

Complex donor anatomy: what's acceptable?

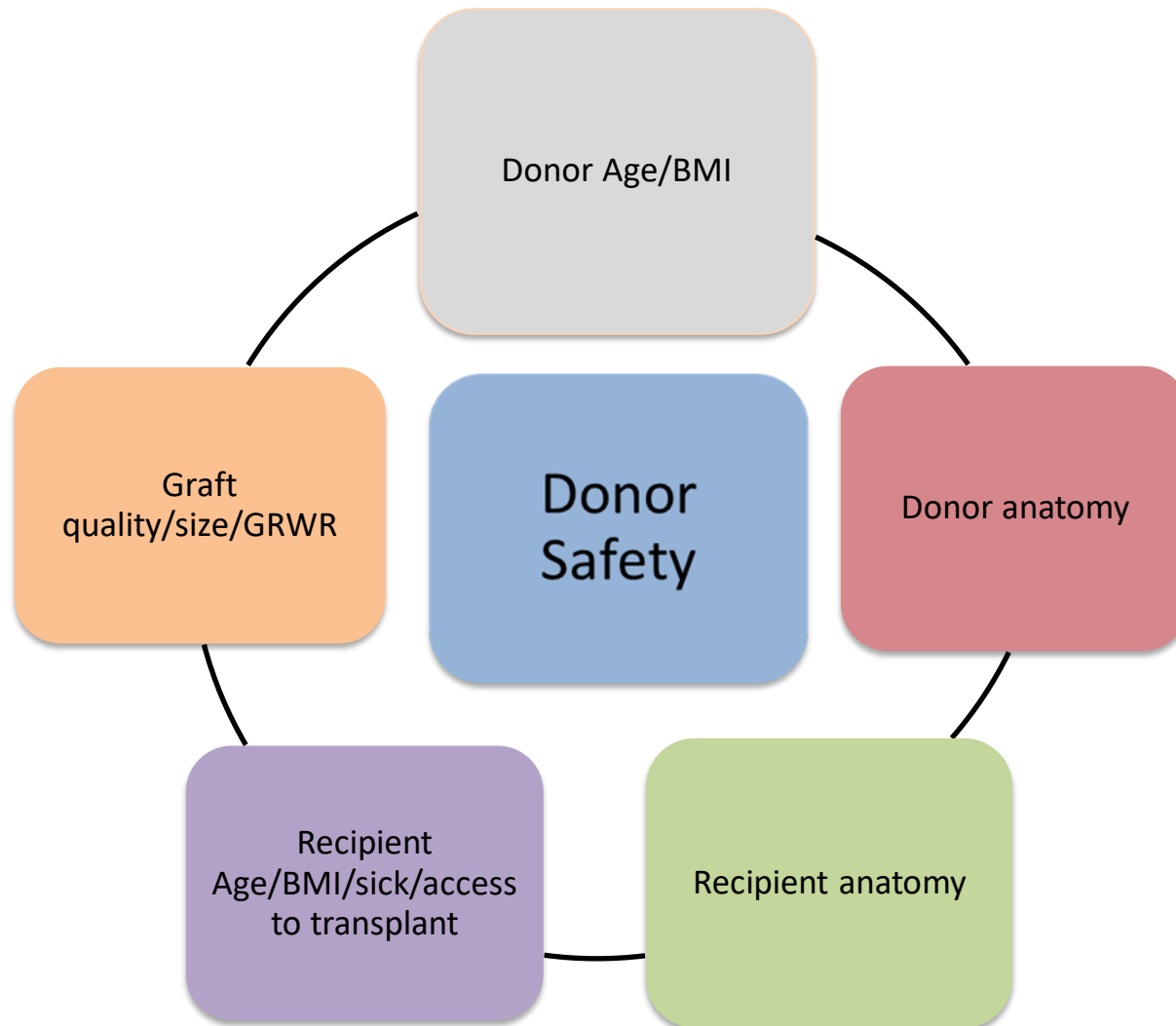
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Consultant Surgeon

Leeds Teaching Hospitals NHS Trust

Looking at the bigger picture-

Important factors



Successful outcome depends on

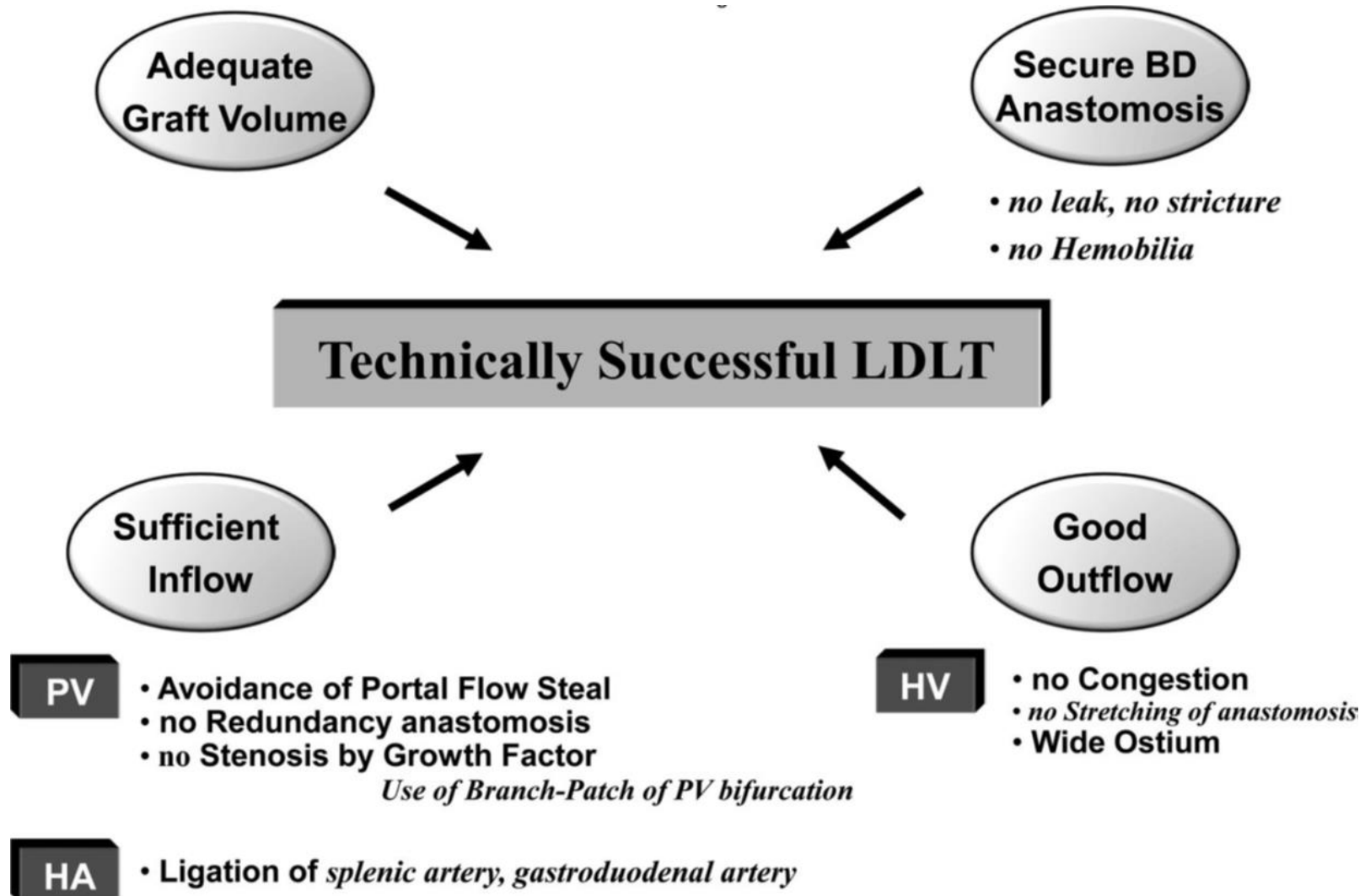
- Intraop Issues with LD grafts
- Venous outflow and optimization
- Portal inflow and modulation
- Hepatic arterial anastomosis
- Duct management

Comprehensive Review

A Complete Treatment of Adult Living Donor Liver Transplantation: A Review of Surgical Technique and Current Challenges to Expand Indication of Patients

S.-G. Lee*

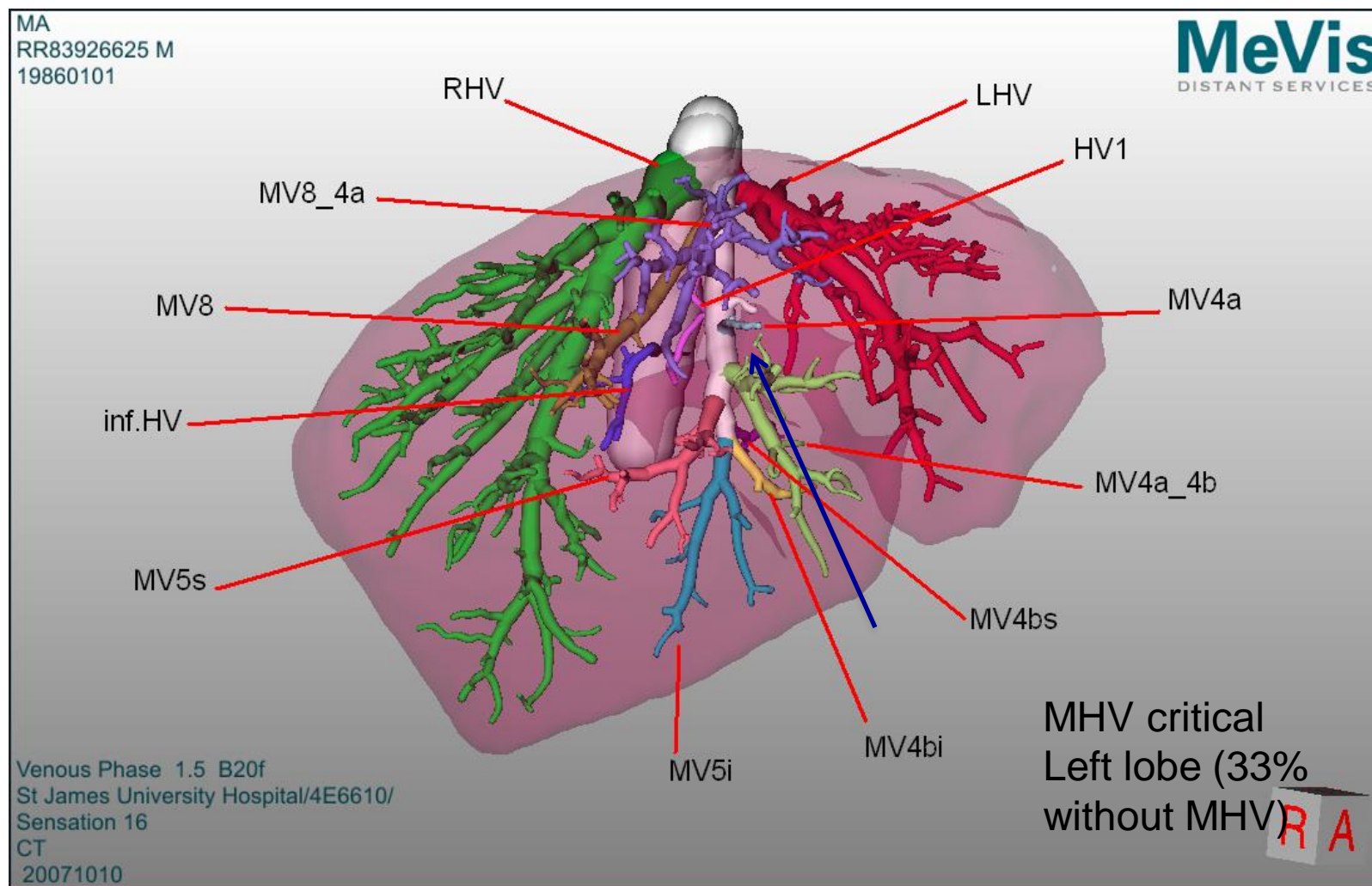
AR, acute rejection; AS, anterior sector; BD, bile duct;
BMI, body mass index; BS, biliary stricture; CT



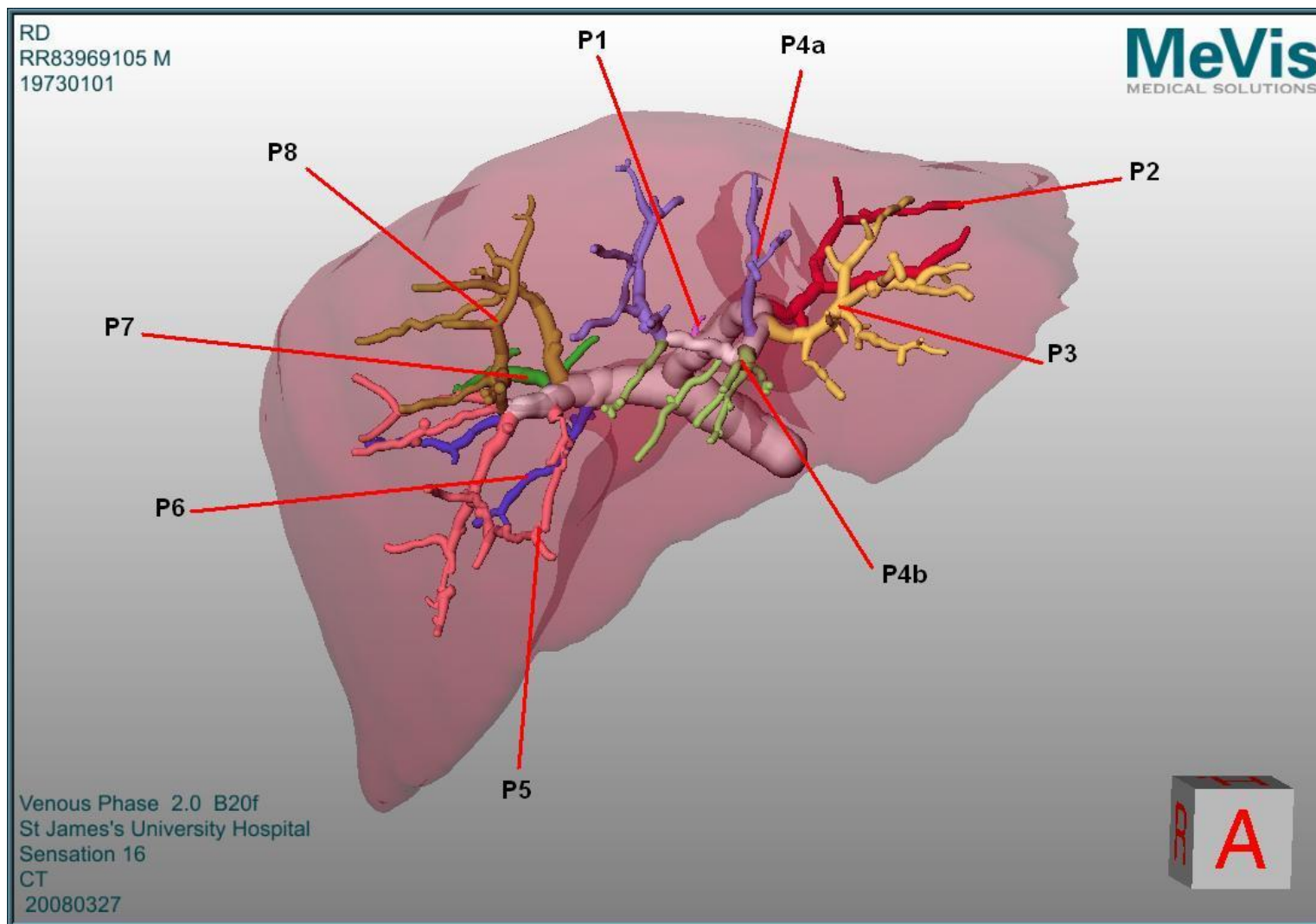
Radiological assessment

- Clear delineation of the anatomy of donor liver
- A precise prediction of the functional reserve volumes of both graft and remnant livers
- The decision whether to use the right or left hemiliver as a graft
- Use of MEVIS and now in house Volumetry

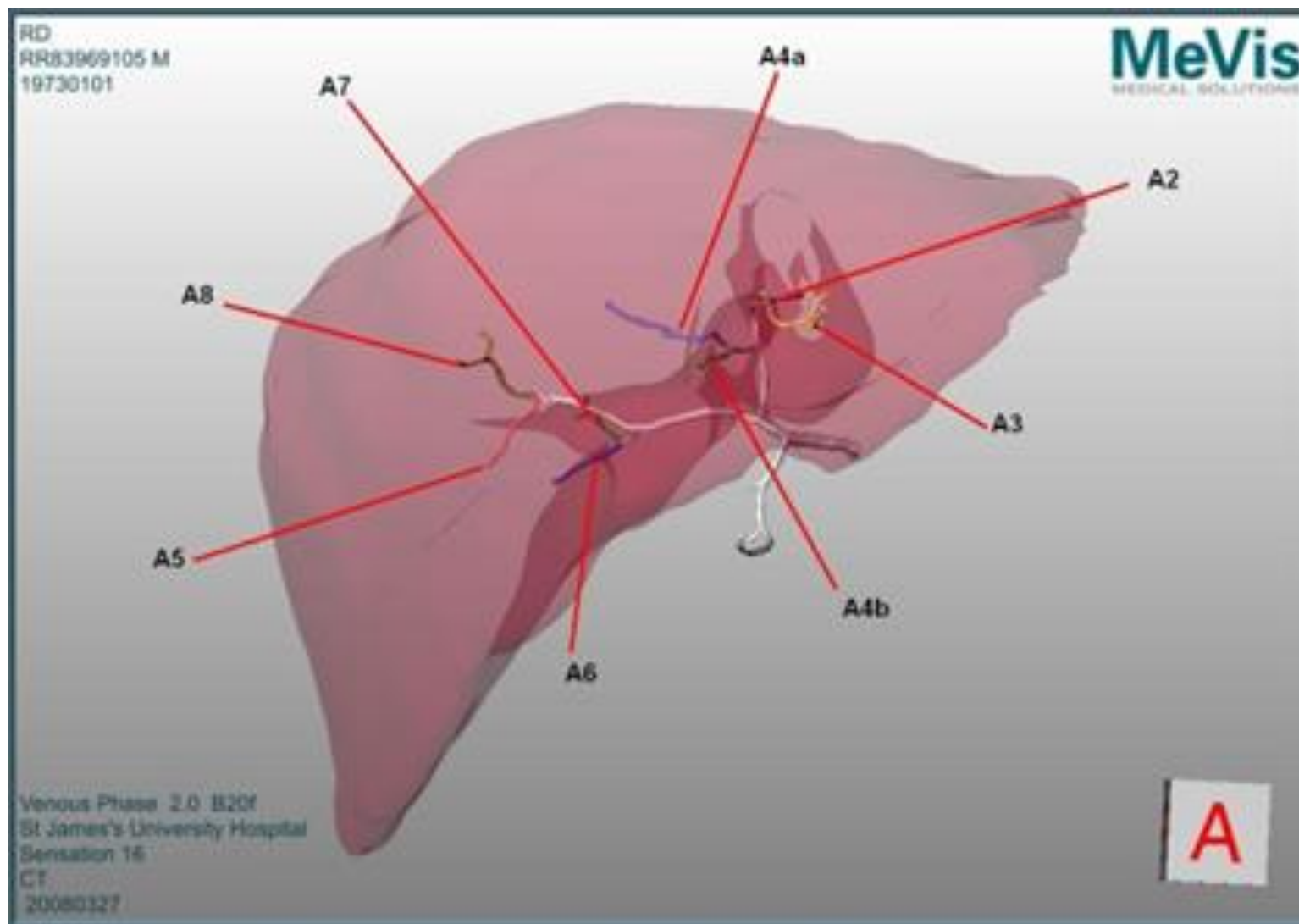
HV Analysis labeled




PV Analysis labeled



HA Analysis labeled

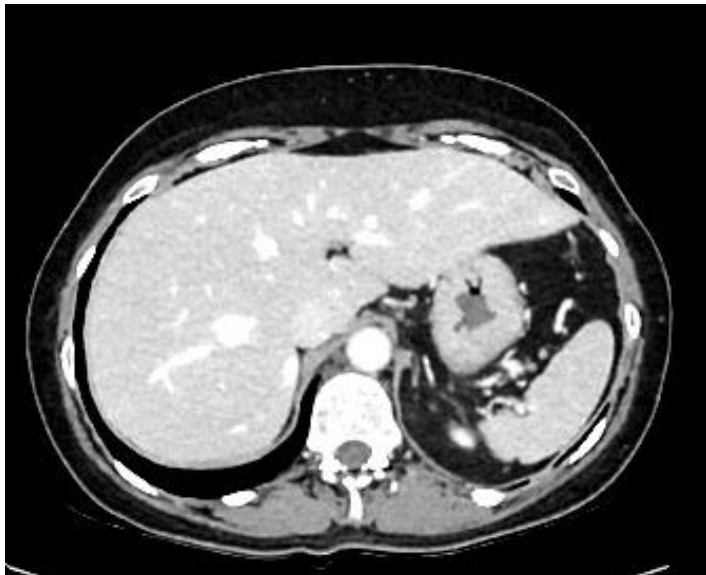
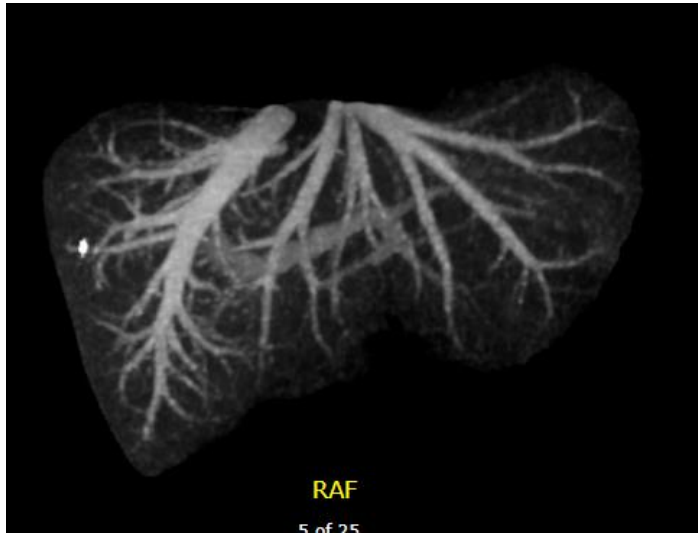


Key developments

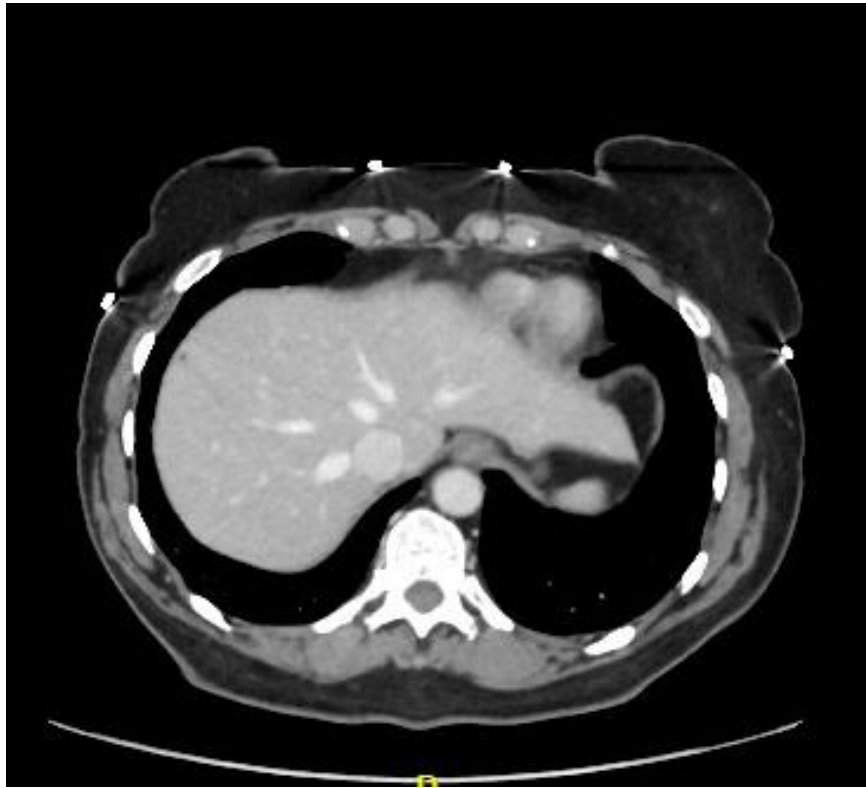
- Altruistic left lateral 2013
 - ***Two arteries, left lobe***, microvascular techniques 2014
 - Monosegmental 2014
 - Type 4 PVT 2014
 - Altruistic right lobe 2014
 - ***Three ducts*** 2021
 - In house volumetry 2021/22
 - ***4 hepatic veins right lobe*** - 2021
 - ***Two portal veins*** 2022
 - ***Two arteries, right lobe*** 2022
 - Retransplantation 2022
- 

2021-22
?Effect of Covid
?Revisit LD
options

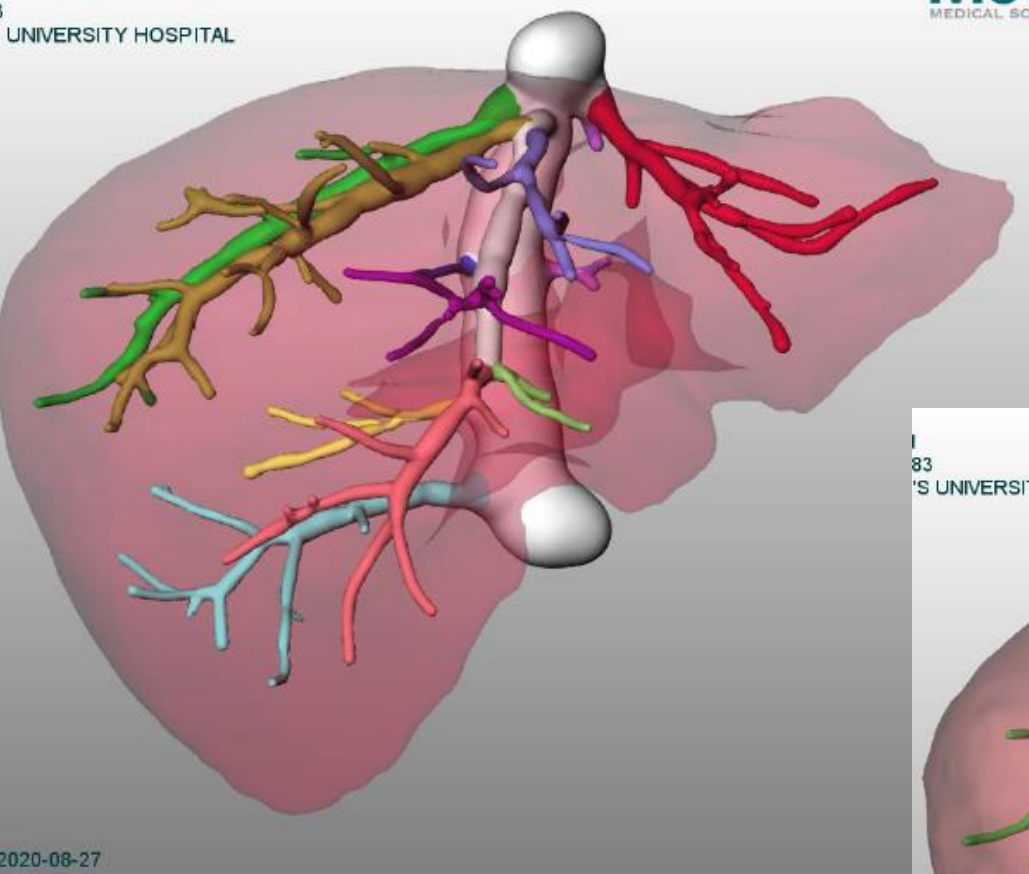
2 HV- RHV, IHRV



3 HV- V5 and V8

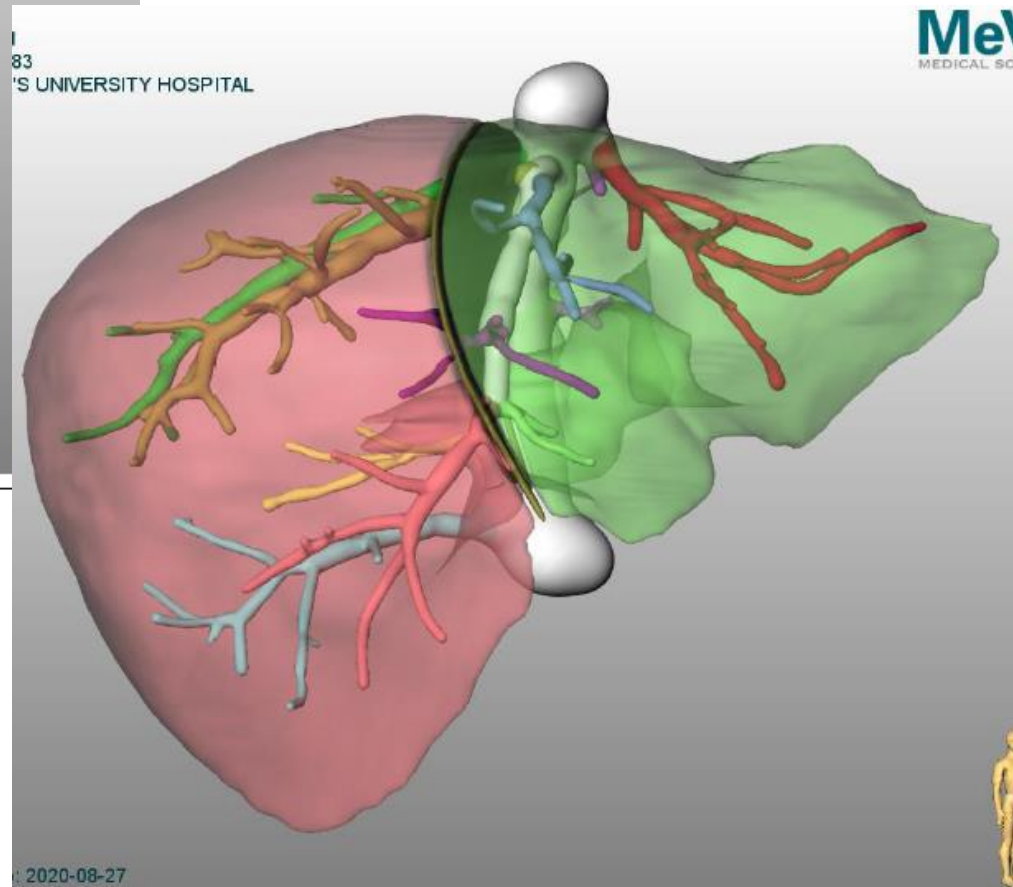


4 HV- RHV, IHRV, V5, V8



2020-08-27

HV Anatomy



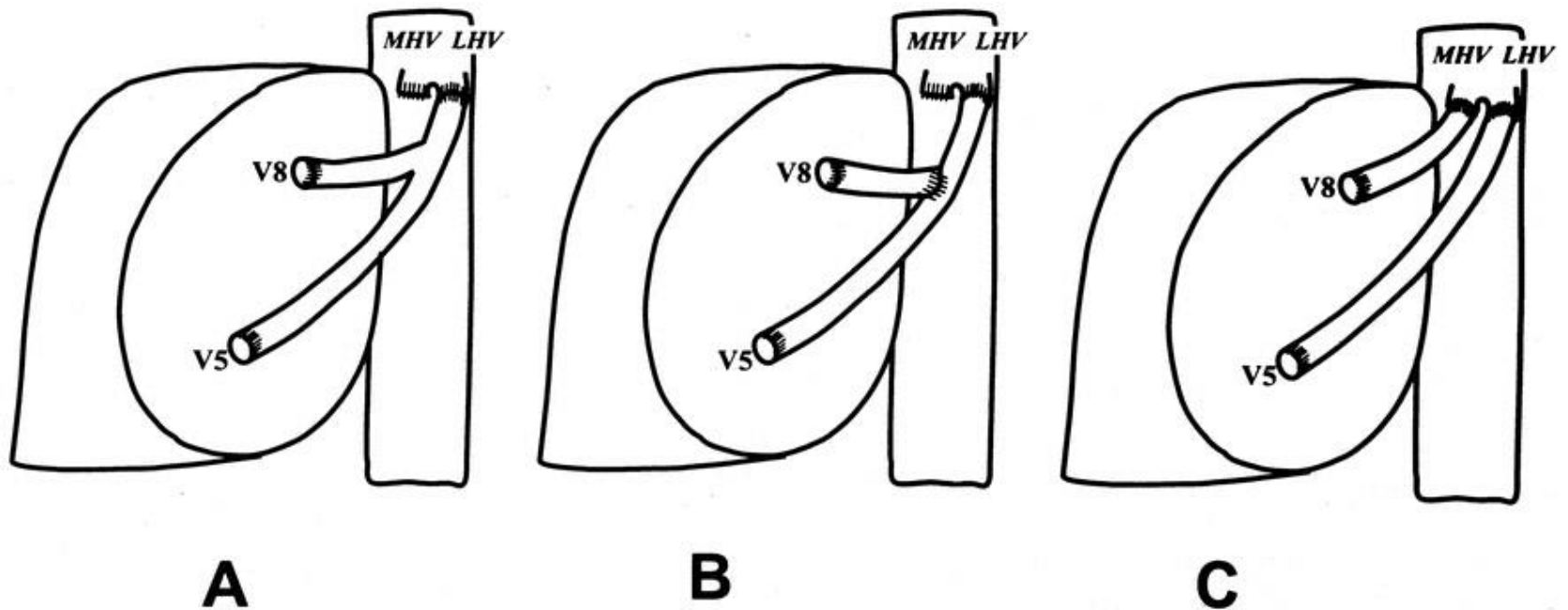
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Plane1, Right Lobe Graft without MHV, Graft and Remnant

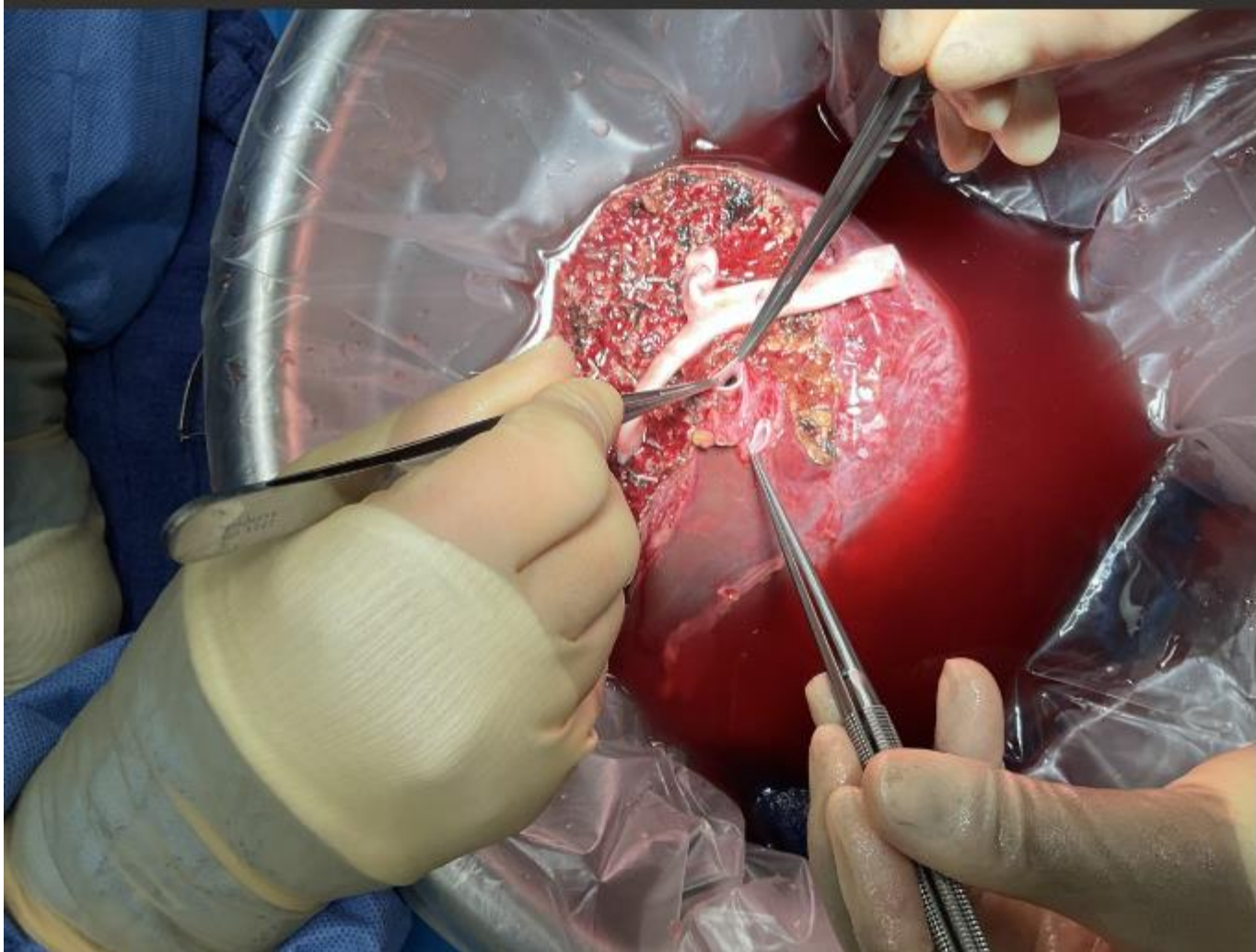
Hepatic Venous Variants

Venous Variants	Implications for Surgery
Variants relevant in donors	
Accessory inferior RHV >5 mm	Increases surgical complexity and will need reconstruction
Anomalous drainage of segments V and VIII into the MHV	Increases surgical complexity and will need reconstruction (PTFE/cadaveric arterial conduit)
Segment 3 vein into MHV	Separate anastomosis or reconstruction on backbench

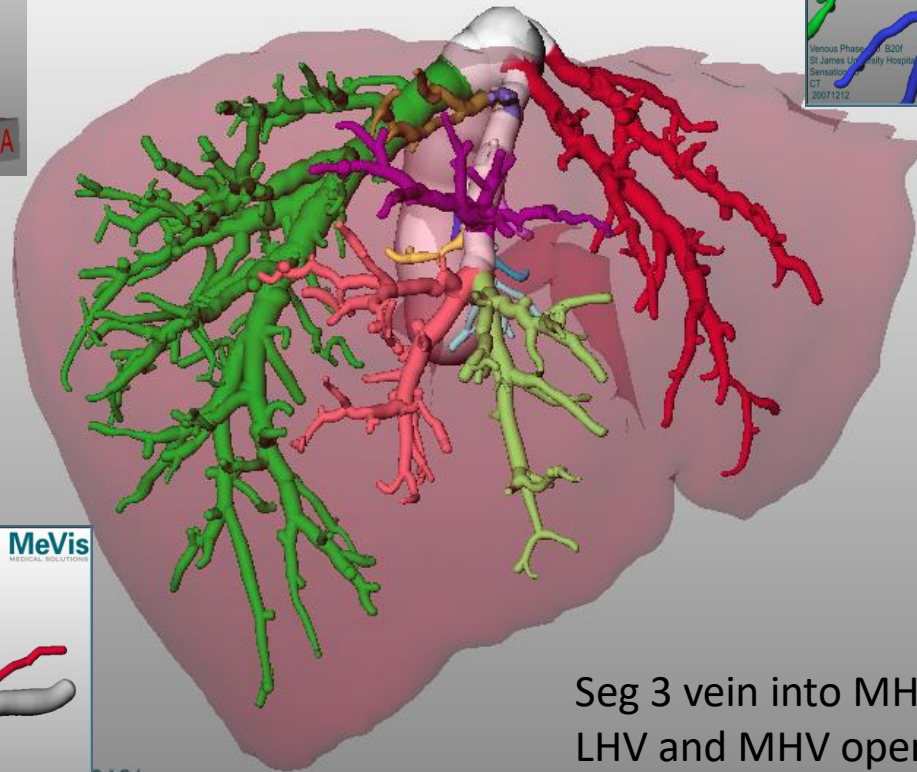
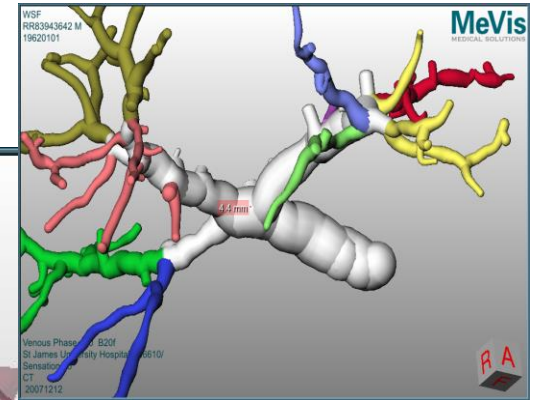
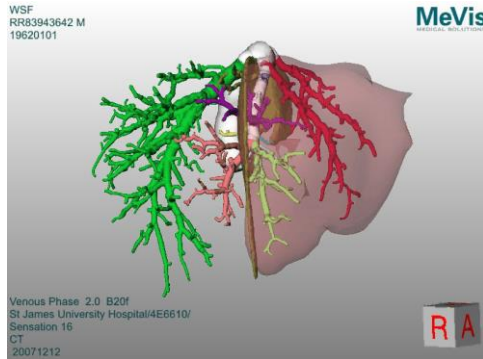
V5 V8 reconstruction- PTFE or cadaveric donor iliac artery



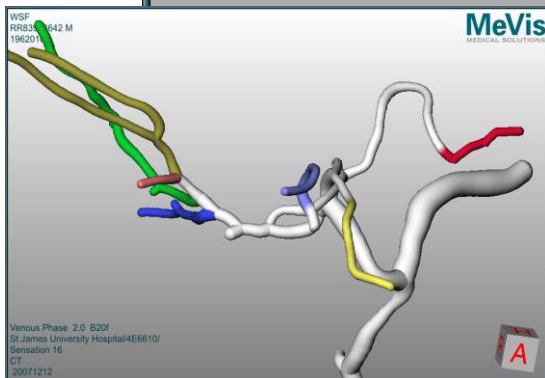
V5 and V8 reconstruction



Left Lobe graft



Seg 3 vein into MHV
LHV and MHV opening separately



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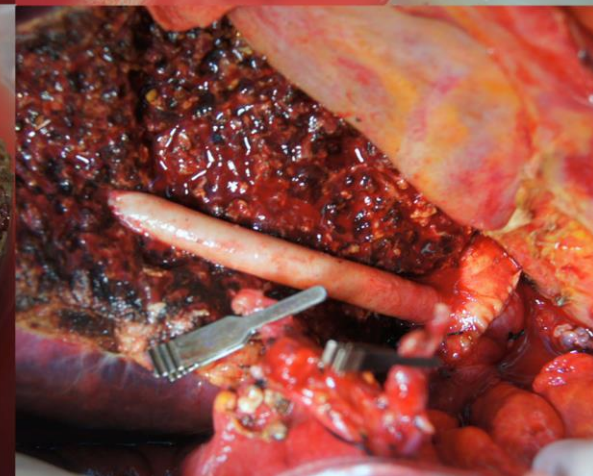
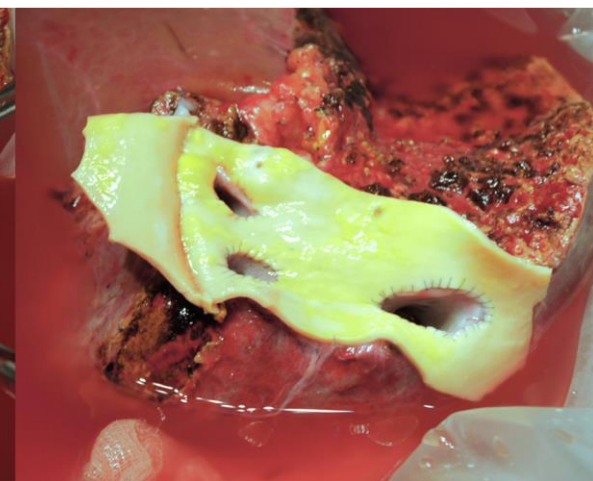
Long-Term Patency of All-in-One Sleeve Patch Graft Venoplasty in 16 Patients Who Underwent Living Donor Liver Transplantation with a Right Liver Graft: A 10-Year, Single-Center, Retrospective Study

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Feasibility and Outcomes of Direct Dual Portal Vein Anastomosis in Living Donor Liver Transplantation Using the Right Liver Graft With Anatomic Portal Vein Variations

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Type A
(common type)



n=125
(83.9%)

Type B
(trifurcation type)



n=7
(4.7%)

Type C
(caudal origin of
the right posterior branch)

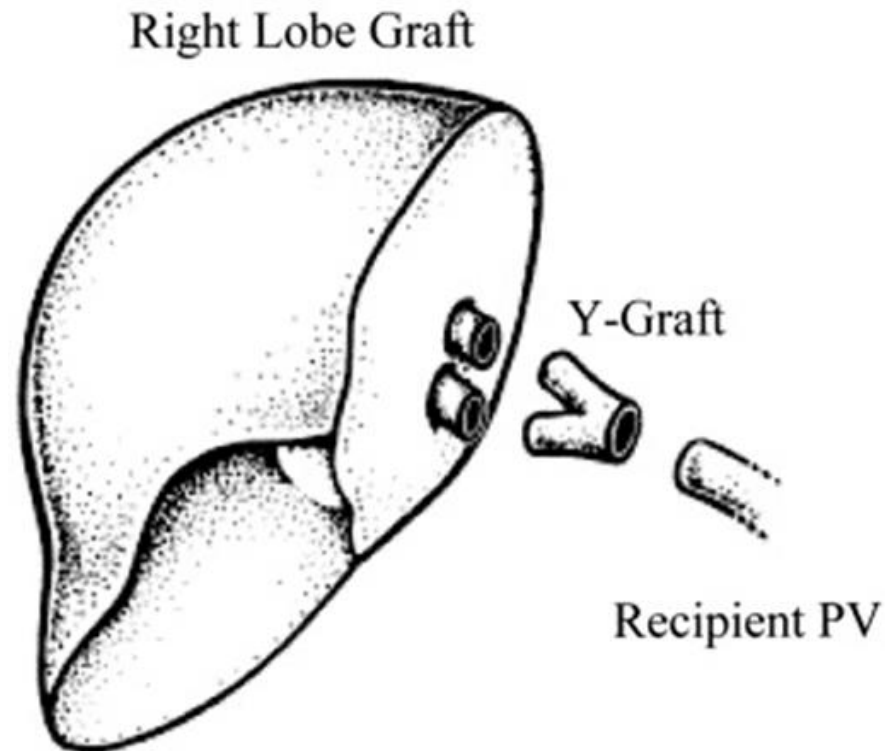


n=17
(11.4%)

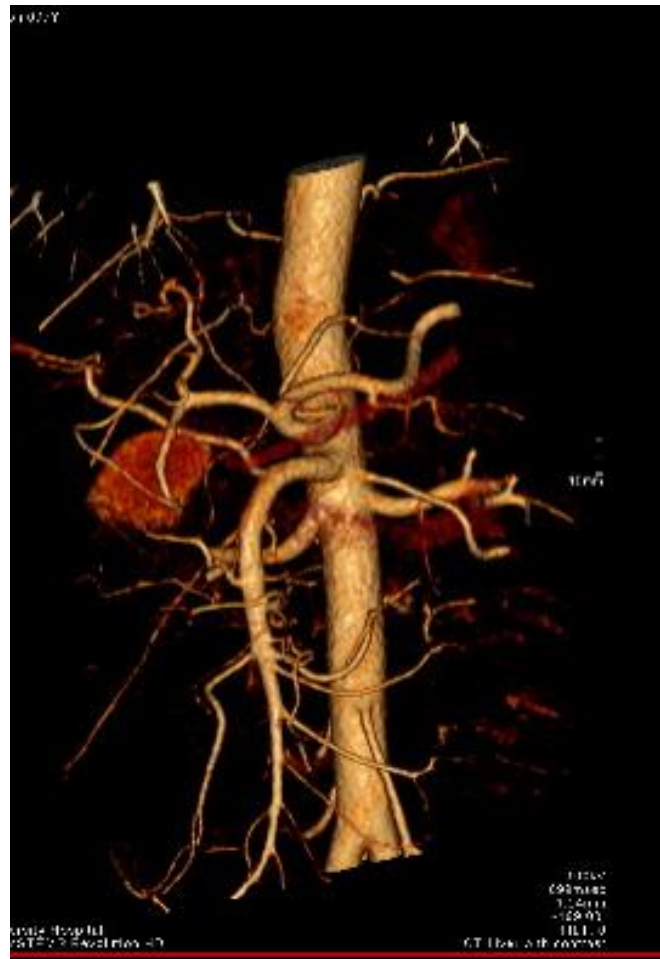
n=24 (16.1%)

2 RPV- options for reconstruction

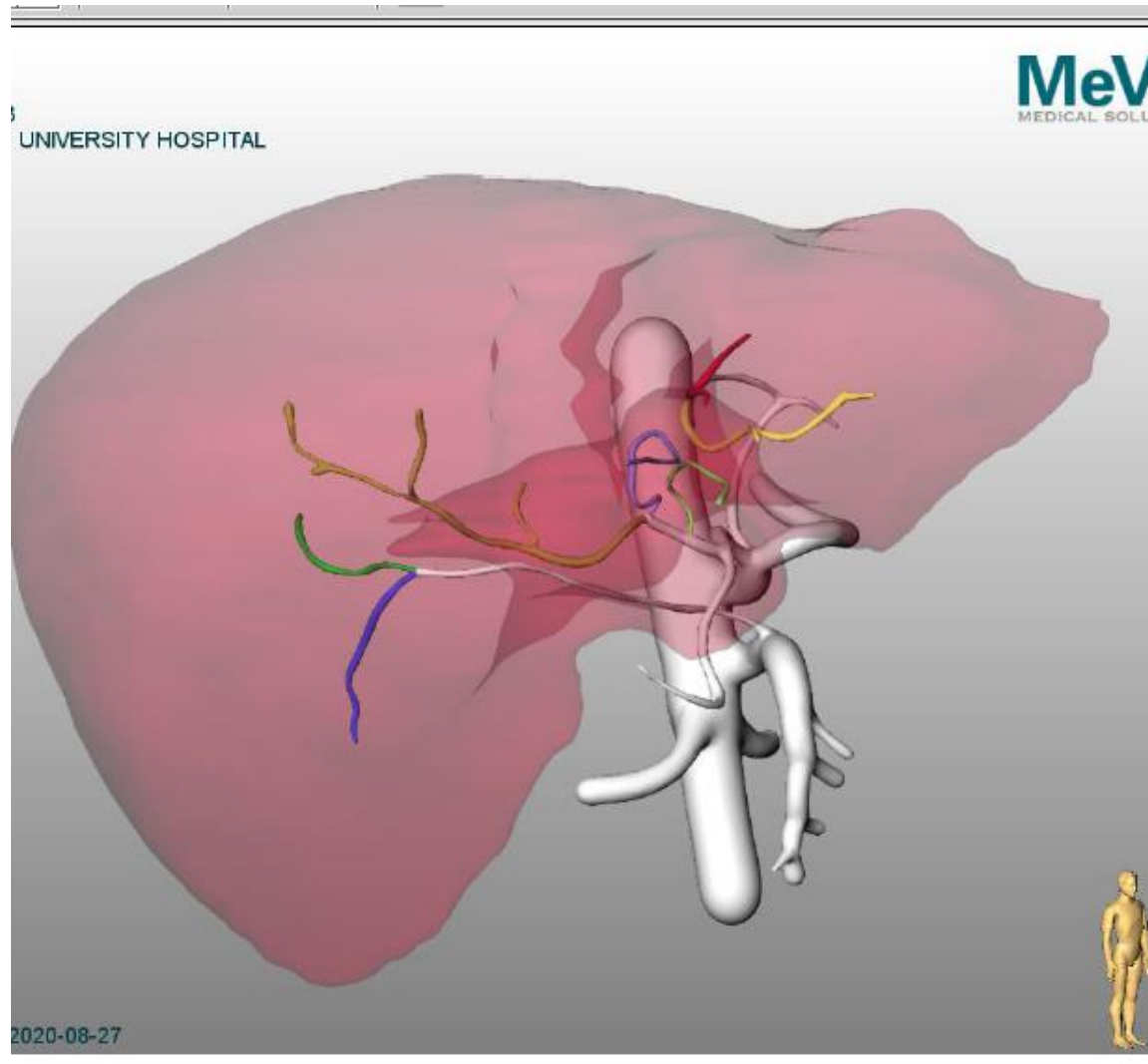
- On bench- using marker pen for orientation
- In situ
- Preserve RPV-LPV in recipient



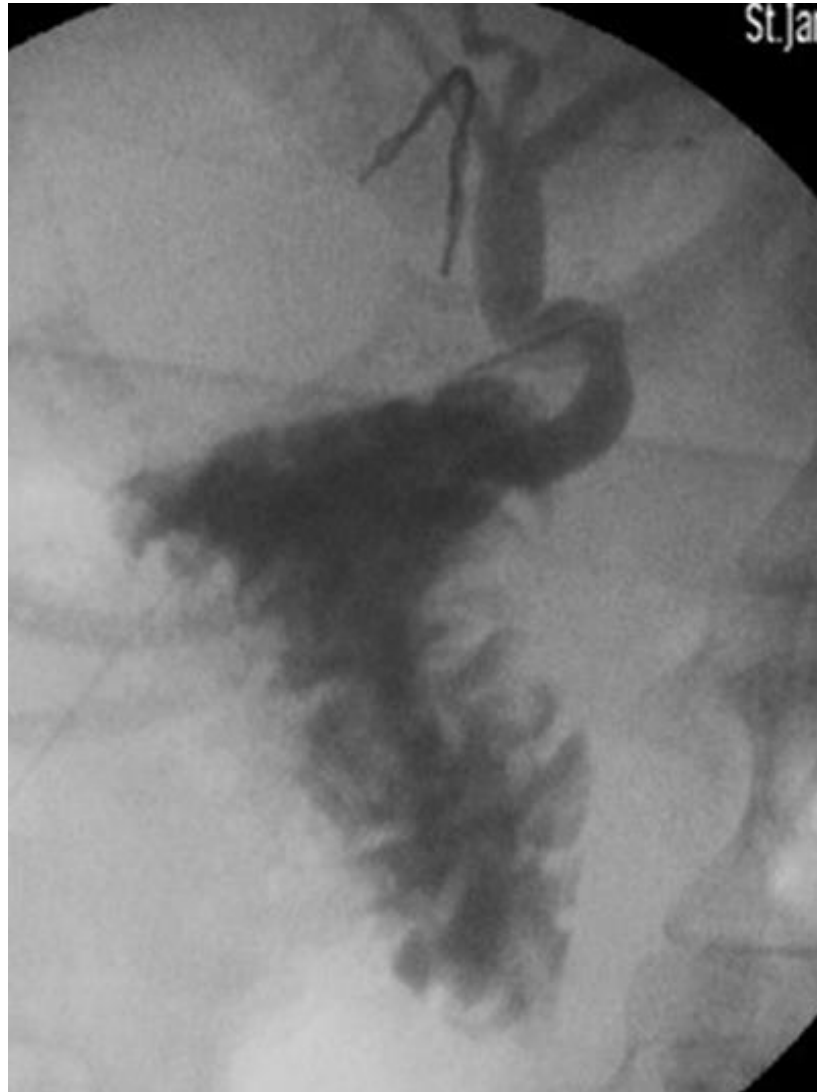
HA- replaced right



2 arteries right lobe



2 hepatic ducts



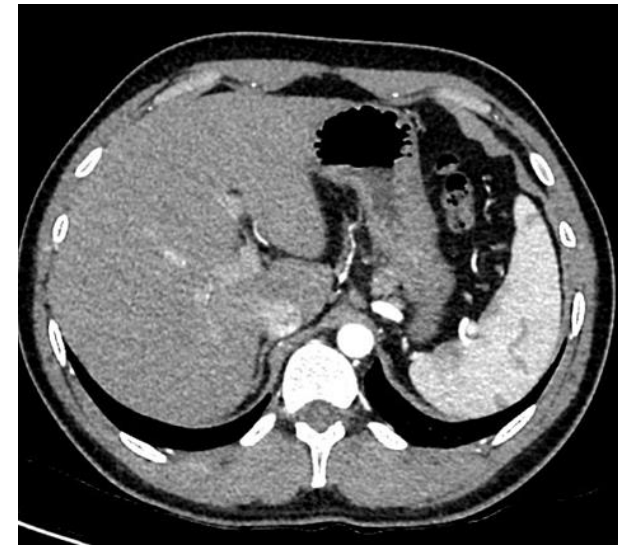
RIGHT OR LEFT?

Donor: 26yr/M/Blood group O pos
HT 175 cm WT 79 KG BMI 25.7

Recipient: 56yr/F/PSC+Hepatic sarcoid
HT 160cm WT 69kg BMI 26.9

Right lobe 689 g GWR 1.00 Remnant 50.4% - 3 ducts

Left Lobe 639 g GRWR 0.93 Remnant 54%- 2 arteries



Results – Donor Outcomes

	Total No. of Donors (N=118)	Adult-to-Adult (n=47; 39.8%)	Adult-to-Paediatric (n=71; 60.2%)
Maximum post-op bilirubin (mg/dL)	24 (8-131)	41 (18-111)	19 (8-131)
Maximum post-op ALT (IU/L)	244 (73-1204)	206 (95-420)	322 (73-1204)
Blood transfusion	1 (0.8%)	1 (2.1%)	0 (0.0%)
No complications	100 (84.7%)	37 (78.7%)	62 (87.3%)
Grade 1	10 (8.5%)	4 (8.5%)	6 (9.2%)
Grade 2	2 (1.7%)	1 (2.1%)	2 (1.5%)
Grade 3a	2 (1.7%)	2 (4.2%; USS guided drainage of collection)	0 (0.0%)
Grade 3b	4 (3.4%)	3 [6.4%; reexploration for bleeding (3)]	1 (1.4%)
Length of hospital stay (days)	6 (2-17)	7 (4-17)	5 (2-12)
Readmissions within first 3 months	12 (10.1%)	7 (14.9%)	5 (7.0%)
Survival status (alive)	100%	100%	100%
Follow-up (months)	85 (1-172)	86 (1-172)	82 (1-170)

Results – Recipient Outcomes

	Adult LDLT	Paediatric LDLT
Recipient age	50 (18-71) years	1 (0-17) years
Female gender	53.5%	52.3%
Common aetiology	Cholestatic liver disease (34.9%)	Biliary atresia (52.3%)
MELD/PELD	13 (6-32)	17 (6-36)
90-days biliary complications	10 (21.2%)	7 (9.8%)
90-days graft loss	2 (4.2%) – immune mediated graft injury and intravascular microangiopathy	6 (8.4%) – HAT (5) and no cause on explant (1)
90-days patient death	1 (2.3%) - sepsis	4 (5.6%) – sepsis (3) and haemorrhage (1)
1- and 5-year patient survival	96% and 96%	93% and 93%
1- and 5-year graft survival	90% and 85%	91% and 90%

Future direction?

Living Donor Liver Transplantation Using Dual Grafts: Experience and Lessons Learned From Cases Worldwide

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LIVER TRANSPLANTATION, November 2015

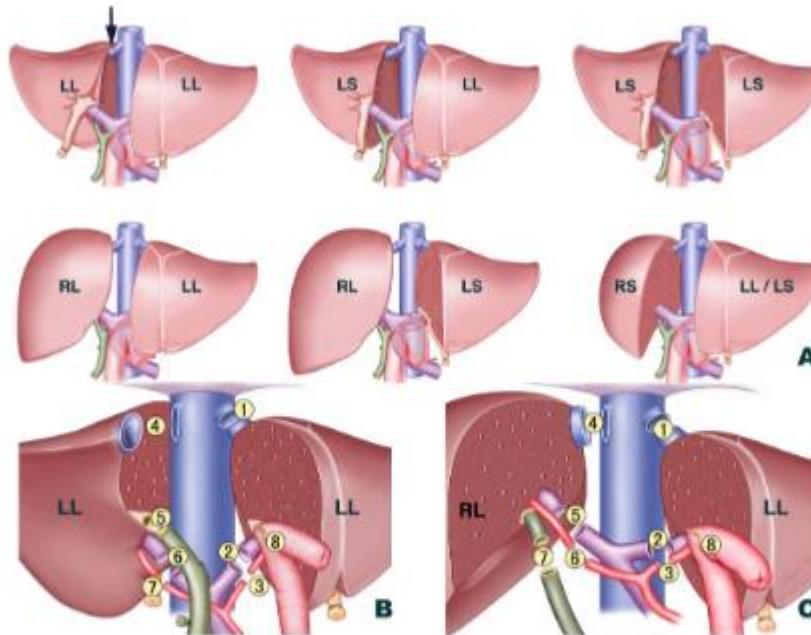


Figure 1. Graft combinations and schematic procedures. (A) Various combinations of graft types reported in the literature. The arrow shows where the interposition venous graft was used when necessary. (B) Schematic procedure of dual LL/LS transplantation: 1, left graft left MHV anastomosis; 2, left graft LPV anastomosis and portal reperfusion; 3, left graft LHA anastomosis and arterial reperfusion; 4, right graft to left MHV anastomosis to recipient RHV; 5, right graft biliary duct to duct anastomosis; 6, right graft LPV anastomosis to recipient RPV and portal reperfusion; 7, right graft LHA anastomosis to recipient RHA and arterial reperfusion; 8, left graft hepaticojejunostomy; (C) Schematic procedure of RL + LL/LS transplantation: 1, RHV anastomosis; 2, RPV anastomosis and portal reperfusion; 3, RHA anastomosis and arterial reperfusion; 4, left MHV anastomosis; 5, LPV anastomosis and portal reperfusion; 6, LHA anastomosis and arterial reperfusion; 7, RHV duct-to-duct reconstruction; 8, left hepatic duct hepaticojejunostomy.

Need?

Ethical?

Appetite?

Complexity

Future direction?

RAPID- Resection and Partial liver transplantation with delayed total hepatectomy



Brief Report | Full Access

A New Approach for Increasing Availability of Liver Grafts and Donor Safety in Living Donor Liver Transplantation: LD-RAPID Procedure in the Cirrhotic Setting With Hepatocellular Carcinoma

Deniz Balci M.D., Elvan Onur Kirimker M.D., Meltem Bingol Kologlu M.D., Evren Ustuner M.D., Ufuk Utku Goktug M.D., Suheyila Karadag Erkoc M.D., Ali Abbas Yilmaz M.D. ... [See all authors](#) ▾

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Simplify?

Shifting risk
to recipient

Donor right
lobe to
LLateral

Thank you

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Donors, Families, Society and entire
LDLT team at Leeds