



CONTROVERSIES & UPDATES  
IN VASCULAR SURGERY

# Dysfonction érectile vasculaire

## Histoire

## Nouveaux concepts

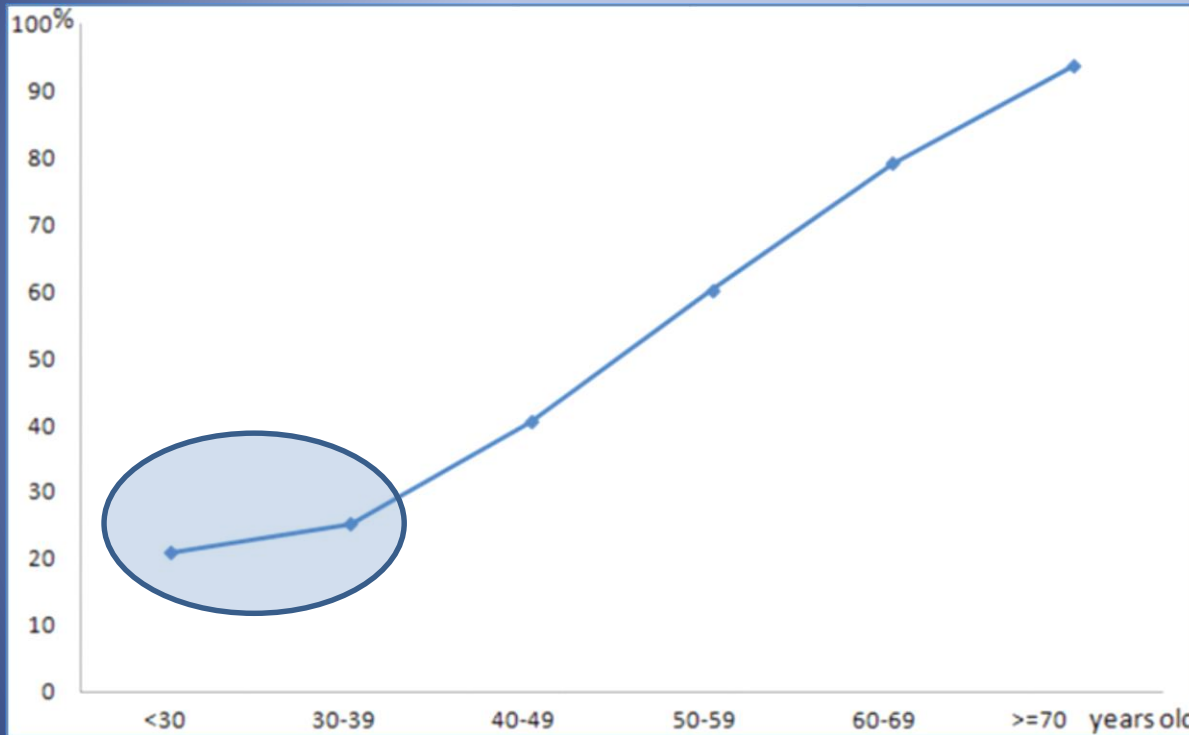
## Nouveaux espoirs

*Ronald Virag ~ CETI ~ Paris*



# Ancestral fear of impotence

## Today's Prevalence of Erectile Dysfunction



Prevalence of erectile dysfunction by different age groups. In China  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5302383/>

« If you want to move forward,  
you need to look way back in  
the history »

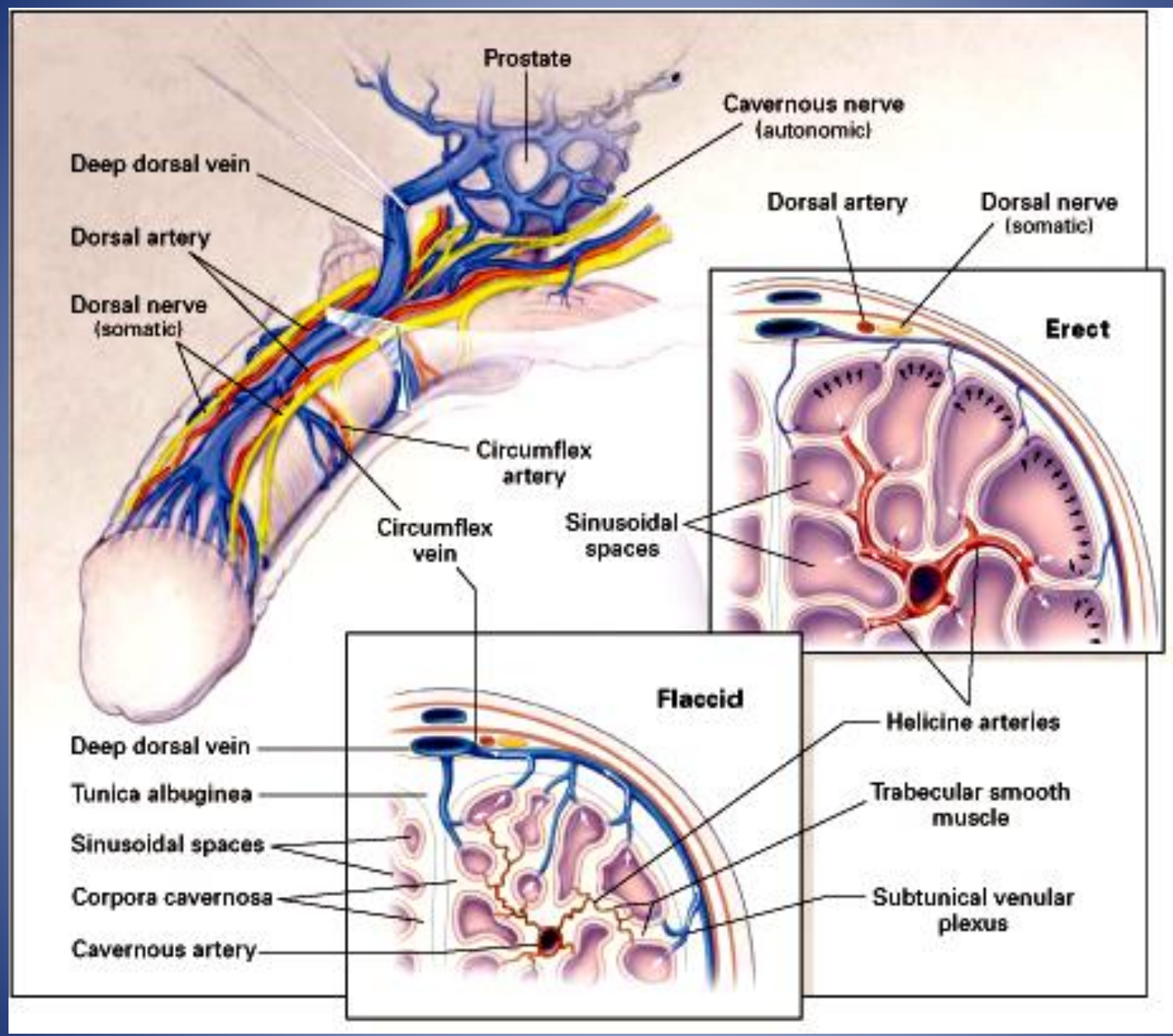




*Regnerus De Graaf  
Delphis Medicinæ Doctor*



CONSTANZO VAROLIO



- Prostate
- Cavernous nerve (autonomic)
- Deep dorsal vein
- Dorsal artery
- Dorsal nerve (somatic)
- Circumflex artery
- Circumflex vein
- Sinusoidal spaces
- Erect
- Flaccid
- Helicine arteries
- Trabecular smooth muscle
- Subtunica venular plexus
- Corpora cavernosa
- Cavernous artery
- Tunica albuginea

# Surgical attempts in 20<sup>th</sup> century

## Arterial side

– Leriche in 1923 links aortoiliac obstruction with ED, without therapeutical issue

– O'Connor (1960) internal iliac endarterectomy

## – Michal (1973)

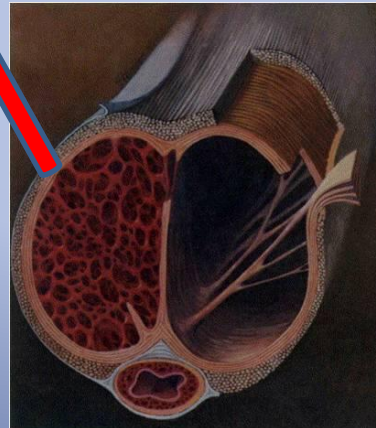
- *ED is part of vascular disease*
- *Artificial erection to enhance penile arteriography*
- *Direct surgery on the penis could be efficient*

## Venous side

– Woten, Lydston (1903) deep dorsal vein ligation

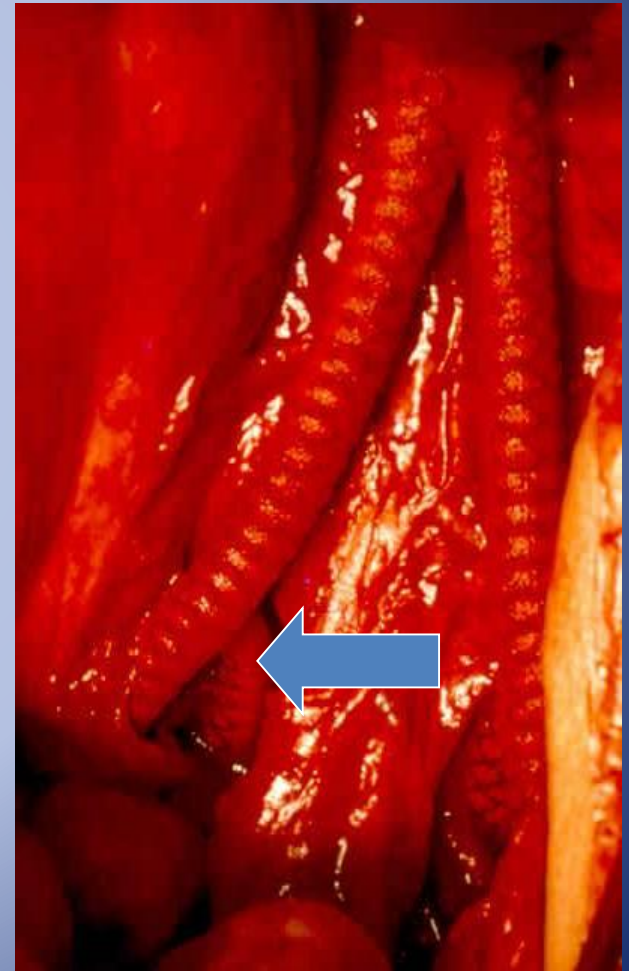
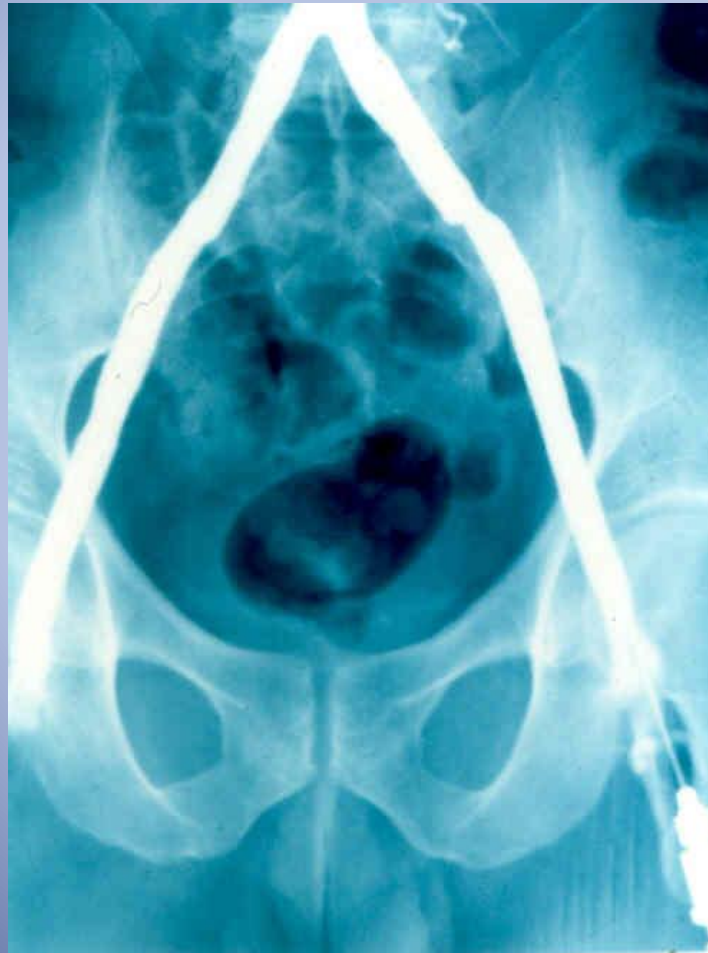
– Lowsley (1936) Plication of the b-c and i-c muscles

– Ebbehøj (1979)

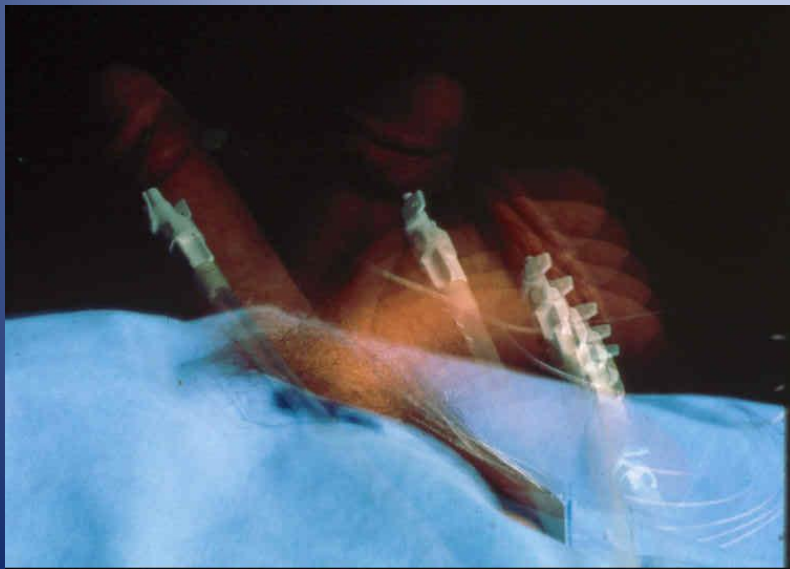
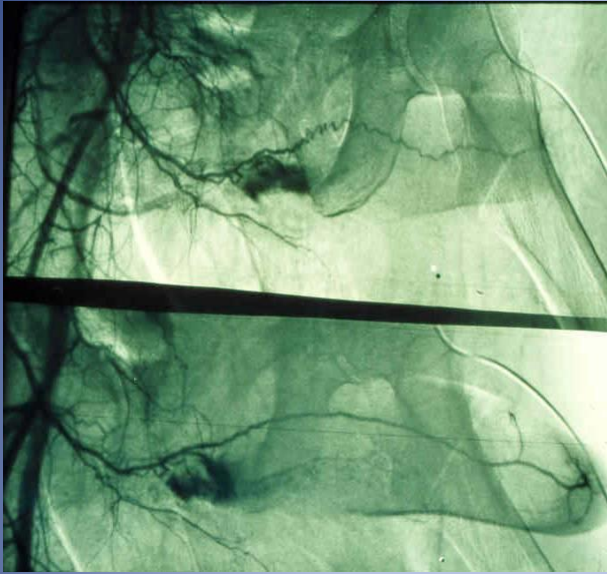


# A critical view on the past

## Failure of the vascular surgeons



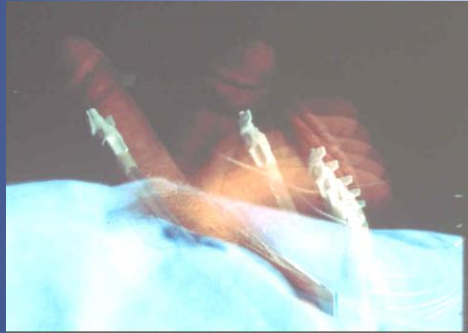
# The making of a concept



the  
he Photo 1 : The Rigidimeter R3 and cavernopump C3 with the chart



# First hemodynamics findings



## Normal

- 120 ml/mn
- <30



No surgery

## Arterial

- Elevated
- Normal



Michal

## Venous

- Normal
- Elevated



Venous ligations

## Mixed

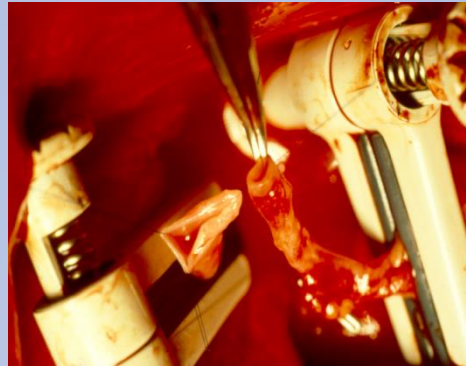
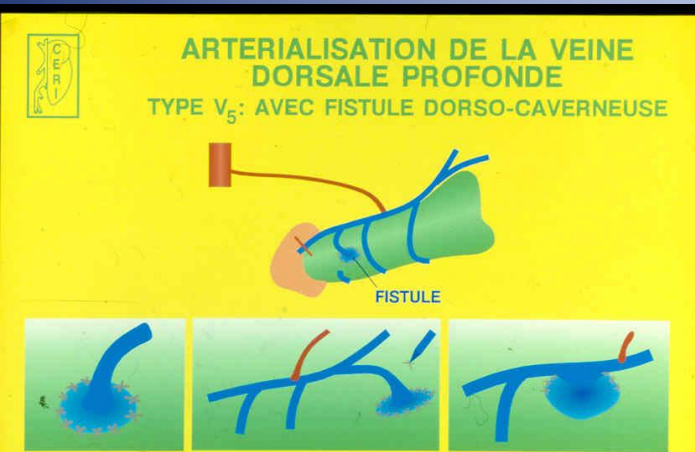
- Elevated
- Elevated



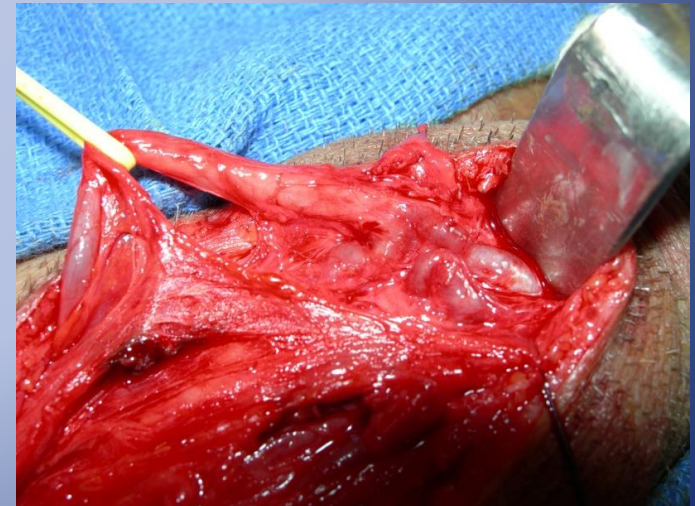
DDVA



# Deep dorsal vein arterialization and abnormal venous drainage



Allan H Bennet's control study (1985) 440 cases



# A critical view on the past

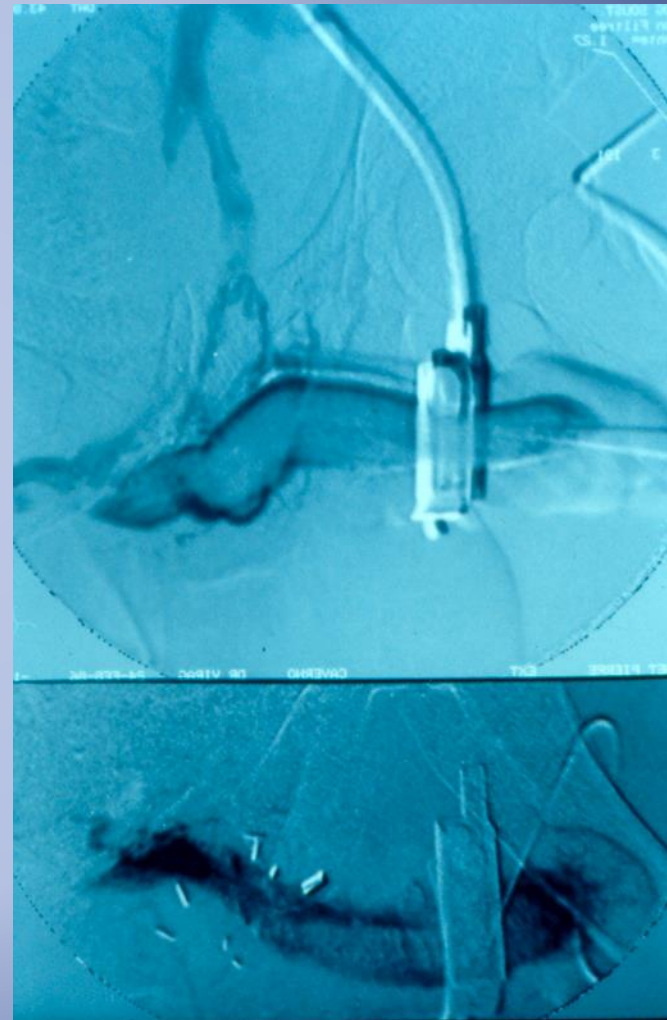
**These results were hardly reproduced. Why?**

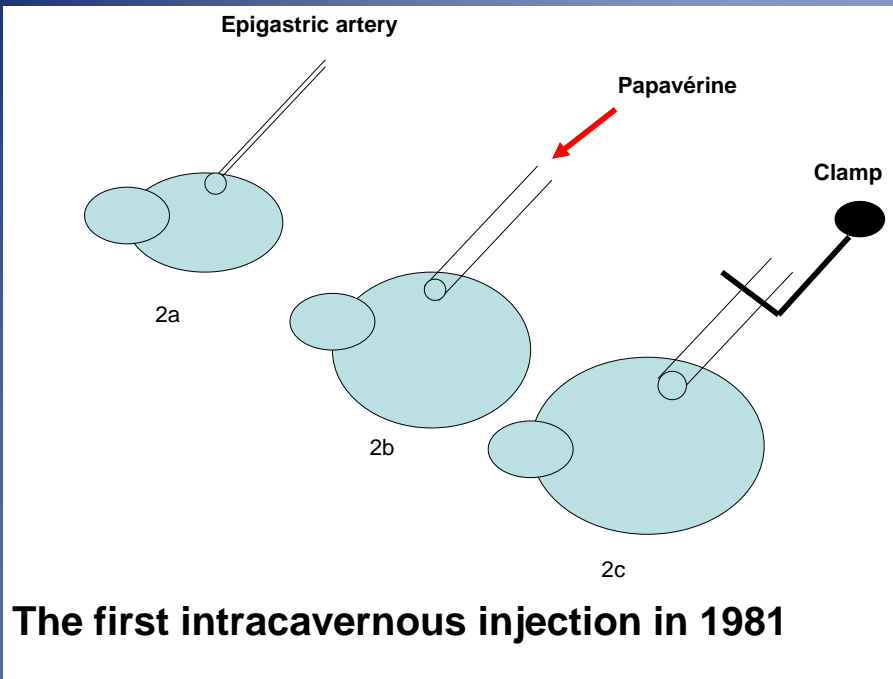
- **Wrong indications**

- No or weak evaluation
  - DDVA = mixed vascular
  - Venous= pure venous leak V1-V2
  - No neurological involvement
  - Psychologically fit

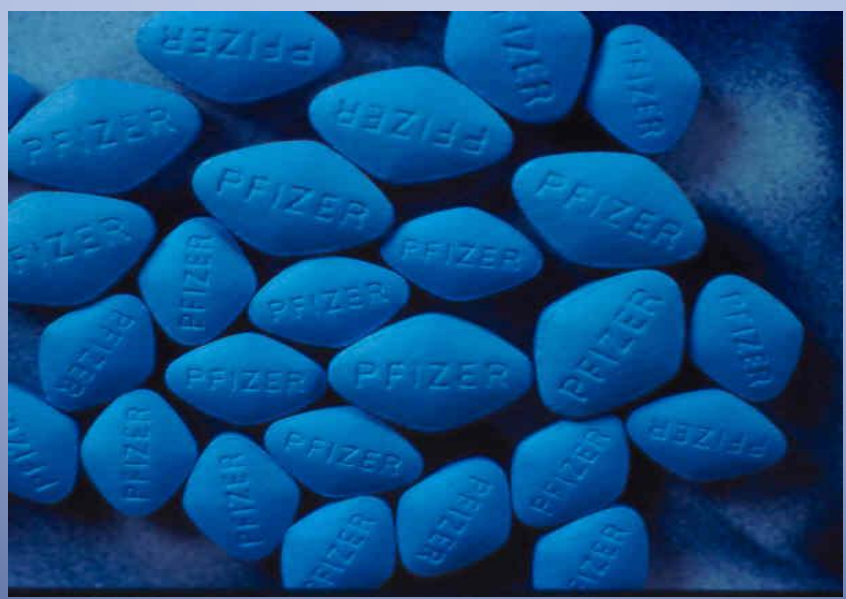
- **Skills**

- Knowledge of local anatomy
- Microvascular surgery

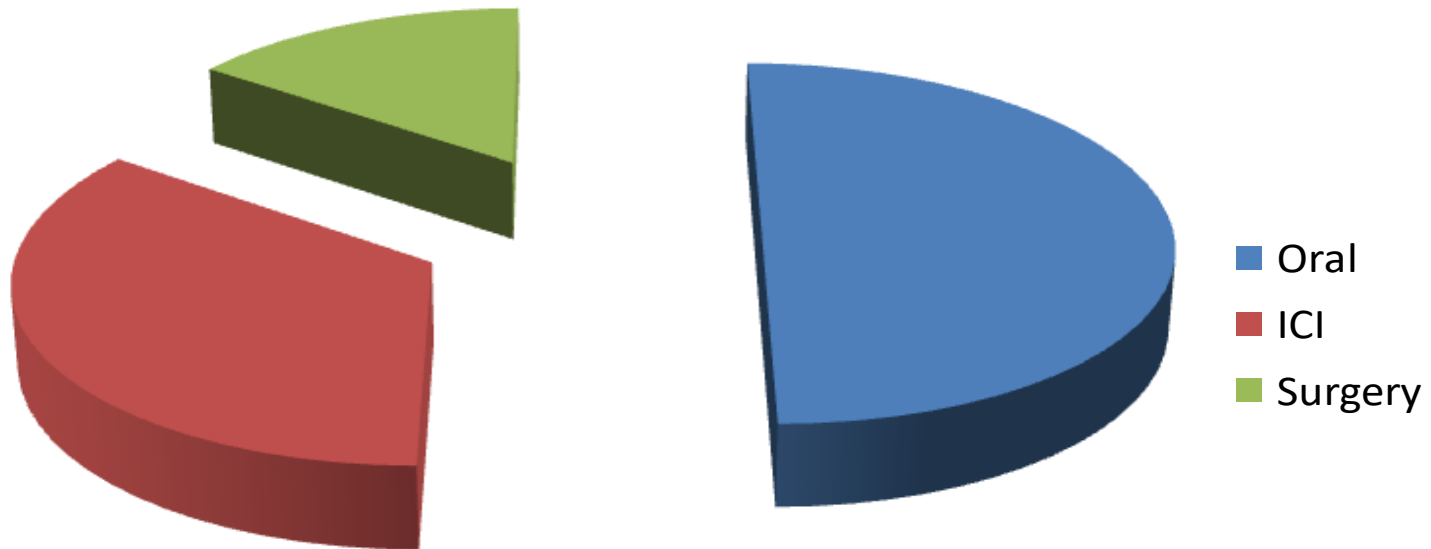




The first intracavernous injection in 1981



# Distribution of ED treatments



# A vision to the future

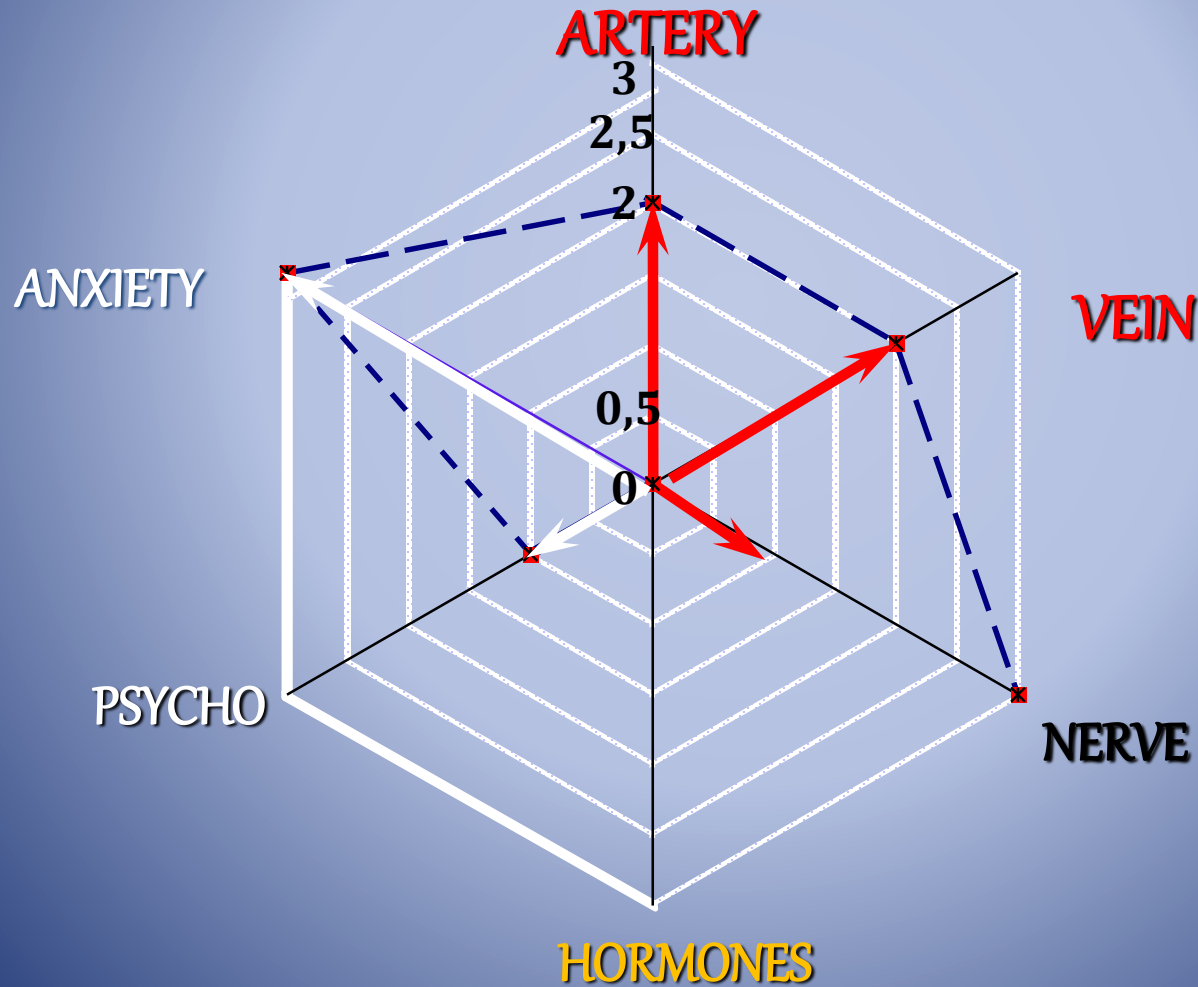


Treatment of  
a symptom

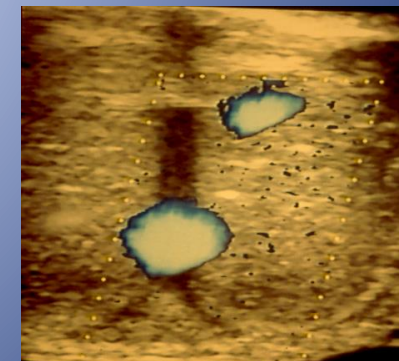
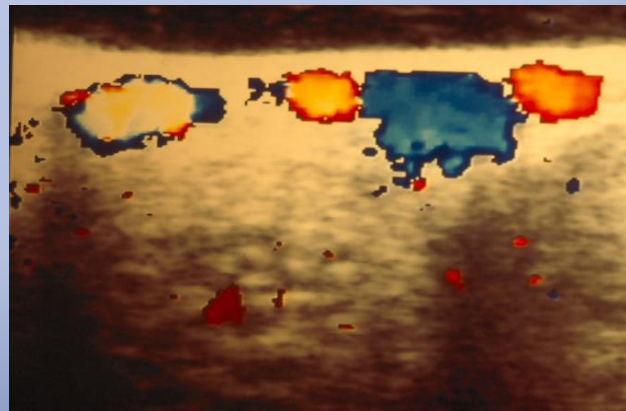
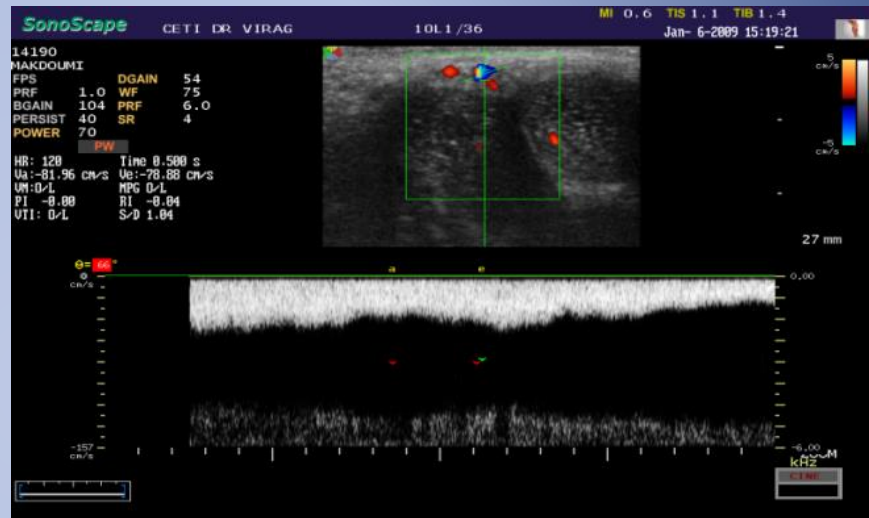
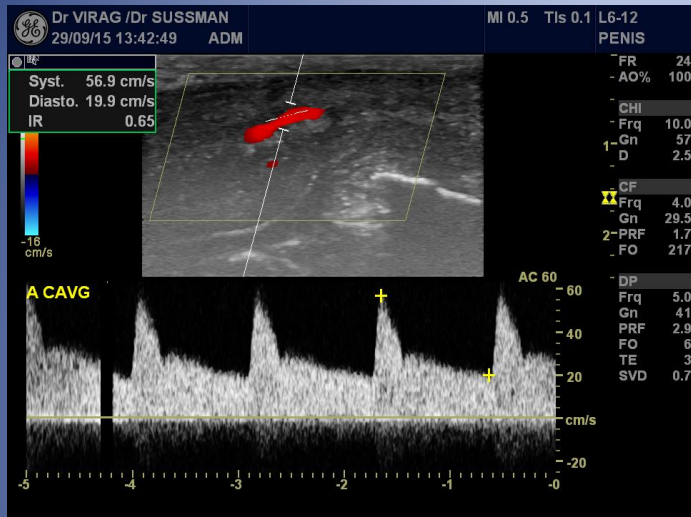


Cure or  
Prevent a  
disease

# Patient's question: What is wrong with me?

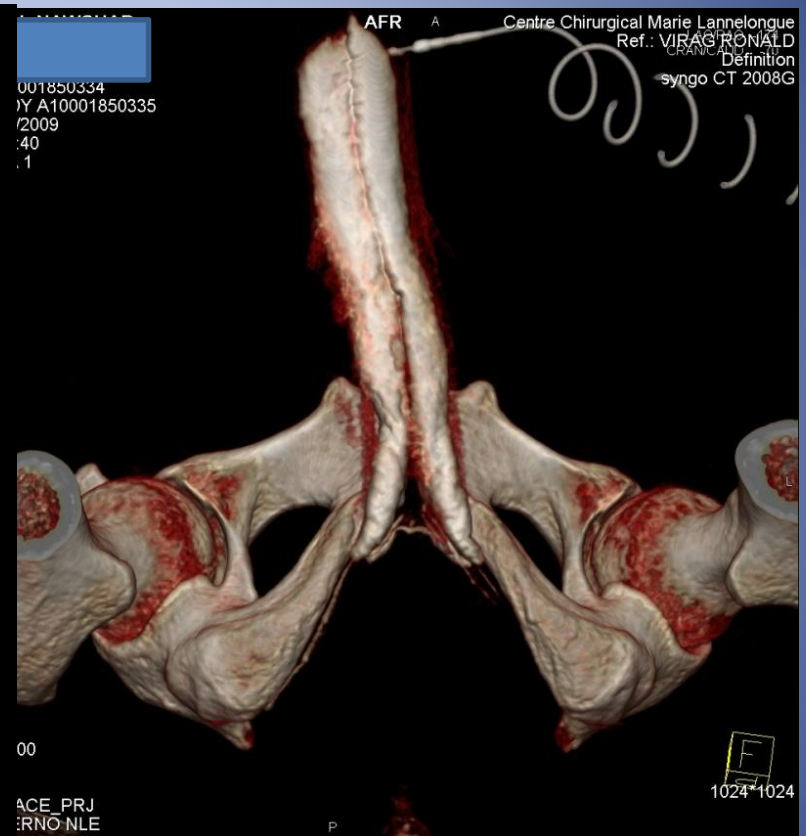


# Penile Ultrasound before and after Pharmacological stimulation of erection





# Yes caverno-venous leak exist...

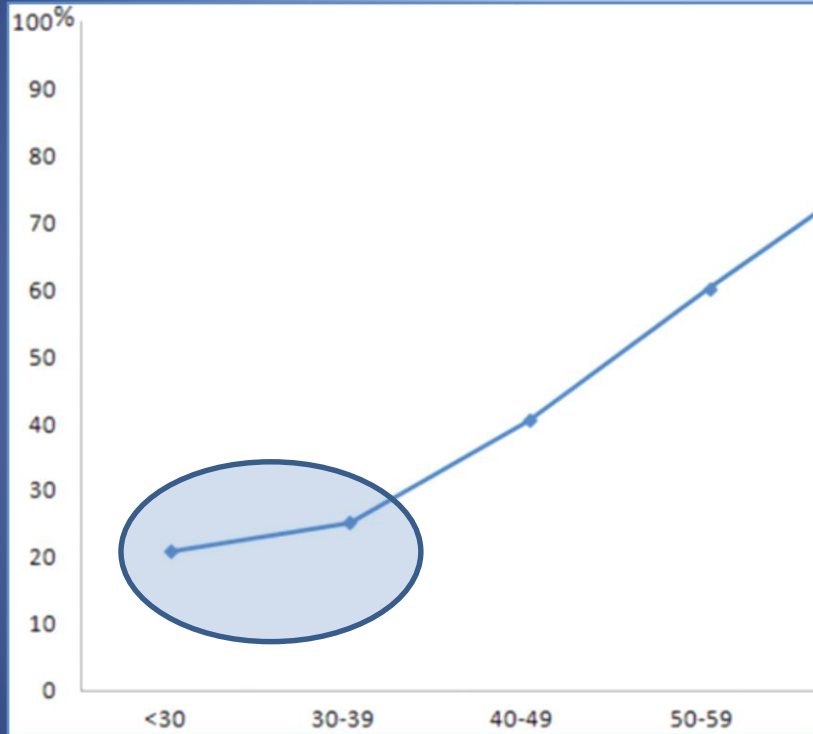


## New Classification of Anomalous Venous Drainage Using Caverno-Computed Tomography in Men with Erectile Dysfunction

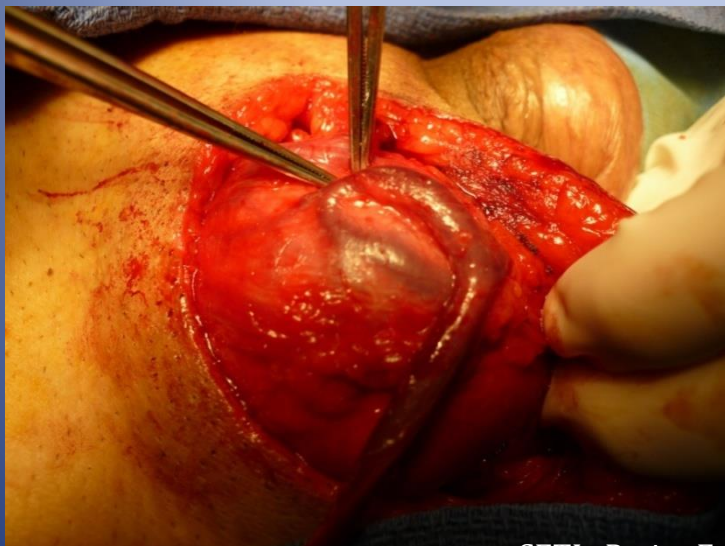
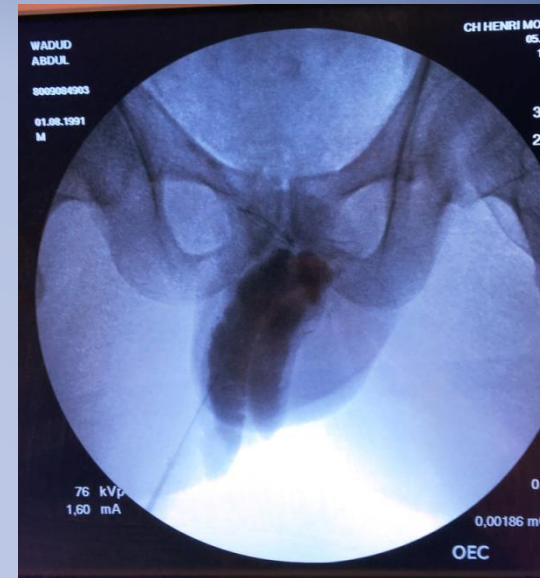
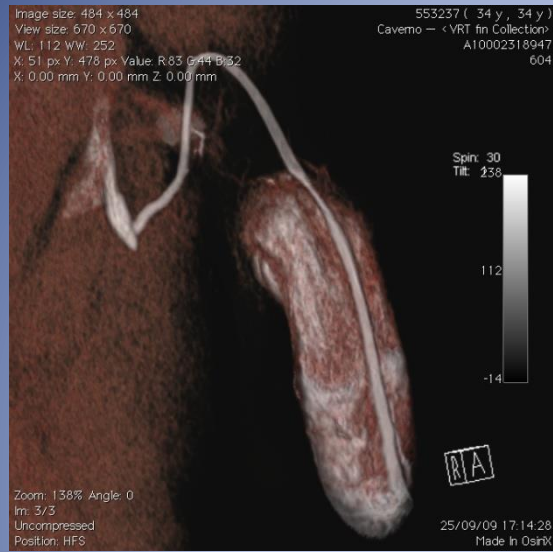
Ronald Virag, MD\* and Jean François Paul, MD†

\*J Sex Med 2011;8:1439-1444

# Yes caverno-venous leak exist...



# Superficial veins: ligations, sclerosis or embolization



# Contrôle per et post op

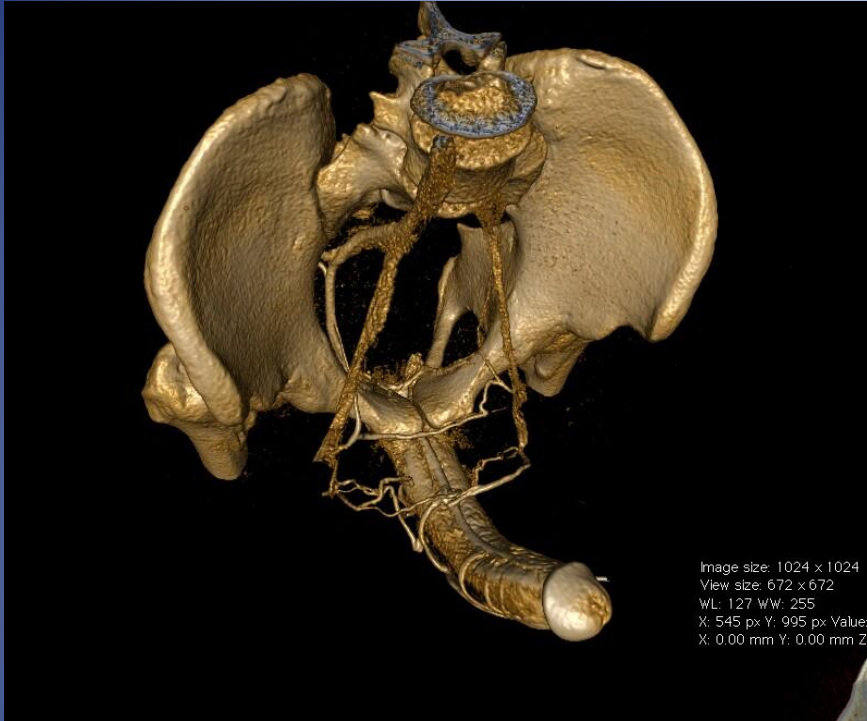
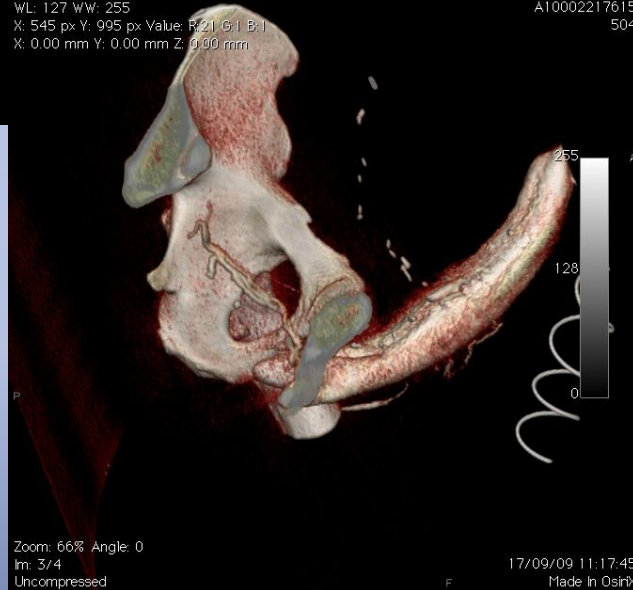


Image size: 1024 x 1024  
View size: 672 x 672  
WL: 127 WW: 255  
X: 545 px Y: 995 px Value: R:21 G:1 B:1  
X: 0.00 mm Y: 0.00 mm Z: 0.00 mm

552962 ( 53 y, 53 y )  
-- <Collection VRT>  
A10002217615  
504



Zoom: 66% Angle: 0  
Im: 3/4  
Uncompressed

17/09/09 11:17:45  
Made in OsiriX

# Results of venous surgery

Table 1:

Author	Year	Method	Number o Pat	short (3 months)	long (>12 months)
Schild	1993	embolisation retrograde	53		75.5%
Vale	1995	ligation	27	70%	63.6%
Nakata	2000	antegrade Embolisation - Ethanol	23	87%	78%
PEŞKİRCİOĞLU	2000	embolisation- N-butyl cyanoacrylate	32		68.7%
Miwa	2001	Sclerotherapy ethanol	10	70%	50%
Basche	2003	retrograde Embolisation	4	no	100%
Cayan	2008	Venous surgery and crural ligation	26	73,1 %	64,5
Kutlu	2009	embolisation	32	yes	yes
Herwig	2015	Sclerotherapy, airblock, valsalva	96	80.21%	72.73%
Carrino	2016	Sclerotherapy, airblock, valsalva	171		90,6 %

Copied from (4)

# Vascular Surgery options for ED today

## Arterial side

- Michal 2 after arterial trauma  
direct anastomosis epigastric  
artery to dorsal artery
- What for arteriosclerotic  
lesions?
  - DDVA arterial with CVOD
  - Endovascular?
    - Kim Asian J and
    - Wang JACC
    - Jason JACC

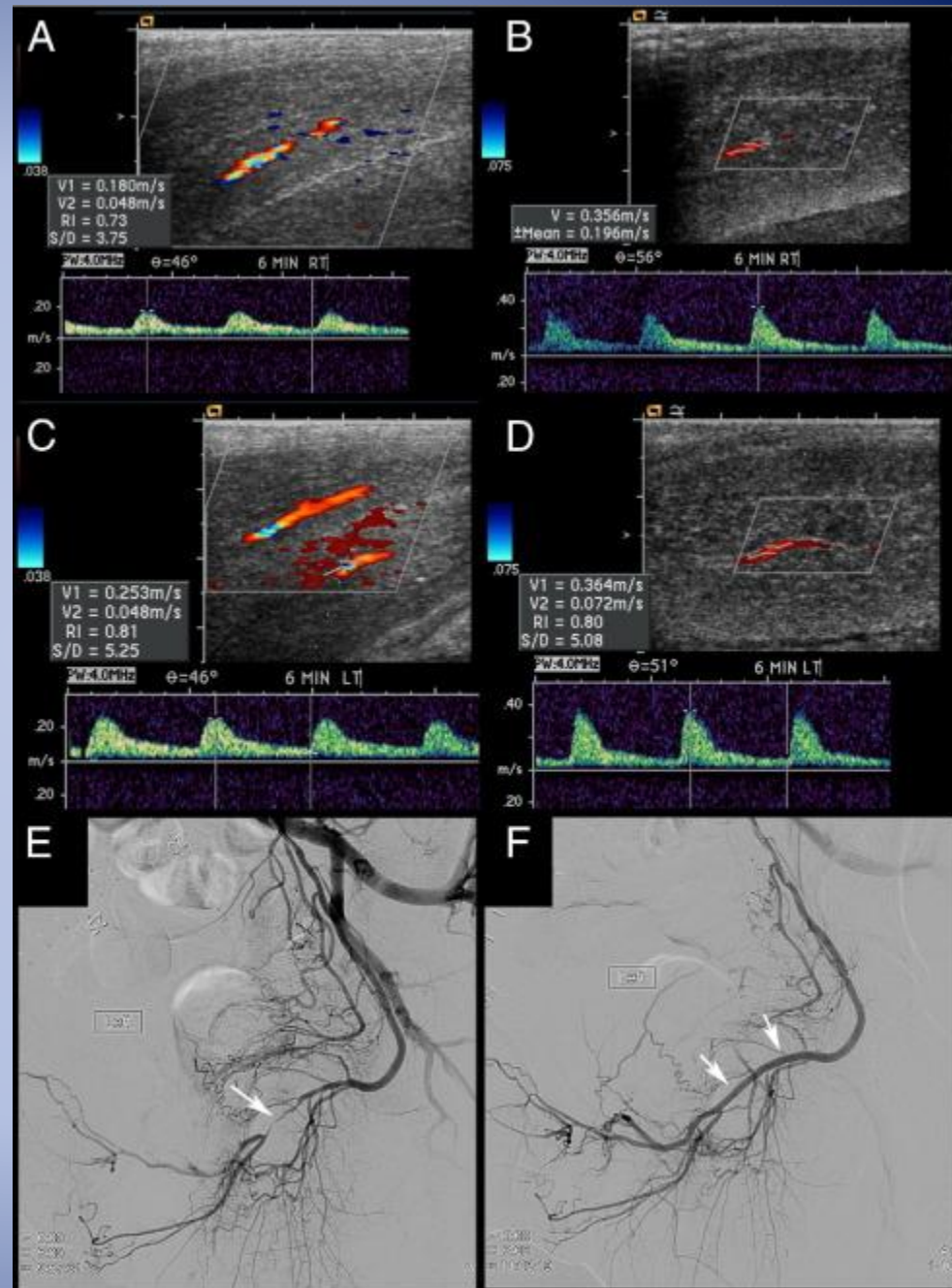


JACC 2012 60 2618-27

## Zotarolimus-Eluting Peripheral Stents for the Treatment of Erectile Dysfunction in Subjects With Suboptimal Response to Phosphodiesterase-5 Inhibitors

Jason H. Rogers, MD,\* Irwin Goldstein, MD,† David E. Kandzari, MD,‡  
Tobias S. Köhler, MD, MPH,§ Curtiss T. Stinis, MD,  
Paula J. Wagner, FNP, MSN,¶  
Jeffrey J. Popma, MD,# Michael R. Jaff, DO,\*\* Krishna J. Rocha-Singh, MD††  
Sacramento, San Diego, and La Jolla, California;  
Atlanta, Georgia; Springfield, Illinois; and  
Boston, Massachusetts

25 patients  
Feasibility 60%  
No complications  
Résultats ???  
Resténose 30%



# Take home message for vascular surgeons

- **Before surgery**
  - Ask for erectile function
  - Evaluate penile flow
- **During surgery**
  - Respect innervation
  - Revascularize at least one main vessel
- **And...Join us to treat Vascular ED**
  - New approaches
  - New materials
  - Multicentric studies...



# What is the future of ED treatment ?

## New Oral or local medications

- **Less side effects**
- **Other or multiple targets**

## Improve local delivery

- **Ultrasonic guided molecules**
- **micropumps**

## Regeneration

- **Autologous cell therapy**
- **Stem cells**
- **Tissue engineering**



**JEAN FLORESCO**

**PASCAL HAUET**

**HÉLÈNE SUSSMAN**

**ERIC ALLAIRE**

**CETI**

**MARIE NOELLE LABASTIE**

**JEAN FRANCOIS PAUL**

**SYLVAIN ORDUREAU**

**CHLOE VANIET**

**HENRI SALTIEL**

**CHRISTIAN DANIEL**

**PATRICK BOUILLY**

**BERNARD MONTANARI**

**CARLA COSTA**

“Le sexe  
sans l'amour  
ce n'est pas  
le paradis,  
l'amour sans sexe  
c'est l'enfer”

Françoise Sagan

**DANIEL FRYDMAN**

[www.medisexe.com](http://www.medisexe.com)

@Docteur Virag

[rvirag@wanadoo.fr](mailto:rvirag@wanadoo.fr)