



GAVE CeLT 2022 ROMA

5-6-7 Dicembre / December 5th-6th-7th



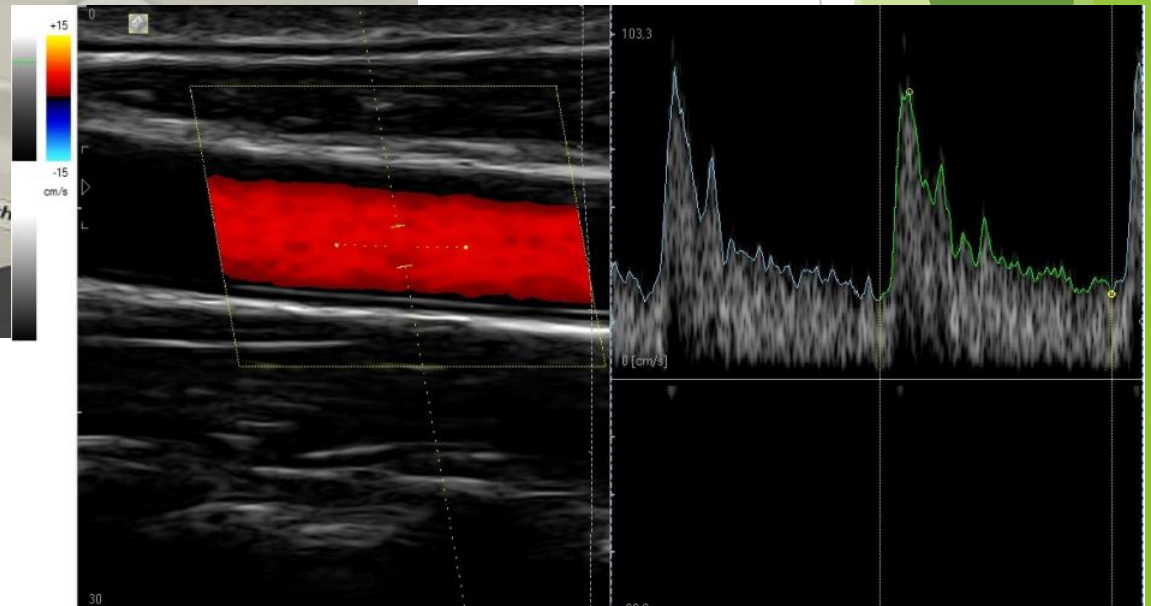
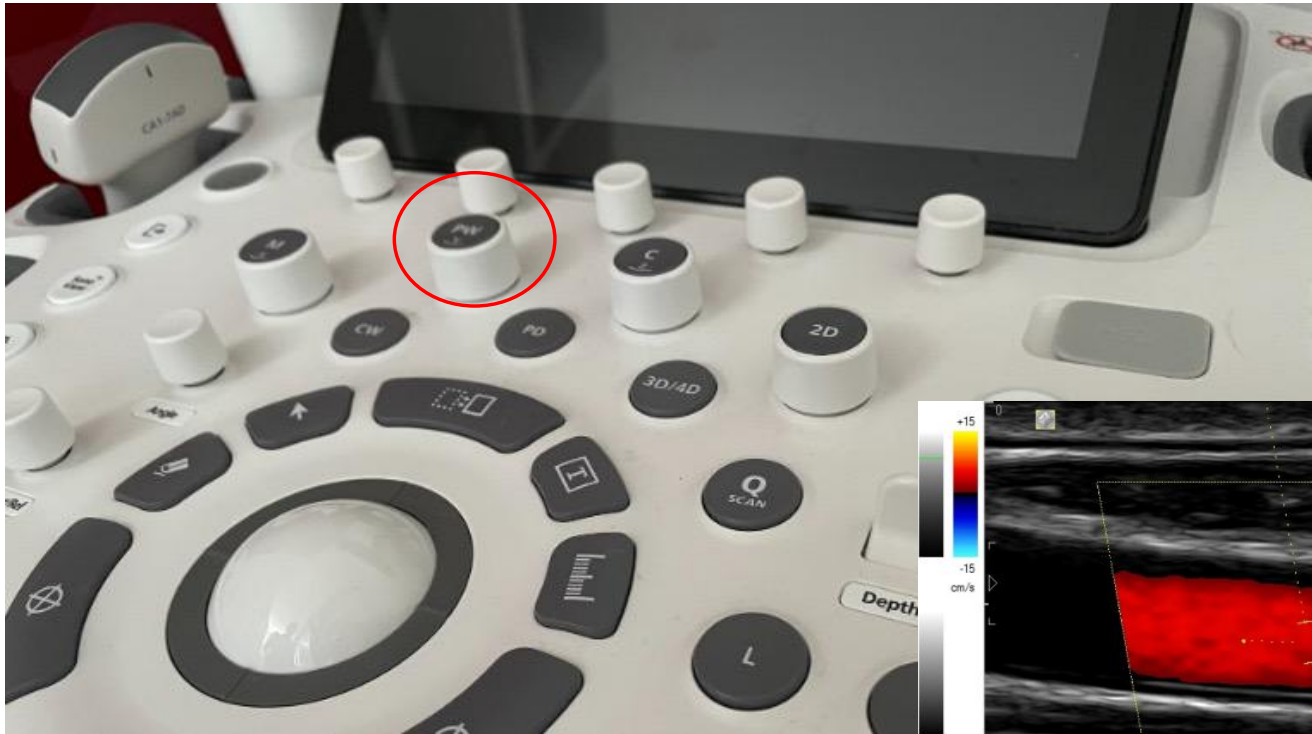
BUBBLE TEST CON DOPPLER PULSATO

Dr. Antonio Gidaro

U.O.C. Medicina Generale / Vascular Access Team

H. Sacco Milano

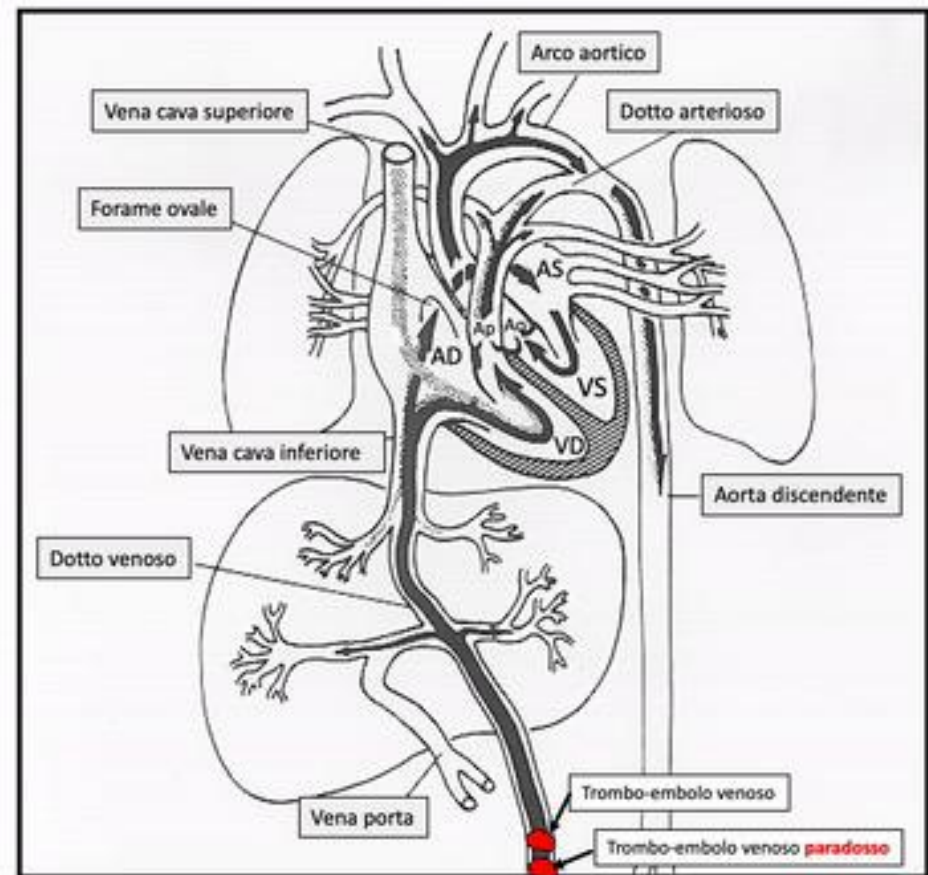
Pulsed Wave (PW): analisi spettrale della traccia Doppler



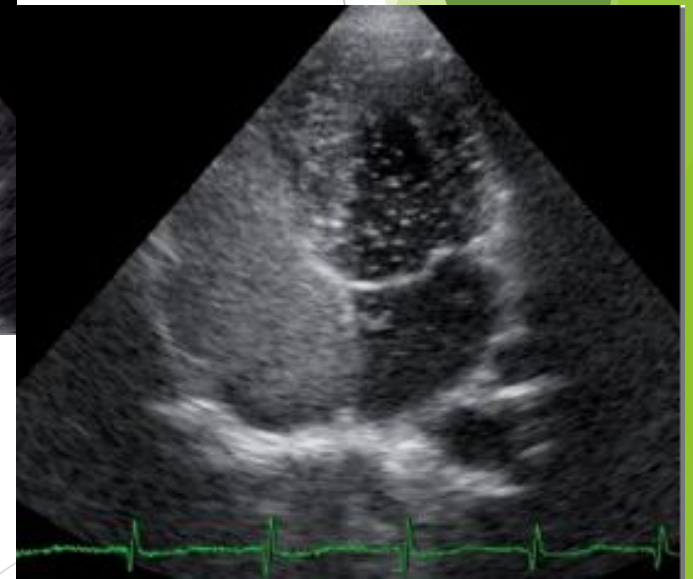
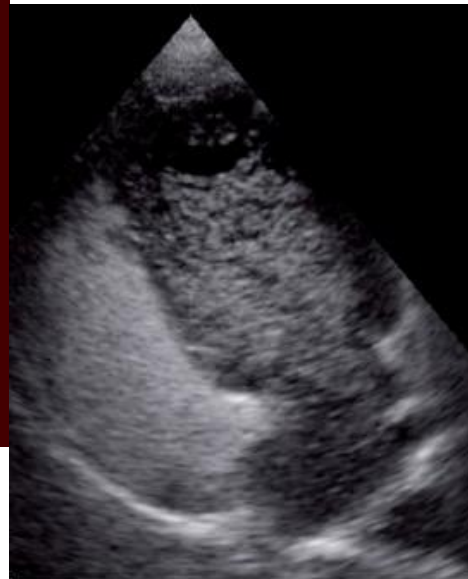
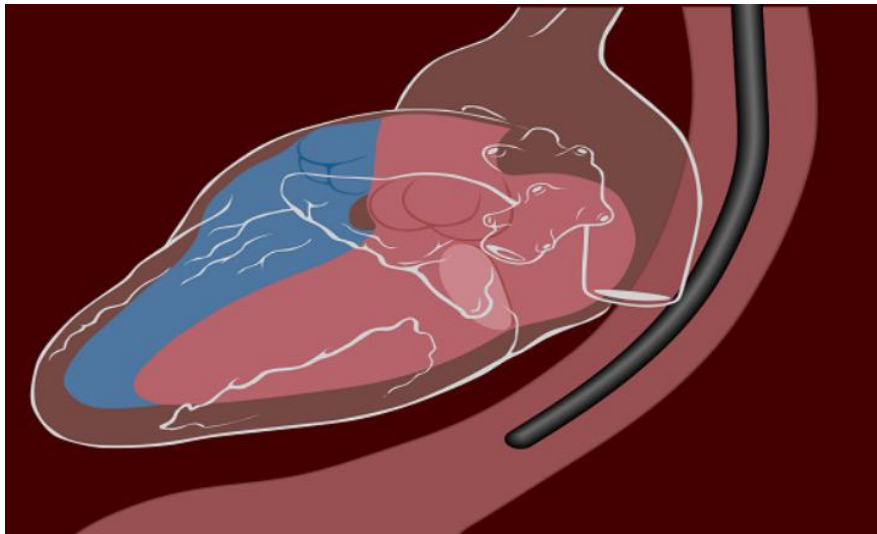
Sindrome di Fantantonio



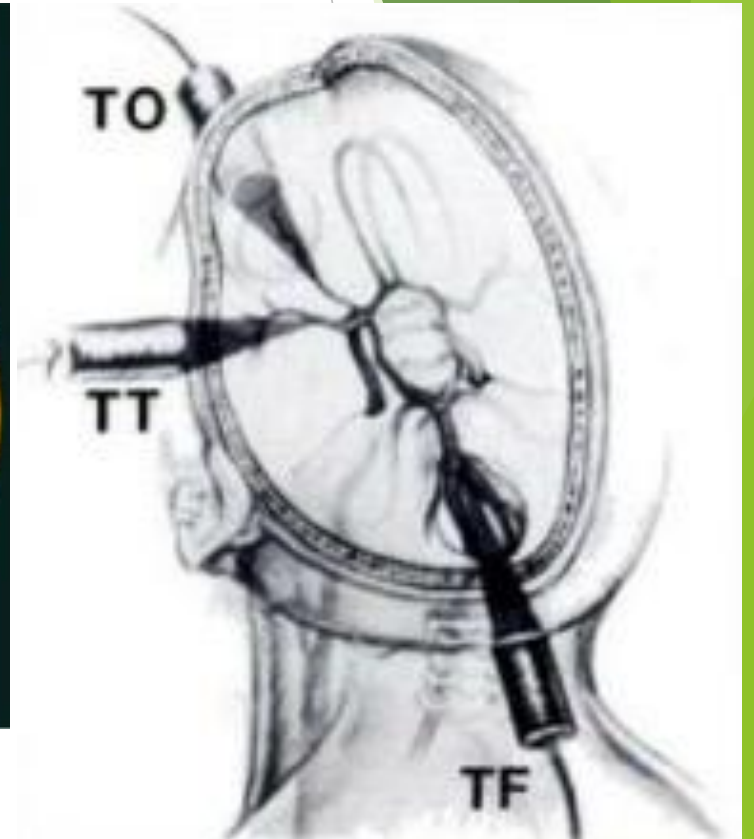
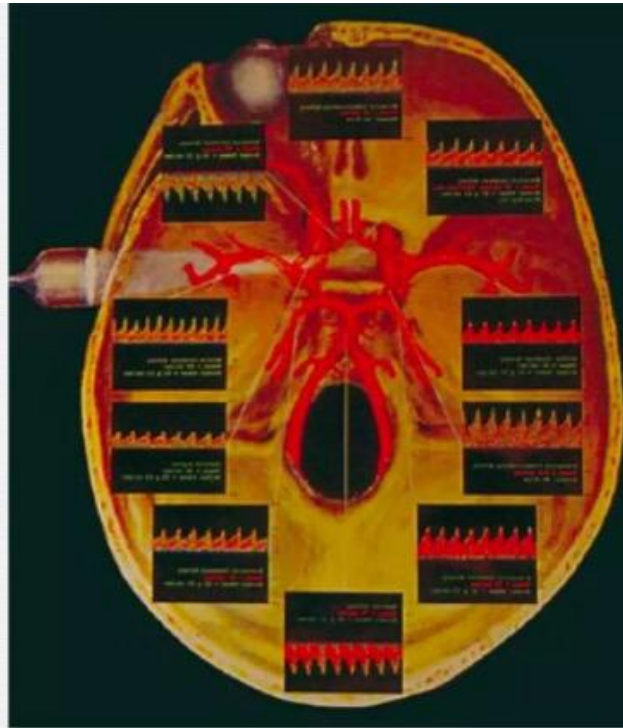
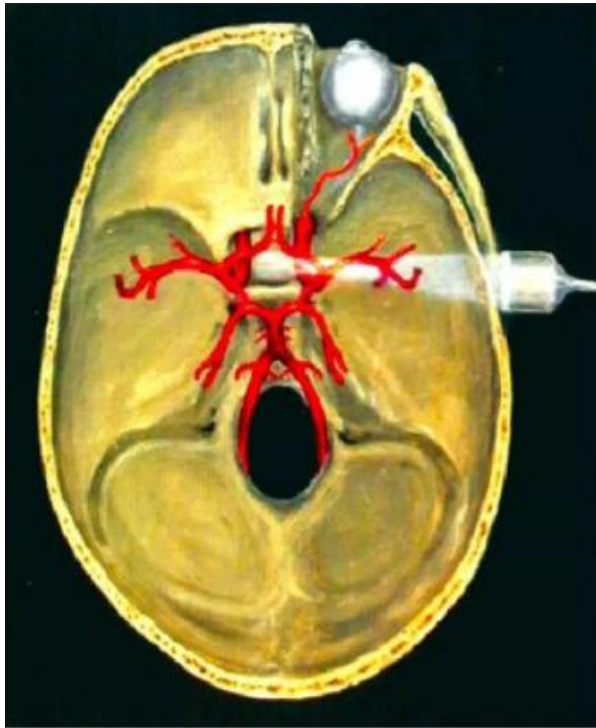
Ictus paradossoso da pervietà del forame ovale



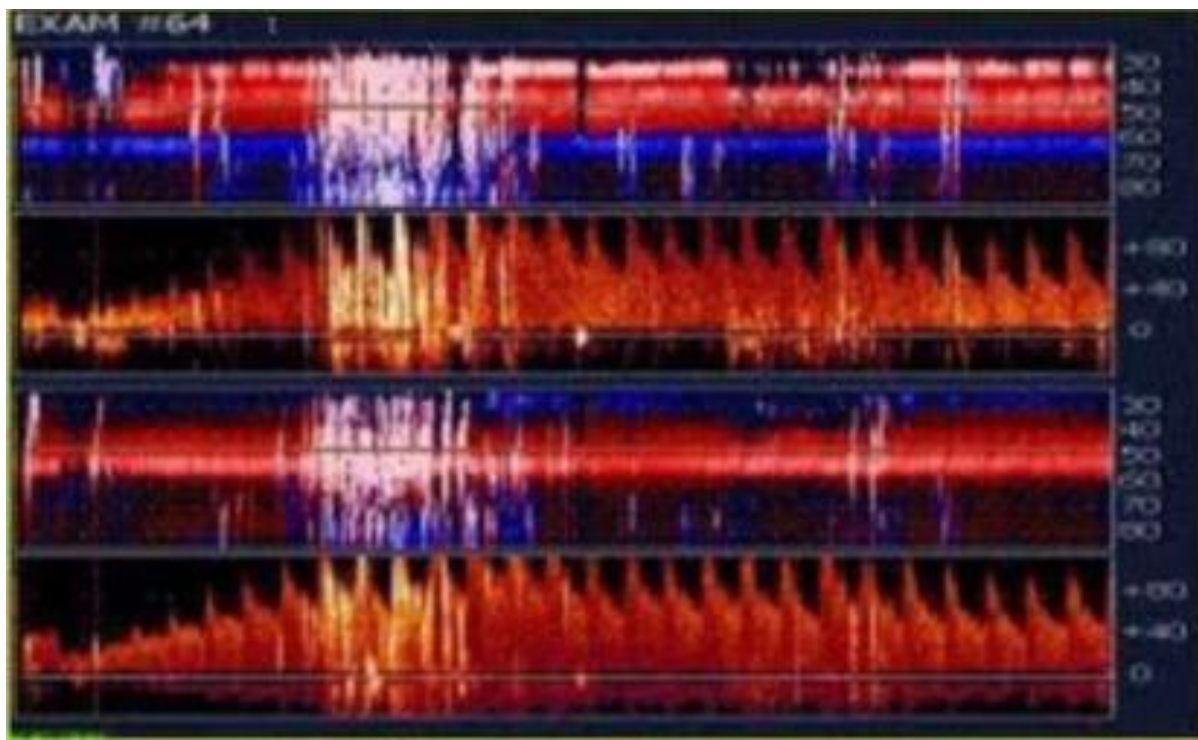
Ictus paradosso da pervietà del forame ovale



Doppler transcranico



Doppler transcranico con mezzo di contrasto sonovue



Diagnostic Accuracy of Carotid Doppler Ultrasound for the Detection of Right-to-Left Cardiac Shunt

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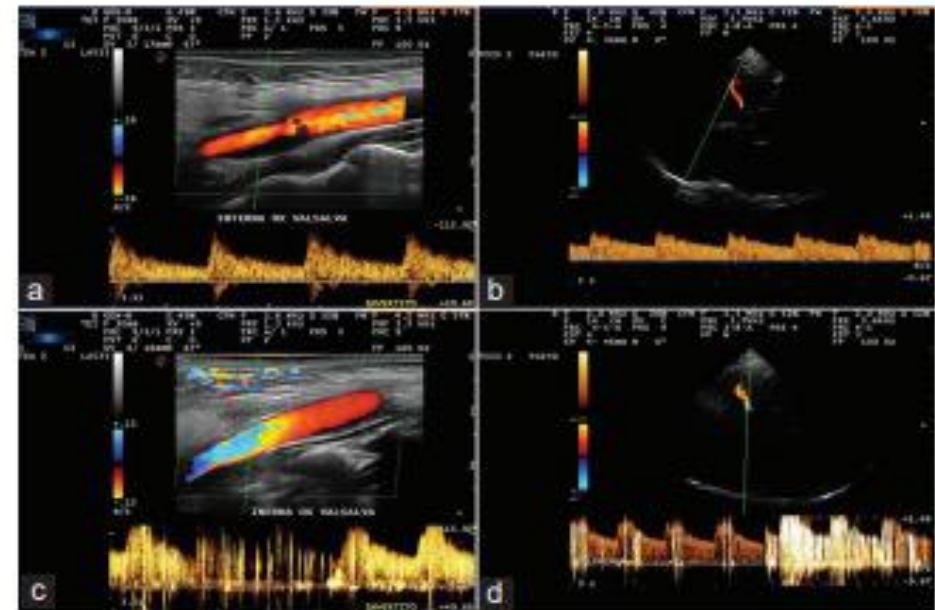
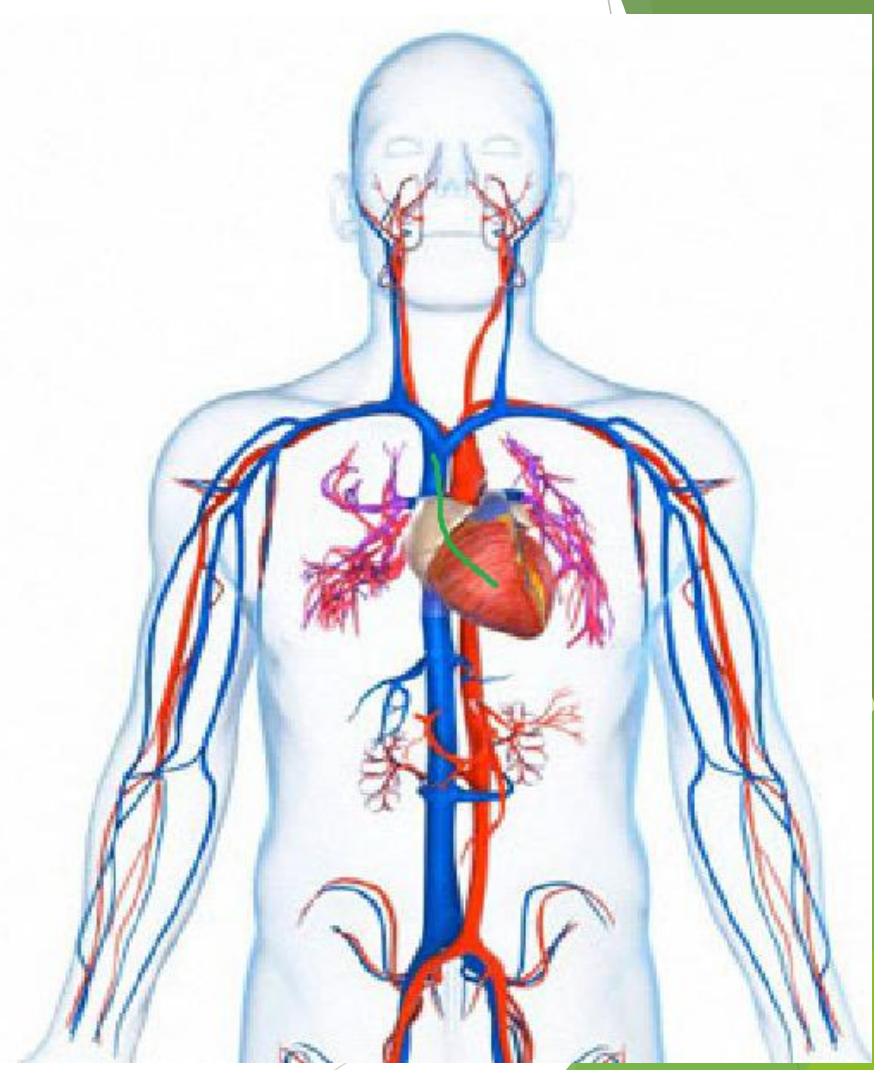
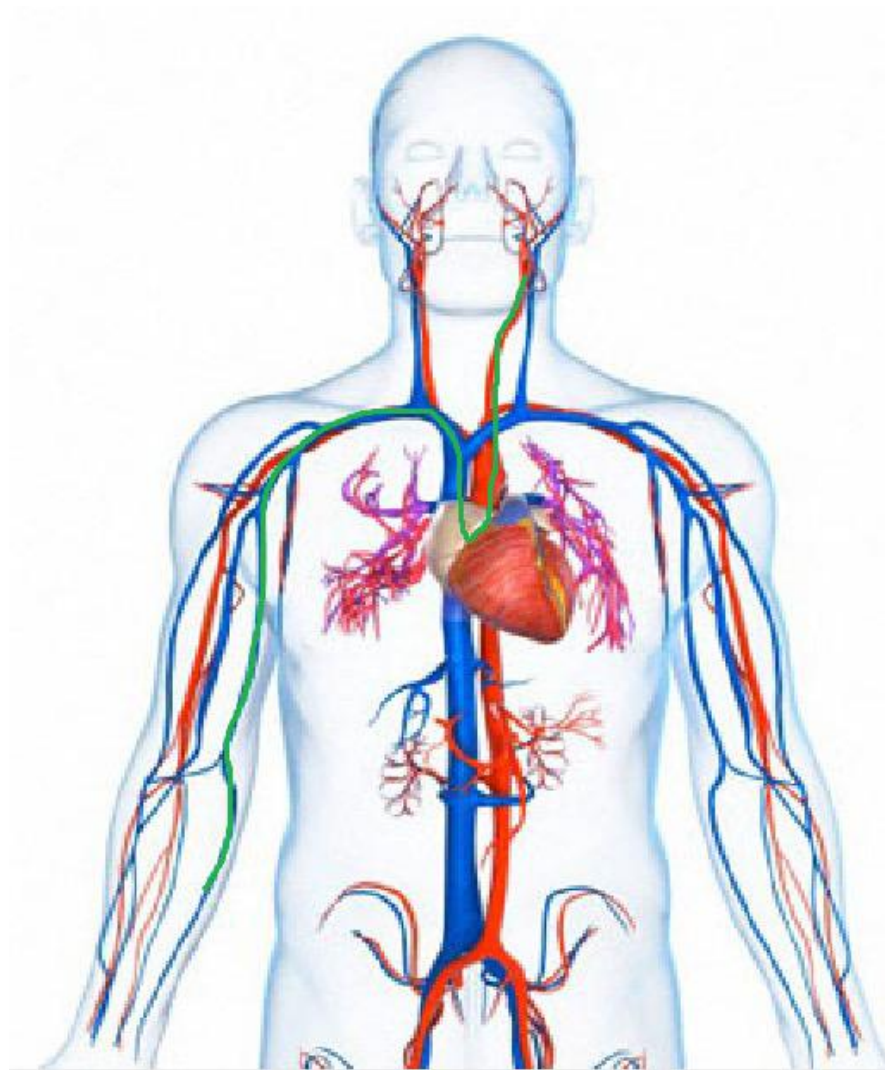


Figure 1: Examples of TCCD and ICA Doppler Ultrasound spectra. Comparison of the same RLS grade, assessed with the two different techniques is shown. (a): ICA Doppler ultrasound spectrum, shunt Grade 0. (b): ICA Doppler Ultrasound spectrum, shunt Grade 3. (c): TCCD spectrum, shunt Grade 0. (d): TCCD spectrum, shunt Grade 3. Shunt Grade 0: 0 MES; shunt Grade 3: Curtain effect. ICA=Internal carotid artery, MES=Microembolic signals, TCCD=Transcranial Colour Doppler

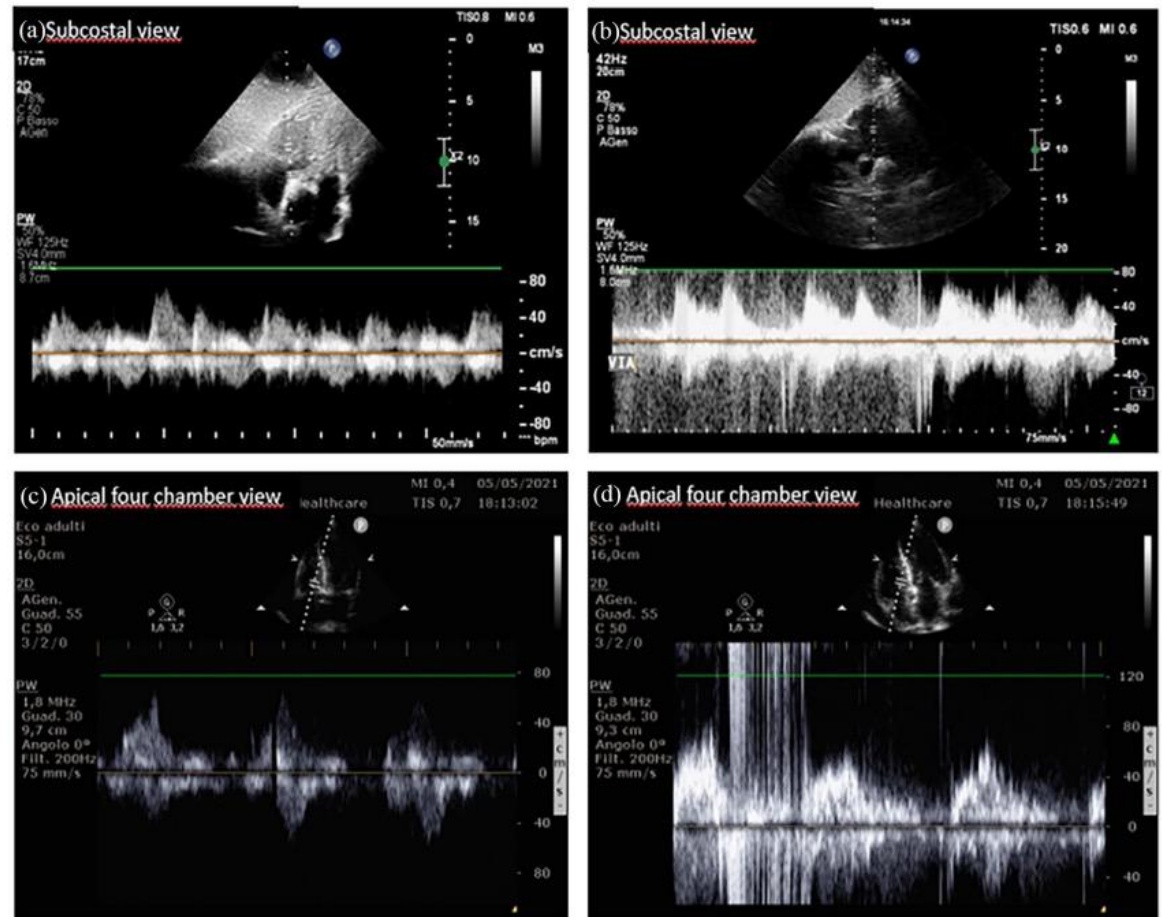


Pulsed-wave Doppler for ultrasound-based tip location using bubble test: A pilot study

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Antonio La Greca², Francesca Lugli¹, Chiara Trione¹,
Maria Calloni¹, Chiara Melchionda¹, Federica Samartin¹,
Emanuele Salvi¹ and Elisa Ceriani¹

- Che vantaggi ha il doppler pulsato nella tip location??

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1: In circa il 5% dei pazienti il bubble test non è informativo



Literature show that the use of pulse Doppler both in transcranial color Doppler¹⁷ and Carotid Doppler²¹ Ultrasound with microbubbles injection is well established in the setting of right-left shunt detection. A right-left cardiac shunt is diagnosed with PW in the presence of ≥ 1 microembolic signals (MESS) in middle cerebral artery or carotid artery after microbubbles injection. The possibility to detect only one microbubble could be useful during MBT to improve test sensibility and specificity.

2: E' più semplice vedere una riga verticale su un orizzontale rispetto a scansionare una area



Time between start of the infusion and the signal appearance in the cardiac chambers is probably better defined compared to usual MBT, because the operator can focus the attention on a single vertical line signal (MES) on the PW spectrum instead of scan the entire atrium looking for white points (the bubbles) in the B-mode.



3: teoria del MAXIBON: two is megl che one!!!!

Moreover, during MBT-PW there is not only a visual feedback of MESs, but it is also produced a typical sound due to the alteration of PW wave, that can help the operator to better perceive passage of bubbles through heart chambers.



4: si può sostituire il tempo con la i cicli necessari per vedere arrivare le bolle

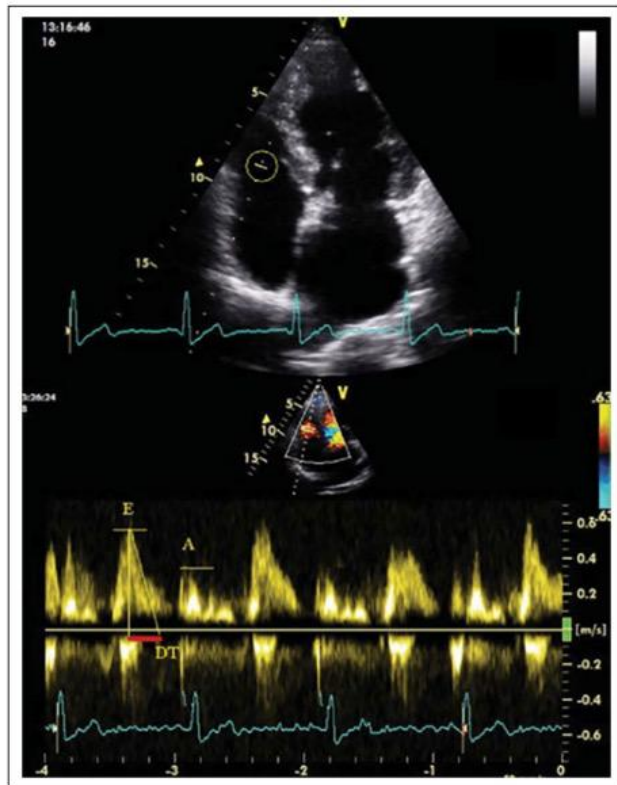
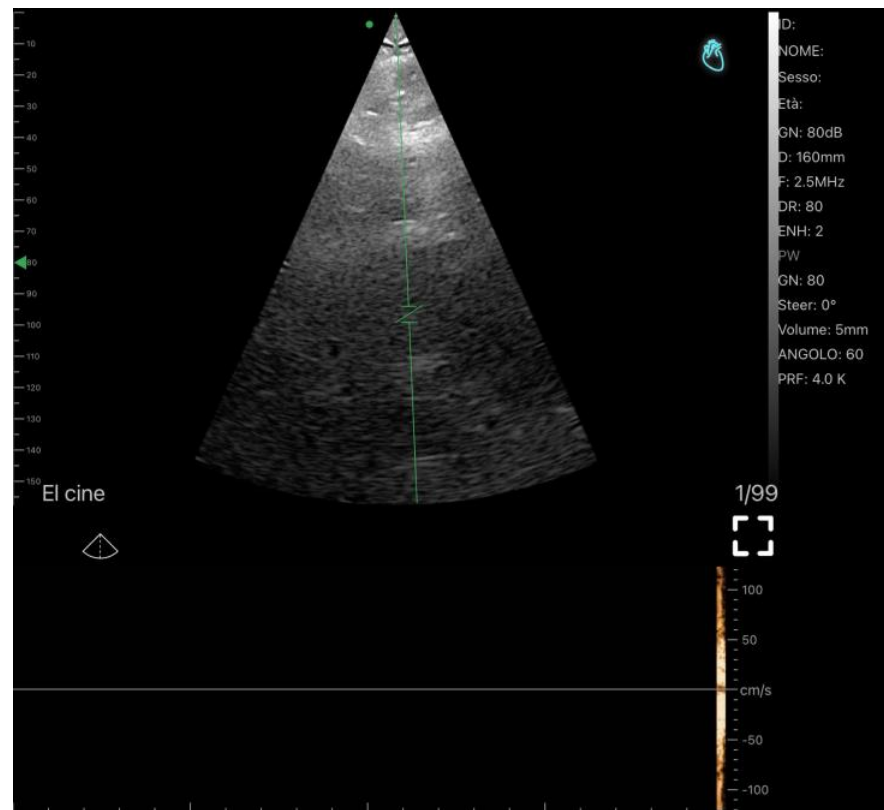


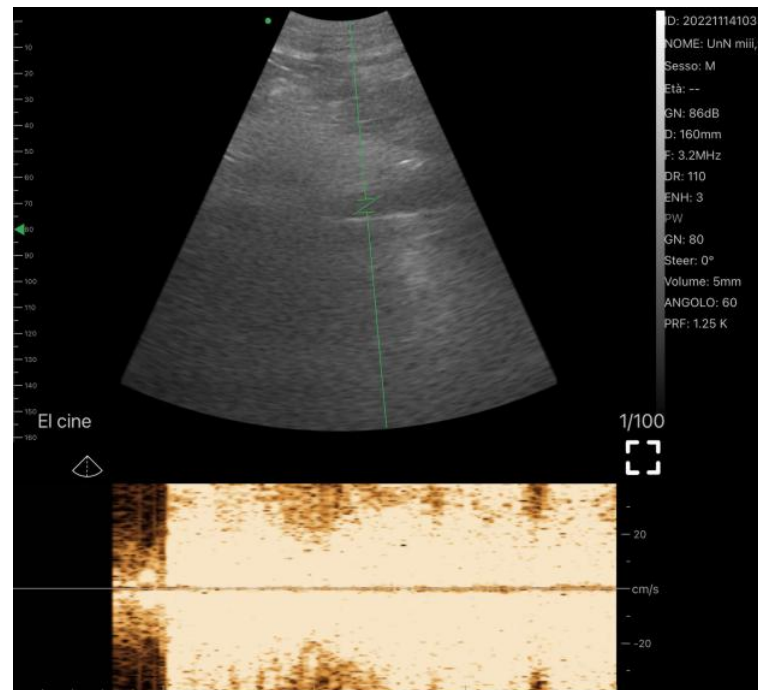
Figure 2. Example of tricuspid pulse Doppler in apical four-chamber: The E wave is due to peak velocity blood flow from left ventricular relaxation in early diastole; the A wave is due to peak velocity flow in late diastole caused by atrial contraction.

Another vantage is that pulse Doppler wave is synchronous with cardiac flow and hearth rate. With PW technique we can replace time measurement with cardiac cycle, whose length is easy to establish ($60 \text{ pulse/min} = 1 \text{ s/cardiac cycle}$; $120 \text{ pulse/min} = 0.5 \text{ s/cardiac cycle}$). For patients in atrial fibrillation we considered the mean frequency to estimate cardiac cycle length. In this way if the operator that injects microbubbles at the same time pushes Doppler button, we can measure cardiac pace instead of time and establish a pace cut-off instead of a time one. Moreover, time from registration starts and MES appearance is measurable on the PW spectrum. Thus, the tip may be correctly positioned if MES are recorded between the first cardiac cycle if the patient rate is 60 pulse/min or at least before the second if rate is 120 pulse/min.

Quando usare il doppler pulsato? Nell'Fibrillazione atriale



Quando usare il doppler pulsato? Nella cava inferiore



Quando usare il doppler pulsato? Nella BICAVALE

