



CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE
CONTROVERSIES & UPDATES IN VASCULAR SURGERY

JANUARY 25-27 2018



MARRIOTT RIVE GAUCHE & CONFERENCE CENTER, PARIS, FRANCE

**NUTCRACKER SYNDROME: ADVANTAGE, INCONVENIENT AND
OUTCOMES IN THE PUBLISHED LITERATURE
LAPAROSCOPY OR ROBOTIC**

Fabien THAVEAU, Anne Lejay, Benoit LUCEREAU, Yannick Georg, Pierre
DELANNOY, Frédéric BECK, Nabil CHAKFE, Philippe NICOLINI

Department of Vascular Surgery and Kidney Transplantation, University Hospital of Strasbourg, Strasbourg, France

Vascular Surgery, Clinique de la Protestante, Lyon, France

Vascular Surgery, Clinique du Tonkin, Lyon, France

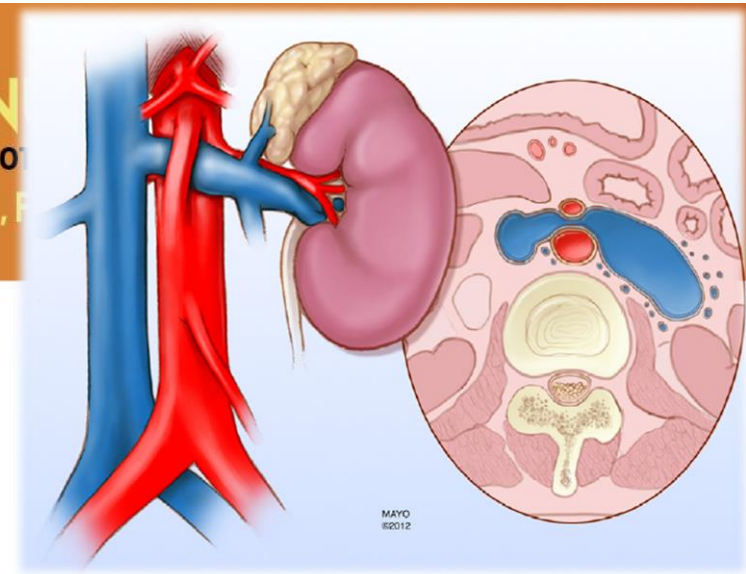
Vascular Surgery, Clinique du Parc, Lyon, France



☐ I do not have any potential conflict of interest

Nutcracker Syndrome

Compression of the LRV between SMA and aorta



Venous hypertension with development of varices on the left side of the aorta and in the renal pelvis

Hematuria, orthostatic proteinuria, flank pain, pelvic congestion syndrom and left varicocele



A systematic review on management of nutcracker syndrome

Camilo A. Velasquez, MD,^a Ayman Saeyeldin, MD,^a Mohammad A. Zafar, MD,^a Adam J. Brownstein, BA,^a and Young Erben, MD,^b *New Haven, Conn*

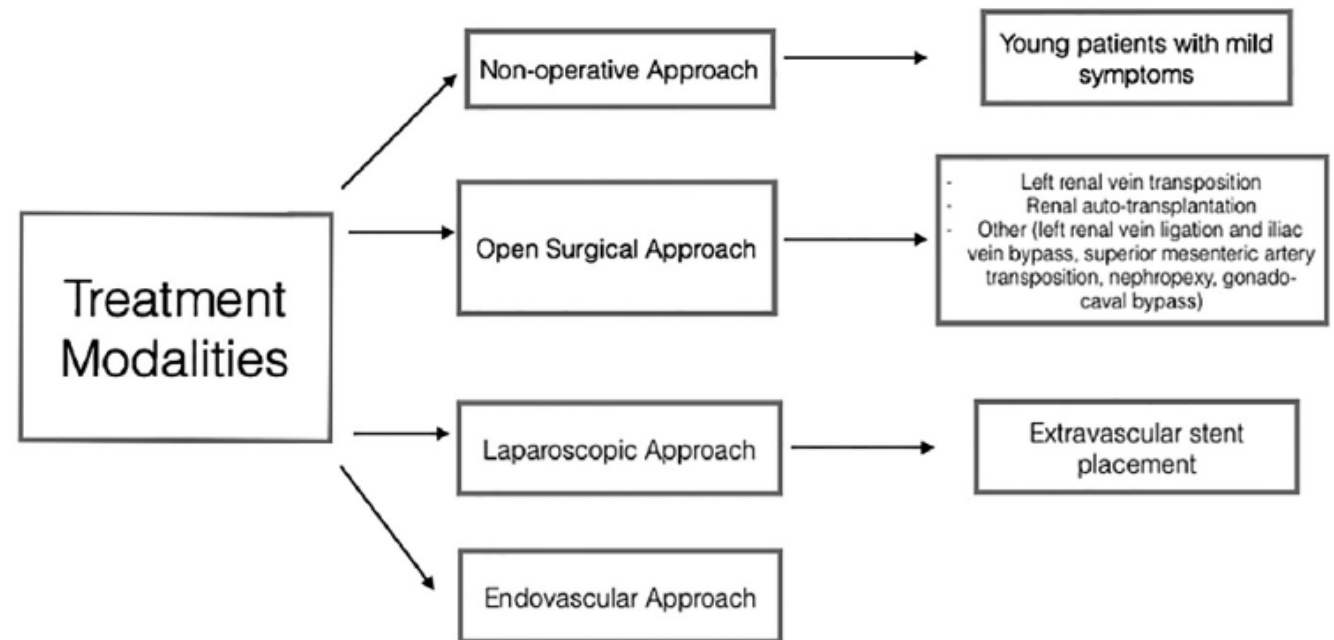
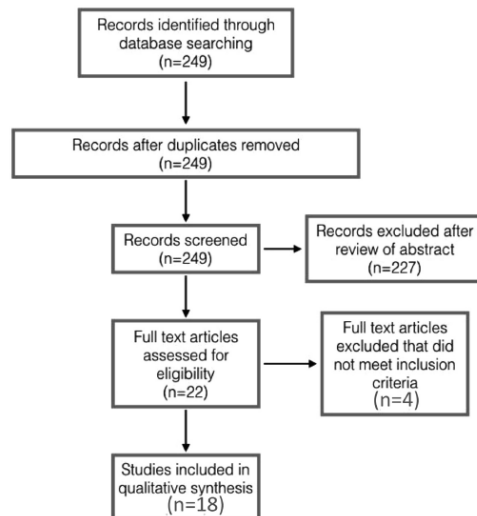
ABSTRACT

Objective: Although nutcracker syndrome (NS) is rare, patients presenting with symptoms or signs and anatomic compression of the left renal vein (LRV) can be considered for intervention. Open, laparoscopic, and endovascular techniques have been developed to decrease the venous outflow obstruction of the LRV. The paucity of data regarding the management of this uncommon disease process poses a challenge for adequate recommendations of the best treatment modality. Herein, we aim to present a systematic review for the management of NS.

Methods: We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement standards to systematically search the electronic databases of MEDLINE from October 1982 to July 2017 for articles about the management of NS. Included were studies in English, Spanish, and German in all age groups.

Results: The literature search provided 249 references. After abstract and full review screening for inclusion, 17 references were analyzed. Eight (47%) described the open surgical approach. The LRV transposition was the most commonly reported technique, followed by renal autotransplantation. Seven (41.11%) described the endovascular technique of stent implantation, and two (11.7%) described the minimally invasive laparoscopic extravascular stent implantation.

Conclusions: NS is a rare entity. Multiple techniques have been developed for the treatment of this condition. However, the rarity of this syndrome, the paucity of data, and the short-term follow-up of the existing evidence are the disadvantages that prevent recommendations for the best treatment strategy. Up to now, open surgical intervention, specifically LRV transposition, has been considered by some experts the mainstay for treatment of NS. The endovascular approach is gaining strength as more evidence has become available. However, the long-term patency and durability of this approach remain to be elucidated. Therefore, careful selection of patients is necessary in recommending this technique. (J Vasc Surg: Venous and Lym Dis 2017;■:1-8.)





Treatment of nutcracker syndrome with open and endovascular interventions

Young Erben, MD,^a Peter Gloviczki, MD,^a Manju Kalra, MBBS,^a Haraldur Bjarnason, MD,^b
Nanette R. Reed, MD,^a Audra A. Duncan, MD,^a Gustavo S. Oderich, MD,^a and Thomas C. Bower, MD,^a
Rochester, Minn

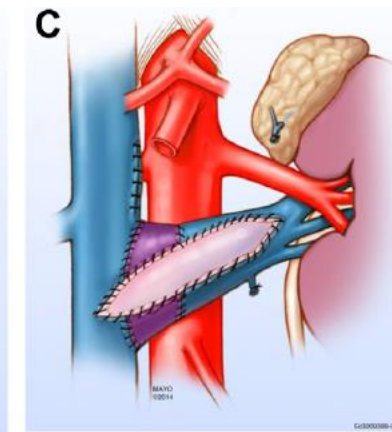
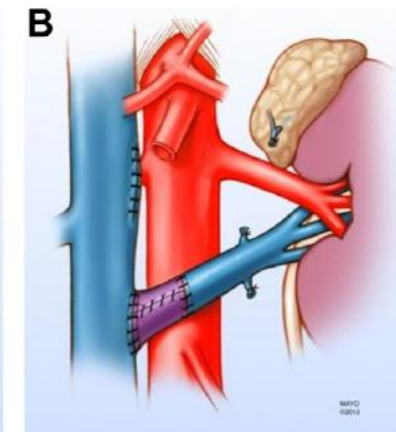
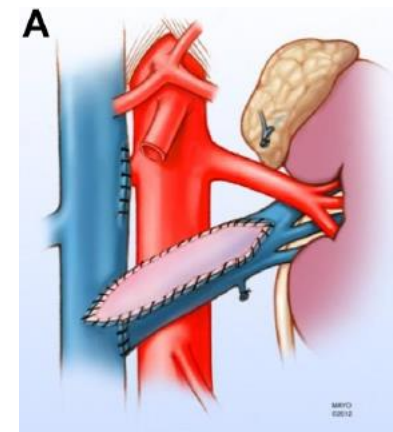
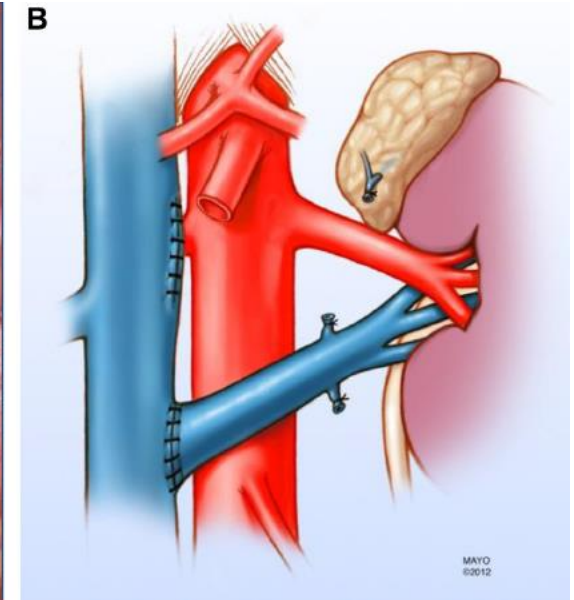
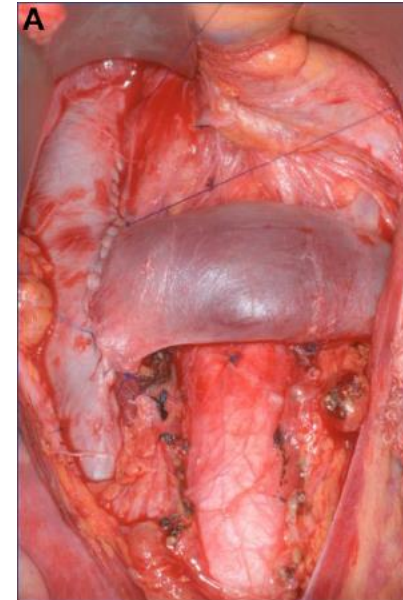
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October 2015

Left renal vein transposition

Safe and effective treatment

Reinterventions

Open reconstruction should be tailored to
the patient's anatomy



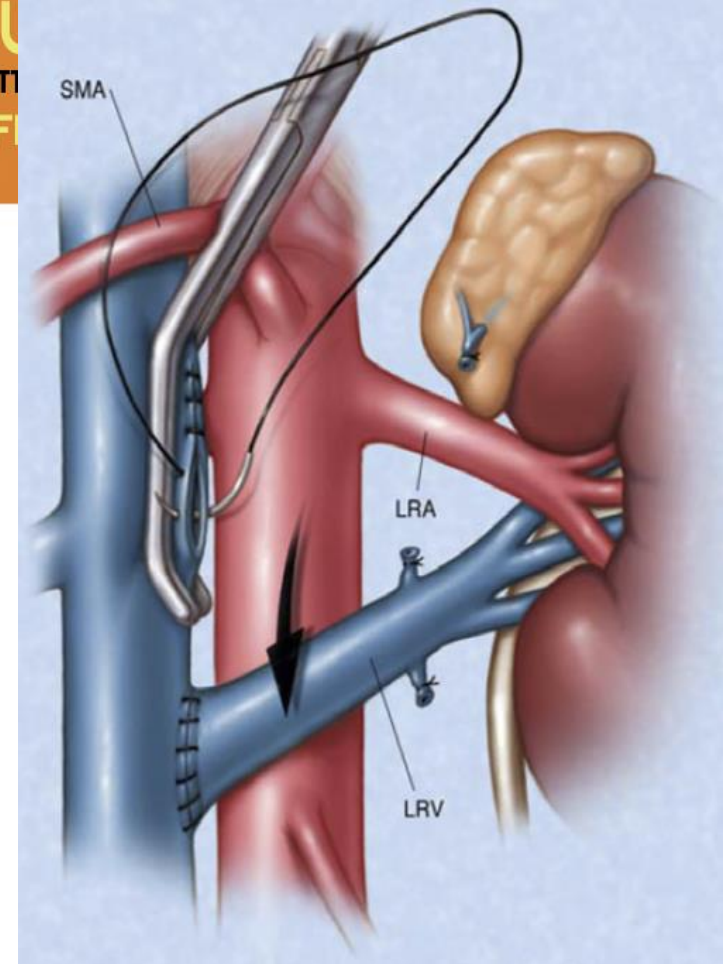
Surgical treatment

Left renal vein transposition

Most frequently used

Transperitoneal approach by a laparotomy

Mini-invasive approach by laparoscopy



Reed and Gloviczki, *JVS* 2009

Said and Gloviczki, *Seminars in Vascular Surgery* 2013

Hartung et al, *JVS* 2010

Laparoscopic technique

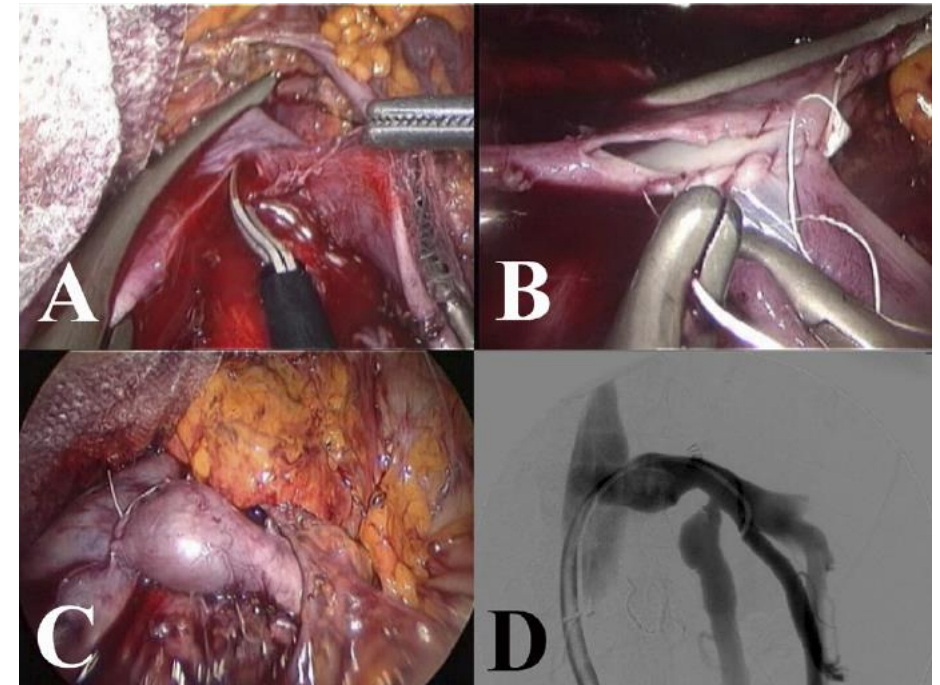
Laparoscopic transposition of the left renal vein into the inferior vena cava for nutcracker syndrome

Olivier Hartung, MD, Amine Azghari, MD, Pierre Barthelemy, MD, PhD, Mourad Boufi, MD, and Yves S. Alimi, MD, PhD, *Marseille, France*

Reimplantation of the left renal vein into the infrarenal inferior vena cava is the standard surgical procedure for nutcracker syndrome. A 40-year-old woman with a solitary left kidney suffered from left lumbar pain and hematuria. Imaging techniques found a large kidney with nutcracker syndrome. A totally laparoscopic transposition of the left renal vein was performed. Twelve months later, the patient is improved and has no more hematuria. Duplex scan showed no residual stenosis. Laparoscopic transposition of the left renal vein into the inferior vena cava is feasible with short length of stay and good short-term result. (*J Vasc Surg* 2010;52:738-41.)

Short postoperative stay and short good term results

Large experience in vascular laparoscopic surgery is needed





Hard to use laparoscopic technique?

Technical learning curve

Anastomosis technique in a deep and close space

Robotic technique as a solution?

Ease of the surgical approach

Ease of suture techniques



Our study

Mini-invasive technique of LRV transposition into the IVC and bypass

Use of the Da Vinci robotic system (dec 2012-mai 2017)

8 patients with symptomatic nutcracker syndrome

Accordingly with robotic technique first described

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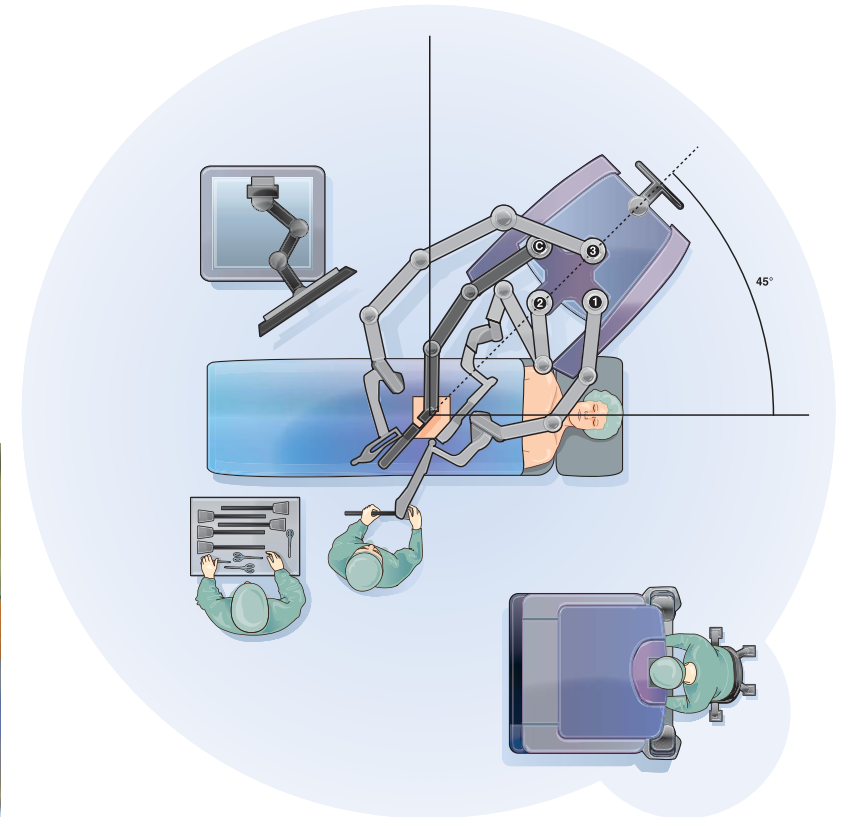
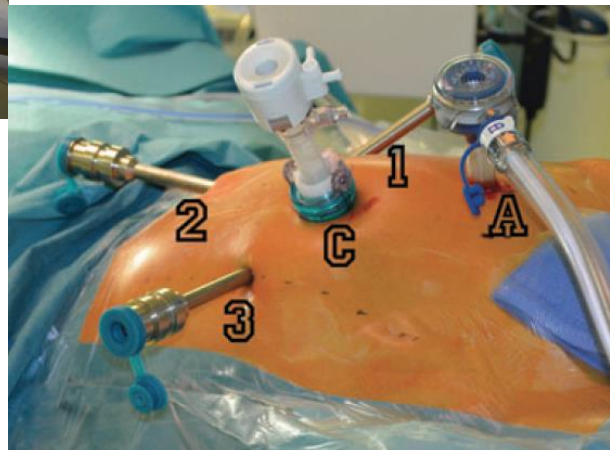
Associated Da Vinci and Magellan Robotic Systems
for Successful Treatment of Nutcracker Syndrome

Fabien Thaveau, MD, PhD¹, Philippe Nicolini, MD², Benoit Lucereau, MD, MSc¹,
Yannick Georg, MD, MSc¹, Anne Lejay, MD, MSc¹ and Nabil Chakfe, MD, PhD¹

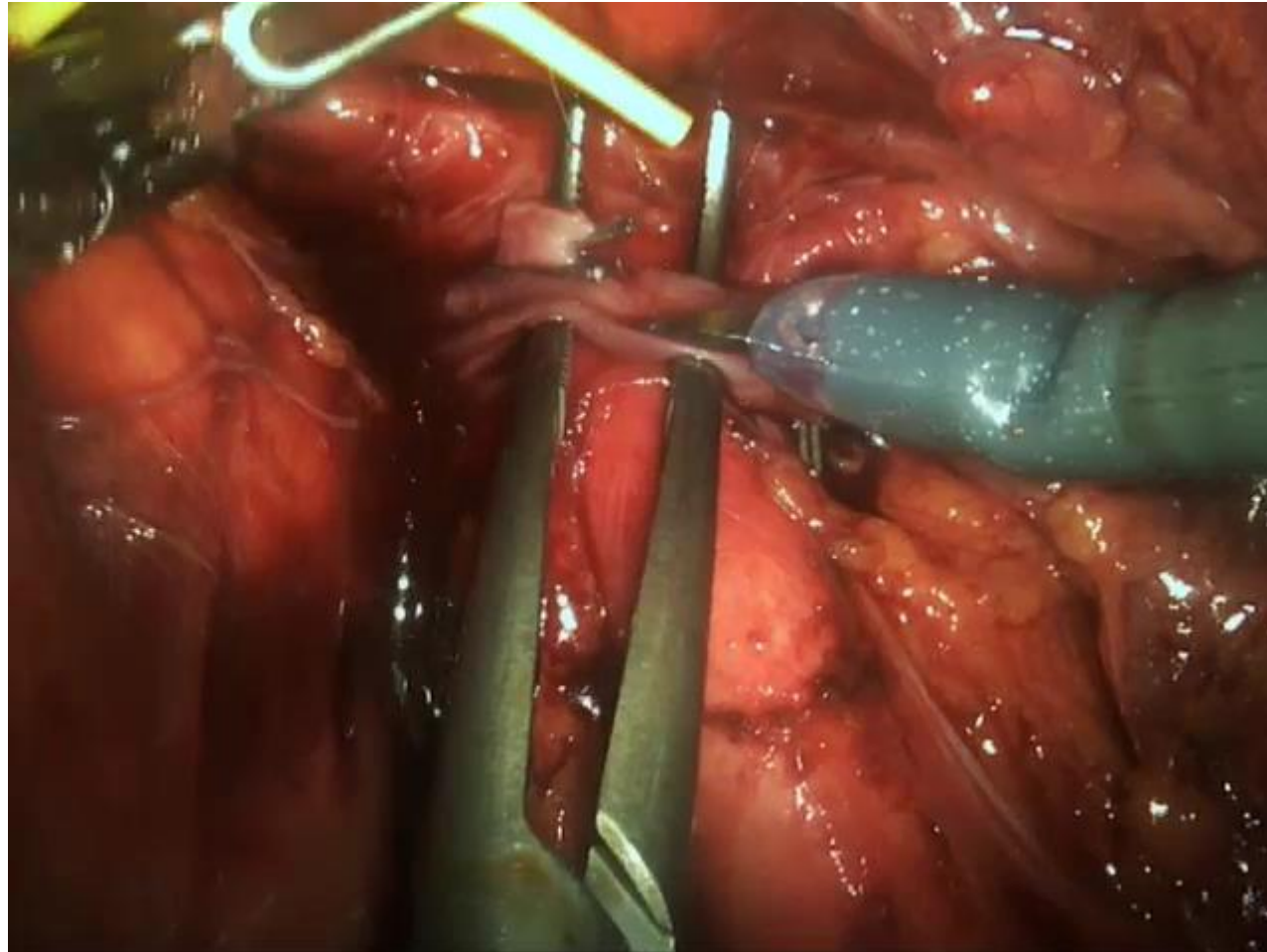


Patient and robot set-up

Dorsal decubitus with 45° right tilt and 20° trendelenburg

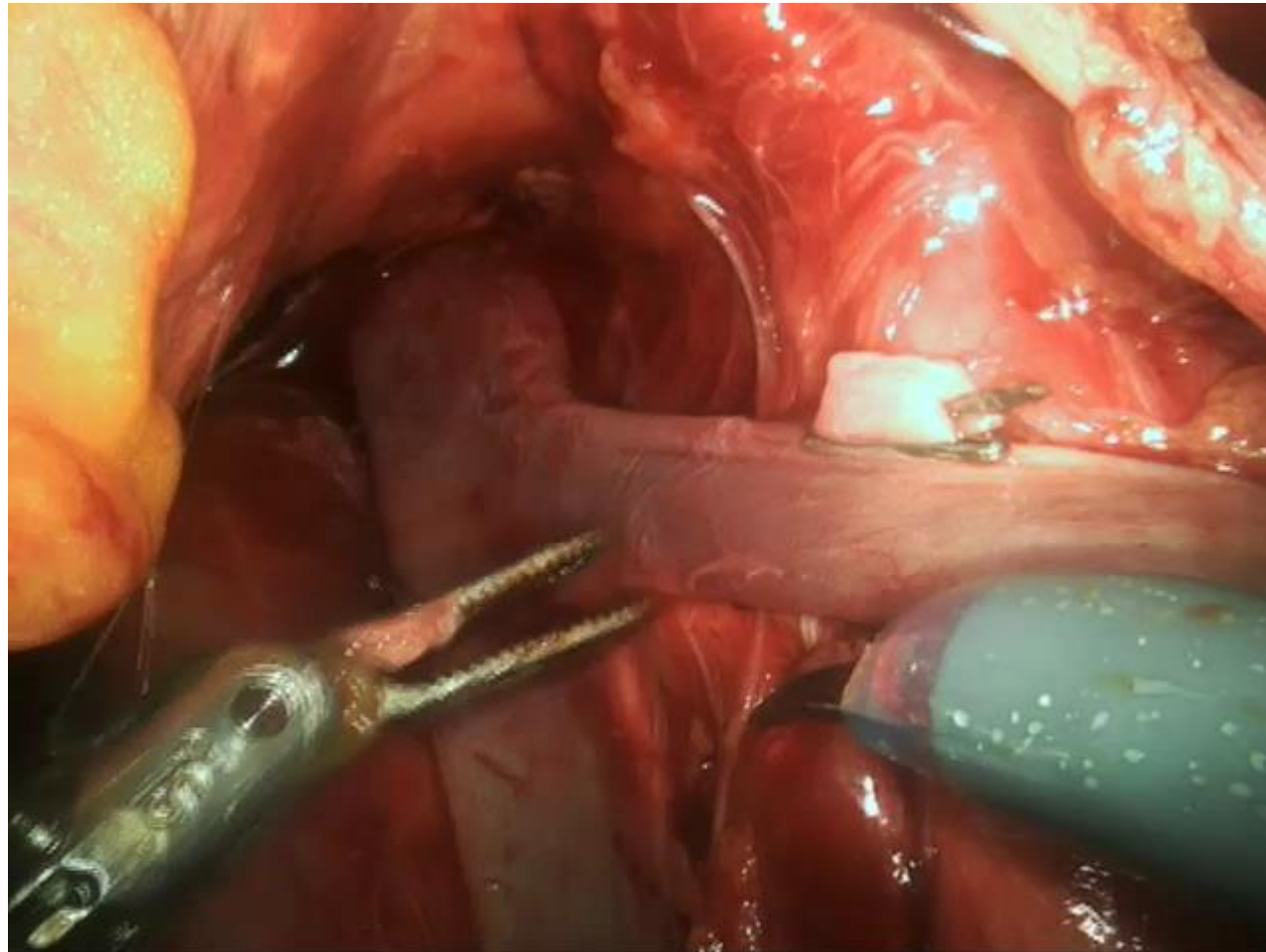


LRV surgical exposure



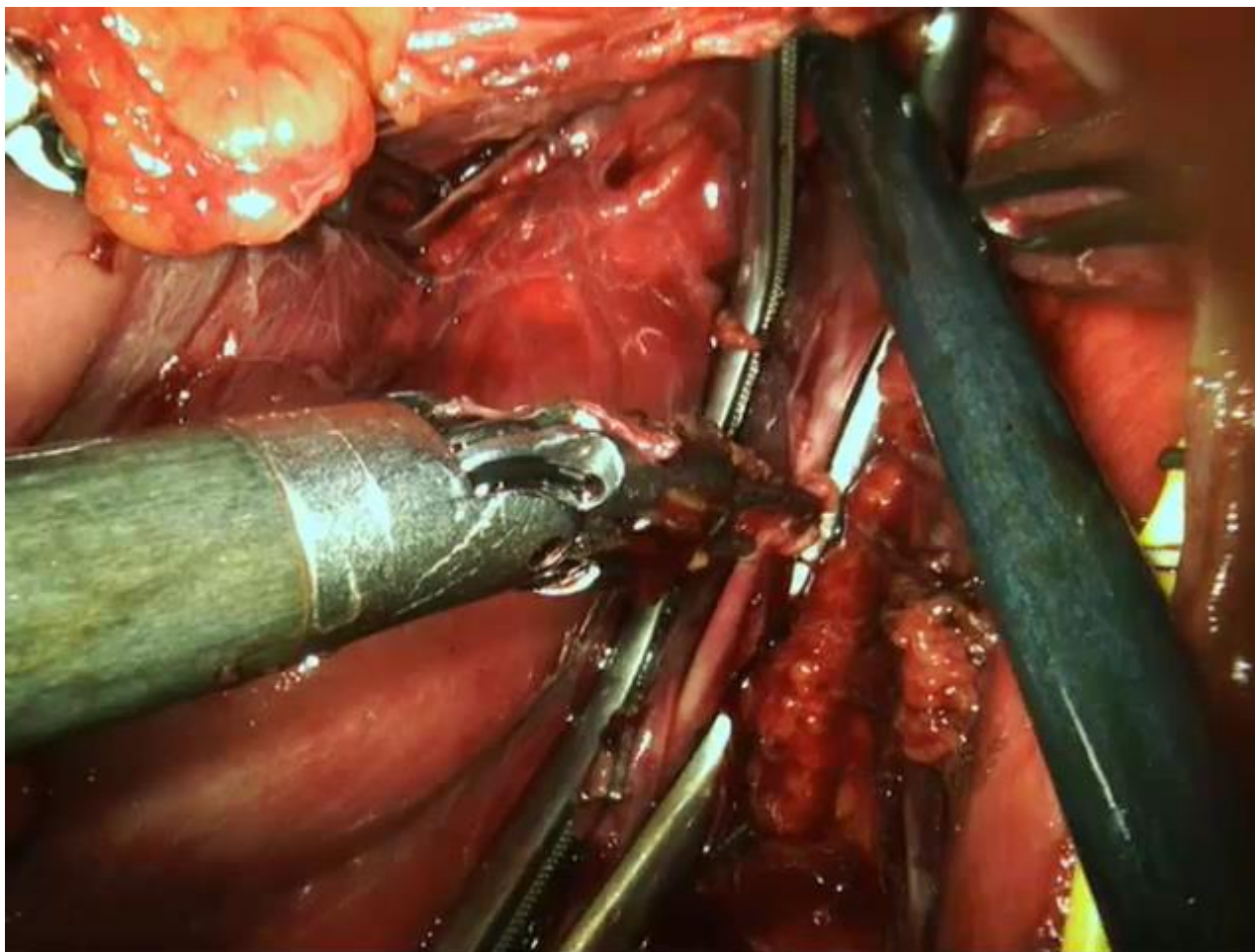


IVC control



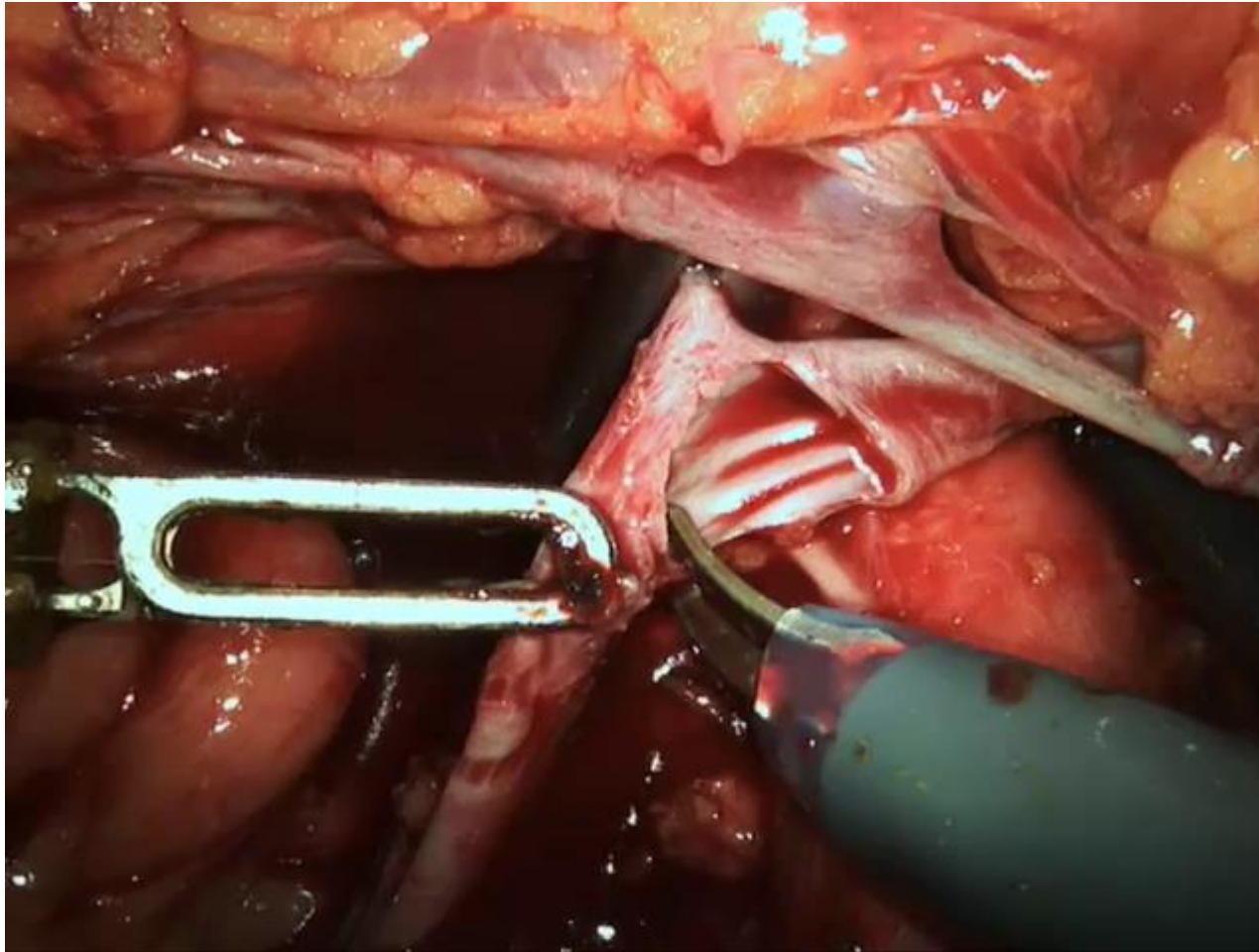


Vena Cava clamp



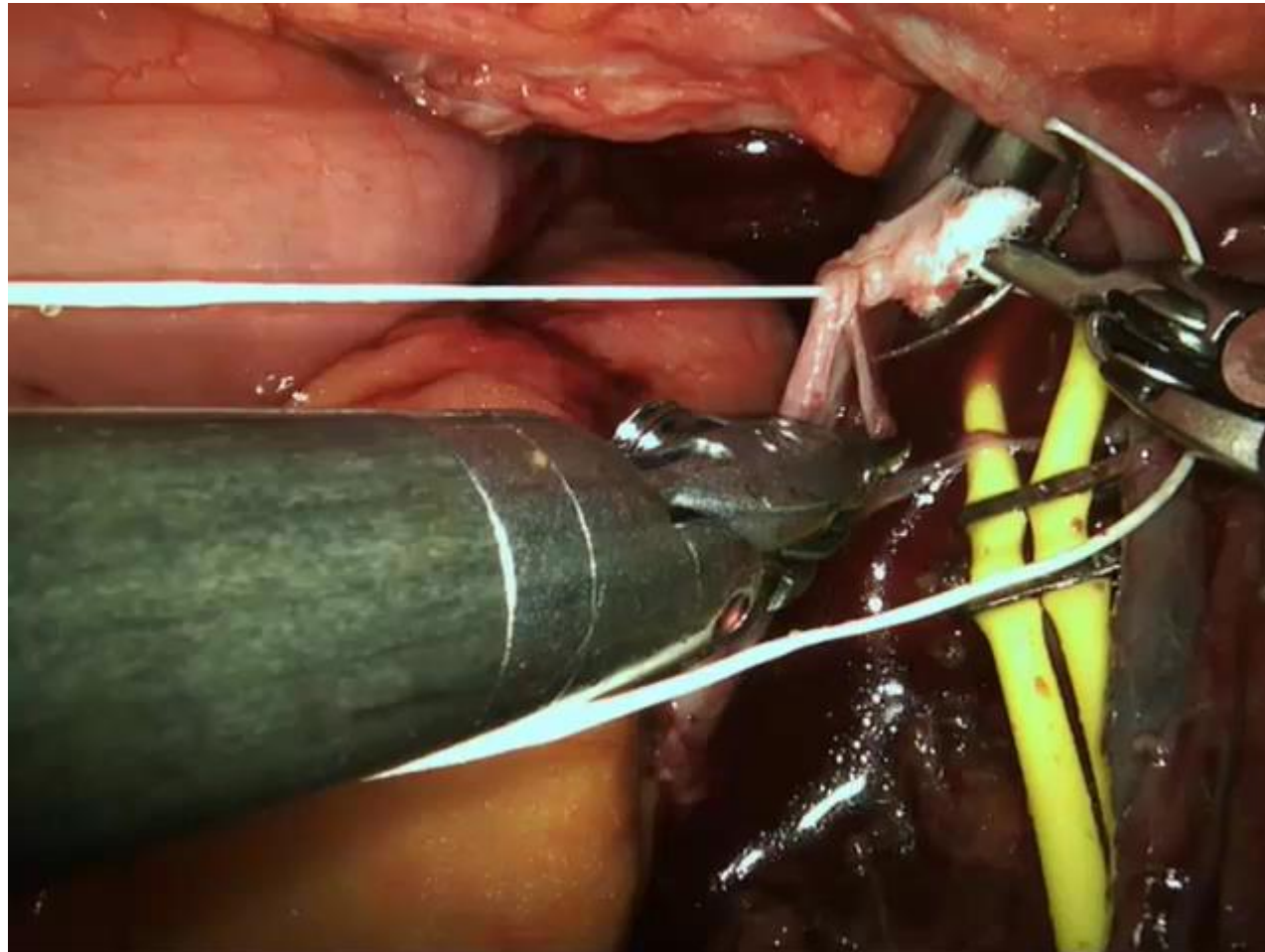


Opening of vena cava and section of LRV



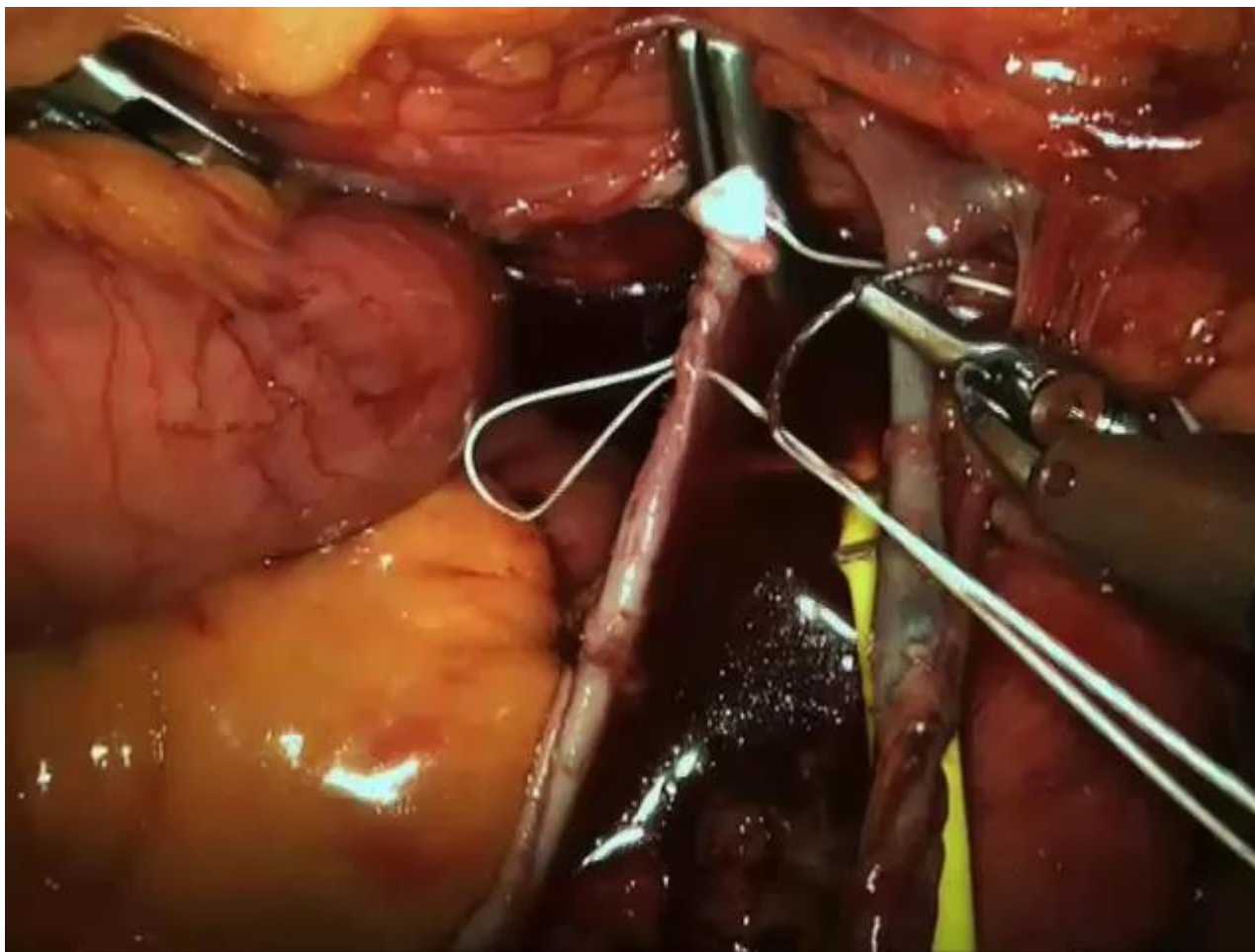


Suture of IVC



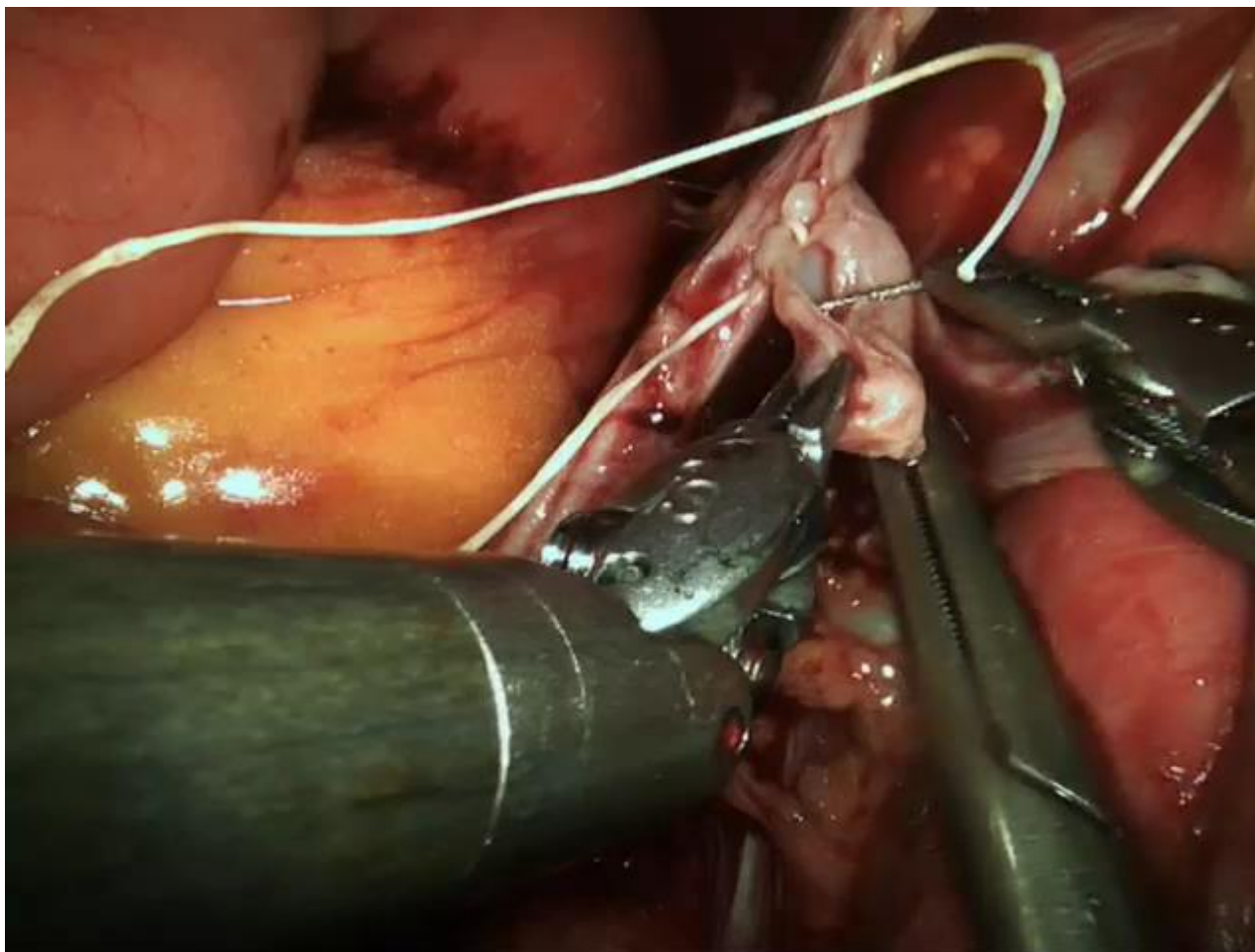


Transposition of LRV



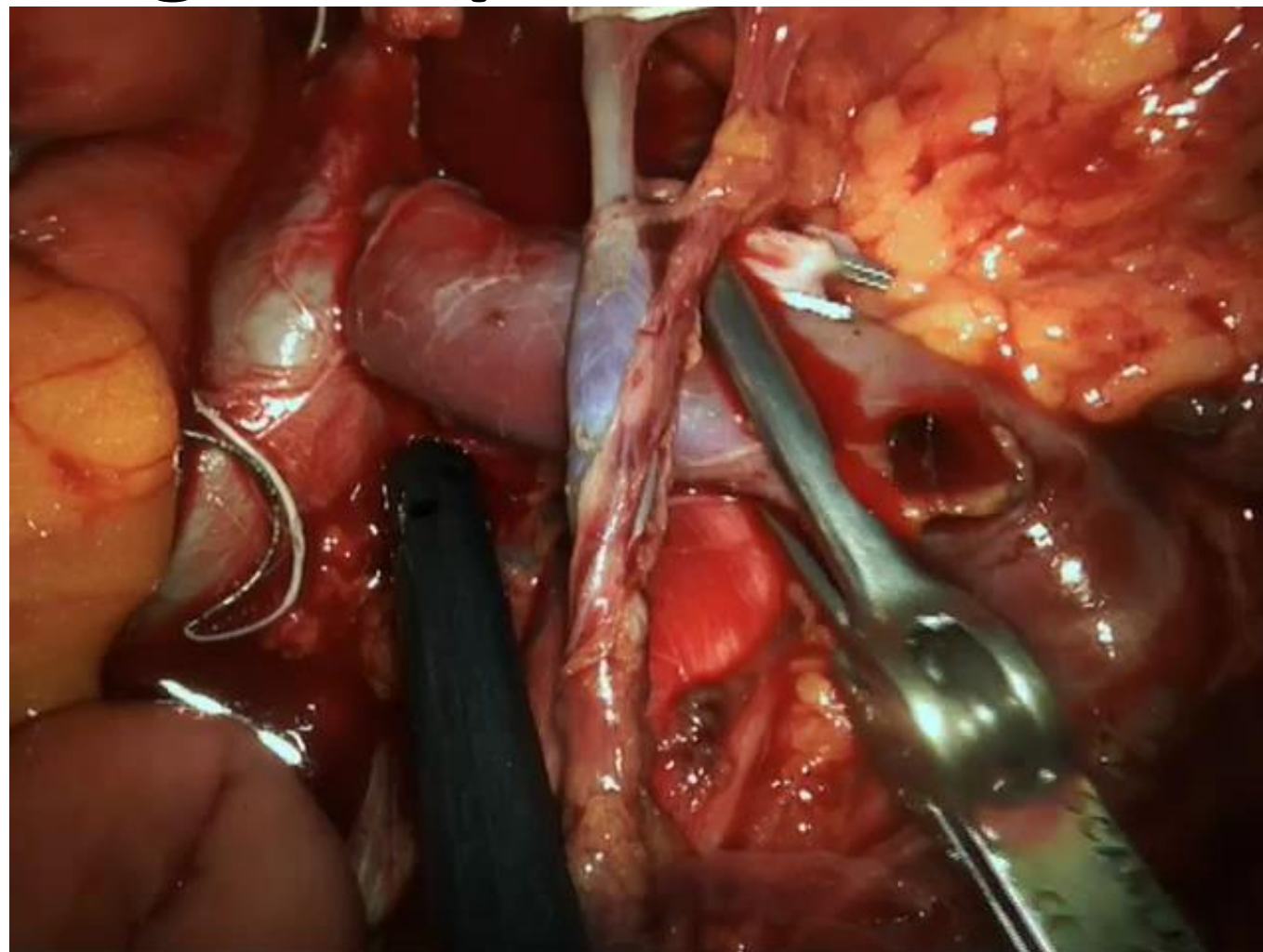


Transposition of LRV





After releasing clamps

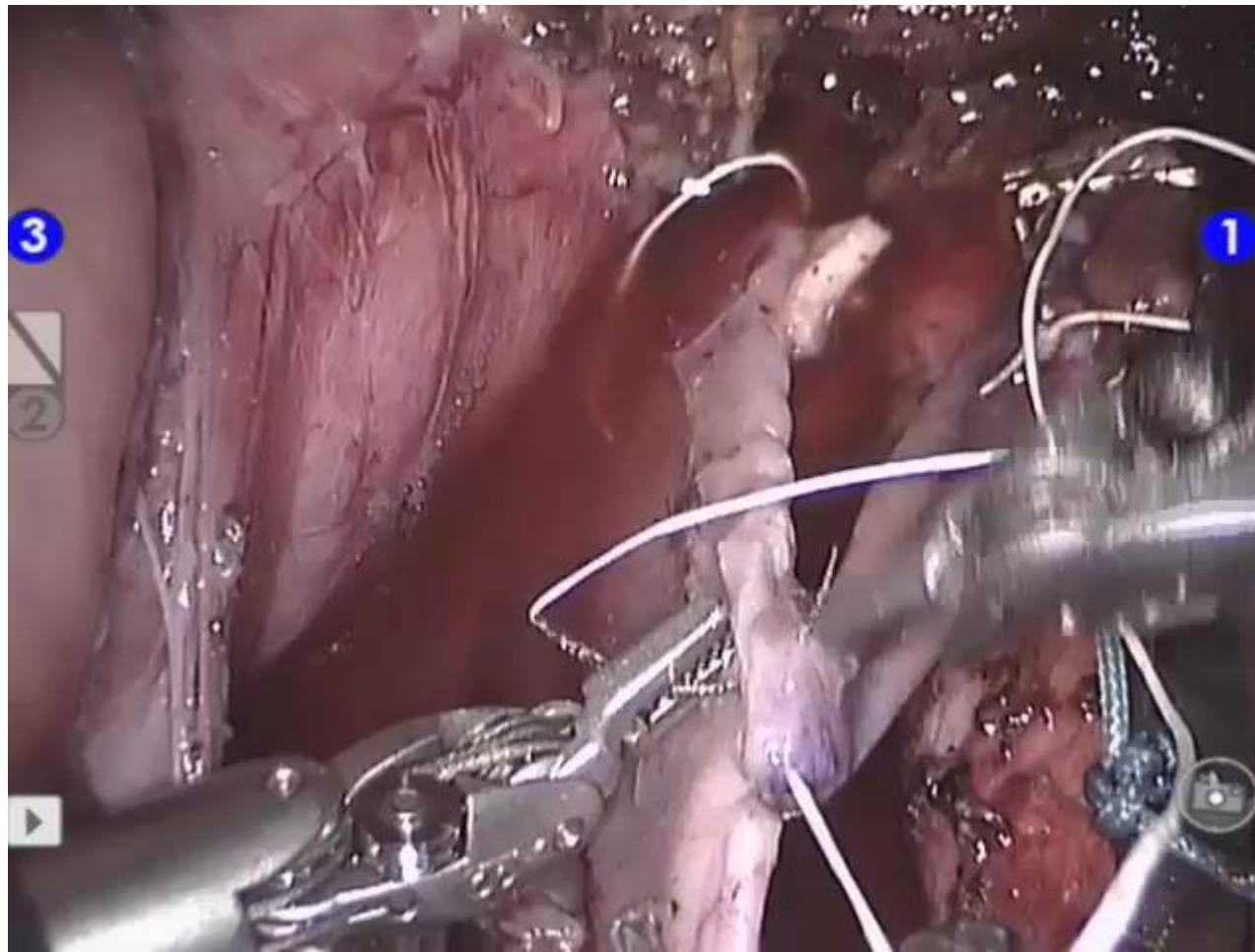


Venous allograft bypass





Venous allograft bypass





1	2	3	4	5	6	7	8
17/12/2012 26 years ♀	15/03/2013 44 years ♀	28/08/2013 18 years ♂	10/02/2015 34 years ♀	10/02/2015 16 years ♀	18/05/2016 49 years ♀	04/11/2016 38 years ♀	30/05/17 28 years ♀
pelvic congestive syndrome	pelvic congestion syndrome	pain and haematuria	pelvic congestion syndrome	pelvic congestion syndrome	pelvic congestion syndrome	pelvic congestion syndrome	pelvic congestion syndrome
ASA 2	ASA 2	ASA 2	ASA 2	ASA 1	ASA 2	ASA 2	ASA 2
LRV robotic transposition + selective embolisation	LRV robotic transposition + selective embolisation	LRV robotic transposition	LRV robotic transposition + selective embolisation	LRV robotic transposition + selective embolisation	LRV venous allograft bypass + selective embolisation	LRV robotic transposition + selective embolisation	LRV venous allograft bypass + selective embolisation

30 days follow-up: early complication

Patient n°4: iatrogenic small bowel perforation (postop day 3):
temporary ileostomy

Patient n°7: iatrogenic left colon perforation: direct suture

Analyse:

Learning curve in laparoscopic and robotic environment

Training with vascular teams with experience in robotic surgery

Mid term follow-up

Mean follow-up = 30 months (6-52 months)

Post operative duplex ultrasound at 1, 6 months and every year

Post operative CT scan between 6 months and 1 year

Primary patency of the LRV: 85% at 6 months, 71% at 1 and 5 years

Conclusion

Robotic LRV transposition technically feasible

Open the space of mini-invasive solution for the surgical treatment of nutcracker syndrome

Iatrogenic complication in our technical learning curve

LRV transposition: most frequently effective, but venous allograft bypass should be considered



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Thank you for your attention