



*Il paziente post-trombotico:
moderne acquisizioni fisiopatologiche,
cliniche e terapeutiche*

Ruolo della chirurgia open ed endovascolare

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Modena



DVRS Club







Italian College
of Phlebology

FINANCIAL RELATIONSHIP DISCLOSURE: None

Marzia Lugli

Deep venous reconstructive surgery (open and endovascular)

-  **what is it today?**
-  **who needs deep venous reconstruction?**
-  **which technique and when?**
-  **what about Guidelines?**

Deep vein reconstructive surgery



what is it?

Surgery of the Deep Veins



*begins with
obstruction correction*

1894	Paroma	Popliteal vein ligation
1948	Linton	Femoral vein ligation
1954	Warren & Thayer	GSV by pass of obstructed femoral vein
1958	Palma & Esperon	Cross-pubic bypass for iliac vein occlusion
1964	Stansel	Synthetic graft for caval reconstruction
1970	Husni	Sapheno-popliteal bypass for femoral venous obstruction
1984	Gloviczki	Reconstruction with prosthetic grafts of inferior vena cava
1988	Zolliker	Endovascular disobliteration and stenting



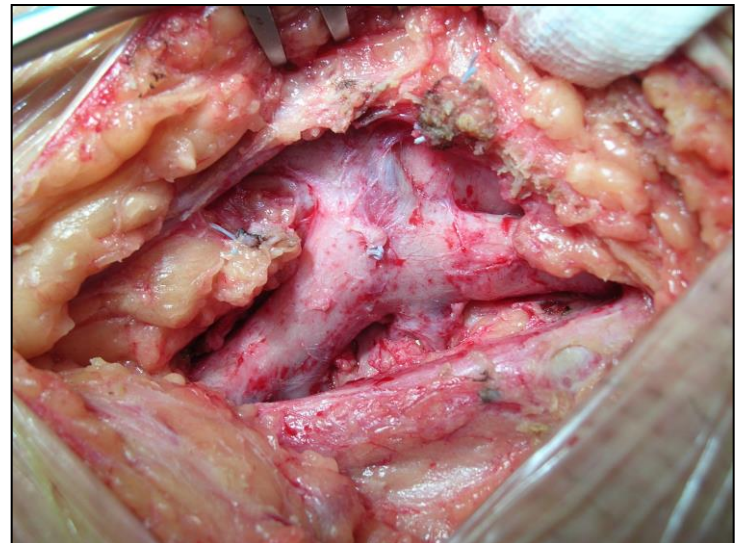
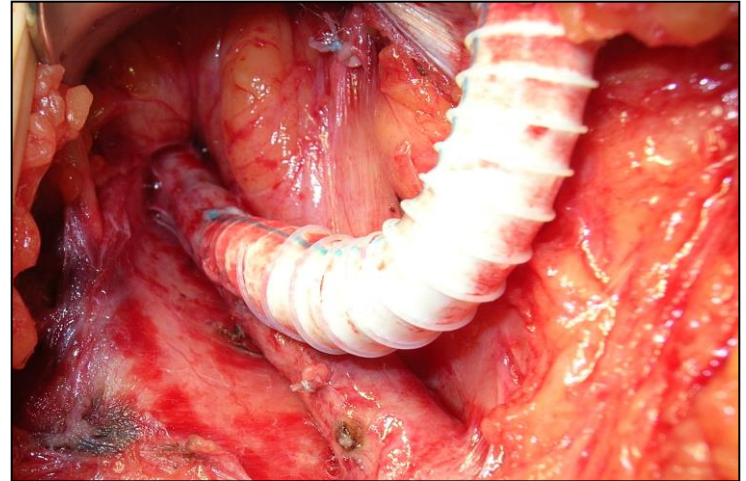
and immediately after with deep reflux treatment (valve surgery)

1953	Eisemann, Malette	First attempt to correct the reflux
1963	Psathakis	Gracilis muscle twining to obtain compression of popliteal vein
1968	Kistner	Internal valvuloplasty
1972	Hallberg	External banding of incompetent valves
1979	Kistner	Valve transposition
1982	Taheri, Raju	Valve transplant
1987	Kistner	Transparietal valvuloplasty
1999	Dalsing	Cryopreserved venous valve allografts
1999	Plagnol	Neovalve by invagination
2000	Raju	Transcommissural valvuloplasty
2002	Maleti	Neovalve reconstruction by parietal dissection
2003	Pavcnik	Bicuspid venous valve stent

From 1984 to 2015 modified techniques (Raju, Lane, Sottiurai, Tripathy, Opie, Perrin)

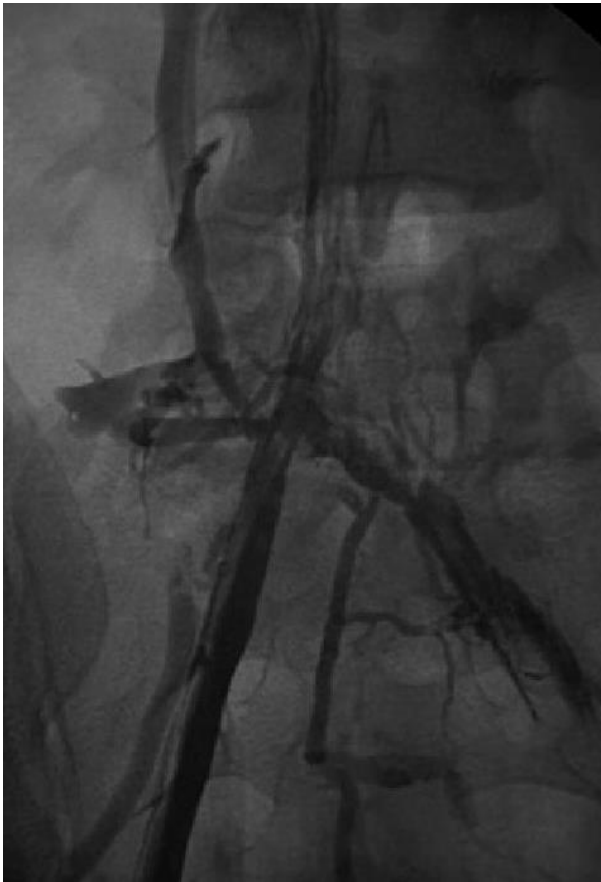
Obstruction correction

1958 – Palma crossover



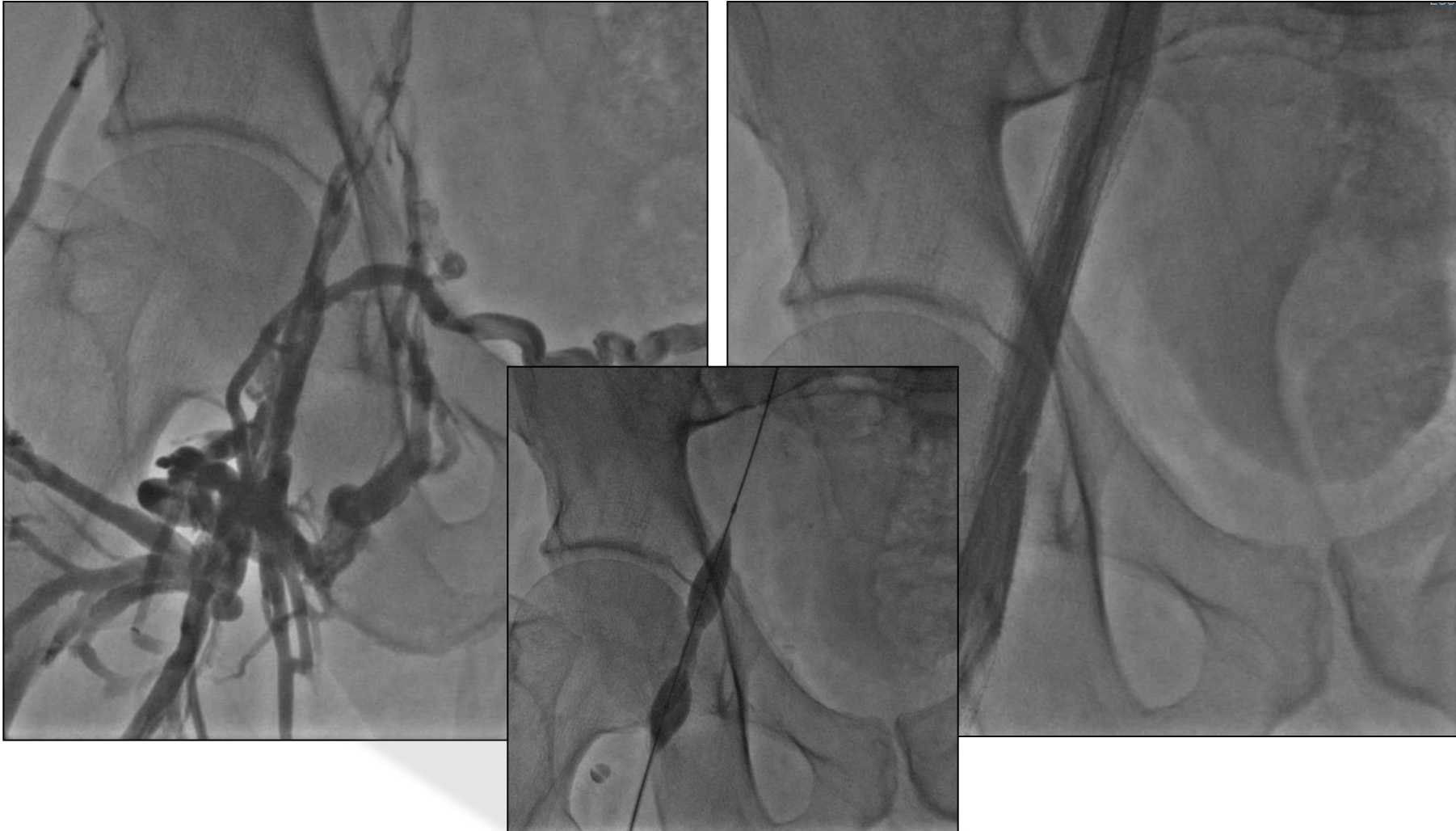
Obstruction correction

2002 – Raju and Neglen Venoplasty/stenting

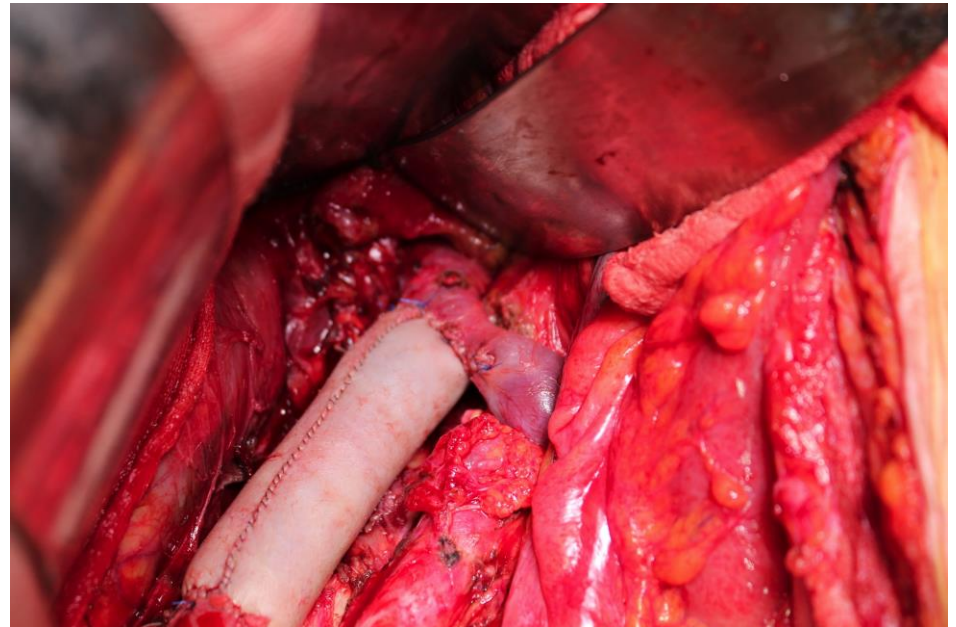
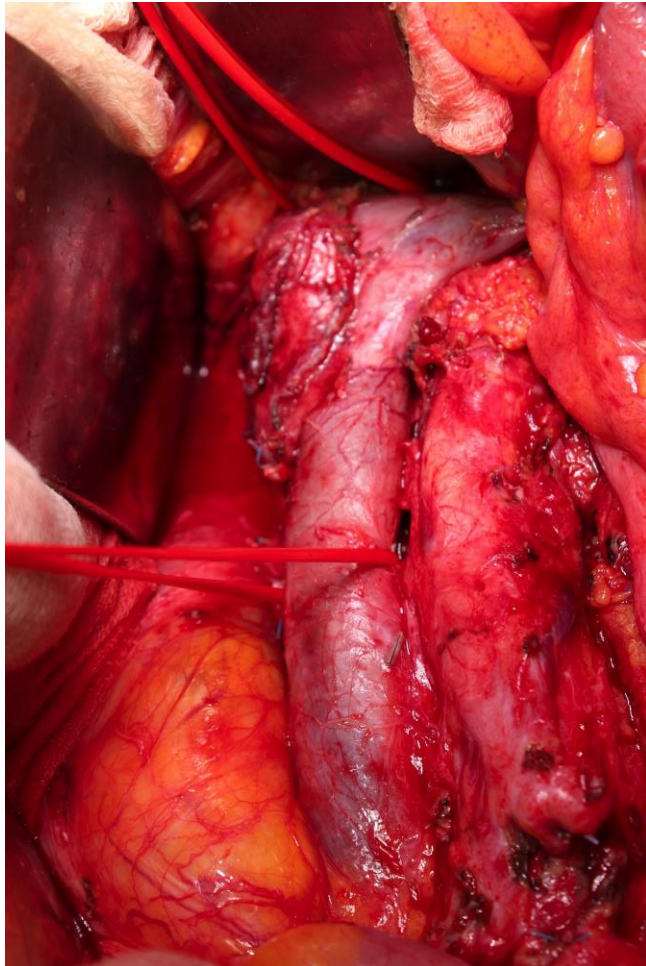


Obstruction correction

2002 – Raju and Neglen Venoplasty/stenting

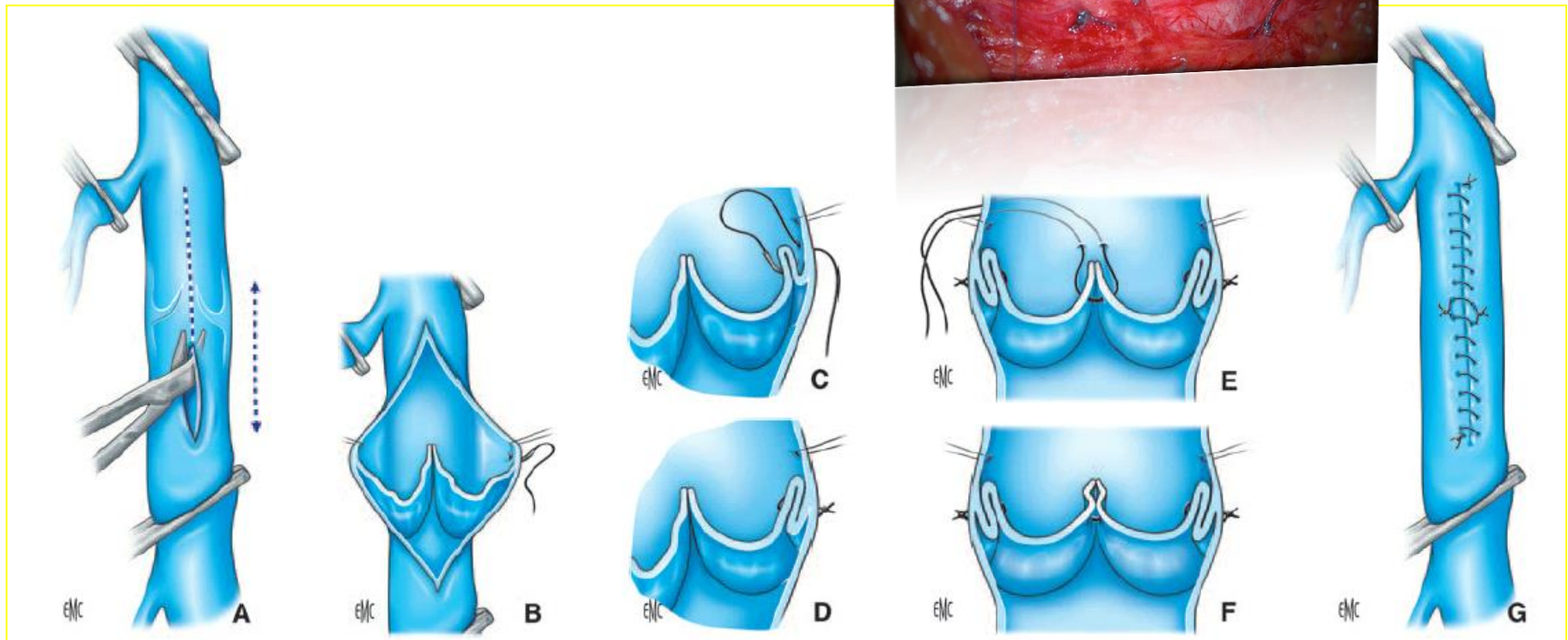
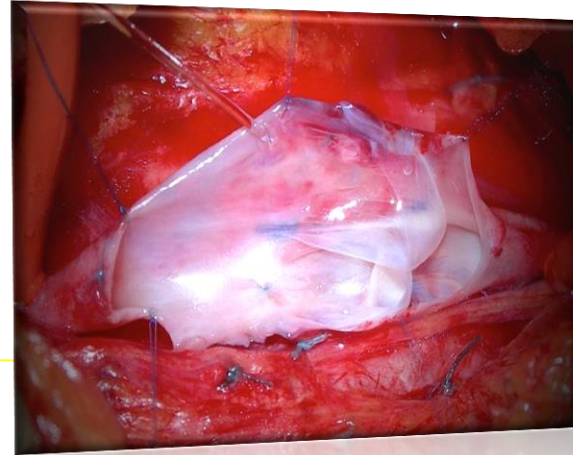


Iliocaval open surgery is today limited to oncological patients



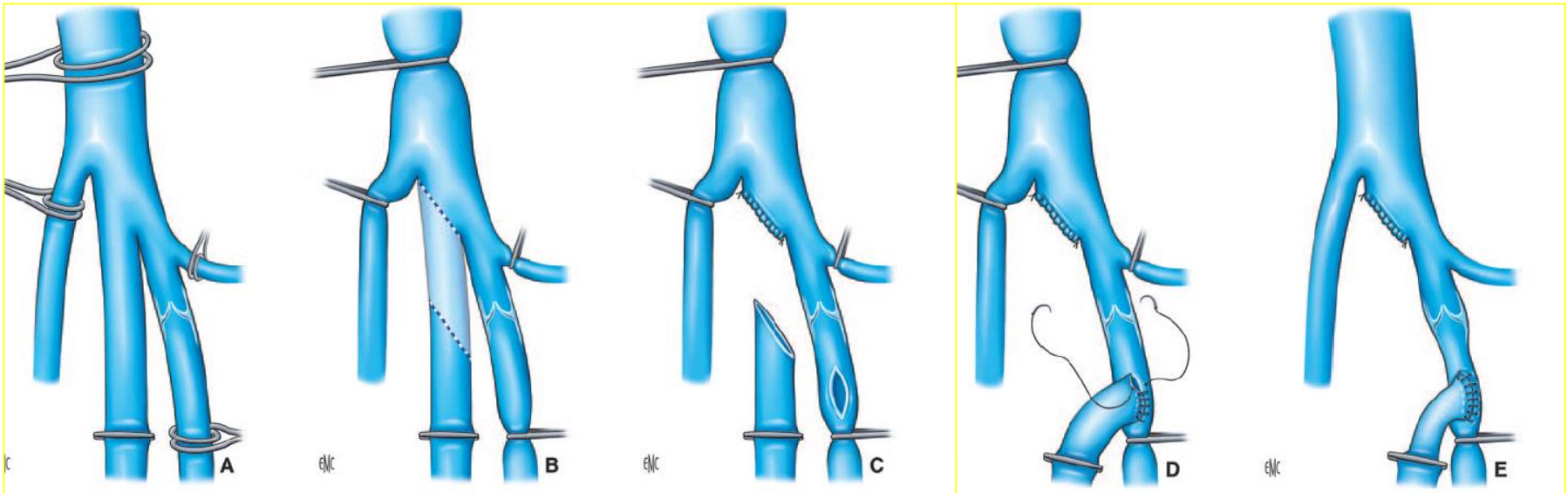
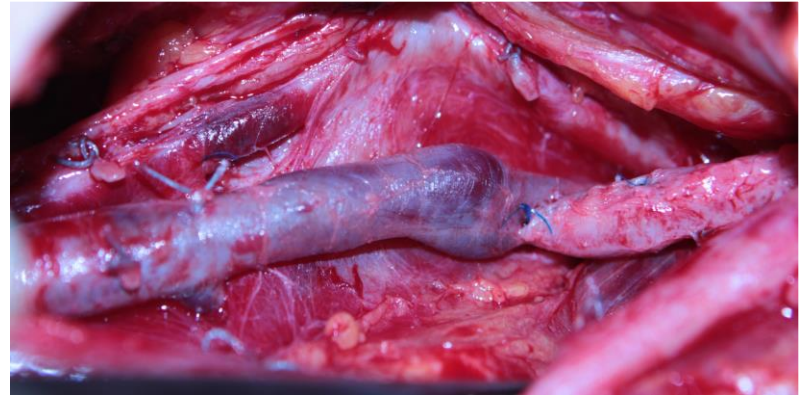
Reflux correction in primary incompetence

1968 – Kistner Valvuloplasty



Reflux correction in PTS and valve agenesis

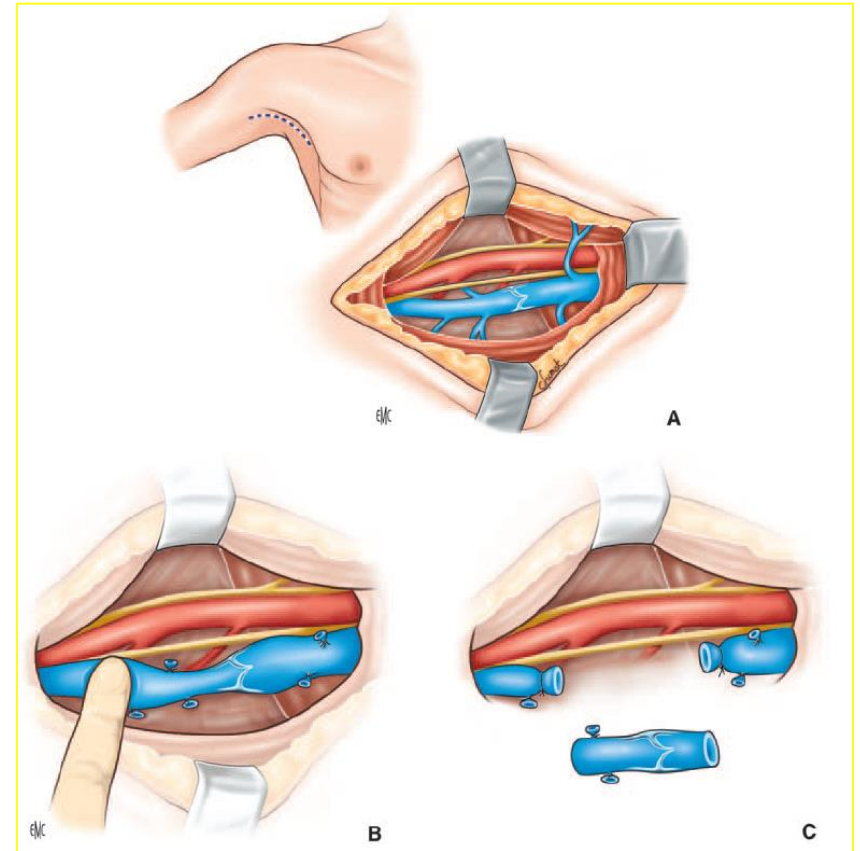
1979 Kistner - Transposition



Reflux correction in PTS and valve agenesis

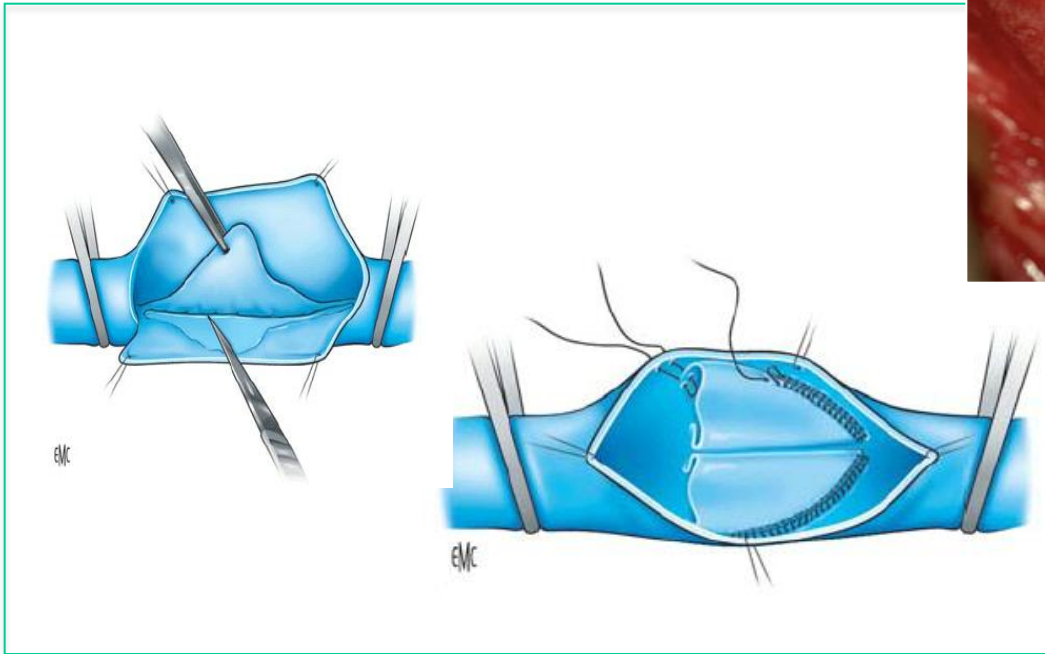
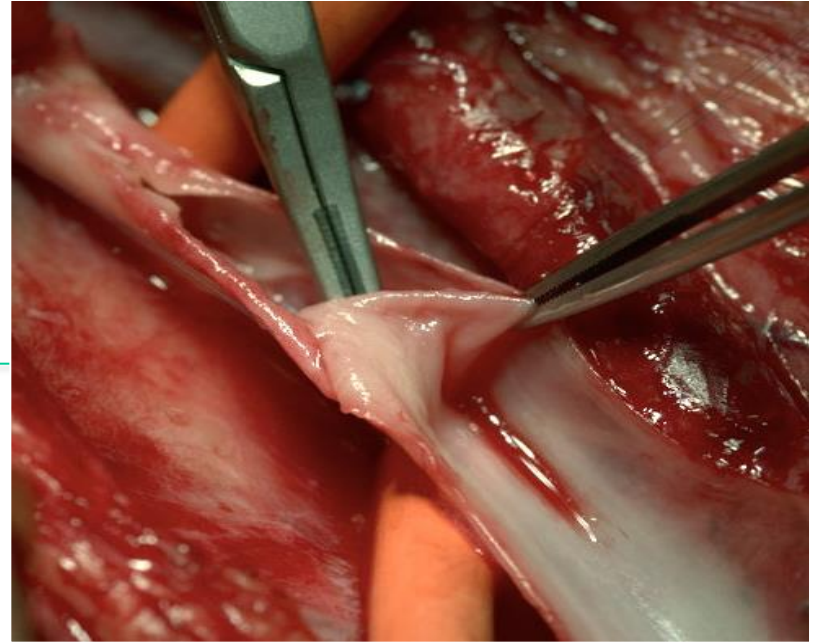


1982 Taheri - Transplant

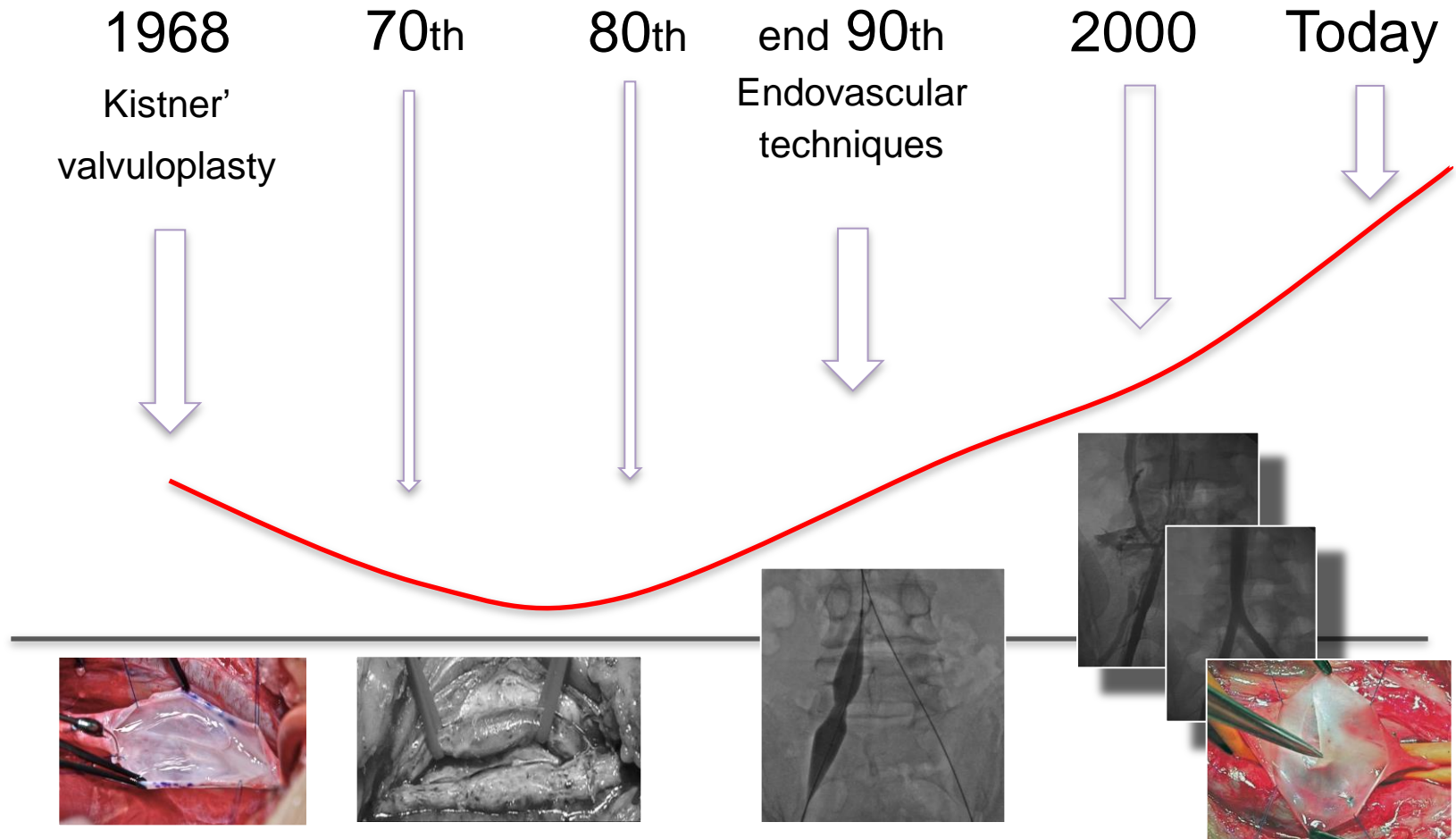


Reflux correction in PTS and valve agenesis

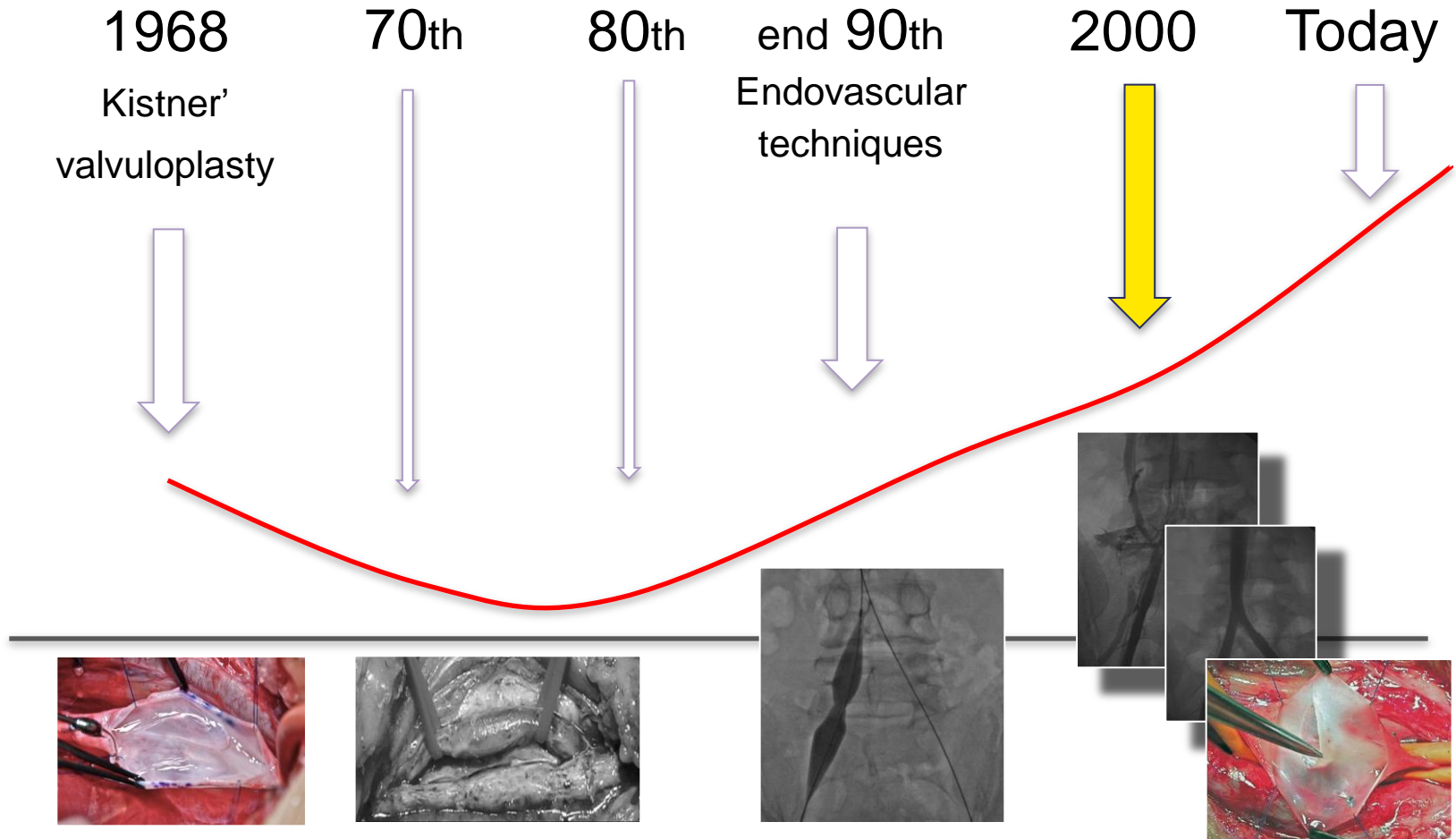
2002 Maleti – Neovalve



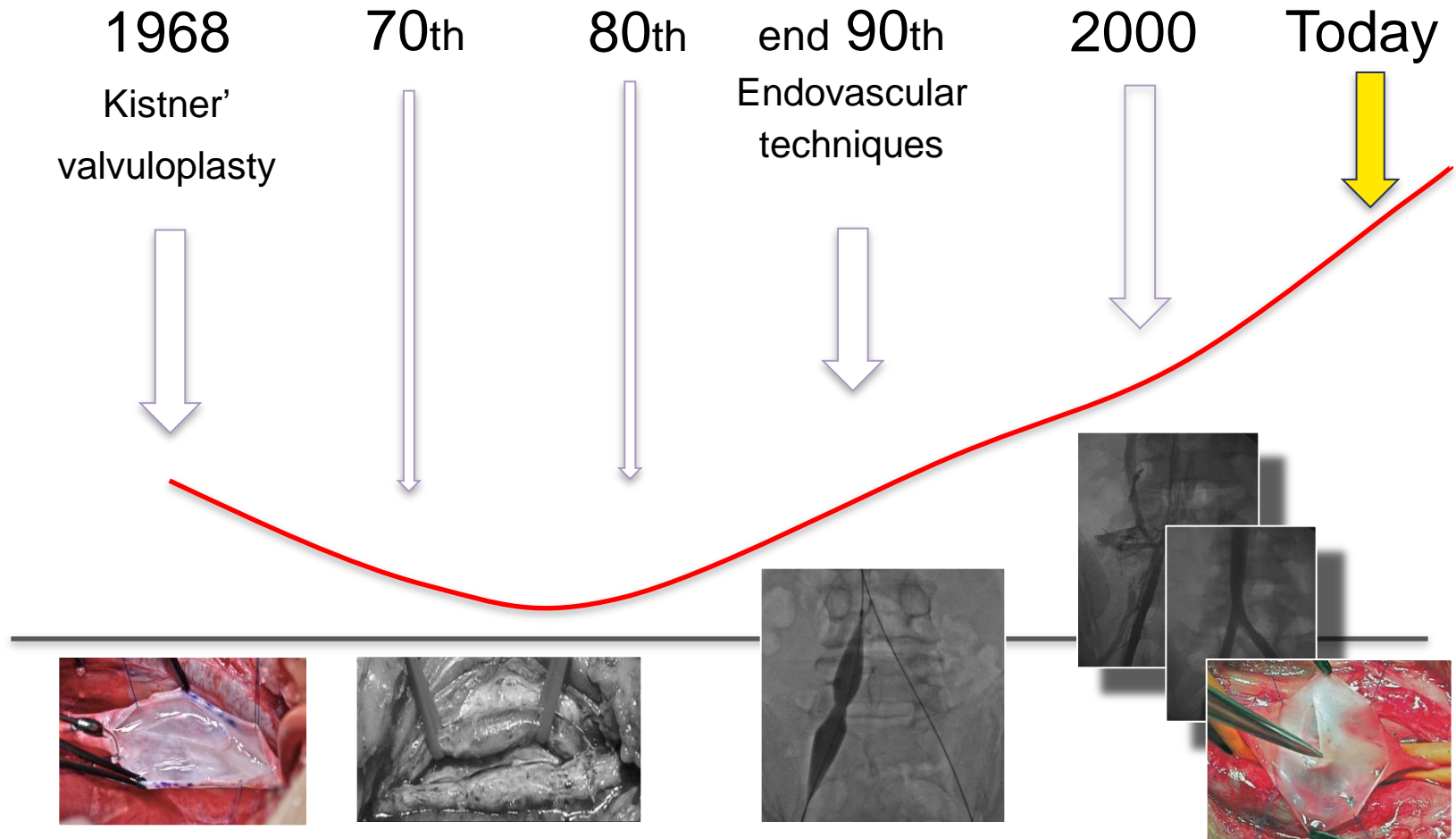
Deep vein reconstructive surgery



Deep vein reconstructive surgery



Deep vein reconstructive surgery



Today

Widespread interest of the scientific community on deep vein diseases, on their role in chronic venous insufficiency occurrence and consequently on deep vein reconstructive surgery, addressing both reflux and obstruction

Deep vein reconstructive surgery



Who needs Deep Venous Reconstruction?

Patients affected by Chronic Venous Insufficiency



Patients affected by Chronic Venous Insufficiency

- **not responding** to compression therapy
- or **without compliance** for compression therapy
- **eligible** for deep venous reconstruction
- **relying on an adequate timing**

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Patients affected by Chronic Venous Insufficiency

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First of all, do identify the etiology of the disease

Why?

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Why?

Different
indications

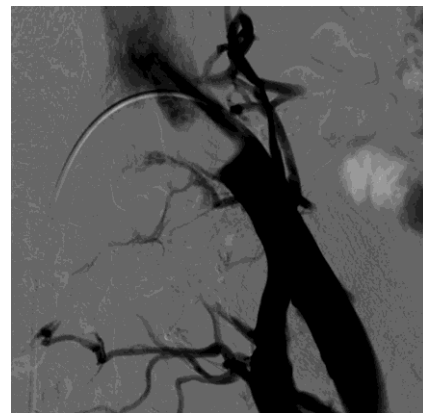


Different **results**

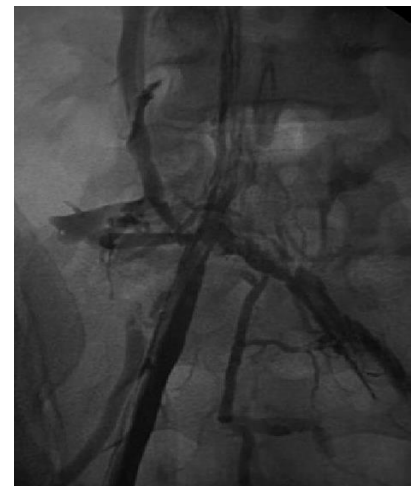
Obstruction



Primary [Ep]



Secondary [Es]





Technical results after iliac stenting

Patency rate @ 3-5 years:

90% to 100% for nonthrombotic disease

74% to 89% for post-thrombotic disease



Clinical results

Clinical relief of pain: 86% to 94%

Relief from swelling: 66% to 89%

Ulcer healing: 58% to 89%



Clinical results

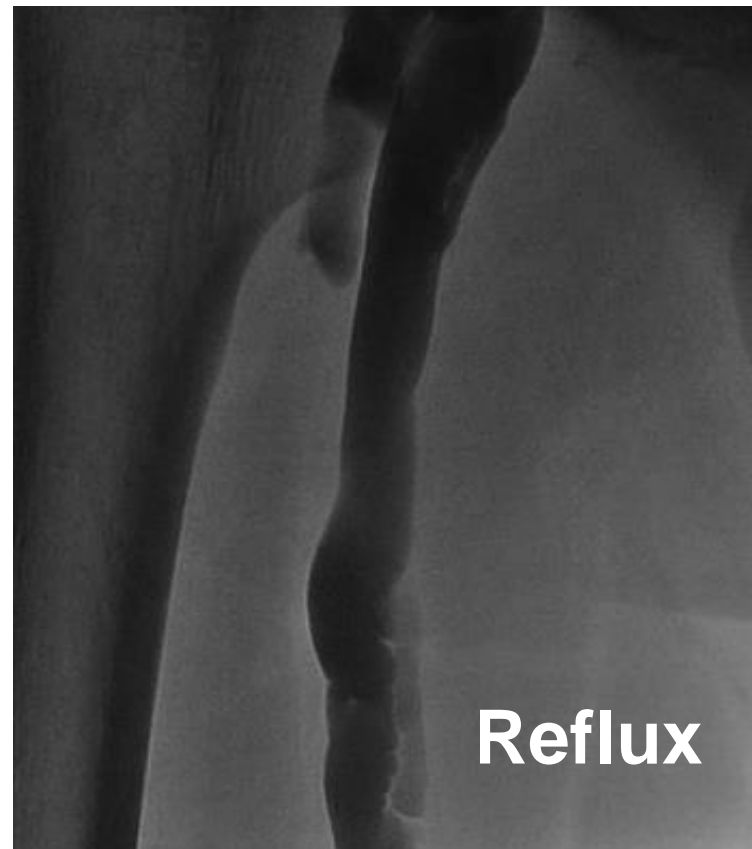
Clinical relief of pain: 86% to 94%

Relief from swelling: 66% to 89%

Ulcer healing: **58% to 89%**



Obstruction



Reflux

The residual reflux after obstruction correction is still symptomatic in approximately **50% of cases**

Deep Reflux



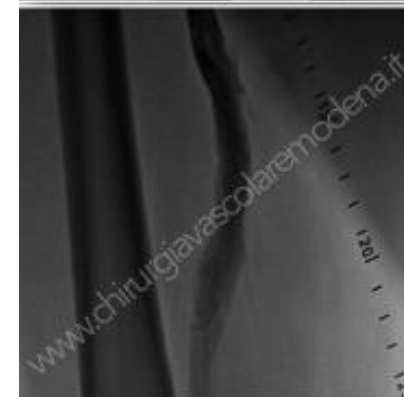
Primary [Ep]



Secondary [Es]



Congenital [Ec]



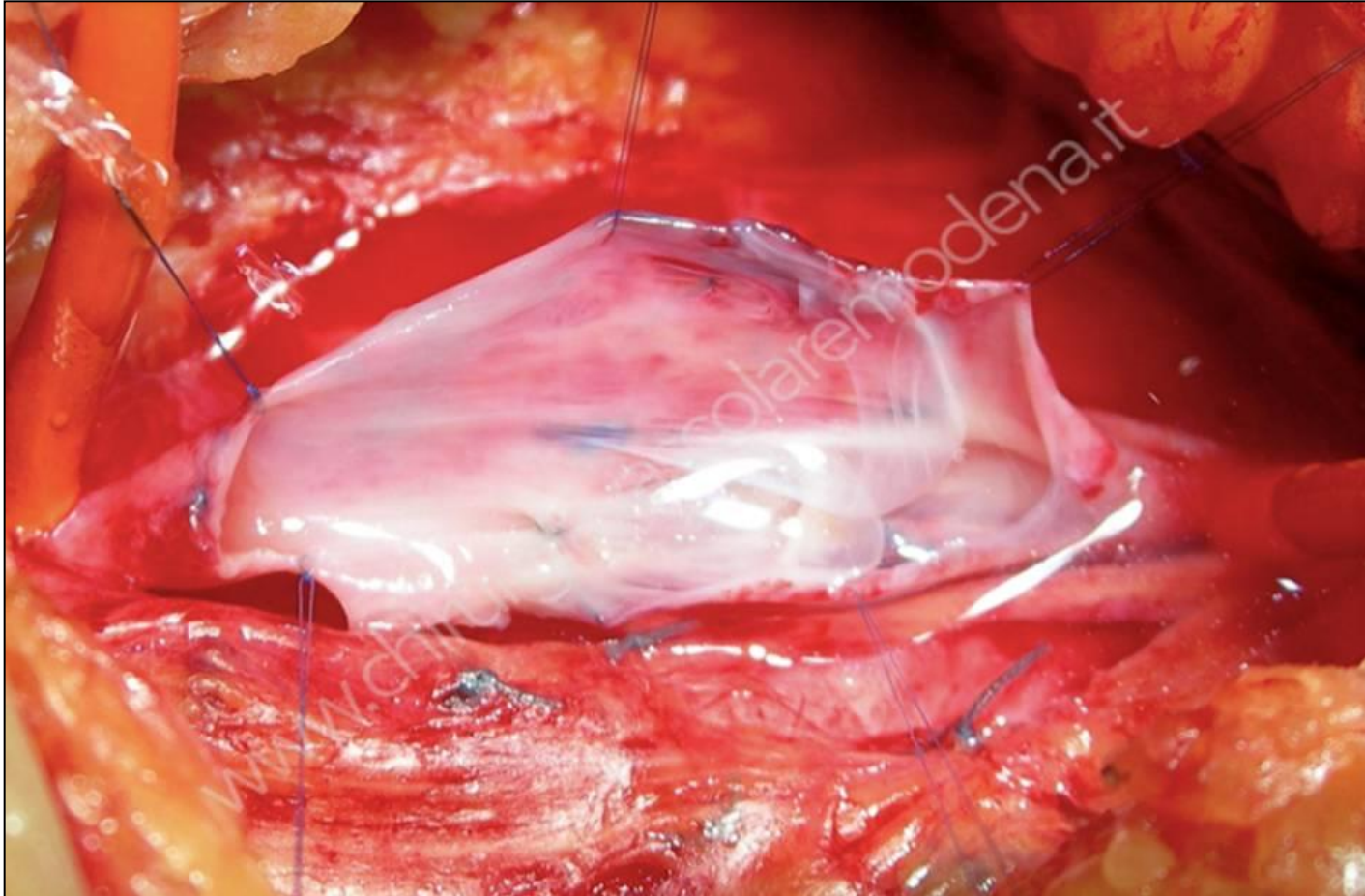
Maletti O, Perrin M. Reconstructive surgery for deep vein reflux in the lower limbs: techniques, results and indications. Eur J Vasc Endovasc Surg 2011;41:837-848

Primary deep venous insufficiency (Ep)



Usually, valves are present but malfunctioning

The valve function can be restored:
valvuloplasty is the best option

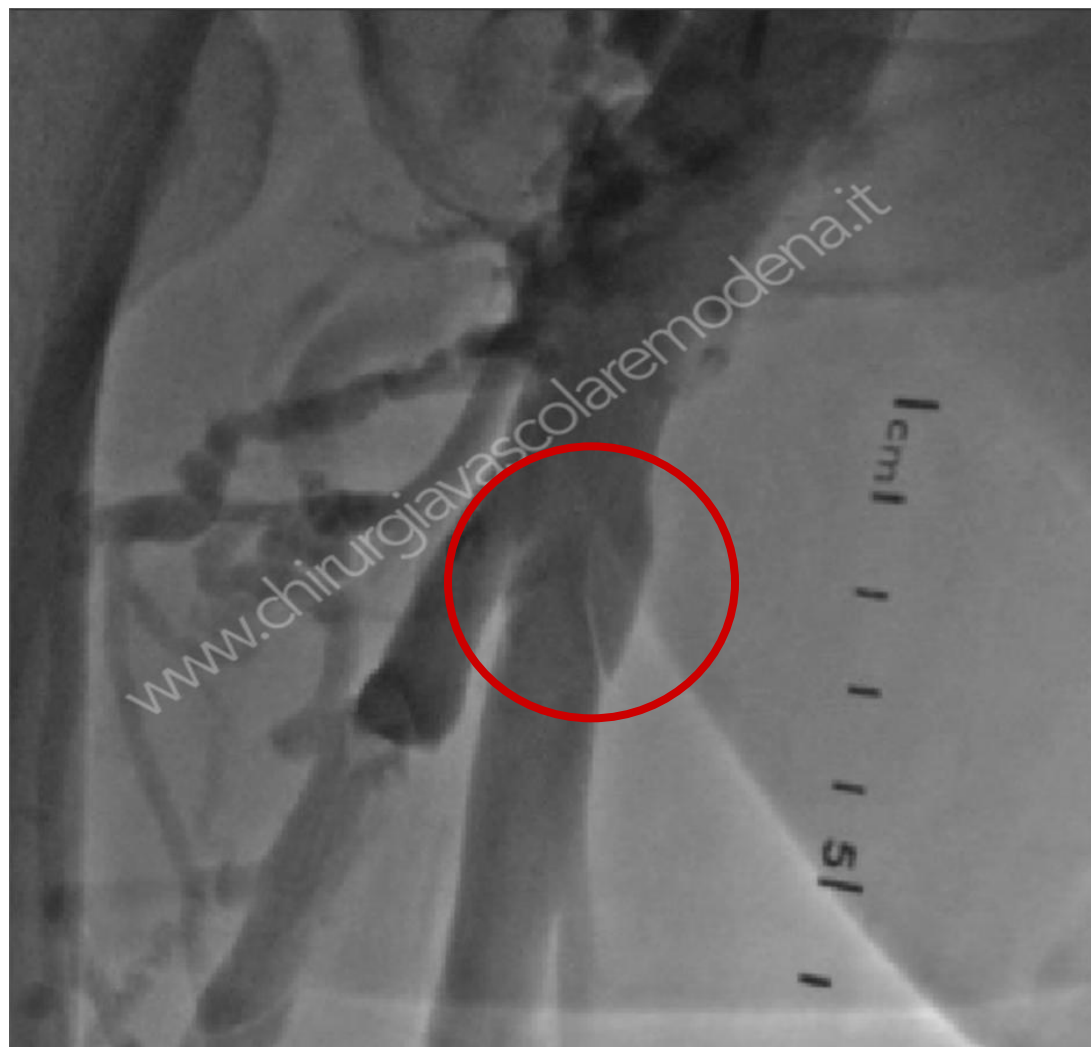


Kistner RL. Surgical repair of a venous valve. Straub Clin Proc 1968;24:41-3.



superficial venous
incompetence is
frequently
associated





Should we first treat the **deep reflux** or the **superficial reflux**?



Should we first treat the **deep reflux** or the **superficial reflux**?

How often is deep venous reflux eliminated after saphenous vein ablation?

Alessandra Puggioni, MD,^a Fedor Lurie, MD, PhD,^{a,b} Robert L. Kistner, MD,^{a,b} and Bo Eklof, MD, PhD,^{a,b} *Honolulu, Hawaii*



In 50% of primary insufficiency, deep competence can be restored by treating the superficial system alone



Deep reflux can be caused by a **functional overload** of deep veins related to a significant superficial reflux



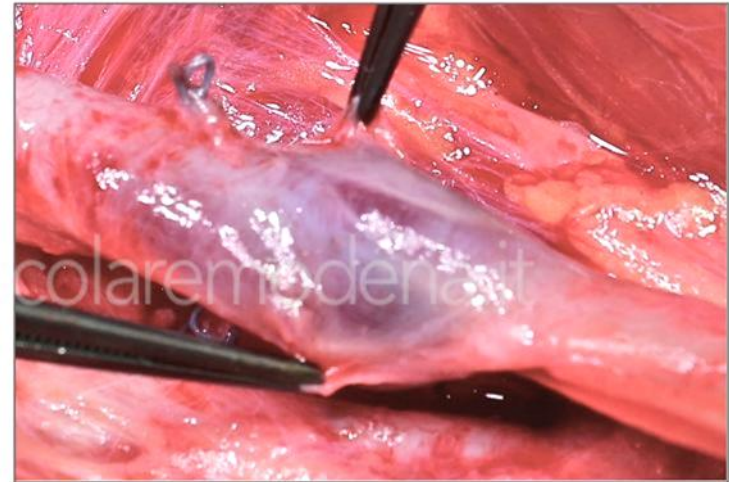
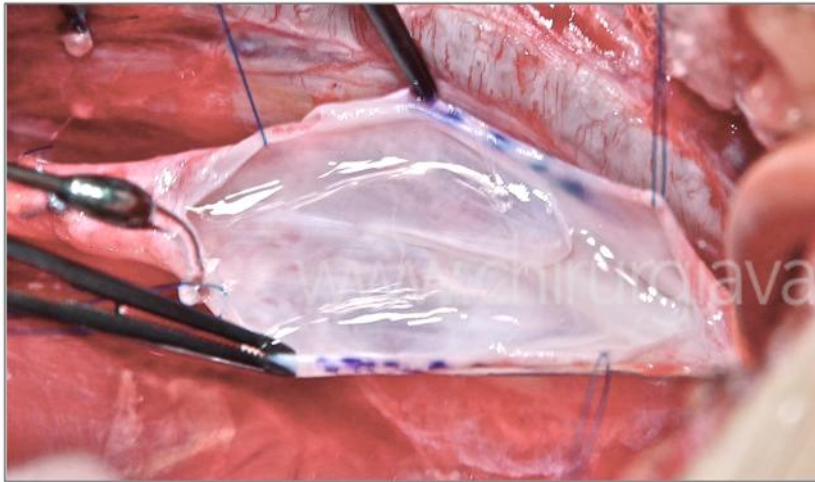
In almost half of the patients the deep venous reflux persists after superficial ablation and the final result is ***varicose veins recurrence***



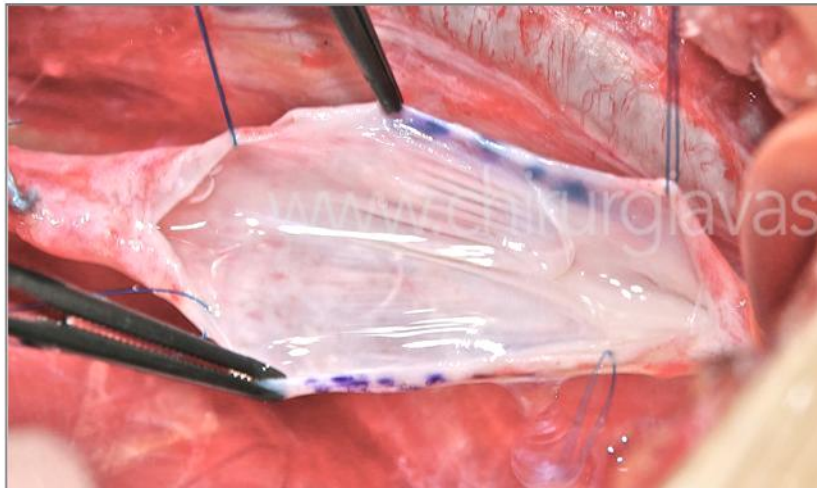
Those different outcomes are related to 2 anatomical conditions



Primary incompetence with **symmetrical cusps**



Primary incompetence with **asymmetrical cusps**



Primary incompetence with symmetrical cusps:

The preliminary treatment of superficial system is advisable.



The reduction of deep overload can restore the valve competence.

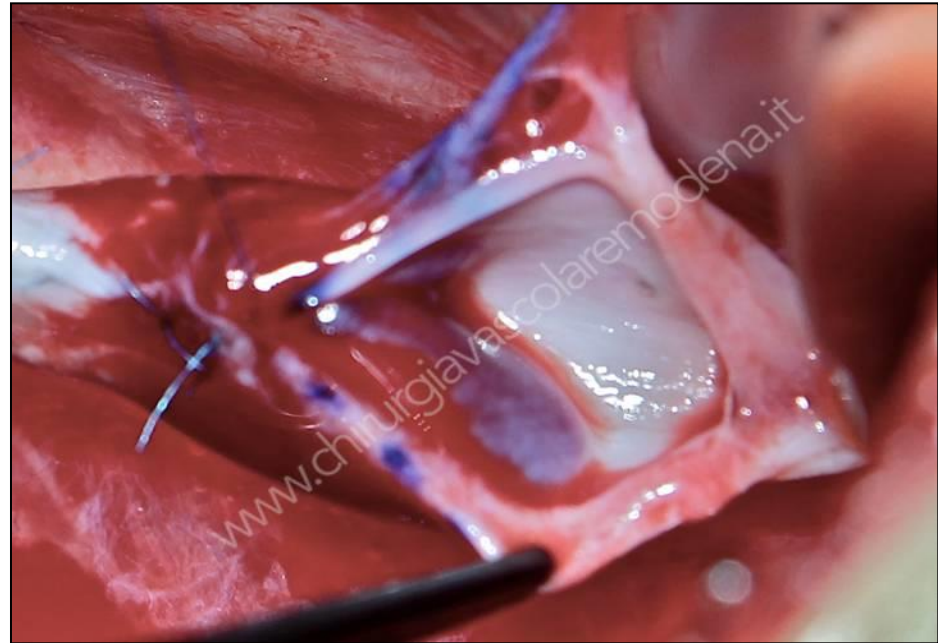


Primary incompetence with asymmetrical cusps:

Valve reconstruction should be the first option.



The reduction of deep overload alone is not able to restore the valve function.



In primary deep venous insufficiency (Ep)

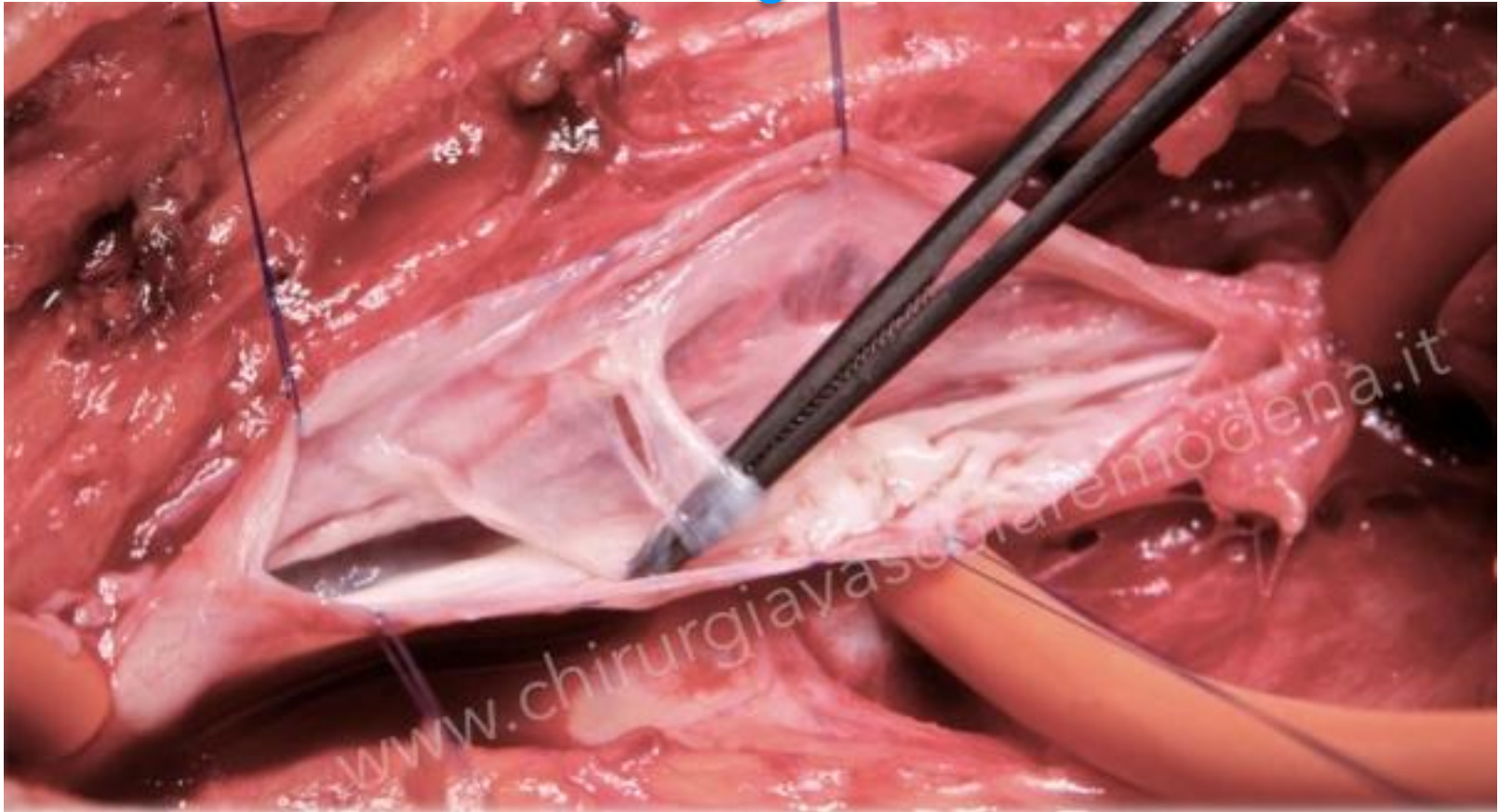
Patient selection, indication to treatment and surgery timing are based on an accurate evaluation of valve anatomy.



The strategy of treatment is based on valve morphology

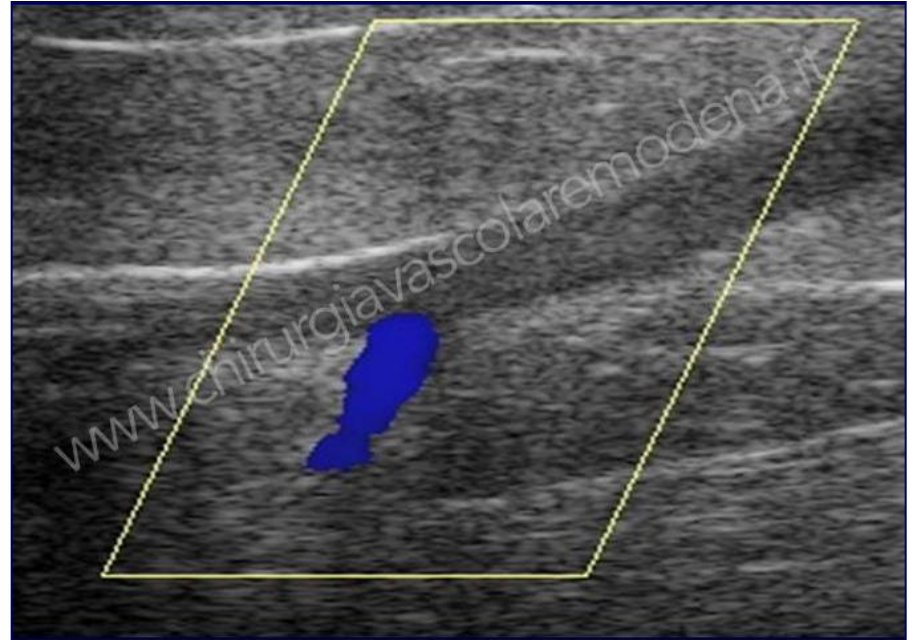
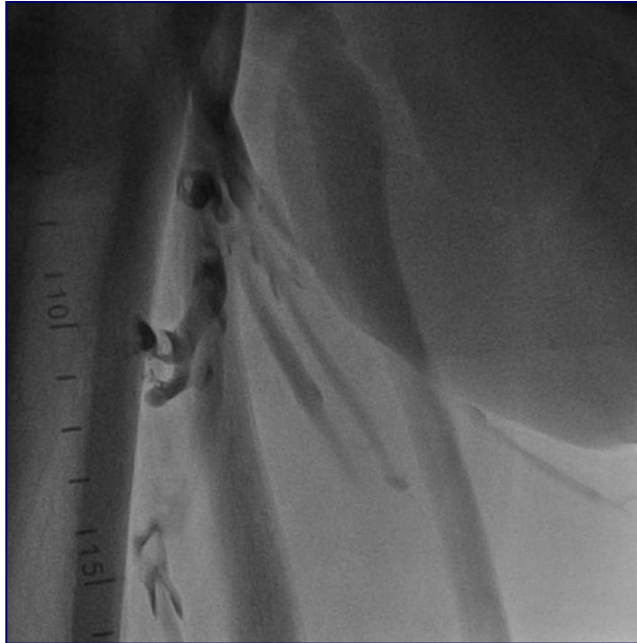
Secondary deep venous insufficiency (PTS)

E_s



In Post-thrombotic syndrome valves are usually destroyed

In PTS, superficial and perforators incompetence are frequently associated



The attention should not be focused on superficial venous system and perforators.

The venous system has to be considered as a single system

PTS is characterized by two principal hemodynamic disorders:

Increase in resistance to flow

stenosis

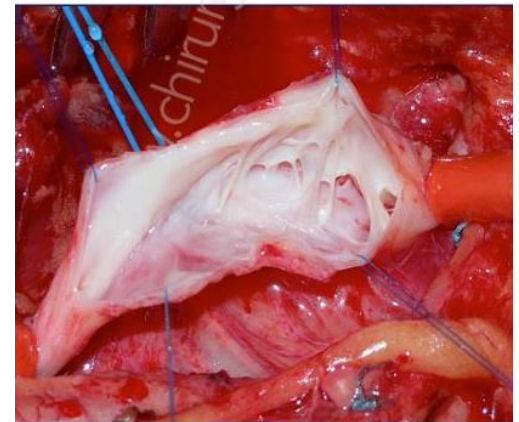
intraluminal webs

rigidity of the venous wall



Reflux

valve damage



Perrin M, Gillet JL, Guex JJ. Syndrome post-thrombotique. Angéiologie 2003;19 (2040):12.
EMC (Elsevier Masson SAS, Paris)

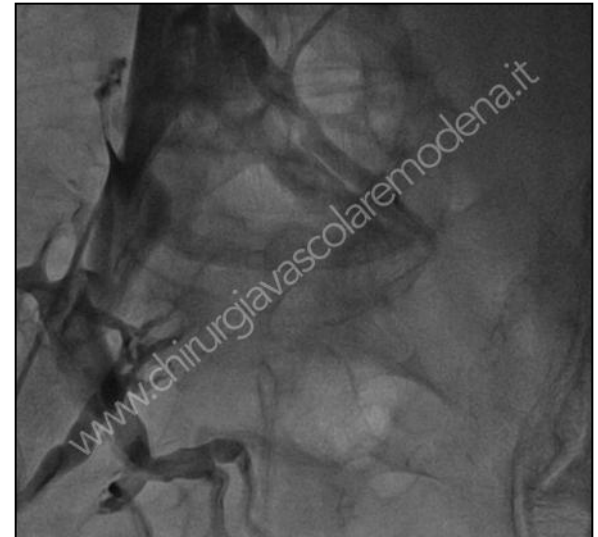
In PTS, an associated obstruction
should be searched



Obstacle to flow can be **more significant than reflux**

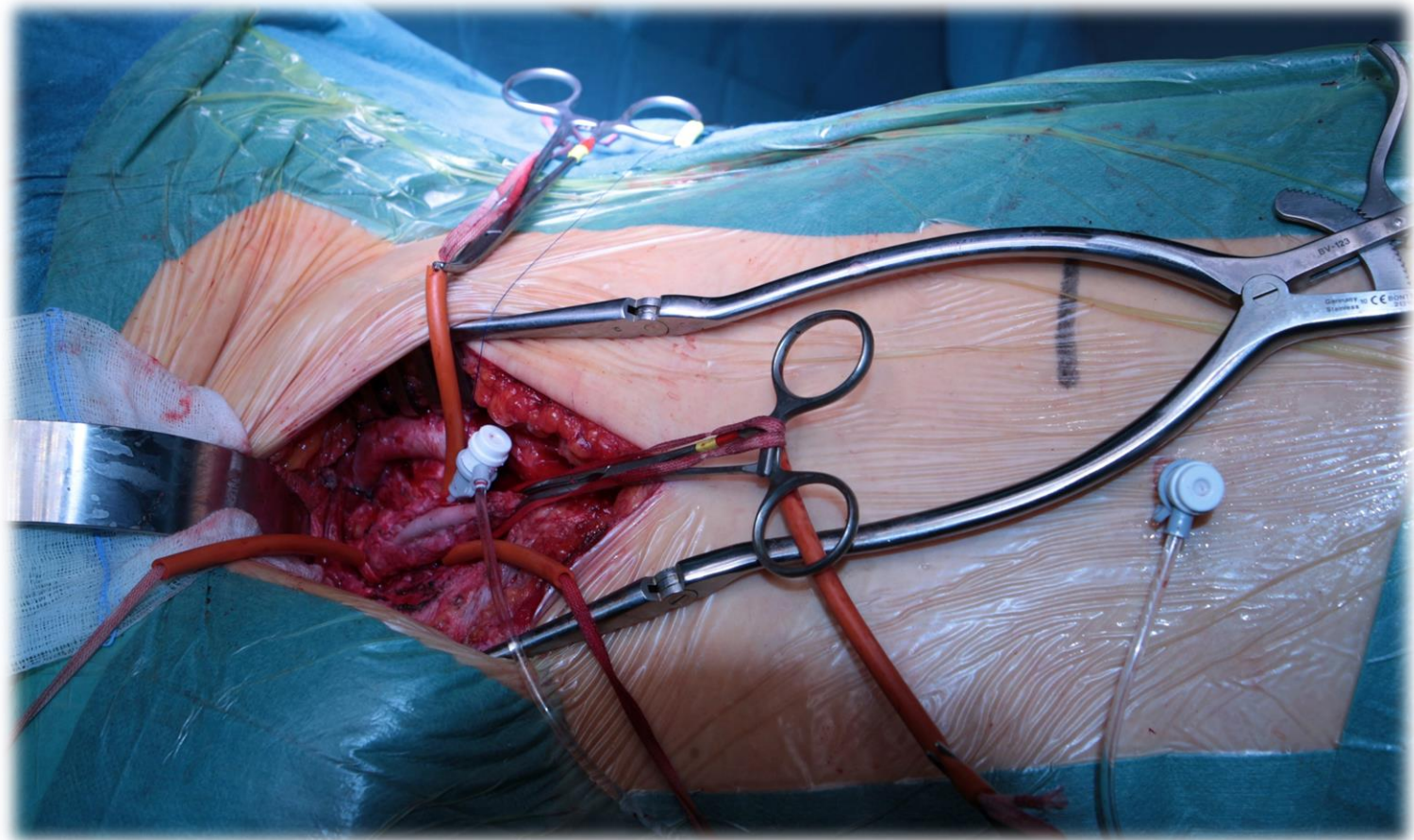


Obstructions **should be treated first**

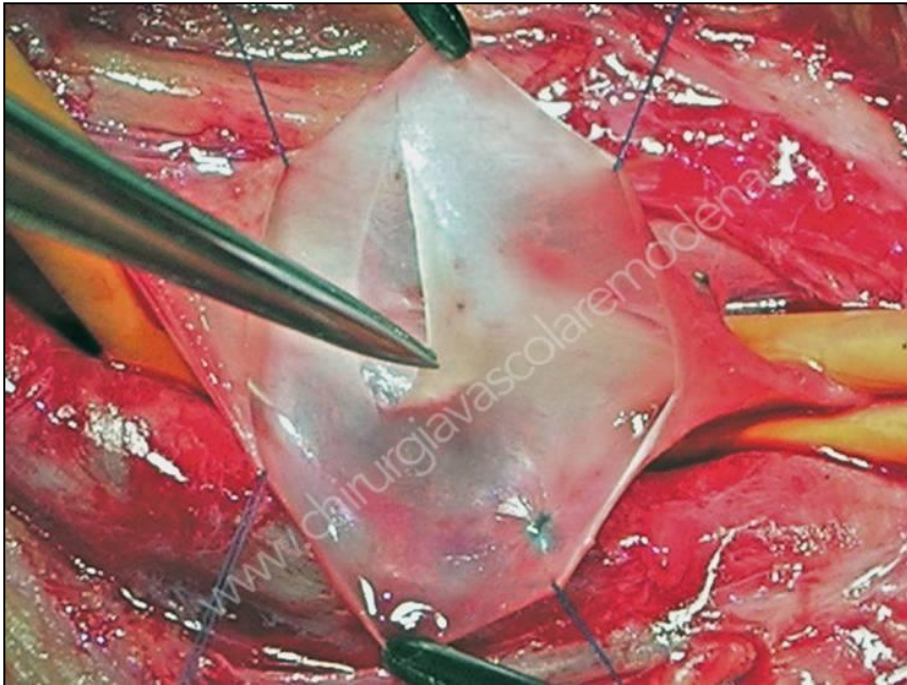


Hybrid procedure

Endophlebectomy combined with venosplasty/ stenting

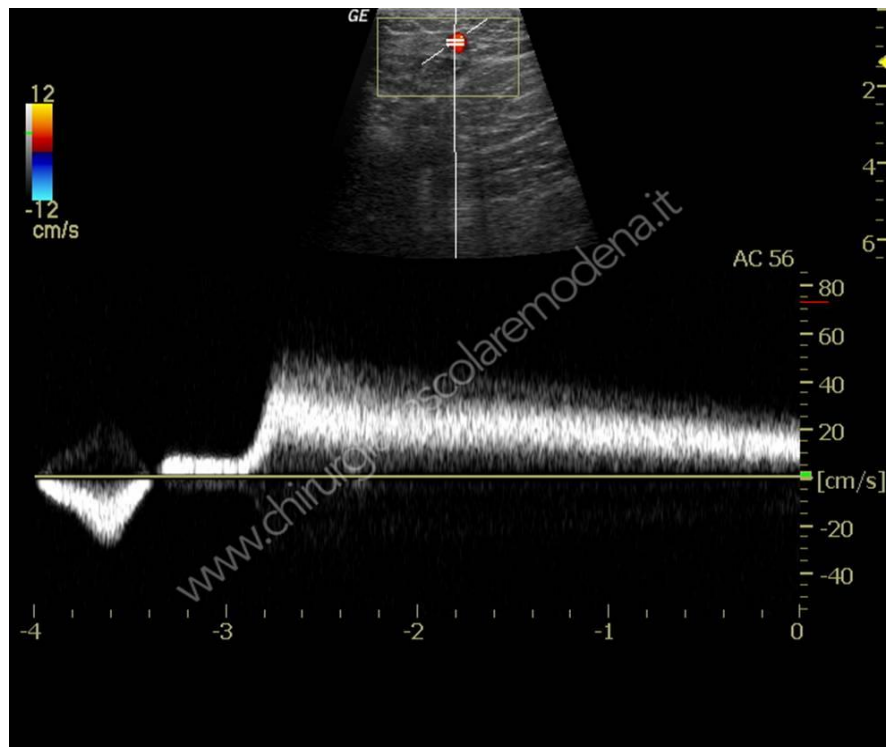


Valve agenesis (Ec)



- Absence of valve in the entire venous system
- Superficial and deep reflux associated
- Young patients
- Severe CVI, poor QoL

Maleti O, Lugli M. Neovalve construction in postthrombotic syndrome. J Vasc Surg 2006;43:794-9.



Any attempt to be radical in the
ablation of varicose vein usually
fails



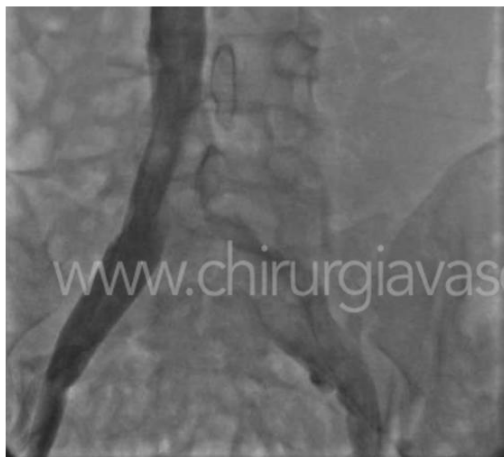
The treatment of superficial system
should be reserved to significant
varicose veins with trophic lesion
in the reflux area

Maleti O, Perrin M. Reconstructive surgery for deep vein reflux in the lower limbs: techniques, results and indications. Eur J Vasc Endovasc Surg 2011;41:837-848

- Valvuloplasty is not performable
- All surgical options addressed to deep veins obtain transitory results.



indirect therapeutic actions applied first



Ensure outflow by treating proximal obstruction, frequently associated



Increase the calf pump efficacy

In PTS and in Valve agenesis the surgical options are:

- Transposition



- New competent axis



- Valve transplant

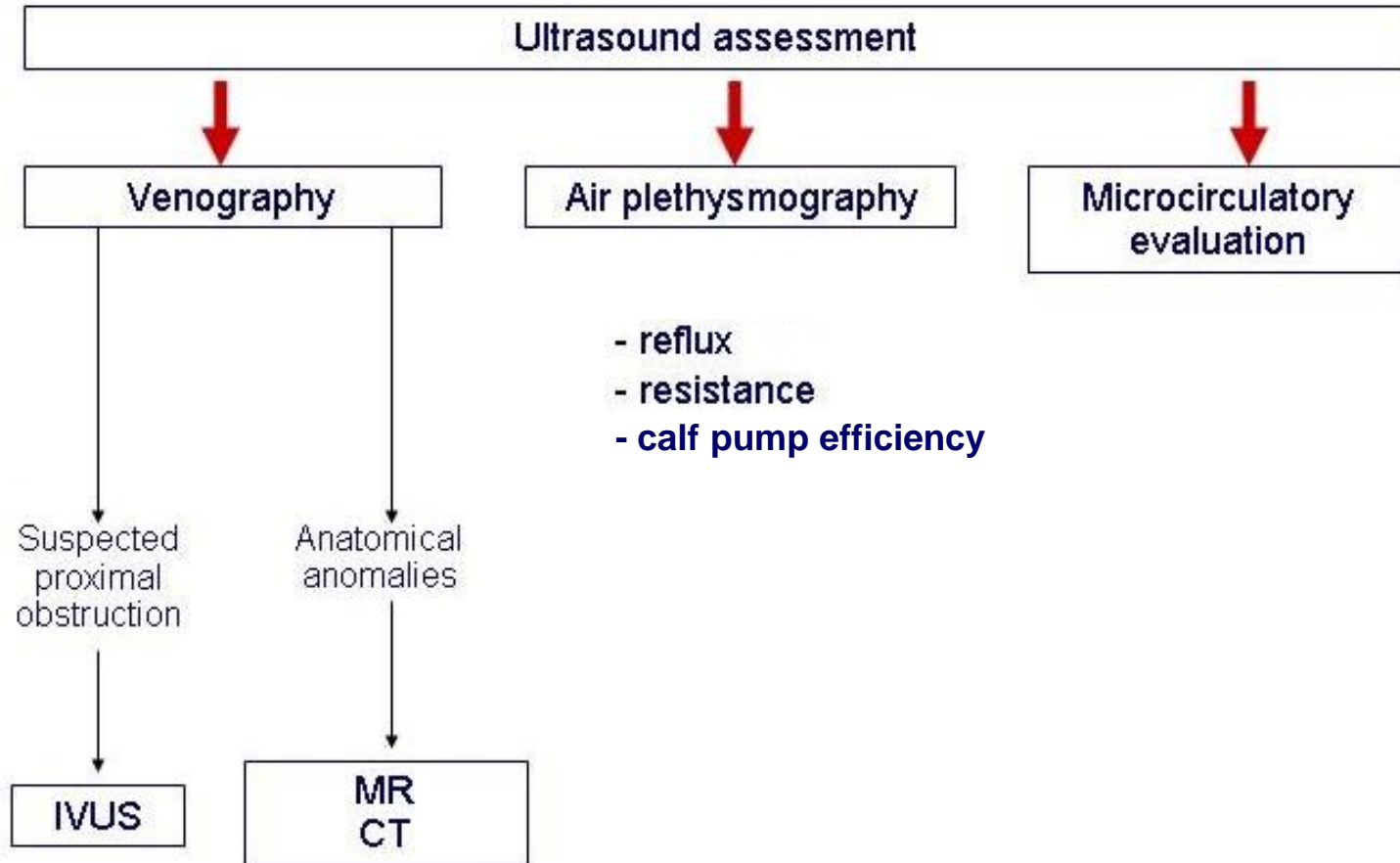


- Neovalve



Strategies are based on:

Diagnostic protocol



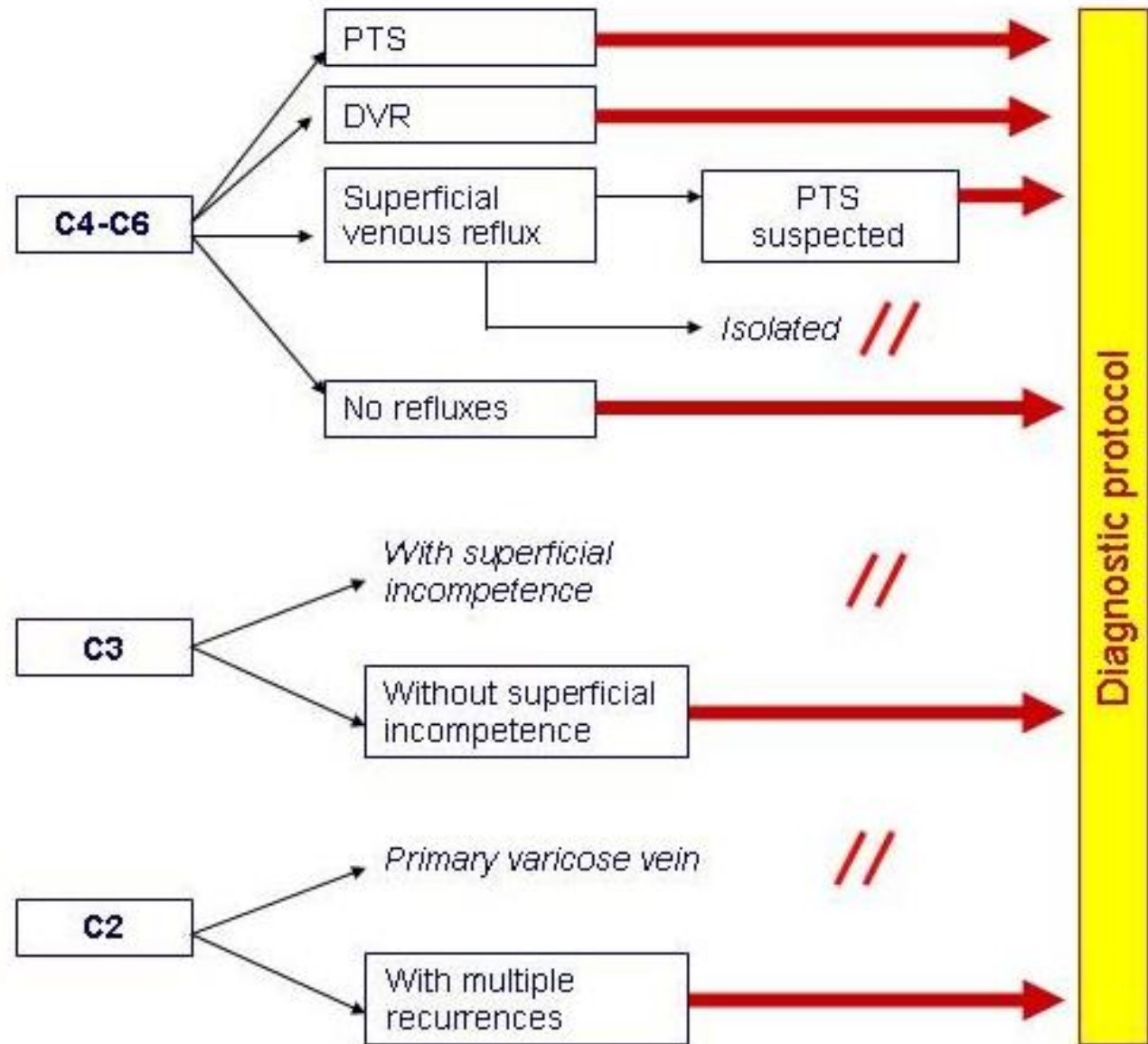
The diagnostic protocol is applied in:

CVI

(in patients eligible for deep vein reconstruction)

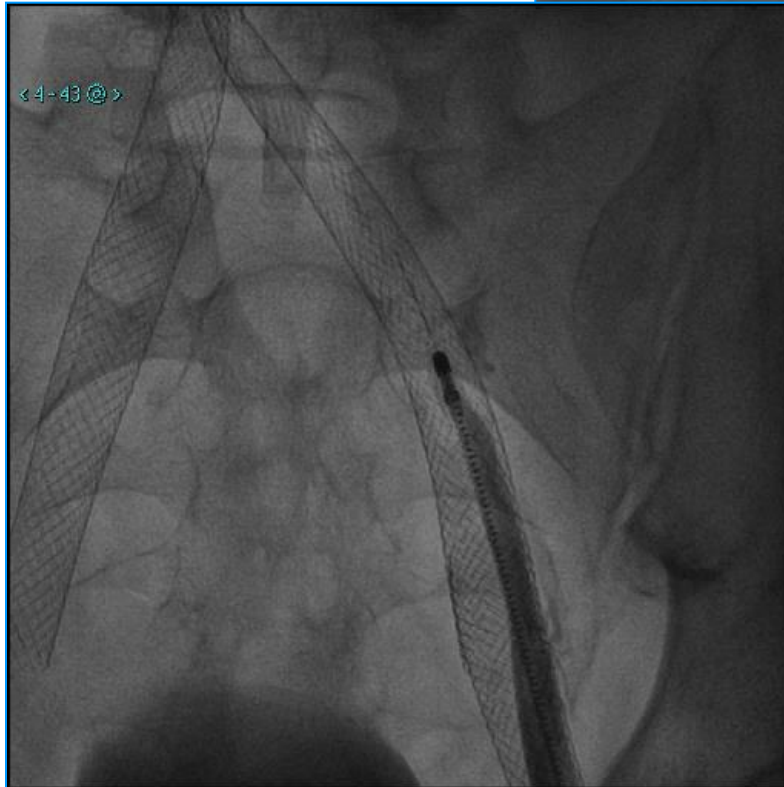
- with improvable QoL and without compliance for compression therapy

- non responding to conservative therapy



Complication management

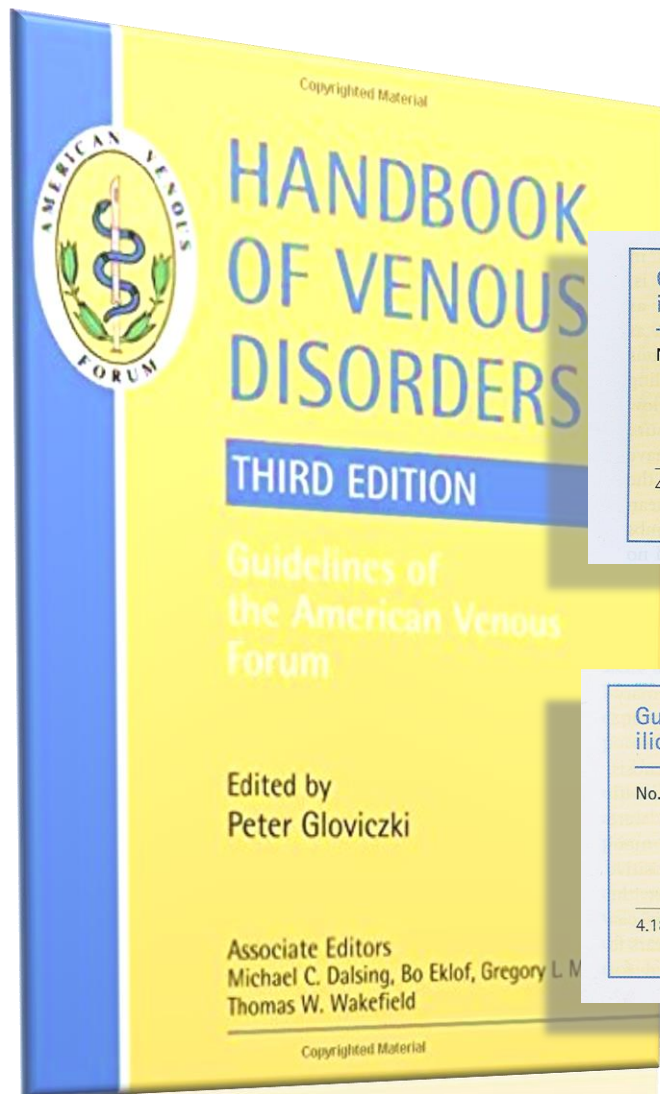
Early thrombus
removal
techniques



Deep vein reconstructive surgery



What about Guidelines?



Obstruction treatment

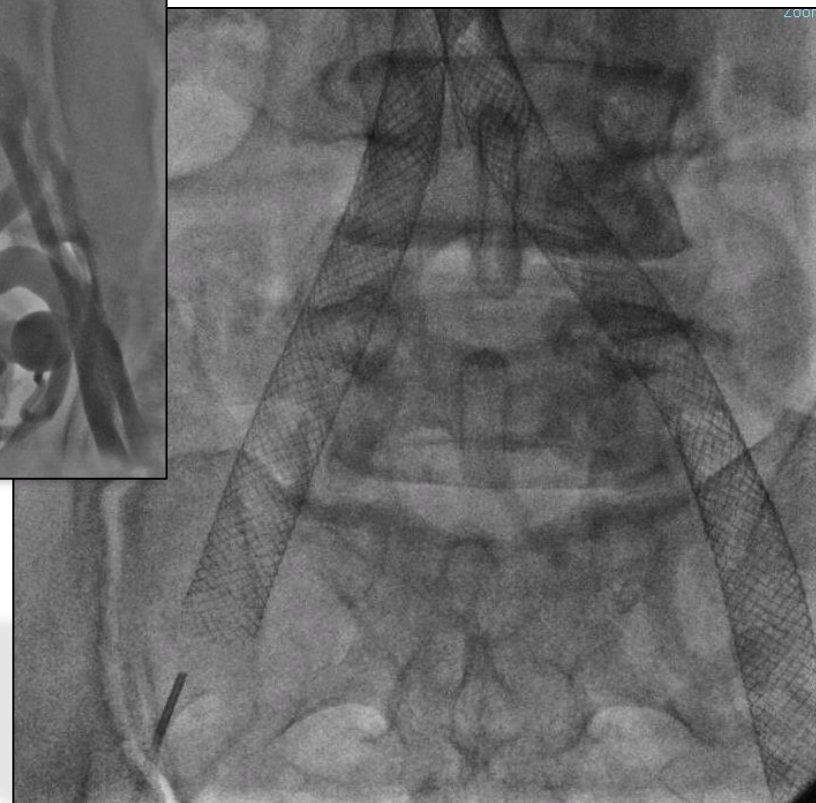
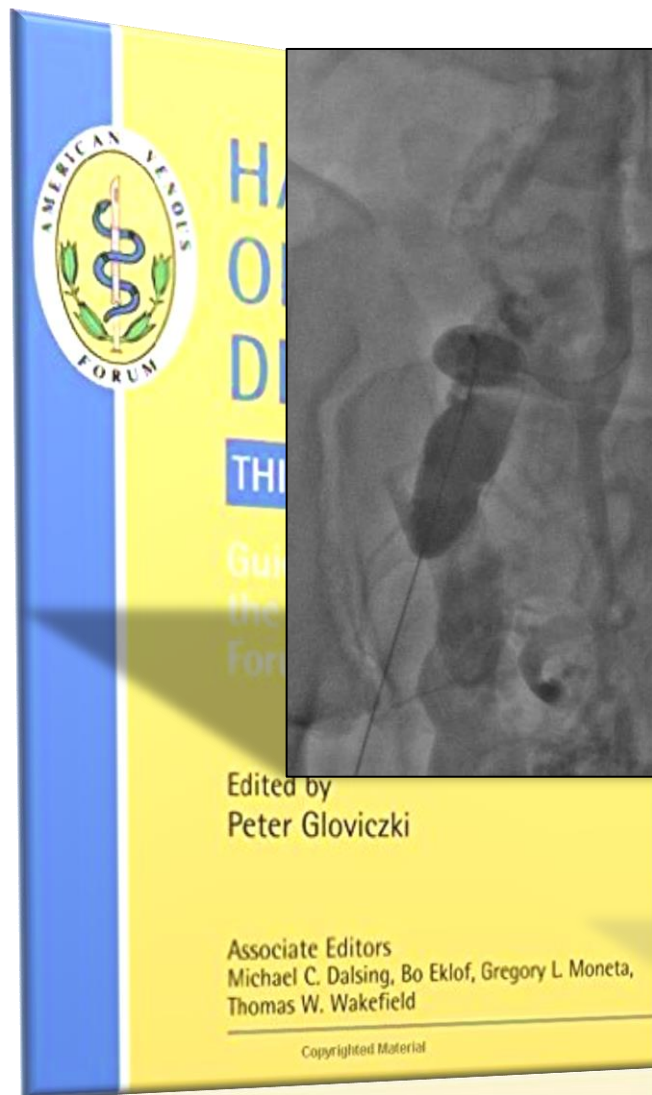
Guidelines 4.17.0. of the American Venous Forum on endovascular reconstruction for chronic iliofemoral vein obstruction

No.	Guideline	Grade of recommendation (1, we recommend; 2, we suggest)	Grade of evidence (A, high quality; B, moderate quality; C, low or very low quality)
4.17.1	For chronic iliac vein obstruction we recommend endovenous stenting to improve symptoms and the quality of life of the patients	1	A

Guidelines 4.18.0. of the American Venous Forum on endovascular reconstruction of complex ilio caval venous occlusions

No.	Guideline	Grade of recommendation (1, we recommend; 2, we suggest)	Grade of evidence (A, high quality; B, moderate quality; C, low or very low quality)
4.18.1	We suggest endovascular stents for reconstruction of complex ilio caval venous occlusions	2	B

Recommendation 1A - 2B



Recommendation **2B** complex ilio caval occlusions

Clinical practice guidelines of the Society for Vascular Surgery (SVS) and the American Venous Forum (AVF): Management of venous leg ulcers

Thomas F. O'Donnell Jr, MD, Marc A. Passman, MD, William A. Marston, MD, William J. Ennis, DO, Michael Dalsing, MD, Robert L. Kistner, MD, Fedor Lurie, MD, PhD, Peter K. Henke, MD, Monika L. Gloviczki, MD, PhD, Bo G. Eklöf, MD, PhD, Julianne Stoughton, MD, Sesadri Raju, MD, Cynthia K. Shortell, MD, Joseph D. Raffetto, MD, Hugo Partsch, MD, Lori C. Pounds, MD, Mary E. Cummings, MD, David L. Gillespie, MD, Robert B. McLafferty, MD, Mohammad Hassan Murad, MD, Thomas W. Wakefield, MD, and Peter Gloviczki, MD

SVS/AVF Joint Clinical Practice Guidelines Committee—Venous Leg Ulcer

Guideline 6.14: Proximal Chronic Total Venous Occlusion / Severe Stenosis with Skin Changes at Risk for Venous Leg Ulcer (C4b), Healed (C5) or Active (C6) Venous Leg Ulcer - Endovascular Repair

In a patient with inferior vena cava and/or iliac vein chronic total occlusion or severe stenosis, with or without lower extremity deep venous reflux disease, which is associated with skin changes at risk for venous leg ulcer (C4b), healed venous leg ulcer (C5), or active venous leg ulcer (C6), we recommend venous angioplasty and stent recanalization in addition to standard compression therapy to aid in venous ulcer healing and to prevent recurrence. [GRADE -1; LEVEL OF EVIDENCE -C]

Recommendation 1 C

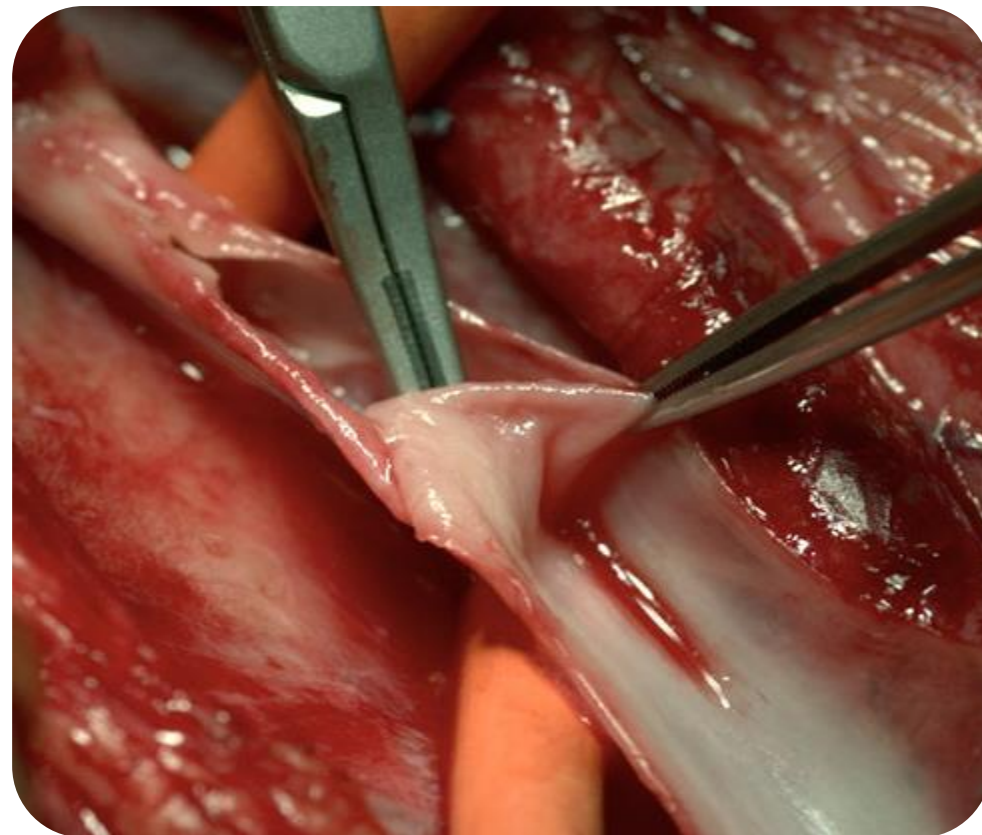
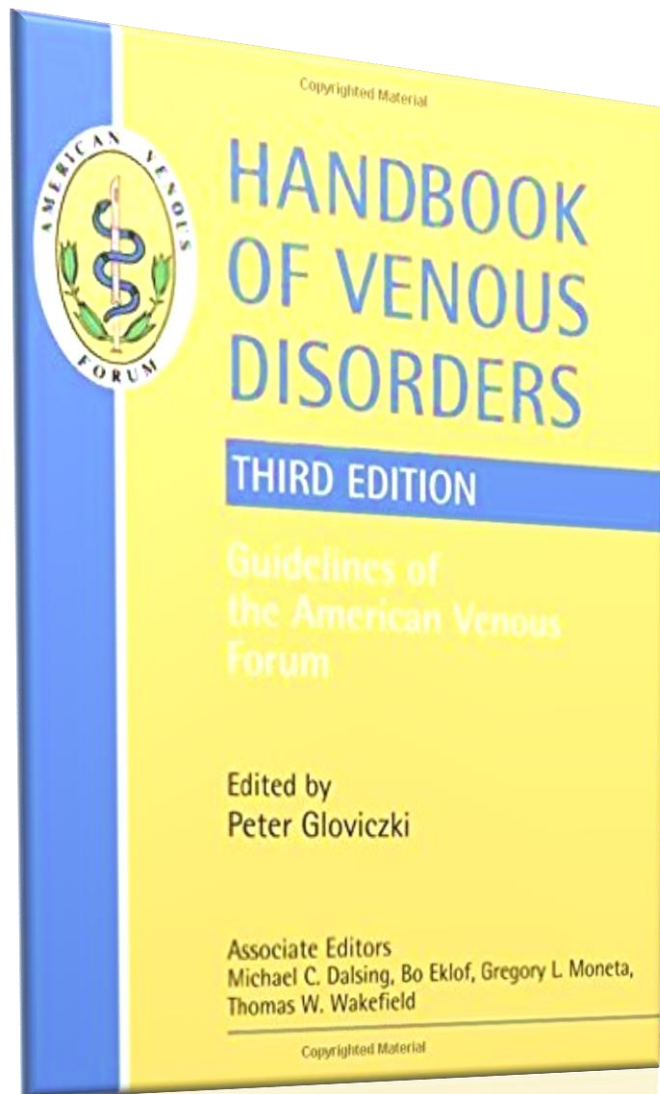
Editor's Choice — Management of Chronic Venous Disease

Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)

Writing Committee ^a C. Wittens, A.H. Davies, N. Bækgaard, R. Broholm, A. Cavezzi, S. Chastanet, M. de Wolf, C. Eggen, A. Giannoukas, M. Gohel, S. Kakkos, J. Lawson, T. Noppeney, S. Onida, P. Pittaluga, S. Thomis, I. Toonder, M. Vuylsteke,
ESVS Guidelines Committee ^b P. Kolh, G.J. de Borst, N. Chakfé, S. Debus, R. Hinchliffe, I. Koncar, J. Lindholt, M.V. de Ceniga, F. Vermassen, F. Verzini,
Document Reviewers ^c M.G. De Maeseneer, L. Blomgren, O. Hartung, E. Kalodiki, E. Korten, M. Lugli, R. Naylor, P. Nicolini, A. Rosales

Recommendation 56	Class	Level
In patients with clinically relevant chronic ilio-caval or ilio-femoral obstruction or in patients with symptomatic non-thrombotic iliac vein lesions, percutaneous transluminal angioplasty and stent placement using large self expanding stents should be considered.	IIa	B
Recommendation 57		
Percutaneous transluminal angioplasty is not recommended as a single treatment for patients with chronic deep venous obstruction.	III	C
Recommendation 58		
After percutaneous transluminal angioplasty stent placement should be considered for patients with chronic deep venous obstruction.	IIa	C

IIa B



Recommendation 2C
reconstructive surgery addressing reflux

Editor's Choice — Management of Chronic Venous Disease

Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)

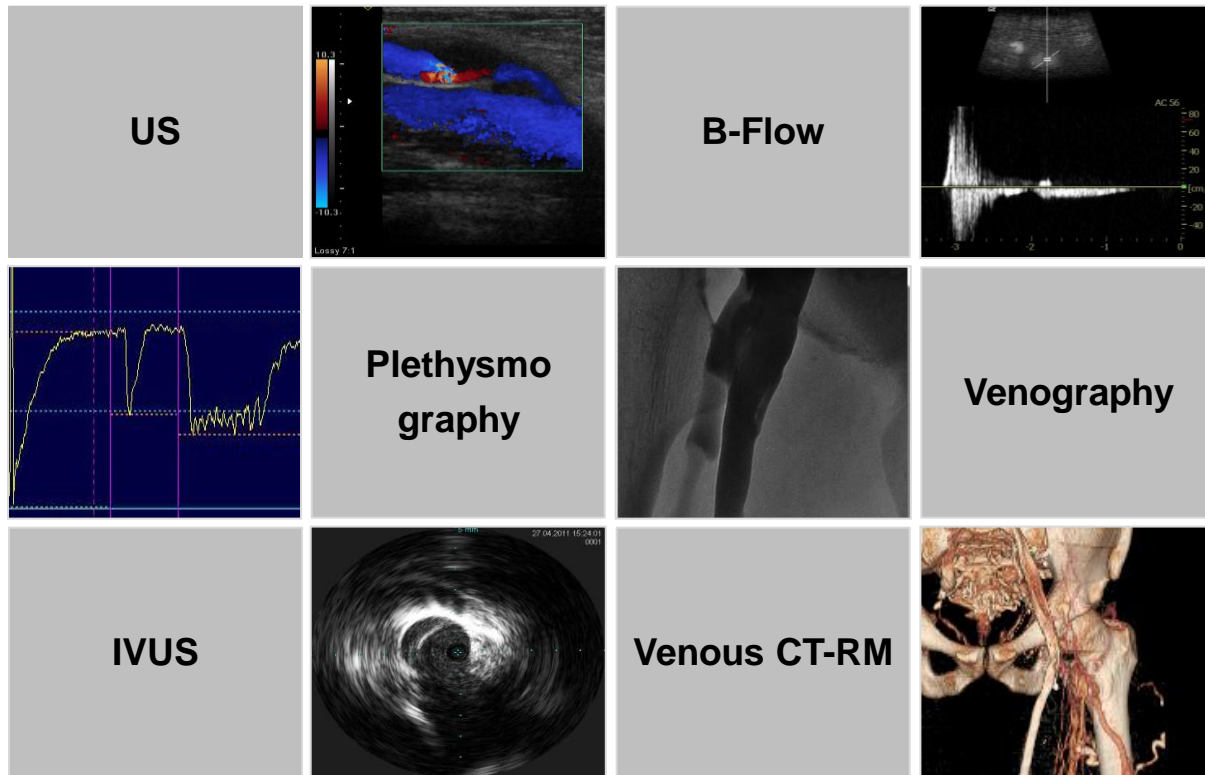
Writing Committee ^a C. Wittens, A.H. Davies, N. Bækgaard, R. Broholm, A. Cavezzi, S. Chastanet, M. de Wolf, C. Eggen, A. Giannoukas, M. Gohel, S. Kakkos, J. Lawson, T. Noppeney, S. Onida, P. Pittaluga, S. Thomis, I. Toonder, M. Vuytsteke,
 ESVS Guidelines Committee ^b P. Kolh, G.J. de Borst, N. Chakfé, S. Debus, R. Hinchliffe, I. Koncar, J. Lindholt, M.V. de Ceniga, F. Vermassen, F. Verzini,
 Document Reviewers ^c M.G. De Maeseneer, L. Blomgren, O. Hartung, E. Kalodiki, E. Korten, M. Lugli, R. Naylor, P. Nicolini, A. Rosales

Recommendation 60	Class	Level	References
Deep venous obstruction should be treated first, before considering treatment of deep venous reflux.	I	C	513
Recommendation 61			
In the absence of deep venous obstruction and after abolition of superficial venous reflux, surgical correction of deep venous axial reflux (proven by duplex ultrasound and descending venography) may be considered in patients with severe and persistent symptoms and signs of chronic venous disease.	IIb	C	498-504, 508-520
Recommendation 62			
Surgical treatment of patients with deep venous reflux, but without severe clinical symptoms and signs of chronic venous disease, is not recommended.	III	C	

Recommendation *IIb* C
reconstructive surgery addressing reflux

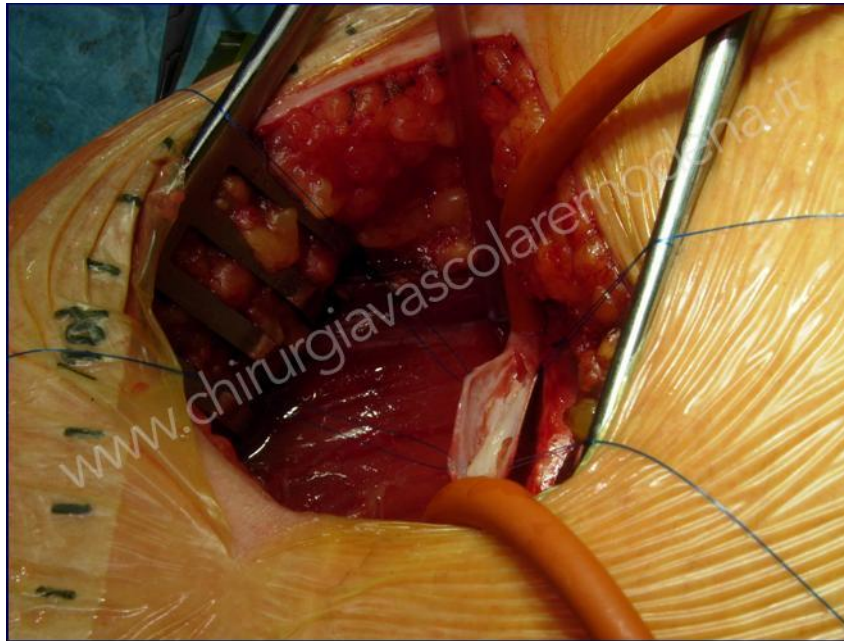
Conclusions

Indication to deep venous reconstruction is based on an exhaustive protocol of investigations



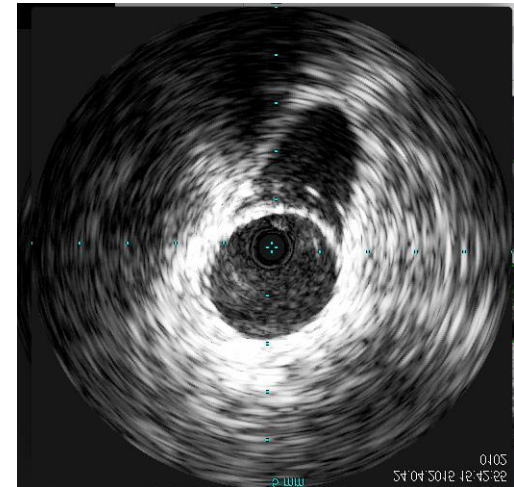
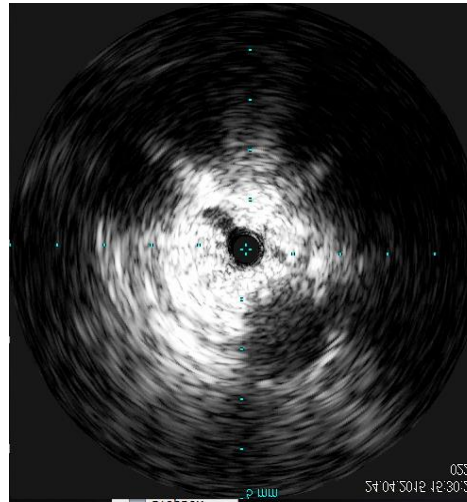
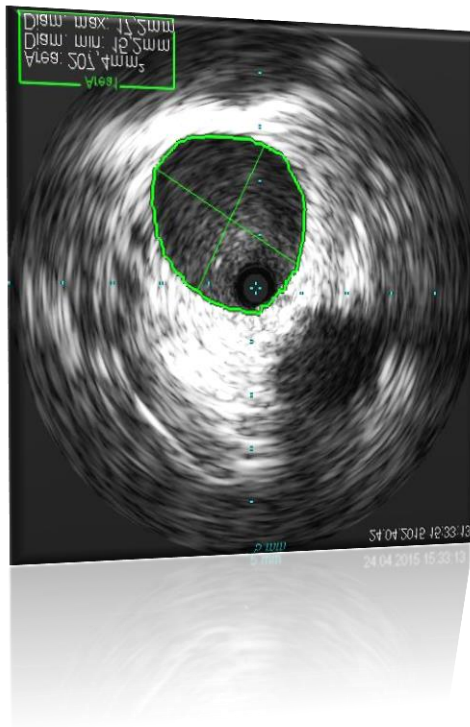
Conclusions

The role of deep vein reconstructive is essential in improving PTS patient QoL.



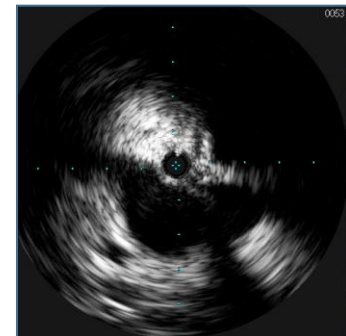
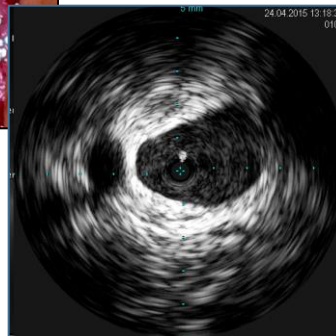
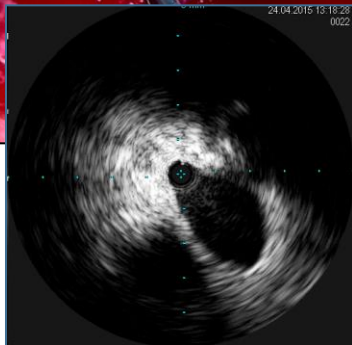
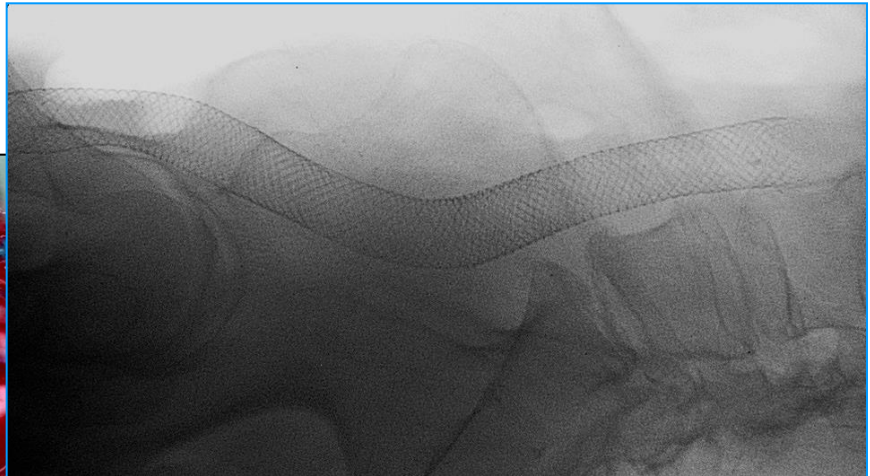
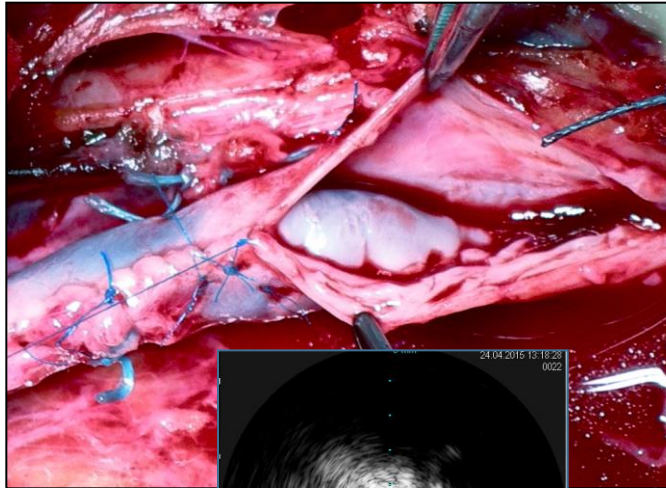
Conclusions

A Deep Vein Reconstructive Center should be able to master all the techniques, both in diagnostic and therapeutic options



Conclusions

***Deep Vein Reconstructive is
a matter of strategy***

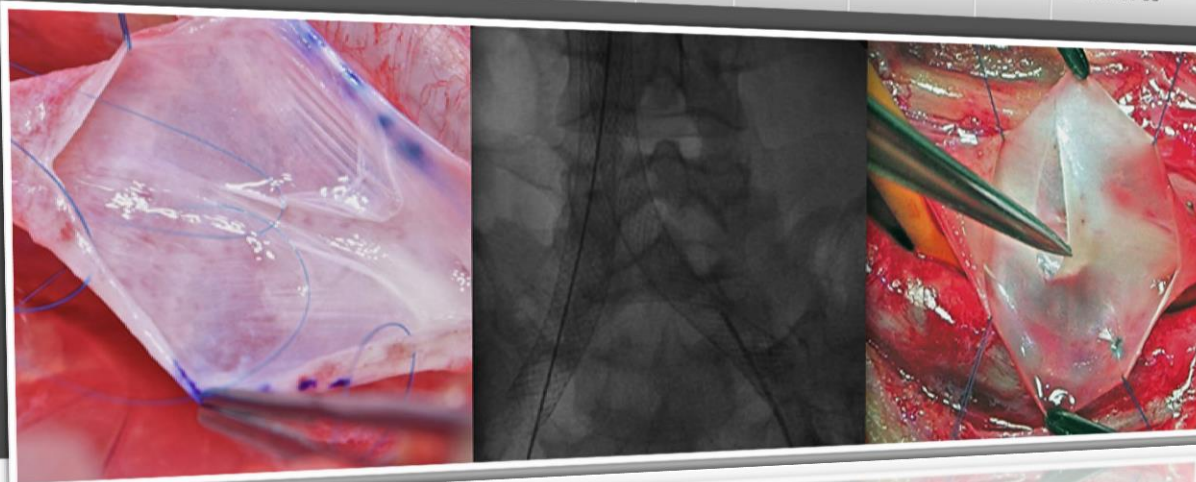




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Thank you