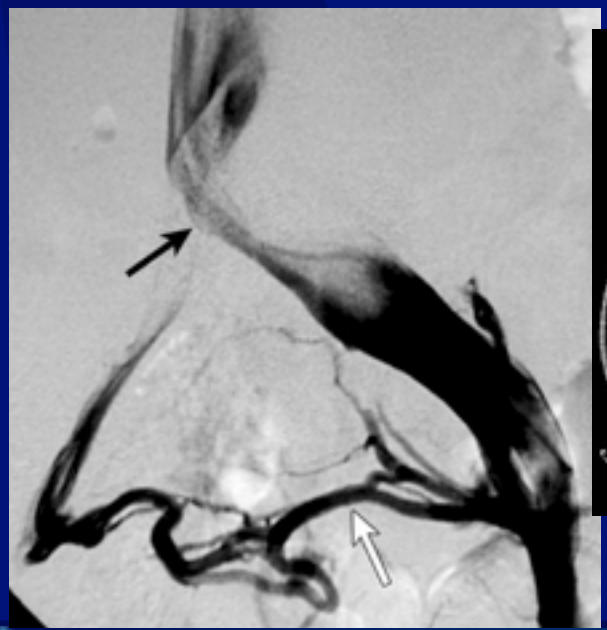
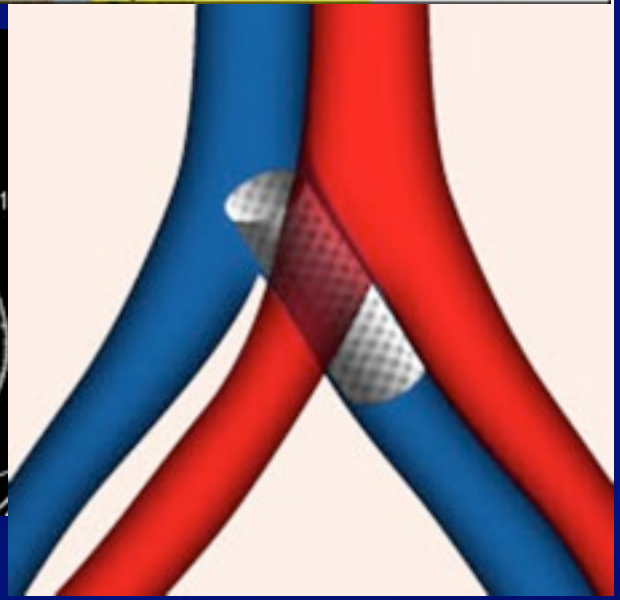
May-Thurner Syndrome

- 2%-5% of lower limbs disorders
- Compression the right iliac artery to left iliac vein
- Three times more common in women than in men
- Second to fourth decades
- DVT and risk of PE
- Treatment ATP stent







Budnur SC, et al. Cardiovasc Interv Ther. 2013 Jan;28(1):101-5.
Gil Martín AR, et al., Radiologia. 2012 May 21.

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Deep Vein Thrombosis & Pulmonary Embolism

- >500.000 Pulmonary embolism every year in USA
- High morbidity and mortality
- IVC Filter reduces PE but no in overall mortality
- Risk factors: > 50 years, Cancer, Hipercoagulability status, Prolonged immobilization.

Jaff M et, al. Circulation 2011;123:1788-1830

Saad N; Semin Intervent Radiol. 2012 Mar;29(1):52-6

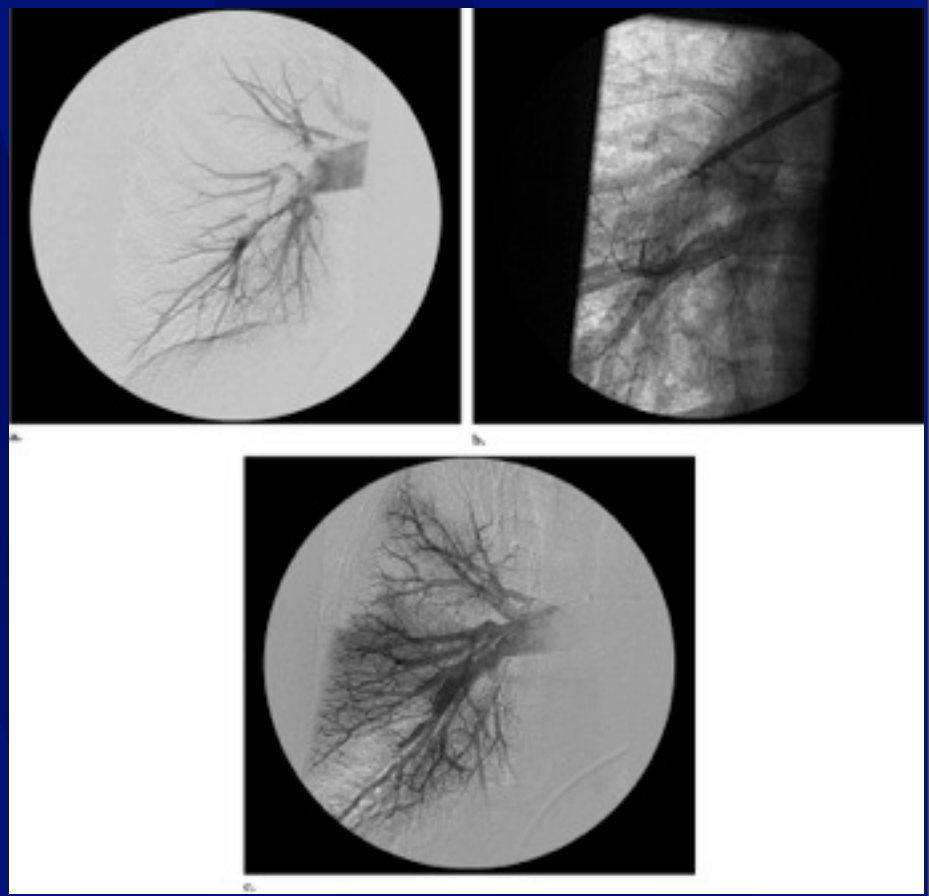
Deep Vein Thrombosis & Pulmonary Embolism

Angiography for Pulmonary Embolism

Deep Vein Thrombosis & Pulmonary Embolism

Pulmonary Embolism; After Thrombolysis

ANGIOJET for mechanical Thrombectomy



Inferior Vena Cava Filter : Indications

1. Adult patients with any confirmed acute PE (or proximal DVT) with contraindications to anticoagulation or with active bleeding complication should receive an IVC filter *(Class I; Level of Evidence C)*.
2. Anticoagulation should be resumed in patients with an IVC filter once contraindications to anticoagulation or active bleeding complications have resolved *(Class I; Level of Evidence B)*.
3. Patients who receive retrievable IVC filters should be evaluated periodically for filter retrieval within the specific filter's retrieval window *(Class I; Level of Evidence C)*.
4. For patients with recurrent acute PE despite therapeutic anticoagulation, it is reasonable to place an IVC filter *(Class IIa; Level of Evidence C)*.

Inferior Vena Cava Filter: Complications

Early complication rate	(%)
Death ≈0.1	
Device malposition	1.3
Pneumothorax	0.02
Unnoticed Carotid puncture	0.04
A-V fistulae	0.02
Late complication	
Recurrent DVT	21
IVC thrombosis	2-10
Penetration	0.3
Filter Migration	0.3

Jaff M, et al. Circulation 2011;123:1788-1830

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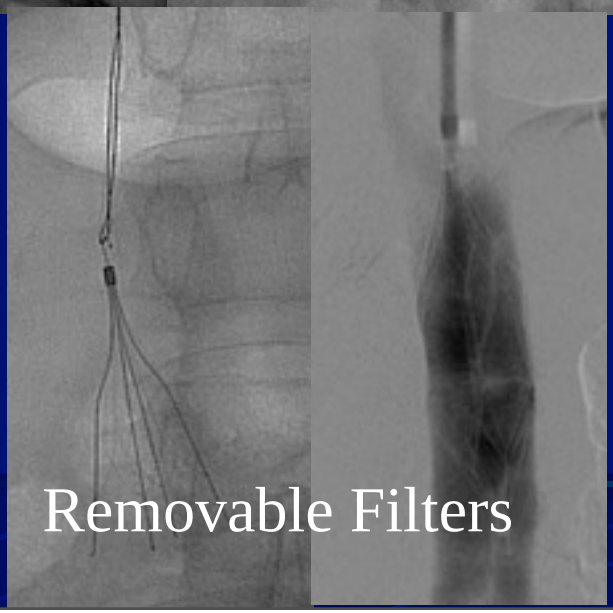
Inferior Vena Cava Filters

Permanent Filter



Removable Filters

Thrombosed Removable Filters

A-V Fistulas

- Incidence of HD in pte with acute renal failure is 183-293/1.000.000 habitants
- 341.000 ptes were to HD in 2008
- More than 350.000 need it in 2020
- Fistulae failure more common in DBT and in eldery
- <50% remain patent at 3 years
- $1 billon/year in USA and rising at more 6%/year in 2009.

Ziv J Haskal, et al. NEJM 2010;362:494-503
Bittl Jhon. JACC Intervention 2010;1-10

Stent graft vs. Ballon Angioplasty in Dialysis Access Graft

	Stent Graft	Balloon Angip.	p
N	97	97	
Age (ys)	61.8	59.8	
Procedure success (%)	94	73	<0.001
Follow-up 6 month			
Binary restenosis (%)	28	78	<0.001

Ziv J Haskal, et al. NEJM 2010;362:494-503

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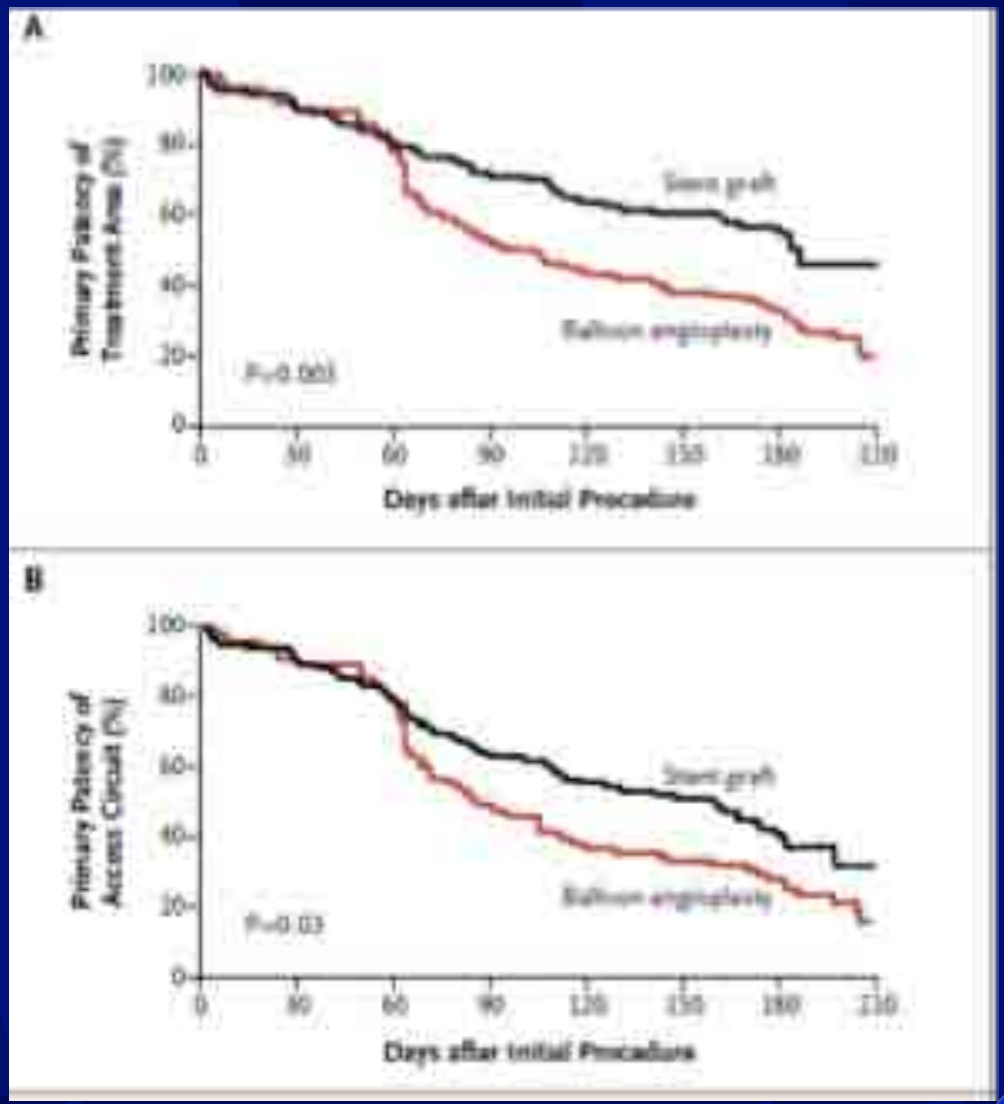
Stent graft vs. Ballon Angioplasty in Dialysis Access Graft



Ziv J Haskal, et al. NEJM 2010;362:494-503

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Cuttting Ballon vs. PTA Balloon

	Cutting Balloon	Balloon	p
N	29	9	
Procedure success (%)	100	100	
Follow up			
Primary permeability			
6-month (%)	56	85	ps
12-month (%)	21	70	ps

Guiu et al, J Vasc Inter Radiol 2007;18:994-1000

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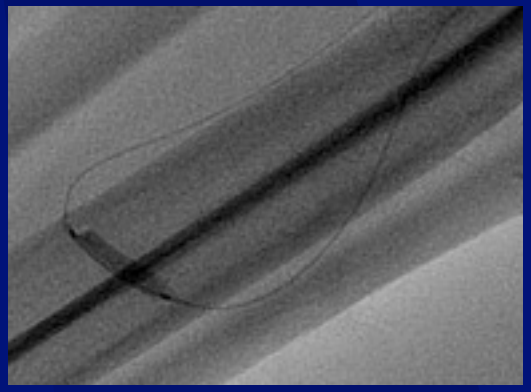
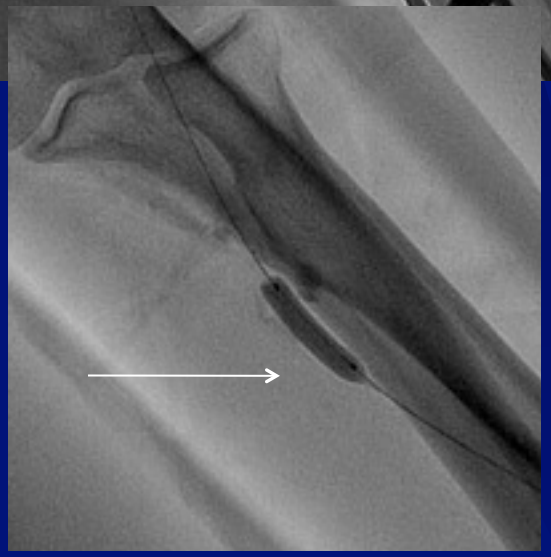
A-V Fistula PTA





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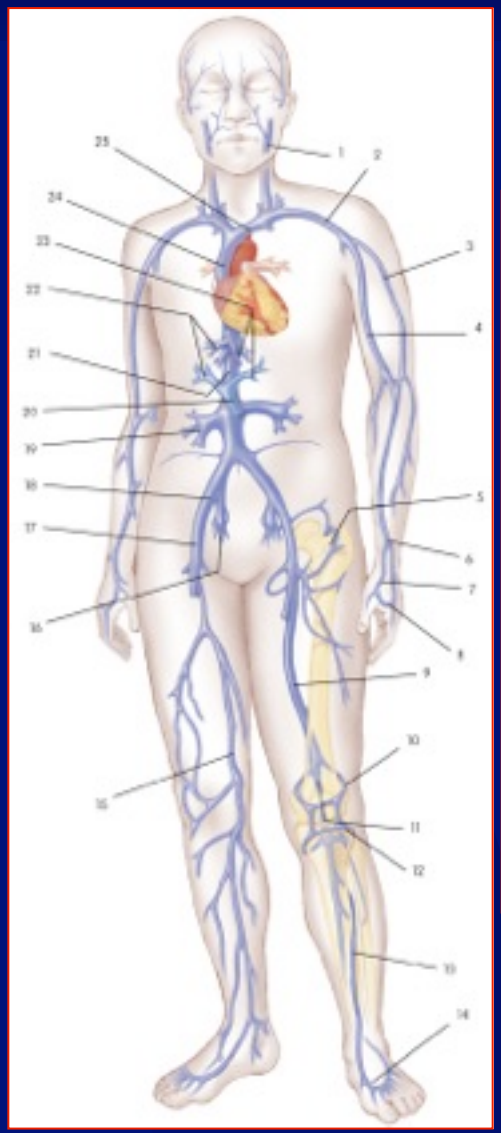
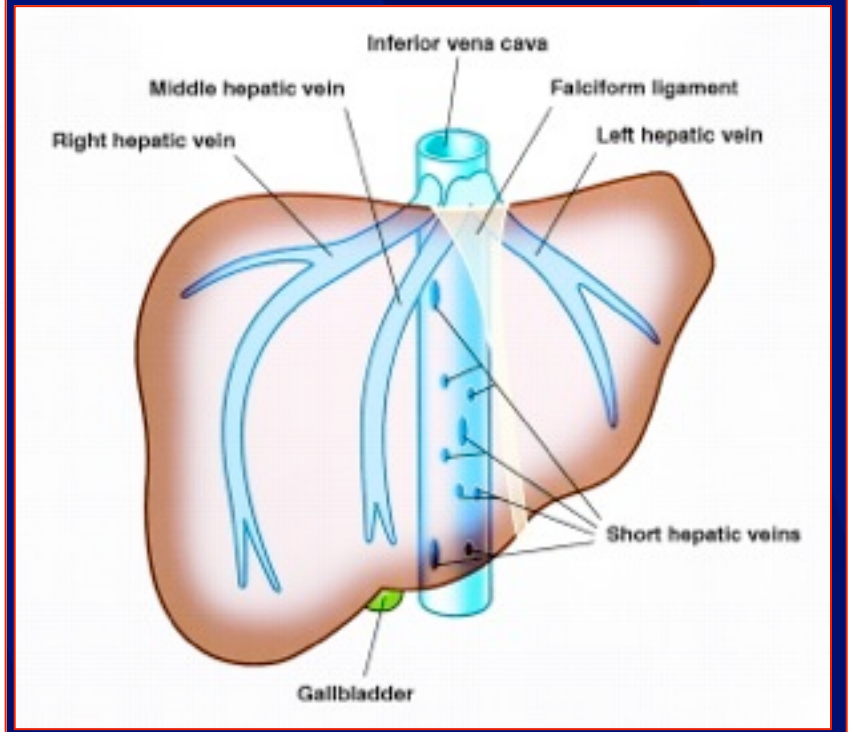
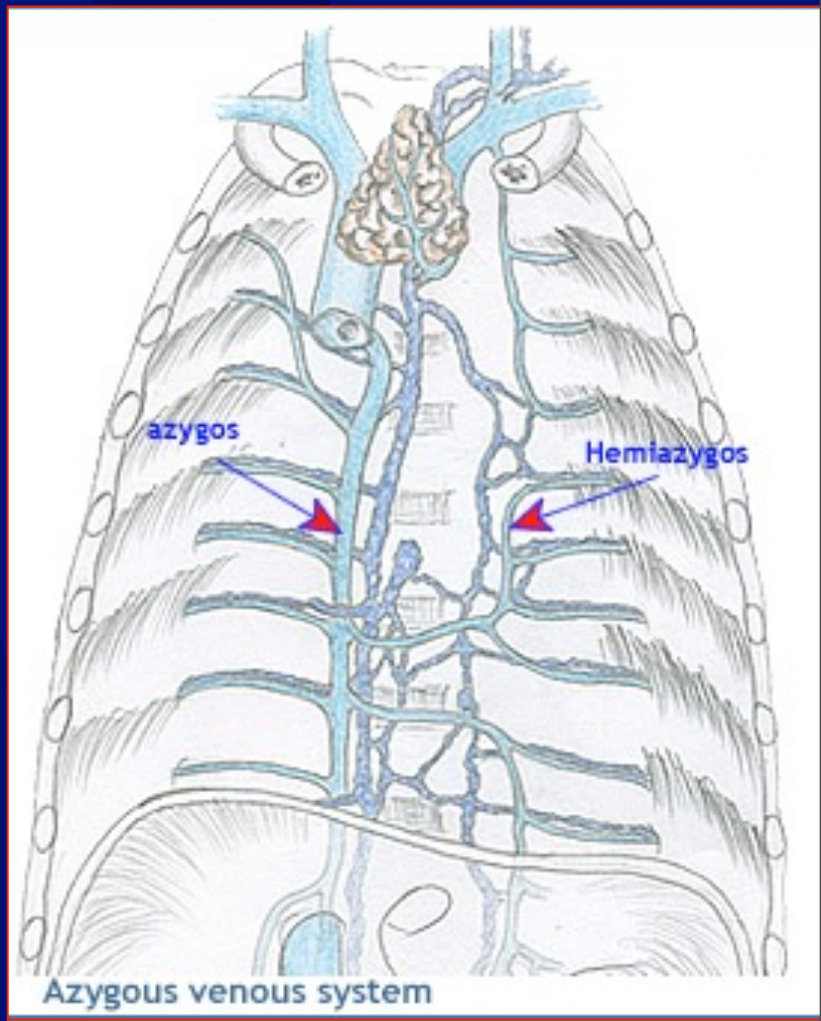
Unconventional Central Venous Access

- Indications:
  - Central veins occlusions, preventing conventionl vascular acces (femoral, subclavian and yugular)
- Etiology
  - Renal failure with haemodialysis
  - Multiple access
  - Bowel failure

Unconventional Central Venous Access







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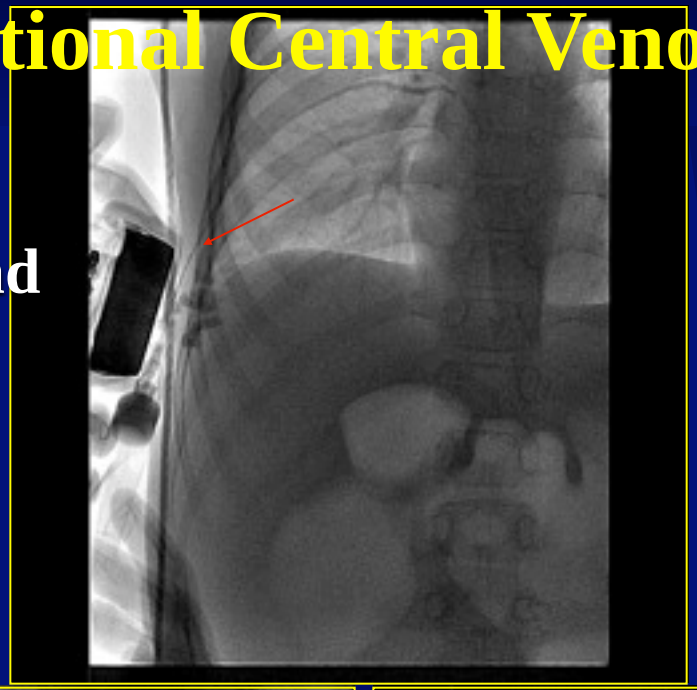
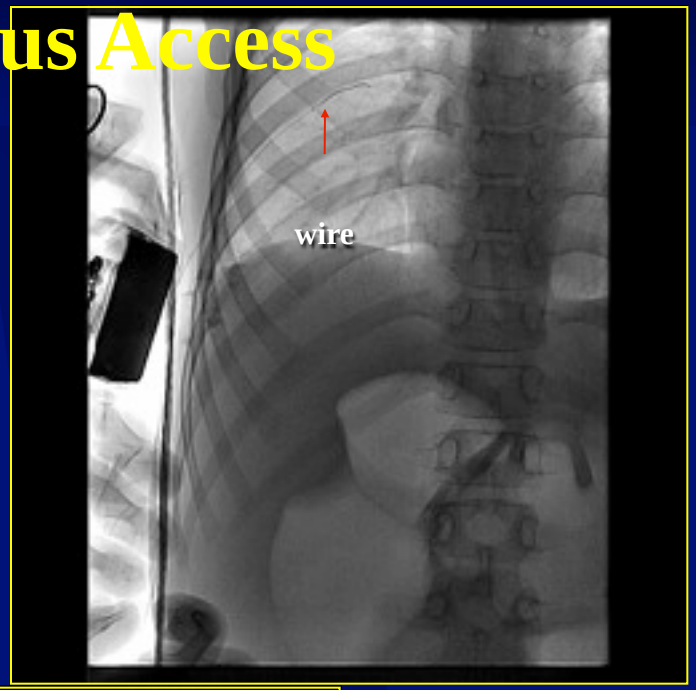
Unconventional Central Venous Access

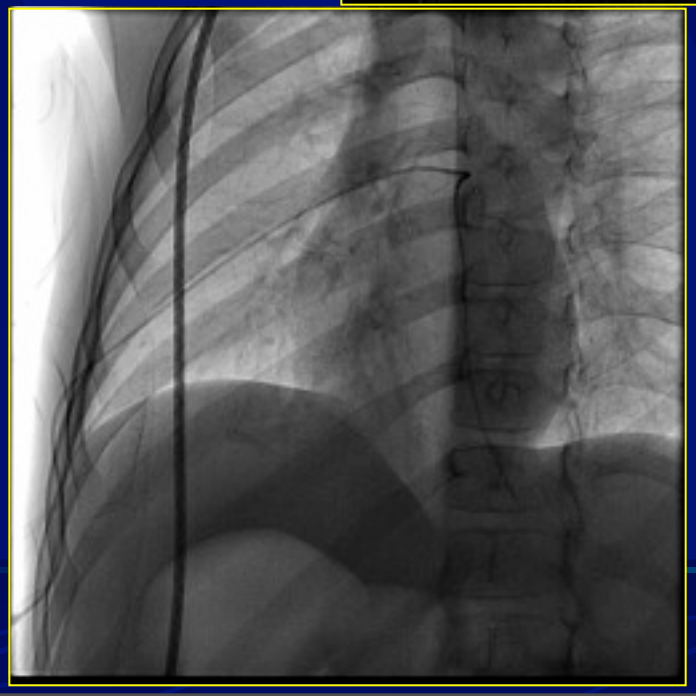
Punction of intercostal vein guided with Echo and catheter in azygos vein

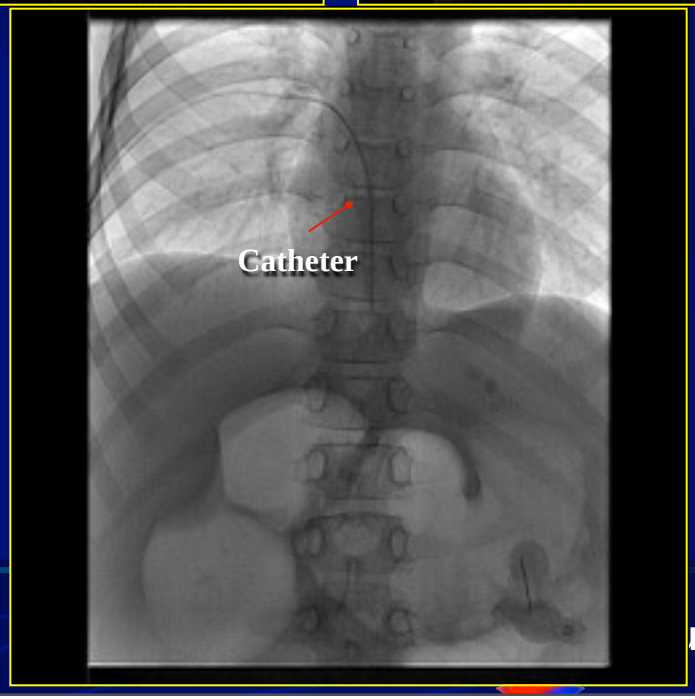
Unconventional Central Venous Access

Punction of intercostal vein guided with Echo and catheter in azygos vein







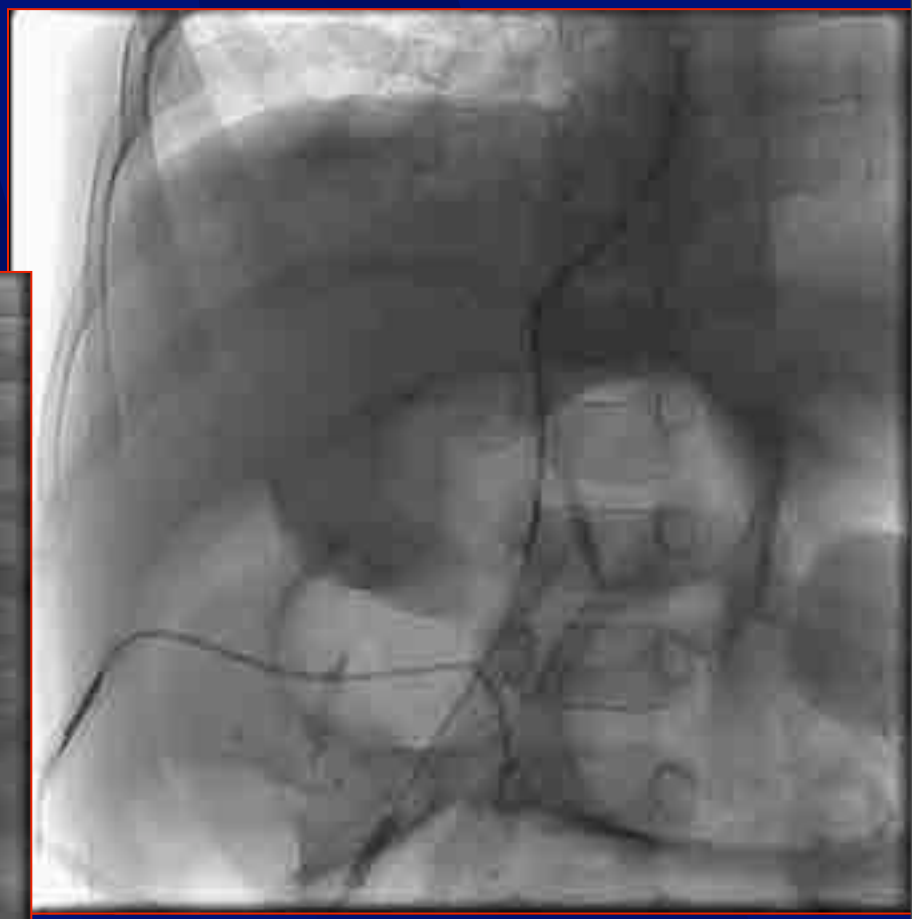


Unconventional Central Venous Access

Suprahepatic vein puncture

Unconventional Central Venous Access

Suprahepatic vein puncture



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Unconventional Central Venous Access: Complications

- Arterial puncture
- Bleeding (liver)
- Hemothorax
- Pneumothorax
- braquial plexus injury
- Catheter kinking

Unconventional Central Venous Access:
Favaloro Foundation Experience (2006-2012)

N	60 prodecure (11 ptes)
Intercostal to azygos	11 (18.3%)
Suprahepatics vein	19 (31.7%)
Subclavian or yugular colaterals to SCV	12 (21.7%)
Retroesternal colaterals	8 (13.3)
Femoral colateral to azygos	5 (8.3%)
Transhepatic to ICV	3 (5%)
Transthoracic to RA	1 (1.7%)

Unconventional Central Venous Access:
Favaloro Foundation Experience (2006-2012)

Follow-up:	
Patients	11 (60 procedures)
Venous Access patency	3.3 month
5 ptes received bowel transplantation	4 are alive
6 ptes without bowel transplant,	5 are alive

Transjugular Intrahepatic Portosystemic Shunt: TIPS

Indication

- Recidivating bleeding without response to medical or endoscopic treatment
- Acute bleeding in cirrhotic with severe liver failure
- Budd Chiari Syndrome
- Refractory ascitis

Complication:

- Hepatic encefalopathy
- Hemolysis
- Infeccion/sepsis
- Hemoperitoneoum
- Hemobilioum

Pomier-Layrargues G, et al. Int J Hepatol. 2012;2012:167868.

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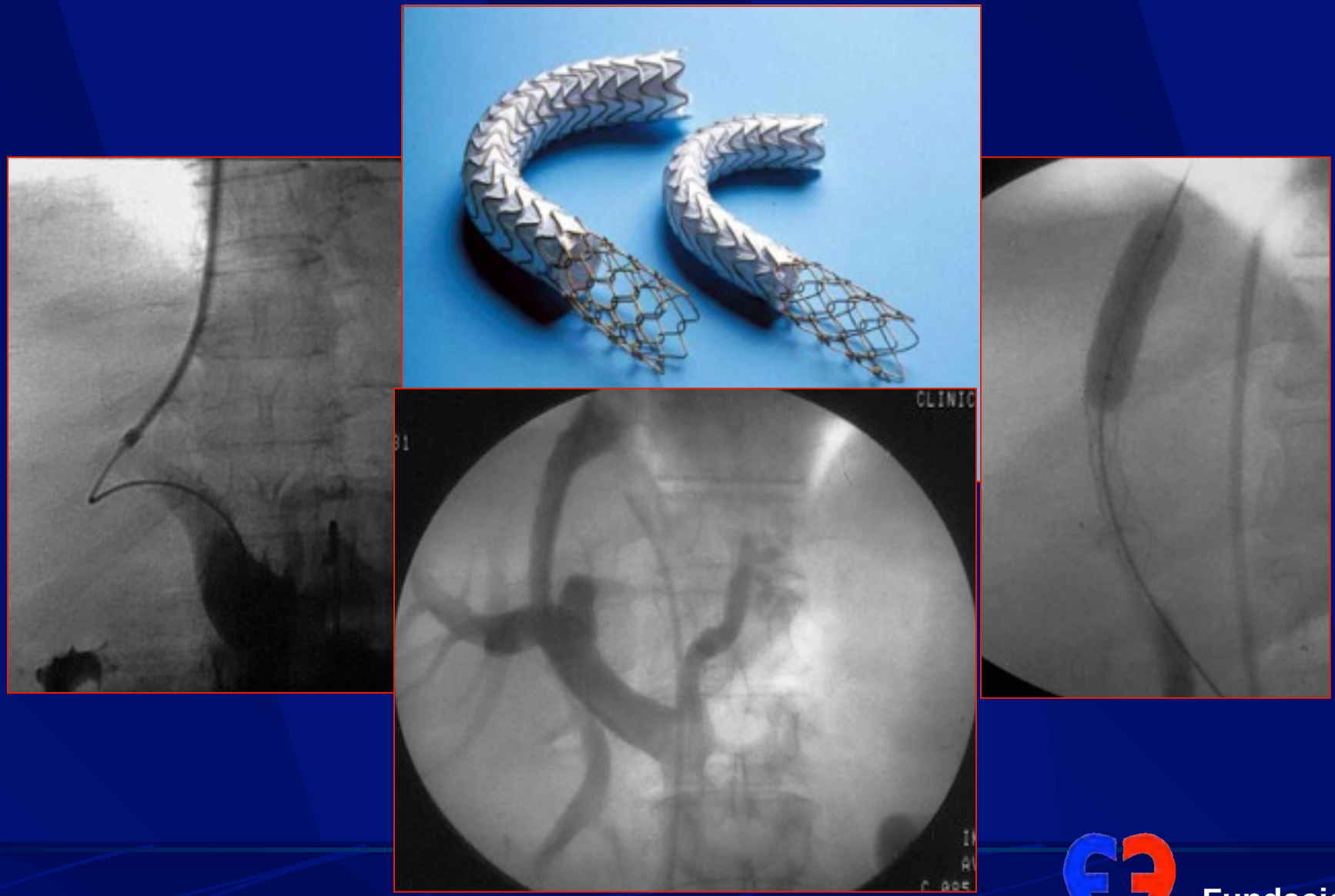
Transjugular Intrahepatic Portosystemic Shunt: TIPS



April 2009 Vol 80 No 4

Journal of neurology neurosurgery & psychiatry

Research paper

Chronic cerebrospinal venous insufficiency in patients with multiple sclerosis

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See Editorial Commentary, p 358

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ABSTRACT

Background: The extracranial venous outflow routes in clinically defined multiple sclerosis (CDMS) have not previously been investigated.

Methods: Sixty-five patients affected by CDMS, and 235 controls composed, respectively, of healthy subjects, healthy subjects older than CDMS patients, patients affected by other neurological diseases and older controls not affected by neurological diseases but scheduled for venography (HAV-C) blindly underwent a combined transcranial and extracranial colour-Doppler high-resolution examination (TCCS-ECD) aimed at detecting at least two of five parameters of anomalous venous outflow. According to the TCCS-ECD screening, patients and HAV-C further underwent selective venography of the azygous

gradient favours venous return to the right hear which can be easily assessed with high-resolutio echocolour Doppler (ECD) and transcranial colou coded Doppler sonography (TCCS), which represe an ideal method by which to investigate the haem dynamics of cerebral venous return.[9–19] In additio ECD clarified the postural control of the extracrani outflow pathways, as follows:[9–12]

- the internal jugular vein (IJV) is the predom nant pathway in the supine position, co firmed by an increased cross-sectional area the internal jugular vein (CSA) related increased blood volume in that posture; and
- redirection of venous flow to the vertebr veins (VVs) occurs in the upright position, wit

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Original article

Disability caused by multiple sclerosis is associated with the number of extra cranial venous stenoses: possible improvement by venous angioplasty. Results of a prospective study

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Abstract

Objective: Chronic cerebrospinal venous insufficiency (CCSVI) was recently described in patients with multiple sclerosis (MS). The hypothesis of the vascular aetiology provides a new approach in the investigation and treatment of MS.

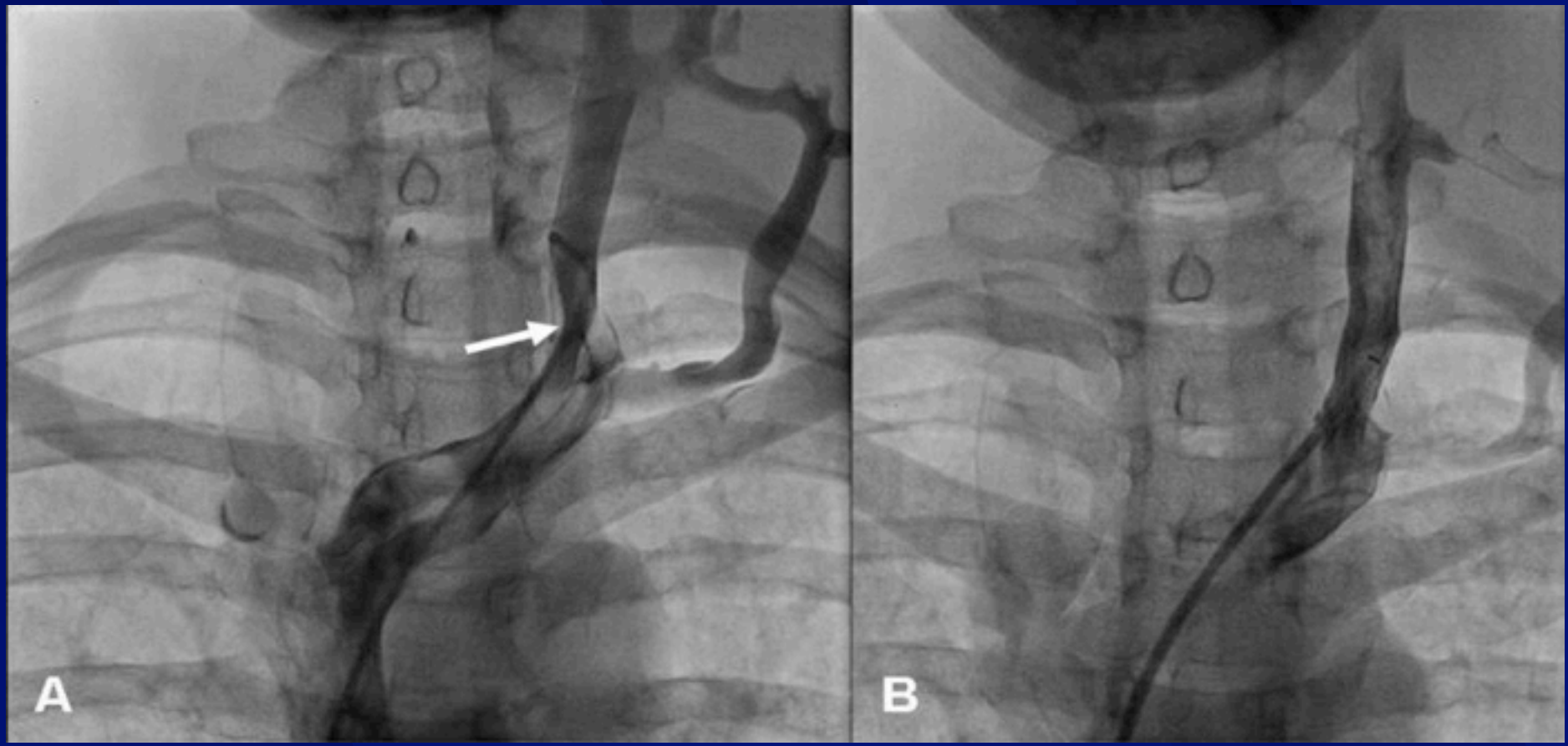
Methods: Our open-label study included 94 MS patients who fulfilled ultrasound sonographic criteria required for CCSVI. The internal jugular and/or azygous veins by a catheter venography were dilated.

Results: In 34.8% of the patients unilateral, in 65.2% bilateral venous abnormalities and in 2.1% no luminal obstructions were demonstrated. The patient group with the higher disability score had a significantly higher number of venous lesions ($P < 0.005$). Significant improvement of clinical disability in relapsing-remitting patients was ($P < 0.001$) achieved. In our study no stents were used. Re-stenosis occurred in 21.7% of the patients.

Conclusion: The number of venous narrowings is higher in more disabled patients. A significant improvement in clinical disability in the relapsing-remitting group was observed.

Keywords: venous pathology; angioplasty; interventional radiology; multiple sclerosis

Stenosis of the left IJV with collateral



Ishihara 3/15

Ishihara 13/15

Zorc M. et al. www.solaci.org

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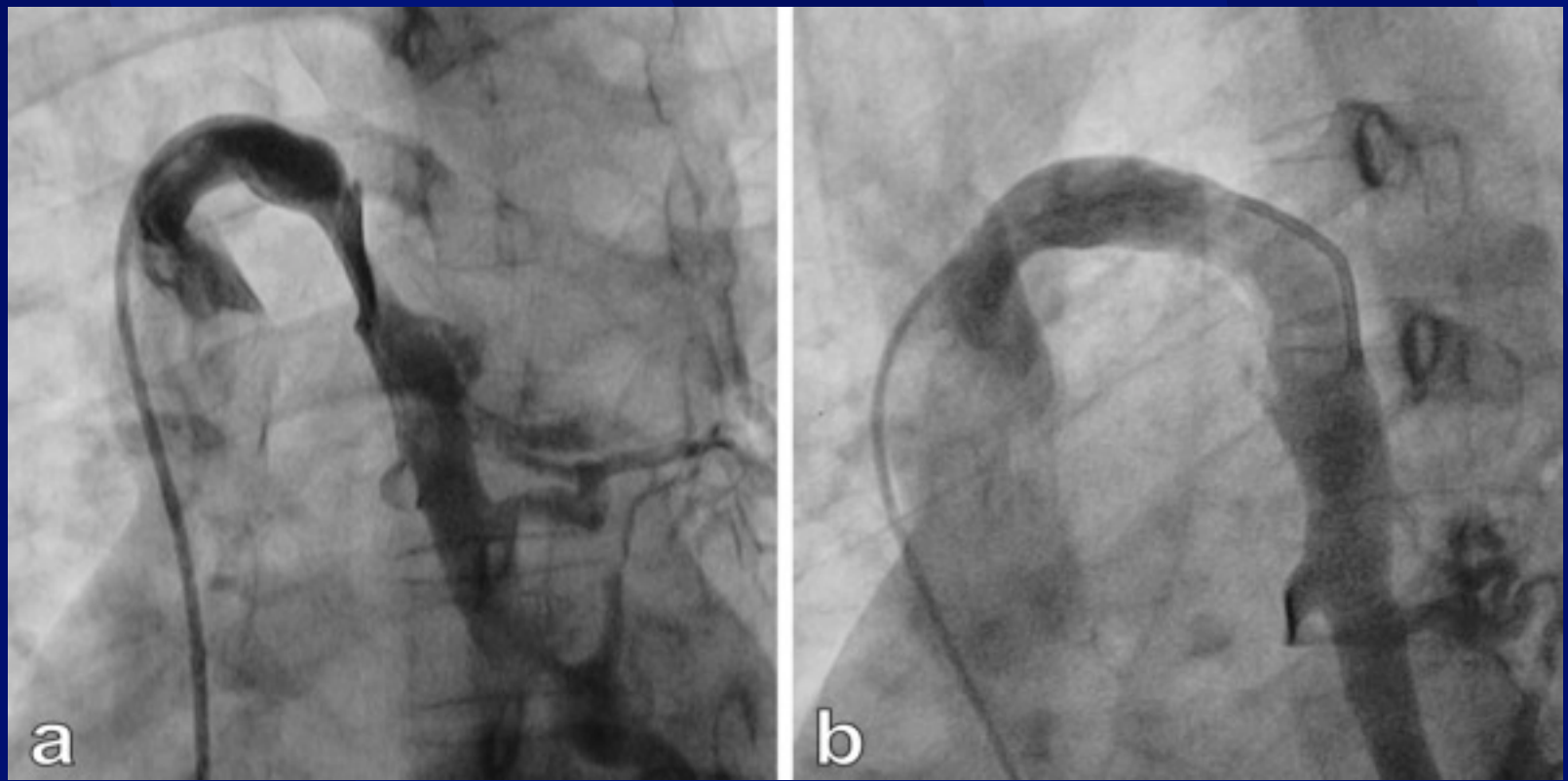
Deformity of the azygous vein

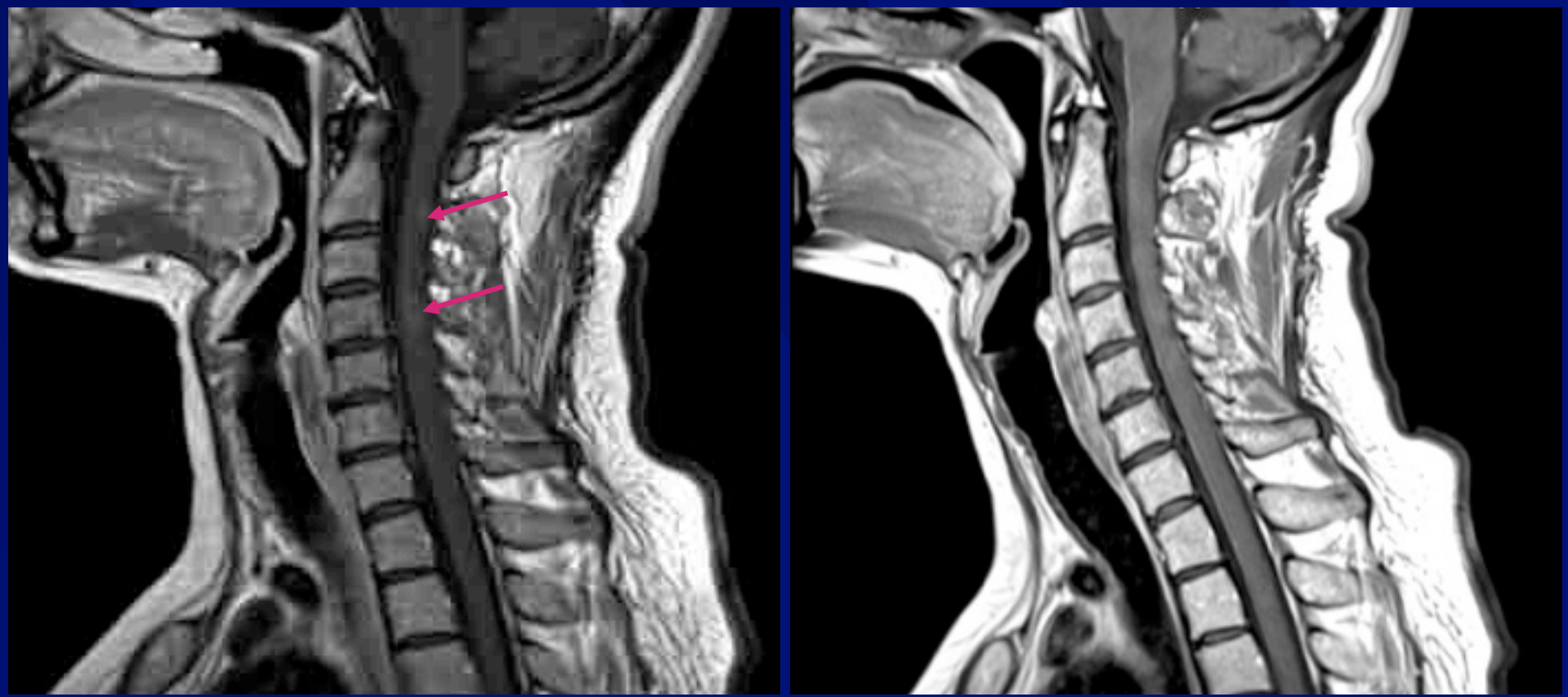


a - stenosis of azygous vein
b - lumen after dilatation)

Spinal cord Gd enhancement

(female patients, 43 years, duration 1 year, course PP)

January 2011 **April 2011**



Gadolinium

Zorc M. et al. www.solaci.org

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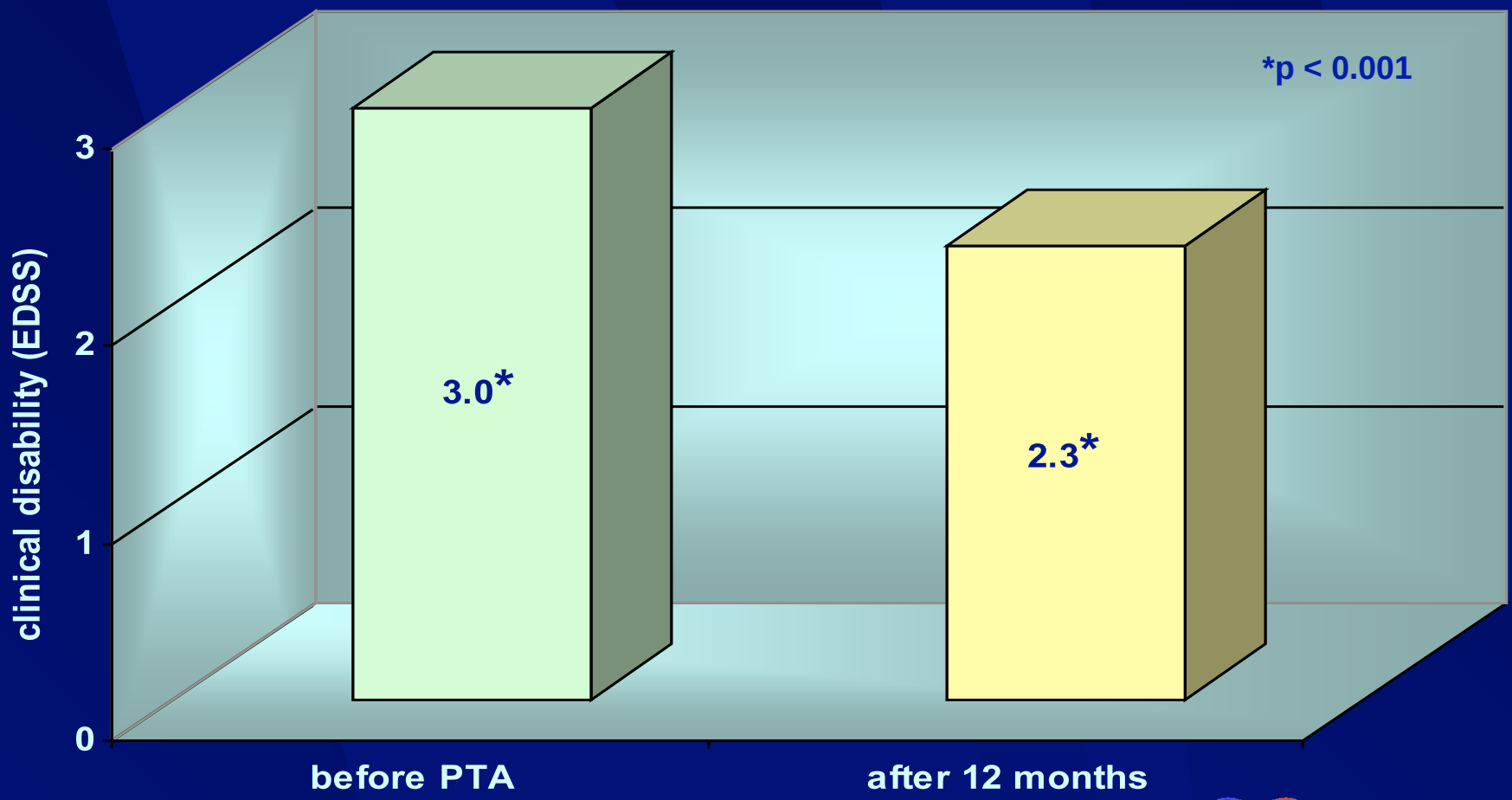
Results

Degree of clinical disability in RR group



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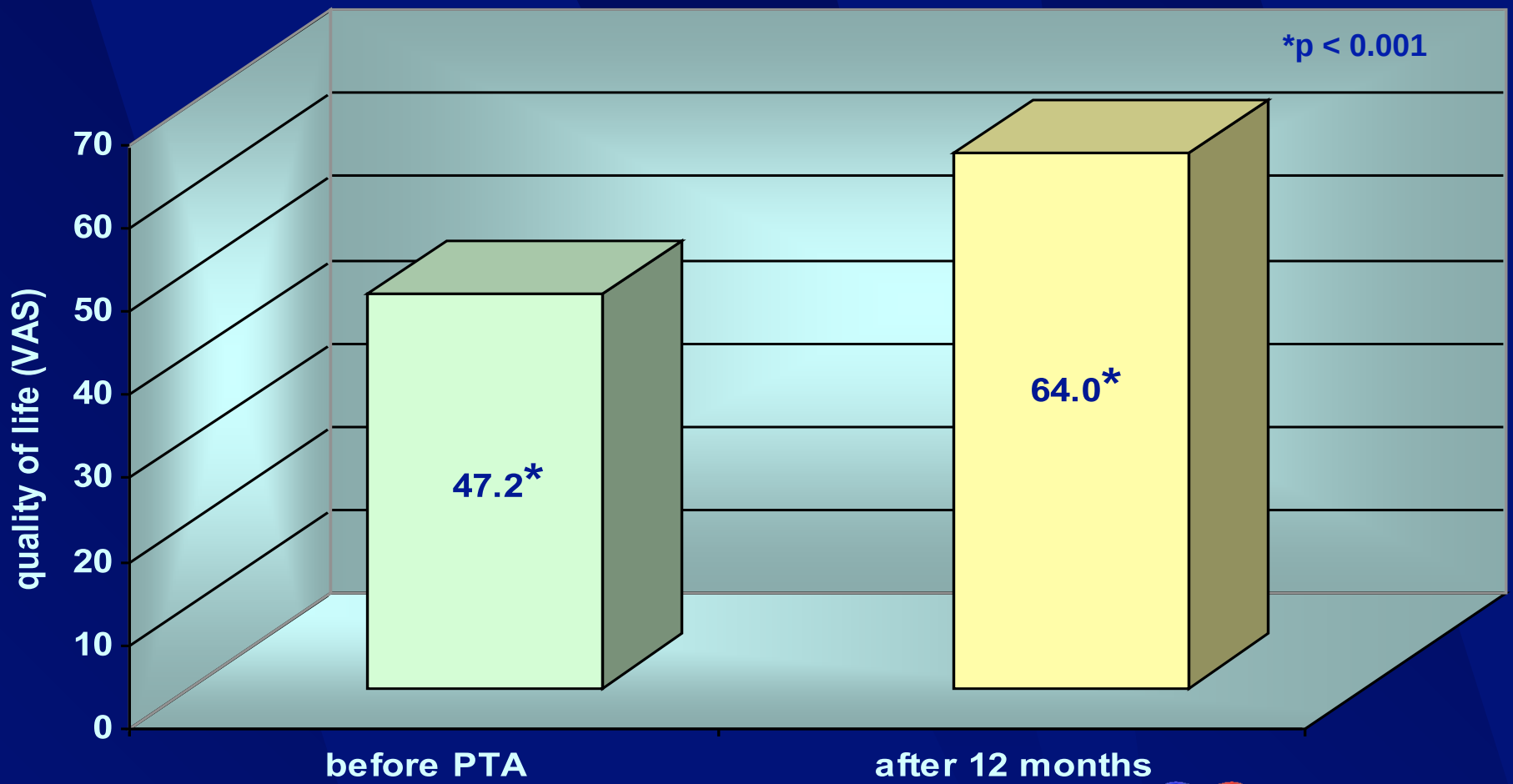
Results

Quality of life (VAS) in whole group



Zorc M. et al. www.solaci.org

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Conclusiones

- Vein vascular disease are not frequent but very difficult to treat with a high reintervention rate.
- Need a team approach including clinicians, surgeons, interventionist and other specialist according with the disease.
- More investigation & randomized trails are needed (CCSVI)

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Gracias por su Atención

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