SURGICAL CHALLENGES IN LIVE DONOR NEPHRECTOMY AND LIVEDONOR KIDNEY TRANSPLANTATION

30 June 2022

Nicos Kessaris, Guy's Hospital, London, UK

Conflict of interest

I declare I have no conflict of interest

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Surgical challenges

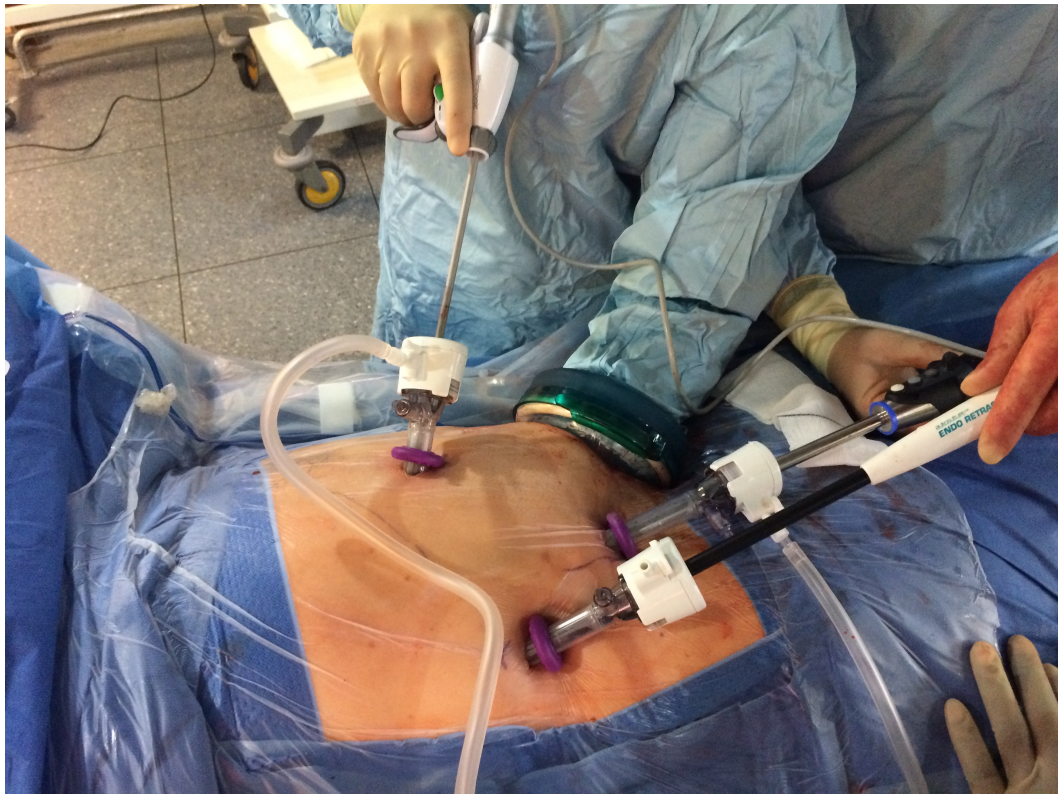
Donor

- BMI
- Multiple vessels
- Right vs Left nephrectomy
- Vascular management of vessels

Recipient

- BMI
- Re-transplantation
- Vascular challenges
- Ureteric challenges

Donor surgical challenges



Donor safety is paramount during this major surgery on a healthy volunteer, for the benefit of another patient

ANALYSIS AND COMMENTARY

Laparoscopic Living Donor Nephrectomy: Making Optimal Use of Donors Without Doing Harm

T. Florian Fuller

Transplantation & Volume 98, Number 11, December 15, 2014

Increasing numbers of living donor kidney transplants are being performed worldwide, and the majority of donor operations are now laparoscopic. Transperitoneal 'pure' and hand-assisted laparoscopic donor nephrectomy (HALDN) are the two most commonly performed procedures, although retroperitoneal approaches are advocated by some centers (*1*).

The 'pure' transperitoneal laparoscopic donor nephrectomy (LDN), first described by Ratner and colleagues in 1995, is the preferred technique in many transplant centers. It typically uses four ports and is performed in the lateral decubitus position by surgeons with prior experience of other complex laparoscopic procedures. On retrieval, the organ is prebagged or extracted by hand, typically through a Pfannenstiel incision.

The HALDN uses an additional air-tight port, thus enabling the surgeon to bring one hand into the operat-

multiple arteries may not seem justified. However, according to previous large studies, the use of living donor kidney grafts with multiple arteries is associated with a higher incidence of ureteral complications (*3, 4*). Because lower pole renal arteries are critical for ureteral blood supply, their reanastomosis should always be attempted (*3*). Although complex vascular anatomy is not considered a contraindication to laparoscopic living donor nephrectomy, recipients of allografts with more than two arteries experience a greater incidence of slow or delayed graft function as shown in the Article by Omoto et al. and by others (*2, 4*). Making increased use of right living donor kidneys is a simple way to keep the use of left kidneys with multiple arteries to a minimum. An earlier report from a high volume renal transplant center clearly advocates laparoscopic right donor nephrectomy as a safe and straightforward

Living Donor Nephrectomy: Is It as Safe as It Can Be? Analysis of Living Donor Deaths in the United States

Douglas Scott Keith, MD, FAST, Joe Brown, MAS, ATP, CFI,† and Kenneth Andreoni, MD‡*

J Patient Saf • Volume 15, Number 4, December 2019

TABLE 1. Death Rates of Activities

Risk of Death Per Event	Activity
1:10,000,000	Risk of death from lightening per year
1:10,000,000	Risk of fatal car accident in a 5-mile commute to work
1:4,700,000	Risk of death in commercial airline accident per flight
1:1,500,000	Risk of death per ski outing
1:500,000	Risk of death from bungee jump
1:200,000	Risk of death from an abortion
1:200,000	Risk of death per scuba dive
1:116,000	Risk of death per hang gliding flight
1:100,000	Risk of death skydiving per jump
1:100,000	Risk of death from general anesthesia in a healthy adult ASA 1
1:26,000	Risk of death driving a motorcycle for 100 miles per event
1:11,000	Risk of death during childbirth
1:10,000	Risk of dying rock climbing for 2.5 h
1:3000–5000	**Risk of death donating a kidney**
1:2300	Risk of death per base jump
1:1000	Risk of death from laparoscopic cholecystectomy
1:500–1000	Risk of death donating a lobe of your liver
1:25	Risk of death attempting to summit Mount Everest

ESOT LIDO MASTERCLASS

Donor BMI

http://www.kidney-international.org clinical investigation

Systematic review and meta-analysis of the relation between body mass index and short-term donor outcome of laparoscopic donor nephrectomy

Jeffrey A. Lafranca[1], Sander M. Hagen[1], Leonienke F.C. Dols[1], Lidia R. Arends[2], Willem Weimar[3], Jan N.M. IJzermans[1] and Frank J.M.F. Dor[1]

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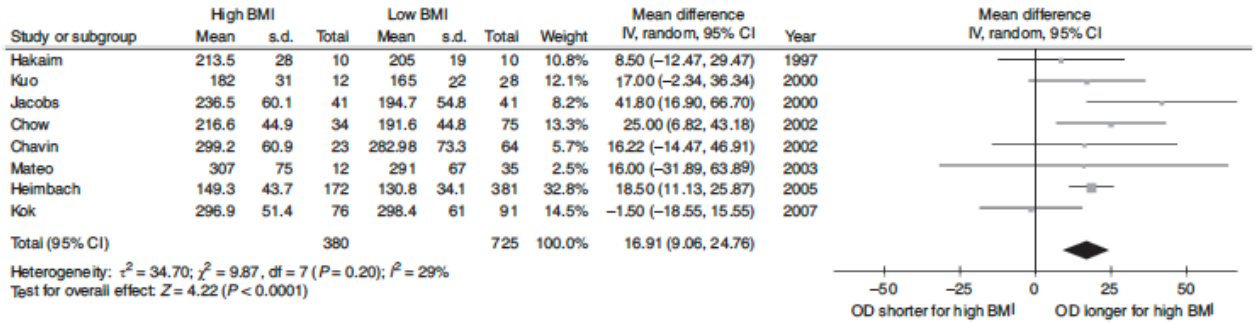
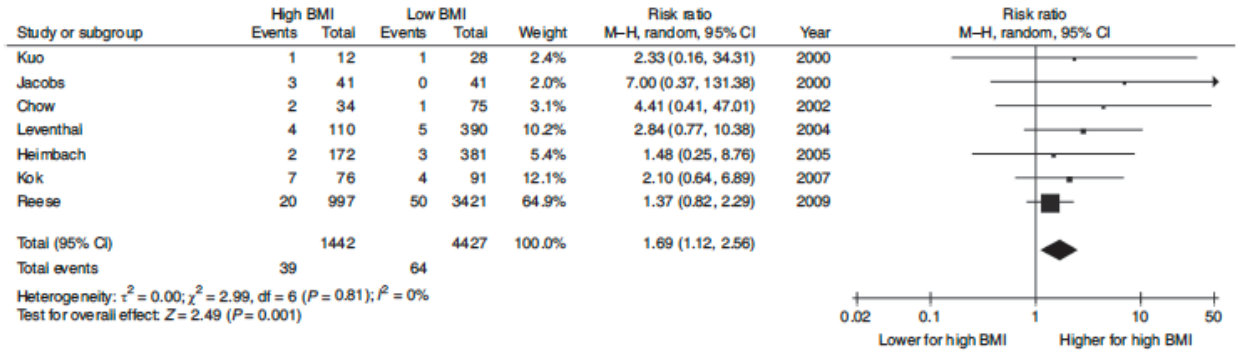


Study or subgroup	High BMI Mean	s.d.	Total	Low BMI Mean	s.d.	Total	Weight	Mean difference IV, random, 95% CI	Year
Hakaim	213.5	28	10	205	19	10	10.8%	8.50 (–12.47, 29.47)	1997
Kuo	182	31	12	165	22	28	12.1%	17.00 (–2.34, 36.34)	2000
Jacobs	236.5	60.1	41	194.7	54.8	41	8.2%	41.80 (16.90, 66.70)	2000
Chow	216.6	44.9	34	191.6	44.8	75	13.3%	25.00 (6.82, 43.18)	2002
Chavin	299.2	60.9	23	282.98	73.3	64	5.7%	16.22 (–14.47, 46.91)	2002
Mateo	307	75	12	291	67	35	2.5%	16.00 (–31.89, 63.89)	2003
Heimbach	149.3	43.7	172	130.8	34.1	381	32.8%	18.50 (11.13, 25.87)	2005
Kok	296.9	51.4	76	298.4	61	91	14.5%	–1.50 (–18.55, 15.55)	2007
Total (95% CI)			380			725	100.0%	16.91 (9.06, 24.76)	

Heterogeneity: $\tau^2 = 34.70$; $\chi^2 = 9.87$, df = 7 ($P = 0.20$); $I^2 = 29\%$
Test for overall effect: $Z = 4.22$ ($P < 0.0001$)

Figure 2 | Forest plot of comparison: high versus low BMI donors; outcome: operation duration (OD) in minutes. BMI, body mass index; CI, confidence interval.



Study or subgroup	High BMI Events	Total	Low BMI Events	Total	Weight	Risk ratio M–H, random, 95% CI	Year
Kuo	1	12	1	28	2.4%	2.33 (0.16, 34.31)	2000
Jacobs	3	41	0	41	2.0%	7.00 (0.37, 131.38)	2000
Chow	2	34	1	75	3.1%	4.41 (0.41, 47.01)	2002
Leventhal	4	110	5	390	10.2%	2.84 (0.77, 10.38)	2004
Heimbach	2	172	3	381	5.4%	1.48 (0.25, 8.76)	2005
Kok	7	76	4	91	12.1%	2.10 (0.64, 6.89)	2007
Reese	20	997	50	3421	64.9%	1.37 (0.82, 2.29)	2009
Total (95% CI)		1442		4427	100.0%	1.69 (1.12, 2.56)	
Total events	39		64				

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 2.99$, df = 6 ($P = 0.81$); $I^2 = 0\%$
Test for overall effect: $Z = 2.49$ ($P = 0.001$)

Figure 3 | Forest plot of comparison: high versus low BMI donors; outcome: conversion (risk ratio). BMI, body mass index; CI, confidence interval.

http://www.kidney-international.org clinical investigation

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No difference in:

- WIT
- Blood loss
- Length of stay
- Perioperative complications

Multiple vessels

Vascular Multiplicity Should Not Be a Contra-Indication for Live Kidney Donation and Transplantation

Jeffrey A. Lafranca[1], Mark van Bruggen[1], Hendrikus J. A. N. Kimenai[1], Thi C. K. Tran[1], Türkan Terkivatan[1], Michiel G. H. Betjes[2], Jan N. M. IJzermans[1], Frank J. M. F. Dor[1]*

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Results

In 237 out of 951 donors (25%), vascular multiplicity was present. CTA had the highest accuracy levels regarding vascular anatomy assessment. Regarding outcome of donors with vascular multiplicity, warm ischemia time (WIT) and skin-to-skin time were significantly longer if arterial multiplicity (AM) was present (5.1 vs. 4.0 mins and 202 vs. 178 mins). Skin-to-skin time was significantly longer, and complication rates were higher in donors with venous multiplicity (203 vs. 180 mins and 17.2% vs. 8.4%). Outcome of renal transplant recipients showed a significantly increased WIT (30 vs. 26.7 minutes), higher rate of DGF (13.9% vs. 6.9%) and lower rate of BPAR (6.9% vs. 13.9%) in patients receiving a kidney with AM compared to kidneys with singular anatomy.

Multiple vessels / Right nephrectomy

World Journal of Urology (2020) 38:919–927
https://doi.org/10.1007/s00345-019-02821-8

ORIGINAL ARTICLE

Check for updates

Feasibility and safety of laparoscopic living donor nephrectomy in case of right kidney and multiple-renal artery kidney: a systematic review of the literature

L. Broudeur[1] · G. Karam[1] · I. Chelghaf[1] · S. De Vergie[1] · J. Rigaud[1] · M. A. Perrouin Verbe[1] · Julien Branchereau[1,2,3]

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Abstract

Purpose To access the current status of the security and feasibility of right kidney (RK) and multiple-renal artery (MRA) laparoscopic living donor nephrectomy (LLDN) which are more challenging compared to left kidney (LK) and single renal artery (SRA) because of a shorter renal vein and more complex vascular anatomy.

Methods We did a systematic review of the literature according to the PRISMA recommendations, reporting RK or MRA donor nephrectomy performed with a laparoscopic technique compared to LK or SRA kidney LLDN. The identified and analyzed primary outcomes of interest were operating time (OT), warm ischemia time (WIT), rate of conversion and transfusion, donor length of stay (LOS), delayed graft function (DGF) and rate of graft loss (GL).

Results 16 comparative studies (1397 cases) of RK-LLDN and 12 comparative studies including 15 series (993 cases) of MRA-LLDN were selected. For RK-LLDN review, conversion rate was 0.8% and blood transfusion rate 0.2%, only one case of graft venous thrombosis was reported, OT was shorter in four studies and there was no any difference of DGF and GL rate compared to LK-LLDN. For MRA-LLDN review, conversion rate was 1.3% and blood transfusion rate 1.1%, OT and WIT were longer compared to SRA-LLDN, there were more ureteral complications in two studies, and no difference in terms of vascular complications and graft loss rate.

Conclusion RK-LLDN and MRA-LLDN would be similar to LK-LLDN and SRA-LLDN in terms of feasibility and safety for the donor as well as graft function results for RK-LLDN.

Surgical Endoscopy (2021) 35:2889–2895
https://doi.org/10.1007/s00464-020-07727-w

A novel difficulty grading system for laparoscopic living donor nephrectomy

Kosei Takagi[1,2] · Hendrikus J. A. N. Kimenai[1] · Turkan Terkivatan[1] · Khe T. C. Tran[1] · Jan N. M. Ijzermans[1] · Robert C. Minnee[1]

Table 2 Univariate and multivariable analysis associated with prolonged operative time (> 190 min)

Variables	Univariate			Multivariable		
	OR	95% CI	*P* value	OR	95% CI	*P* value
Age (years)						
≤ 60 (vs. > 60)	1.36	1.10–1.69	0.0052	1.20	0.96–1.52	0.12
Gender						
Male (vs. Female)	1.76	1.45–2.15	< 0.001	1.69	1.37–2.09	< 0.001
BMI (kg/m^2)						
> 28 (vs. ≤ 28)	1.11	0.90–1.37	0.34	1.36	1.08–1.72	0.009
Technique of LDN						
Pure (vs. Hand-assisted)	2.11	1.67–2.69	< 0.001	1.99	1.53–2.60	< 0.001
Side of LDN						
Right (vs. Left)	1.39	1.14–1.70	0.001	1.09	0.87–1.36	0.4571
No. of renal artery						
Multiple (vs. Single)	2.59	2.02–3.34	< 0.001	2.38	1.83–3.10	< 0.001
No. of renal vein						
Multiple (vs. Single)	2.68	1.90–3.83	< 0.001	2.18	1.52–3.16	< 0.001

BMI body mass index; *LDN* laparoscopic donor nephrectomy; *OR* odds ratio; *CI* confidence interval

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Table 3 A difficulty grading system of living donor nephrectomy

Variables	OR (95% CI)	Score
Gender		
Female	1 (reference)	0
Male	1.69 (1.37–2.09)	1
BMI (kg/m^2)		
≤ 28	1 (reference)	0
> 28	1.36 (1.08–1.72)	1
Technique of LDN		
Hand-assisted	1 (reference)	0
Pure	1.99 (1.53–2.60)	2
No. of renal artery		
Single	1 (reference)	0
Multiple	2.38 (1.83–3.10)	2
No. of renal vein		
Single	1 (reference)	0
Multiple	2.18 (1.52–3.16)	2
Difficulty index (Total score)		0–8
Difficulty classification based on difficulty index		
Low		0–2
Intermediate		3–5
High		6–8

BMI body mass index; *LDN* laparoscopic donor nephrectomy; *OR* odds ratio; *CI* confidence interval

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Fig. 2 Benchmark operation of laparoscopic donor nephrectomy based on the difficulty index. *LDN* laparoscopic donor nephrectomy

Difficulty of laparoscopic donor nephrectomy									
Difficulty index	0	1	2	3	4	5	6	7	8
Difficulty classification	Low			Intermediate			High		
Definition	• For surgeon starting LDN • For surgeons with experience of <15 cases of LDN • Consider hand-assisted LDN			• For surgeon who can consistently perform LDN in 'low difficulty' cases • For surgeons with experience of >15 and <30 cases of LDN			• For surgeon who can consistently perform LDN in 'intermediate difficulty' cases • For surgeons with experience of > 30 cases of LDN		
Benchmark operation	• Simple donor without risk factors : Non-obese, single anatomy			• Donors with a few risk factors : Male, obese, OR multiple vessels			• Difficult donor with many risk factors : Male, obese, AND multiple vessels		

Review

Perioperative Events and Complications in Minimally Invasive Live Donor Nephrectomy: A Systematic Review and Meta-Analysis

Kirsten Kortram, MD,[1] Jan N.M. Ijzermans, MD, PhD,[1] and Frank J.M.F. Dor, MD, PhD[1]

Background. Minimally invasive live donor nephrectomy has become a fully implemented and accepted procedure. Donors have to be well educated about all risks and details during the informed consent process. For this to be successful, more information regarding short-term outcome is necessary. **Methods.** A literature search was performed; all studies discussing short-term complications after minimally invasive live donor nephrectomy were included. Outcomes evaluated were intraoperative and postoperative complications, conversions, operative and warm ischemia times, blood loss, length of hospital stay, pain score, convalescence, quality of life, and costs. **Results.** One hundred ninety articles were included in the systematic review, 41 in the meta-analysis. Conversion rate was 1.1%. Intraoperative complication rate was 2.3%, mainly bleeding (1.5%). Postoperative complications occurred in 7.3% of donors, including infectious complications (2.6%), of which mainly wound infection (1.6%) and bleeding (1.0%). Reported mortality rate was 0.01%. All minimally invasive techniques were comparable with regard to complication or conversion rate. **Conclusions.** The used techniques for minimally invasive live donor nephrectomy are safe and associated with low complication rates and minimal risk of mortality. These data may be helpful to develop a standardized, donor-tailored informed consent procedure for live donor nephrectomy.

(*Transplantation* 2016;100: 2264–2275)

Prophylaxis of Wound Infections-antibiotics in Renal Donation (POWAR)

A UK Multicentre Double Blind Placebo Controlled Randomised Trial

Zubir Ahmed, MSc, FRCS, FEBS, Raphael Uwechue, BM, MRCS,* Pankaj Chandak, MBBS, MRCS,* David van Dellen, MD, FRCS,† Jamie Barwell, MD, FRCS,‡ Sarah Heap, MSc, FRCS,§ Laszlo Szabo, MD, FRCS,¶ Carolyn Hemsley, PhD, FRCPath,|| Jonathon Olsburgh, PhD, FRCS,*** Nicos Kessaris, MSc, FRCS,* and Nizam Mamode, MD, FRCS*✉*

Background: Postoperative infection after hand-assisted laparoscopic donor nephrectomy (HALDN) confers significant morbidity to a healthy patient group. Current UK guidelines cite a lack of evidence for routine antibiotic prophylaxis. This trial assessed if a single preoperative antibiotic dose could reduce post HALDN infections.

Methods: Eligible donors were randomly and blindly allocated to preoperative single-dose intravenous co-amoxiclav or saline. The primary composite endpoint was clinical evidence of any postoperative infection at 30 days, including surgical site infection (SSI), urinary tract infection (UTI), and lower respiratory tract infection (LRTI).

Findings: In all, 293 participants underwent HALDN (148 antibiotic arm and 145 placebo arm). Among them, 99% (291/293) completed follow-up. The total infection rate was 40.7% (59/145) in the placebo group and 23% (34 of 148) in the antibiotic group ($P = 0.001$). Superficial SSIs were 20.7% (30/145 patients) in the placebo group versus 10.1% (15/148 patients) in the antibiotic group ($P = 0.012$). LRTIs were 9% (13/145) in the placebo group and 3.4% (5/148) in the antibiotic group ($P = 0.046$). UTIs were 4.1% (6/145) in the placebo group and 3.4% (5/148) in the antibiotic group ($P = 0.72$). Antibiotic prophylaxis conferred a 17.7% (95% confidence interval 7.2%–28.1%), absolute risk reduction in developing postoperative infection, with 6 donors requiring treatment to prevent 1 infection.

Interpretation: Single-dose preoperative antibiotic prophylaxis dramatically reduces post-HALDN infection rates, mainly impacting SSIs and LRTIs.

Keywords: donor nephrectomy, infection, kidney, living donation, nephrectomy, transplant

(*Ann Surg* 2020;272:65–71)

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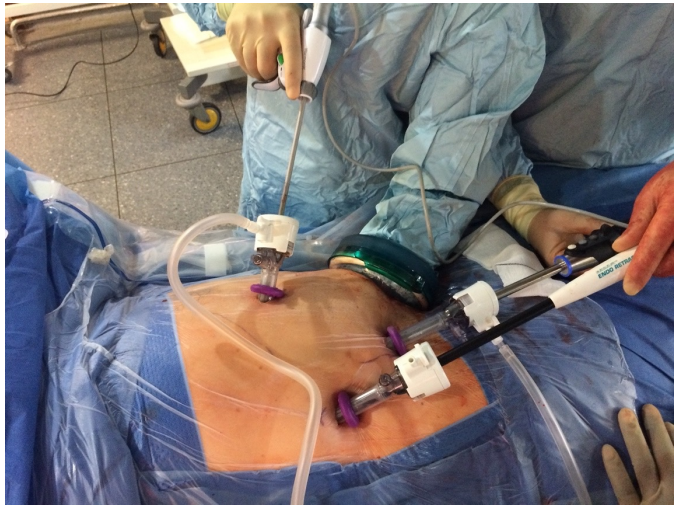
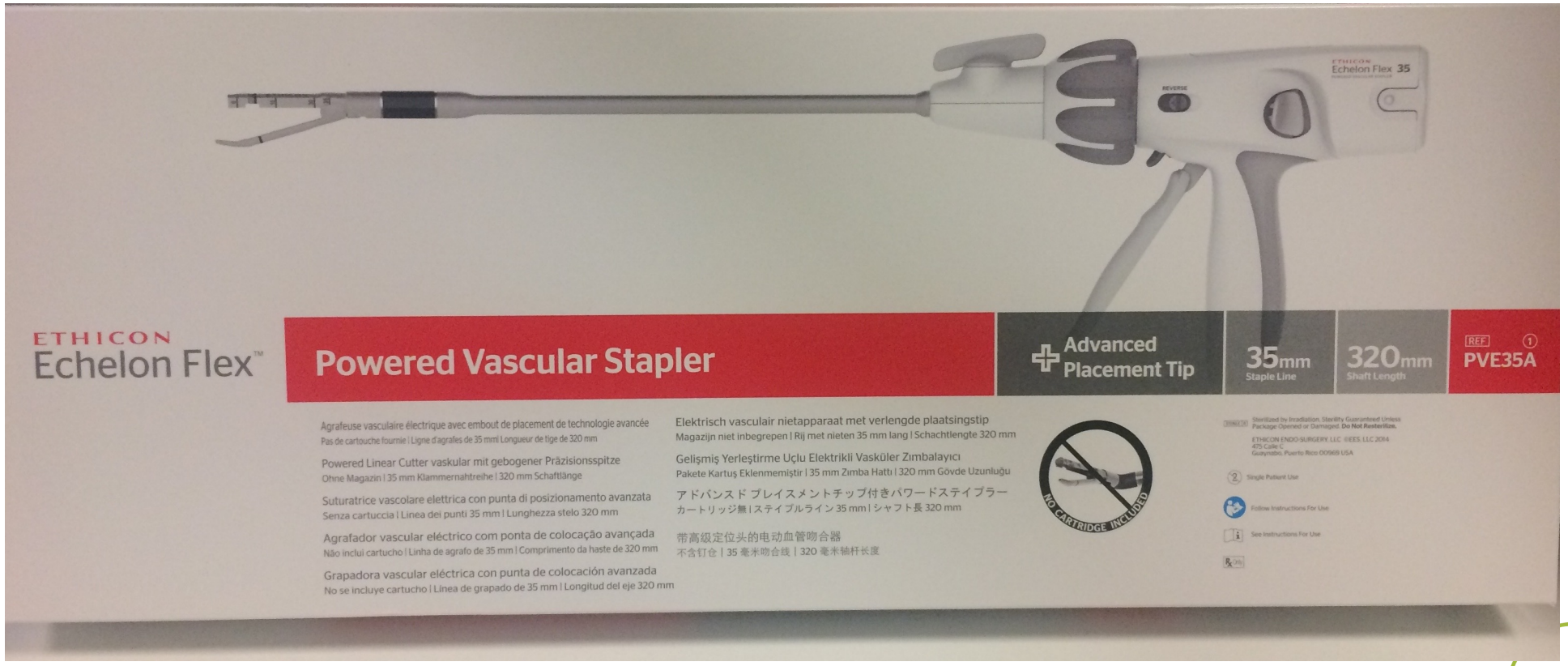
Vascular Management of Vessels

How can we achieve vascular control in the laparoscopic era?



- **Staplers**
- **Surgical clips**
  - Locking
  - Non-locking

Staplers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35mm Staple Line
320mm Shaft Length
REF PVE35A
Agrafeuse vasculaire électrique avec embout de placement de technologie avancée
Pas de cartouche fournie | Ligne d'agrafes de 35 mm| Longueur de tige de 320 mm
Powered Linear Cutter vaskular mit gebogener Präzisionsspitze
Ohne Magazin | 35 mm Klammernahtreihe | 320 mm Schaftlänge
Suturatrice vascolare elettrica con punta di posizionamento avanzata
Senza cartuccia | Linea dei punti 35 mm | Lunghezza stelo 320 mm
Agrafador vascular eléctrico com ponta de colocação avançada
Não inclui cartucho | Linha de agrafo de 35 mm | Comprimento da haste de 320 mm
Grapadora vascular eléctrica con punta de colocación avanzada
No se incluye cartucho | Línea de grapado de 35 mm | Longitud del eje 320 mm
Elektrisch vasculair nietapparaat met verlengde plaatsingstip
Magazijn niet inbegrepen | Rij met nieten 35 mm lang | Schachtlengte 320 mm
Gelişmiş Yerleştirme Uçlu Elektrikli Vasküler Zımbalayıcı
Pakete Kartuş Eklenmemiştir | 35 mm Zımba Hattı | 320 mm Gövde Uzunluğu
アドバンスド プレイスメントチップ付きパワードステイプラー
カートリッジ無 | ステイプルライン 35 mm | シャフト長 320 mm
带高级定位头的电动血管吻合器
不含钉仓 | 35 毫米吻合线 | 320 毫米轴杆长度
NO CARTRIDGE INCLUDED
Sterilized by Irradiation. Sterility Guaranteed Unless Package Opened or Damaged. Do Not Resterilize.
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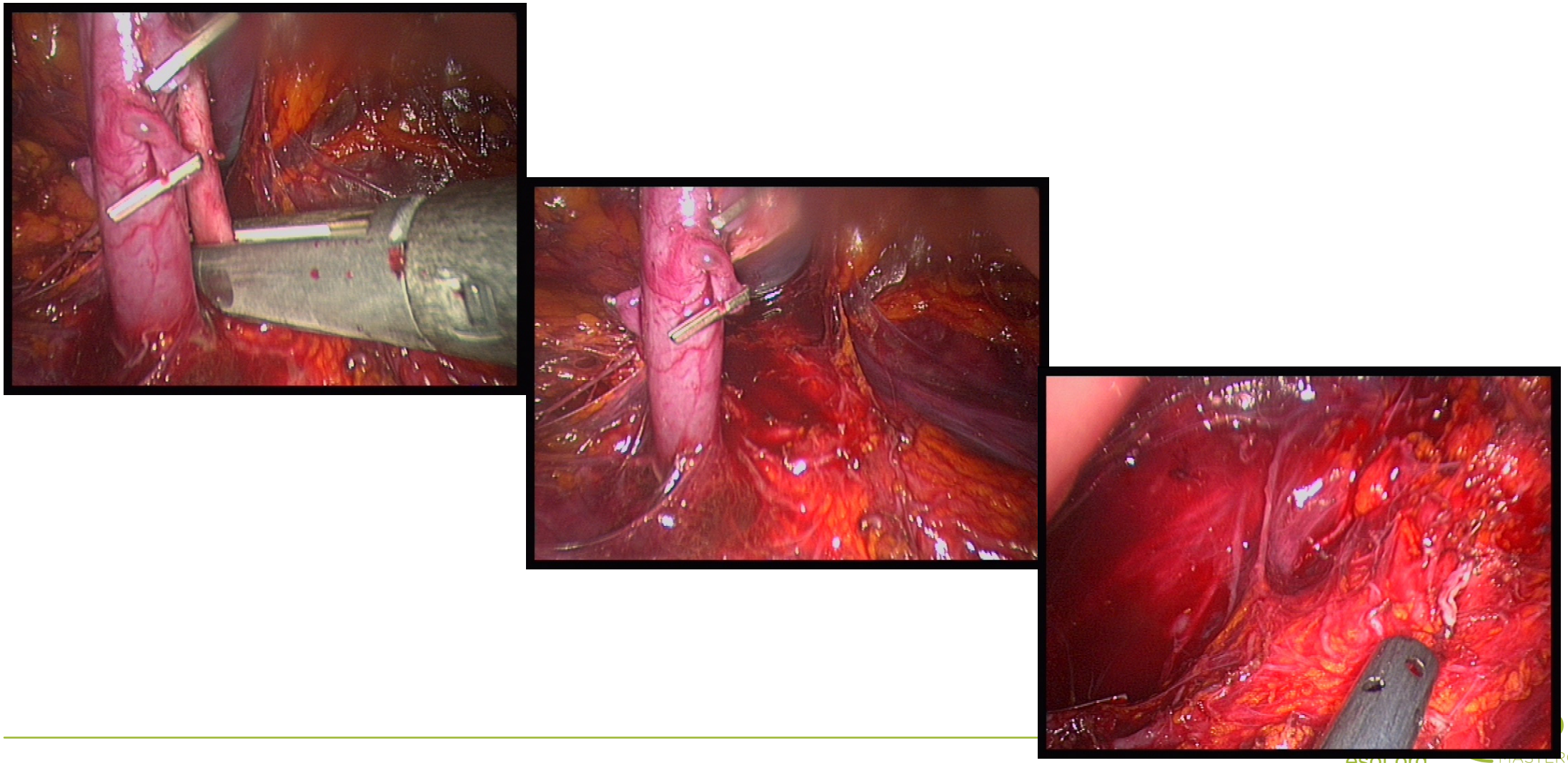
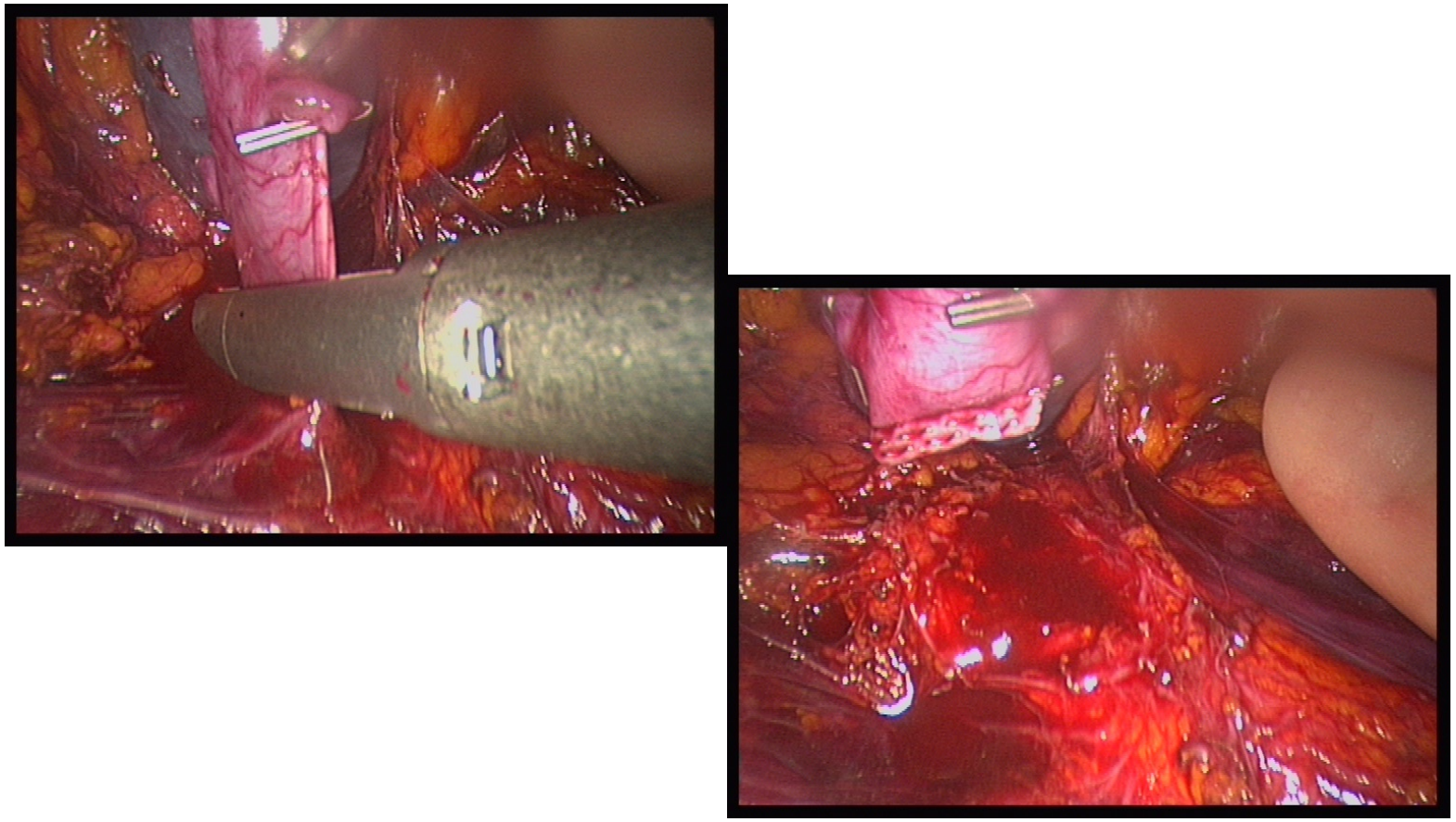
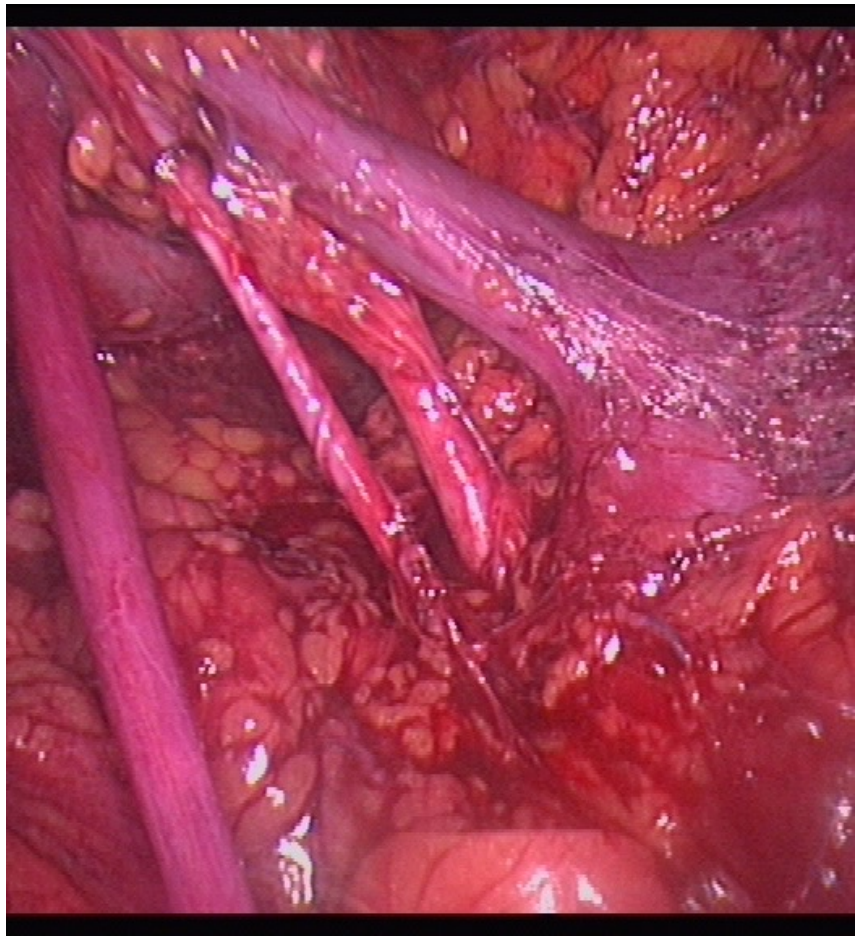
Left nephrectomy

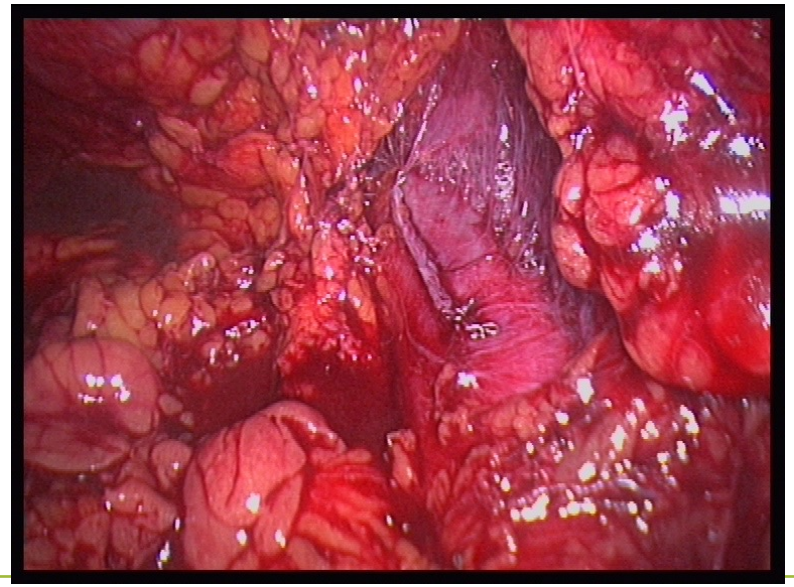


Left nephrectomy

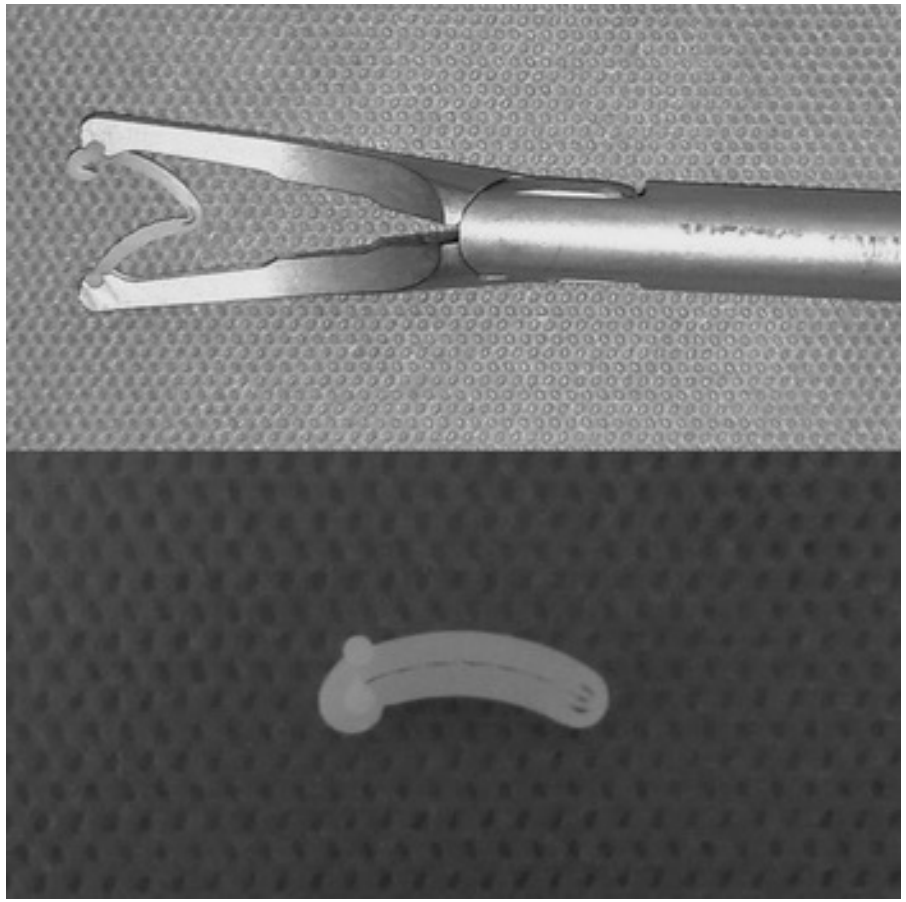


Right nephrectomy





Surgical clips



What are the risks when using staplers or surgical clips?

What are the risks when using staplers or surgical clips?

Risk of malfunction

- stapler misfire
- clip slippage

What are the risks when using staplers or surgical clips?

Risk of Bleeding

- Controlled
- Uncontrolled

What are the risks when using staplers or surgical clips?

Controlled bleeding

- Conversion to open operation
- Blood transfusion
- Injury to other structures
- Re-operation

What are the risks when using staplers or surgical clips?

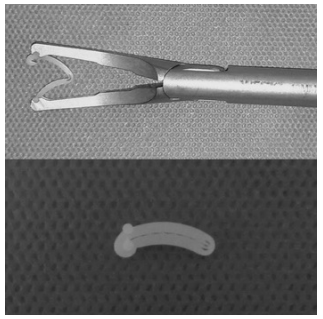
Controlled bleeding

- Conversion to open operation
- Blood transfusion
- Injury to other structures
- Re-operation

Uncontrolled bleeding

- Hypotension
- Multiple blood transfusions
- Renal failure
- Injury to other structures
- Re-operation
- Death

FDA



Weck Hem-o-Lok Ligating Clips Contraindicated for Ligation of Renal Artery During Laparoscopic Living-Donor Nephrectomy: FDA and HRSA Joint Safety Communication

Date Issued: May 5, 2011

Audience: Urologists, Transplant Surgeons, Kidney Transplant Physicians, Hospital Administrators, Hospital Risk Managers, Clinical Transplant Coordinators, Operating Room Supervisors and Staff, and Patients

Medical Specialty: Kidney Donor Transplant Surgery, (Tertiary) Surgery Care, Hospital and Other Medical Center Kidney Programs

Purpose: The Food and Drug Administration (FDA) and the Health Resources and Services Administration (HRSA) are alerting health care providers that Weck Hem-o-Lok Ligating Clips should NOT be used for the ligation of the renal artery during a laparoscopic living-donor nephrectomy because of serious risks to the donor.

ESOT LIDO MASTERCLASS

American Journal of Transplantation 2015; 15: 1701–1707
Wiley Periodicals Inc.

doi: 10.1111/ajt.13142

Brief Communication

Vascular Management During Live Donor Nephrectomy: An Online Survey Among Transplant Surgeons

S. Janki[1], D. Verver[1], K. W. J. Klop[1], A. L. Friedman[2], T. G. Peters[3], L. E. Ratner[4], J. N. M. Ijzermans[1] and F. J. M. F. Dor[1,*]

[1]Division of HPB & Transplant Surgery, Department of Surgery, Erasmus MC, University Medical Center, Rotterdam, The Netherlands
[2]New York Organ Donor Network, New York, NY
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[4]Department of Surgery, Columbia University, New York, NY
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Introduction

Kidney transplantation is the treatment of choice for many patients suffering from end-stage renal disease (1). As the incidence and prevalence of end-stage renal disease is increasing worldwide (2), the demand for kidney donors is rising. Fortunately, live donor kidney transplantation can contribute to solving the donor shortage, and there continues to be many advantages associated with receiving a live donor kidney (1,3,4). Furthermore, as more LDN procedures are undertaken, there is a general sense that the operation is quite safe (5,6). Recent data determined the mortality risk for live kidney donors at 90 days postoperatively to be 0.03%. One of the most

In 2006, a survey from the American Society of Transplant Surgeons disclosed significant and sometimes fatal hemorrhagic events in live donor nephrectomies (LDN) related to failure of clips, leading to the contraindication of the Weck® Hem-o-lok® clip for control of the renal artery during LDN. A survey regarding vascular control techniques, their perceived safety ratings and their failures was sent to 645 European Society for Organ Transplantation members who profiled their profession as ''surgeon'' and selected ''kidney'' as organ type. Two hundred forty-three (41%) members responded, of whom 171 (63.3%) independently perform LDN. Their responses were analyzed. For arterial and venous vascular control, the GIA™ and TA™stapler are used most frequently, and were rated the safest. Of the 121 reported hemorrhagic events, slippage and dislodgement of clips occurred at least 58 times, while stapler malfunction occurred at least 40 times. One donor death from hemorrhage related to clip dysfunction was reported. Hemorrhagic complications of LDN with fatal and non-fatal outcomes still occur. Strikingly, many surgeons do not use the vascular closing technique that they consider most safe. Failure of non-transfixion techniques is associated with greater risks for the donor. Control of major vessels in LDN must employ transfixion techniques for optimal donor safety.

Abbreviations: ASTS, American Society of Transplant Surgeons; ESOT, European Society for Organ Transplantation; LDN, live donor nephrectomy

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American survey

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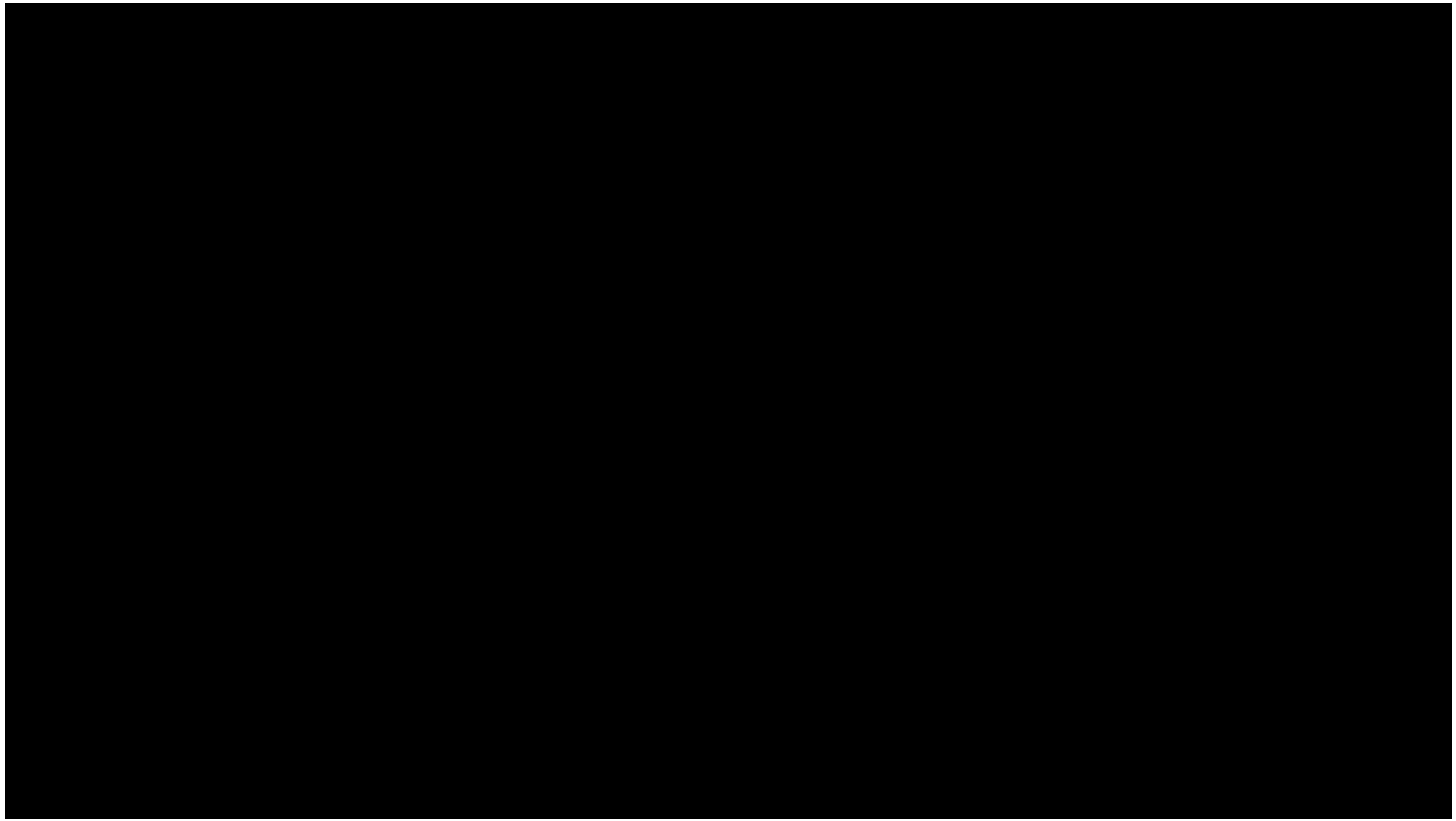


Living Donor Nephrectomy: Is It as Safe as It Can Be? Analysis of Living Donor Deaths in the United States

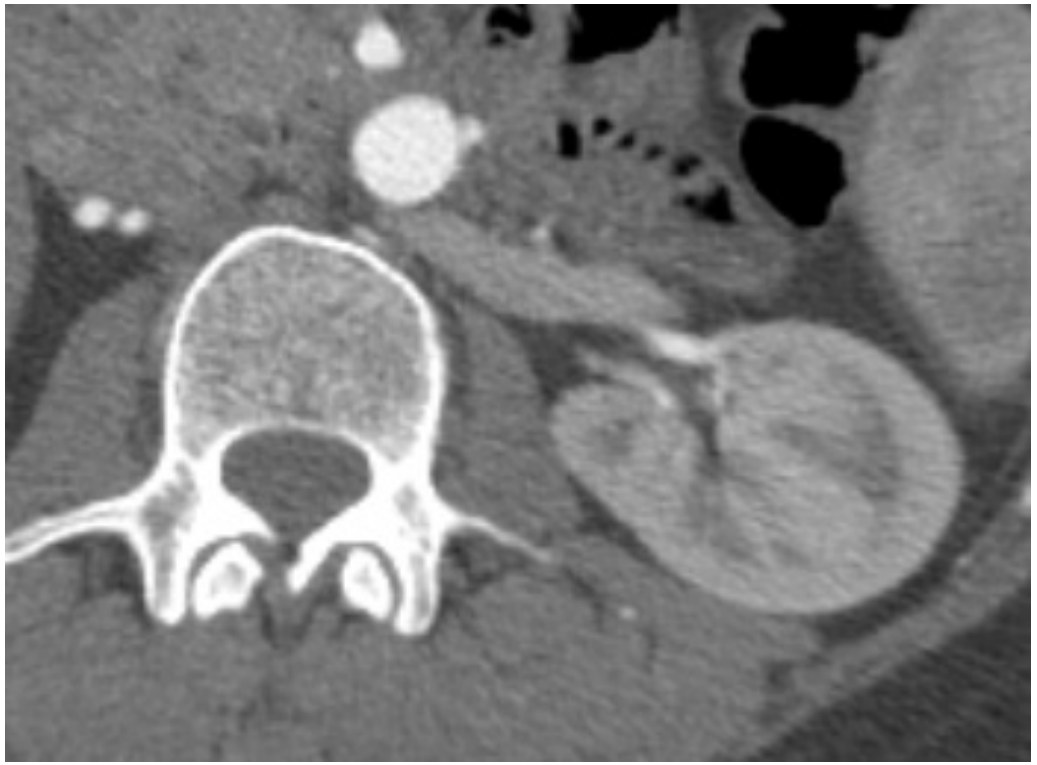
Douglas Scott Keith, MD, FAST, Joe Brown, MAS, ATP, CFI,† and Kenneth Andreoni, MD‡*

J Patient Saf • Volume 15, Number 4, December 2019

TABLE 4. Summary of Causes of Death in First 90 Days

Cause of Death	n	Potential for Prevention
Hemorrhage	7	Potentially preventable
Cardiovascular	3	
Infection related to donation	2	
Pulmonary embolism	2	
Suicide	2	
Cerebrovascular accident	1	
Pulmonary arrest	1	
Other/unknown	8	Unsure
Accident	2	Not preventable
Homicide	1	
Ruptured cerebral aneurysm	1	

Retroaortic left renal vein



Urologia Internationalis

Original Paper

Urol Int 2020;104:641–645
DOI: 10.1159/000507642

Is a Retroaortic Vein a Risk Factor in Laparoscopic Living Donor Nephrectomy?

Josef Mang[a] Linda Hennig[a] Nadine Biernath[a] Lutz Liefeldt[b] Anna Bichmann[c] Bernhard Ralla[a] Andreas Maxeiner[a] Robert Peters[a] Hannes Cash[a] Klemens Budde[b] Frank Friedersdorff[a]

[a]Department of Urology, Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin and Berlin Institute of Health, Berlin, Germany; [b]Department of Nephrology, Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin and Berlin Institute of Health, Berlin, Germany; [c]Department of Anesthesiology and Operative Intensive Care Medicine, Campus Charité Mitte, Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin and Berlin Institute of Health, Berlin, Germany

alyzed. ***Results:*** 221 patients underwent donor nephrectomy between 2011 and 2017; 11 patients (4.98%) showed the feature of a retroaortic left renal vein, and in 8 patients (72.7%) out of those 11 the left kidney was chosen for transplantation. Mean preoperative serum creatinine was 0.77 (0.49–0.98) mg/dL and 1.28 (0.97–1.64) mg/dL at discharge. In recipients mean serum creatinine preoperatively, after 1 week, 1 month,1 year, 2 and 3 years of follow-up was 10.36 (6.09–20.77) mg/dL, 1.71 (0.67–2.72), 1.33 (0.70–1.89), 1.31 (0.95–2.13), 1.31 (0.98–2.13) and 1.33 (1.03–1.84), respectively. Neither donors nor recipients suffered from any operative complications. ***Conclusions:*** Laparoscopic living donor nephrectomy of a left kidney with retroaortic renal vein is safe for the donor, without limitation in the outcome for the recipient.

Chylous ascites

Received: 19 November 2018 | Revised: 19 December 2018 | Accepted: 14 January 2019

DOI: 10.1111/ctr.13483

BRIEF COMMUNICATION

WILEY Clinical TRANSPLANTATION

Chylous ascites following laparoscopic live donor nephrectomy: A new improved treatment paradigm

Leigh-Anne Dale[1] | Pedro Rodrigo Sandoval[2] | Lloyd E. Ratner[2]

[1]Columbia Vagelos College of Physicians and Surgeons, New York, New York

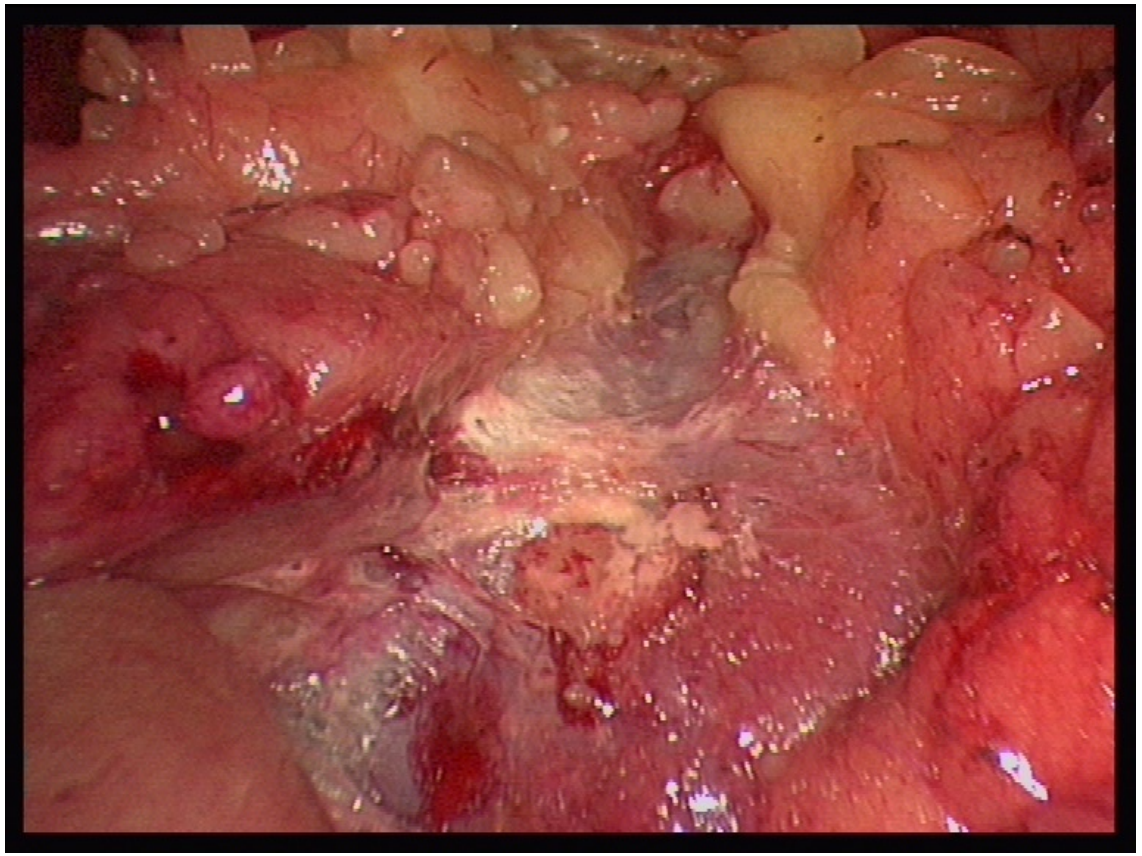
[2]Department of Surgery, Columbia University Medical Center, New York, New York

Correspondence
Leigh-Anne Dale, Columbia Vagelos College of Physicians and Surgeons, New York, New York.
Email: ld2517@cumc.columbia.edu

Abstract

Chylous ascites is a difficult, albeit uncommon complication of laparoscopic live donor nephrectomy (LLDN). Lymphatic leak is believed to be a result of injury to the cisterna chyli, regional lymph nodes, or other peri-aortic lymphatics intraoperatively. Recommended management with dietary modifications can result in malnutrition and immunodeficiency. We present four patients who developed chylous ascites following LLDN. Approach to these patients evolved over time. Our initial two patients were successfully treated with a combination of surgical intervention followed by drain placement, after the failure of conservative management. The latter two cases were successfully treated with prompt intra-abdominal drain placement, without dietary modifications. Our cohort challenges the standard of care for treatment of chylous ascites after LLDN. We believe that prompt diagnosis and placement of an intra-abdominal drain can be used safely in select patients that develop this complication. We hypothesize that continuously draining the lymphatic leak, thus avoiding the re-accumulation of ascites, allows bowel and mesentery to make contact and adhere to the retroperitoneal tissue. We believe that prompt, initial, percutaneous drain placement is a viable alternative to both conservative and reoperative management in the treatment of chylous ascites after LLDN and should be considered as a reasonable first-line therapy.

Adhesions



Recipient Surgical Challenges

BMI

BMI

Journal of Nephrology (2020) 33:371–381
https://doi.org/10.1007/s40620-019-00654-7

ORIGINAL ARTICLE

UK renal transplant outcomes in low and high BMI recipients: the need for a national policy

Ioannis D. Kostakis[1] · Theodoros Kassimatis[1] · Valentina Bianchi[1] · Panoraia Paraskeva[1] · Clare Flach[2] · Chris Callaghan[1] · Benedict Lyle Phillips[1] · Nikolaos Karydis[1] · Nicos Kessaris[1] · Francis Calder[1] · Ioannis Loukopoulos[1]

Abstract

Introduction We assessed the effect of recipient body mass index (BMI) on the outcomes of renal transplantation and the management of obese patients with end-stage renal disease across the UK.

Methods We analyzed data of 25539 adult renal transplants (2007–2016) from the UK Transplant Registry. Patients were divided in BMI groups [underweight: < 18.5, normal: 18.5–24.9 (reference group), overweight: 25–29.9, class I obese: 30–34.9, class II/III obese: ≥ 35]. We also conducted a national survey of all UK renal transplant centers on the influence of BMI on decisions regarding management of renal transplant candidates.

Results BMI ≥ 25 was an independent risk factor for delayed graft function and primary non-function ($p \leq 0.001$). Underweight ($p = 0.001$), class I obese ($p = 0.017$) and class II/III obese recipients ($p < 0.001$) had poorer graft survival, however, 5- and 10-year graft survival rates were good. Patient survival was shorter for underweight recipients ($p < 0.001$) and longer for overweight ($p = 0.028$) and class I obese recipients ($p = 0.013$). The national survey revealed significant variability among transplant centers in BMI threshold for listing patients on transplant waiting list and limited support with conservative or surgical procedures for weight control.

Conclusions Obesity alone should not be a barrier for renal transplantation. A national strategy is required to give all patients equal chances in transplantation.

BMI

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Table 2 Logistic regression analysis of factors associated with DGF

Parameter	OR	95% CI	*p* value
Recipient BMI (reference: normal)			
Underweight	0.81	0.61–1.09	0.165
Overweight	1.17	1.06–1.29	0.001
Class I obese	1.58	1.41–1.77	< 0.001
Class II/III obese	1.73	1.41–2.12	< 0.001

BMI

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Table 3 Logistic regression analysis of factors associated with graft PNF

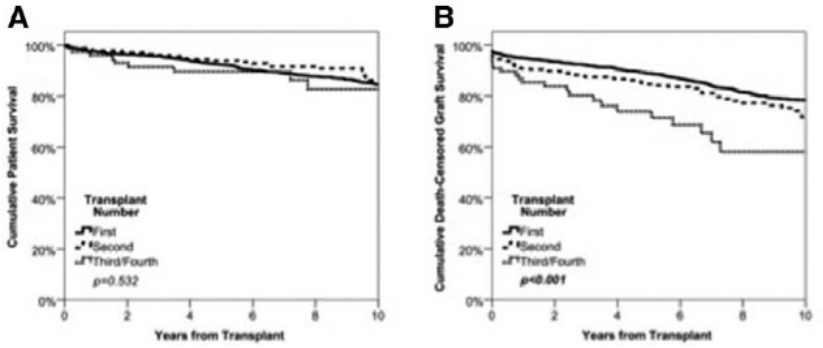
Parameter	OR	95% CI	*p* value
Recipient BMI (reference: normal)			
Underweight	1.26	0.63–2.52	0.519
Overweight	1.32	1.02–1.71	0.035
Class I obese	1.68	1.25–2.26	0.001
Class II/III obese	2.24	1.39–3.6	0.001

Retransplantation

Original Clinical Science—General

Outcomes in Third and Fourth Kidney Transplants Based on the Type of Donor

Dilan Dabare, MRCS,[1] Theodoros Kassimatis, MD, PhD,[1] James Hodson, BSc,[2] Muhammad Arslan Khurram, PhD, MRCS,[1] Georgios Papadakis, MSc, MBBS,[1] Gianluca Rompianesi, MD,[1] Olivia Shaw, PhD,[3] Nikolaos Karydis, PhD,[1] Chris Callaghan, PhD, FRCS,[1] Jonathon Olsburgh, PhD, FRCS,[1] Nizam Mamode, MD, FRCS,[1] Nicos Kessaris, FRCS,[1] and Ioannis Loukopoulos, PhD, FRCS[1]



Background. An increasing number of patients are requiring multiple retransplants. We assessed outcomes of third and fourth kidney transplants, to aid decision making on the most suitable donor type. **Methods.** Data were collected retrospectively for 2561 transplants, including 69 third and 8 fourth, performed from 2000 to 2017. Demographics and outcomes for the combined third/fourth group were compared to first and second transplants. Within the third/fourth kidney transplant group, comparisons were made between deceased donors (n = 39), live donor HLA-compatible (n = 23) and -incompatible (n = 13) transplants, as well as between standard (n = 25) and extended-criteria (n = 14) deceased donor transplants. **Results.** Patient survival did not differ significantly by transplant number ($P = 0.532$), whereas death-censored graft survival declined progressively, from 89% at 5 years in first, 85% in second and 74% in the third/fourth transplant group ($P < 0.001$). Within the combined third/fourth transplant subgroup, 5-year graft survival was found to be 100% in recipients of HLA-compatible live donors, compared to 75% in deceased donors and 53% in HLA-incompatible live donors, although this difference did not reach statistical significance ($P = 0.083$). No significant difference in patient survival ($P = 0.356$) or complication rates ($P = 0.757$) were detected between these groups. For recipients of deceased donors in the third/fourth transplant group, there were no significant differences between standard versus extended-criteria donors for any of the outcomes considered. **Conclusions.** Despite variable functional outcomes, third and fourth kidney transplant recipients experience comparable patient survival rates to first and second transplants, regardless of the donor type. In selected patients, HLA-incompatible live donors and extended-criteria deceased donors should be considered.

(*Transplantation* 2019;103:1494–1503)

Retransplantation

Original Clinical Science—General

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1494 Transplantation ■ July 2019 ■ Volume 103 ■ Number 7

Surgical Aspects of Third and Fourth Kidney Transplantations

At surgery, an extraperitoneal approach was achieved in 75% (n = 58) of cases, with an intraperitoneal approach employed for the remainder (25%, n = 19). In 2 of these cases, an extraperitoneal approach was converted into an intraperitoneal operation, due to difficulties in gaining exposure safely. In a further 2 cases, a midline approach was used due to difficulties in dissecting the iliac vessels. In 69% (n = 53), the right iliac fossa was used. The orthotopic location was not used.

The majority of the grafts were left kidneys (n = 55, 71%). Twenty (26%)patients underwent a transplant nephrectomy of 1 or more of their previous grafts before their transplant, primarily due to recurrent infections. In 5 further cases, a nephrectomy of an old graft was required at the time of transplantation due to restrictions in space. The donor artery was anastomosed onto the recipient external iliac artery in 69% (n = 53) of cases and onto the common iliac artery in 32% (n = 25). For the venous anastomosis, the recipient external iliac vein was used in 77% (n = 59), common iliac vein in 19% (n = 15), and inferior vena cava in 4% (n = 3) of cases. The implantation of the ureter was performed using a Lich-Gregoir technique in all cases. A transperitoneal approach was required in 15 (19%) cases.

Multiple vessels

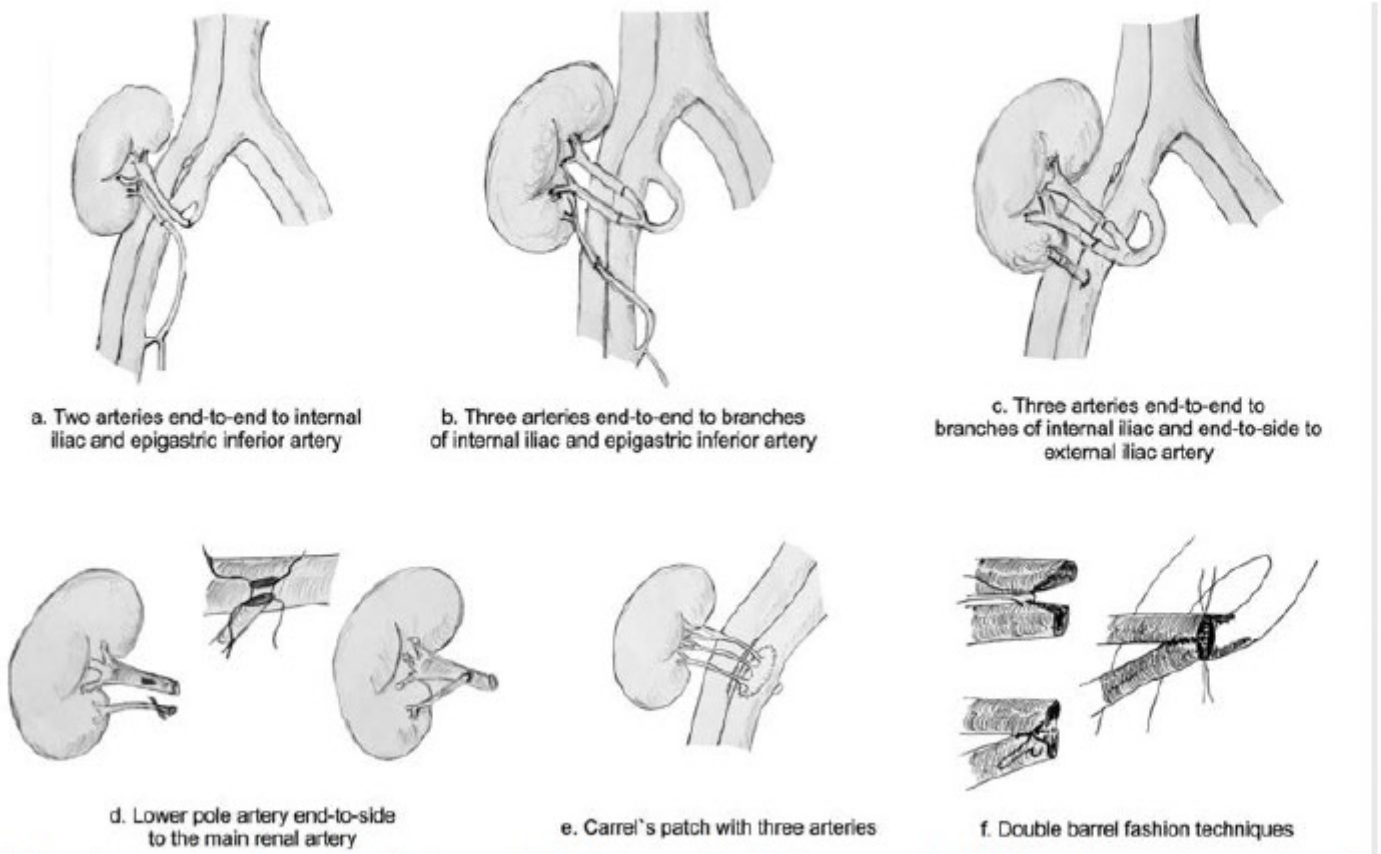
Management of Multiple Renal Arteries and Unusual Venous Anatomy During Kidney Transplant: From a Simple Technical Problem to a Graft-Saving Procedure

Zivko Popov,[3-5] Oliver Stankov,[1,3] Sotir Stavridis,[1,3] Skender Saidi,[1,3] Ognen Ivanovski,[1,3] Goce Spasovski,[2,3] Koco Cakalaroski,[2] Ninoslav Ivanovski[3,4]

Table 2. Arterial Malformations and Technique of Reconstruction

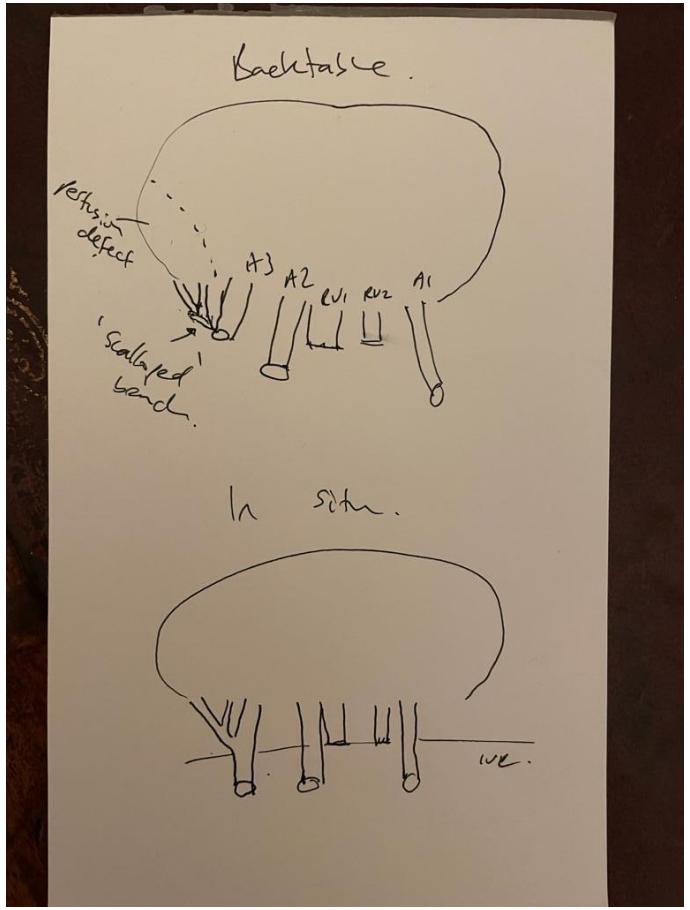
Malformation and Technique	Number (%)
Single renal artery, No. (%)	209 (83.6%)
End-to-end with hypogastric artery	198 (79.2%)
End-to-side with iliac external artery	11 (4.4%)
Two arteries, No. (%)	34 (13.6%)
Two main renal arteries anastomosed end-to-end to the branches of internal iliac artery	12 (4.8%)
Side-to-side conjoined artery-to-artery anastomosis (double-barrel technique)	2 (0.8%)
Main and polar arteries, No. (%)	15 (6%)
Seven upper polar arteries (3 into the main renal artery, 4 smaller ligated), 8 lower polar arteries (5 to epigastric inferior, 1 end-to-side with external iliac, 1 end-to-side lower polar artery to main renal artery, 1 ligated), Carrel patch from the aorta with end-to-side with common/external iliac artery	5 (2%)
Three arteries, No. (%)	7 (2.8%)
Three 3-hilar arteries (internal plus external artery), 2 main with lower pole arteries (epigastric artery)	5 (2%)
Carrel patch from the aorta with end-to-side with common/external iliac artery	2 (0.8%)

Figure 1. Schematic Examples of Our Surgical and Microsurgical Techniques of Intracorporeal and Ex Vivo Anastomosis for Grafts With Multiple Renal Arteries

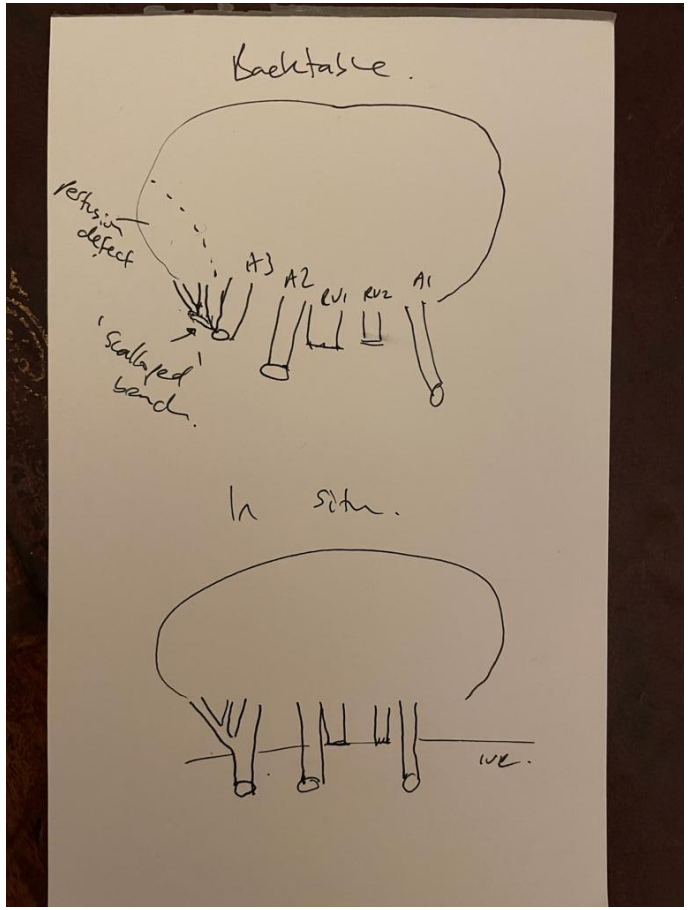


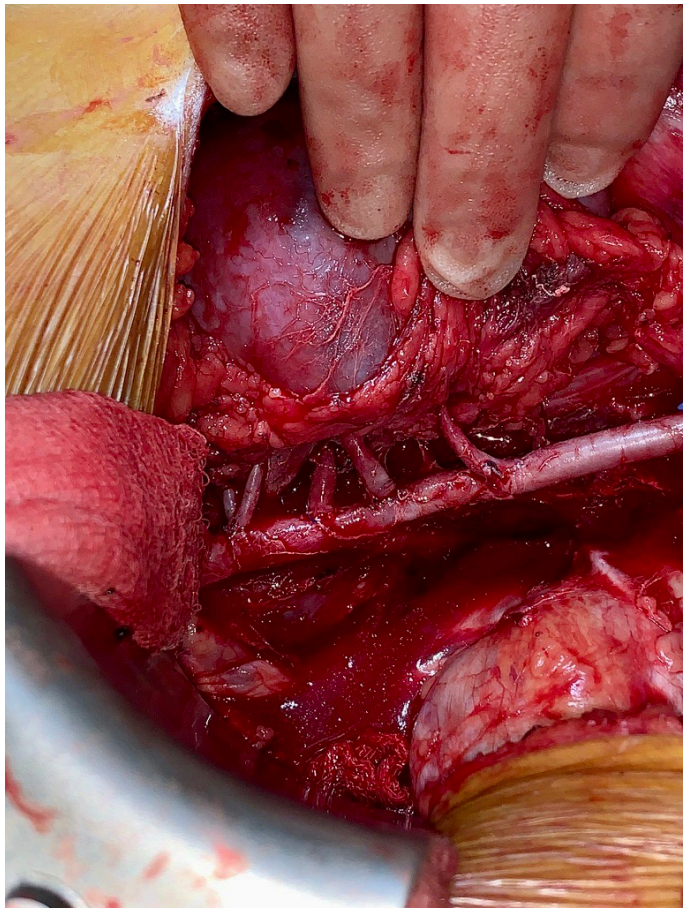
Schematic examples of surgical and microsurgical techniques of **(a-c)** intracorporeal and **(d-f)** ex vivo anastomoses for grafts with multiple renal arteries (Popov Z, Personal data)

Multiple vessels



Multiple vessels





Renal vein reconstruction

Case Report

Vascular Reconstructions in Living Unrelated Kidney Transplant Using Donor Ovarian Vein and Recipient Inferior Epigastric Artery with Simultaneous Enucleation of a Complex Cyst

Giuseppe Serena,[1,2] **Javier Gonzalez**,[3] **Giselle Guerra**,[2,4] **Mohamed Ammar Al Nuss**,[1,2] **Maykel Valdes**,[2] **and Gaetano Ciancio**[1,2,5]

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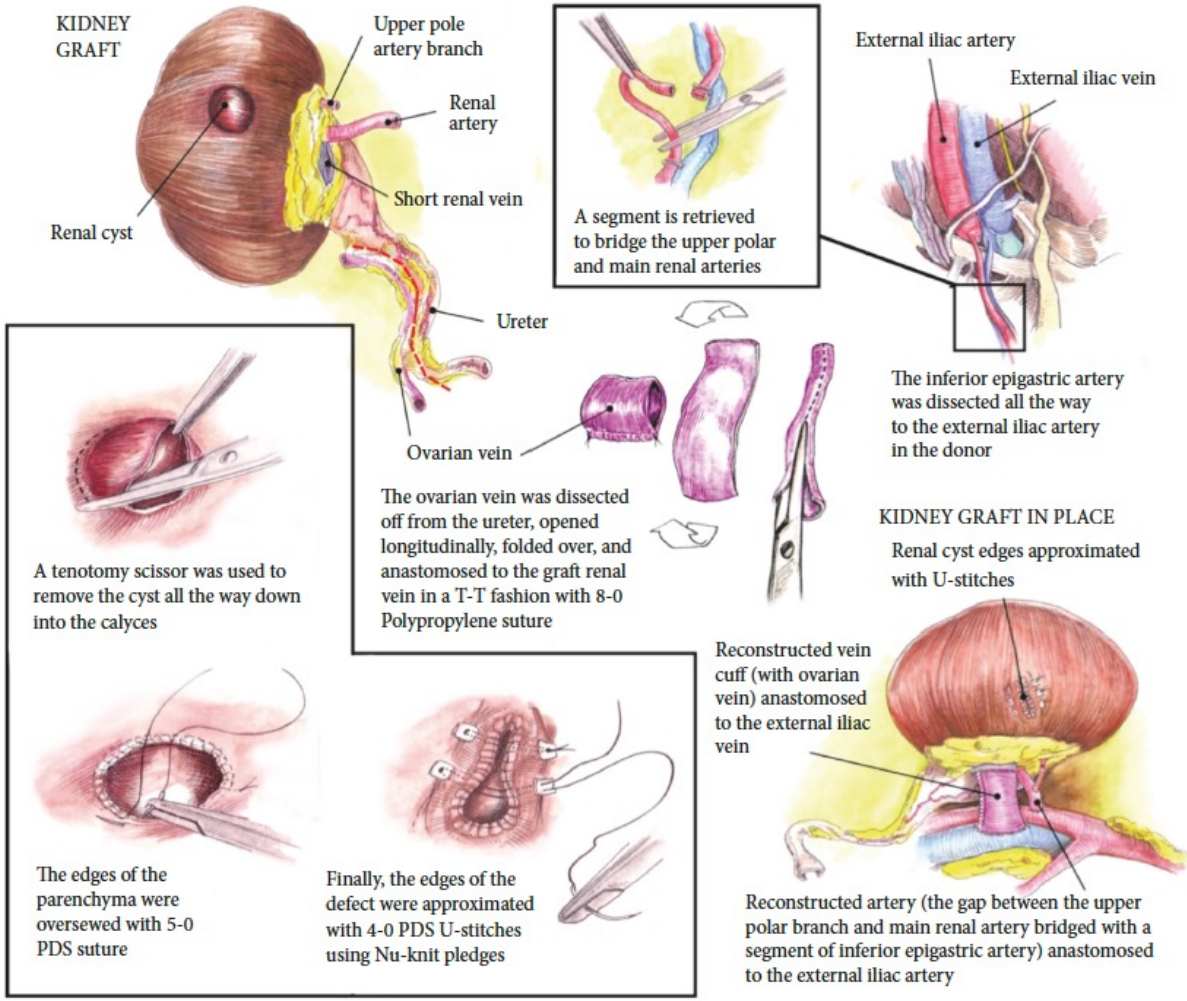

FIGURE 1: Schematic drawing describes the three surgical anomalies of the right donor kidney.

Aorto-iliac vascular disease

European
Surgical Research

Research Article

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Screening, Management, and Acceptance of Patients with Aorto-Iliac Vascular Disease for Kidney Transplantation: A Survey among 161 Transplant Surgeons

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Jan N.M. IJzermans[a] Robert C. Minnee[a]

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Conclusion: There is no uniformity in the screening, management, and acceptance of patients with AVD for transplantation. If a center declines a patient with AVD because of technical concerns, the patient should be referred for a second opinion to a tertiary center with expertise in pre-transplant vascular interventions. Multidisciplinary meetings including a vascular surgeon and a cardiologist could help optimize these patients for transplantation.

Endarterectomy for Iliac Occlusive Disease during Kidney Transplantation: A Multicenter Experience

William S. Sorrells, MD[1] Shennen A. Mao, MD[2] Timucin Taner, MD, PhD[3] Caroline C. Jadlowiec, MD[4] Houssam Farres, MD[1] Victor Davila, MD[5] Samuel R. Money, MD[5] William M. Stone, MD[5] Mohammad Al-Khasawneh, MD[6] Joao A. Da Rocha Da Rocha-Franco[1] Warner A. Oldenburg, MD[1] Gustavo S. Oderich, MD[6] C. Burcin Taner, MD[2] Albert G. Hakaim, MD[1] Young Erben, MD[1]

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Int J Angiol 2021;30:91–97.

Fig. 1 Coronal view of a noncontrast computed tomography scan of the abdomen and pelvis in a patient with significant Iliac occlusive disease (IOD) prior to kidney transplantation.

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Results

There was a total of 6,757 KT at our three sites (Florida, Arizona, and Minnesota). From these, 22 (0.32%) patients had concomitant IOD requiring iliac artery endarterectomy at the time of transplantation. The demographic data, comorbidities, and the etiology of kidney failure are presented in ►**Table 2**. Thirteen (59.1%) patients were male and the mean age at KT was 61.5 ± 7 years. The most common etiology of kidney failure was diabetic nephropathy in 10 patients (45.5%) followed by a combination of hypertensive/diabetic nephropathy in five patients (22.7%) and hypertensive nephrosclerosis in three patients (13.6%). The mean time from dialysis to transplantation was 2.9 ± 2.9 years. Sixteen patients (72.7%) received renal allografts from deceased donors and six (27.3%) were recipients from living donors.

Table 3 Postoperative complications

Postoperative complications	*n* (%)
Acute blood loss anemia, requiring transfusion	10 (45.5)
Perinephric hematoma requiring reoperation	2 (9.1)
Ischemic colitis requiring colectomy	1 (4.5)
Graft thrombosis requiring nephrectomy	1 (4.5)

Transplant International

META-ANALYSIS

The prognosis of kidney transplant recipients with aorto-iliac calcification: a systematic review and meta-analysis

Elsaline Rijkse[1], Jacob L. van Dam[1], Joke I. Roodnat[2], Hendrikus J. A. N. Kimenai[1], Jan N. M. IJzermans[1] & Robert C. Minnee[1]

SUMMARY

The prognosis of kidney transplant recipients (KTR) with vascular calcification (VC) in the aorto-iliac arteries is unclear. We performed a systematic review and meta-analysis to investigate their survival outcomes. Studies from January 1st, 2000 until March 5th, 2019 were included. Outcomes for meta-analysis were patient survival, (death-censored) graft survival and delayed graft function (DGF). Twenty-one studies were identified, eight provided data for meta-analysis. KTR with VC had a significantly increased mortality risk [1-year: risk ratio (RR) 2.19 (1.39–3.44), 5-year: RR 2.28 (1.86–2.79)]. The risk of 1-year graft loss was three times higher in recipients with VC [RR 3.15 (1.30–7.64)]. The risk of graft loss censored for death [1-year: RR 2.26 (0.58–2.73), 3-year: RR 2.19 (0.49–9.82)] and the risk of DGF (RR 1.24, 95% CI 0.98–1.58) were not statistically different. The quality of the evidence was rated as very low. To conclude, the presence of VC was associated with an increased mortality risk and risk of graft loss. In this small sample size, no statistical significant association between VC and DGF or risk of death-censored graft loss could be demonstrated. For interpretation of the outcomes, the quality and sample size of the evidence should be taken into consideration.

Transplant International 2020; 33: 483–496

Abnormal venous anatomy

Arterial

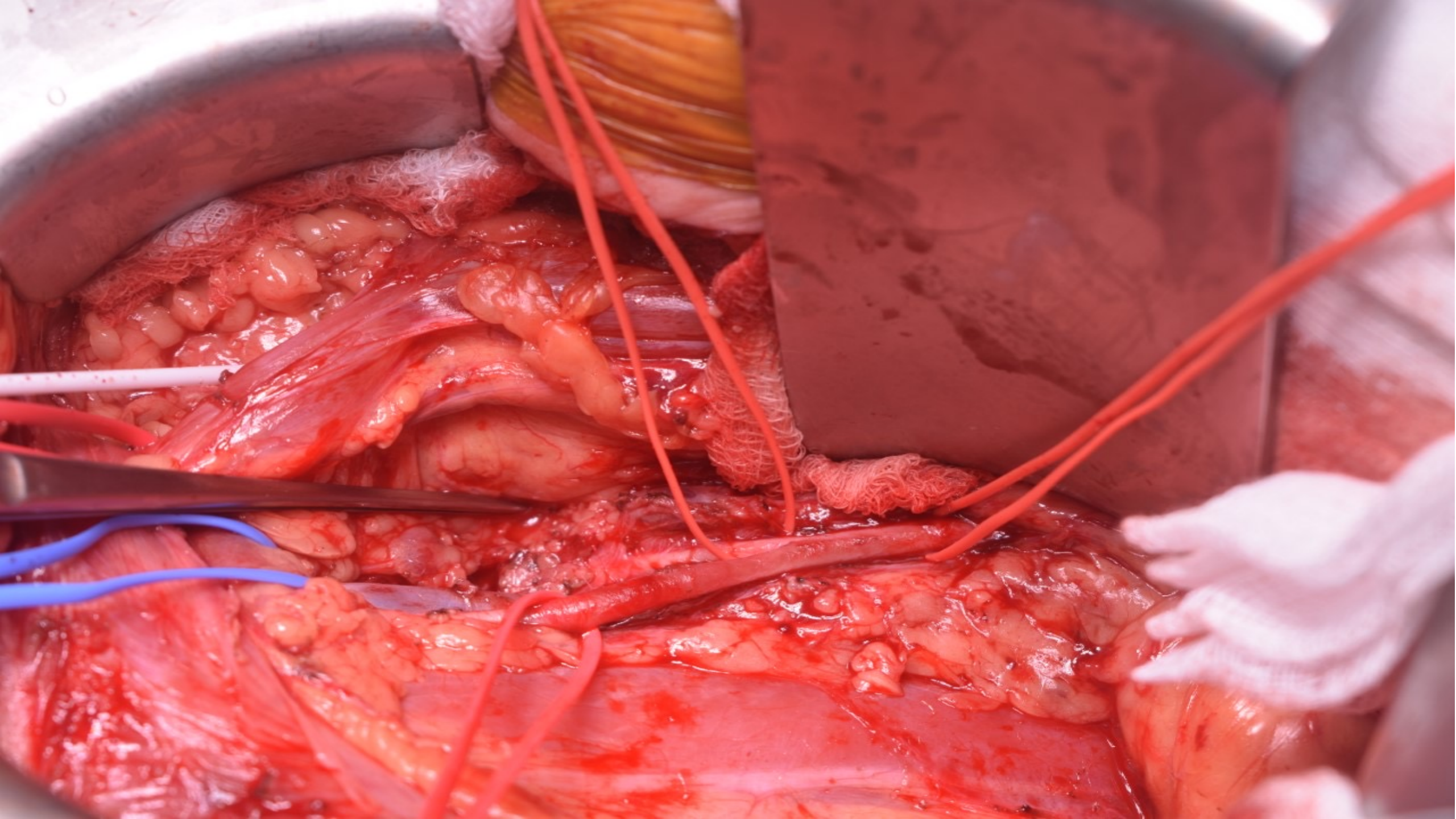
Venous

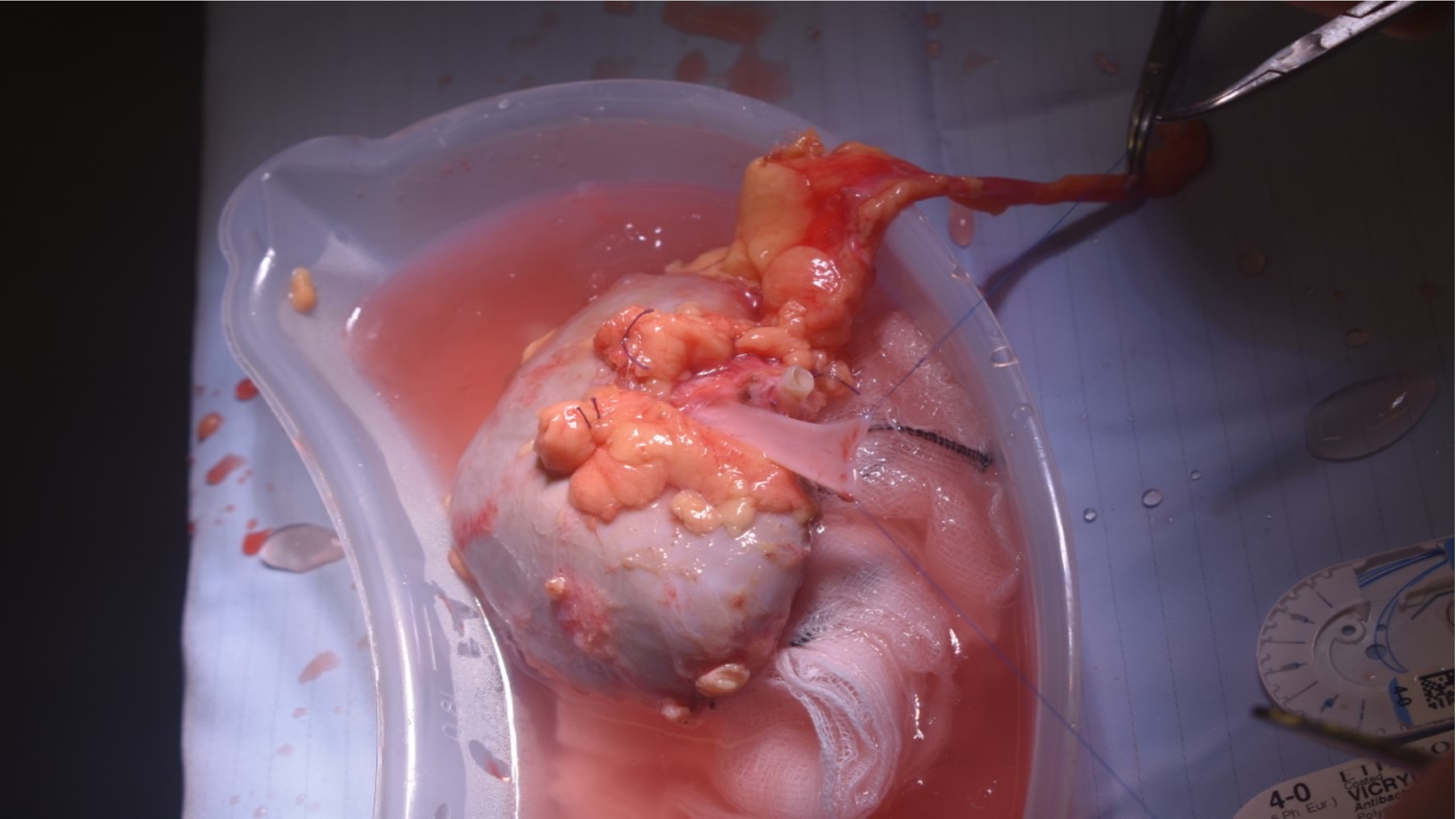
Abdominal Vessels

Vessel	Diameter
Intrahepatic-Infrahepatic/retrohepatic IVC	Absent
Right CIV/EIV	Absent
Left CIV	Absent
Portal vein	10x10mm
SMV	5mm
Splenic Vein	5-8mm
Left External iliac vein	6-7mm (5-6mm length)
Abdominal aorta	Normal

Preparation

- Imaging
- Collaboration with liver transplant surgeon
- Blood group compatible deceased donor vessels to be available on the day of surgery
- MDMs

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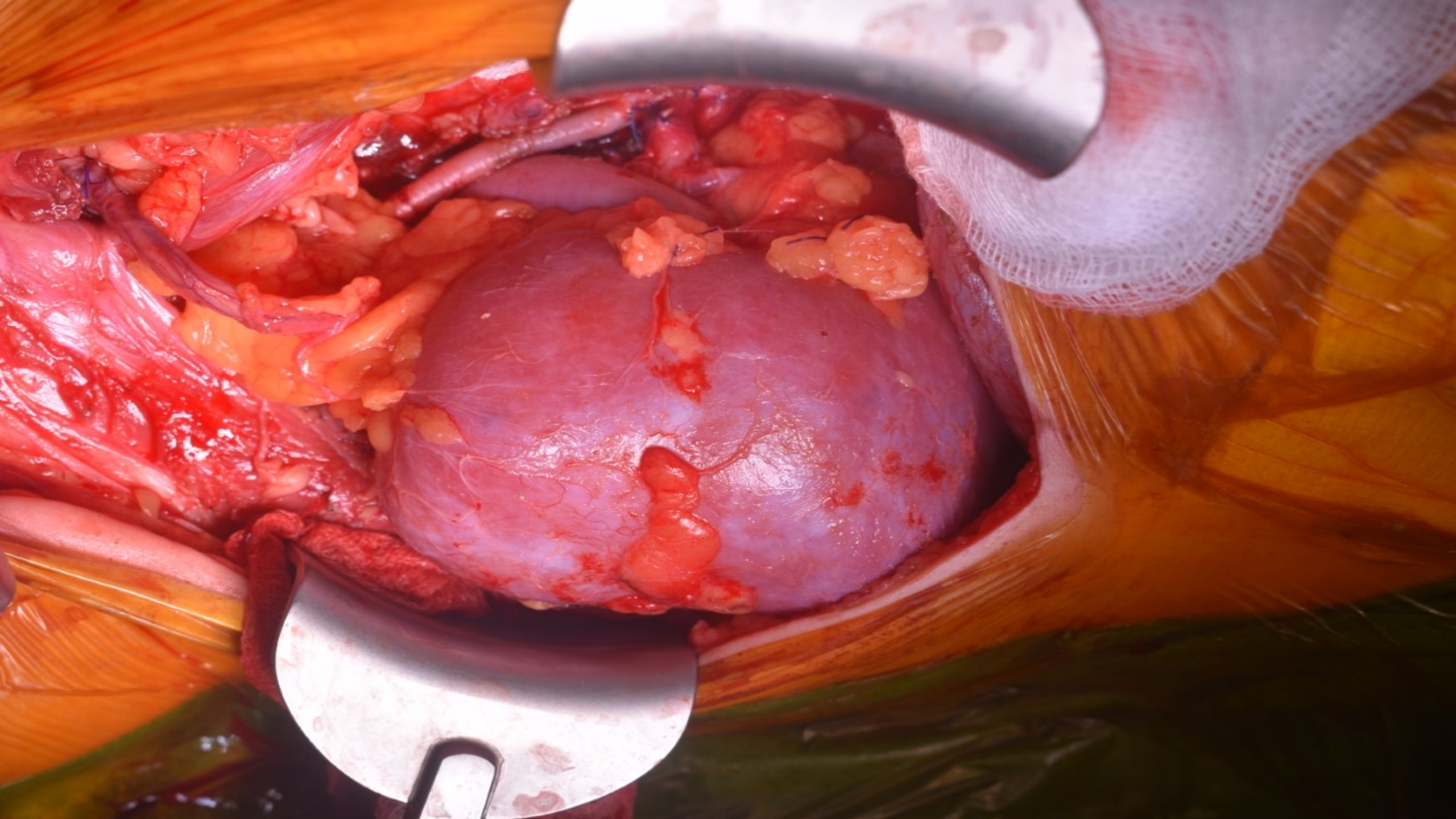

Urological complications

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DOI: 10.12659/AOT.920086

An Update on Early Urological Complications in Kidney Transplantation: A National Cohort Study

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Incidence of urological complications

Overall, among 3329 kidney transplant recipients, MUCs occurred in 208 patients (6.2%) within 3 months after surgery. After 1 year, this number increased to 236 (7.8%), as shown in Table 2. Urinary leakage mainly occurred within the first 3 months, including 83 patients (2.5%). The number of patients with ureteral obstruction was 142 (4.3%) after 3 months and increased to 174 (5.8%) after 1 year. There were no significant differences in the number of MUCs between recipients from living donors or deceased donors.

Predictive factors of urological complications

We performed binary logistic regression to identify predictive factors for the occurrence of MUCs within 3 months after transplantation. In the regression analysis, recipient age, recipient BMI, recipients with diabetes or cardiac events, donor age, and donor sex were significantly associated with the occurrence of MUCs and were therefore analyzed in a multiple regression model. Donor age and previous cardiac events within the recipient were identified as predictors for the development of early MUCs following KTX (Table 3).

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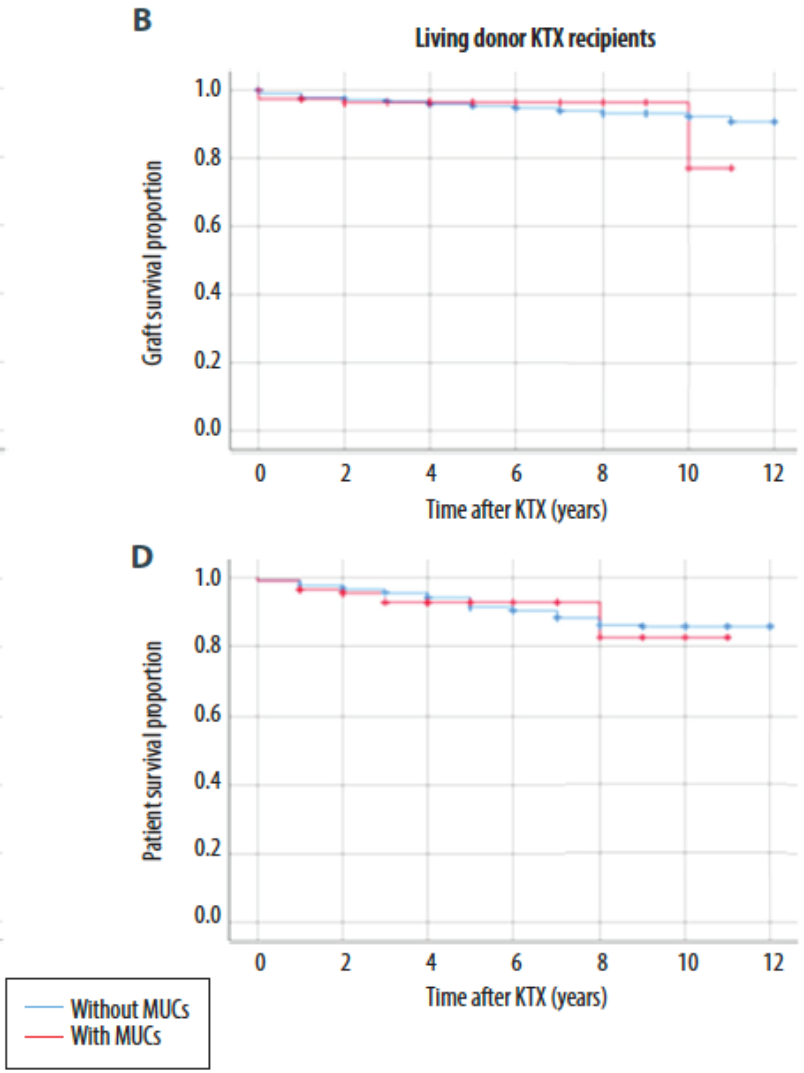

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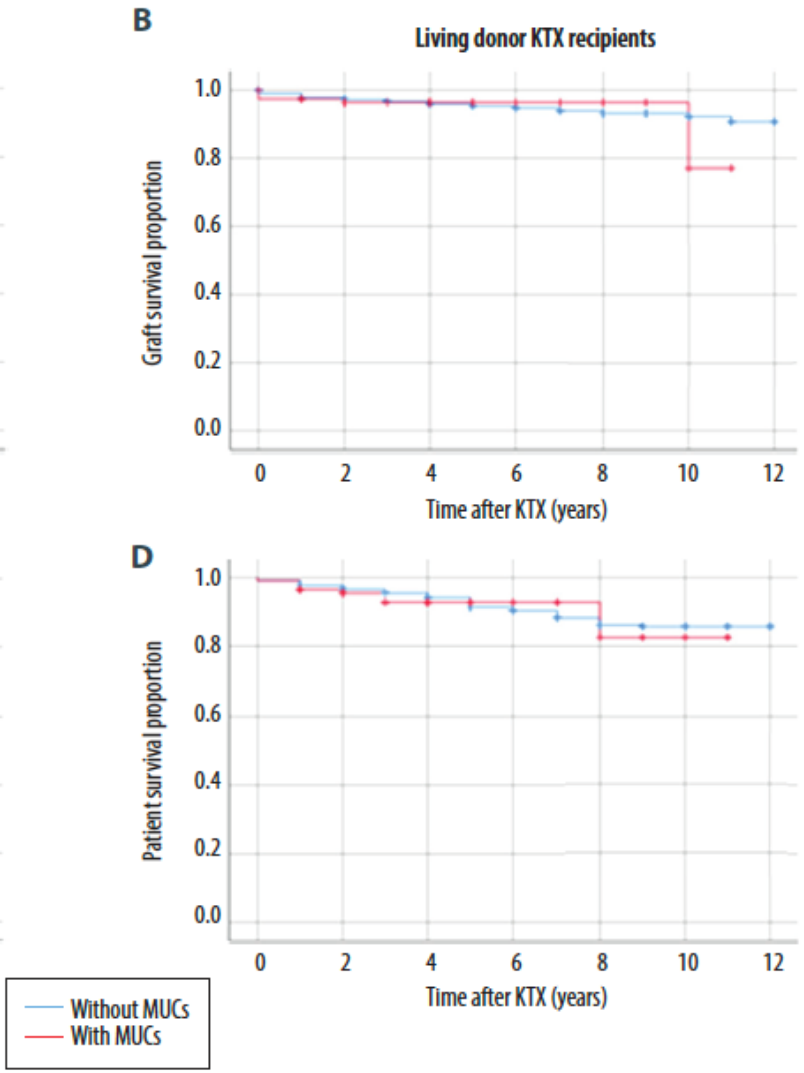
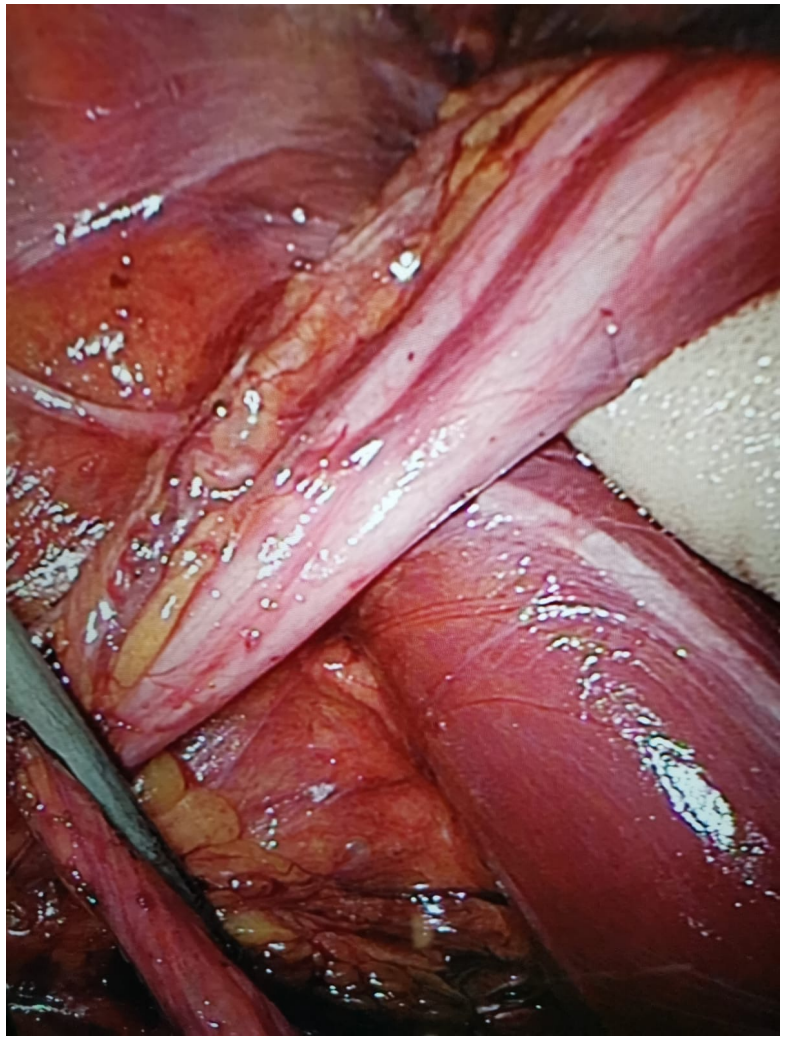
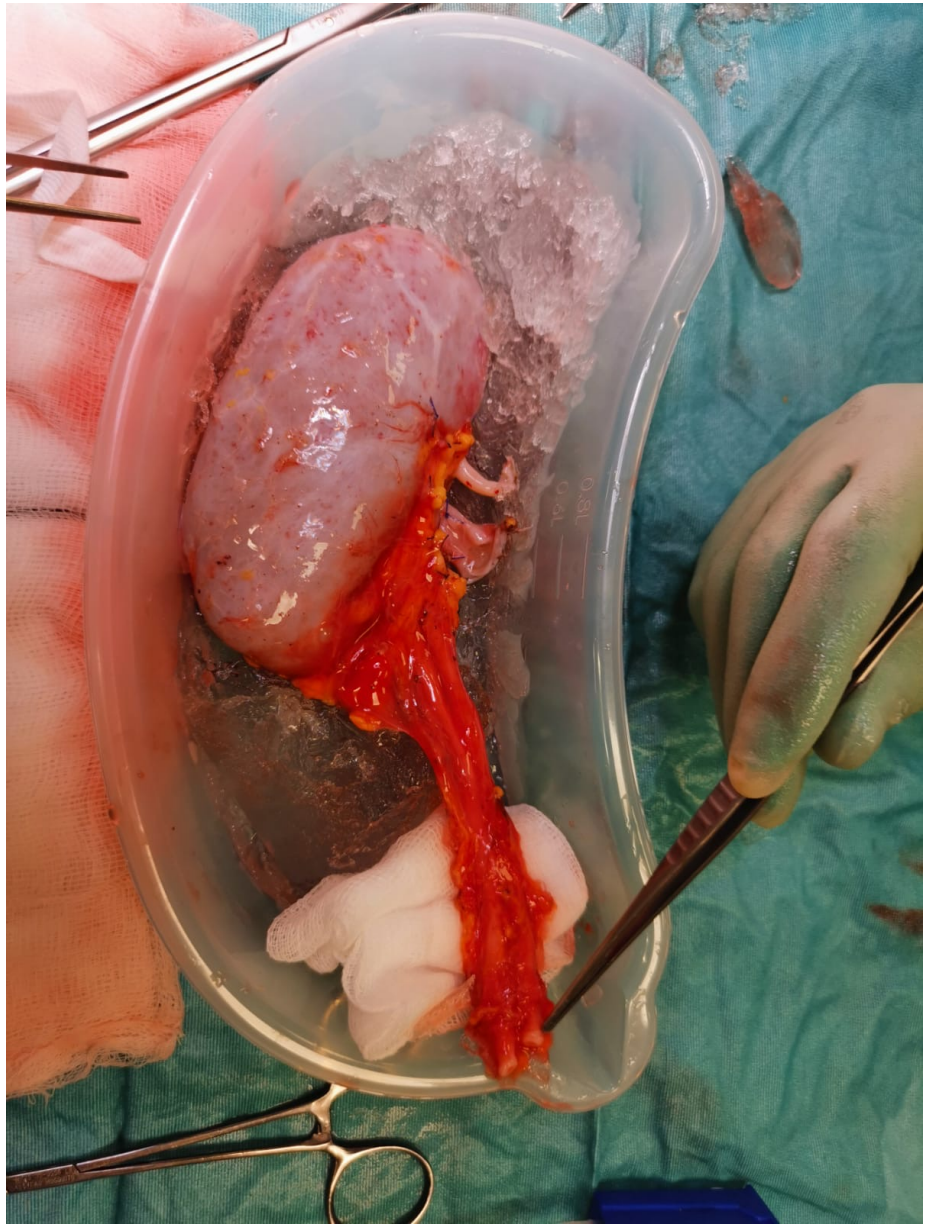
Table 4. Assessment of preservation of peri-ureteric connective tissue.

	Patients without urinary leakage [mean±SD]	Patients with urinary leakage [mean±SD]	*P*-value
Ureteral score [1–3] (mean of all observers)			
Proximal	2.3±0.3	2.5±0.5	0.107
Distal	1.7±0.5	1.7±0.5	1.000
Average	2.0±0.3	2.1±0.4	0.318



Multiple Ureters





TRANSPLANT INTERNATIONAL

Transplant International ISSN 0934-0874

ORIGINAL ARTICLE

Ureterovesical anastomotic techniques for kidney transplantation: a systematic review and meta-analysis

Victor P. Alberts,[1] Mirza M. Idu,[1] Dink A. Legemate,[1] Maria P. Laguna Pes[2] and Robert C. Minnee[1]

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2 Department of Urology, Academic Medical Center, Amsterdam, The Netherlands

Summary

No consensus exists about which ureterovesical anastomosis technique to use for kidney transplantation. The aim of this systematic review was to compare the existing techniques in relation to the risk of urological complications. All studies that compared ureterovesical anastomotic techniques in kidney transplantation were included. Study endpoints were urinary leakage, ureteral stricture, vesicoureteral reflux and hematuria. Subanalyses of stented and nonstented techniques were performed. Two randomized clinical trials and 24 observational studies were included. Meta-analyses were performed on the Lich-Gregoir (LG) versus Politano-Leadbetter (PL) techniques and LG versus U-stitch (U) techniques. Compared with the PL technique, the LG technique had a significantly lower prevalence of urinary leakage (risk ratio (RR): 0.47, 95% confidence interval (CI): 0.30 to 0.75) and a significantly lower prevalence of hematuria when compared with both PL and U techniques (RR: 0.28, 95% CI: 0.16 to 0.49 and RR: 0.23, 95% CI: 0.11 to 0.50, respectively), regardless of ureteral stenting. There was no difference in the prevalence of ureteral strictures or vesicoureteral reflux between the various techniques. Of the three most frequently used ureterovesical anastomotic techniques, the LG technique results in fewer urological complications than the PL and U techniques.

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MINIREVIEWS

Early urological complications after kidney transplantation: An overview

Jesmar Buttigieg, Andrei Agius-Anastasi, Ajay Sharma, Ahmed Halawa

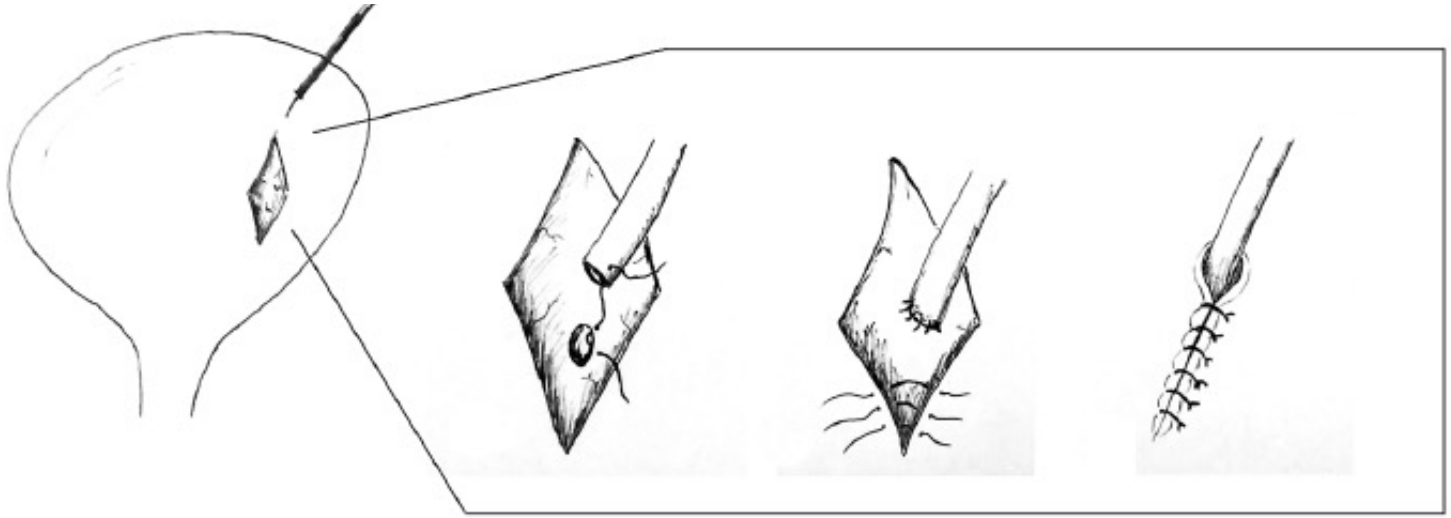

Figure 4 Lich-Gregoir technique. A: Bladder wall incision through the detrusor muscle is performed, leaving a very thin layer of muscle and uroepithelium unbreached; B: The distal part is completely incised to create a neo-ureter-bladder anastomosis; C: Suturing of the neo-ureter is performed *via* the same access used to introduce it into the bladder; D: The ureter is positioned in the groove and in direct contact to the uroepithelium, followed by closure of the muscle over the ureter while carefully avoiding constriction of the neo-ureter.

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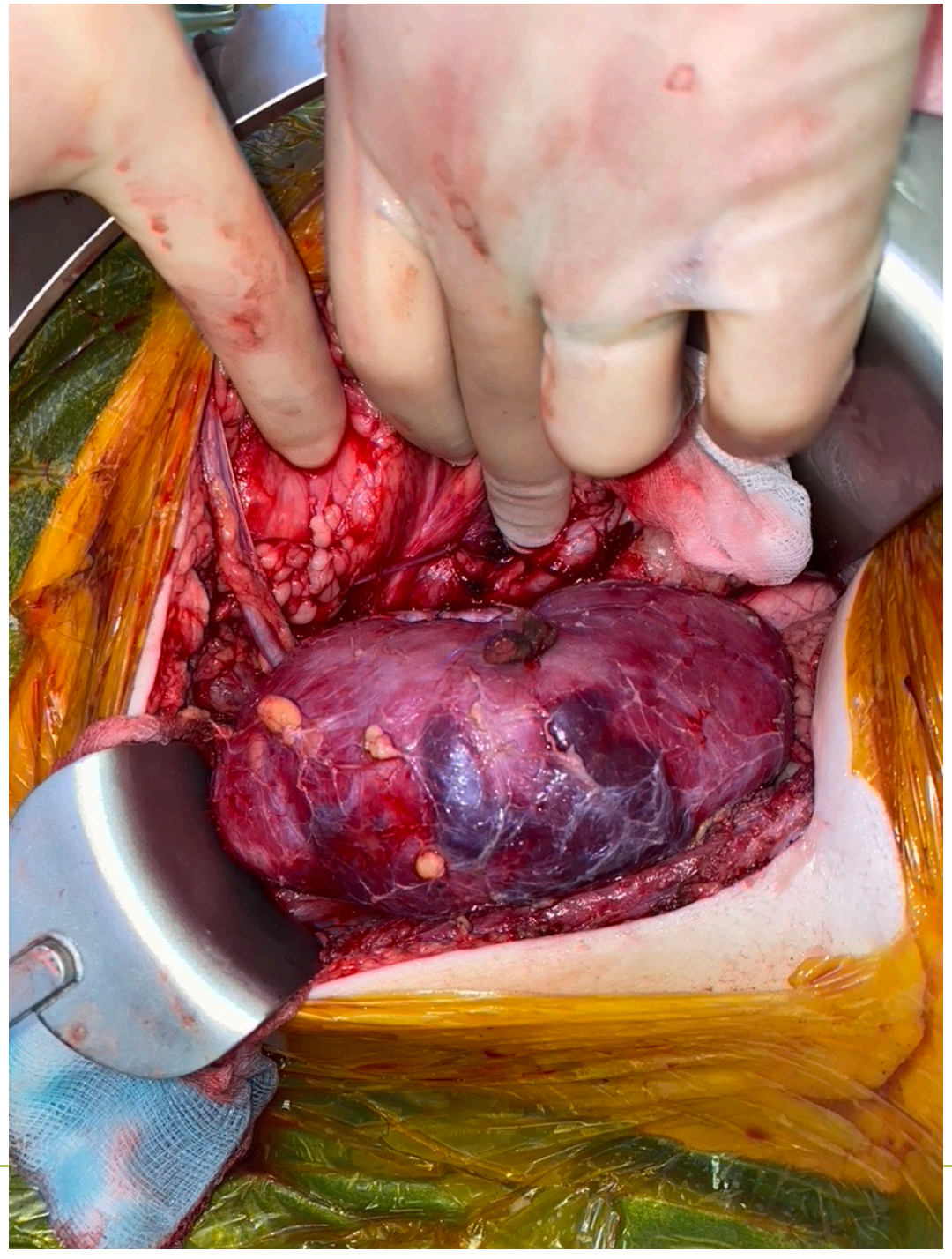
MINIREVIEWS

Early urological complications after kidney transplantation: An overview

Jesmar Buttigieg, Andrei Agius-Anastasi, Ajay Sharma, Ahmed Halawa

A ureter that appears ischemic after reperfusion should be resected proximally until an adequately perfused area is reached. In this situation, achieving a tension-free urinary anastomosis may require special techniques, such as ipsilateral uretero-ureterostomy (joining the transplant ureter to the native ureter of that side), pyelovesicostomy, psoas hitch, Boari flap or fashioning of an ileal ureter, in that order of priority. In general, the risk of urinary complications following laparoscopic donor nephrectomy has decreased substantially over time, now comparable to open nephrectomy[40].



Summary

Donor surgical challenges

- BMI
- Multiple vessels
- Right vs Left nephrectomy
- Vascular management of vessels

Recipient surgical challenges

- BMI
- Re-transplantation
- Vascular challenges
- Ureteric challenges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