

Hemodynamic Consequences of Pre-and Retroaortic
Left Renal Vein Compression („Nutcracker Syndrome“)
Causing a Surprising Variety of Symptoms and
Complaints, Especially in Patients Affected by
Hypermobility Spectrum Disorders

Wilhelm Sandmann ¹,

Thomas Scholbach ²

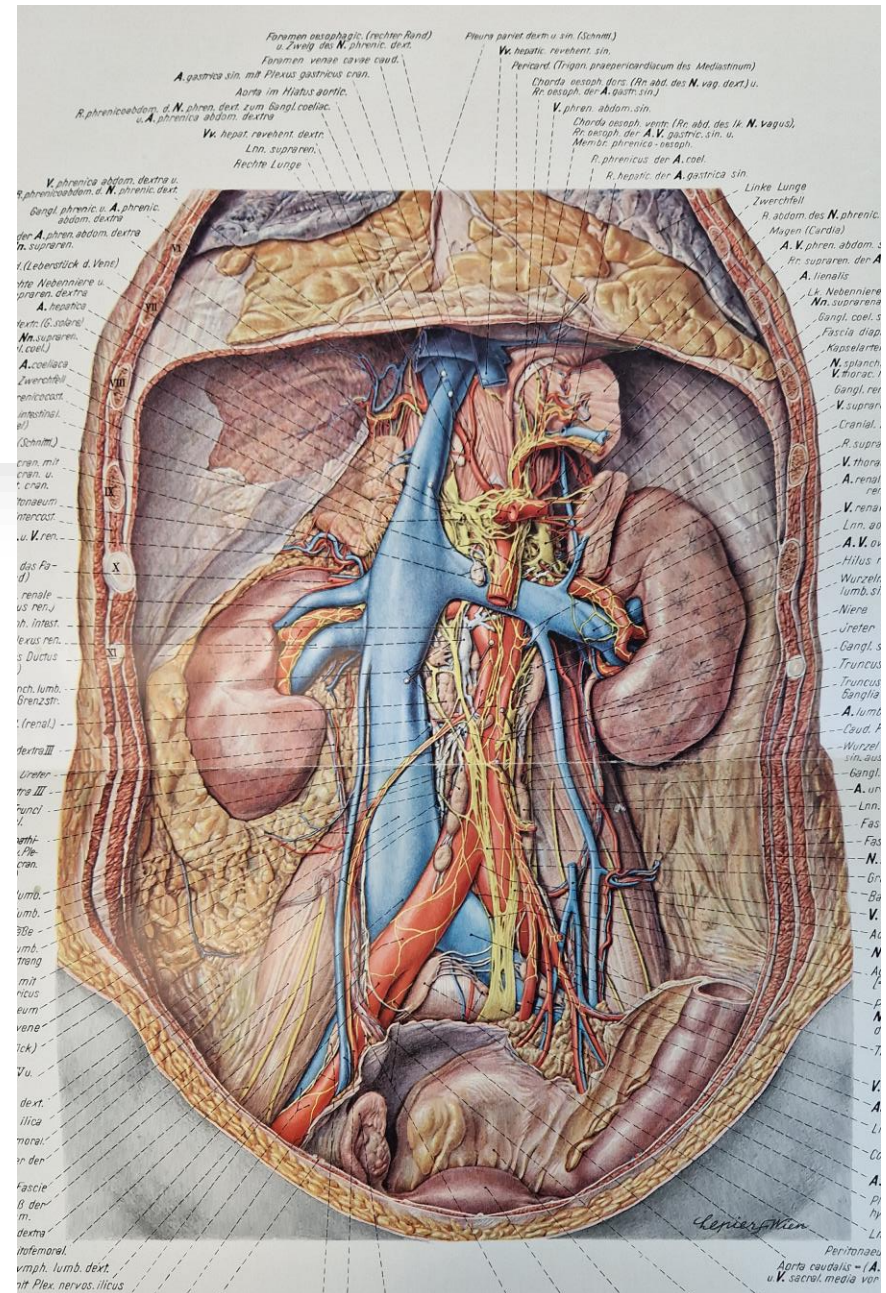
¹ Clinic Bel Etage ,Head , Dept. Vasc. Surgery, Prof. emer. former chairman Vasc. Surgery ,
former dir, dept. Vasc.surgery and kidney TX, Heinrich Heine Univ. Düsseldorf

² Praxis für USD Diagnostik für Kinder und Erwachsene, Leipzig

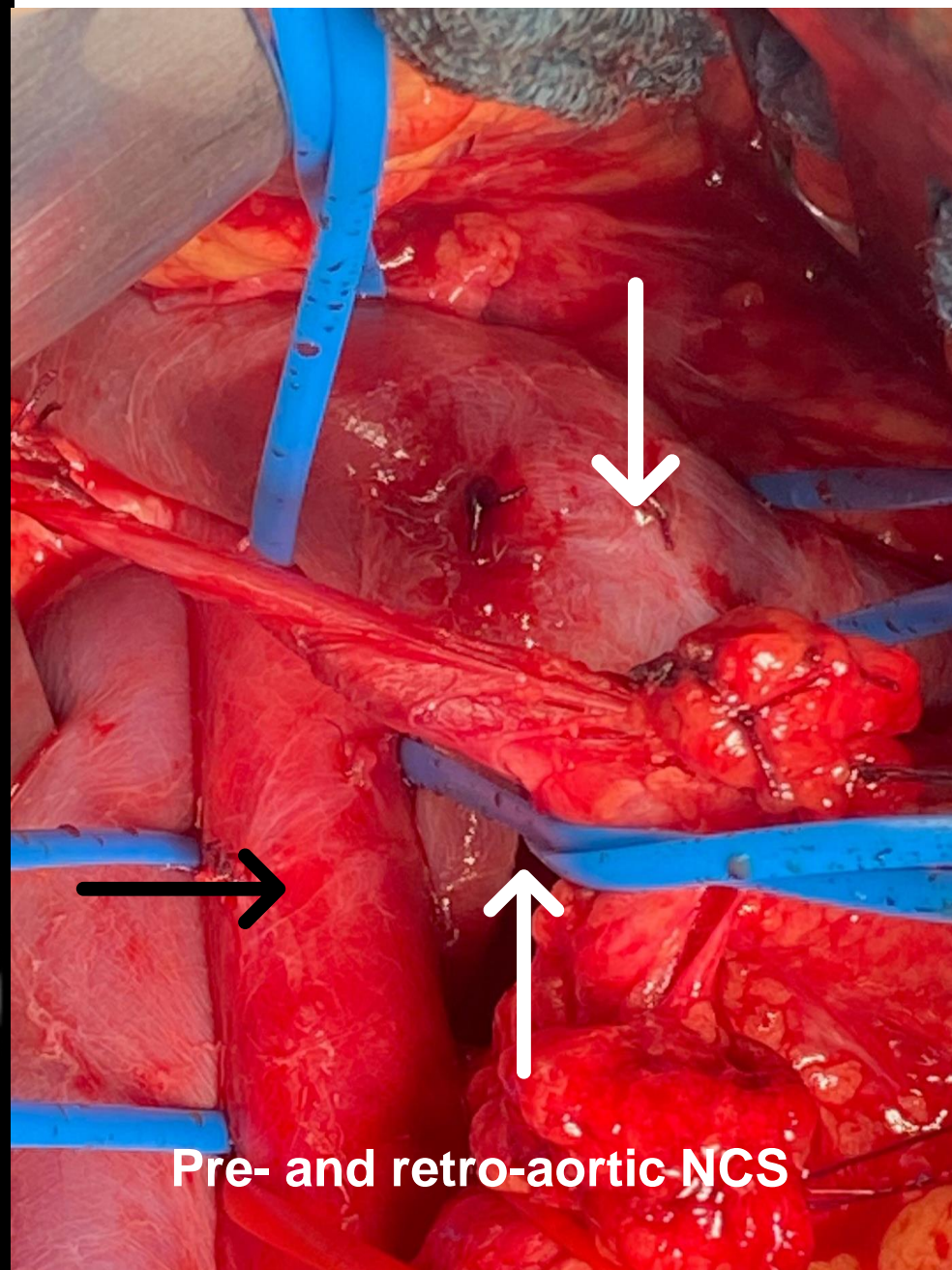
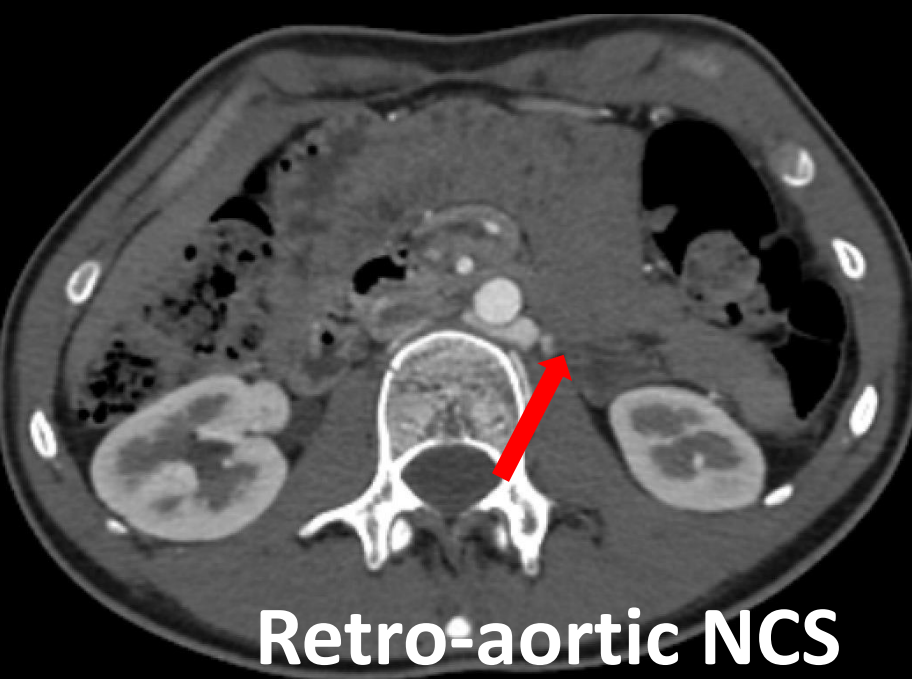
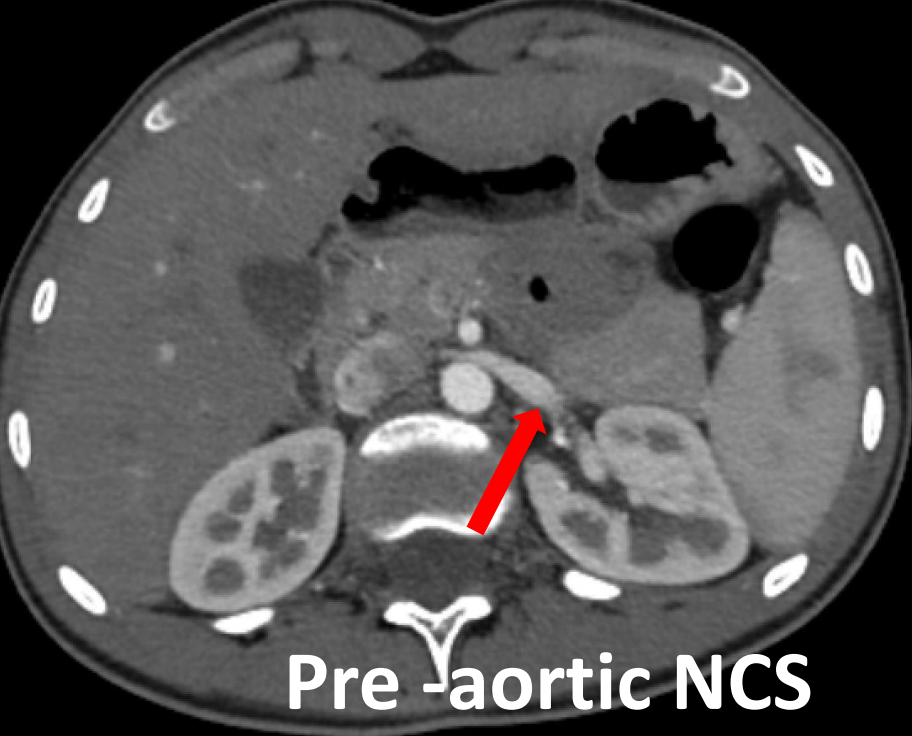
Nothing to disclose

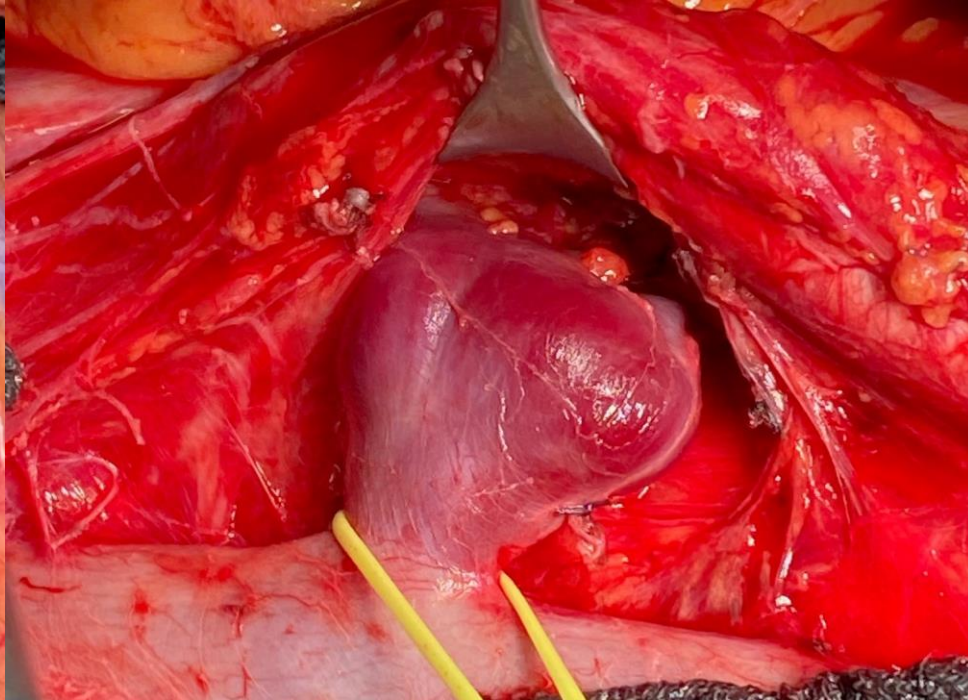
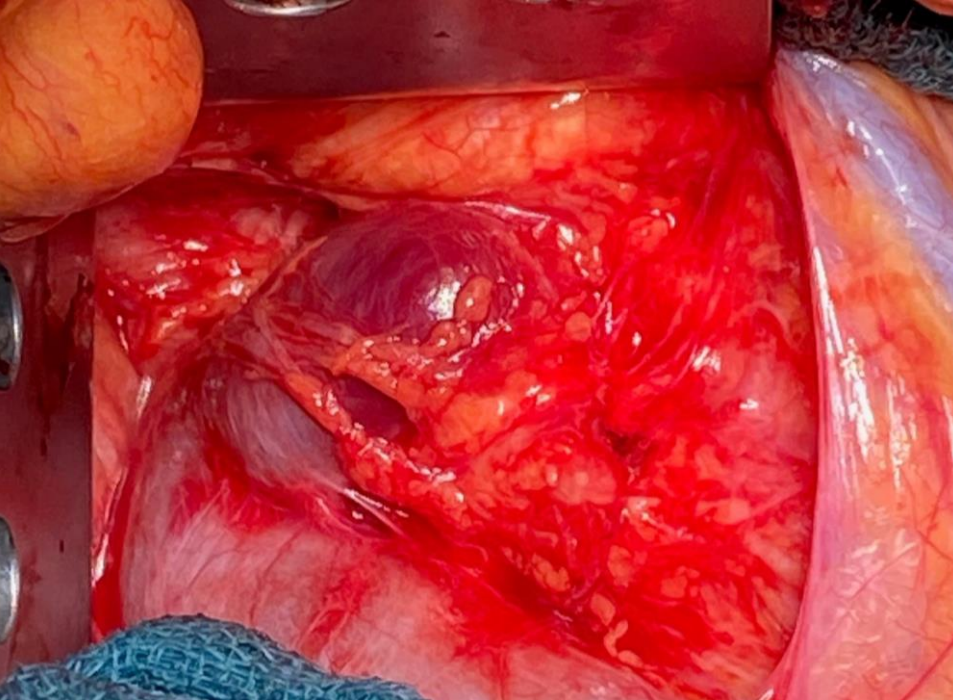
Nutcracker Syndrome – The Chameleon

- Functional Disorder and
- Symptoms according to:
- Regional (Anatomical) Congestion
- Kidney (Hematuria)
- Ovar left side (Pelvic pain, Menstruation)
- Suprarenal Vein (Suprarenal gland Insufficiency-M.Addison
- Spinal Neurological Symptoms and Dysfunction (Headache, Migraine, Nausea, Vertigo, POTS, Paraparesis, Monoparesis)

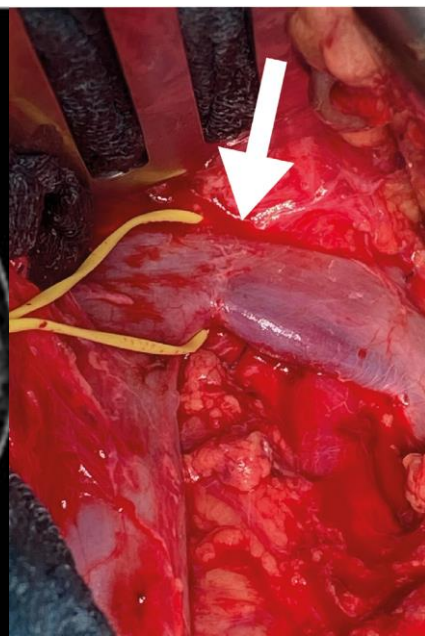
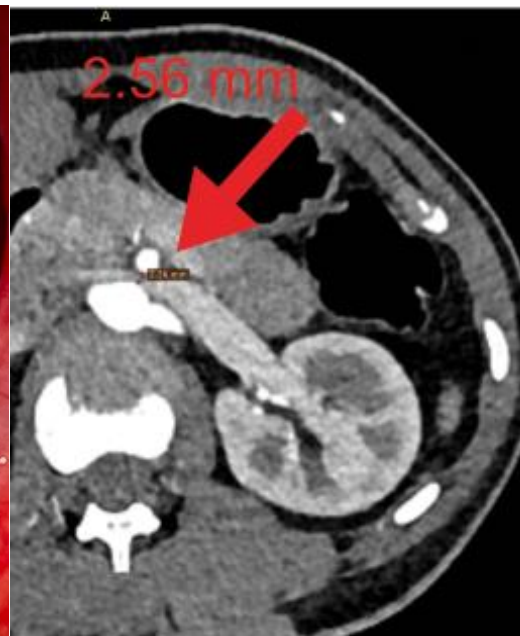
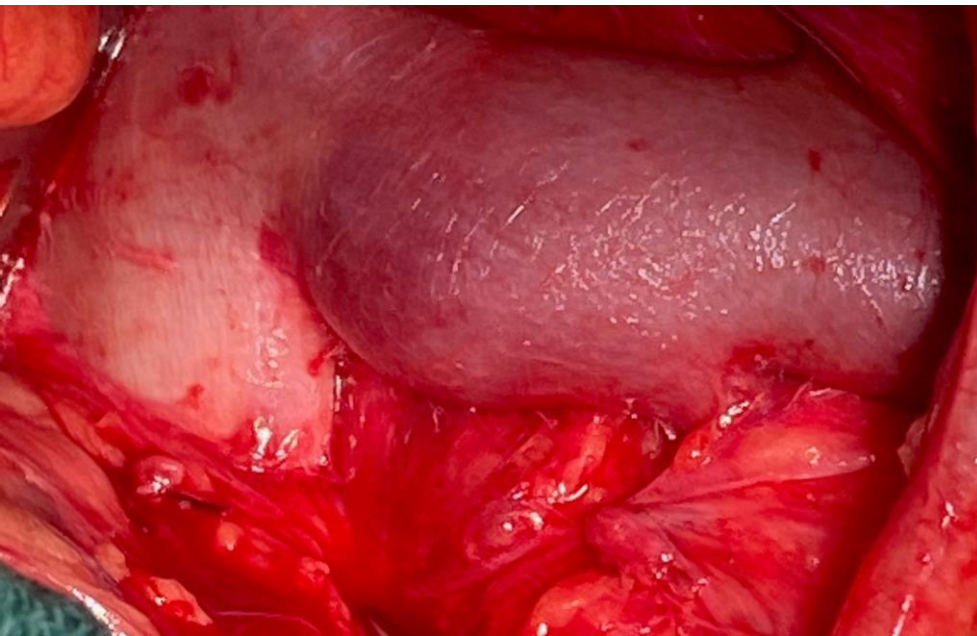


Eduard Pernkopf –
Topographische Anatomie (1941)

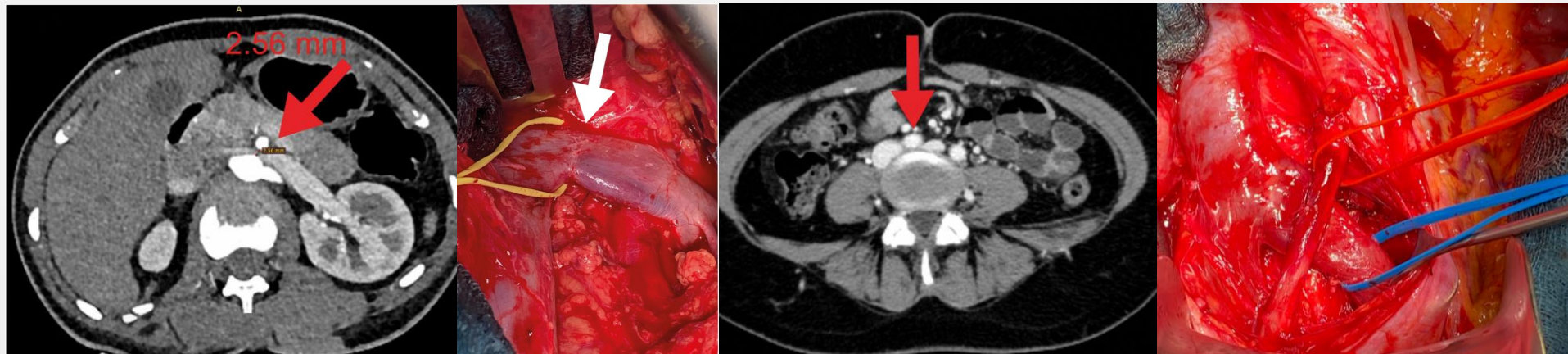




LRV Aneurysms and nutcracker syndrome: are these appropriate for stenting???



More complex Symptomatology: Nutcracker S. and MAY-THURNER S. appear often simultaneously with compressions within the abdomen (MALS and SMAS =WILKIE Syndrome)



Nutcracker

MAY-THURNER

	240 Patients
NCS, MTS, MALS, SMAS	41
NCS, MTS, MALS	43
NCS, MTS, SMAS	14
NCS, MTS	39
NCS, MALS, SMAS	7
NCS, MALS	36
NCS, SMAS	4
NCS	10
MTS, MALS, SMAS	2
MTS, SMAS	0
MTS, MALS	7
MTS	4
MALS	28
SMAS	2
SMAS, MALS	3
Total NCS	184 multi compressions out of (194)



16 years old girl with NCS and SMAS (WILKIE) just after implantation of PEJ to prevent further loss of weight

Patient Data 01.01.2017-31.12.2023		
Patients total (All types of compression syndr.)	240	100%
Female patients	200	83%
Male patients	40	17%
Average age years; all patients	30,68	
female patients, years	31,21	
male patients, years	28,58	
Patients operated for NCS, total	194	80,83%
Operated for NCS and Multi-CS.	184	94,84 %
Operated for Mono NCS	10	5,16%
Retro-aortic 6 P. Retro-and pre-aortic (ring) 2 P.		
Time periode: 01.01.2020 - 31.12.2023		
with HSD / hEDS	115	59,3
female patients with HSD / hEDS	102	88,7%
male patients with HSD / hEDS	13	11,3%
Beighton score 2-9; mean4,5 ; Scoliosis 28,op.2		
Nephropexies (01.01.2020 -31.12.2023)	54	47,0%
female	49	90,7%
male	5	9,3%

The Challenge for Diagnostic Work Up

We have found, that:

- NCS in HDS/ hEDS patients presents rarely as a monocompression
- if abdominal compression syndromen(s) is/are also present and patients cannot eat(NJT, PEJ, TPN), the patient is usually categorized psychotic (83% female!)



***„You don't have pain in
your abdomen - you have problems in
your head!“***

MEMOIRES ORIGINAUX

Le tronc veineux réno-rachidien

Suppléance de la veine rénale gauche

Menace pour la moelle épinière

par

Ph. FRANTZ, P. ABOULKER (*), R. KÜSS et A. JARDIN

Clinique Urologique, Hôpital de la Pitié,

83, boulevard de l' Hôpital, 75634 Paris Cedex 13

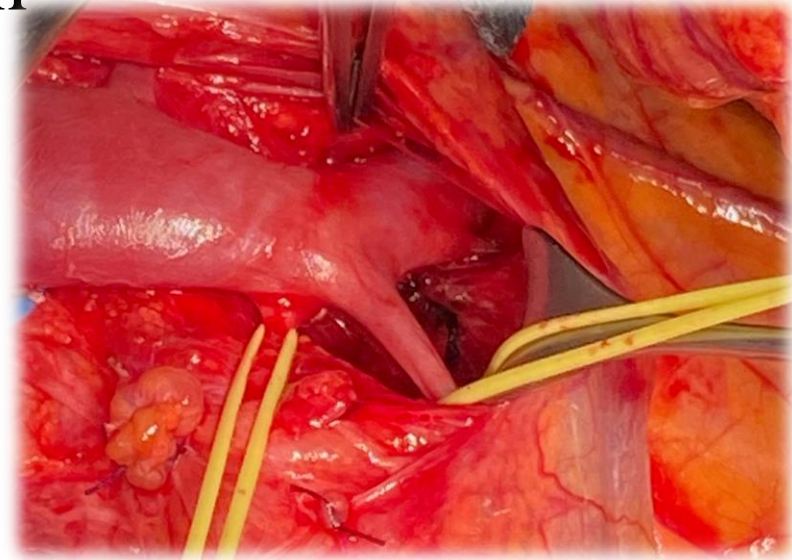
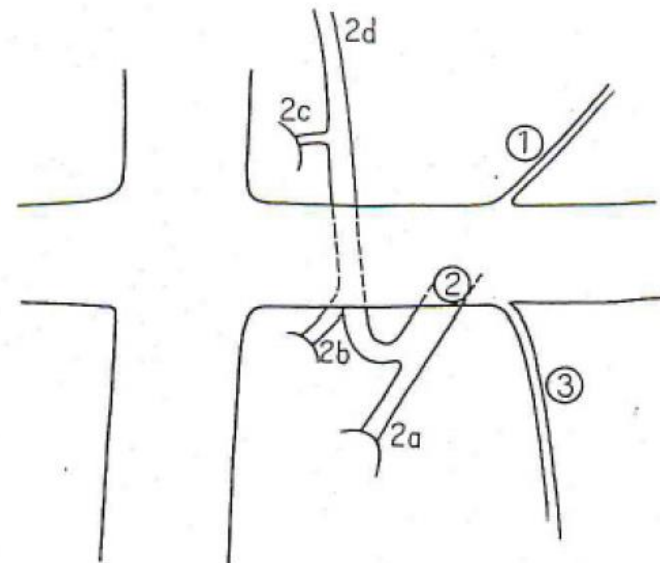


FIG. 1. — Schéma de dissection.

Cas de dissection avec un gros tronc réno-rachidien donnant 3 rameaux pour les trous D12-L1, L1-L2, L2-L3.

1. Veine surrénalienne grêle.
2. Tronc réno-rachidien :
 - a) pour l'espace L2-L3,
 - b) pour l'espace L1-L2,
 - c) pour l'espace D12-L1,
 - d) racine interne de l'hémi-azygos.
3. Veine gonadique grêle.





Le tronc veineux réno-rachidien

NCS Patients with spinal neurological symptoms and clinical results

Patients	Cases	Gender
Paraparesis	n=5 (20%) n=1 Quadriplegia	Female n=4, male n=1 Female n=1
Monoparesis	n=2 (8%)	female n=2 male n=0
Clumsy left leg	n=17 (68 %)	female n=13 male n=4
Total	N= 25 / 194 (12,9 %)	

All except one female patient were neurologically normal after decompression surgery, one female patient with quadriplegia improved to normal, but the LRV obstructed and ended with paraparesis only, 7/8 patients, arriving wheelchair bounded, walked out of the hospital on their own feet (TRONC RENO- RACHIDIEN)

Pillars on which indication for decompression is based

- a) **Clinical symptoms and dysfunctions**
- b) **Hemodynamics** (functional USD-Duplex)
- c) **Morphology** (CTA preferrable; MRI sometimes not precise)

Methods for Decompression

Periode I (01.01.2017 -31.12.2019)

proximal Vein Patch plasty of the left renal vein Transposition
superior mesenteric artery

Periode II (01.01.2020 – 31.12.2023)

ringenforced tubegrafiting (mesaortic Stent by R.BARNES)
ringenforced tubegrafiting for MTS (W. SANDMANN)

Results of treatment for NCS

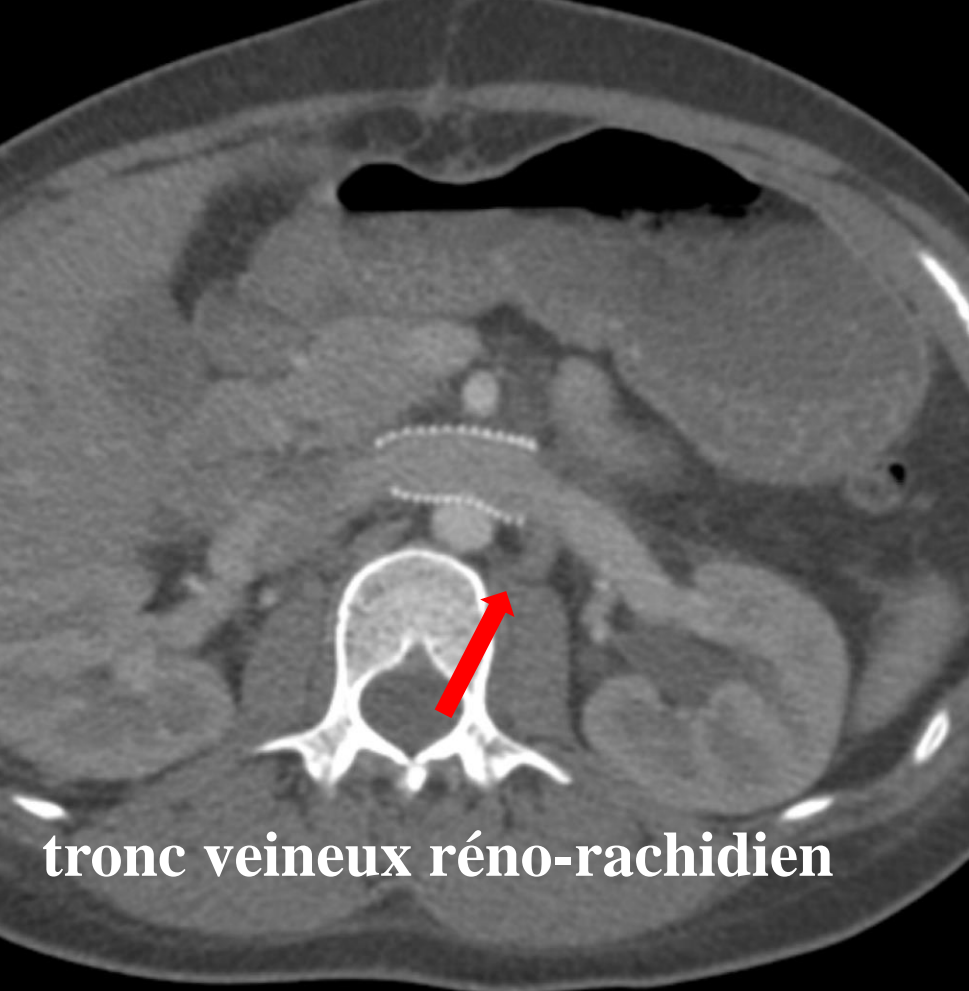
01.01.2017-31.12.2019: two recurrences due to aneurysm formation after SMAS TX

several remaining symptomatic patients, due to unresolved MTS, one death due to duodenal leakage and sepsis, liver failure after additional IVC segmental replacement.

01.01.2020 - 31.12.2023: in four patients ringreinforced PTFE tube graft had to be removed, elongated or replaced by a longer one, In two cases the left renal vein had to be replaced by an interposition graft. No loss of kidney. no infection, no death.

One thrombotic vein occlusion, two due to scar.

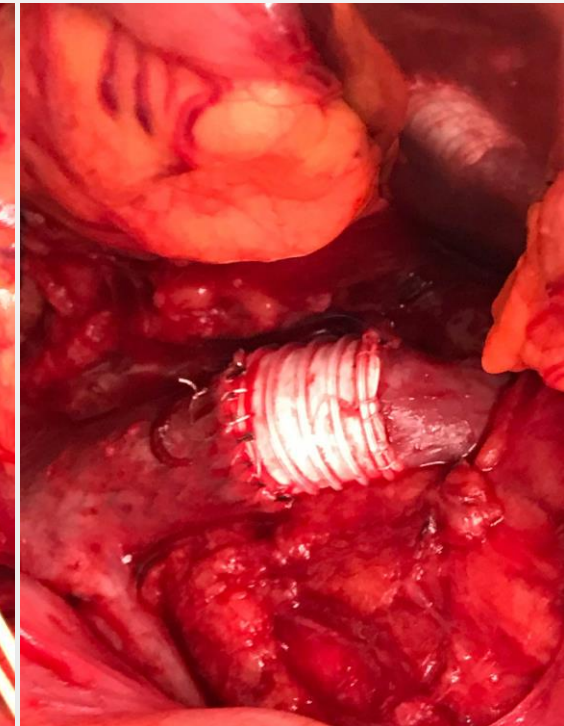
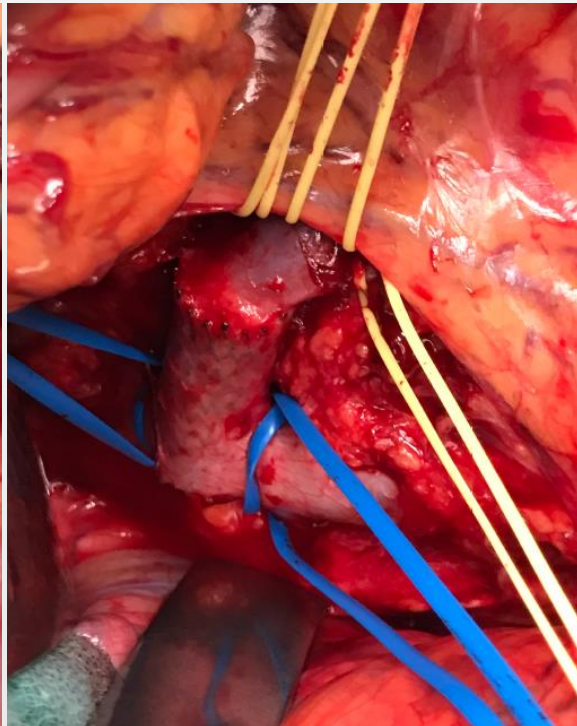
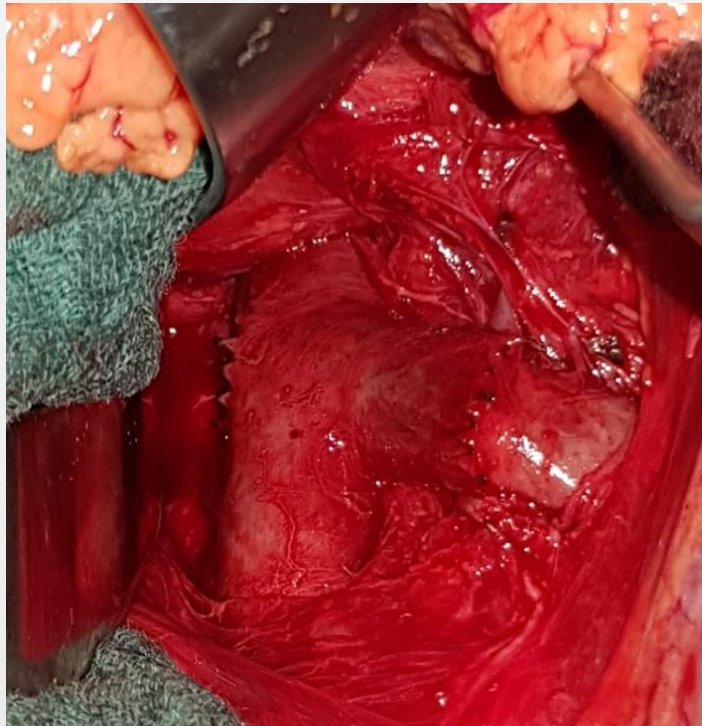
Success rate clinical and in regard to decompression 96,5 %



Our preferred Therapy today
Protection of the left renal vein
(technic by Robert Barnes 1988)

The major problems of stented patients (n:16)

- 1) Perforation of the vein by stent hooks
- 2) Protruding of the stent against the wall of the IVC resulting in flow obstruction due to a curtain like configuration
- 3) Remaining flow obstruction from stent compression



„Non-Thrombotic Venous Stenosis“

Stented (Total)

NCS

n=16 (elsewhere)

MTS

n=8

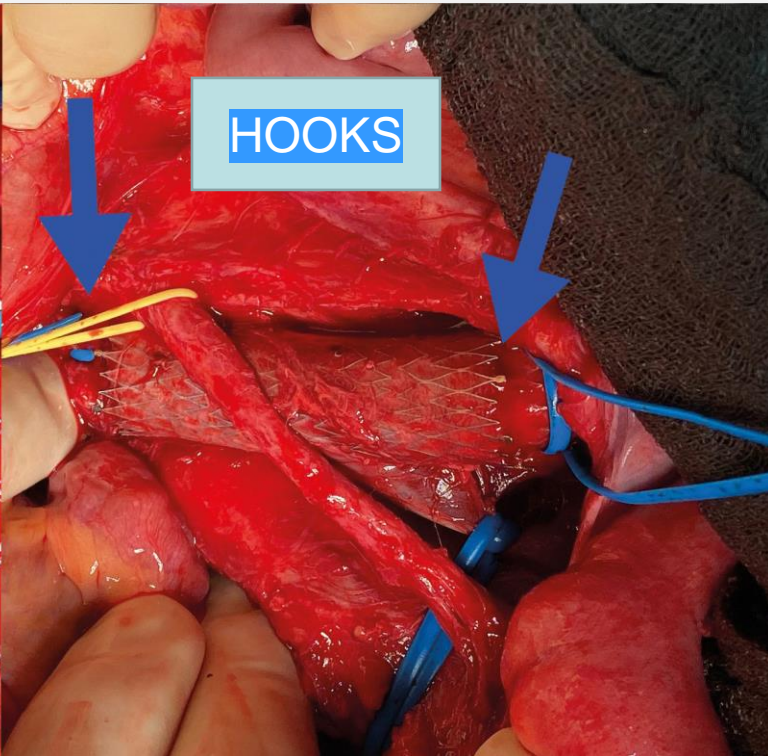
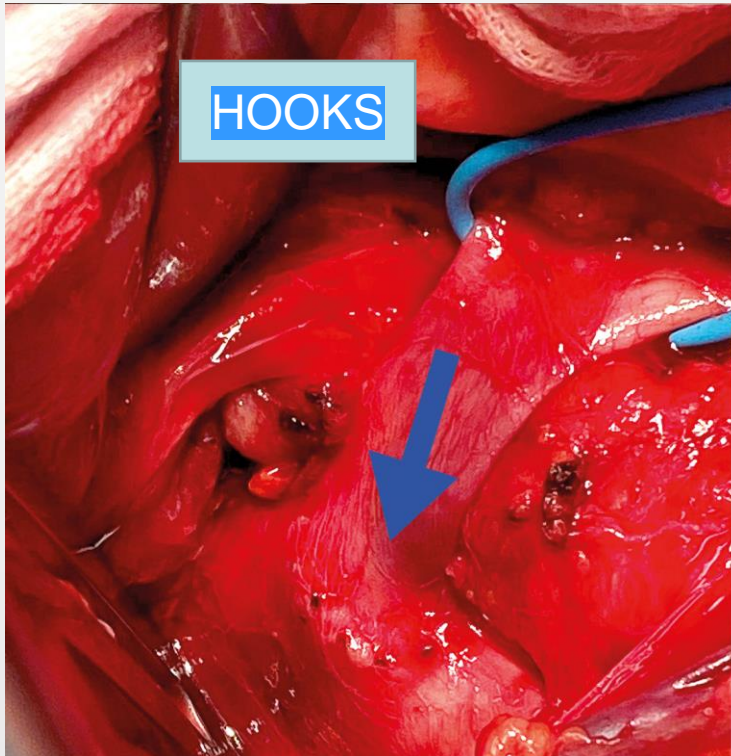
Both

n=7

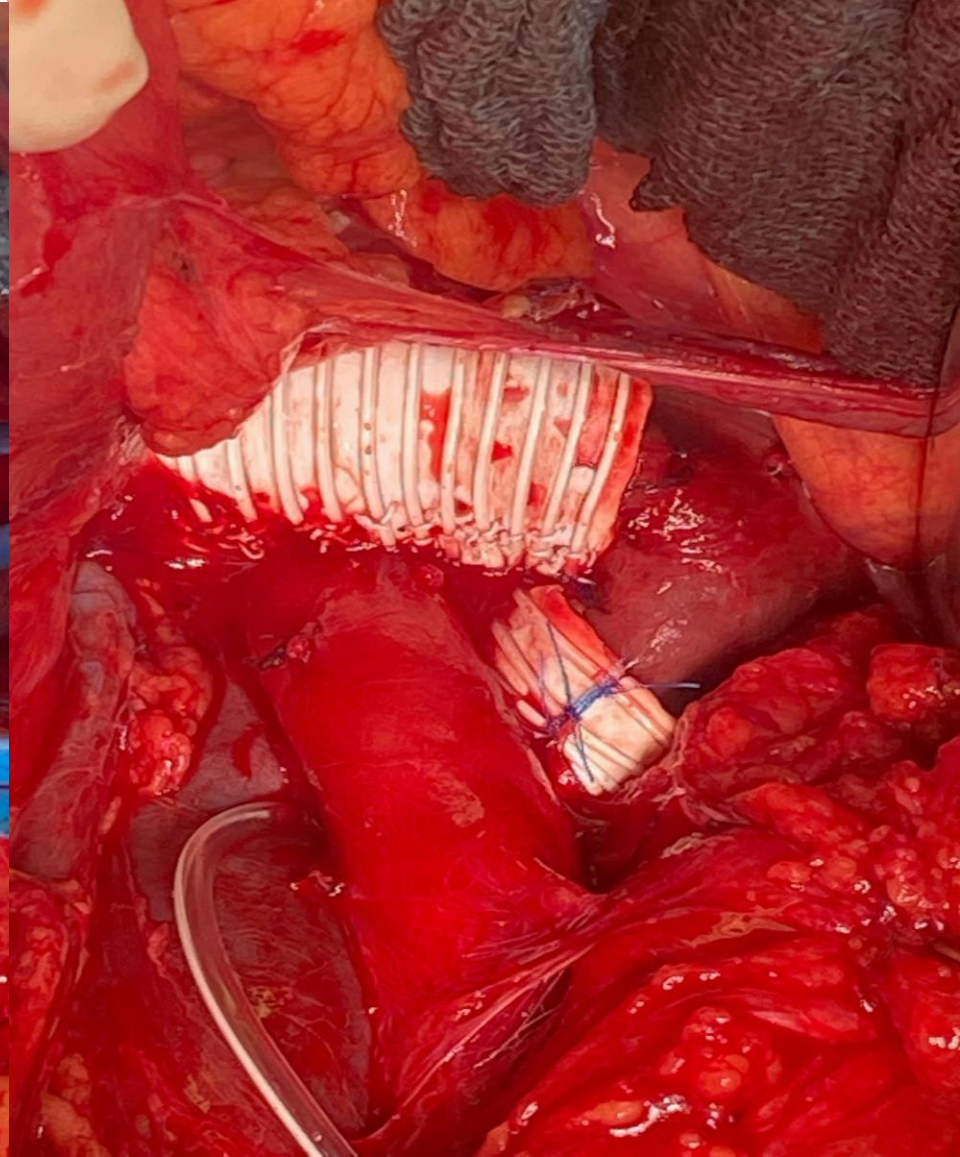
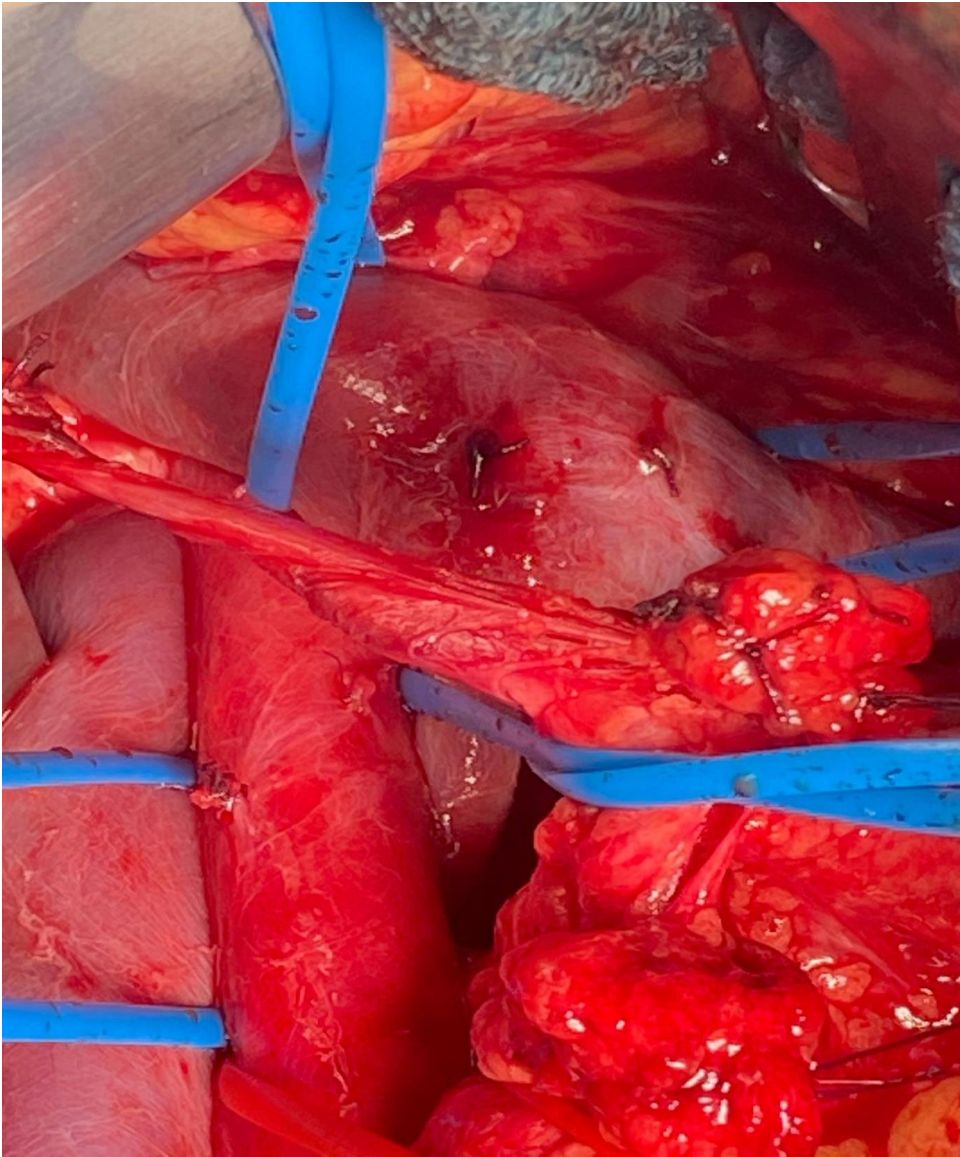
n=1

Renal Auto-TX

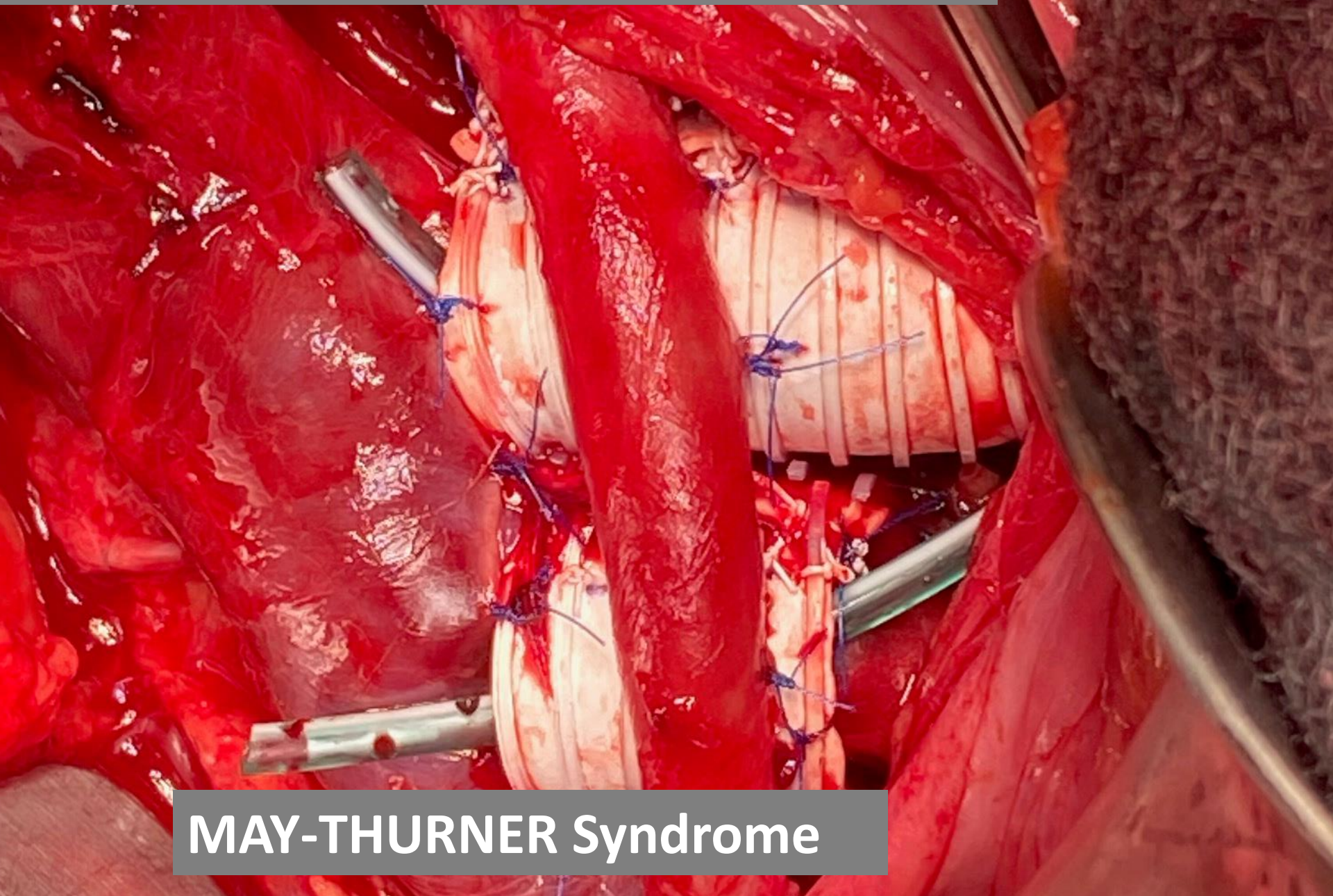
n=5 (elsewhere)



Pre-retroaortic NCS



Two compressed left-sided iliac veins



MAY-THURNER Syndrome



Thank You