

Pelvic congestion syndrome - our experiences in 36 years

diagnosed thousands of patients with vascular compression syndromes
hundreds successfully operated
hundreds successfully treated

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Conflict of interest

Thomas Scholbach invented the PixelFlux-technique and his son Jakob Scholbach, owner of Chameleon-software, wrote the PixelFlux-software
www.chameleon-software.de

Agenda

- Defining pelvic congestion
- Causes
- Treatment



What is pelvic congestion syndrome?

- **Pelvic pain and dysfunction** of pelvic organs due to increased blood volume in pelvic organs and blood vessels
- **Reduced drainage**
 - left (right) common iliac vein / vena cava inferior
- **Increased venous influx**
 - Left gonadal vein, asc. lumbar vein, contralateral internal iliac vein
- **Diagnosis**
 - Symptoms
 - Proof of obstruction and/or flooding
 - Requires measurement of blood volumes by volumetry and tissue perfusion measurement with the PixelFlux technique



How to evaluate pelvic congestion?

- B-mode ultrasound: Edema/varicose veins/common iliac vein distension
- Colour Doppler ultrasound: Increased venous blood flow in pelvic organs- PixelFlux measurement
- **Asymmetry** of pelvic venous drainage/volumetry
- Outflow **obstruction**:
 - On the promontory/beneath the right common iliac artery/lordogenetic compression of the vena cava inferior/compression by the right renal artery/diaphragmatic obstruction/
- Increased influx: via left gonadal / contralateral internal iliac vein
- Orthostatic venous pooling in pelvis and legs



Pelvic congestion is only one colour in a spectrum!

Synchronous occurrence of multiple compression syndromes is the rule not the exception

- **Lordogenetic midline syndrome**
- **Typical sequence** of vascular compressions
 1. Left renal vein compression
 2. Left common iliac vein compression
 3. Vena cava inferior compression
 4. Coeliac trunk compression
 5. Duodenal compression
 6. Internal jugular vein compression
 7. Subclavian vein compression
 - Femoral vein compression
 - Popliteal vein compression
 - Cubital vein compression
 - Splenic vein compression
 - Superior mesenteric vein compression
 - Portal vein compression
 - Hepatic vein compression
 - Jejunal vein compression
 - Gastric compression
- Insidious development of symptoms starting in puberty
- Female preponderance (90% in diagnosed, 84% in our operated cases)
- **Hypermobility disorders (hypermobile Ehlers-Danlos syndrome)**
 - Flat lower thoracic aperture
 - Increased lumbar/cervical lordosis
 - Spinal length- pelvic width - carrying weight
- **Narrow abdominal cavity**
 - Space reservoir **decompensates** with
 - Orthostasis
 - Food uptake
 - Certain body postures



Diagnosis

What you need

Compassion

Trust

Knowledge

Experience

Time

Functional quantitative colour
Doppler ultrasound

What you rarely need

Three-dimensional reconstruction of
Venous CTA in 1 mm slices

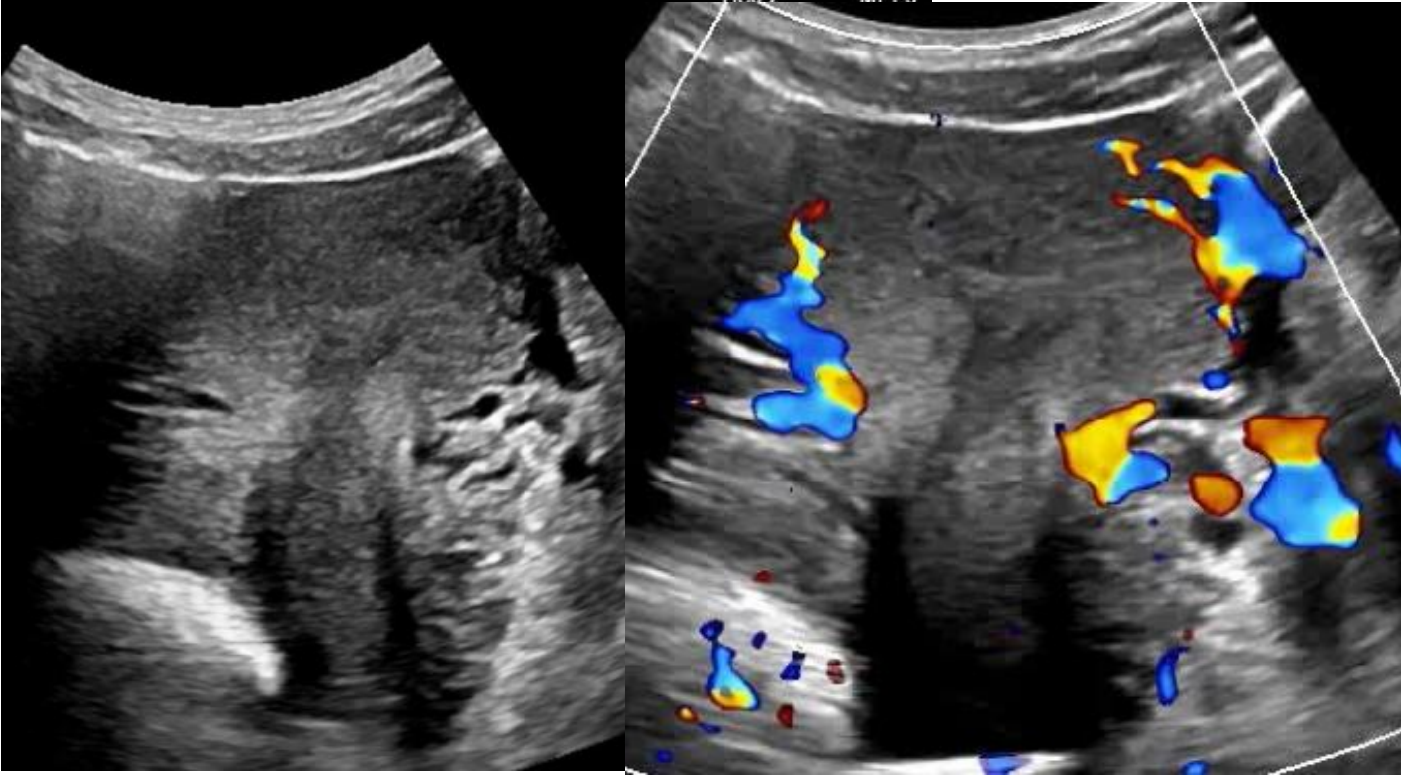
What you can forgo

- Psychologist
- MRI
- Intravascular ultrasound
- Transvaginal ultrasound
- Diagnostic laparoscopy
- Nerve decompression



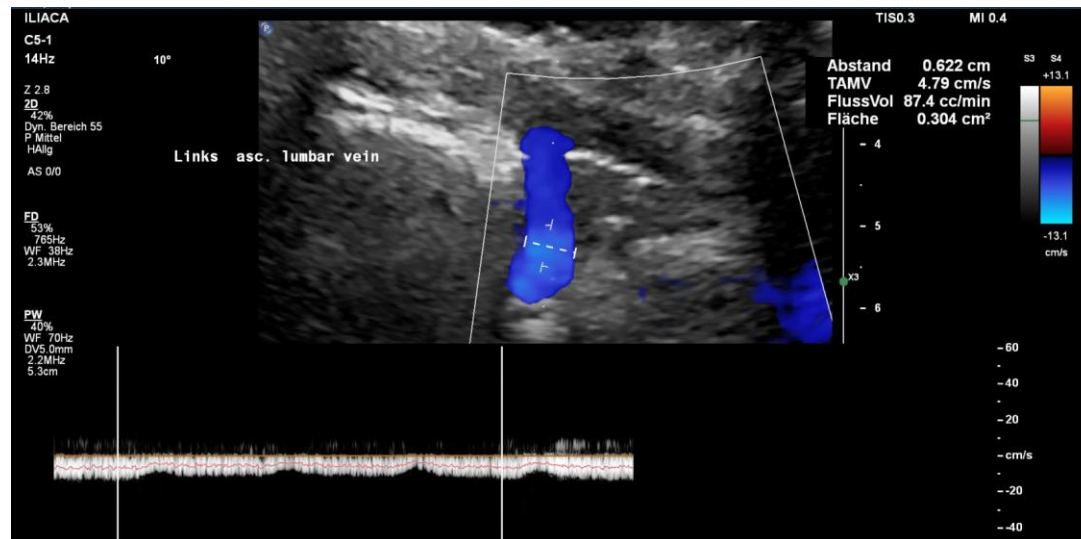
Maximum wall thickness of the vagina < 3 mm

Varicose veins

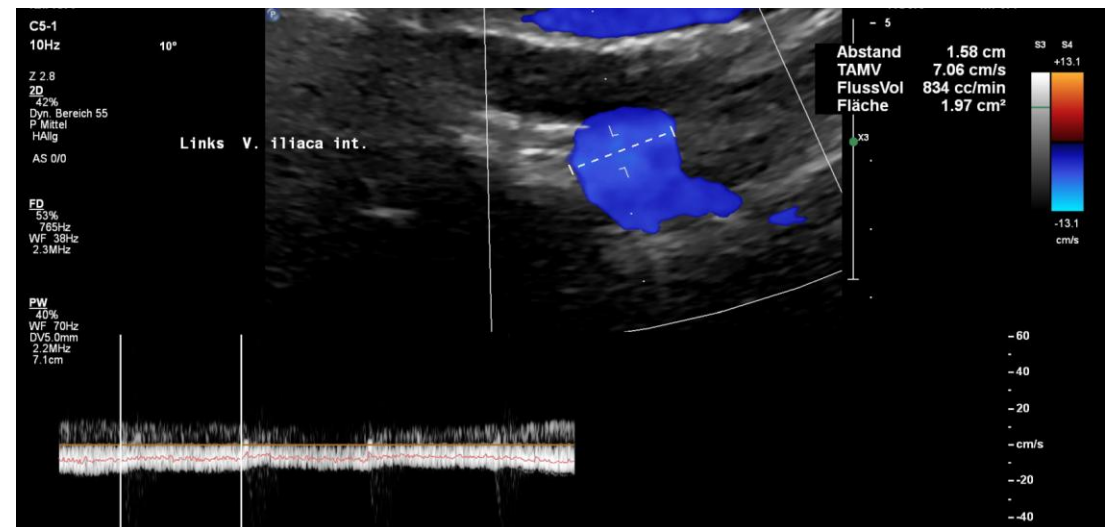


Blood flow volume measurements in the internal iliac veins and collaterals

Cranial flow in the left ascending lumbar vein



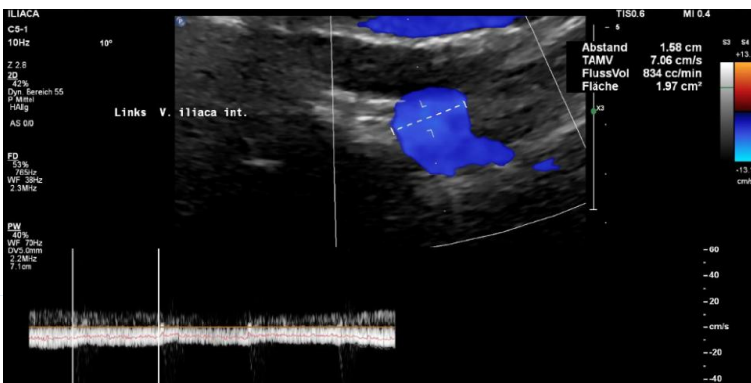
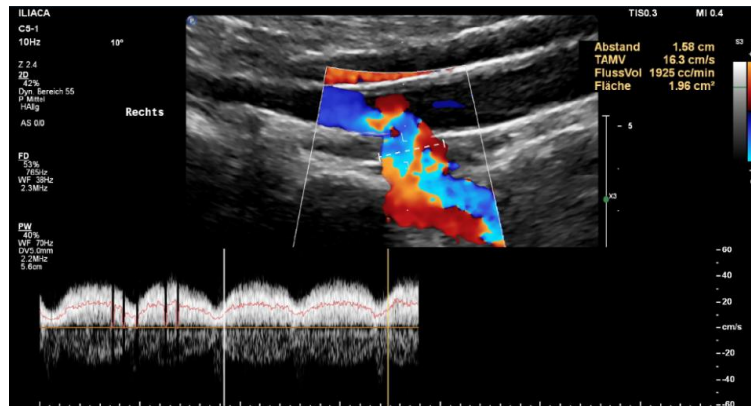
Retroverted flow into the left internal iliac vein



Asymmetry of the venous drainage of the pelvic organs

Blood flow volume measurements in the left and right internal iliac vein

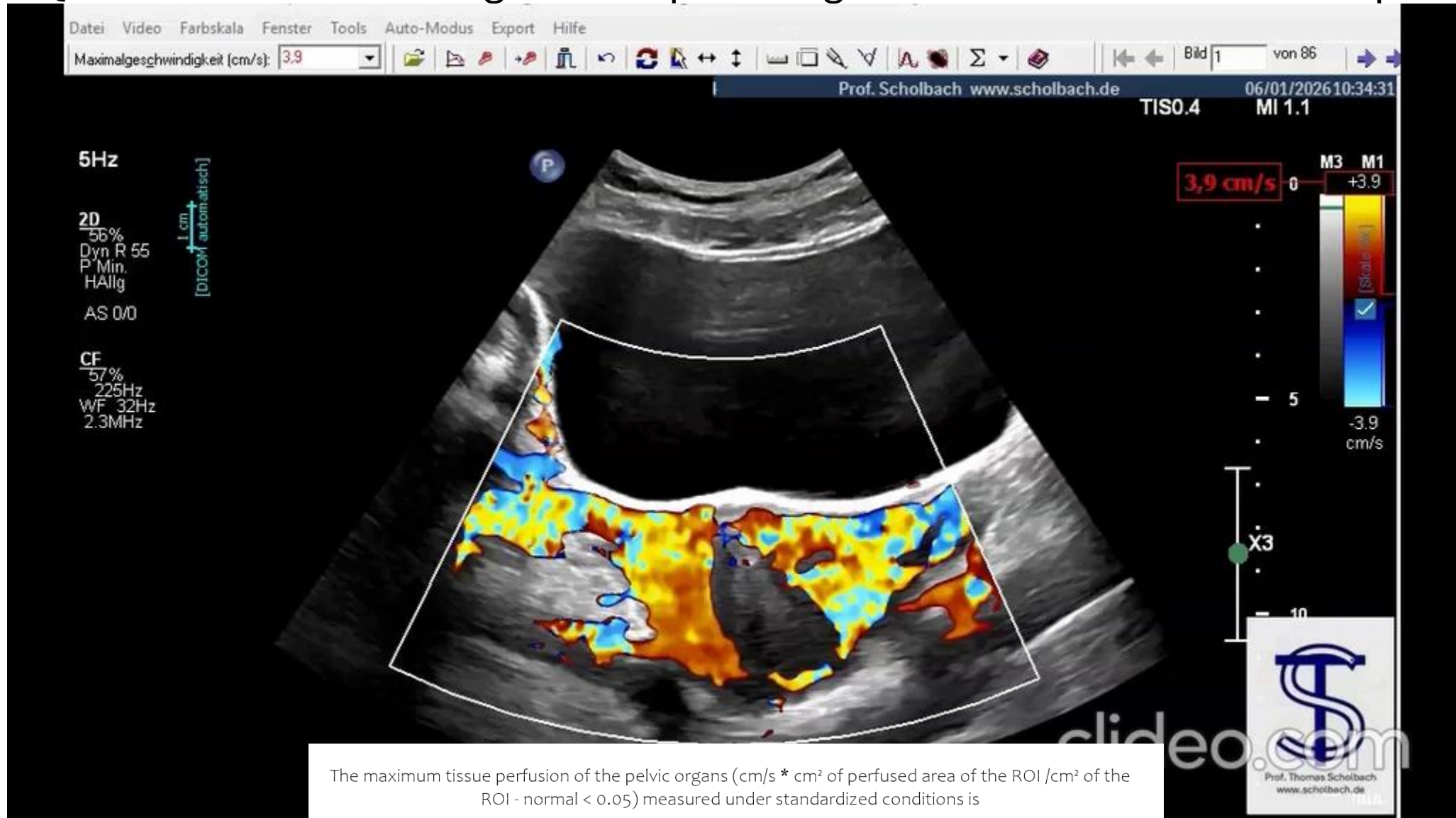
Calculation of the discrepancy



Side	Internal iliac vein flow volume (ml/min)	Share of the left side on the total pelvic drainage volume (%)
Left	-834	-30 %
Right	1925	Normal ~ 50%



Quantification of the congestion of pelvic organs with the PixelFlux technique

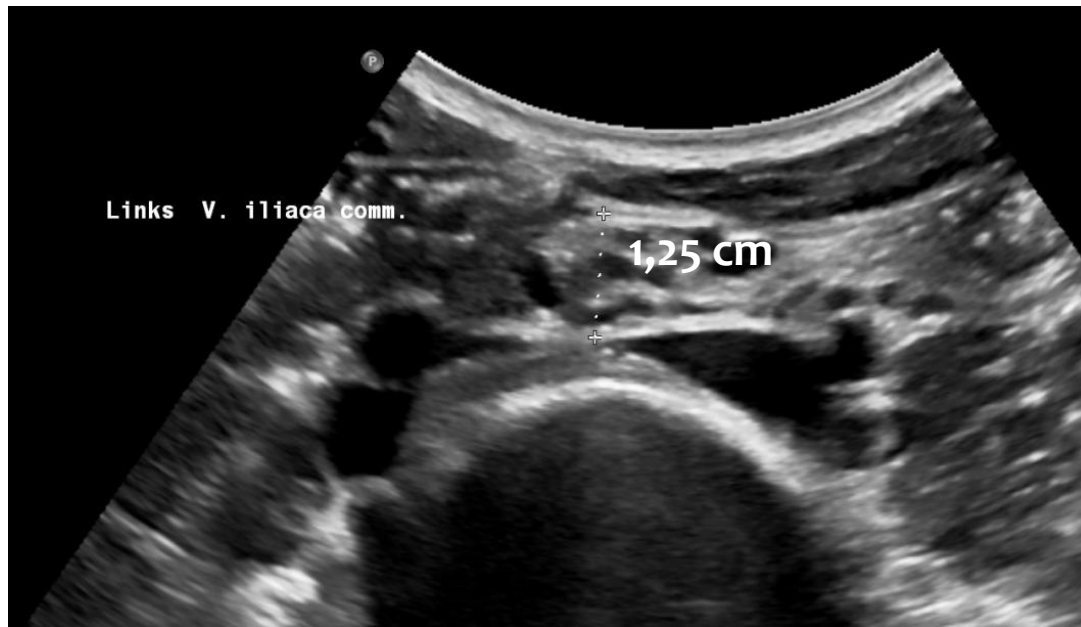


Organ	mean (%)
urethra	1222.0%
uterus	3534.0%



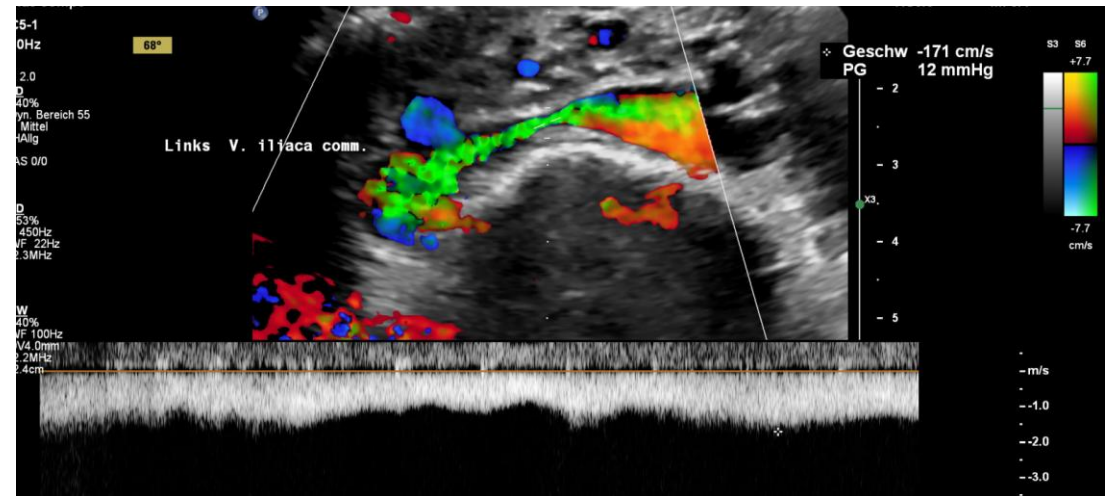
Left common iliac vein compression

Uplifted promontory reducing the abdominal depth



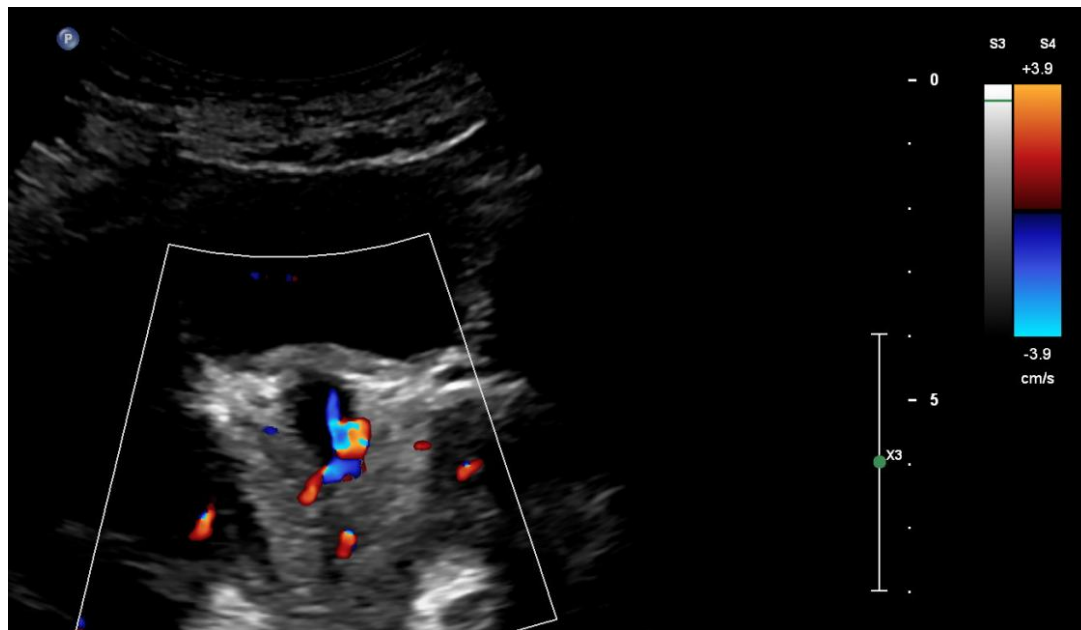
Pressurisation by uplifting –

Maximum compression not always by the right common iliac artery



Urethral congestion: residual volume, urgency, frequency, dysuria

Urethral congestion requiring self catheterisation until the decompression of the left common iliac vein



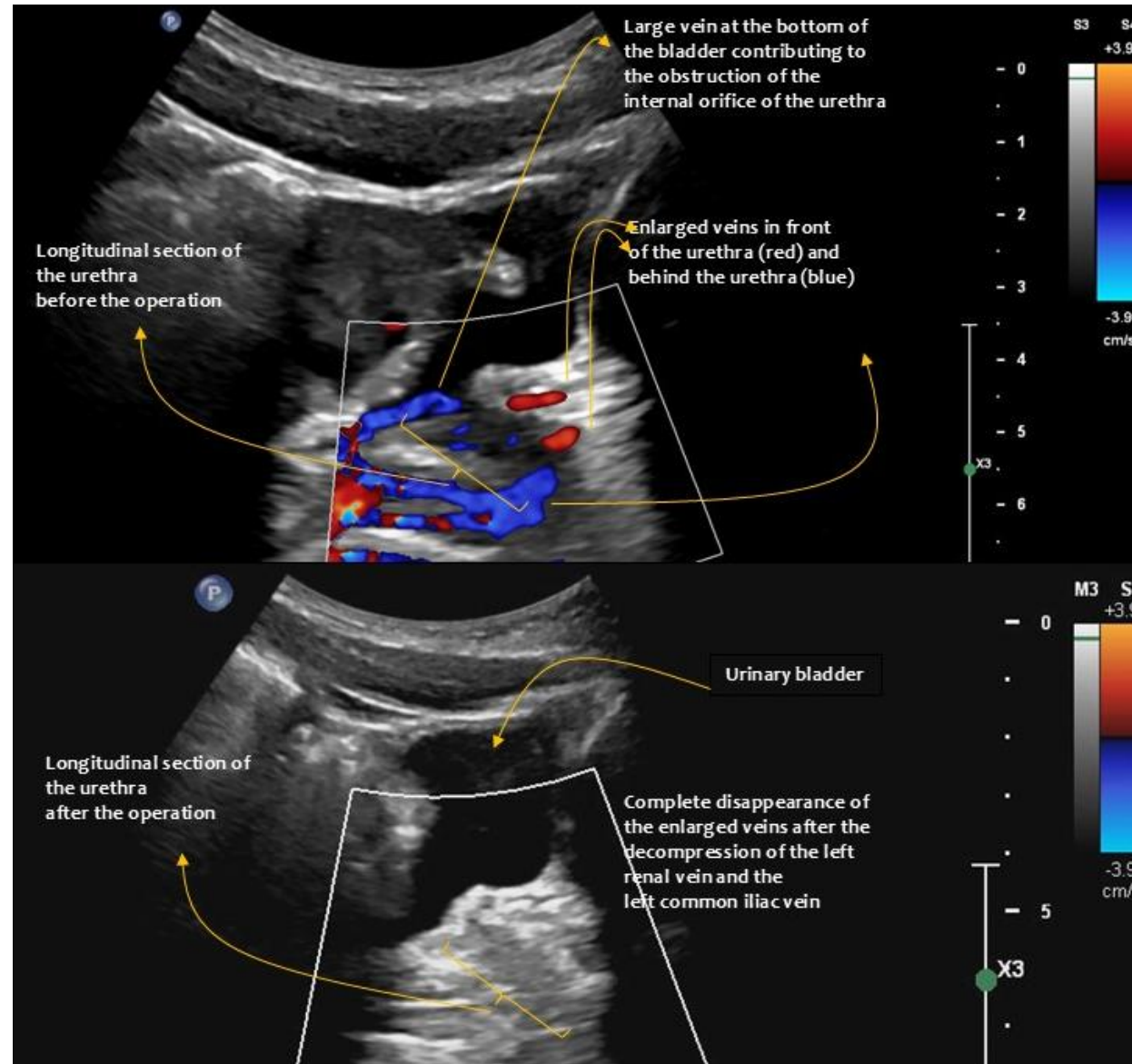
PixelFlux tissue perfusion of the pelvic organs measured under standardised conditions ($\text{cm/s} \cdot \text{cm}^2$ of the perfused area of the ROI / cm^2 of the ROI – normal < 0.05)

rectum	0,073	146%
urethra	0,363	726%
uterus	0,534	1068%
vagina	0,204	408%

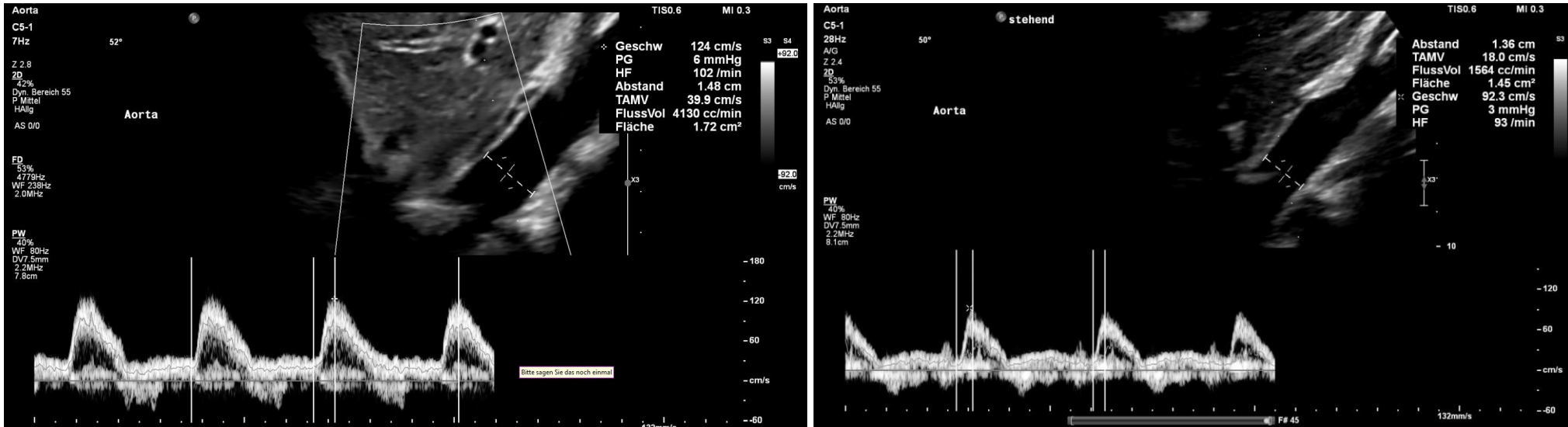


Urethral congestion

No more self catheterisation after PTFE-decompression of the left common iliac vein



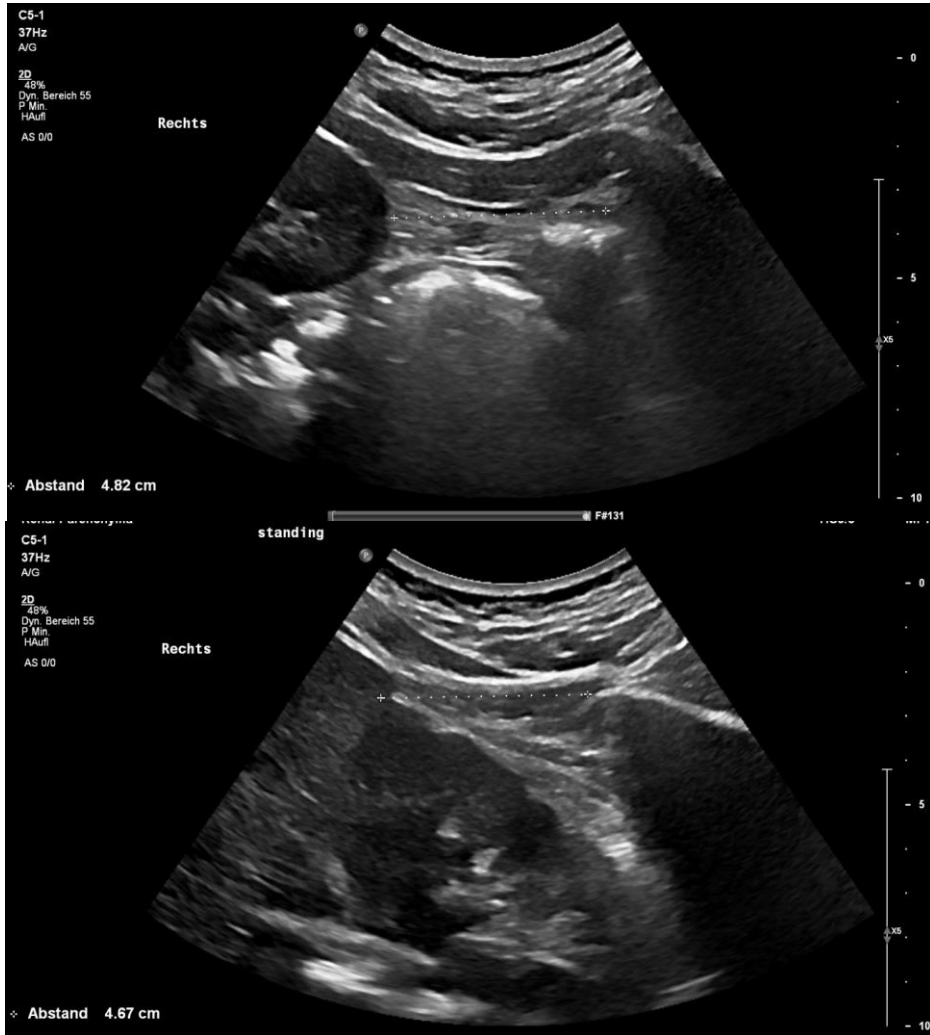
Orthostatic pooling and reflux



Posture	Abd. aortic flow volume (ml/min)	Heart rate (1/min)	Systol. flow velocity (cm/s)	Abd. Portion left ventricular ejection (ml)
horizontal	4130	120	124	40
upright	1564	93	93	17
Orthostatic difference (%)	-62%	-9%	-25%	-58%

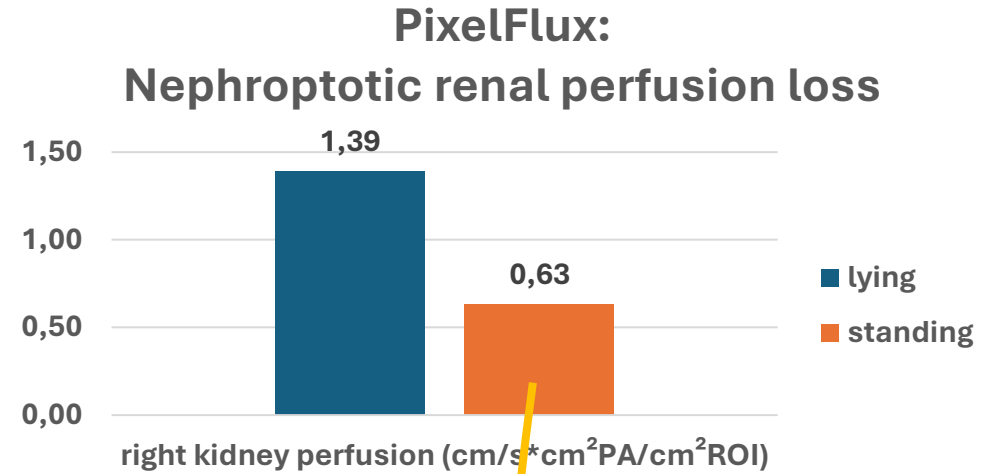


Functionally relevant orthostatic nephroptosis:



drives pelvic congestion due to reduced renal blood uptake

is successfully treated with nephropexy



Side	Posture	Distance of the lower pole to the iliac crest (cm)	Distance of the upper pole to the iliac crest (cm)	Renal length	Orthostatic renal ptosis (cm)
Left kidney	Horizontal	57			
Right kidney	Horizontal	48		107	
Left kidney	Vertical	20			37
Right kidney	Vertical		47		108



Treatment

What you should avoid

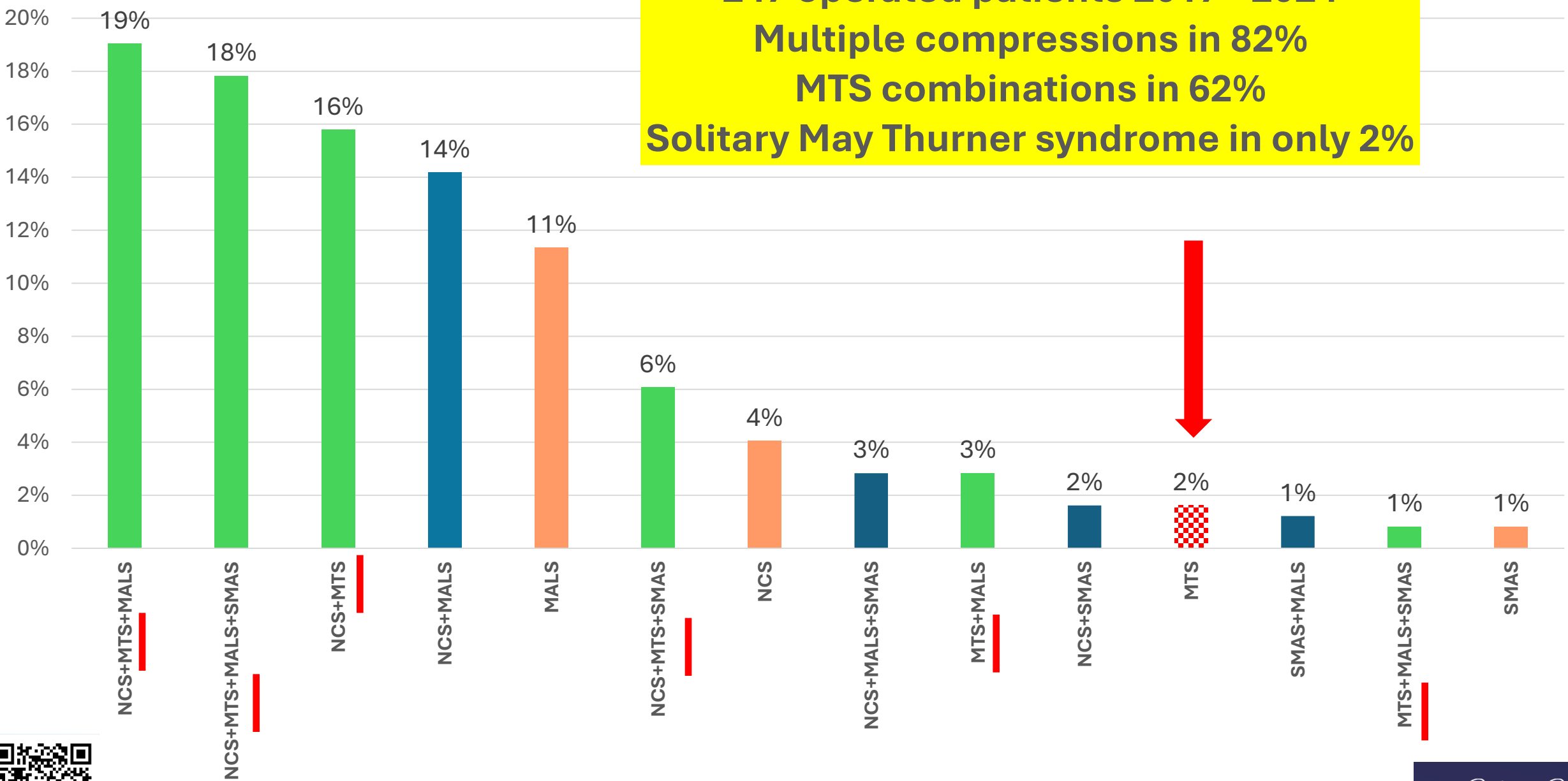
- Reduction of the collaterals
- Embolization
- Coiling
- Ligation
- Hysterectomy
- Stents

What you need to do

- Reduce spinal curvature
- Foster collaterals
- Decompress venous obstructions

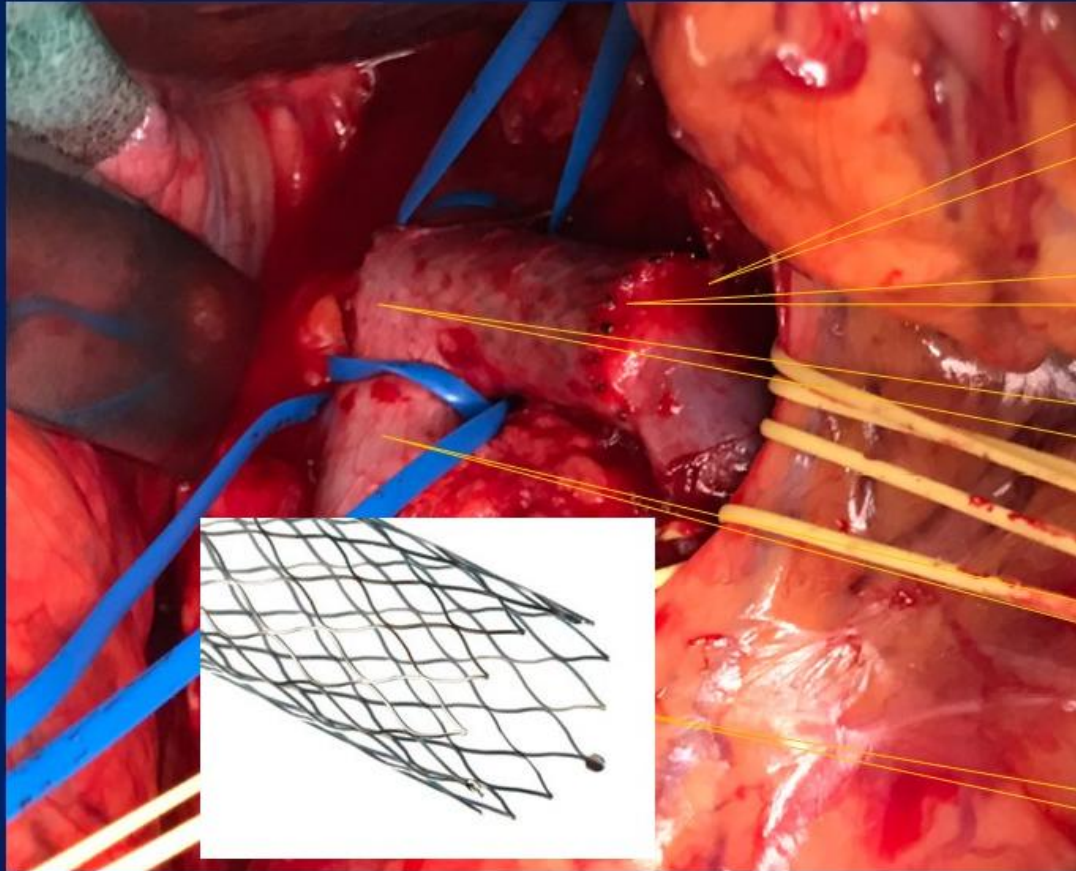


247 operated patients 2017 - 2024
Multiple compressions in 82%
MTS combinations in 62%
Solitary May Thurner syndrome in only 2%



What a stent may look like

<https://scholbach.de/de/risiken-venoesser-stents>



left renal vein seen from the left side, hanging down in front of the left aperture of the stent

poking left sided aperture of the venous stent

poking right sided aperture of the venous stent

inferior vena cava

triangular peaks of a stent opening



Non-invasive treatment

Reduction of the lumbar lordosis

Daily physical training

Planks

Prone trunk elevation

Pelvic tilt control

Flexing hips

Contraction of gluteal and abdominal muscles

Weight reduction

Squats

Fostering of collateral pathways

- Aspirin and physical exercises



Surgical treatment

“Nihil nocere!”

Do not harm the vein

- No stent
- No embolization
- No bypass
- No patch

Reconstruct venous return

- Ring enforced PTFE shield covering the compressed portion of the vein
- Left common iliac vein and left renal vein
- Nephropexy if orthostatic nephroptosis is haemodynamically relevant (PixelFlux)
- Treat all other compression simultaneously

