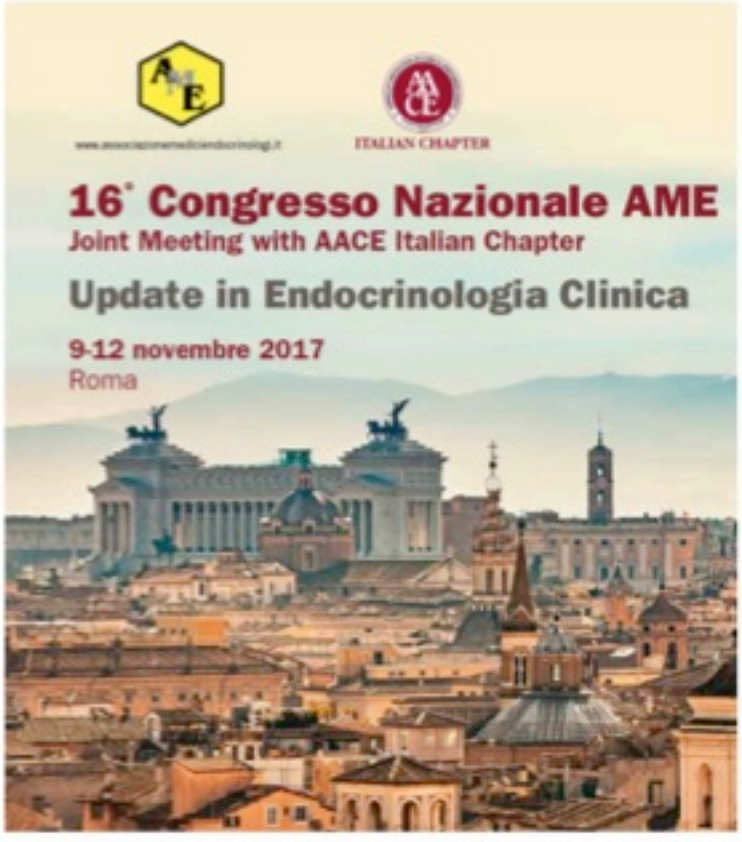
Ecografia Andrologica

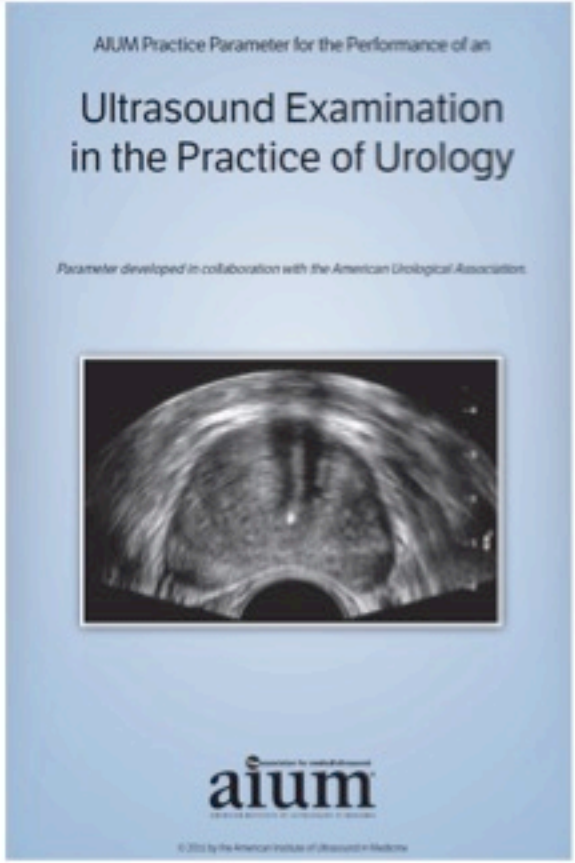


Anatomia ecografica normale del pene e della sua vascolarizzazione arteriosa

Dott. M.G. Schiesaro

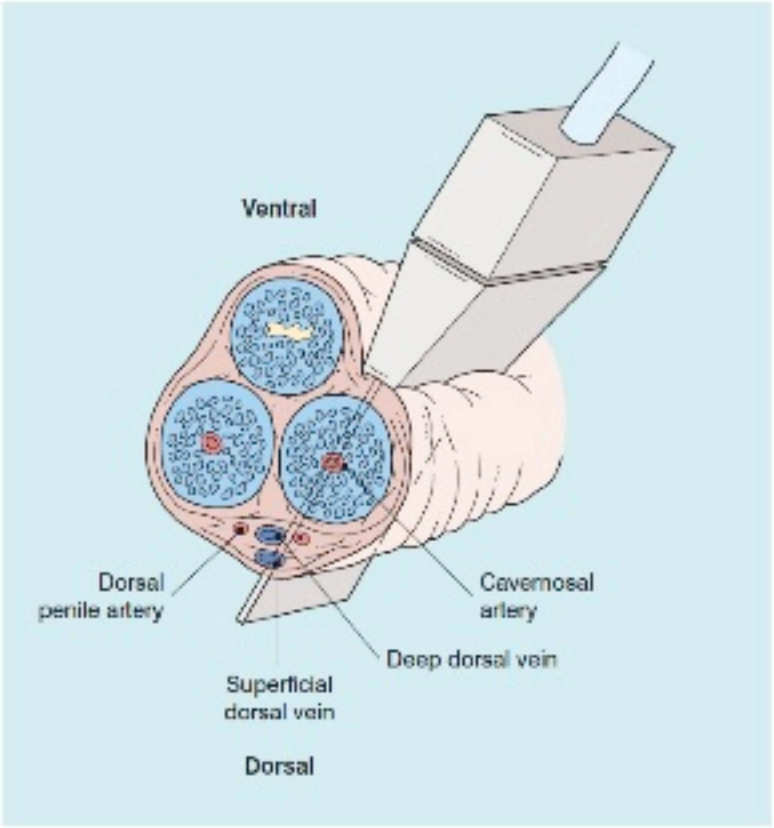
Direttore UOC Medicina Interna
Ospedale Classificato Villa Salus
Mestre (VE)

Indicazioni ad ecografia peniena

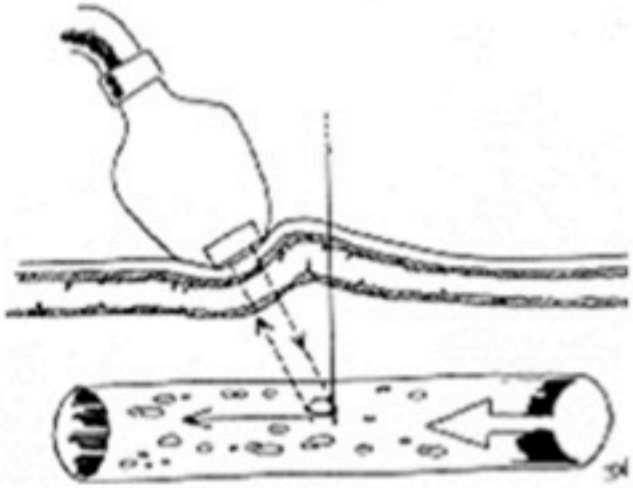


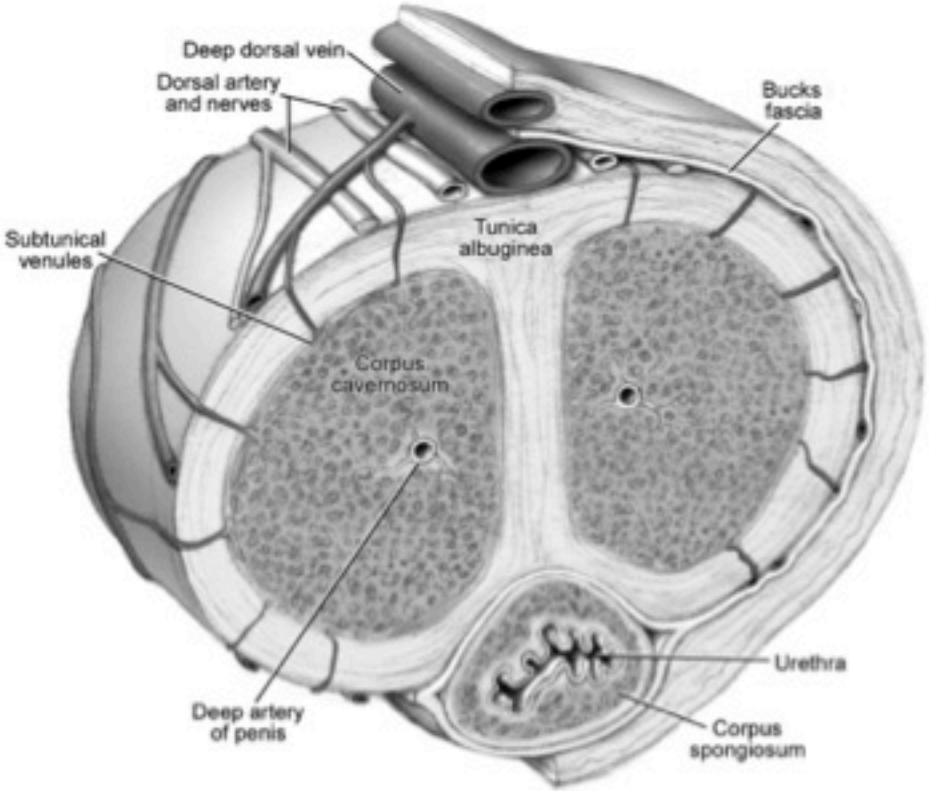
- Disfunzione Erettile
- Priapismo
- Trombosi vene dorsali del pene
- Fibrosi o curvature anomale
- Reperti patologici obiettivabili
- Neoplasie
- Valutazione dell'uretra
- Traumi

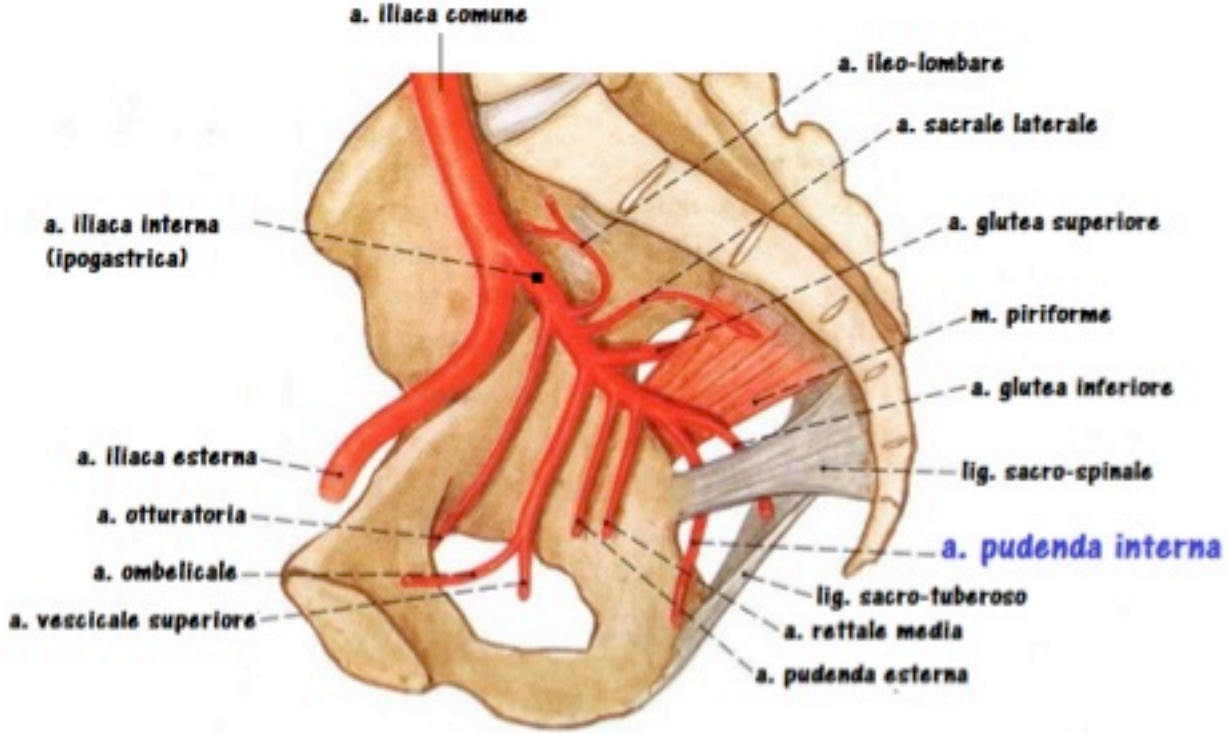
Indicazioni non esclusive



Angolo di incidenza compreso tra 40°e 60°

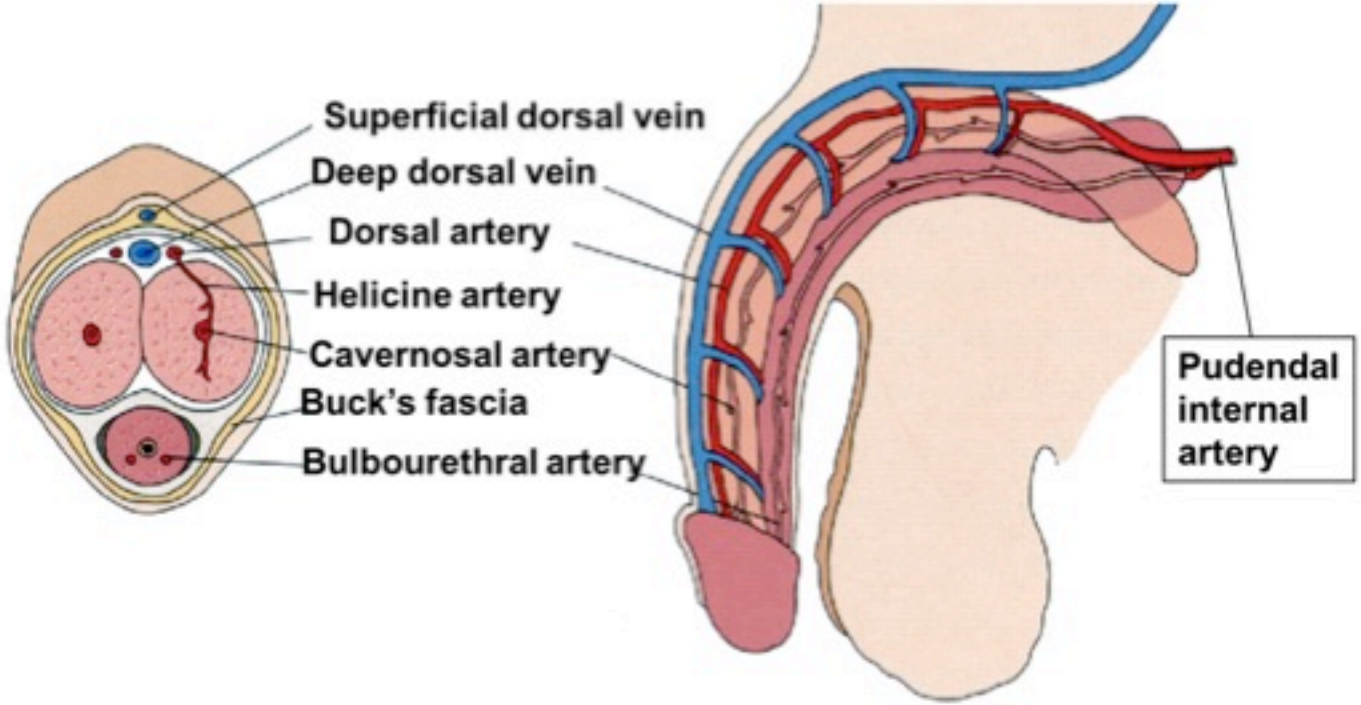



Deep dorsal vein
Dorsal artery and nerves
Bucks fascia
Subtunical venules
Tunica albuginea
Corpus cavernosum
Urethra
Deep artery of penis
Corpus spongiosum



arteria pudenda interna

Anatomia del pene



Ecocolor doppler penieno

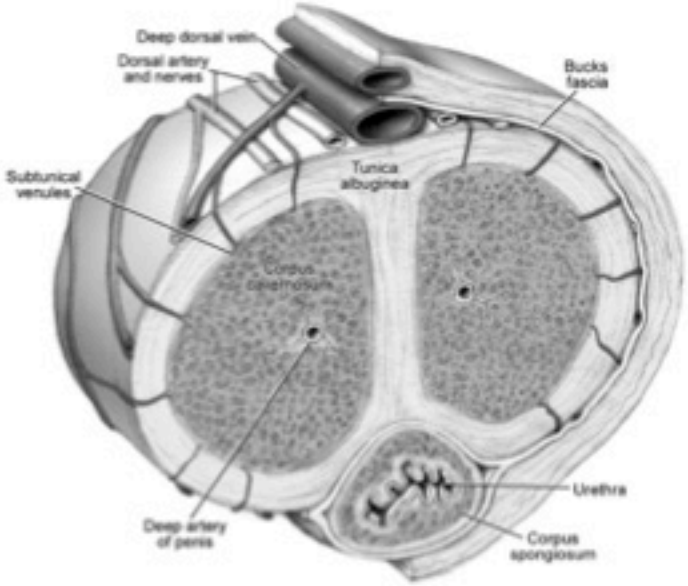
- **Basale**
- Dinamico
  - Farmacostimolazione standard : Alprostadil 10 mcg
  - Ripetizione del test
    - Alprostadil 10 mcg + Fentolamina 1 mg + Papaverina 30 mg
      - (Rischio di priapismo)
    - Alprostadil 10 mcg + Fentolamina 2 mg o Clorpromazina 2.5 mcg

Anatomia Ecografica

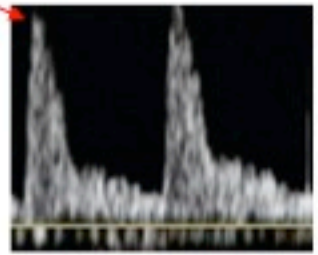
- Corpi cavernosi : fini echi distribuiti in modo omogeneo
- Albuginea : Iperecogena, setto intercavernoso ipo-anecogeno
- Pilastri intracavernosi : Decorso latero mediale, iperecogeni
- Corpo spongioso : ecogenicità simile CC
- Glande : Iperecogeno, ecostruttura fine

- Arteria Pudenda Interna
- Arteria Peniena
  - Arteria dorsale del pene → Glande
  - Arteria cavernosa → Arterie Elicine → CC
  - Arteria bulbare → CS

Misurazioni

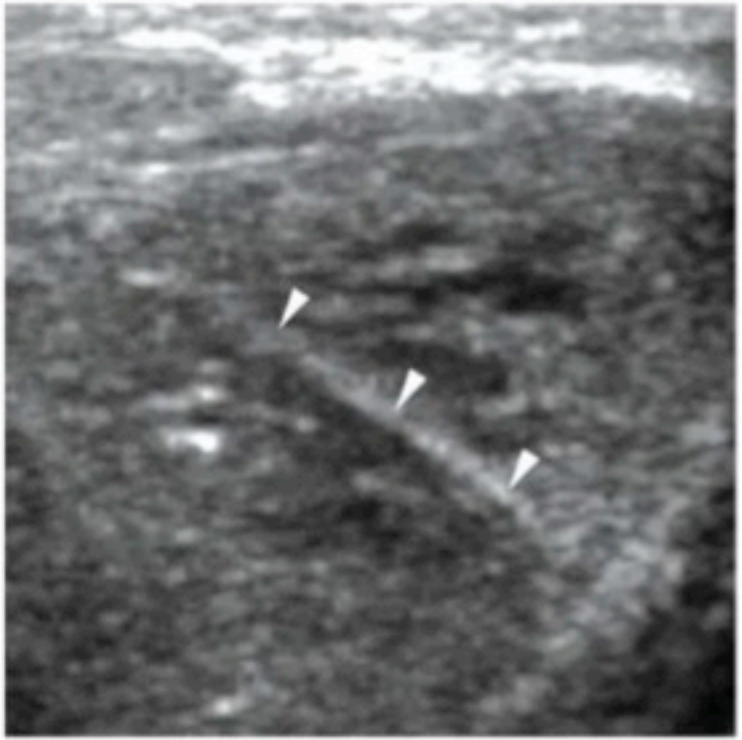


	Flaccidità	***Erezione***
Albuginea	2-3 mm	0.5 mm
A. Cavernose	0.3-0.7 mm (Long.)	1-1.2 mm (Long.)
IMT	< 0.3 mm	
PVS	> 13 cm/sec	> 35 cm/sec



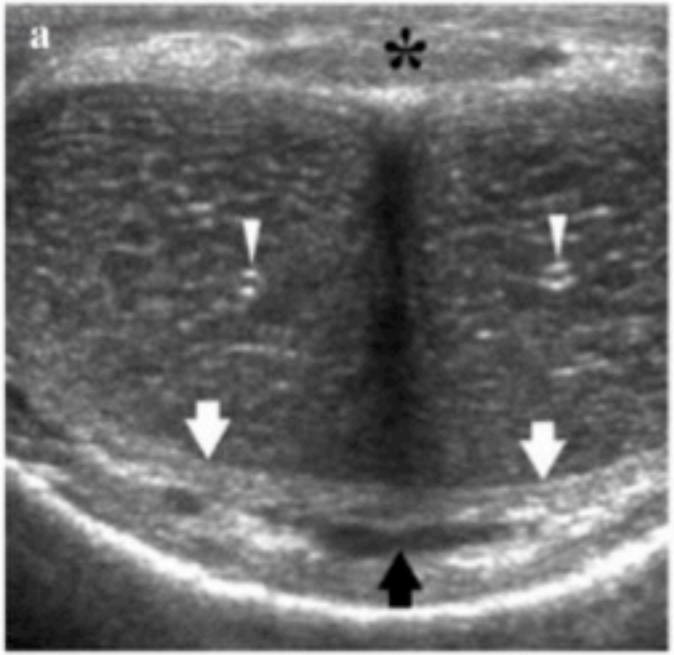
Albuginea

Setti Intracavernosi



Arterie Cavernose

Sc. Assiale

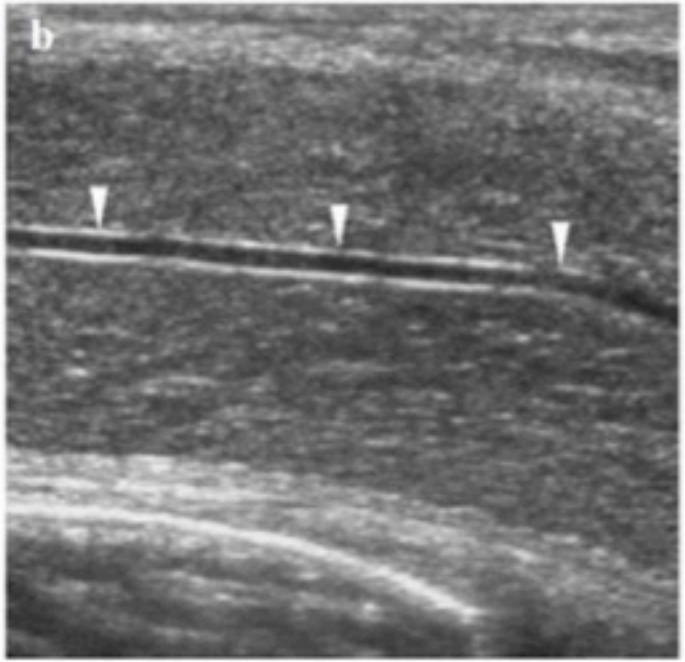


Spongioso

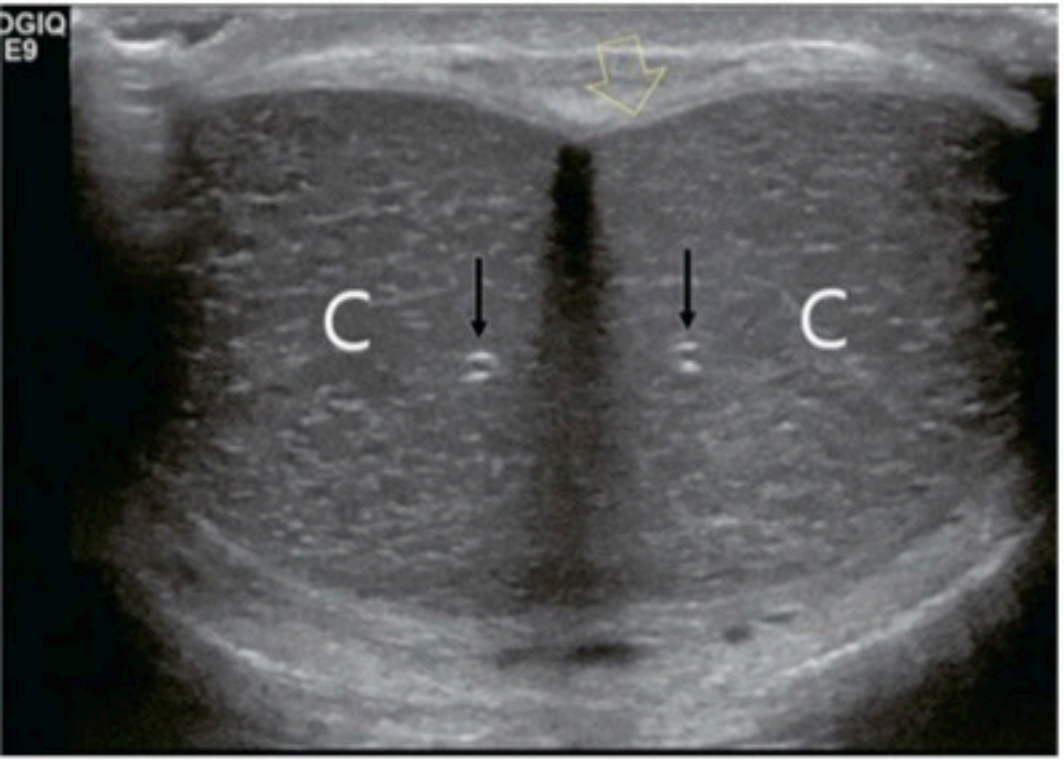
Albuginea

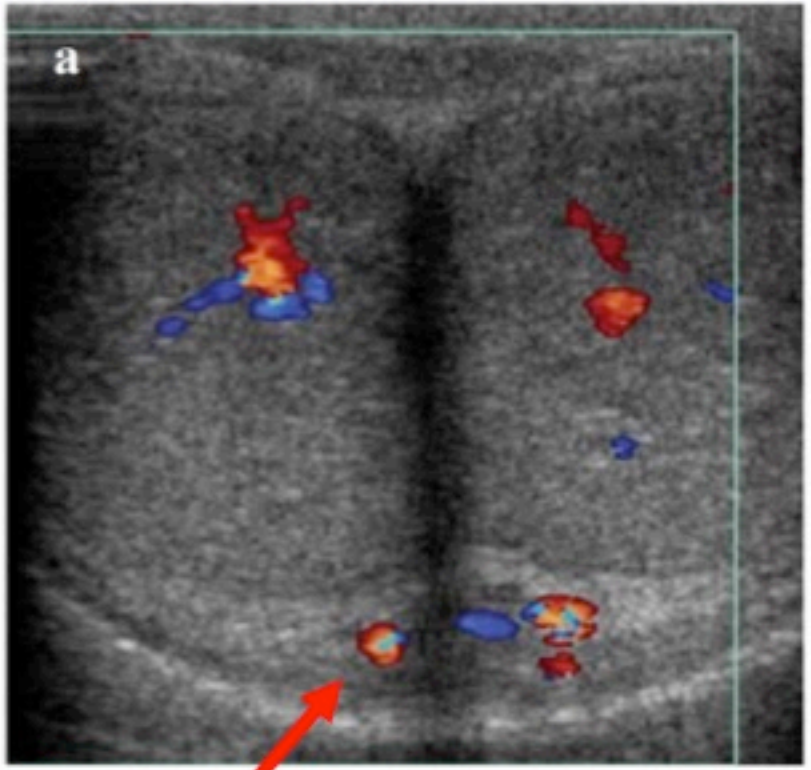
Vasi Dorsali

Sc. Longitudinale



Arterie Cavernose



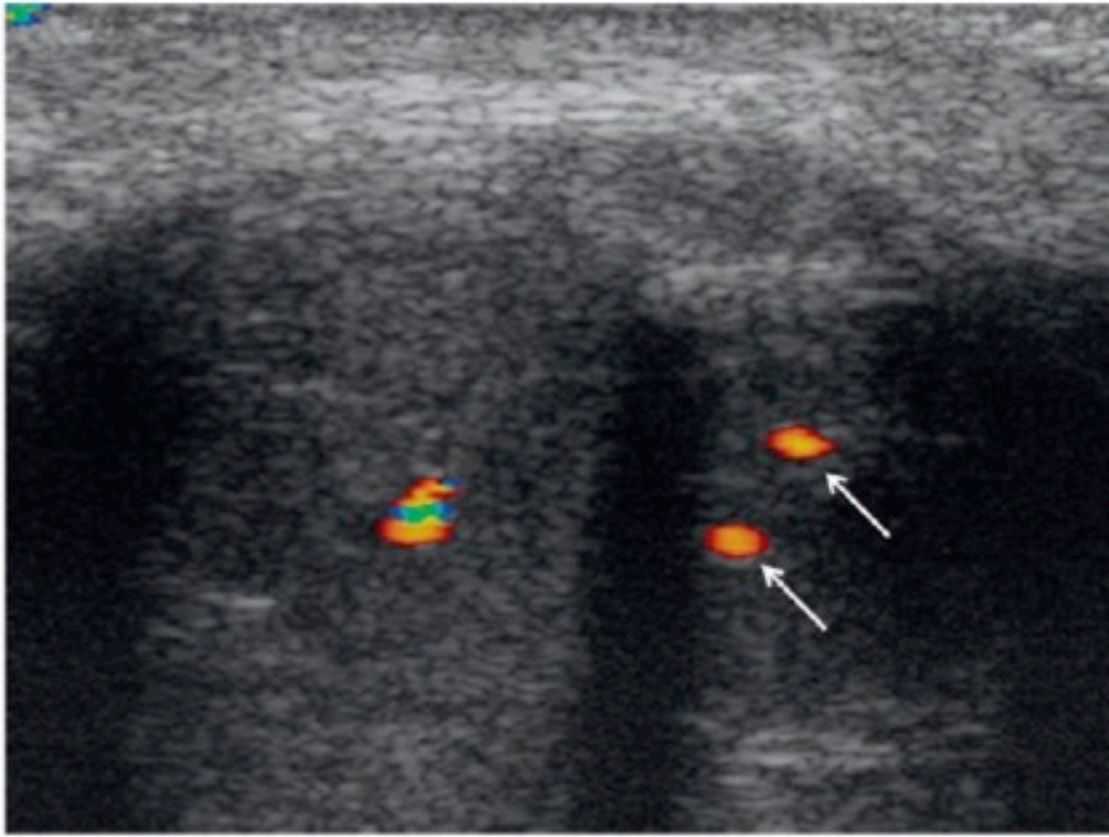


Arteria dorsale

Duplicazione arteria cavernosa

Varianti Anatomiche :

-Comunicazione tra A. Cavernose
-Ipoplasia A. Dorsale
-Origine monolaterale di A. Cavernose
-Origine aberrante di A. Cavernose
-Duplicazione A. Cavernosa

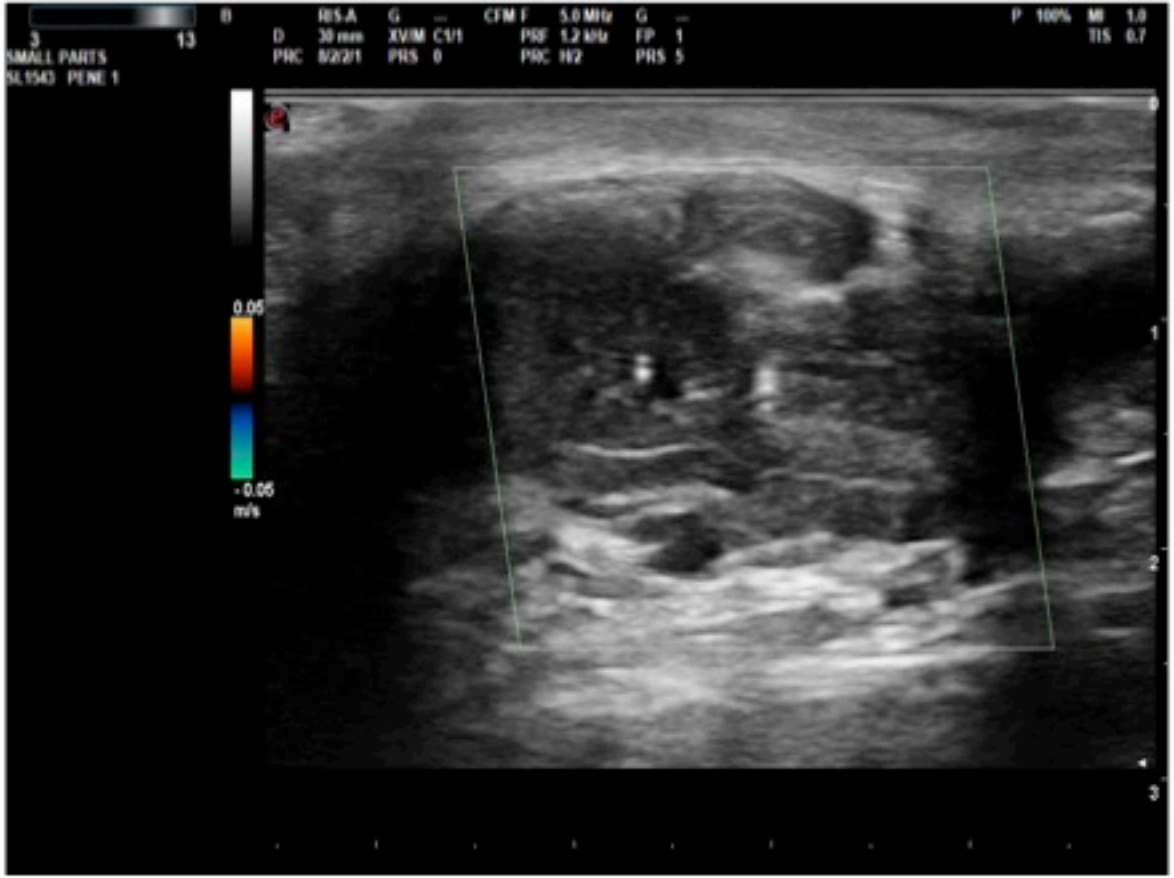


Quadri di normalità

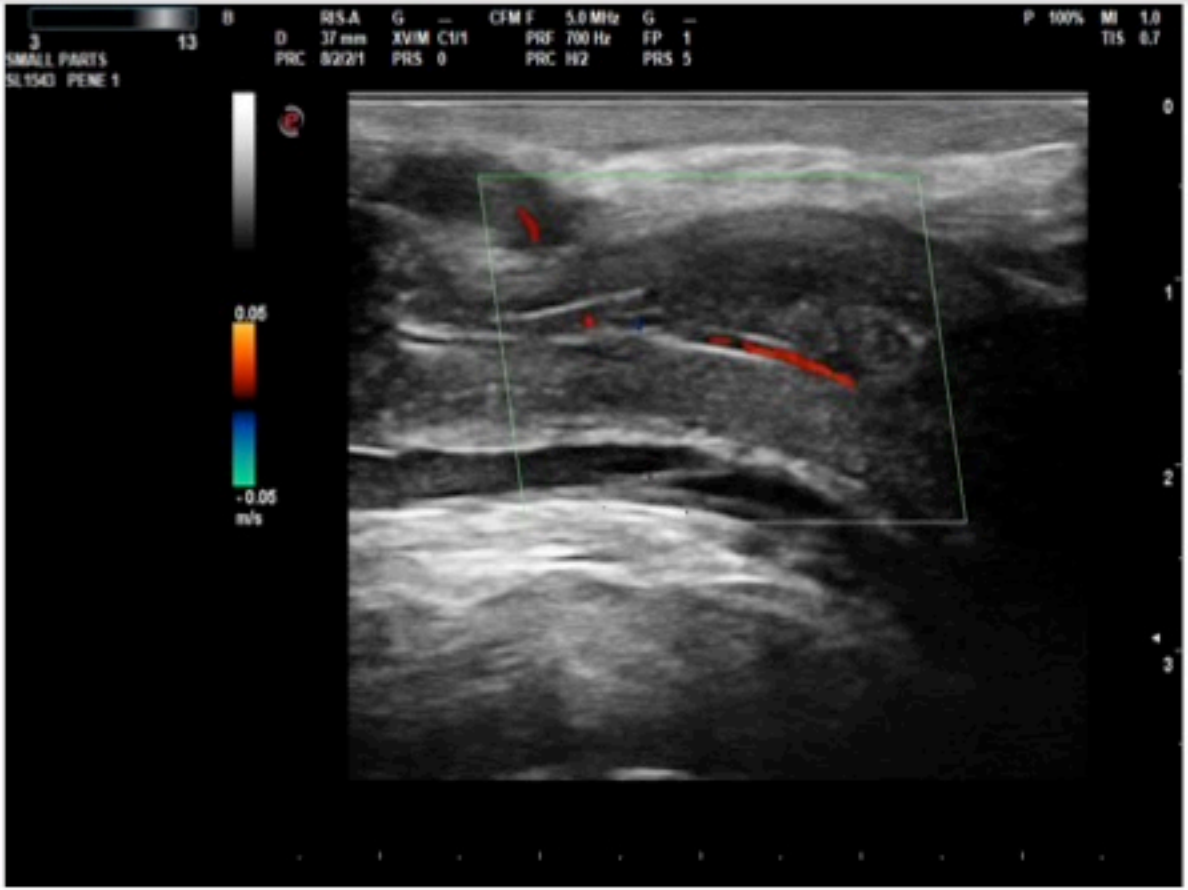
Video 1


B
RES A
G
3
13
D 30 mm
XV/M C1/1
PRC 8/2/2/1
PRS 0
P 80% MI 1.2
SMALL PARTS
SL1543 PENE 1
1
2
3
4

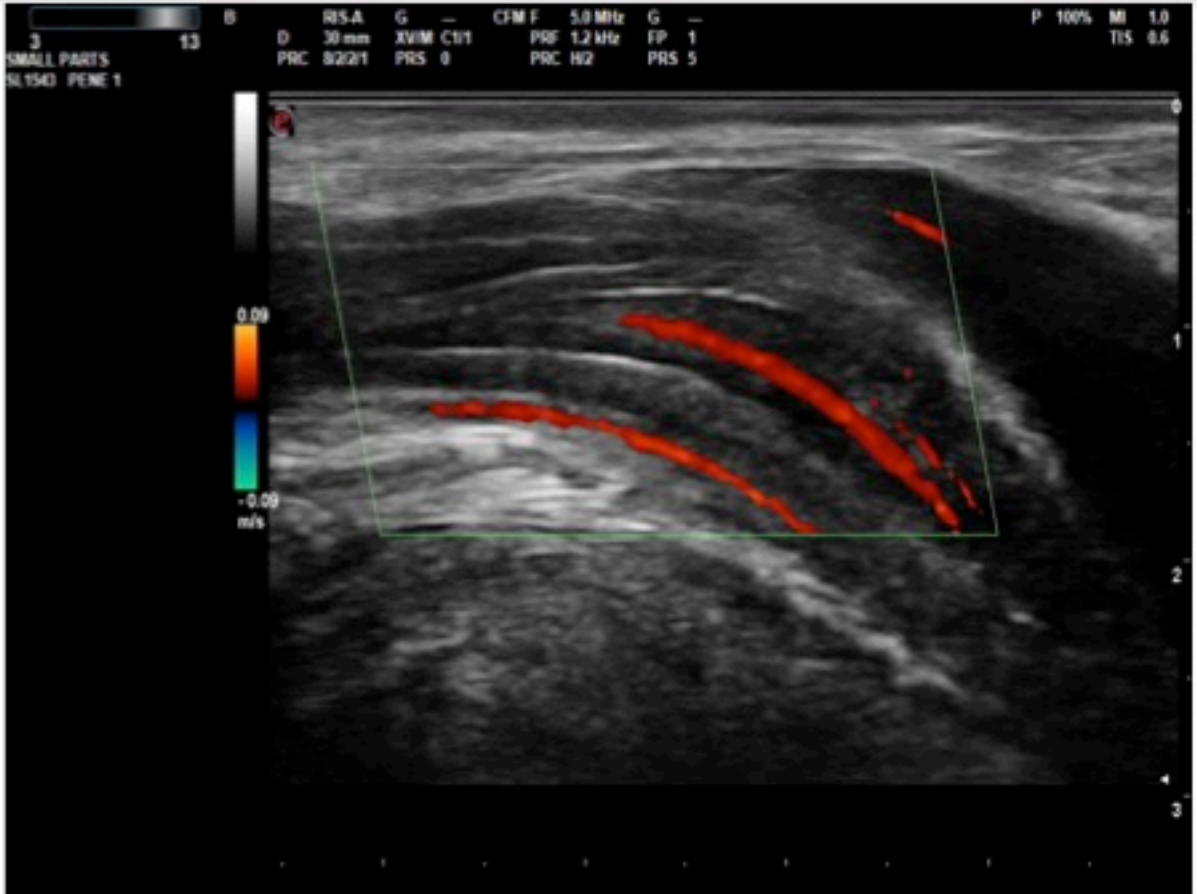
Video 2

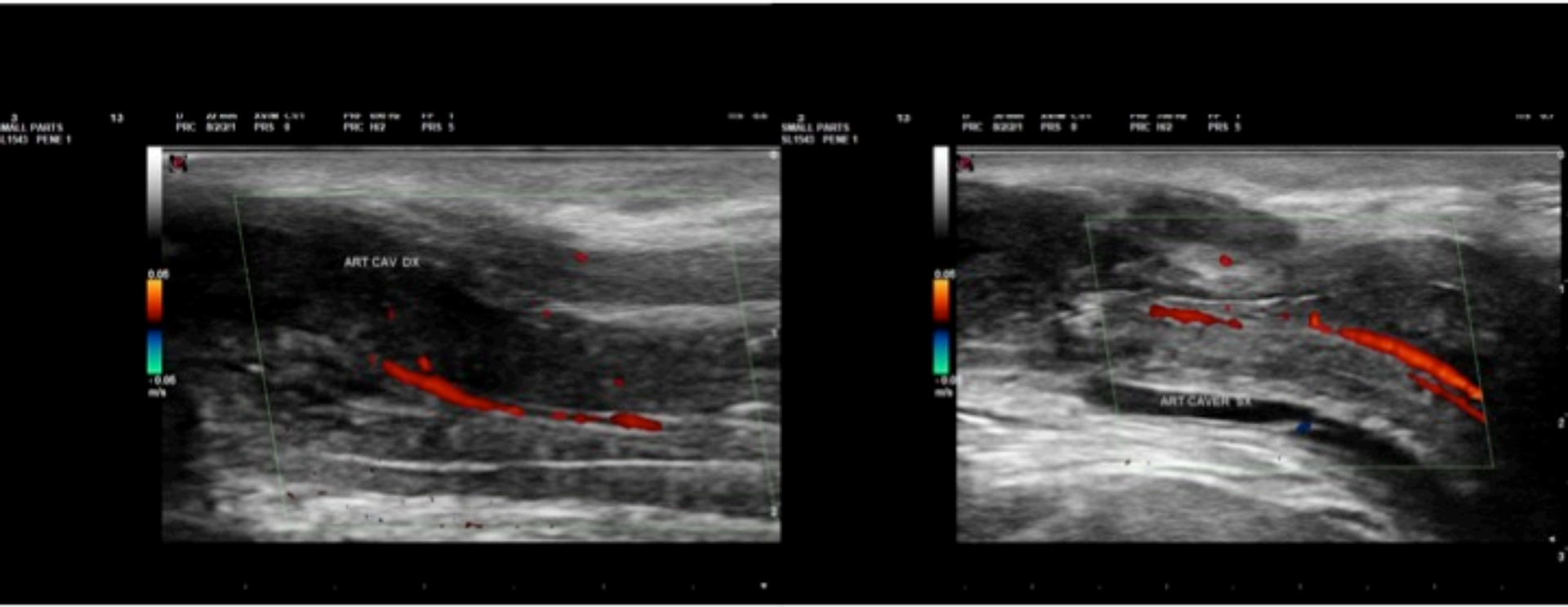


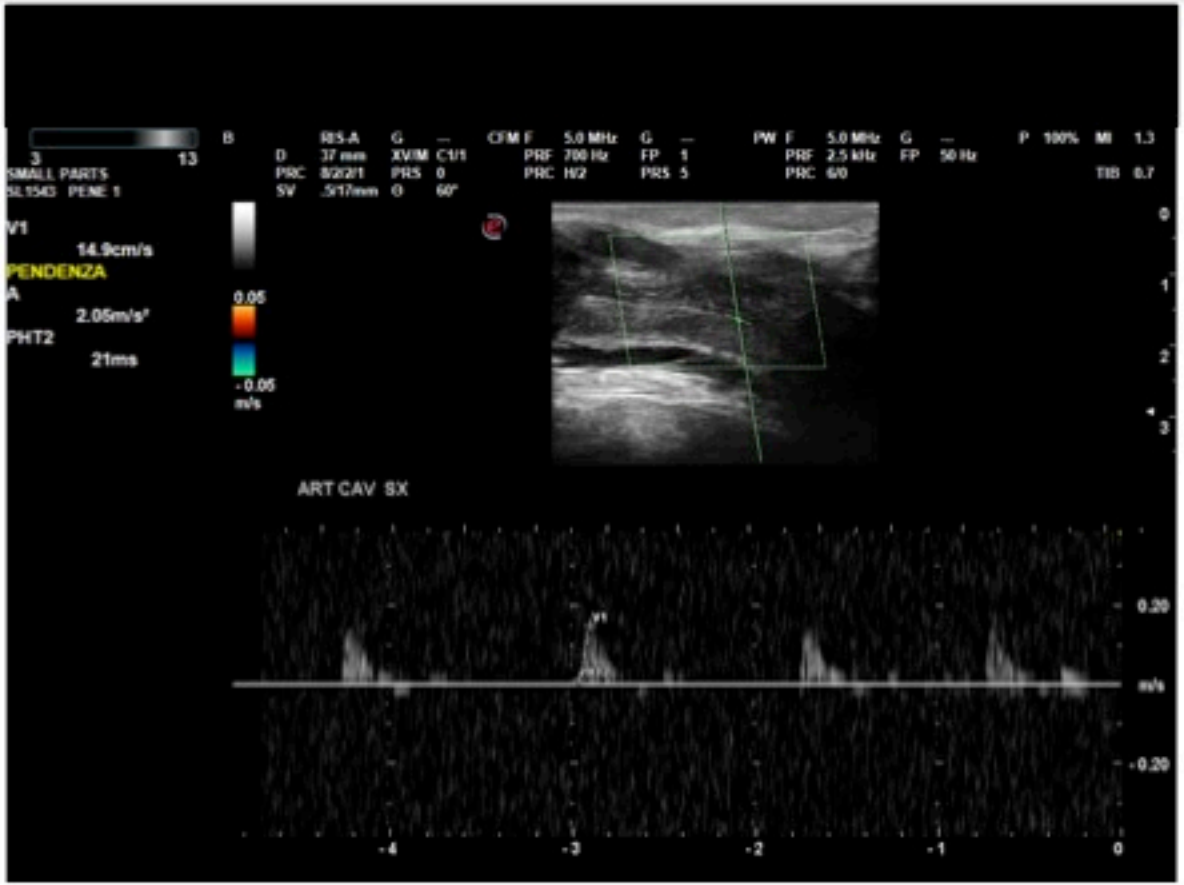
Video 3



Video 4




ART CAV DX
ART CAVER SX



Rilevazione su porzione lineare di arteria cavernosa

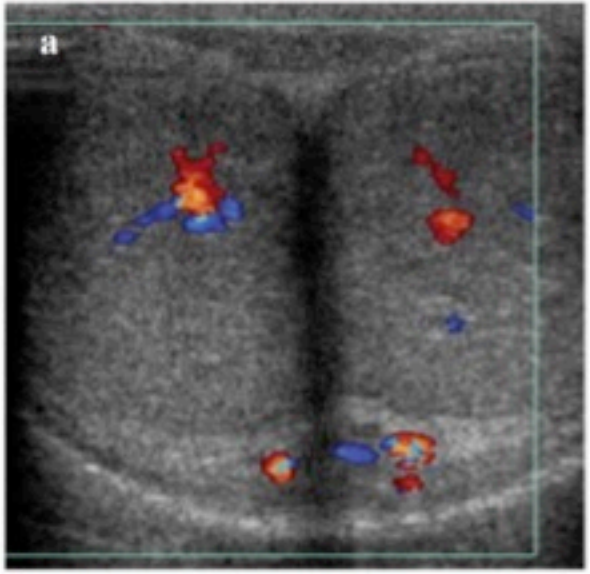

SMALL PARTS
SL1543 PENE 1
V1
16.8cm/s
PENDENZA
A
4.01m/s²
PHT2
13ms
0.09
-0.09
m/s
ART CAV DX
0.20
m/s
-0.20
-4
-3
-2
-1
0

Video 5

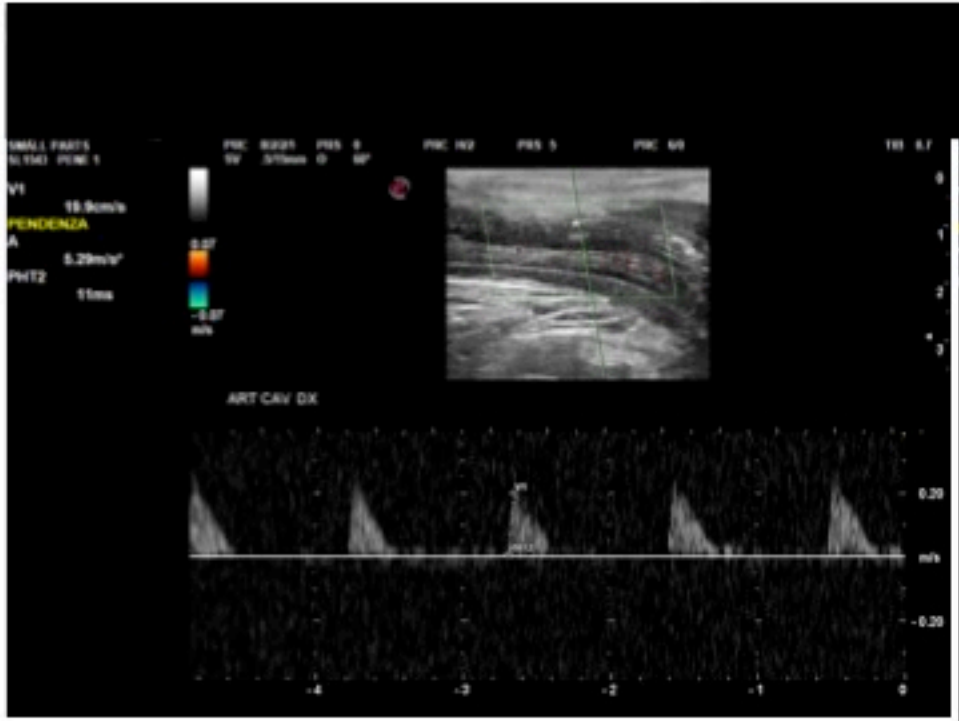
Setti intracavernosi

Video 6

Arterie dorsali

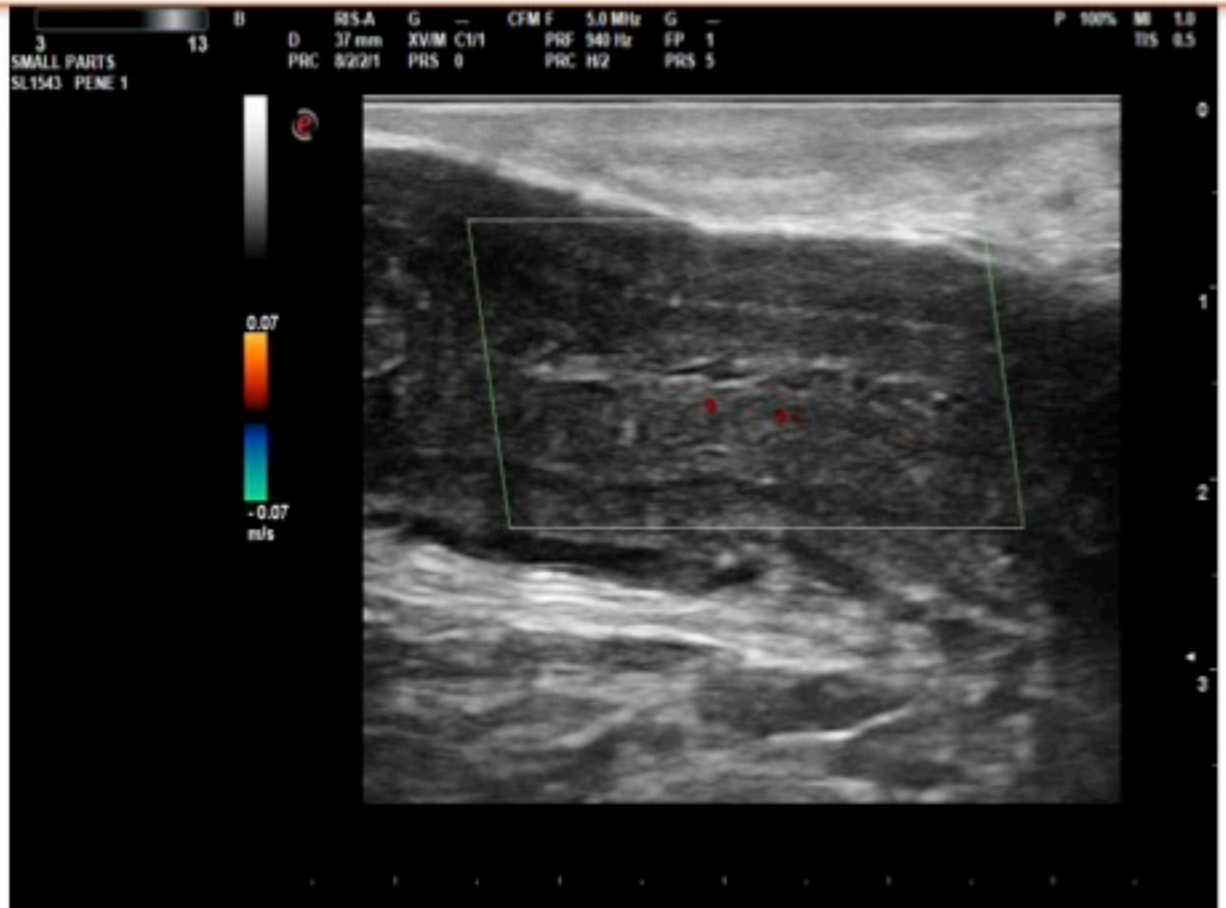


Quadro patologico

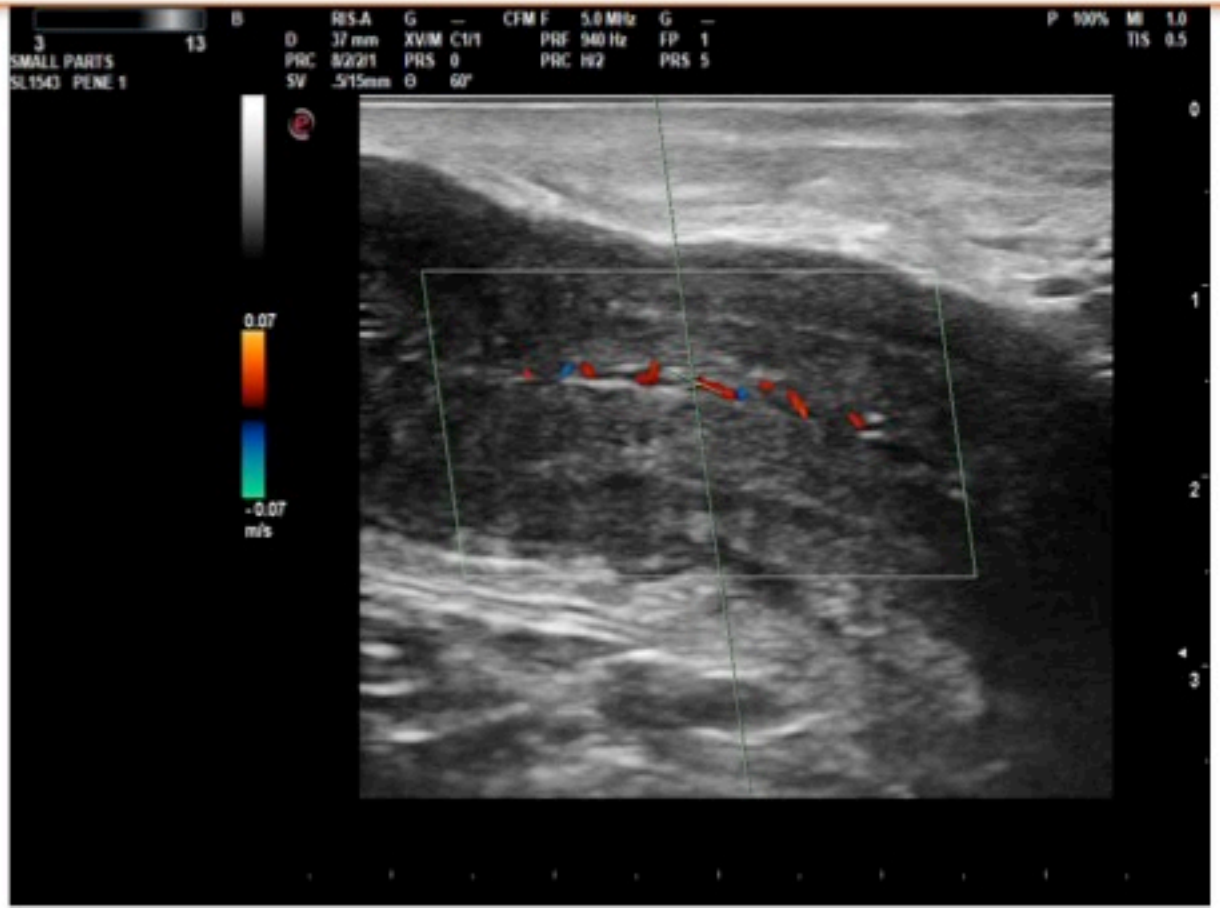

SMALL PARTS
V1
18.9cm/s
PENDENZA
A
5.29m/s²
PHT2
11ms
ART CAV DX
0.20
m/s
-0.20
-4
-3
-2
-1
0


SMALL PARTS
V1
21.0cm/s
PENDENZA
A
16.80m/s²
PHT2
4ms
ART CAV SX
0.20
m/s
-0.20
-4
-3
-2
-1
0

Video 7



Video 8



Ecocolor doppler penieno

- Basale
- Dinamico
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  - Ripetizione del test
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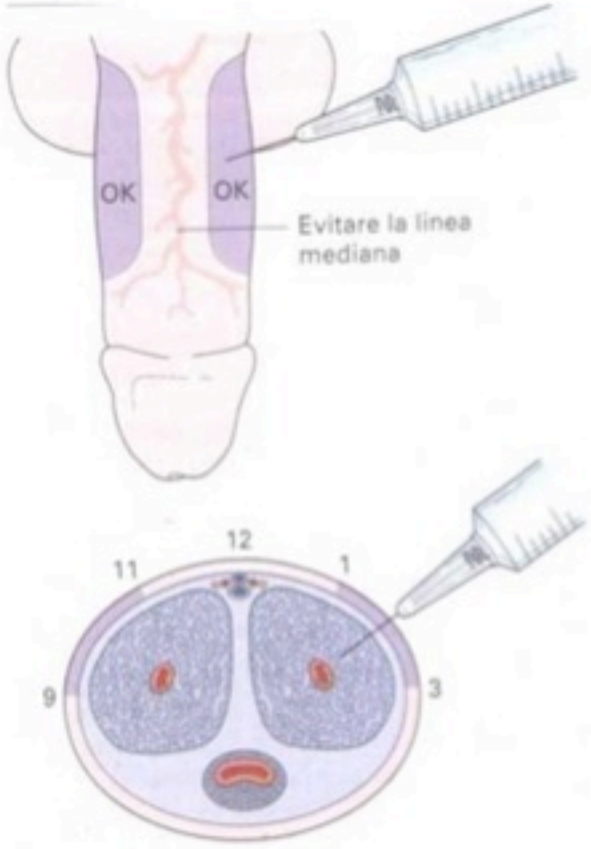
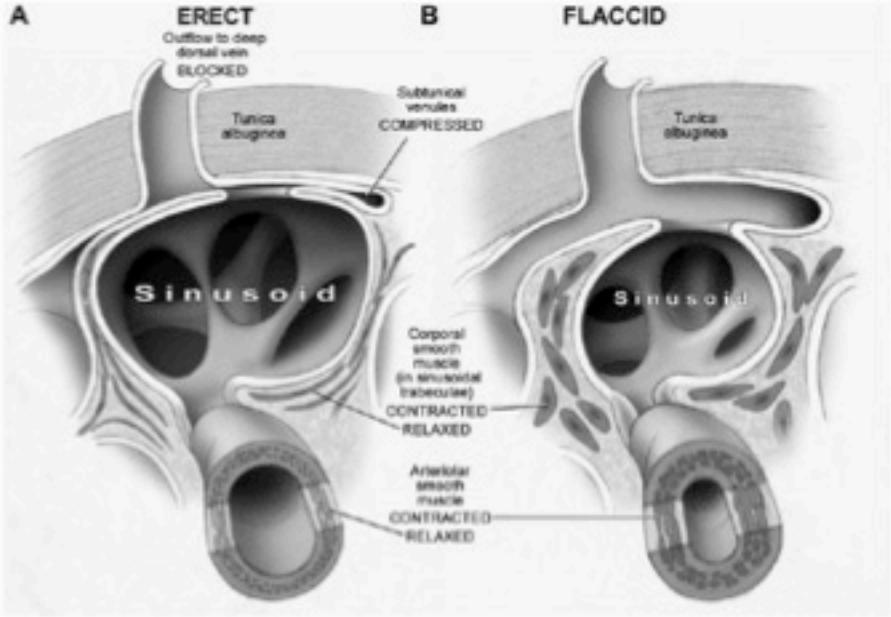
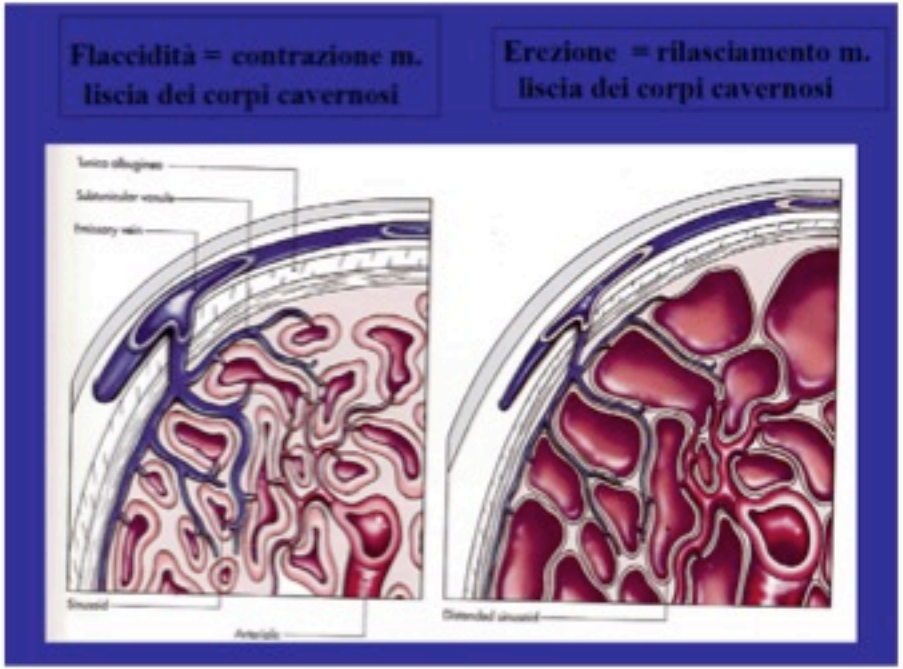
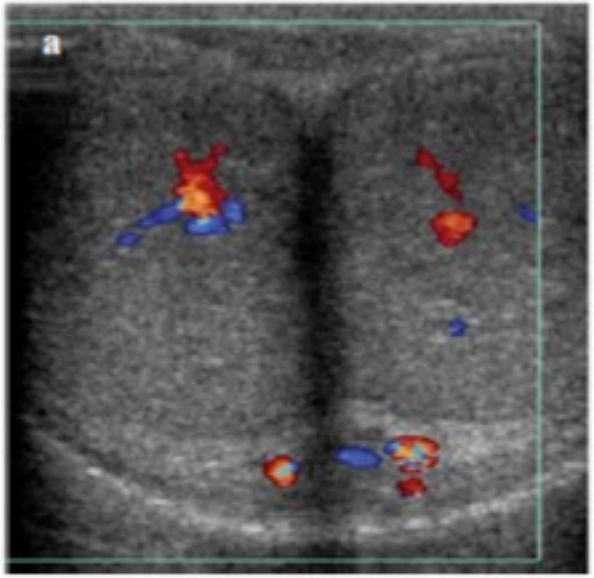
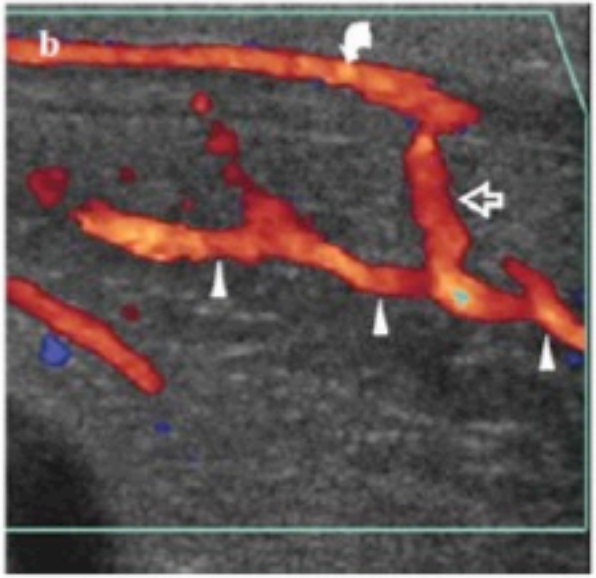
      - (Rischio di priapismo)
    - Alprostadil 10 mcg + Fentolamina 2 mg o Clorpromazina 2.5 mcg

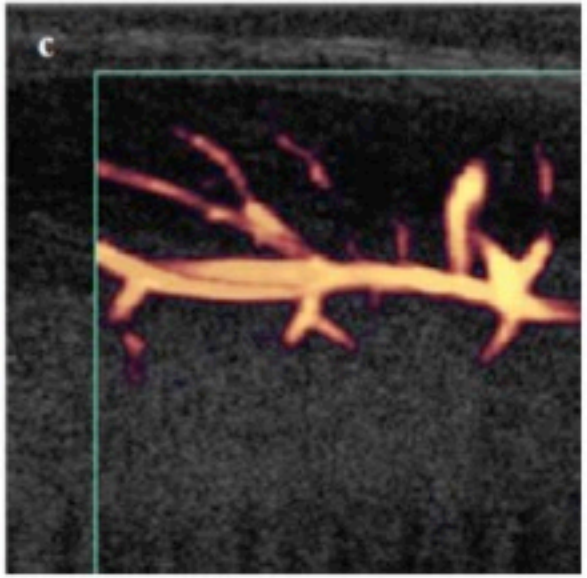



A
ERECT
Outflow to deep dorsal vein BLOCKED
Tunica albuginea
Subtunical venules COMPRESSED
Sinusoid
B
FLACCID
Tunica albuginea
Sinusoid
Corporal smooth muscle (in sinusoidal trabeculae) CONTRACTED RELAXED
Arteriolar smooth muscle CONTRACTED RELAXED


Flaccidità = contrazione m. liscia dei corpi cavernosi
Erezione = rilasciamento m. liscia dei corpi cavernosi





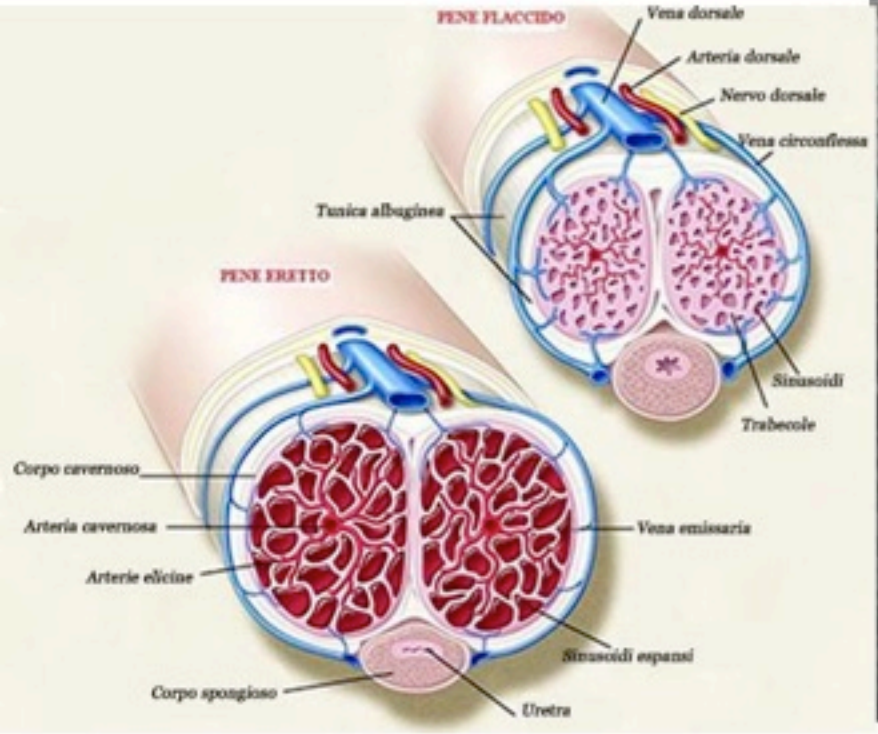


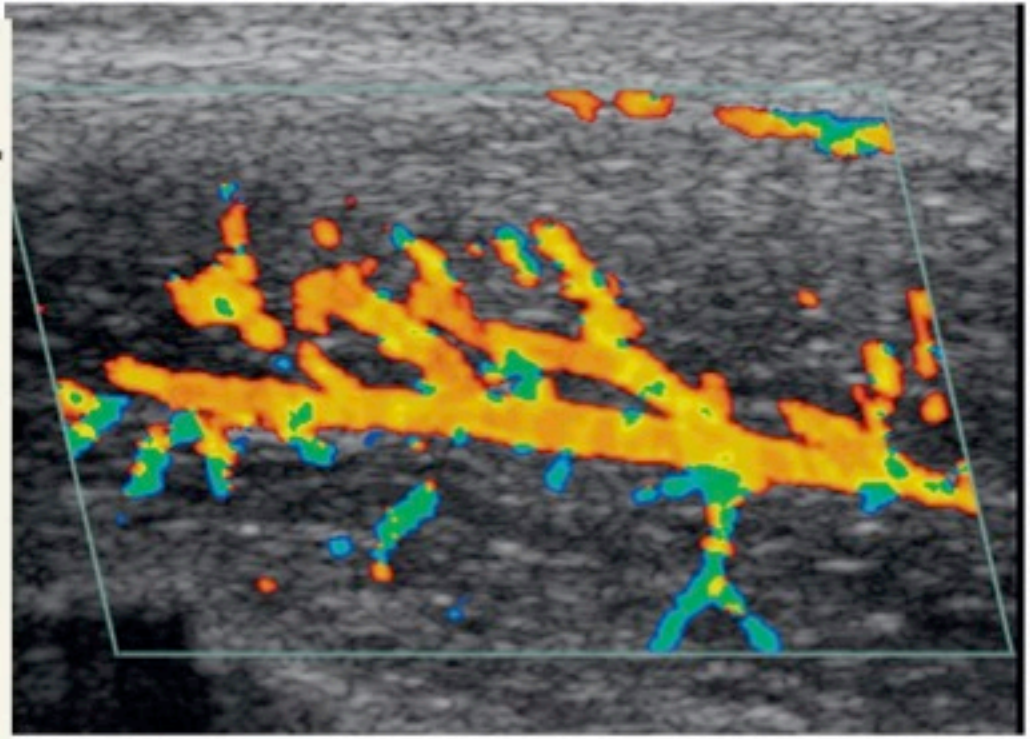
△ Arteria Cavernosa

⇦ Ramo comunicante

Arteria uretrale

Arterie Elicine





Fasi

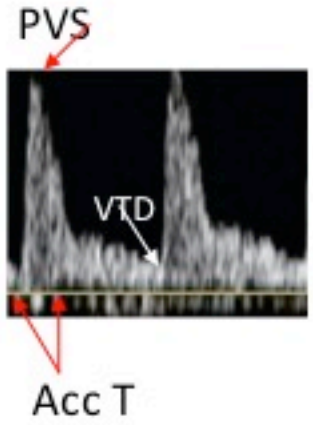
Fase 0	Flaccidità	Onda monofasica, alte resistenze, assenza di flusso diastolico
Fase 1	Inizio Erezione	Incremento flusso sistolico e diastolico, flusso continuo, PVS > 35 cm/sec, VTD > 8 cm/sec.
Fase 2		Aumento della pressione all'interno dei corpi cavernosi, riduzione del flusso diastolico
Fase 3		Assenza di flusso diastolico
Fase 4		Inversione del flusso diastolico
Fase 5	Massima Erezione	Decremento di PVS

Cavernosal Artery Hemodynamics of the Erectile Process in Normal Men

Minutes post injection	Intracavernosal Pressure	Doppler waveform	Doppler waveform
5	Low		Low resistance
10	Equal to diastolic B/P		Decreased or no diastolic flow continued high systolic flow
15	Greater than diastolic pressure		Reversal of diastolic flow
20	Very high intrapenile pressure		Dampened arterial waveform No diastolic flow

Parametri misurabili

	Valore Normale	Patologico
Velocità di picco sistolico (PVS)	> 35 cm/sec	< 25 cm/sec
Velocità telediastolica (VTD)	< 5 cm/sec	> 5 cm/sec
Tempo di accelerazione (Acc T)	< 100 msec	>100 msec
Indice di resistenza (IR)	> 0.9	< 0.75



IR=(PVS-VTD)/PVS

Doppler Sonography of Deep Cavernosal Artery of the Penis: Variation of Peak Systolic Velocity According to Sampling Location

Seung Hyup Kim, MD, Jae Seung Paik, MD, Sung Eun Lee, MD, Byung Tae Choi, MD, Kyung Mo Yoon, MD, Man Chung Han, MD

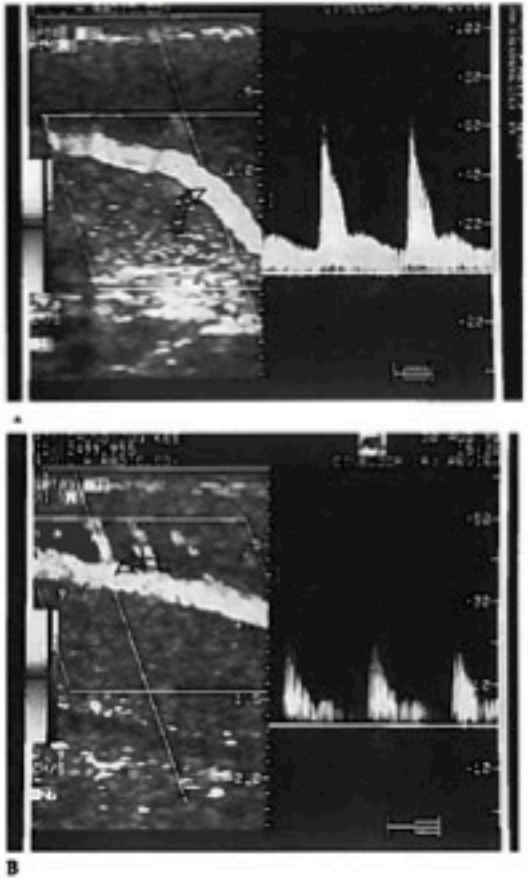


Table 1: Peak Systolic Velocity of the Proximal and Distal Cavernosal Arteries

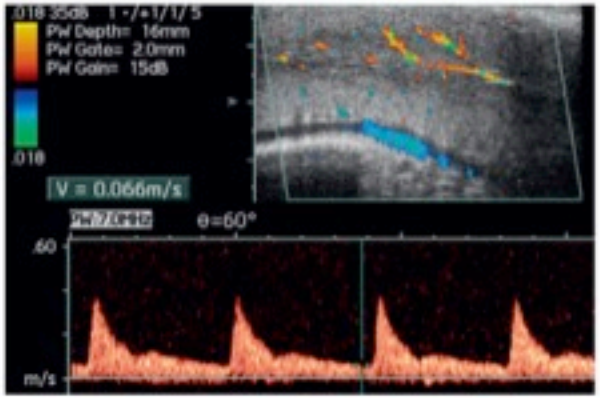
	Patients with Erectile Dysfunction (n=32)			Control Patients (n=15)		
	Right	Left	Both	Right	Left	Both
PSV (proximal) (cm/sec)	40.2 ± 12.1	37.9 ± 12.5	39.0 ± 11.2	39.4 ± 7.0	40.2 ± 6.8	39.8 ± 8.0
	(21-69)	(20-68)	(20-69)	(31-55)	(30-67)	(30-67)
PSV (distal) (cm/sec)	21.4 ± 6.6	18.5 ± 6.5	20.0 ± 5.6	20.7 ± 6.0	21.9 ± 4.9	21.3 ± 5.5
	(11-39)	(9-31)	(9-39)	(10-32)	(15-37)	(10-37)
[PSV (distal) / PSV (proximal)] x 100 (%)	55.2 ± 13.4	50.5 ± 14.2	52.8 ± 12.5	52.2 ± 9.9	55.1 ± 7.8	53.6 ± 9.1
	(15.9-76.5)	(17.0-79.3)	(15.9-79.3)	(28.6-69.7)	(39.5-70.0)	(28.6-70.0)

Note: Values are mean ± standard deviation. Parenthesis indicate range of values.

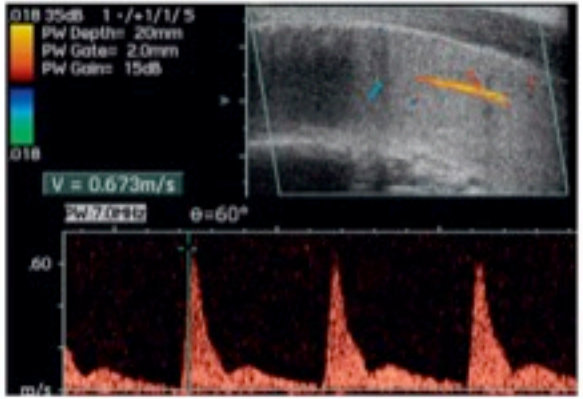
Figure 1 Doppler waveforms obtained at proximal and distal portions of the cavernosal arteries. A, Doppler waveform obtained at the base of the penis, where the vessel angles posteriorly (*arrow*). Peak velocity of blood flow at this location is 63 cm/sec. B, Doppler waveform of the same artery obtained immediately after (A) at distal portion of the shaft, where the artery's course is straight (*arrow*). Peak velocity at this location is 23 cm/sec.

J Ultrasound Med. 1994 Aug;13(8):591-4.

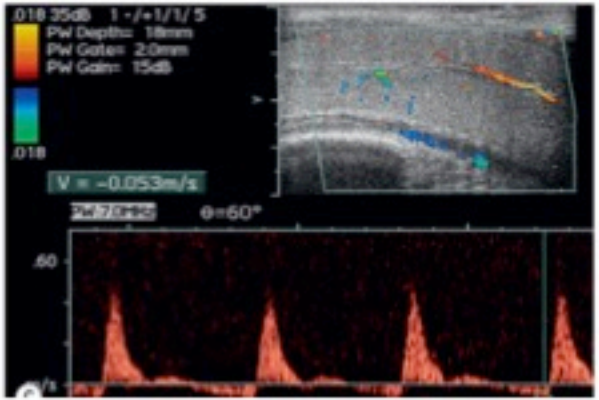
Normale



5’

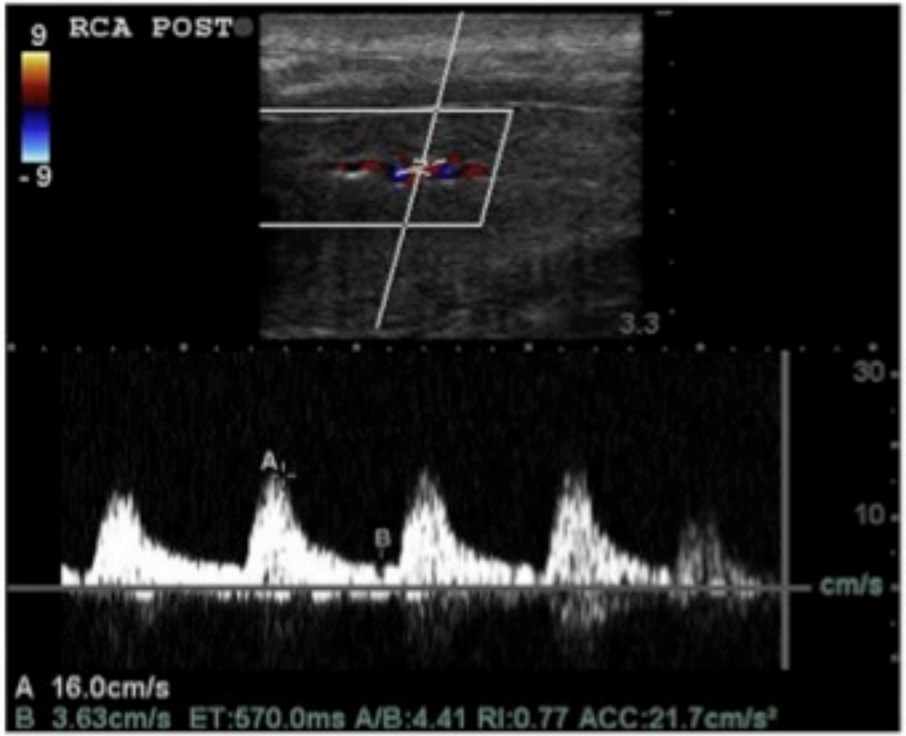


10’

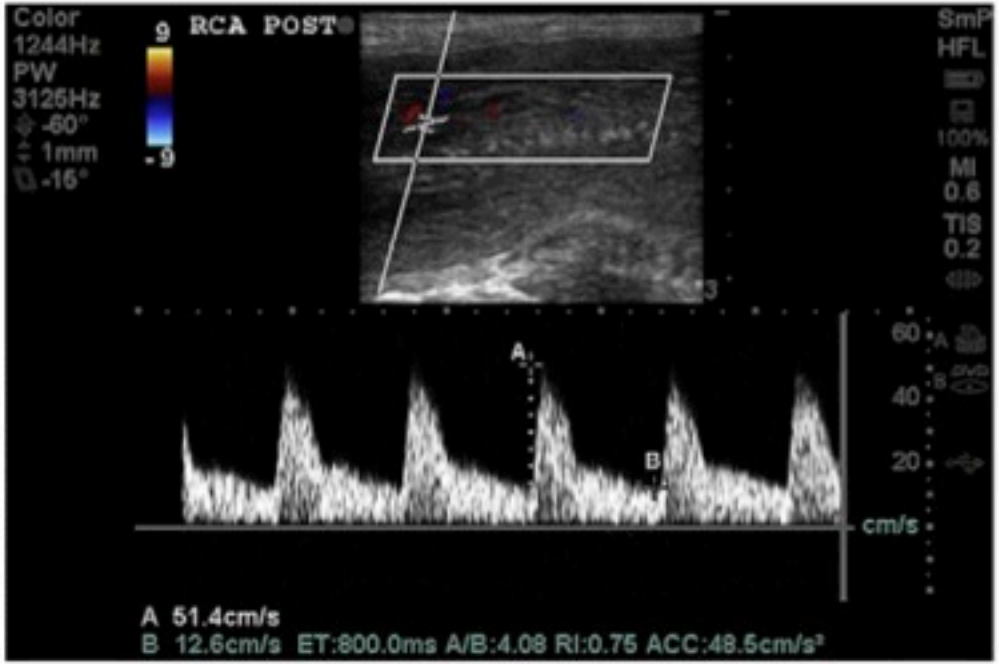


15’

Pat. Arteriosa



Pat. Veno-occlusiva



Patologia veno-occlusiva

- Alterazioni degenerative dell'Albuginea
  - M. di La Peyronie
  - DM
  - Invecchiamento
- Traumatismi
- Stato ansioso
- Alterazioni di trabecole, endotelio, muscolatura liscia
- Shunt venosi acquisiti (Correzione di priapismo)

- Se insufficienza arteriosa, scarsa specificità di VTD > 5 cm/sec

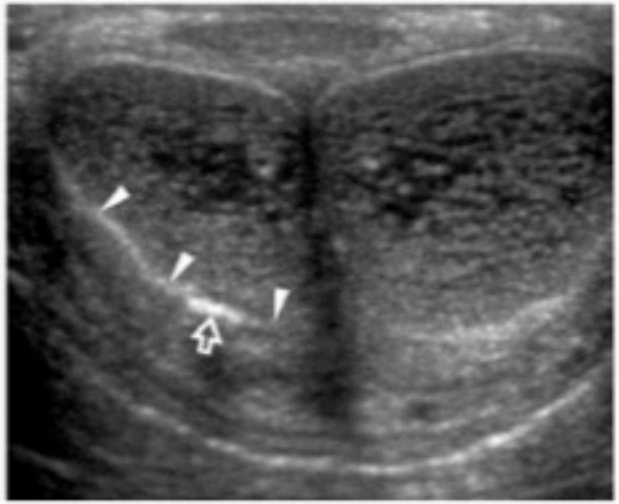
Classificazione DE

	VPS	VTD	IR
Normale	N	N	N
Parz. Arteriosa	25-35 cm/sec	N	
Arteriosa	< 25 cm/sec	N	N
Parz. Venosa	N	3-6 cm/sec	0.6-0.8
Venosa	N	> 6 cm/sec	< 0.6
Combinata borderline	25-35 cm/sec	3-6 cm/sec	0.6-0.8
Combinata	< 25 cm/sec	> 6 cm/sec	< 0.6

Standardization of Vascular Assessment of Erectile Dysfunction

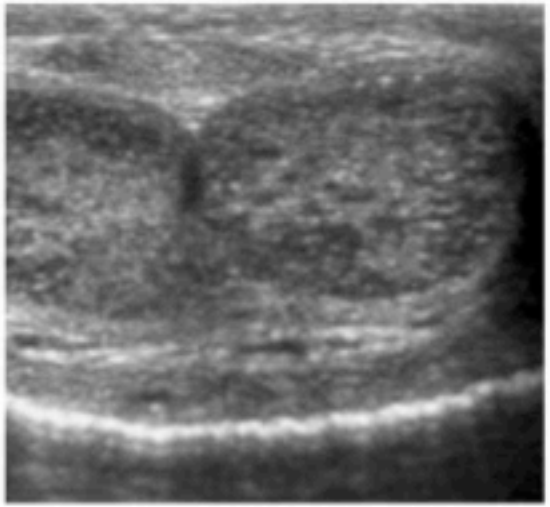
J Sex Med 2013;10:120–129

Reperti patologici



Induratio Penis Plastica

Rottura Albuginea



Fibrosi C. Cavernosi

Vademecum per la refertazione (1)

- Forma ed ecostruttura dei corpi cavernosi : descrivere alterazioni morfologiche e noduli con relative dimensioni
- Spessore ed ecogenicità dell'Albuginea, presenza di placche fibrotiche e calcificazioni con sede e dimensioni
- Descrizione morfologica delle Arterie Cavernose
- PVS a pene flaccido

Vademecum per la refertazione (2)

- Anastomosi tra arterie cavernose e dorsale o altri circoli collaterali
- PVS
- VTD
- IR
- Acc T
- Valutazione obiettiva grado di erezione

1. Assenza di tumescenza
2. Tumescenza senza rigidità, < 50%
3. Tumescenza con rigidità incompleta 50-75%
4. Rigidità completa > 75%

Grazie per l'attenzione