Open Surgical and Endovascular Treatment of Nutcracker Syndrome : Do We Have the Answer Now?

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VEITH SYMPOSIUM

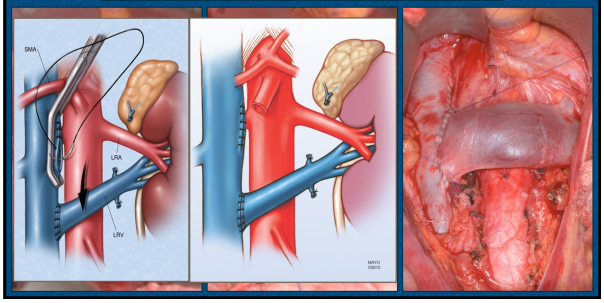
Disclosure

I have no relevant financial relationships to disclose

Left Renal Vein Compression:
- Compensated
- Uncompensated

Relieve Compression

LRV Transposition



Long-term Results

Mean Follow up 37 mths

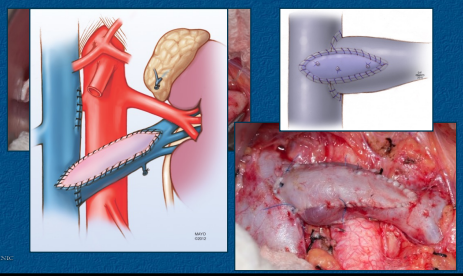
Patients	n=37
Stenosis	7
Thrombosis	1

Secondary Interventions	
6 stents	
1 stent migration	Retrieval+Restenting
2 in-stent stenosis	Restenting
2 open	
1 saphenous vein patch	
1 gonadal vein re-implantation	

Nutcracker Phenomenon: Etiology

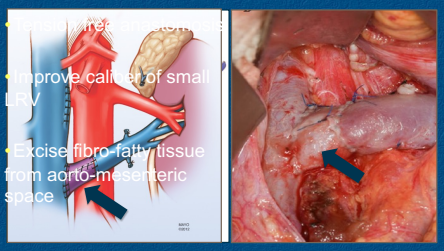
- Narrow aorto - mesenteric angle
- Low or lateral origin of SMA
- High course of LRV
- Stretching of LRV over the aorta
  - Asthenic body habitus
  - Ptosis of the left kidney
  - Lack of retroperitoneal fat
  - Fibrous tissue aorto-mesenteric angle
  - Wasted paraspinal muscles

LRV Transposition: GSV patch

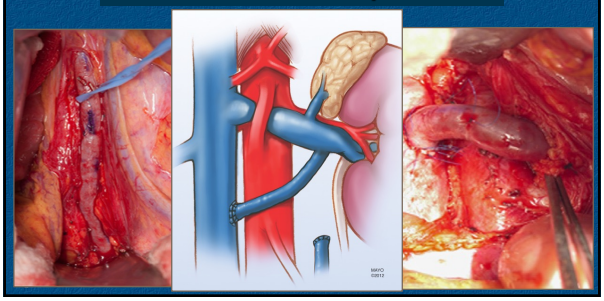


LRV Transposition: GSV cuff

- Improve caliber of small LRV
- Excise fibro-fatty tissue from aorto-mesenteric space



Gonadal Vein Transposition



Left Renal Vein Stenting

Endovascular Stenting for Treatment of Nutcracker Syndrome: Report of 61 Cases With Long-Term Followup

Shanwen Chen, Hongkun Zhang,* Heng Shi, Lu Tian, Wei Jin and Ming Li

	Chen et al	Wang et al	Wu et al
No of Patients	61	30	75
Technical success	98%	100%	100%
Symptom relief	95%	93%	?
Follow up	66 mths	36 mths	55 mths
Stent migration	1	2	5

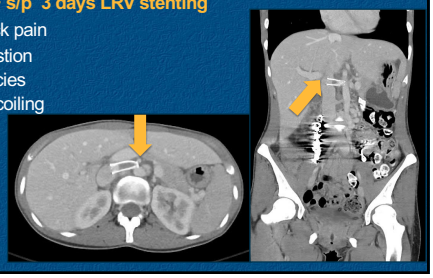
patients with nutcracker syndrome

Zheng Wu, MD, PhD,* Xiangtao Zheng, MD, PhD,* Yangyan He, MD,* Xin Fang, MD,* Donglin Li, MD, PhD,* Lu Tian, MD,* and Hongkun Zhang, MD, PhD,* *Hangzhou and Wenzhou, China*

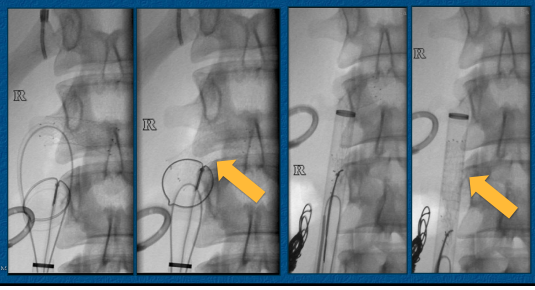
Stent Migration

24 yr F s/p 3 days LRV stenting

- Recent flank/ back pain
- h/o pelvic congestion
- Multiple pregnancies
- B/L ovarian vein coiling
- LRV stenting
- Stent thrombosis
- Stent migration



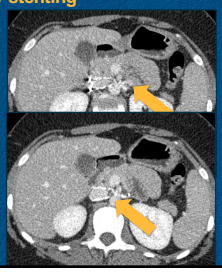
Stent Migration



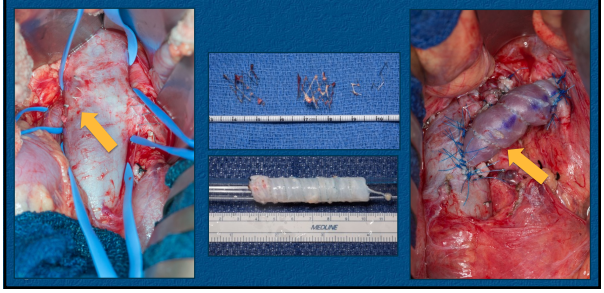
Stent Compression

17 yr F 3 years s/p LRV stenting

- Initial excellent relief
- Recurrent flank/ back pain
- PTA for stenosis
- Stent thrombosis
- Mechanical thrombectomy
- Xeralto
- Acute symptomatic PE

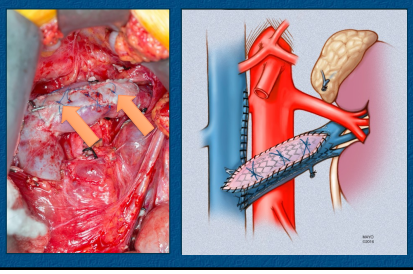


Stent Removal + Reconstruction

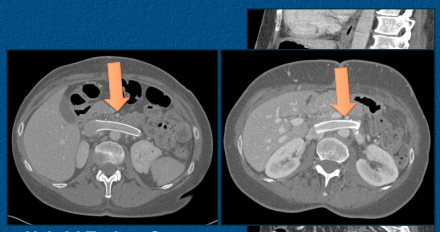


Hybrid Reconstruction ?

Hybrid Reconstruction



Hybrid Reconstruction



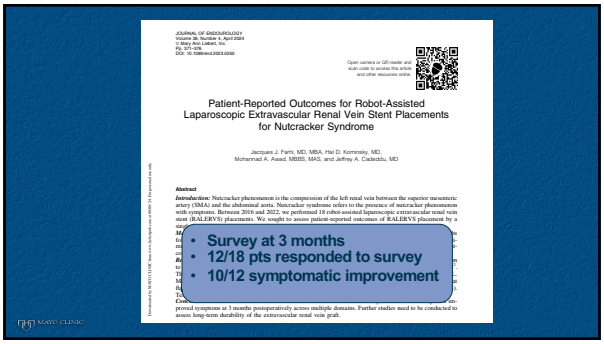
Hybrid Endo – Open

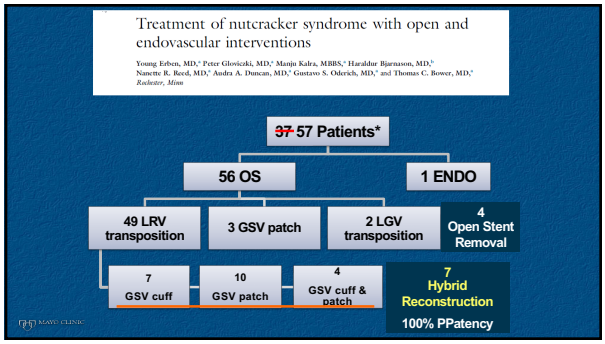
Stenting alone

Nutcracker Syndrome

Hybrid Reconstruction

- **Provides the best decompression of LRV compression and chance of long-term patency**
  - Transposition removes vein from area of maximum compression
  - Patch allows use of large caliber stent (≥14mm)
  - Stent prevents LRV compression
  - No stent migration (shorter stents? No IVC protrusion)
- **Early patency excellent / Long-term ?**
- **Longer term results of dedicated venous stents (VICI, Venovo, Zilver Venous, ABRE) awaited**

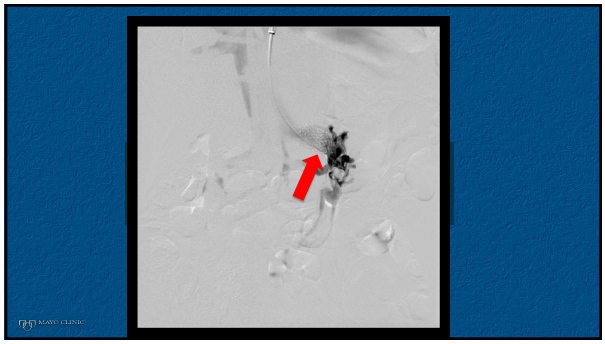




Late Results

Symptom	% Relief
Left flank /abdominal pain	45 (72%)
Hematuria	25 (96%)
Proteinuria	19 (100%)
Varicocele / pelvic pain	2/5 (40%)

	57 Patients
Mortality	0
Nephrectomy *(3/4 stent removal pts)*	7
Considering nephrectomy	2
LRV thrombosis *(no intervention)*	1



Nutcracker Syndrome
Questions

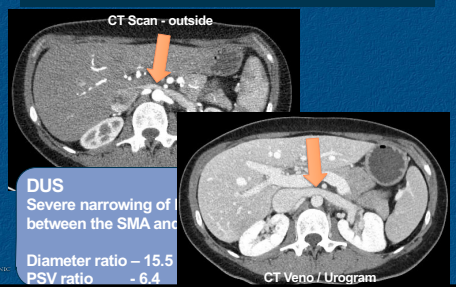
- How pathological is the LRV compression?
  - Why do patients with surgical LRV ligation not develop symptoms?
  - LRV compression – incidental finding
  - L Ovarian vein dilatation – incidental finding
  - LRV compression – fixed or dynamic?
- Are the symptoms really from renal venous hypertension?
  - Why should patients with widely patent LRVs get flank symptoms

Patient Selection

31 yr F with diagnosis of Nutcracker Syndrome

- Abdominal and flank/ back pain
- Pelvic / perineal pain
- B/L groin and LE discomfort
- Multiple pregnancies
- Ovarian vein coil embolization
- s/p hysterectomy for uterine prolapse
- Dizziness / presyncope

Imaging



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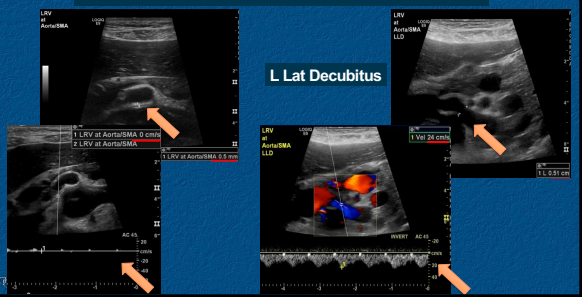

Do We Have the Answer Now ?

NOT QUITE YET !