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Learn with Dr. Nicos Labropoulos Abdominal and Pelvic Vein Imaging

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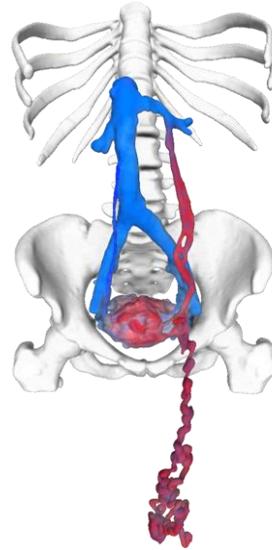
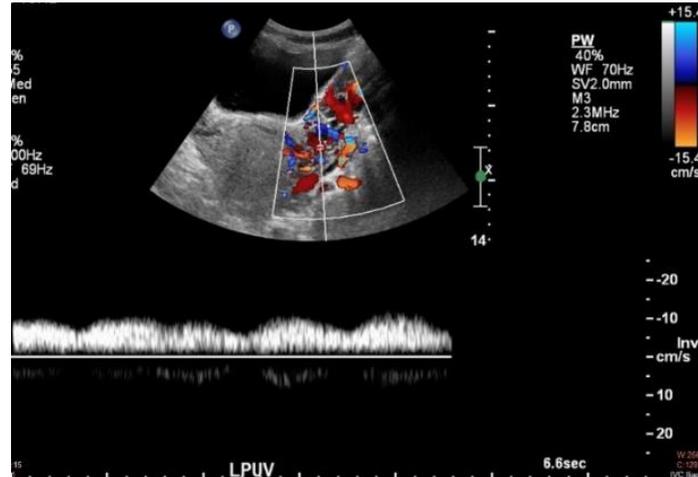
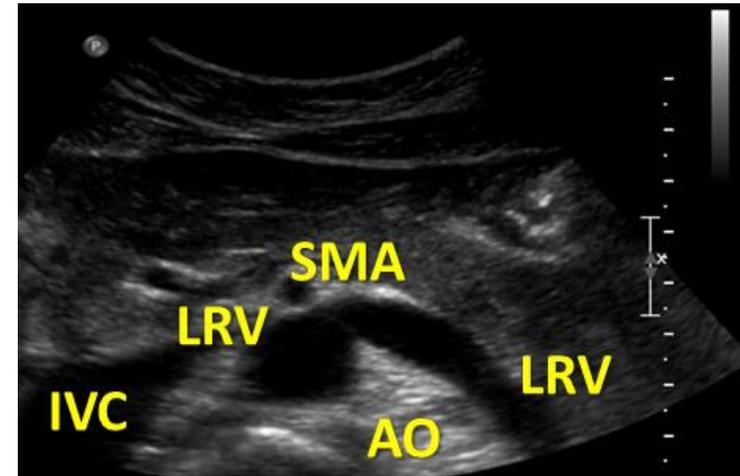


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Abdominal and pelvic vein imaging

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Patterns of pelvic reflux

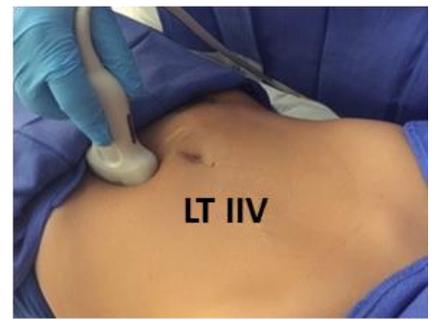
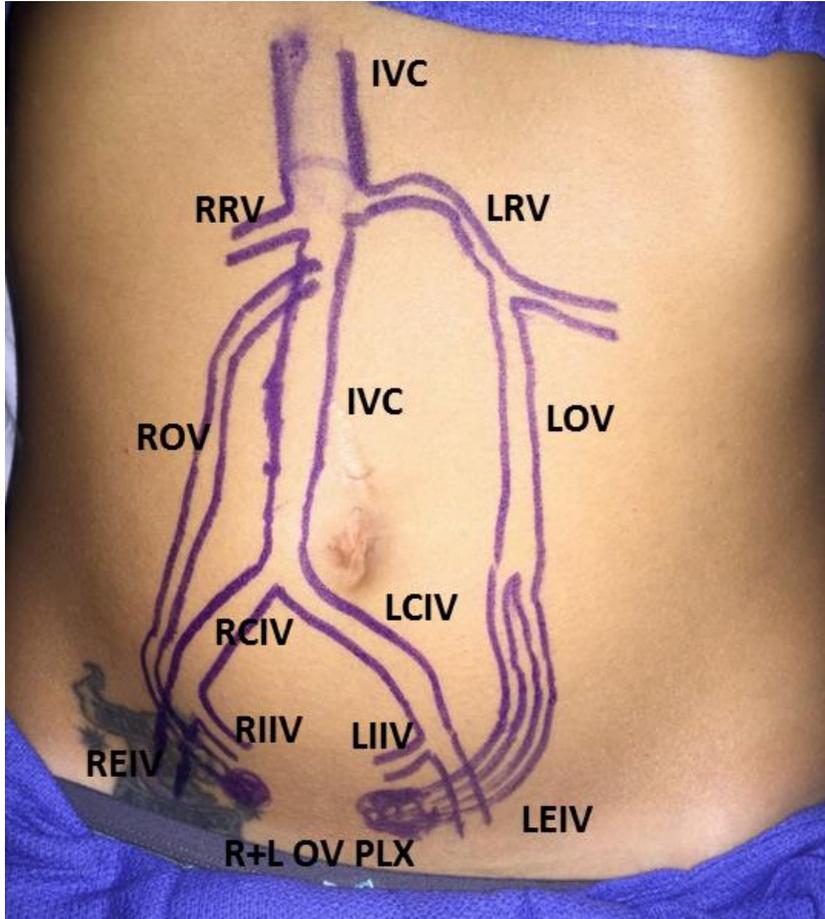
- ❖ Ovarian veins and ovarian plexus
- ❖ Uterine and peri-uterine veins
- ❖ Internal iliac tributaries
- ❖ Pelvic floor

**These patterns can be isolated in the pelvis or connecting with veins
In the lower extremity.**

A standardized ultrasound approach to pelvic congestion syndrome.

Labropoulos N, Jasinski PT, Adrahtas D, Gasparis AP, Meissner MH. Phlebology 2017;32:608-619

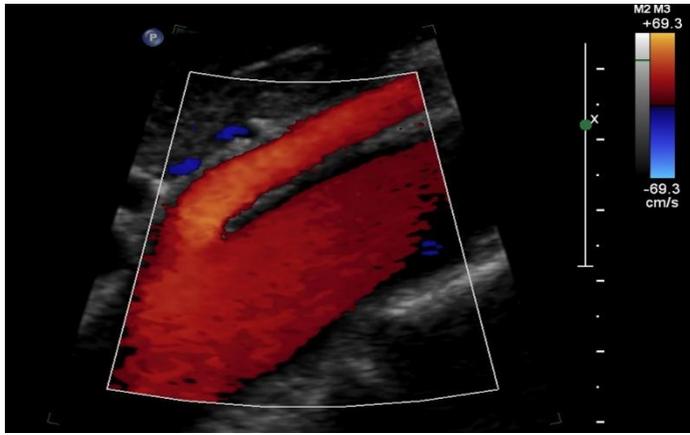
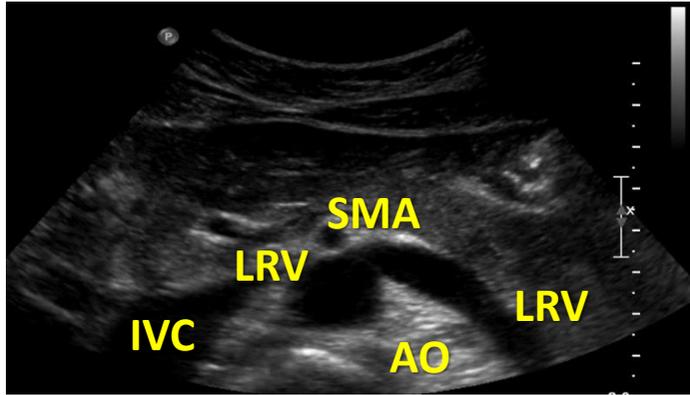
The different imaging windows and locations have been drawn and displayed in a patient with left ovarian and pelvic vein reflux.



Imaging protocol

- ❖ IVC and iliac veins to check for obstruction
- ❖ Left renal for Nutcracker phenomenon
- ❖ Ovarian veins and ovarian plexus
- ❖ Uterine and peri-uterine veins
- ❖ Internal iliac vein tributaries and pelvic floor
Gluteal, pudendal, obturator, inguinal
- ❖ Connections of lower limb veins with pelvic floor

Nutcracker phenomenon



Ptosis of the left kidney

Compression of the LRV by the SMA

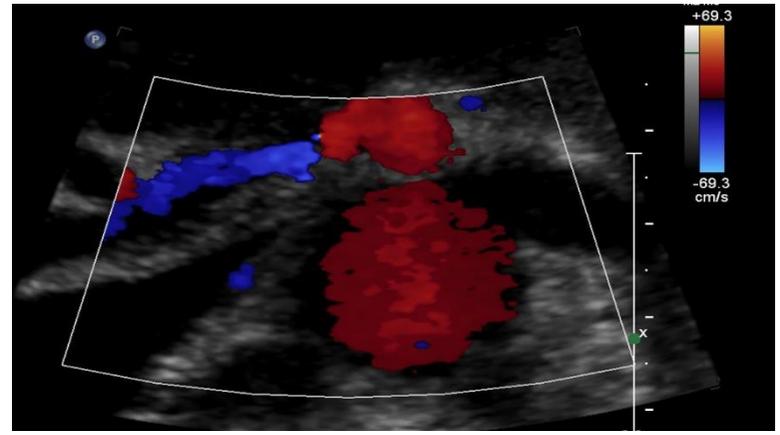
Lean people with aorto-SMA angle $<25^\circ$

Pre-stenotic **LRV dilatation** with $V2/V1 > 5$

Diameter ratio of 5

Presence of collateral veins

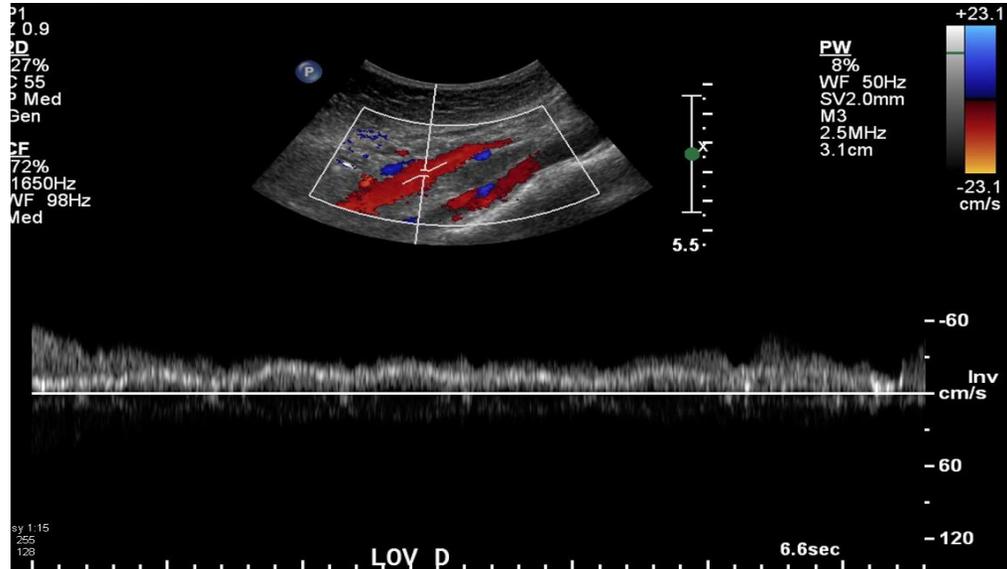
Flow diversion into LOV extending into the pelvic plexuses.



Nutcracker Syndrome

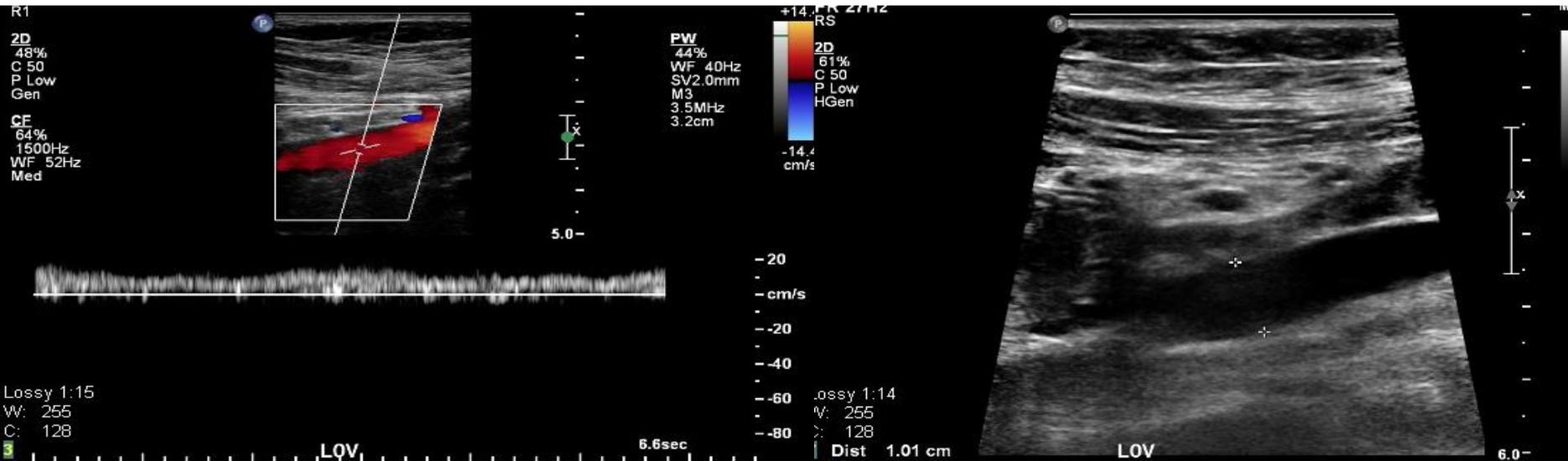
F 37y old with pelvic pain and hematuria

LOV was dilated measuring **14mm** and had **retrograde flow**



Spontaneous reverse high volume flow in the left ovarian vein.
Indirect sign to diagnose **left renal vein obstruction** as the kidney has the left ovarian vein as the main outflow.

LOV reflux in a patient with pelvic pain and bilateral lower limb varicose veins



Evaluation of ovarian veins with a linear transducer.

A standardized ultrasound approach to pelvic congestion syndrome.

Labropoulos N, Jasinski PT, Adrahtas D, Gasparis AP, Meissner MH. *Phlebology* 2017;32:608-619

Correlation between pelvic congestion syndrome and body mass index.

Nanavati R, Jasinski P, Adrahtas D, Gasparis A, Labropoulos N. *J Vasc Surg* 2018;67:536-41

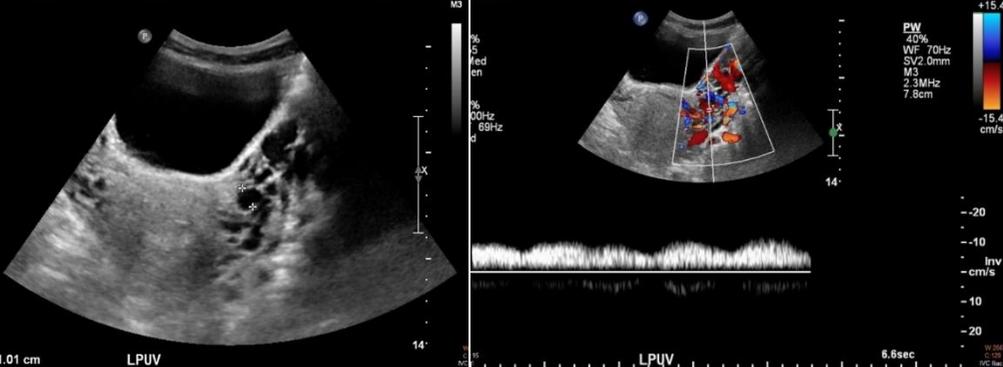
The ovarian veins in most patients are imaged with a linear transducer.

In our study we showed that about **80%** of patients with pelvic vein disorders have a **BMI<25**.

Those with **nutcracker phenomenon** have even a **lower BMI**.

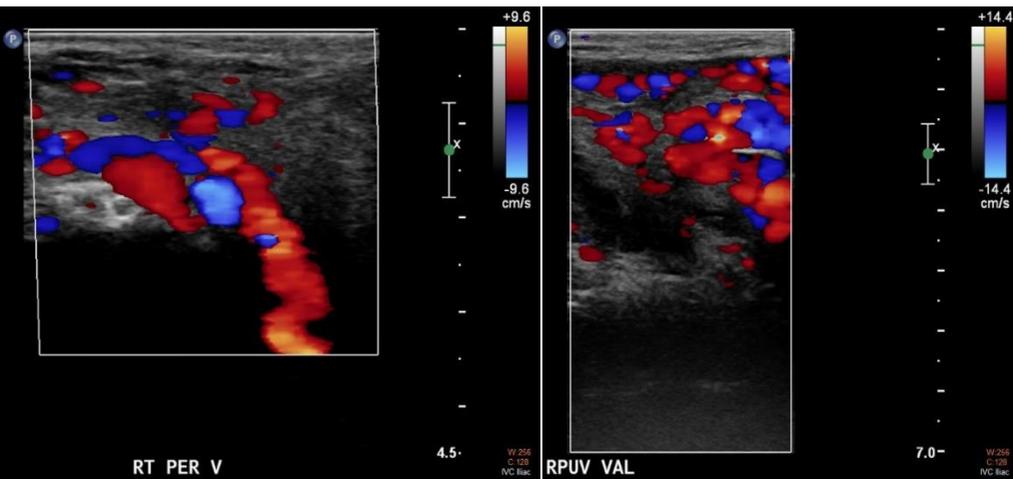
Correlation between pelvic congestion syndrome and body mass index.

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Peri-uterine vein reflux

Dilated peri-uterine veins with reflux during small inspiration contracting the abdominal muscles.



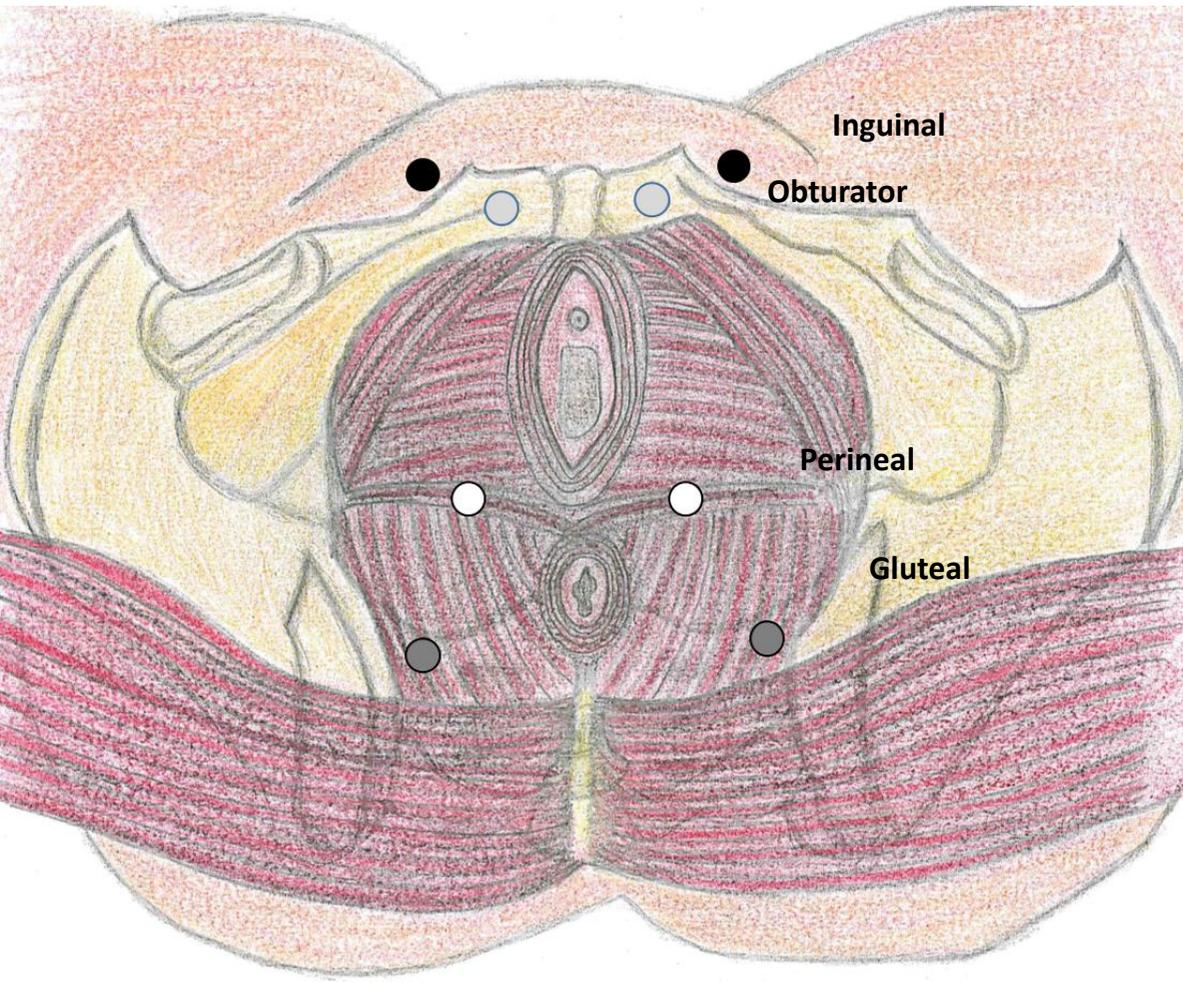
Pelvic reflux

Reflux in the pelvic veins exiting in the vulvar area and lower limb veins.

Examination in the standing position

- ❖ It uses hydrostatic pressure
- ❖ The Valsalva maneuver can be performed without any interference from the abdomen
- ❖ Veins have the largest diameter
- ❖ The trans- and peri-uterine veins, distal tributaries of the internal iliac vein and the connections with the pelvic floor and lower limbs can be easily assessed
- ❖ In vast majority of patients imaging is performed with a linear array transducer





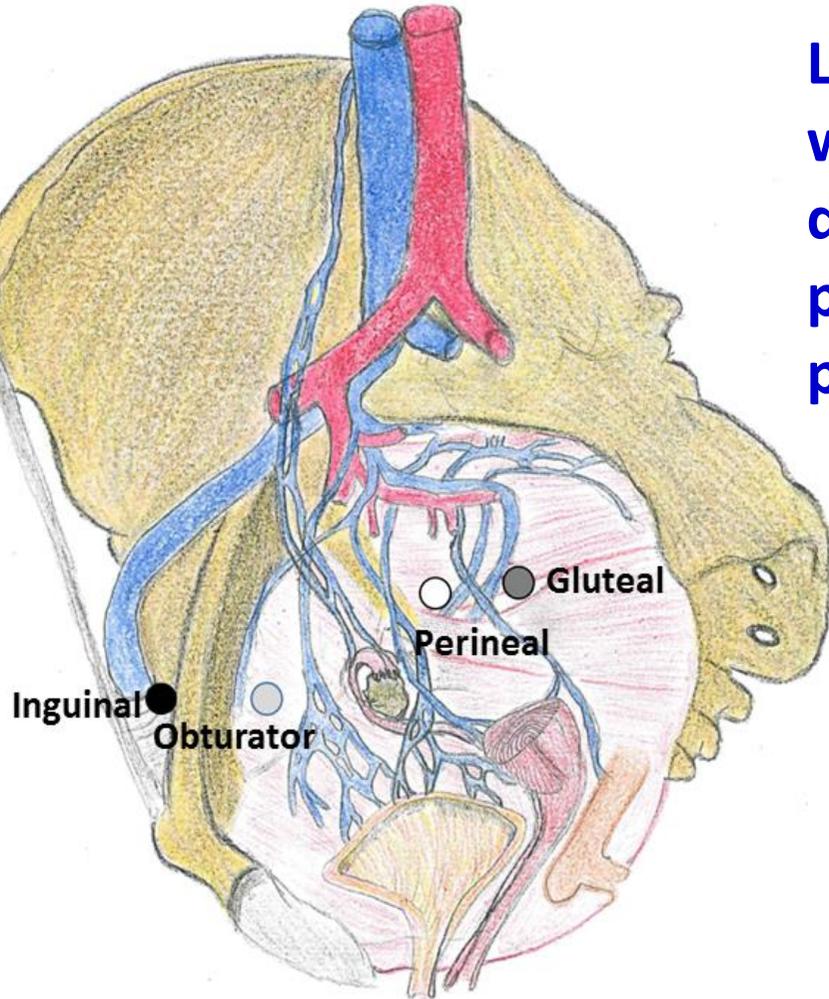
Pelvic outlet

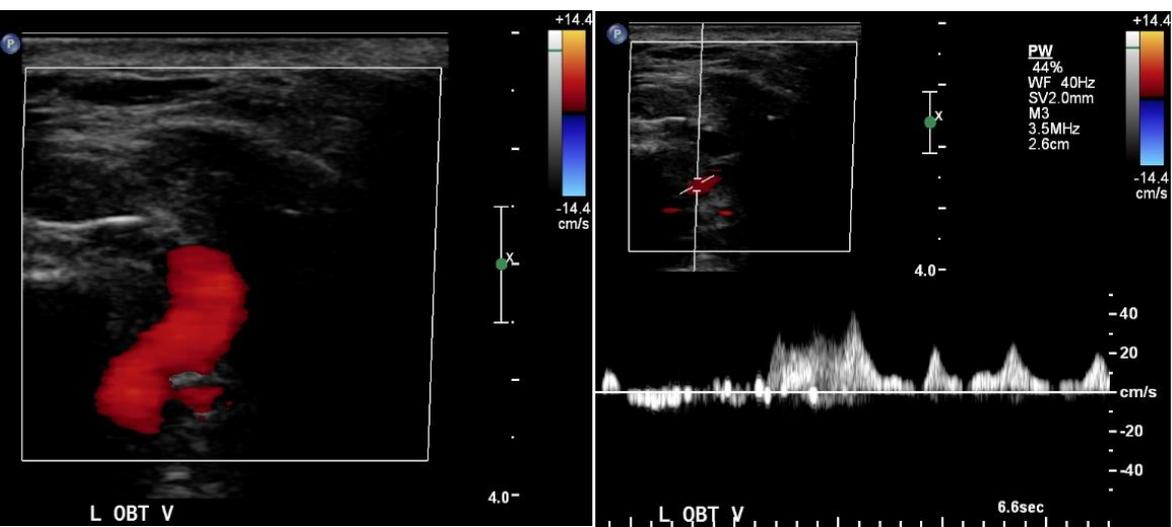
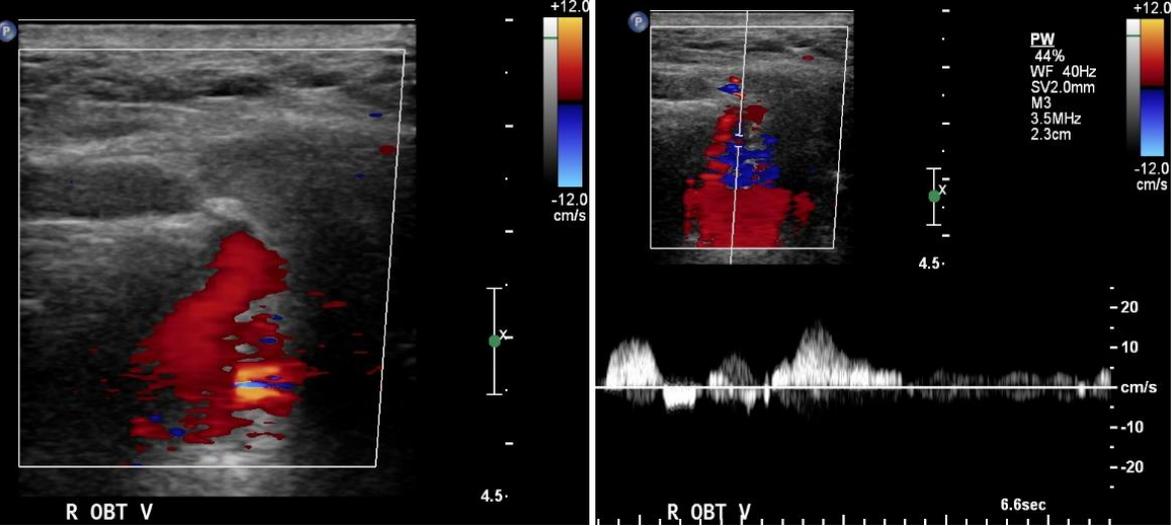
**View from inferior
in the supine position**

Excellent imaging can be achieved even with a linear transducer of the pelvic veins and their connections with the pelvic floor and lower limbs.

Four windows in each hemipelvis: Gluteal, perineal obturator and inguinal

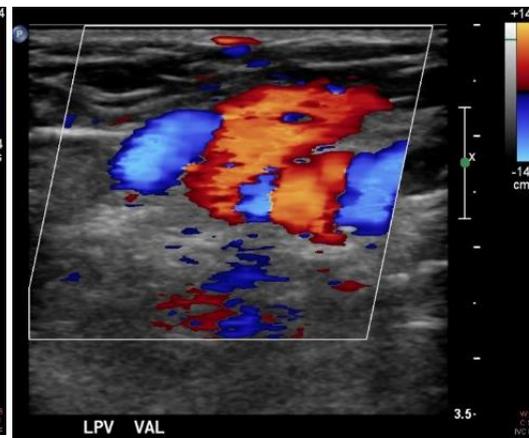
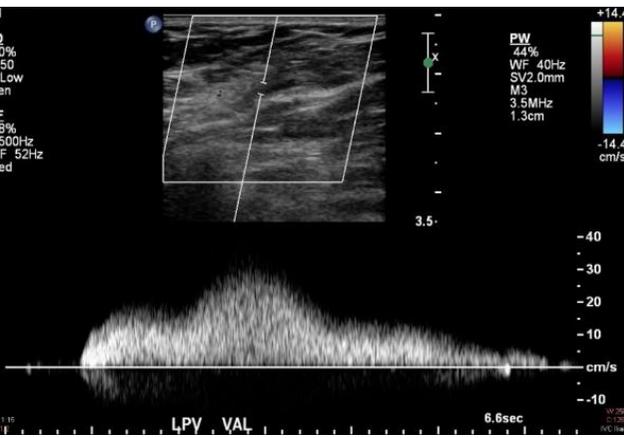
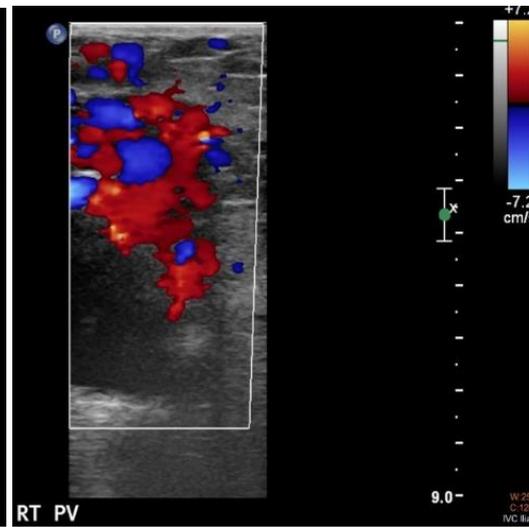
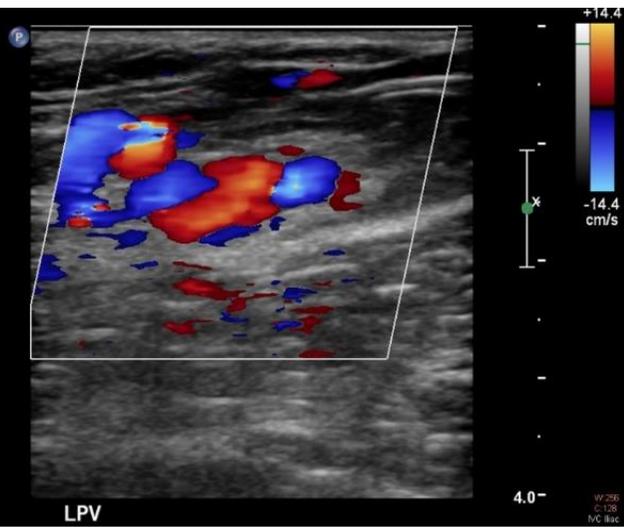
Lateral view of the right hemi-pelvis with the vertebral column removed demonstrating the course of the pelvic veins and corresponding view points from inferior view.





Obturator vein reflux

Both obturator veins were dilated and had reflux exiting the pelvic floor. The small hook characteristic of these veins is seen in both images. The hook is better appreciated in the venogram as the ultrasound has small field of view.



Medial to the SFJ

Perineal veins extending medially and postero-medially in both lower limbs.

Reflux is seen in all images during Valsalva maneuver.

Such veins are often seen during the physical exam which is a good way to identify these patients.

Pelvic Venous Disorders – Key points

Reflux, obstruction or both

Left renal vein

IVC, Iliac veins – CIV, IIV, EIV

Ovarian veins

Connections with lower extremity veins

Ultrasound is the diagnostic test of choice

Other tests such as CTV and MRV may be useful when there is suboptimal imaging or limited experience with ultrasound.