Unità Operativa di Neurologia
Ospedale "Madonna del Soccorso"
San Benedetto del Tronto (AP)
Direttore M.Ragno

STUDIO VENOSO CEREBRALE (Metodologia ultrasonora e vene)

Perché il TCCD è diventato un esame insostituibile nella gestione del paz con patologia cerebrale?

Dr. Sandro Sanguigni

Neurosonologia Stroke-Unit

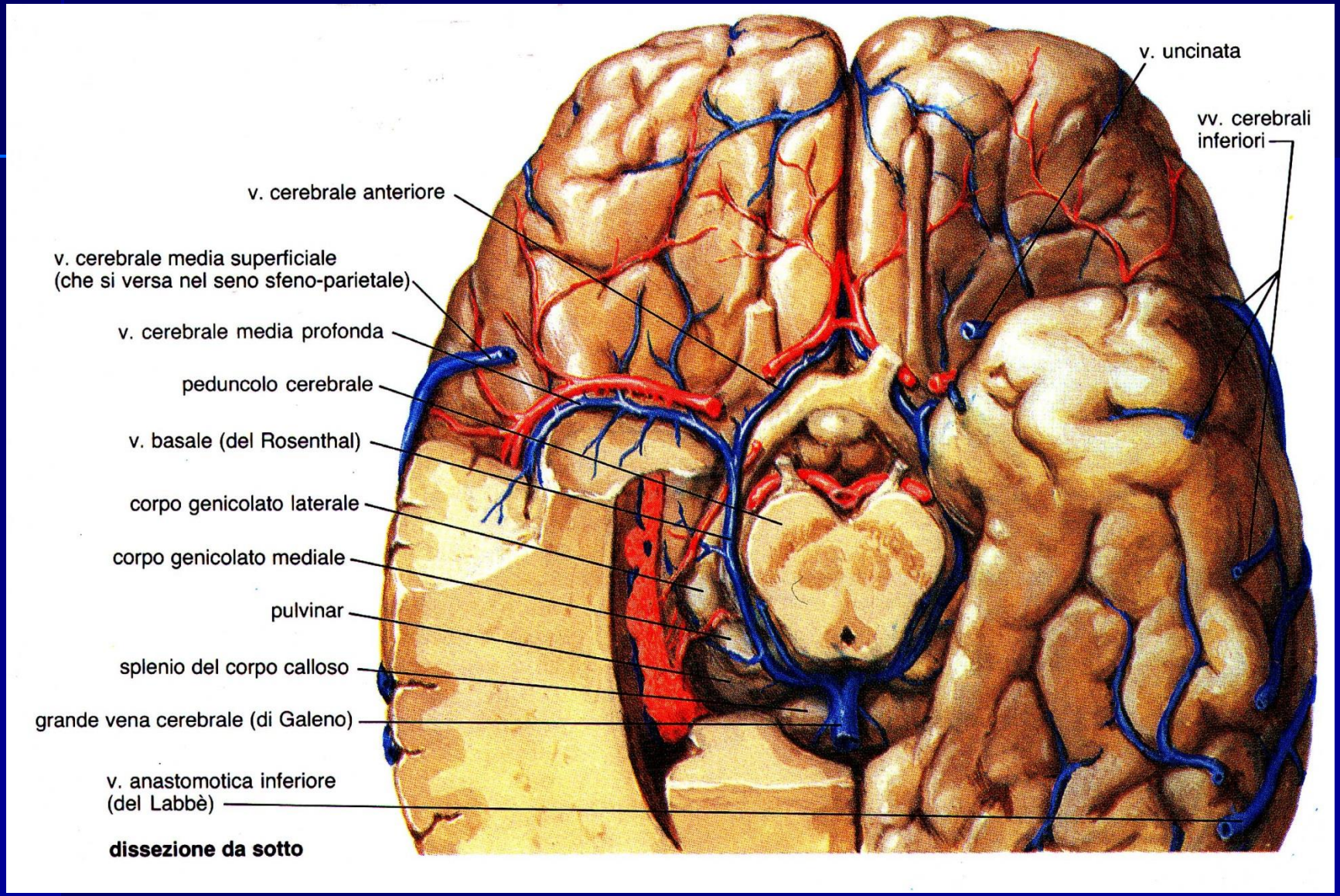
San Benedetto del Tronto

6-8 Novembre 2017

Società Italiana Interdisciplinare NeuroVascolare

Società Italiana
Interdisciplinare Neurovascolare

Vene Cerebrali

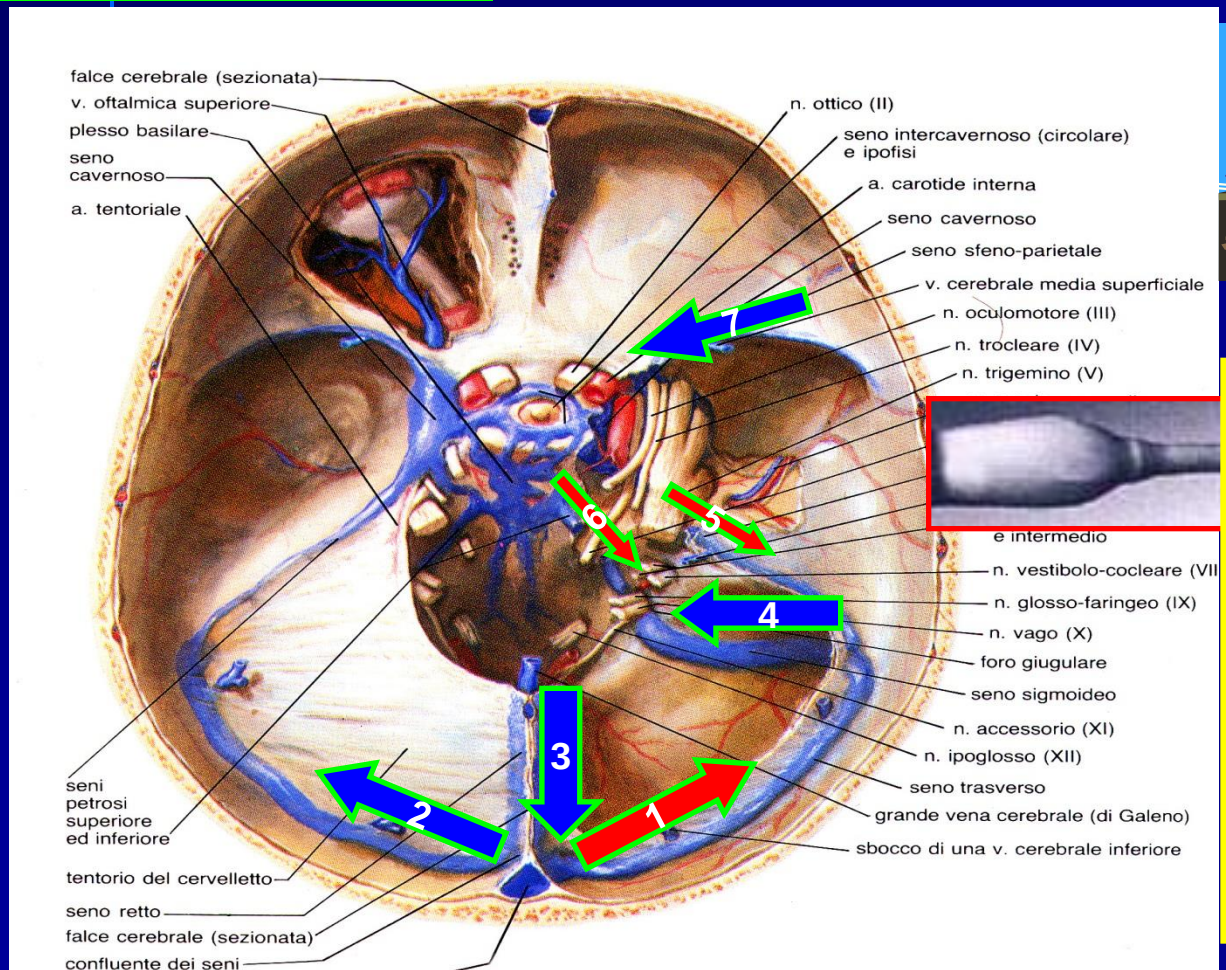


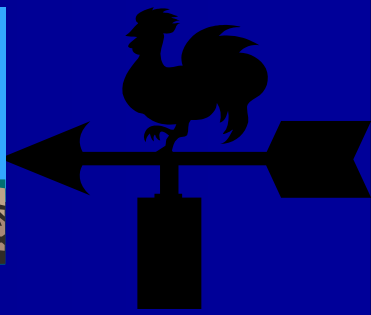
Patterns sonologici

- Criteri Indiretti -

- Alterazione della "direzione" del flusso venoso

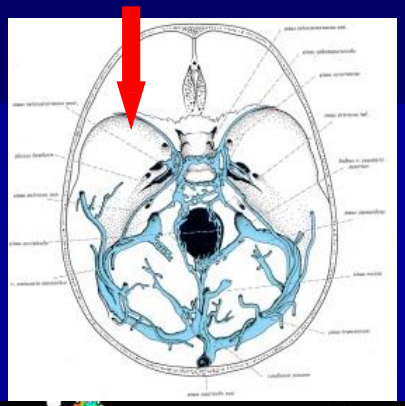
"COLOR-CODING" DEL CIRCOLO VENOSO POSTERO-BASALE

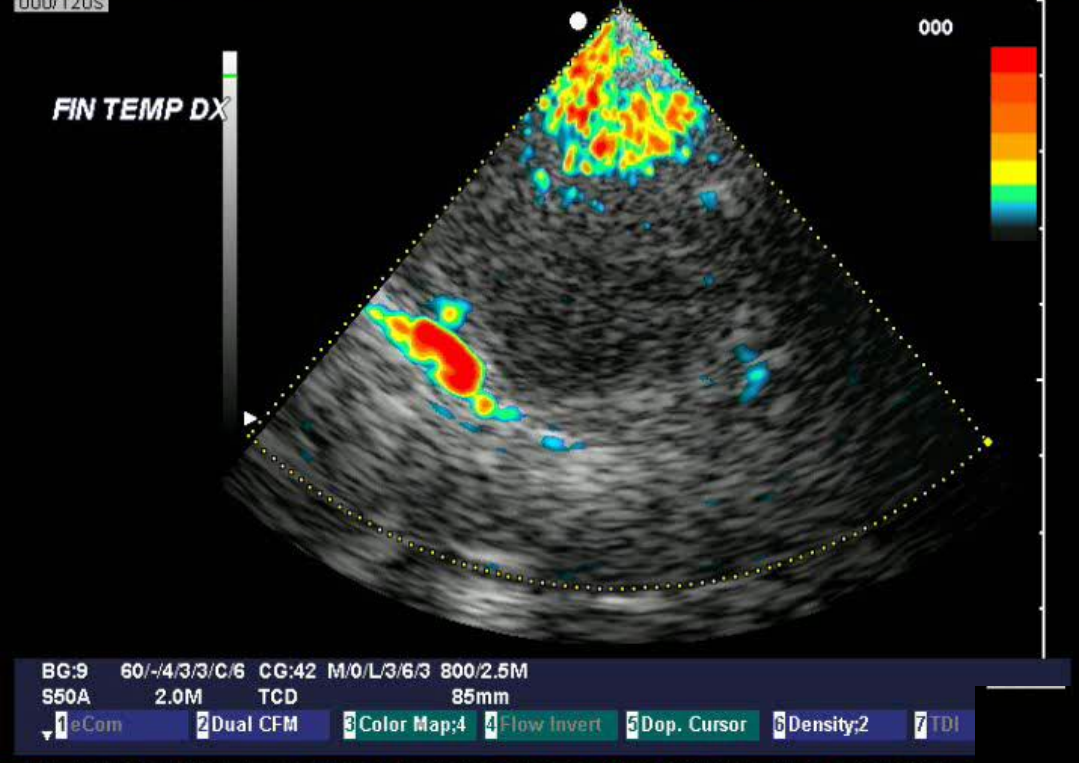


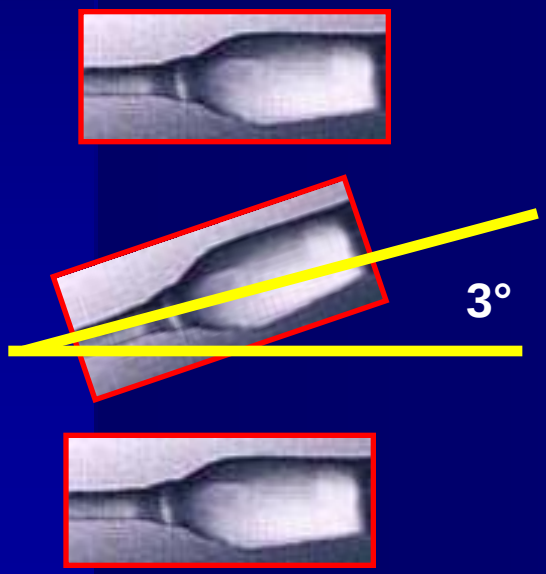


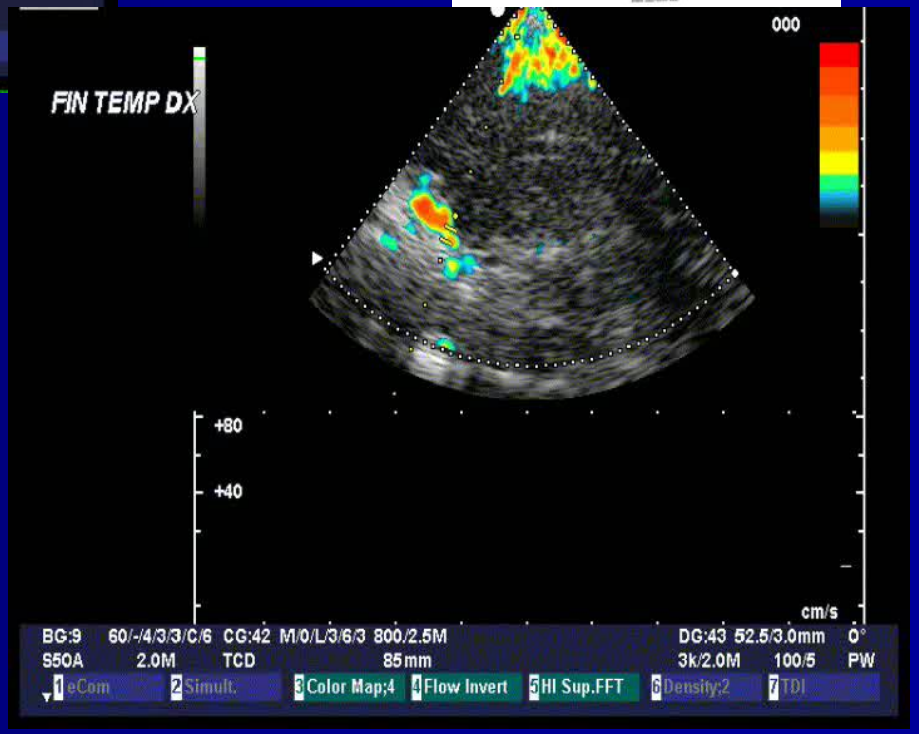
1) Seno Trasverso omol.
2) Seno Trasverso contr.
3) Seno Retto
4) Seno Sigmoideo
5) Seno Petroso sup.
6) Seno Petroso infer.
7) Seno Sfenoparietale

SENO SFENOPARIETALE

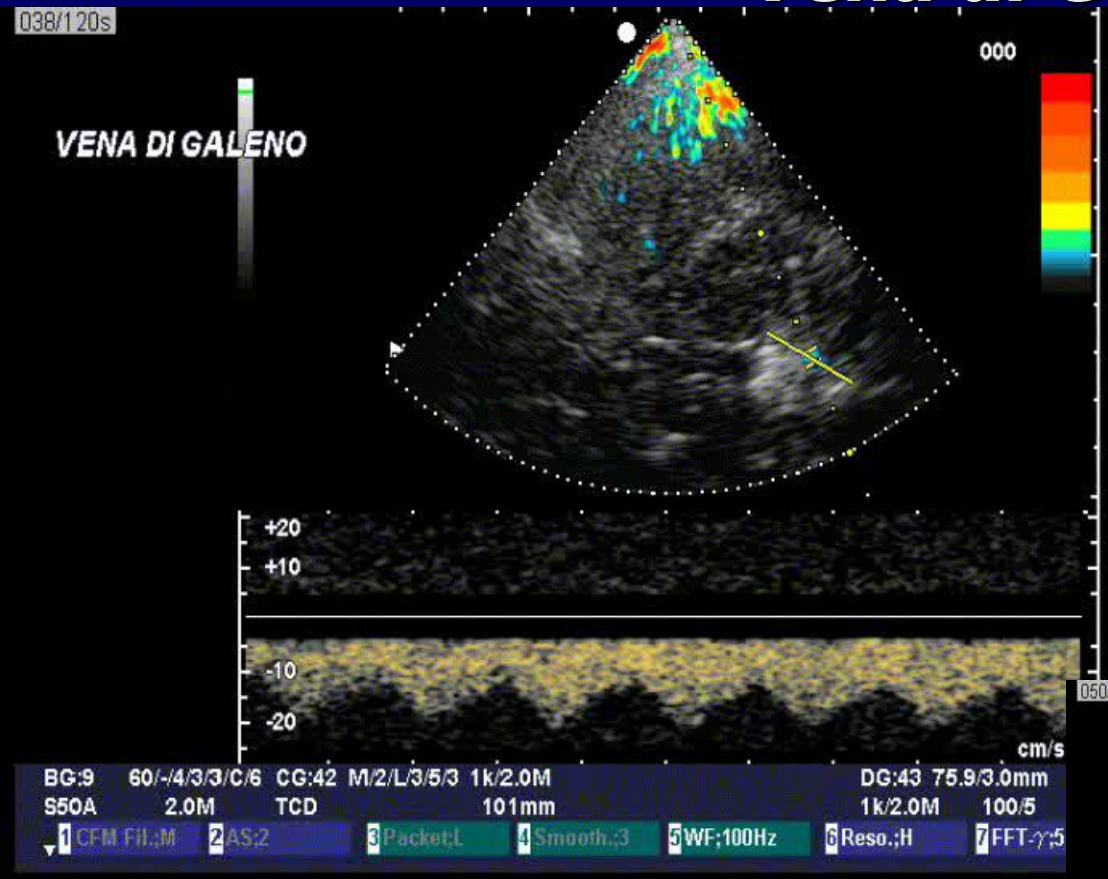


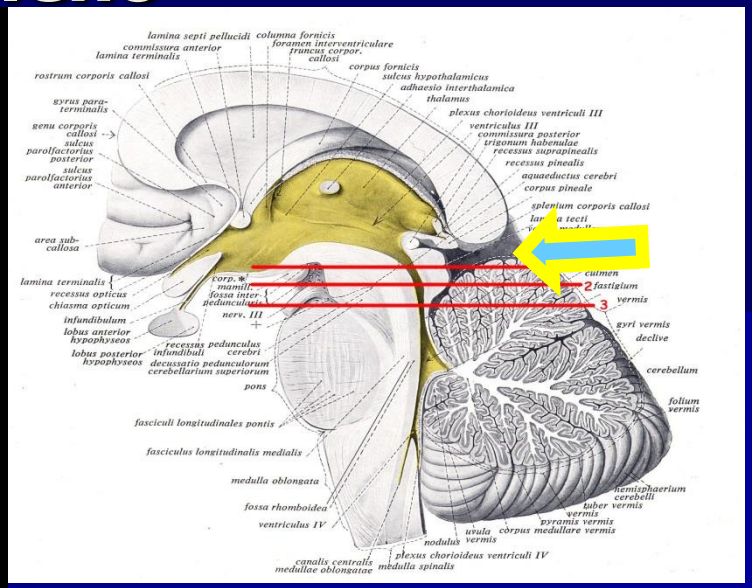




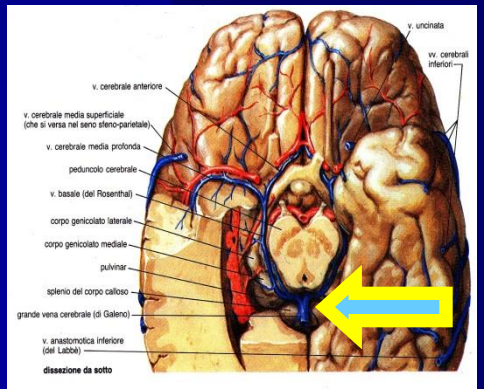


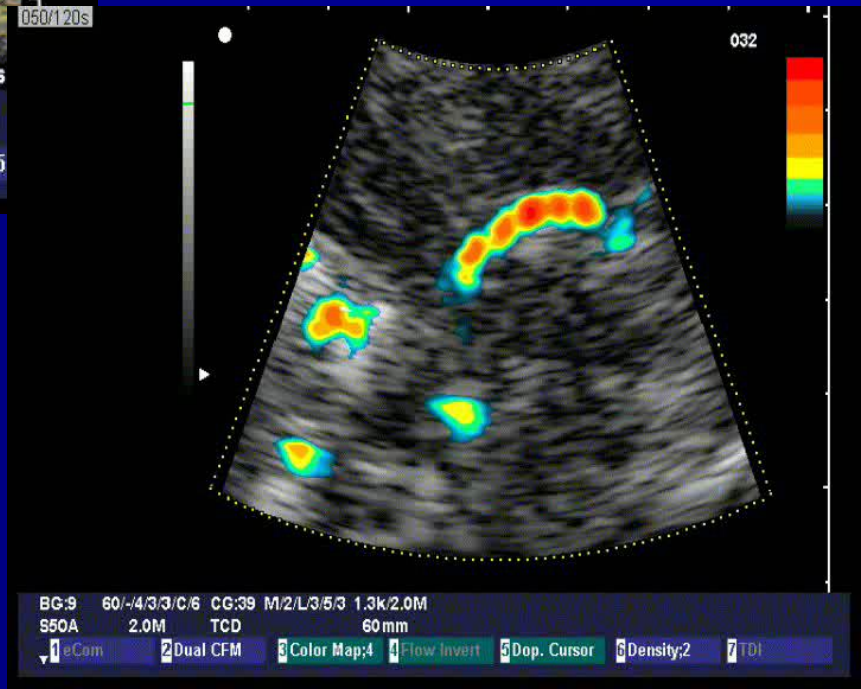
Vena di Galeno





Piano Mesencefalico Superiore



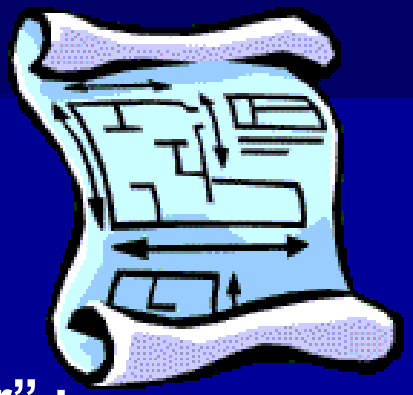


Patterns sonologici
- Criteri Indiretti -

- Alterazione della "direzione" del flusso venoso
- Alterazione della "velocità" del flusso venoso

Considerazioni emodinamiche

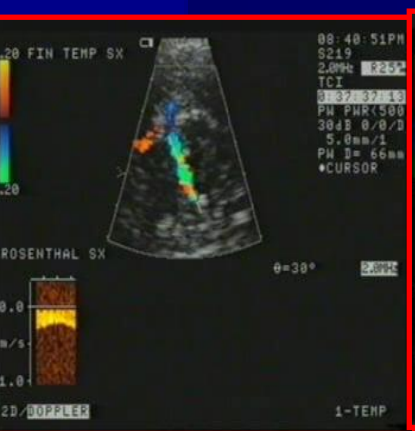
Tuttavia l'ampia variabilità anatomica e l'estesa rete anastomotica rende spesso molto più complessa la dinamica venosa.

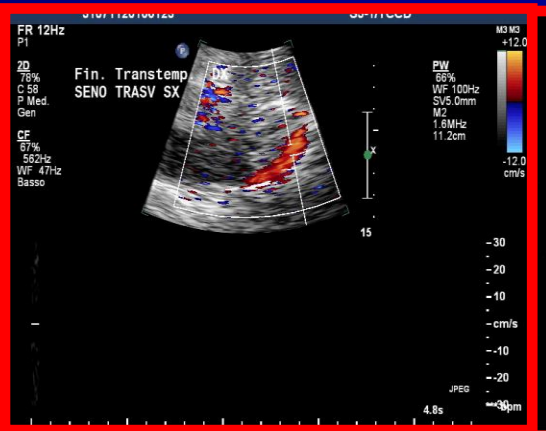


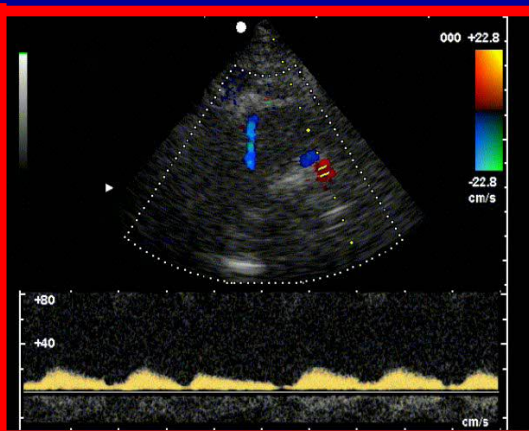
Test dinamici:

-compressione della giugulare (Franceschi)
-manovra di Valsalva
-studio a 0° e 90°
-respiro profondo

Non è sufficiente inoltre il solo pattern "color" :
Ma occorre dimostrare e studiare anche
CRITERI INDIRETTI:
-Direzione
-Velocità





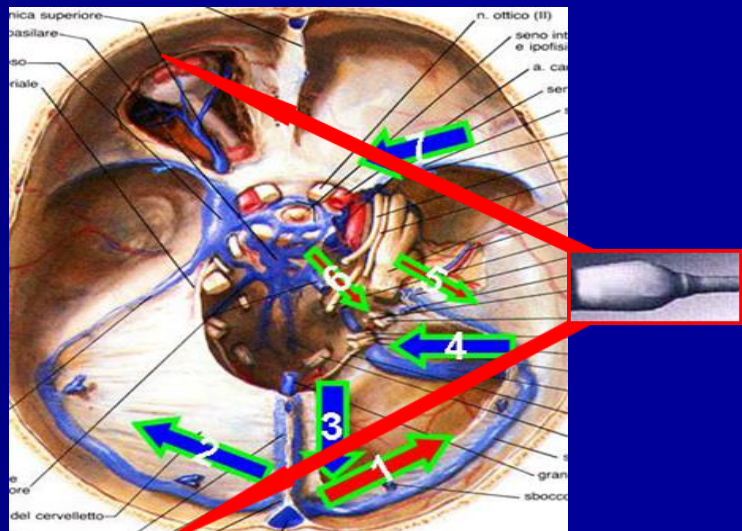


Quando i reperti venosi al TCCD/TCD diventano patologici?

A livello cerebrale sono assenti le valvole:
contano esclusivamente i gradienti pressori

Velocità venosa patologica: se > della V. media +2DS
Regola generale:
Per le vene cerebrali: FV >30-35 cm/sec
Per i seni: FV > 40-45 cm/sec

Direzione di flusso patologica:
se il flusso è invertito rispetto alla normale direzione.



Pitfall

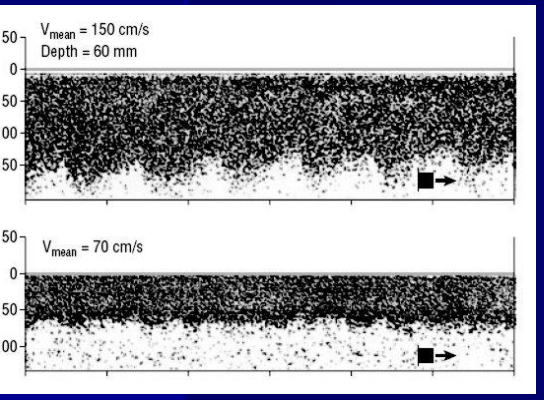
«In case of hypoplasia of the sigmoid sinuous or the proximal portion of the transvers sinous
is generally coupled with compensatory re-routing of the venous blood into prominent mastoid emissary or posterior condilar emissary veins»

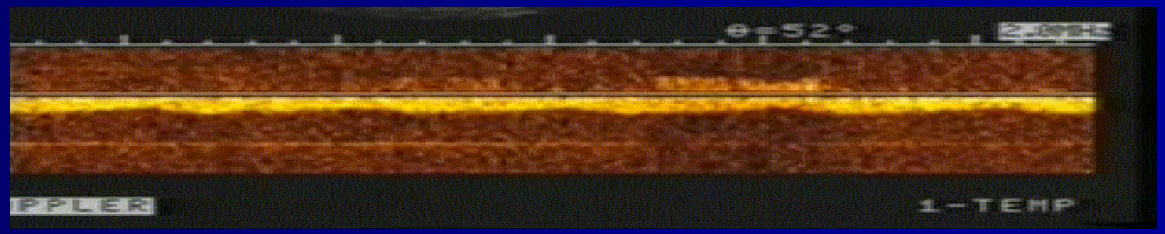
Knott 1881; Knott JF. On the cerebral sinuses and their variations J.Anatom.Physiol. 16,27-42 (1881)

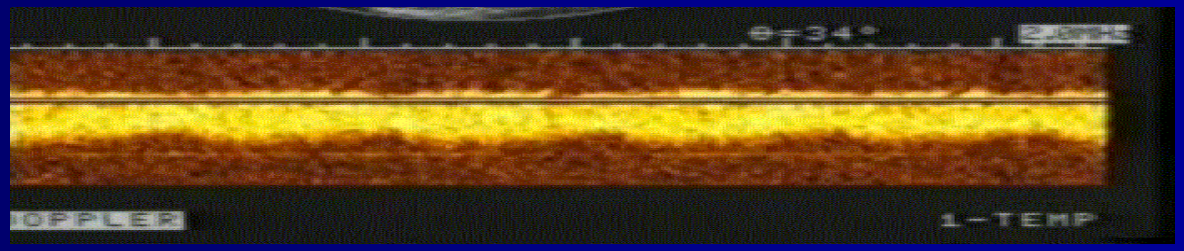
Laff 1939;

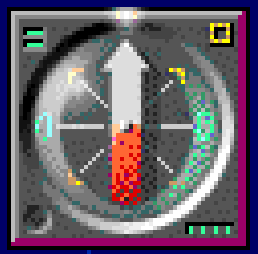
take home :Patterns sonologici

- Alterazione della "velocità" del flusso venoso









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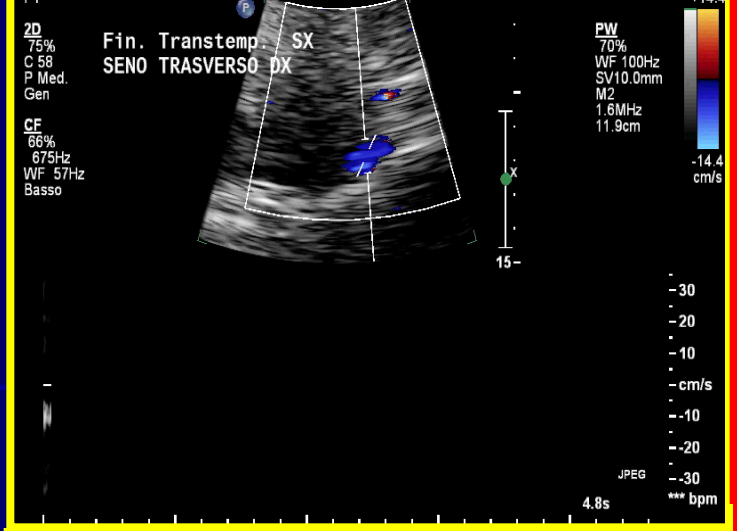
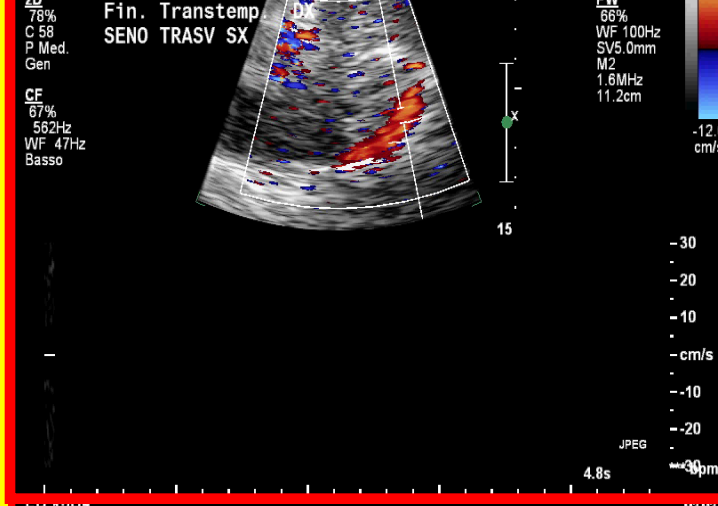
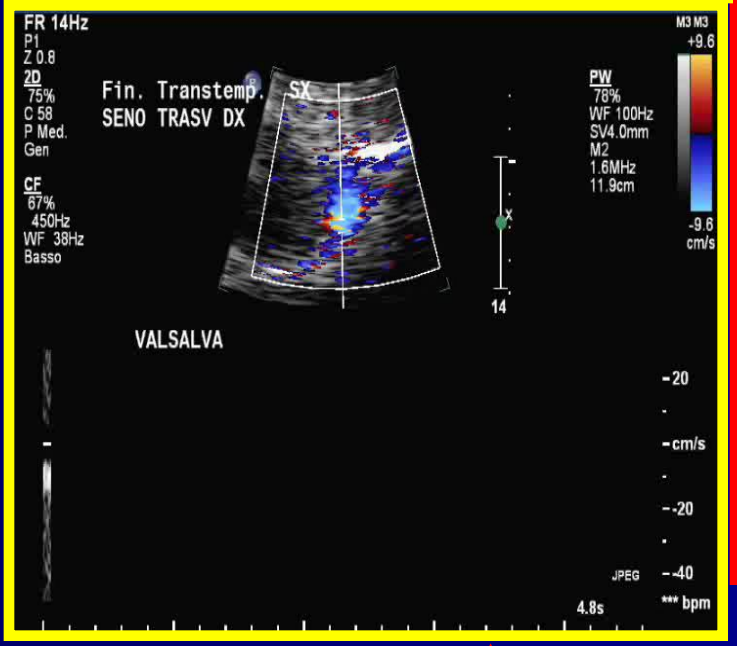
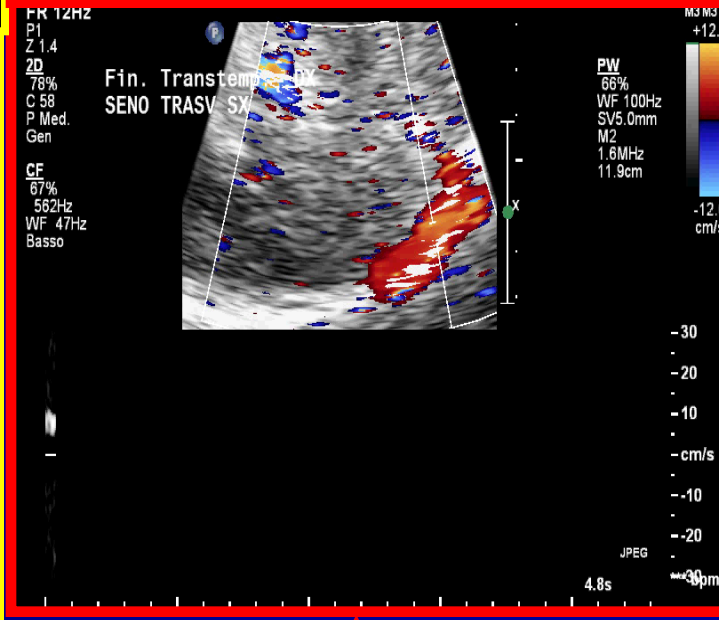
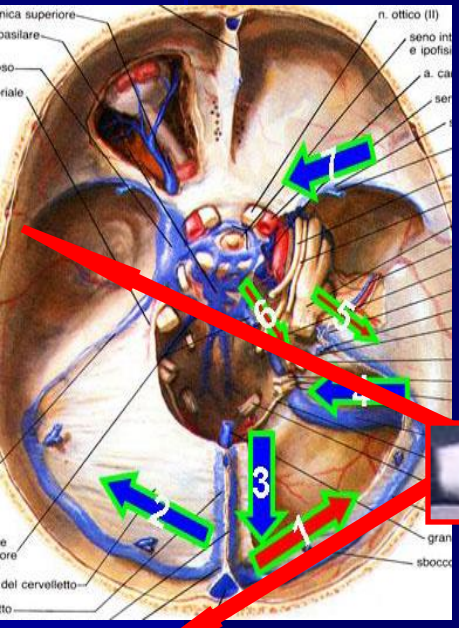








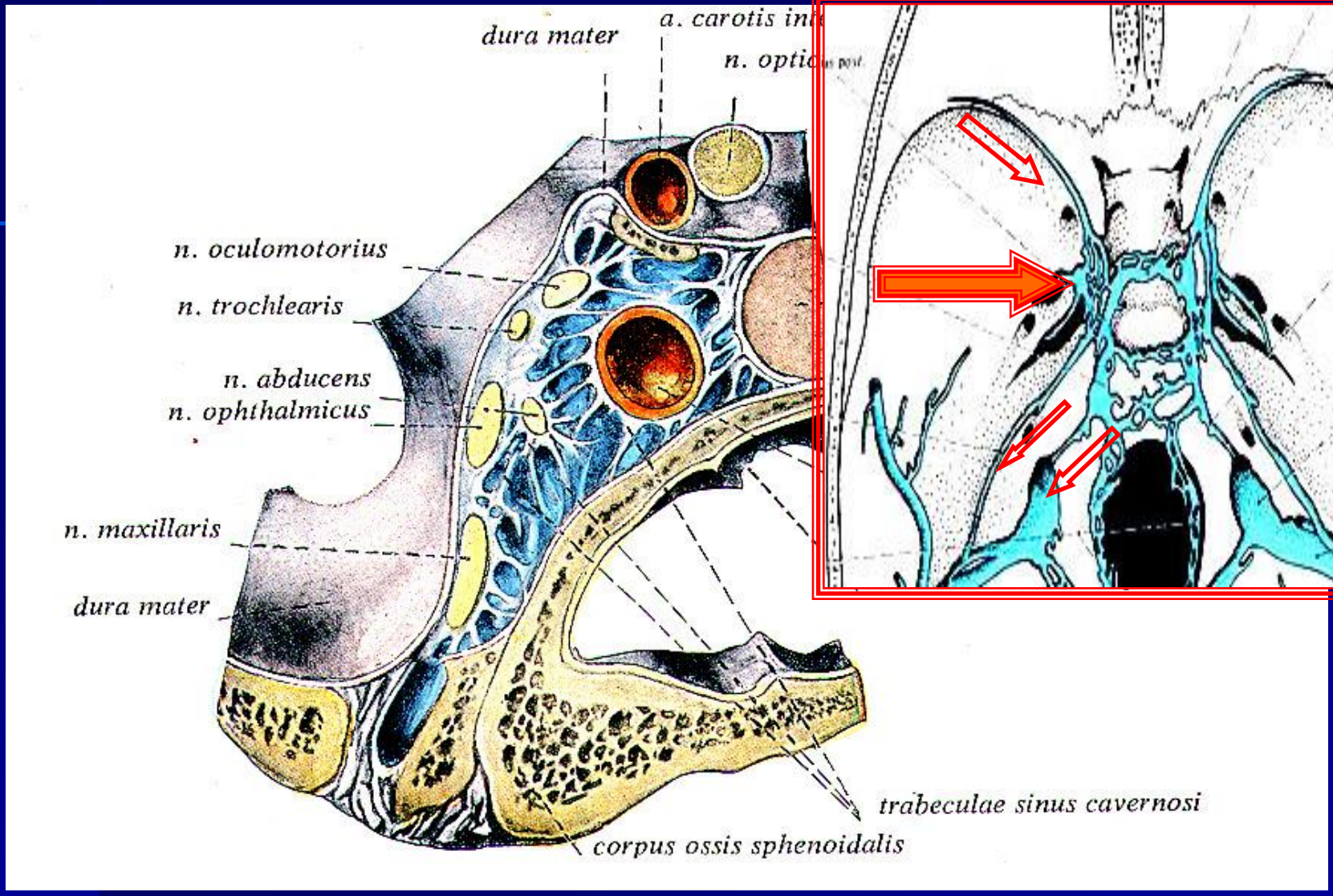


Insonazione temporale

Fisiologia
Direzione normale

Patologia?
Direzione alterata

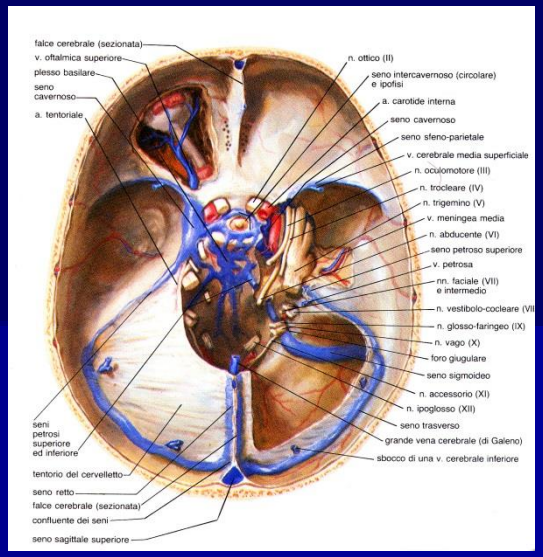
Seno Cavernoso



- Difficile insonazione(sfenoide)
- Area compartimentata a bassissime velocità (doppler shift troppo basso)

Take home per Neurosonologo:

OGNI MODIFICAZIONE ACUTA E/O PROGRESSIVA DEL PATTERN FLUSSIMETRICO VENOSO DEL SENO SFENOPARIETALE DEVE ESSERE ATTENTAMENTE VALUTATA E STUDIATA



POICHE’ ESSA CI PUO’ FORNIRE IMPORTANTI INFORMAZIONI INDIRETTE RIGUARDANTI LO STATO CIRCOLATORIO A LIVELLO DEL SENO CAVERNOSO.

MODIFICAZIONI DEL PATTERN FLUSSIMETRICO AL SENO SFENOPARIETALE SX EVIDENZIATE CON TCCD :

A

θ=52

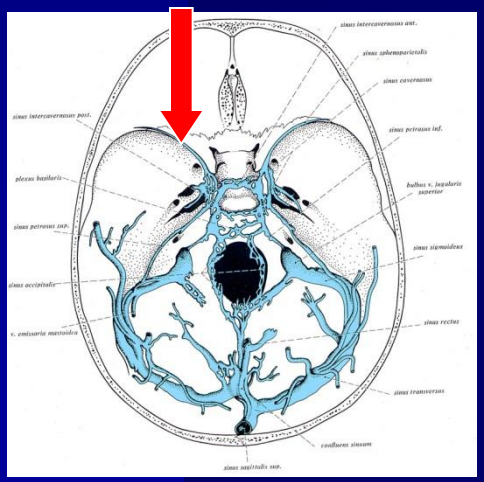
B

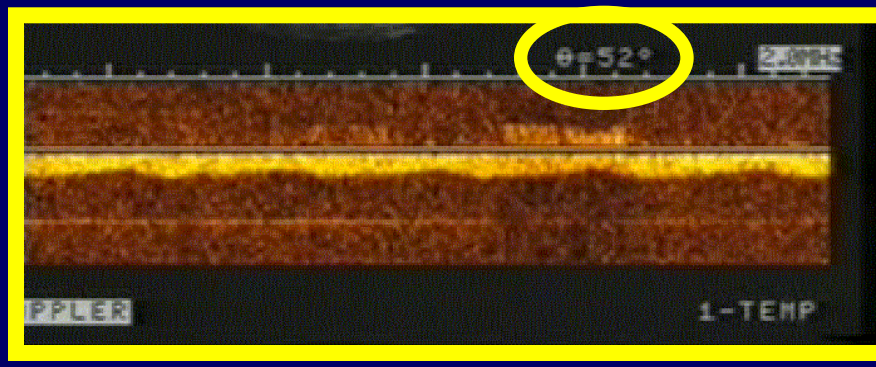
θ=34

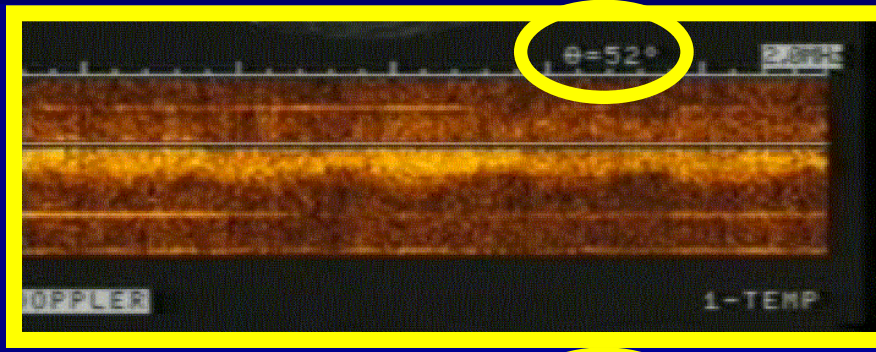
C

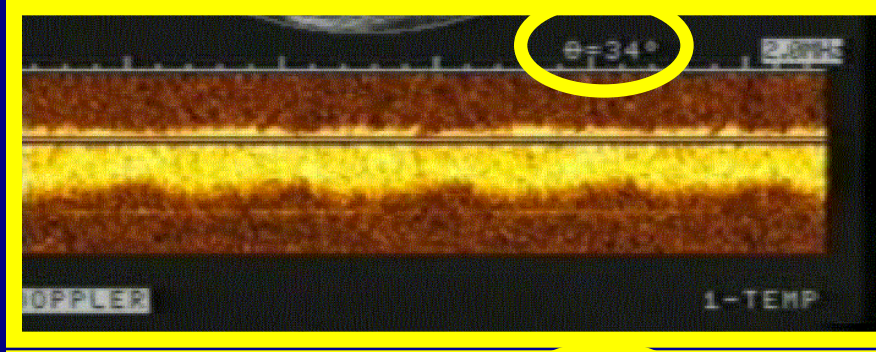
θ=52

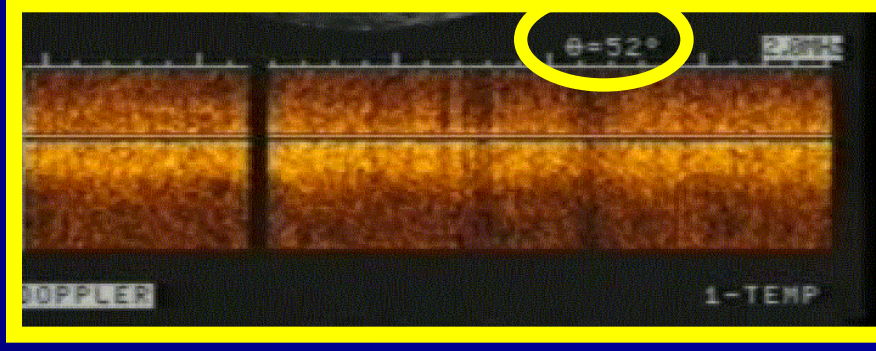
D ??











In order to identify the zones of convergence of the medullary veins of the cerebral white matter, gelatin-mixed barium sulfate was injected into normal brains at autopsy. A catheter was inserted into the internal jugular veins or the carotid and vertebral arteries. Serial soft tissue roentgenograms of whole brains and brain slices were used to determine the zones of convergence. The deep medullary veins had four zones of covergence before draining into the subependymal veins:

-the first **(superficial),**

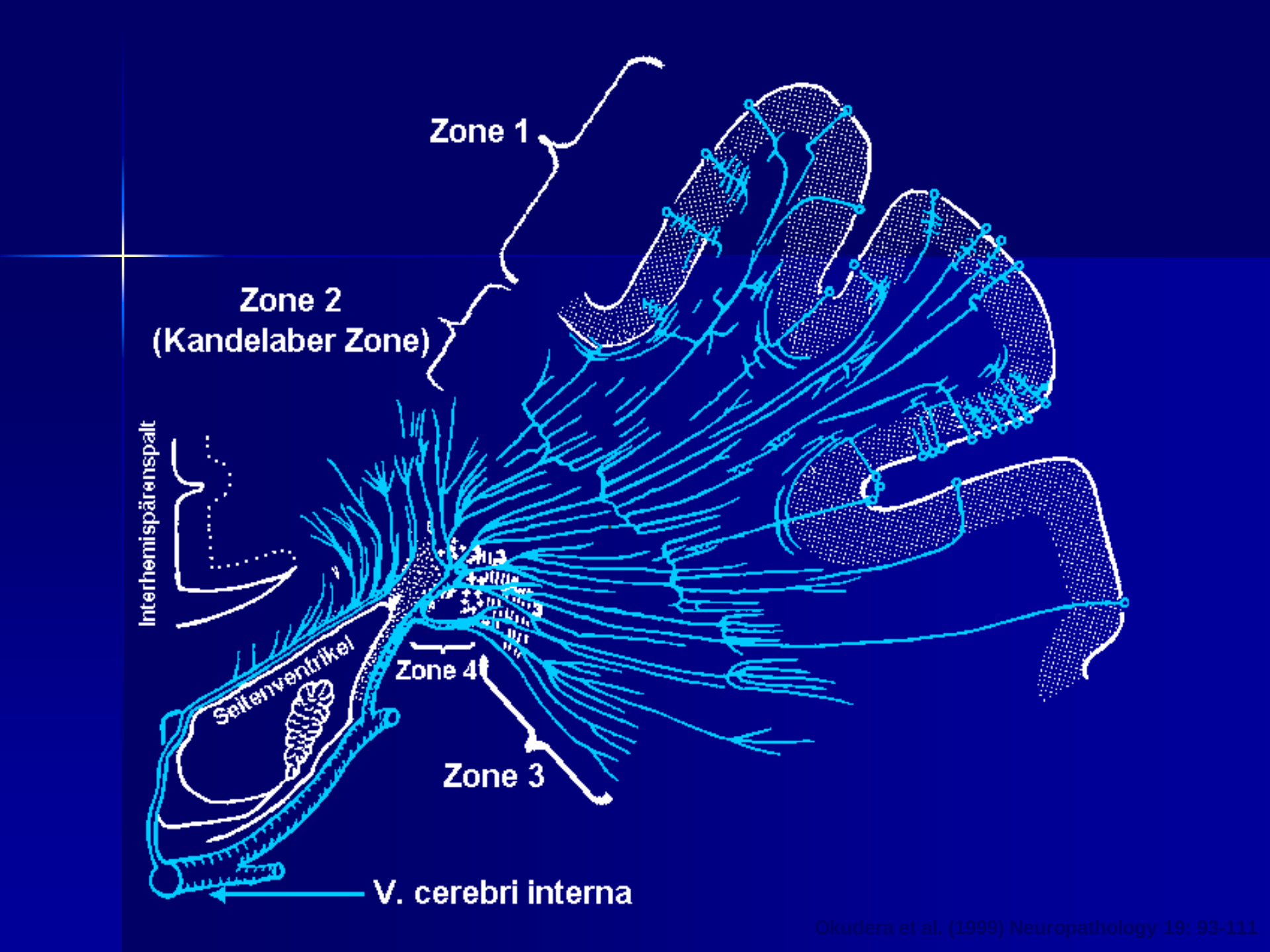
-second **(candelabra),**

-third **(palmate),**

fourth **(subependymal).**

Okudera T. et al

Neuropathology



Okudera et al. (1999) Neuropathology 19: 93-111

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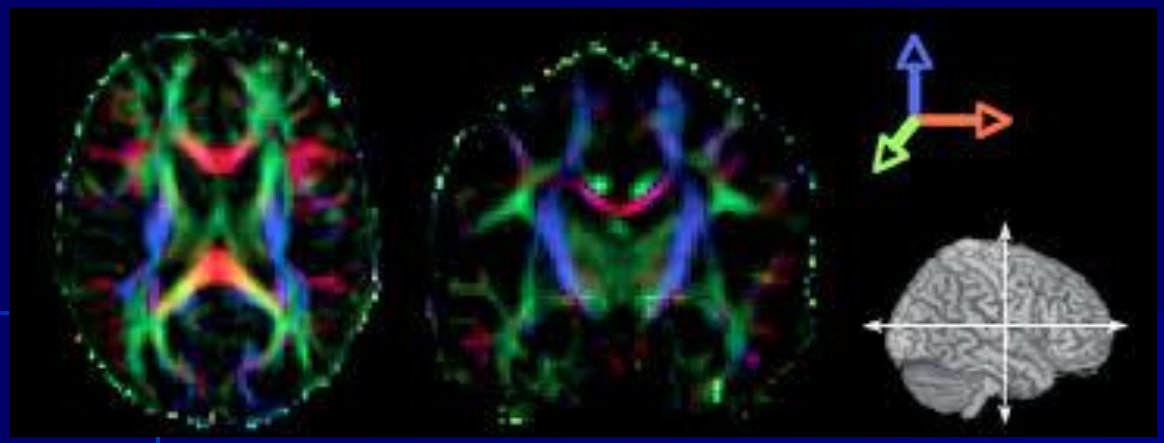
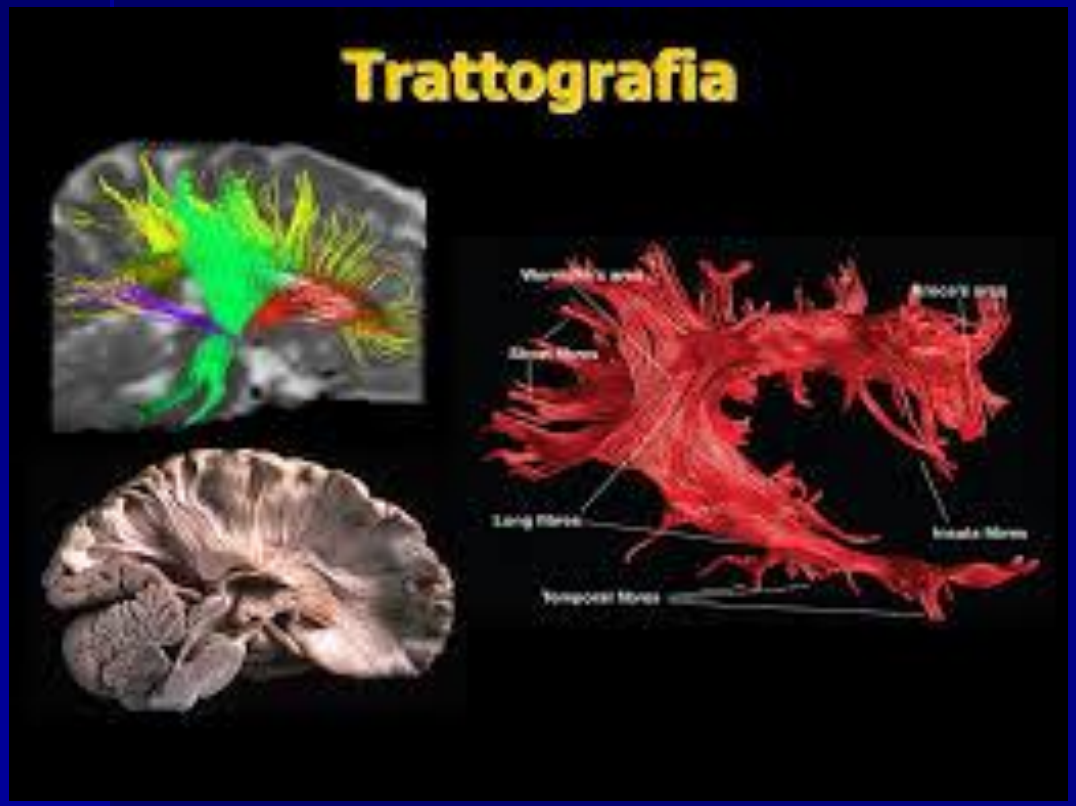
The zones of various venous convergence within the white matter were due to the crossing of **nerve** fiber tracts (e.g. the pes of the corona radiata, the radiation of the corpus callosum, the superior occipitofrontal fasciculus, the tapetum and the sagittal strata).

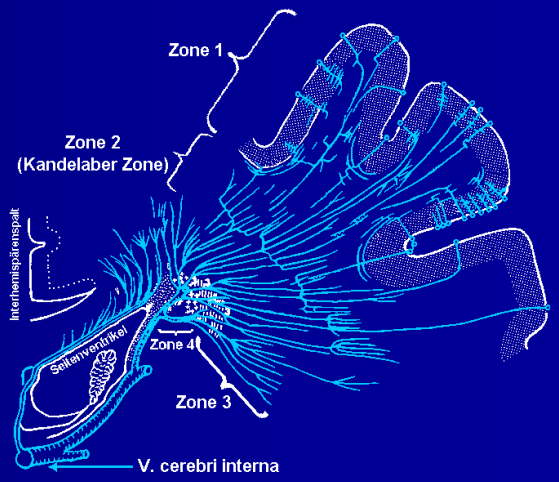
Okudera T. et al

Neuropathology

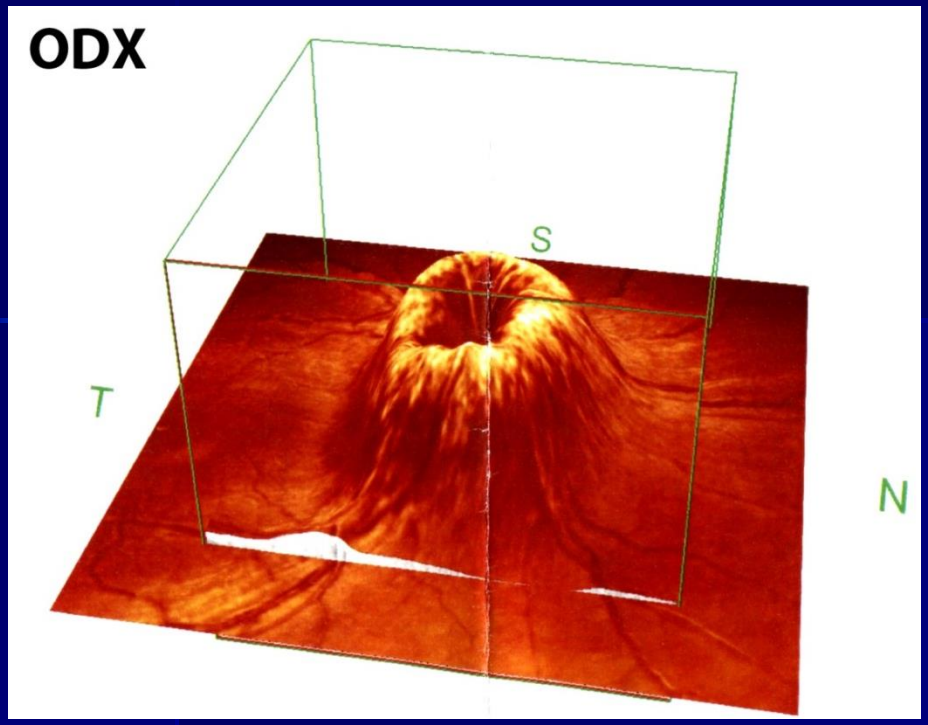
Our ongoing experiences







Donna di 25 anni
Non obesa
Anamnesi negativa (pillola, farmaci ecc)
Cefalea da alcuni mesi


ODX
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T
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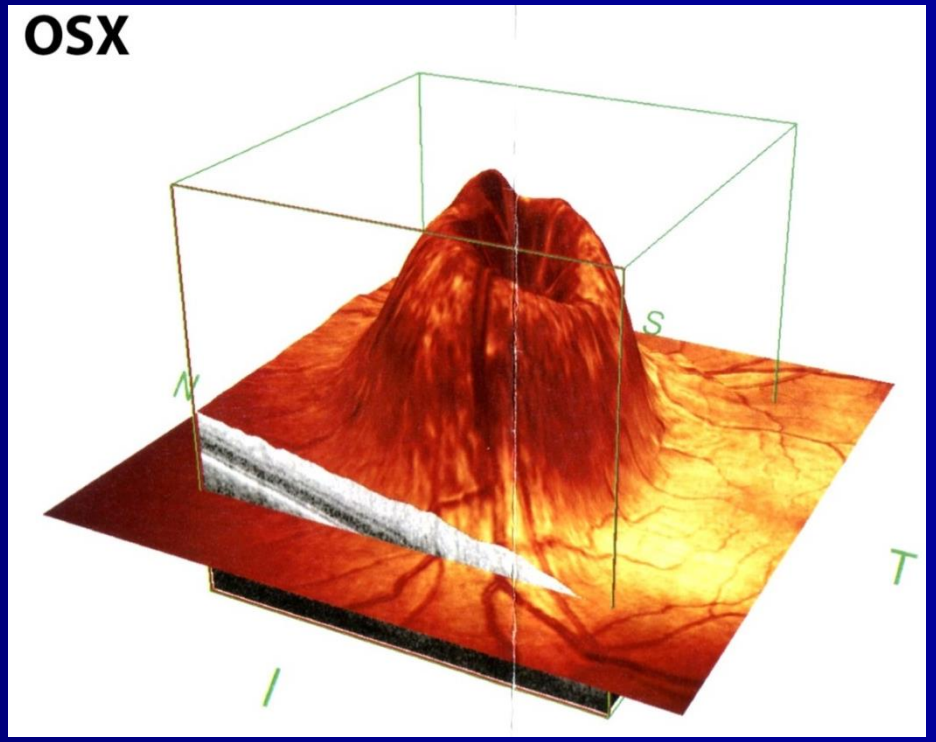
OSX
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N
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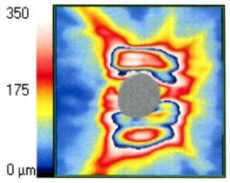
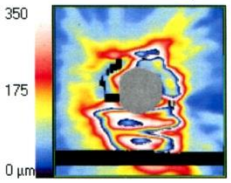
RNFL and ONH:Optic Disc Cube 200x200 — OD | OS

RNFL Thickness Map (OD)

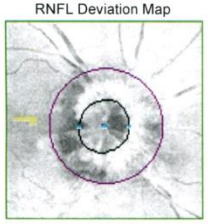


	OD	OS
Average RNFL Thickness	268 µm	258 µm
RNFL Symmetry	55%	
Rim Area	1.99 mm²	2.11 mm²
Disc Area	1.93 mm²	2.10 mm²
Average C/D Ratio	0.06	0.06
Vertical C/D Ratio	0.05	0.05
Cup Volume	0.000 mm³	0.000 mm³

RNFL Thickness Map (OS)

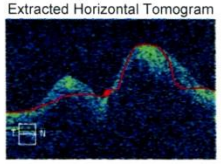


RNFL Deviation Map (OD)

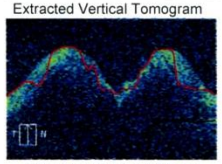


Disc Center (0.04,-0.16) mm

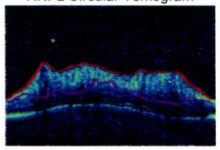
Extracted Horizontal Tomogram



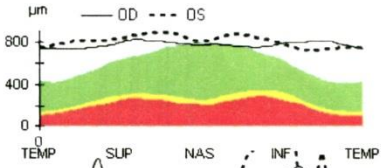
Extracted Vertical Tomogram



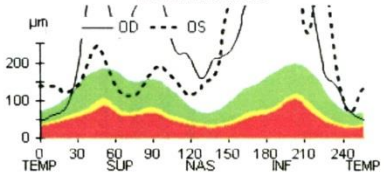
RNFL Circular Tomogram



Neuro-retinal Rim Thickness

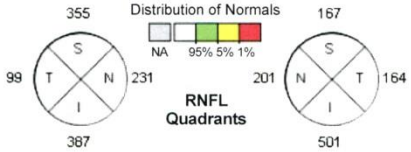


RNFL Thickness

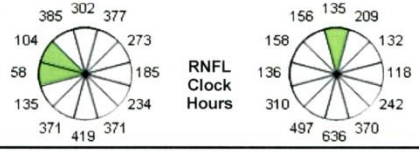


Distribution of Normals

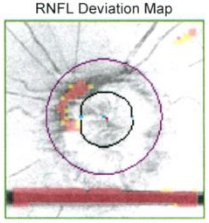
RNFL Quadrants



RNFL Clock Hours

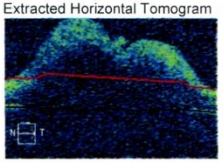


RNFL Deviation Map (OS)

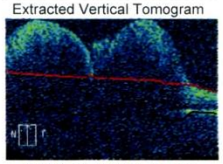


Disc Center (-0.04,0.10) mm

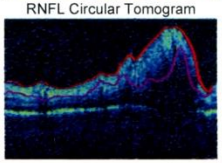
Extracted Horizontal Tomogram



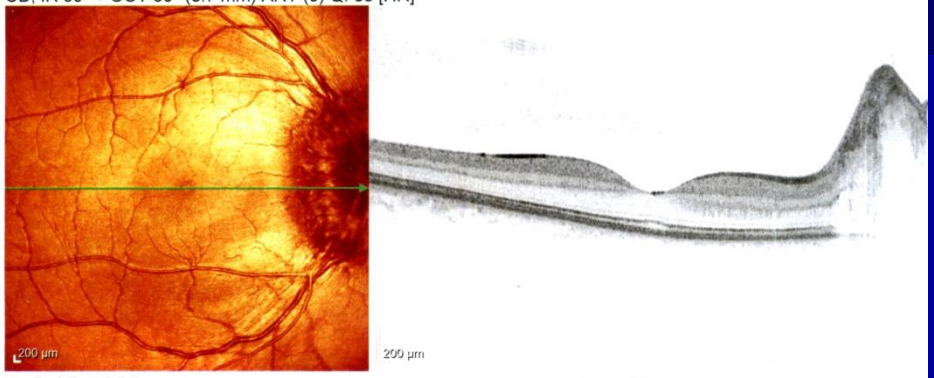
Extracted Vertical Tomogram



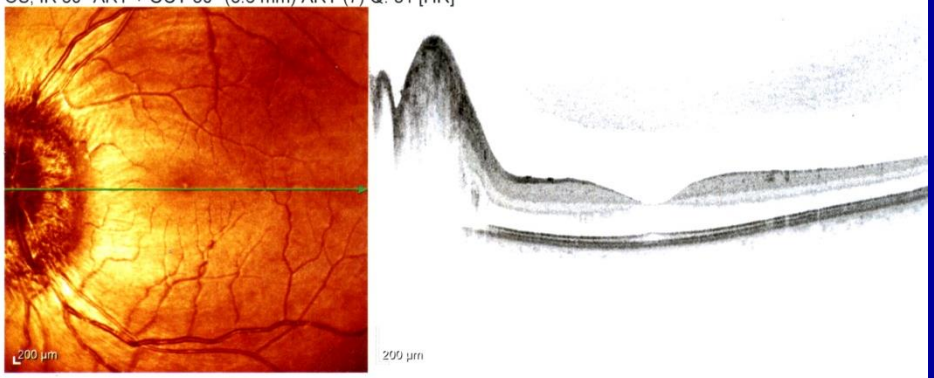
RNFL Circular Tomogram

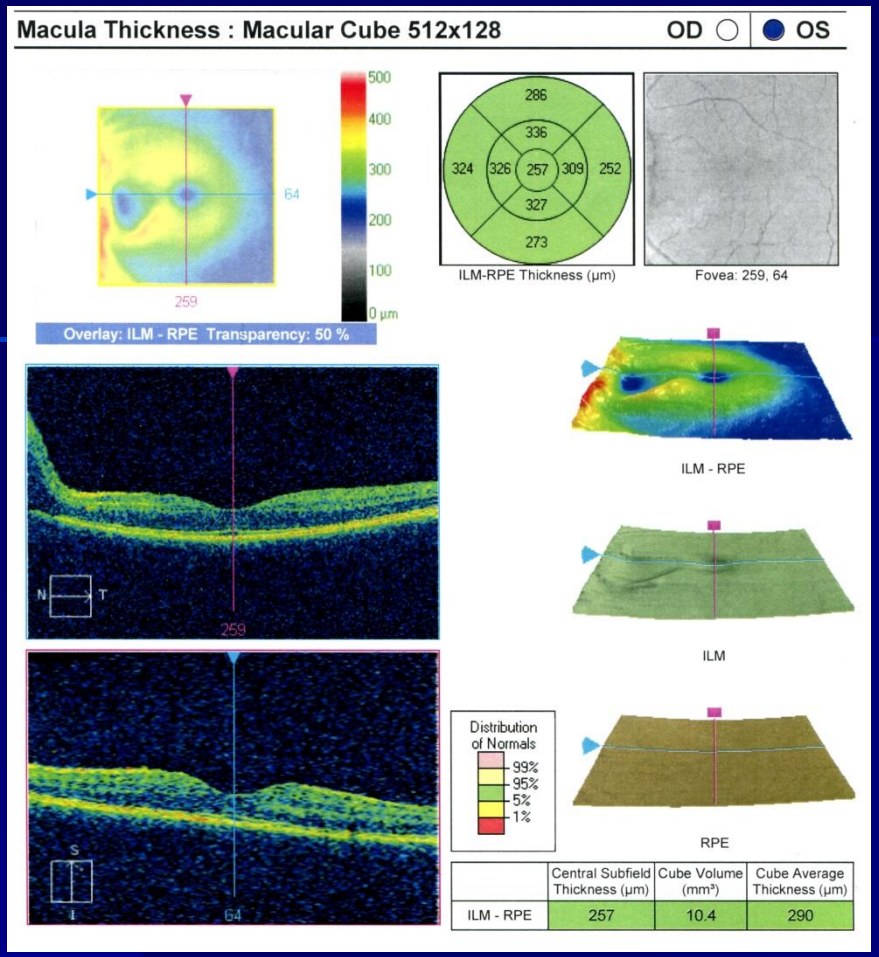


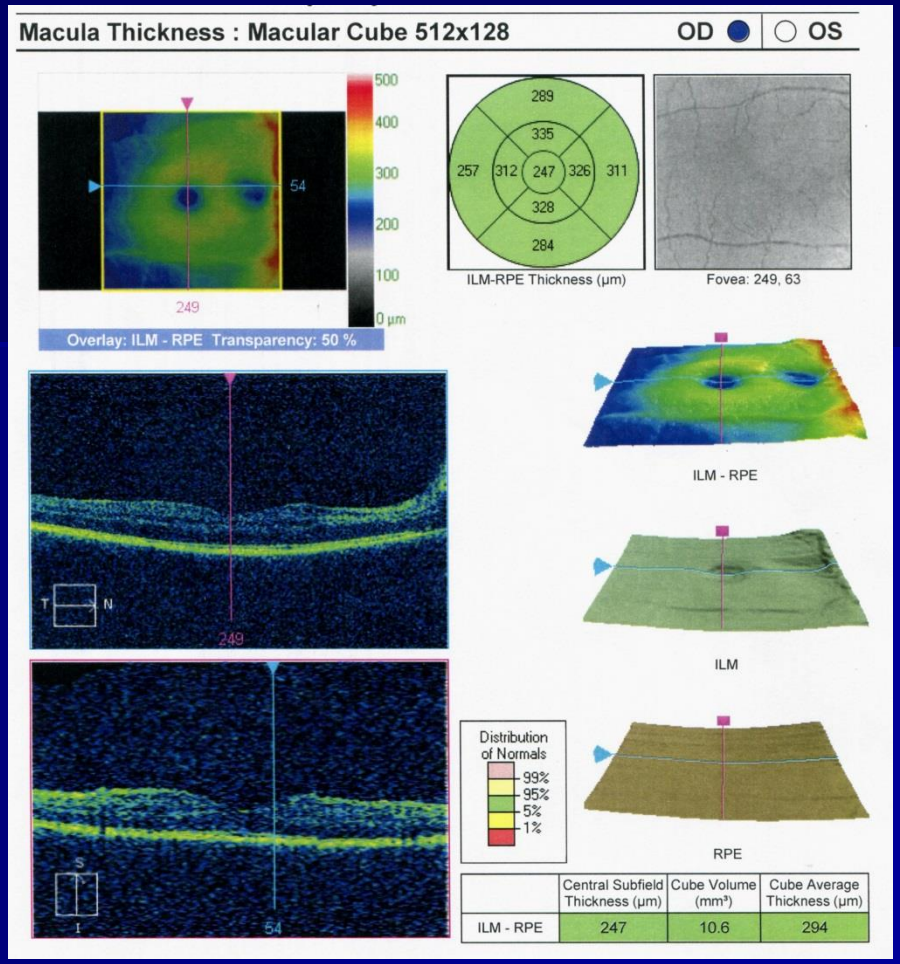
OD, IR 30° + OCT 30° (8.7 mm) ART (9) Q: 35 [HR]



OS, IR 30° ART + OCT 30° (8.6 mm) ART (7) Q: 31 [HR]

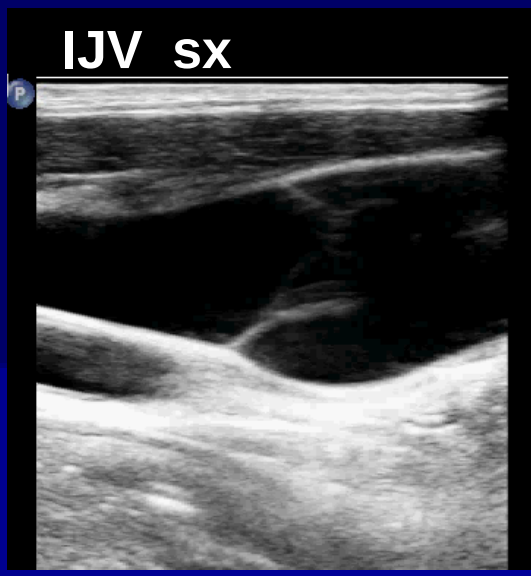




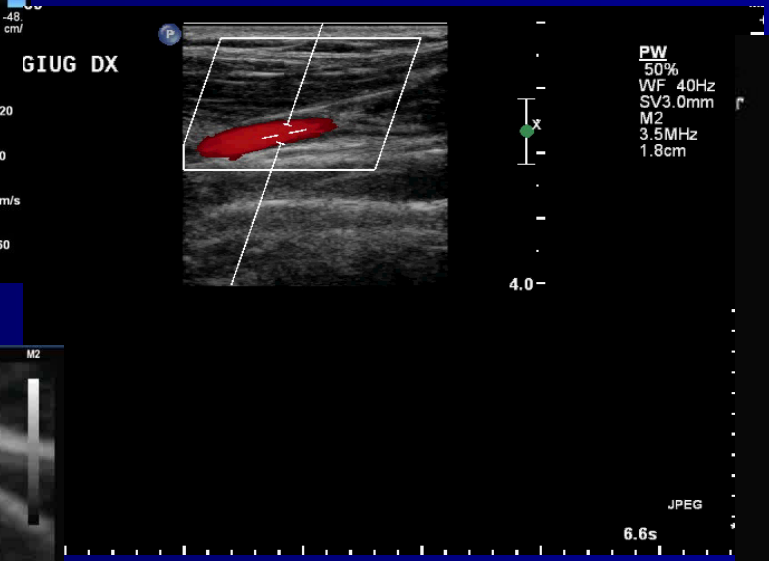


Giunge al PS: TAC negativa !

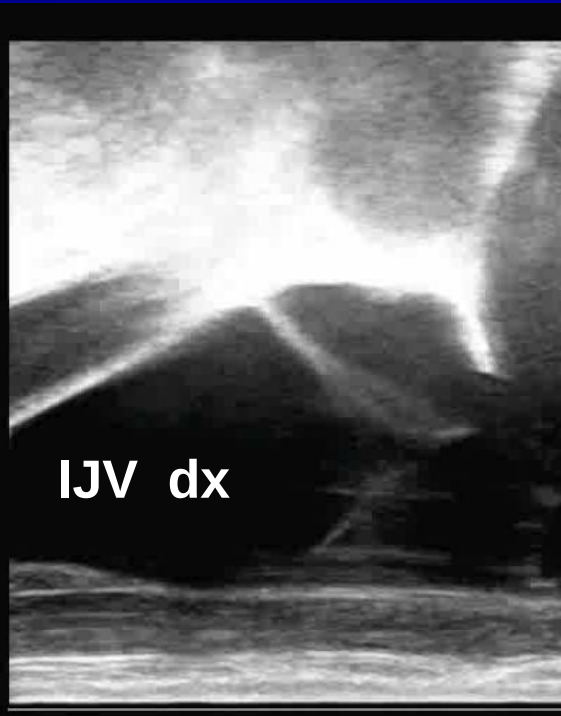

06391720141110 NEUROLOGIA - S.B.T. L9-3/TSA
FR 12Hz 60°
R1
2D
77%
C 50
P Bassa
Gen
IJV SX
CF
77%
5000Hz
WF 250Hz
Med.
PW
58%
WF 60Hz
SV4.0mm
M2
3.5MHz
2.2cm
M2 M3
+48.1
-48.1
cm/s
4.0
60
cm/s
-60
-120
VALSALVA
6.6s


IJV sx

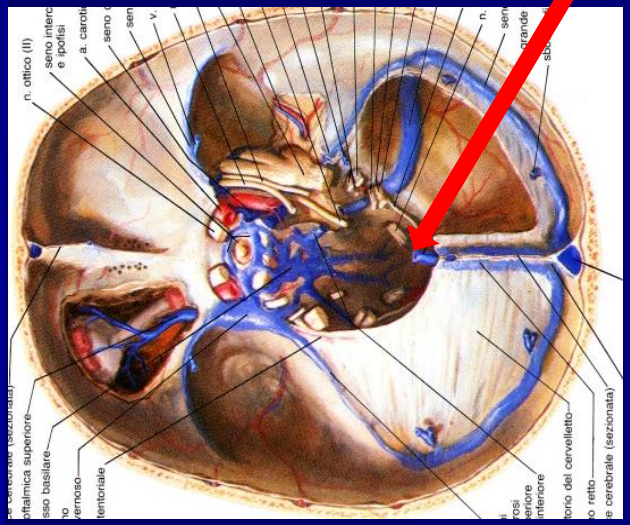

FR 11Hz 60°
R1
2D
68%
C 50
P Bassa
Gen
IJV DX
CF
75%
5000Hz
WF 250Hz
Med.
PW
50%
WF 60Hz
SV1.5mm
M2
3.5MHz
1.7cm
M2 M3
+48.1
4.0
120
60
cm/s
-60
VALSALVA
6.6s


GIUG DX
PW
50%
WF 40Hz
SV3.0mm
M2
3.5MHz
1.8cm
4.0
JPEG
6.6s


FR 43Hz
Ris./Vel.
Z 3.4
2D
55%
C 50
P Bassa
Ris
M2
JPEG

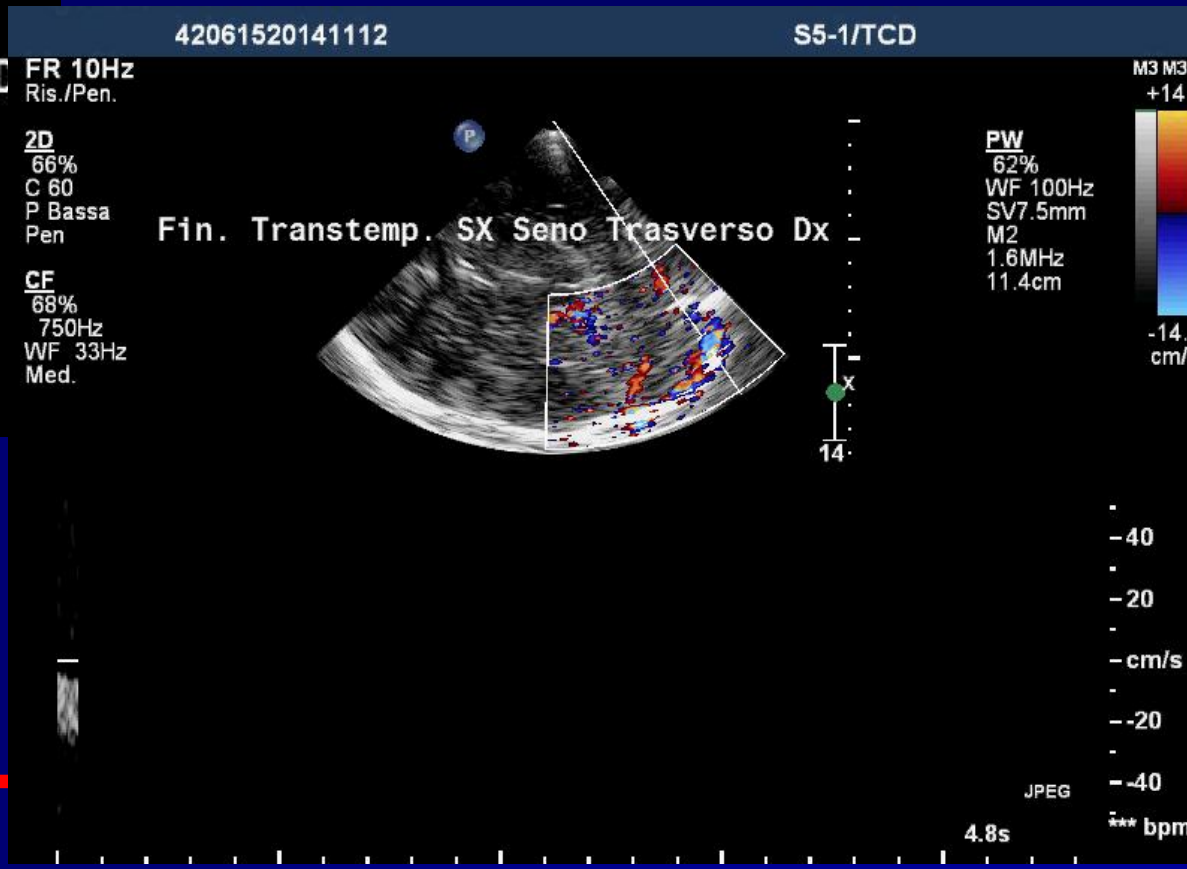

IJV dx

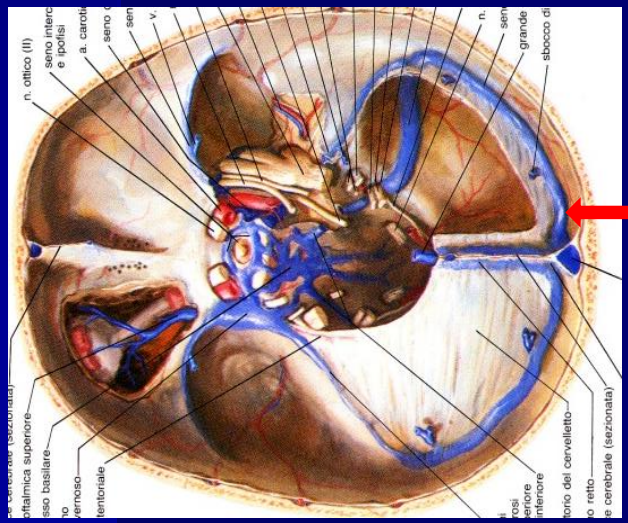

06391720141110 NEUROLOGIA - S.B.T. S5-1/TCCD
FR 7Hz
P1
Z 3.4
2D
80%
C 58
P Med.
Gen
CF
65%
562Hz
WF 47Hz
Basso
Fin. Transtemp. DX
CONFLUENZA GALENO RETTO
PW
66%
WF 100Hz
SV3.0mm
M2
1.6MHz
7.5cm
M3 M3
+9.0
-15.0
cm/s
40
20
cm/s
-20
-40
-60
4.8s



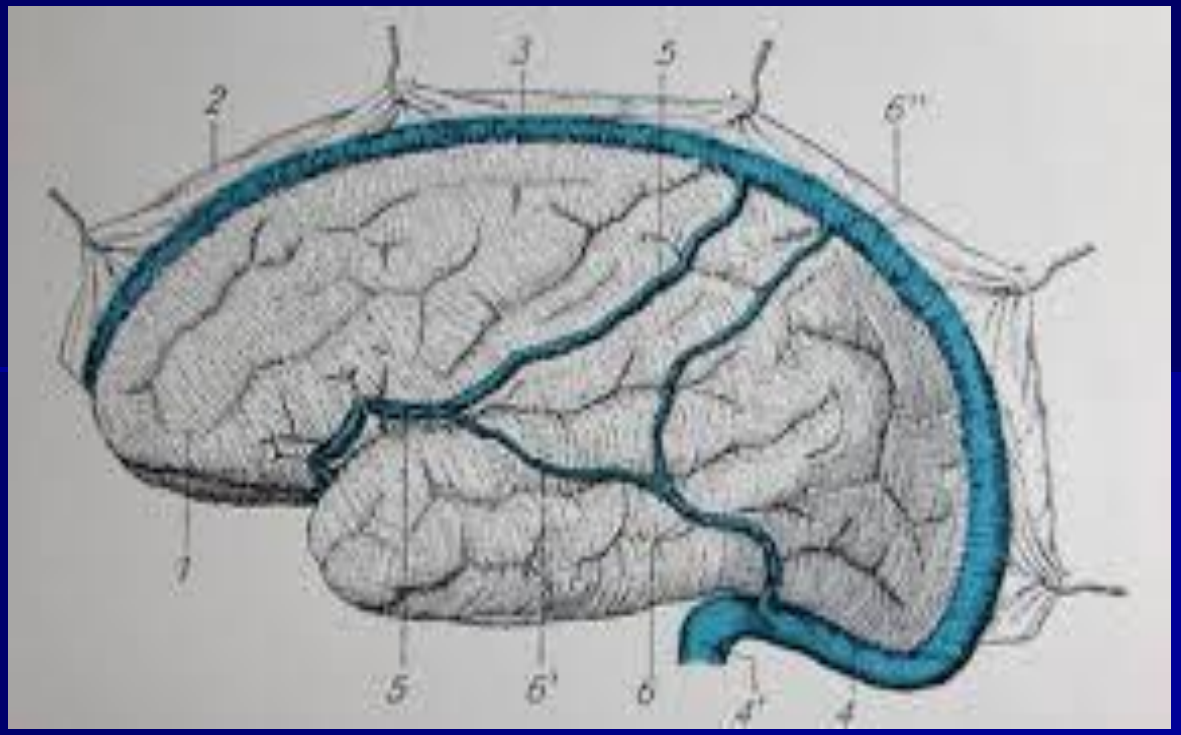

06391720141110 S5-1/TCCD
FR 7Hz
P1
Z 3.4
2D
80%
C 58
P Med.
Gen
CF
65%
562Hz
WF 47Hz
Basso
Fin. Transtemp. DX
CONFLUENZA GALENO RETTO
PW
66%
WF 100Hz
SV3.0mm
M2
1.6MHz
7.5cm
M3 M3
+9.0
-15.0
cm/s
40
20
cm/s
-20
-40
-60
JPEG
*** bpm
4.8s

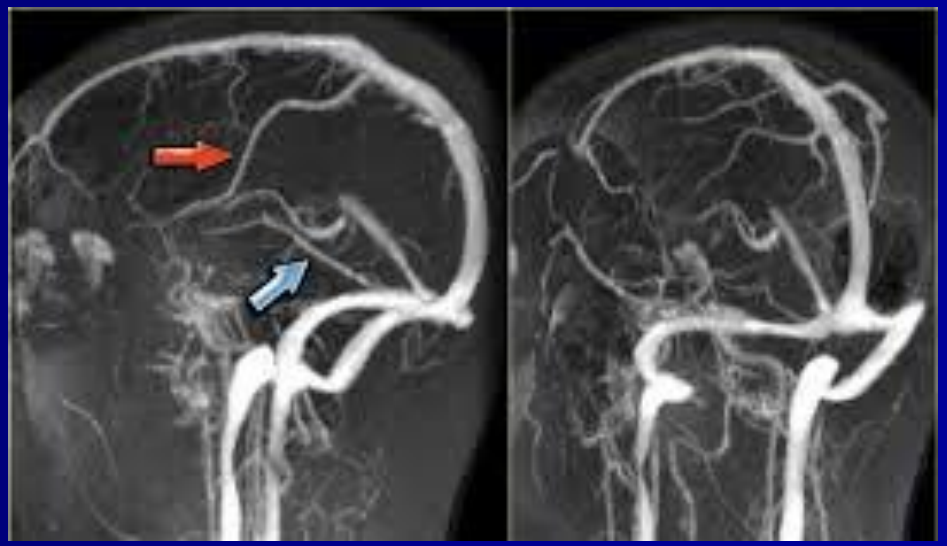

141112
S5-
anstemp. SX Seno Trasverso D


42061520141112
S5-1/TCD
FR 10Hz
Ris./Pen.
2D
66%
C 60
P Bassa
Pen
CF
68%
750Hz
WF 33Hz
Med.
Fin. Transtemp. SX Seno Trasverso Dx
PW
62%
WF 100Hz
SV7.5mm
M2
1.6MHz
11.4cm
M3 M3
+14
-14
cm/
14
40
20
cm/s
-20
-40
JPEG
4.8s
*** bpm

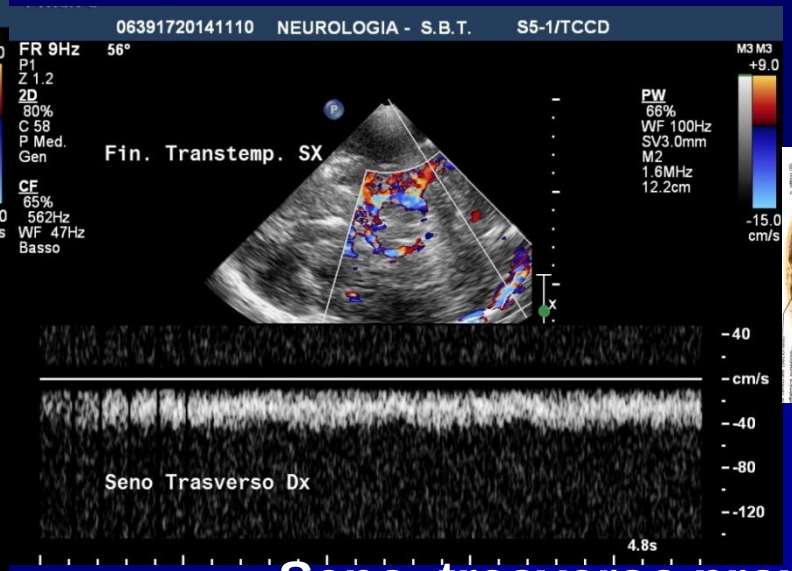


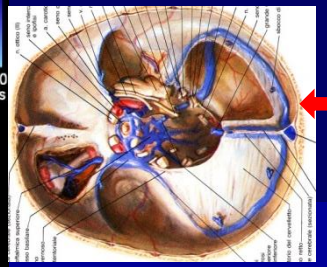
Vena di Labbe



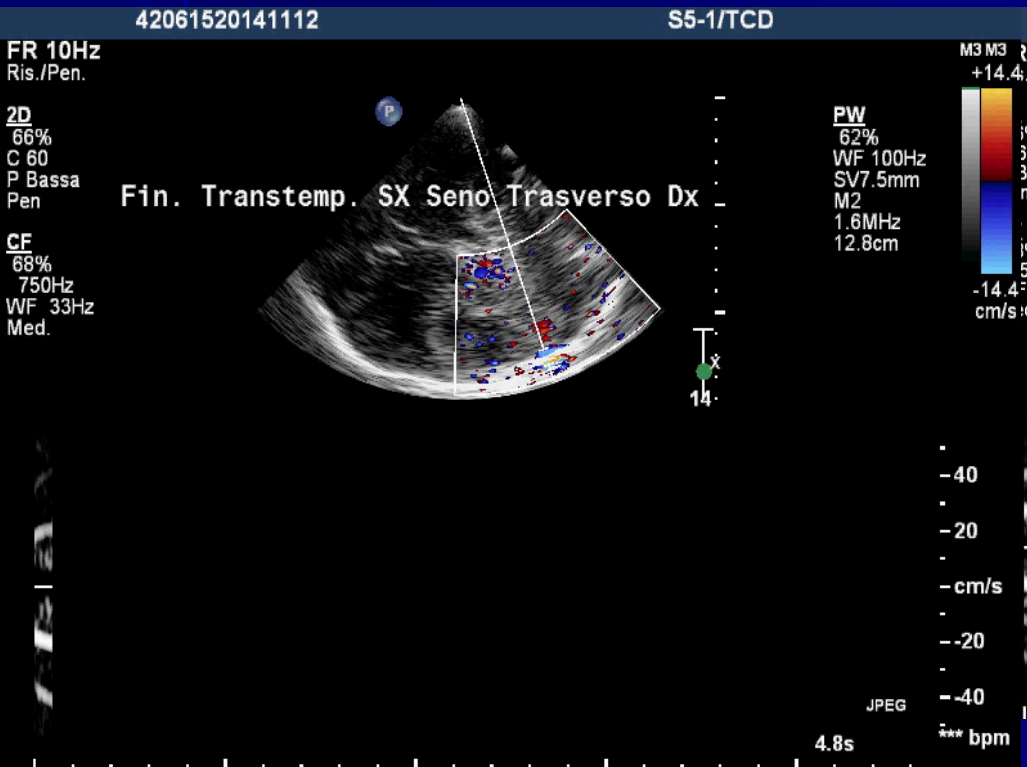


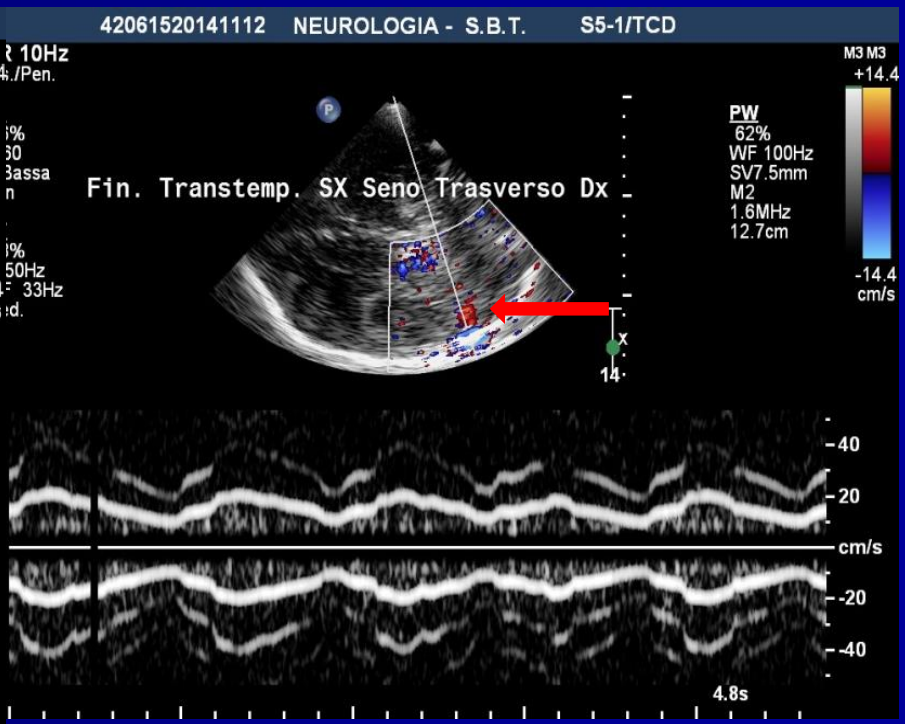
Neuroradiologie Masson eds

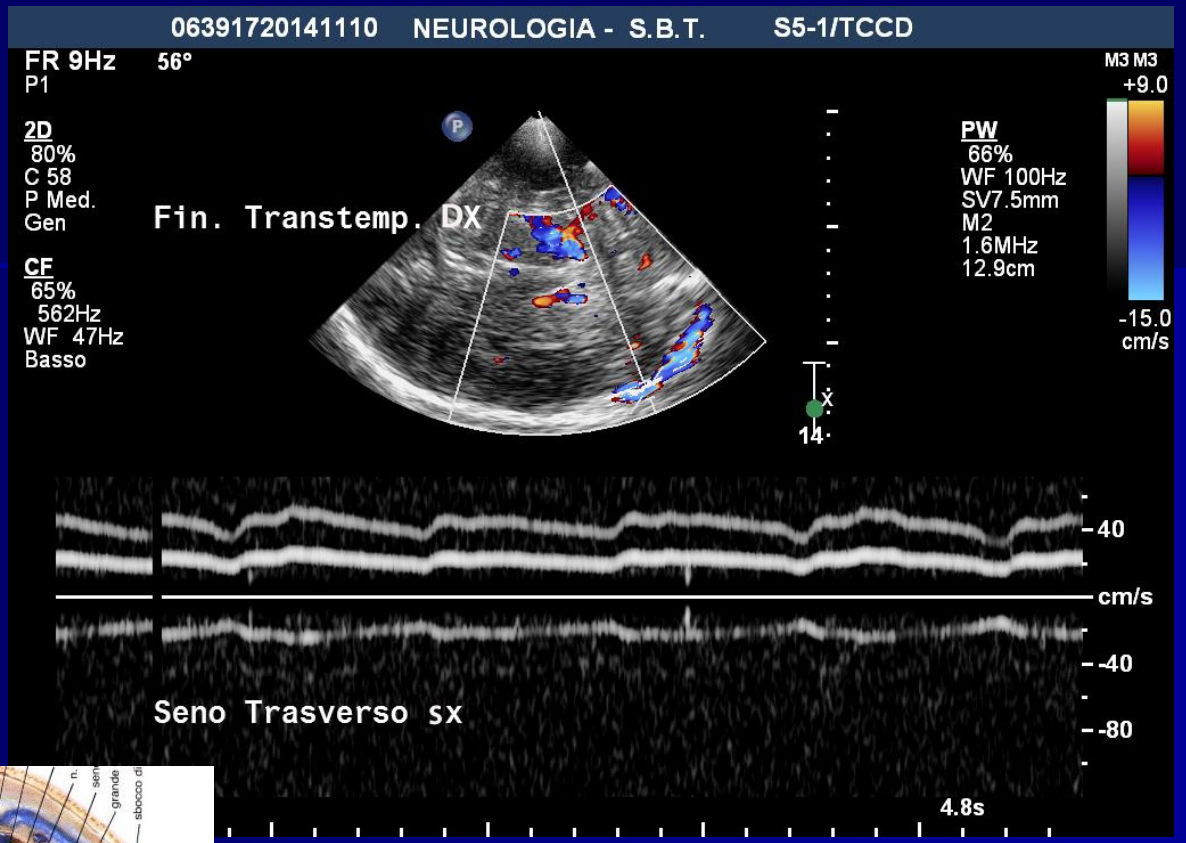


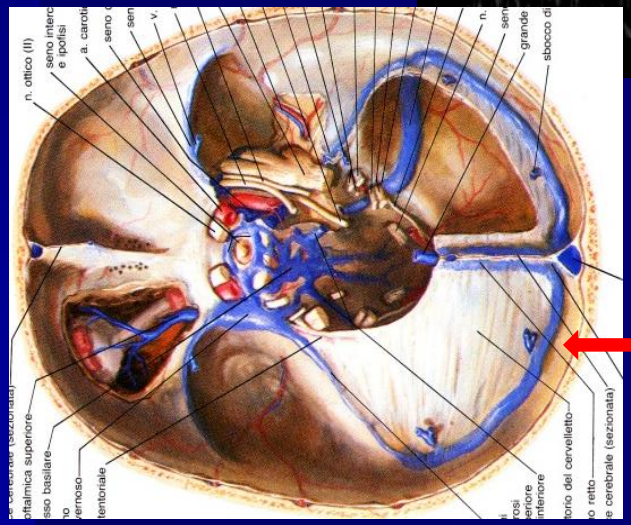


Seno trasverso prox dx





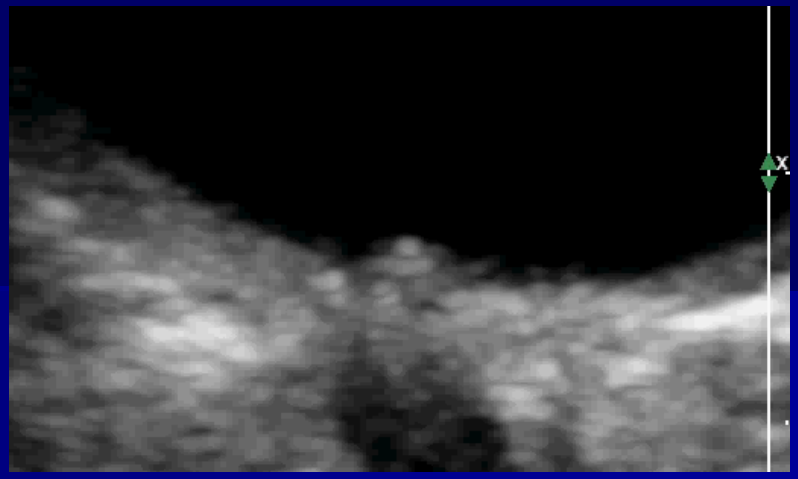


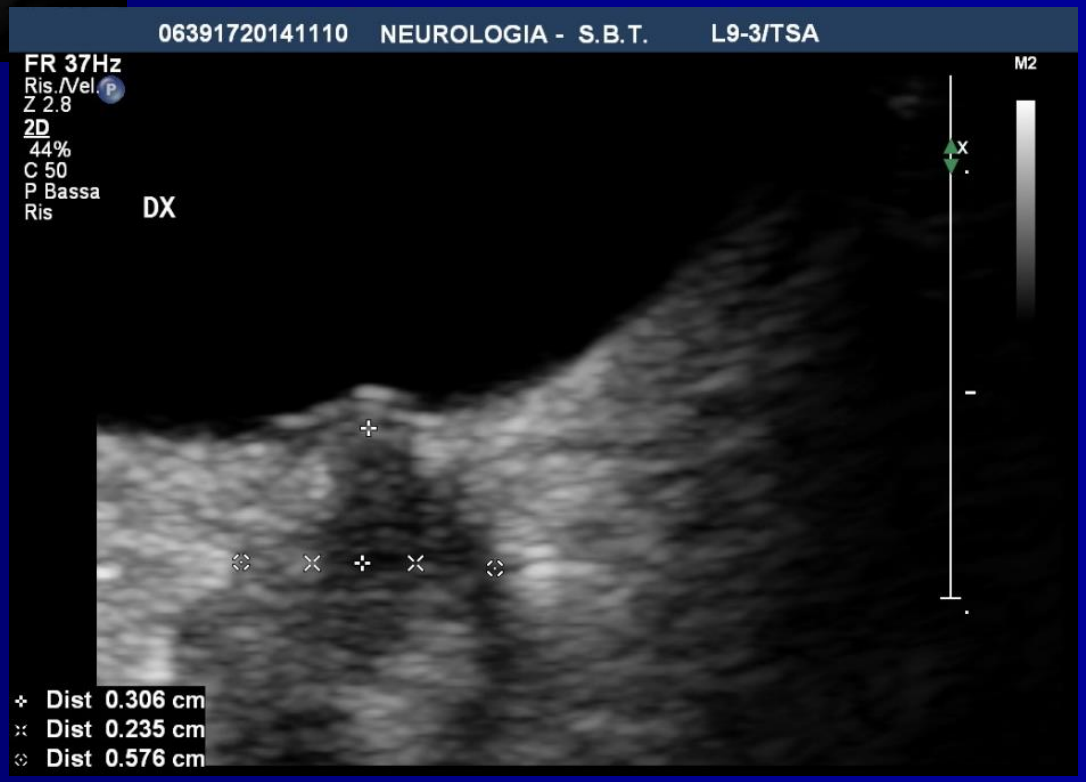


Seno trasverso sx

ODX

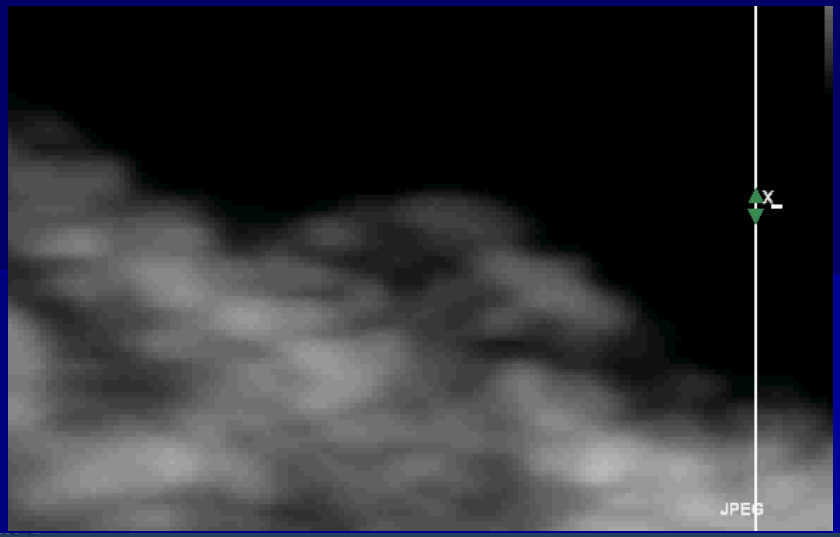

06391720141110 NEUROLOGIA - S.B.T. L9-3/TSA
FR 37Hz
Ris./Vel.
Z 2.8
2D
44%
C 50
P Bassa
Ris
DX
OPE
M2
Dist 0.114 cm

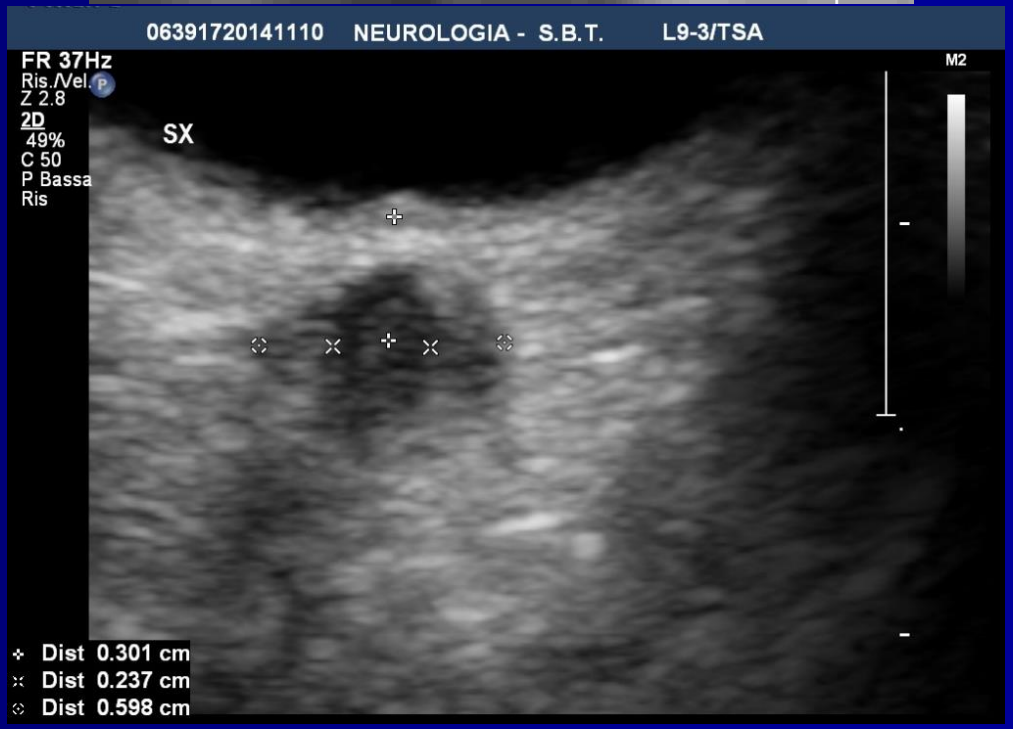


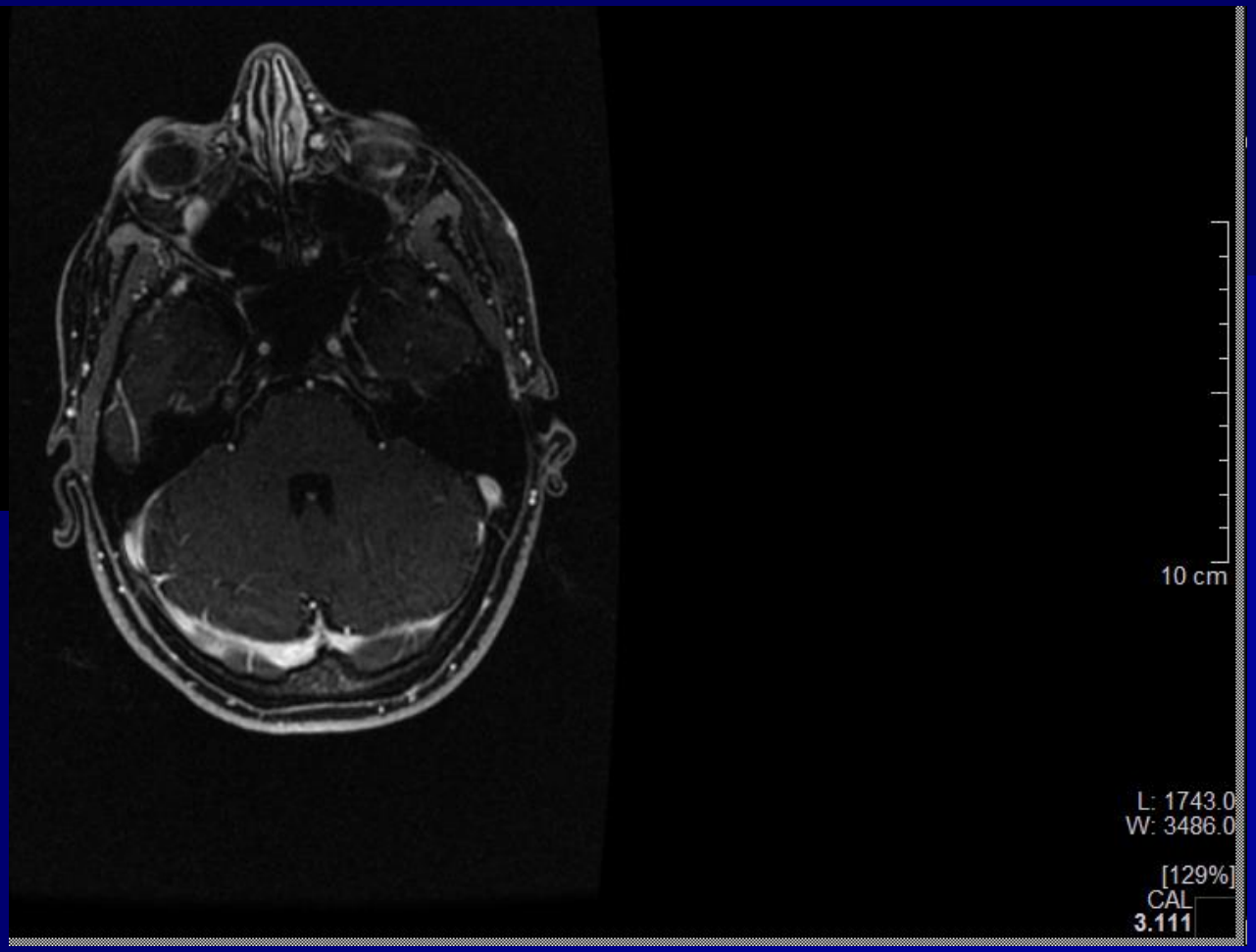

06391720141110 NEUROLOGIA - S.B.T. L9-3/TSA
FR 37Hz
Ris./Vel.
Z 2.8
2D
44%
C 50
P Bassa
Ris
DX
M2
Dist 0.306 cm
Dist 0.235 cm
Dist 0.576 cm

OSX

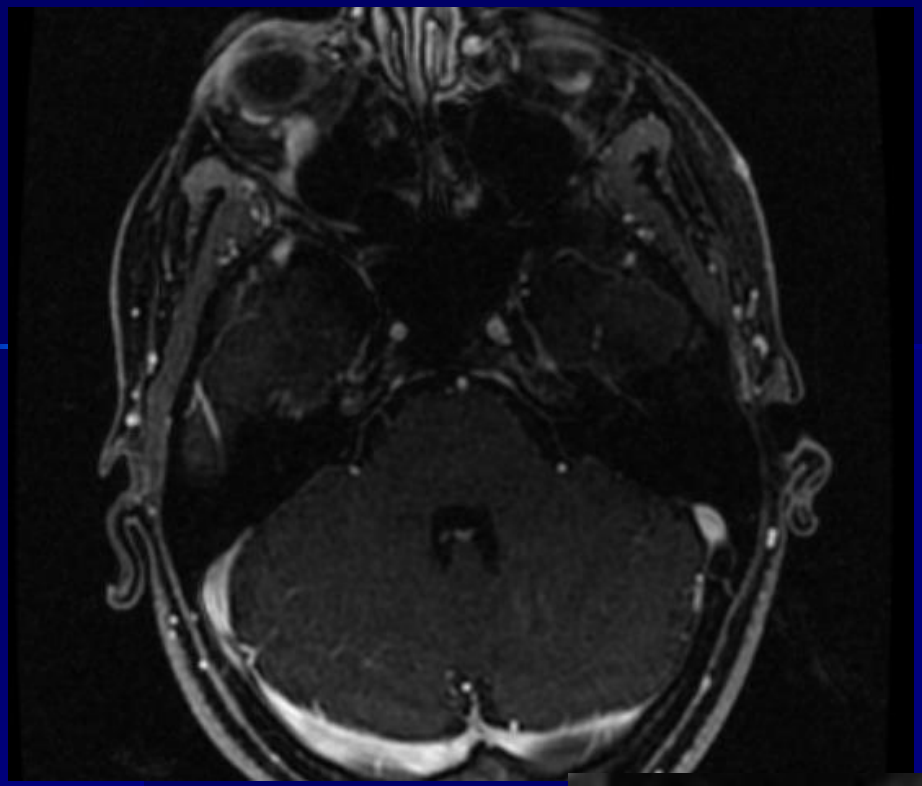

06391720141110 NEUROLOGIA - S.B.T. L9-3/TSA
FR 37Hz
Ris./Vel.
Z 2.8
2D
49%
C 50
P Bassa
Ris
SX
M2
Dist 0.189 cm

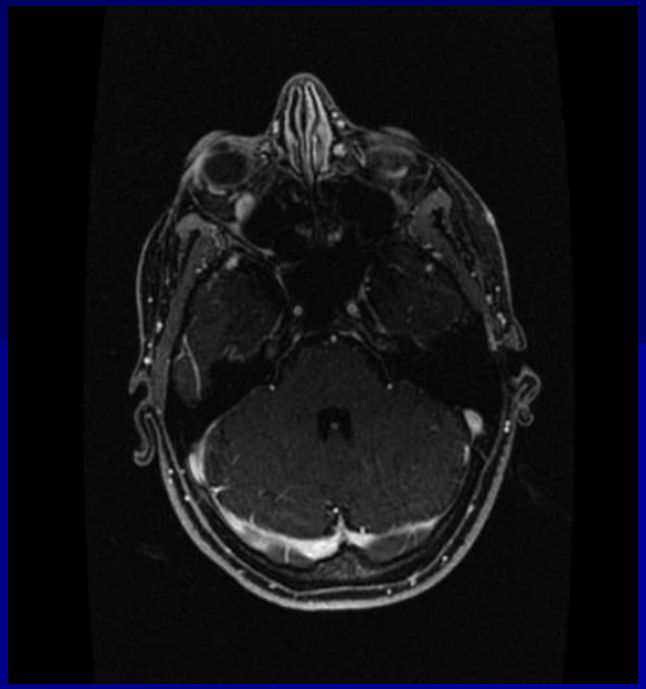

JPEG

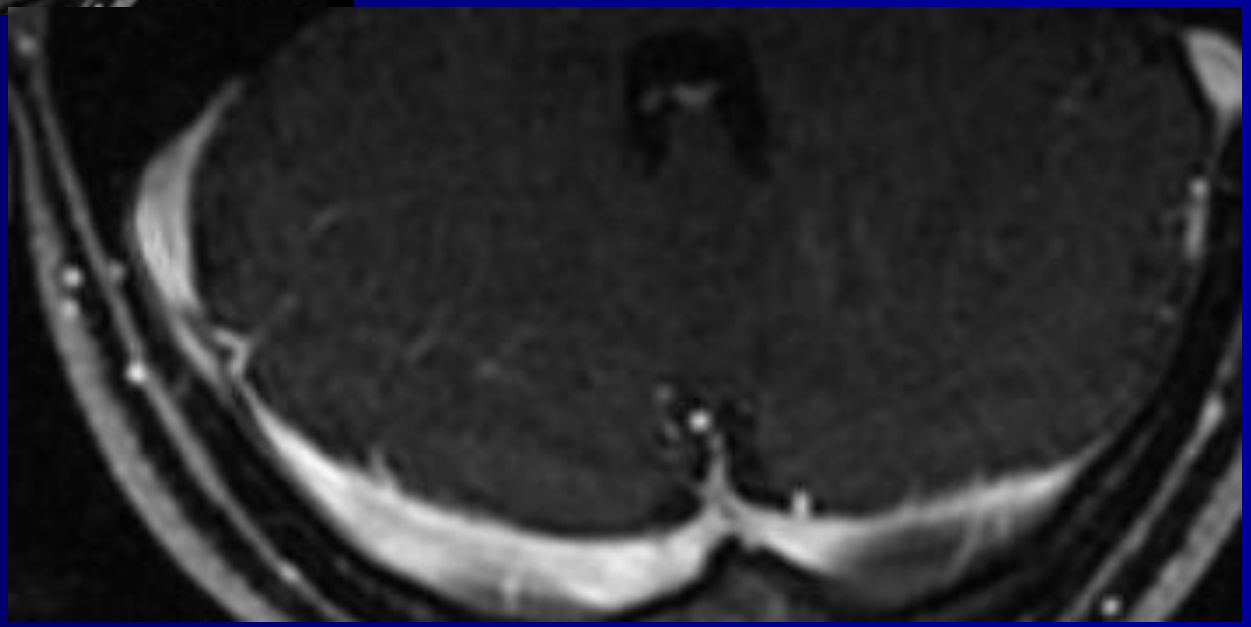

06391720141110 NEUROLOGIA - S.B.T. L9-3/TSA
FR 37Hz
Ris./Vel.
Z 2.8
2D
49%
C 50
P Bassa
Ris
SX
M2
Dist 0.301 cm
Dist 0.237 cm
Dist 0.598 cm

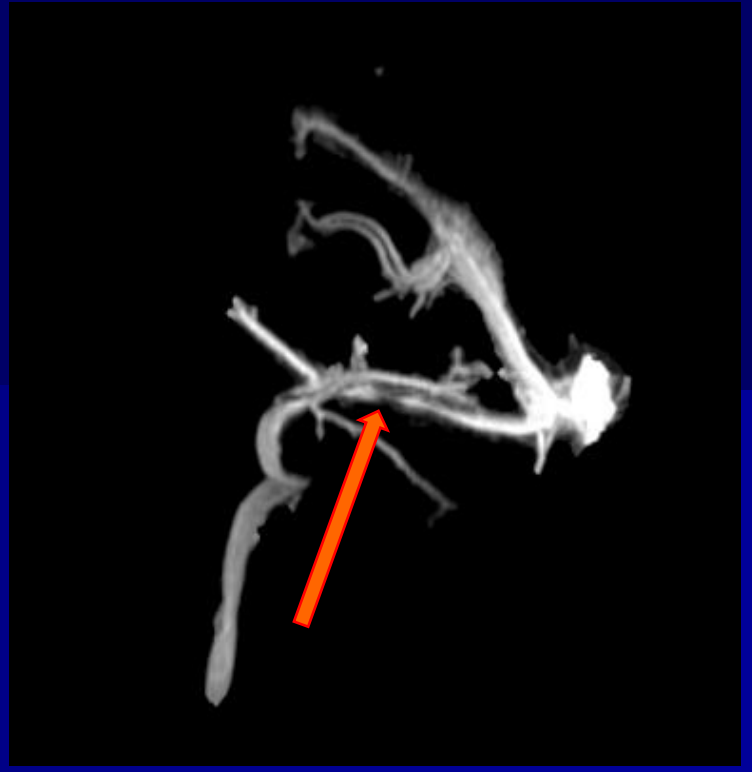


RMN:
parenchima ndr
Angio arteriosa ndr









ESISTE ANCORA L'IPERTENSIONE INTRACRANICA IDIOPATICA (IIH) ???

Neurology 2003;60:1406-1407

Editorials

The death of idiopathic intracranial hypertension?

Stephen D. Silberstein, MD and Robert C. McKinstry, III, MD PhD

From the Department of Neurology (Dr. Silberstein), Thomas Jefferson University, Philadelphia, PA; and St. Louis Children's Hospital and Barnes-Jewish Hospital (Dr. McKinstry), St. Louis, MO.

XIV° Congresso Nazionale SINV
27-29 ottobre 2005
Bassano del Grappa

San Benedetto del Tronto

GRAZIE PER L'ATTENZIONE