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Treatment Algorithm for Symptomatic Left Renal Vein Compression

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Disclosure(s):

- None

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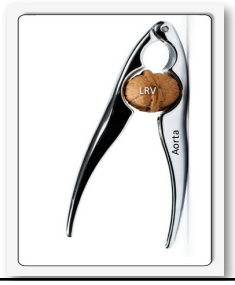
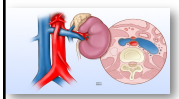


Types of NCS:

- ***Anterior NCS***

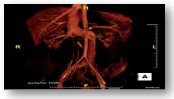


The LRV is compressed as it passes between the aorta and the SMA

- Posterior NCS:

Retro-aortic LRV is compressed between the abdominal aorta and the vertebral column

- Atypical NCS



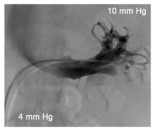
With left IVC, LRV and IVC may be compressed as they pass between the aorta and the SMA

NCS – Imaging (Venography)

NCS – Imaging (CTV)

- CTV advantage:
  - Less costly
  - More familiar to most vascular surgeons

- Renocaval pressure gradient measurement
  - 3 to 10 mm Hg in normal patients
  - 2 to 14 mm Hg in NCS
  - An overlap and area of diagnostic uncertainty if one were to attempt to diagnose NCS by the renocaval pressure gradient alone
- Venous reflux into gonadal and pelvic collaterals.
- Injection under excessive pressure into the LRV, can cause "artificial" flow in the gonadal vein.
- We use delayed imaging of selective left renal artery to:
  - Demonstrate unprovoked reflux into gonadal or lumbar veins if present
  - Delineate anatomy of gonadal vein for potential surgical procedure



Angiography
- Selective contrast injection in left renal artery* with delayed imaging of venous outflow
- If direct venous access**: contrast administration w/o pressurized injection
  - LRV and GV diameter
  - GV, lumbar, perirenal plexus reflux
  - +/- renacaval pressure gradient

femoral arterial access
**femoral venous or internal jugular access*

Yes

Cross sectional imaging
- **MRV*** **or CTV (abdomen/pelvis)**
  - LRV compression
  - LRV dilatation (lateral to proximal SMA)
  - Pelvic venous collaterals
  - Dilation of gonadal and/or lumbar veins

**preferred*

No

Symptoms **AND** radiologic findings consistent with NCS

Yes → Treatment eligible

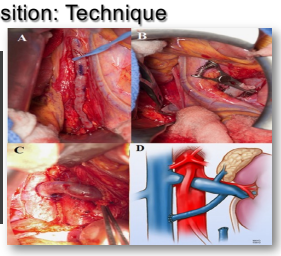
No → Investigate for other pathology

Treatment Modalities

- All treatment options are directed to reduce venous hypertension
- Treatment modalities …still evolving…
  - Surgical/open – remains gold standard
  - Surgical/laparoscopic – effective but confined to few centers
  - Endovascular – less effective with higher complications
  - Hybrid – promising, await longer term results

Gonadal Vein Transposition: Technique

- Mini-laparotomy
- Standard retroperitoneal exposure
- Mobilize left GV, dividing all branches
- Left GV divided distally and tunneled behind IMV
- Left GV is reimplanted into IVC



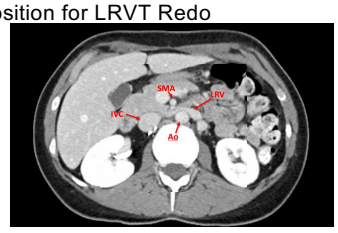
Gonadal Vein Transposition

- Transposing the gonadal vein (transected and re-implanted into the IVC) achieves:
  - Decrease in pelvic congestion
  - Decompression of the LRV ***without risk to the kidney***
  - Avoidance of leg incision

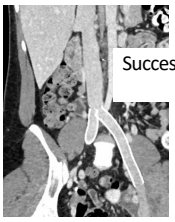
Gonadal Vein Transposition for complex Surgical Cases:

Gonadal Vein Transposition for LRVT Redo

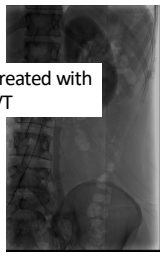
- A 30 y.o. F w/PMH of pelvic venous congestion syndrome and NCS s/p bilateral **iliac vein stents** treated with l**eft renal vein transposition.**
- **Persistent symptoms at one year:** severe left flank pain and microhematuria.
- Left renal vein remains **compressed**



Gonadal Vein Transposition for LRVT Redo



Successfully treated with LGVT

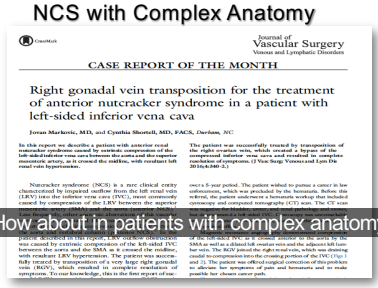


Posterior NCS

Renal vein transposition much more difficult

Patient successfully treated with left GVT transposition, symptom free

NCS with Complex Anatomy



Journal of Vascular Surgery
Venous and Lymphatic Disorders

CASE REPORT OF THE MONTH

Right gonadal vein transposition for the treatment of anterior nutcracker syndrome in a patient with left-sided inferior vena cava

Jovan Markovic, MD, and Cynthia Shortell, MD, FACS, Durham, NC

How about in patients with complex anatomy?

NCS with Complex Anatomy (left sided IVC)

Journal of Vascular Surgery
Venous and Lymphatic Disorders

CASE REPORT OF THE MONTH

Patient was treated with right GVT, remains symptom free at 5 Years
- Working at ATF

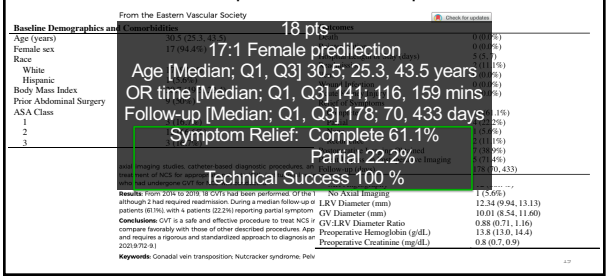
In patients with complex anatomy GVT may be the only option

NCS with Concurrent SMA syndrome

Successfully treated with simultaneous LGVT and gastrojejunostomy

The reduction of the aortomesenteric angle and compressed LRV and distal 3rd portion of duodenum

Gonadal Vein Transposition: Duke Experience



From the Eastern Vascular Society

18 pts
17:1 Female predilection
Age [Median; Q1, Q3] 30.5; 25.3, 43.5 years
OR time [Median; Q1, Q3] 141; 116, 159 mins
Follow-up [Median; Q1, Q3] 178; 70, 433 days
Symptom Relief: Complete 61.1%
Partial 22.2%
Technical Success 100 %

Left gonadal vein transposition:

If the diameter/length of the left GV is sufficient

Proposed as a first approach to treating severe nutcracker syndrome

Summary

- With proper patient selection GVT, LRVT and other surgical and hybrid options is **safe and effective**
- GVT can be tailored to the individual patient's **vascular anatomy** (anterior, posterior), and can be used to treat **complex cases**

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Thank You!

The big picture doesn't just come from distance; it also comes from time