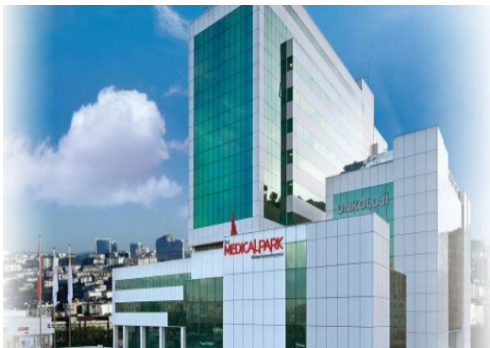
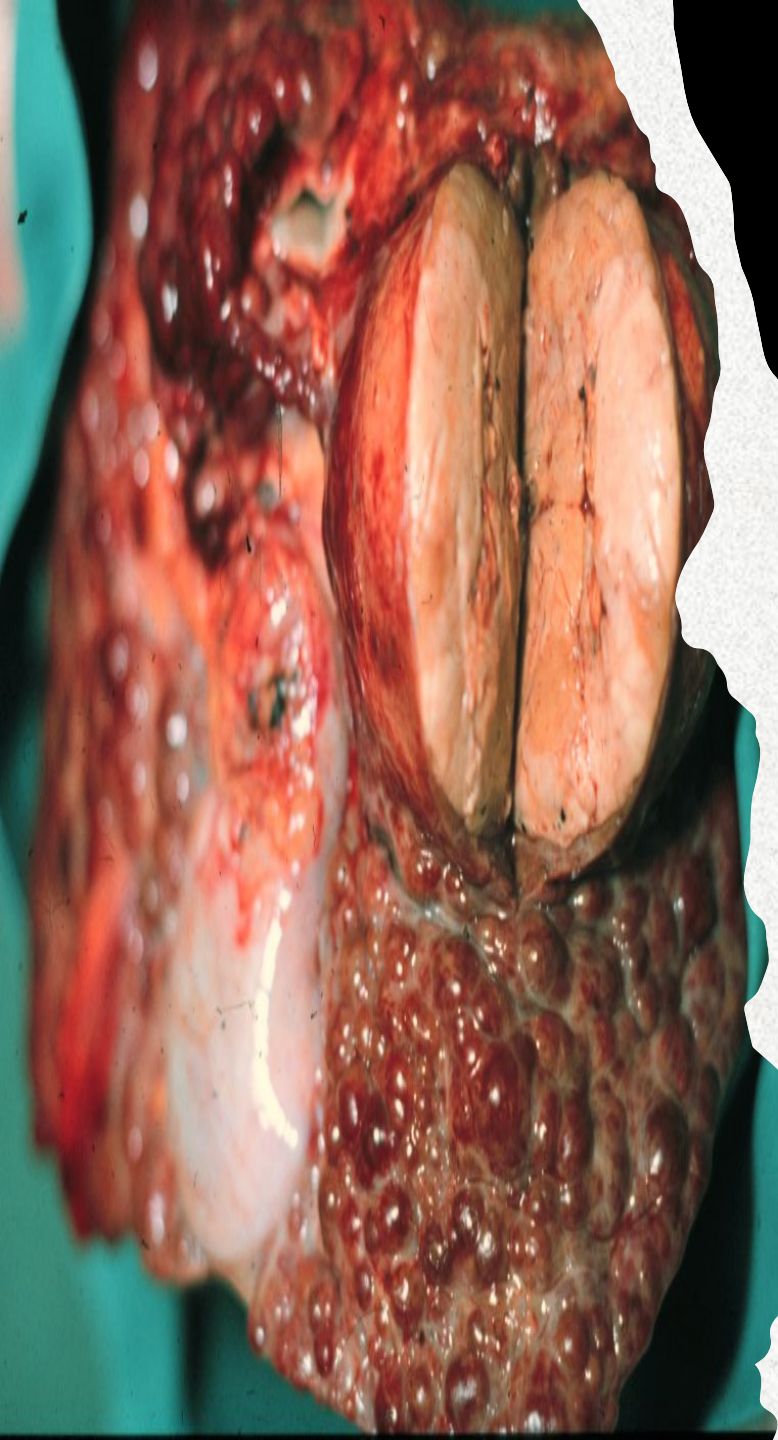


Hepatocellular Cancer: Current Surgical Treatment in 2025

Deniz Balci M.D.

Professor of General Surgery
Chief, Department of Surgery and Transplantation
Bahçeşehir University, Istanbul



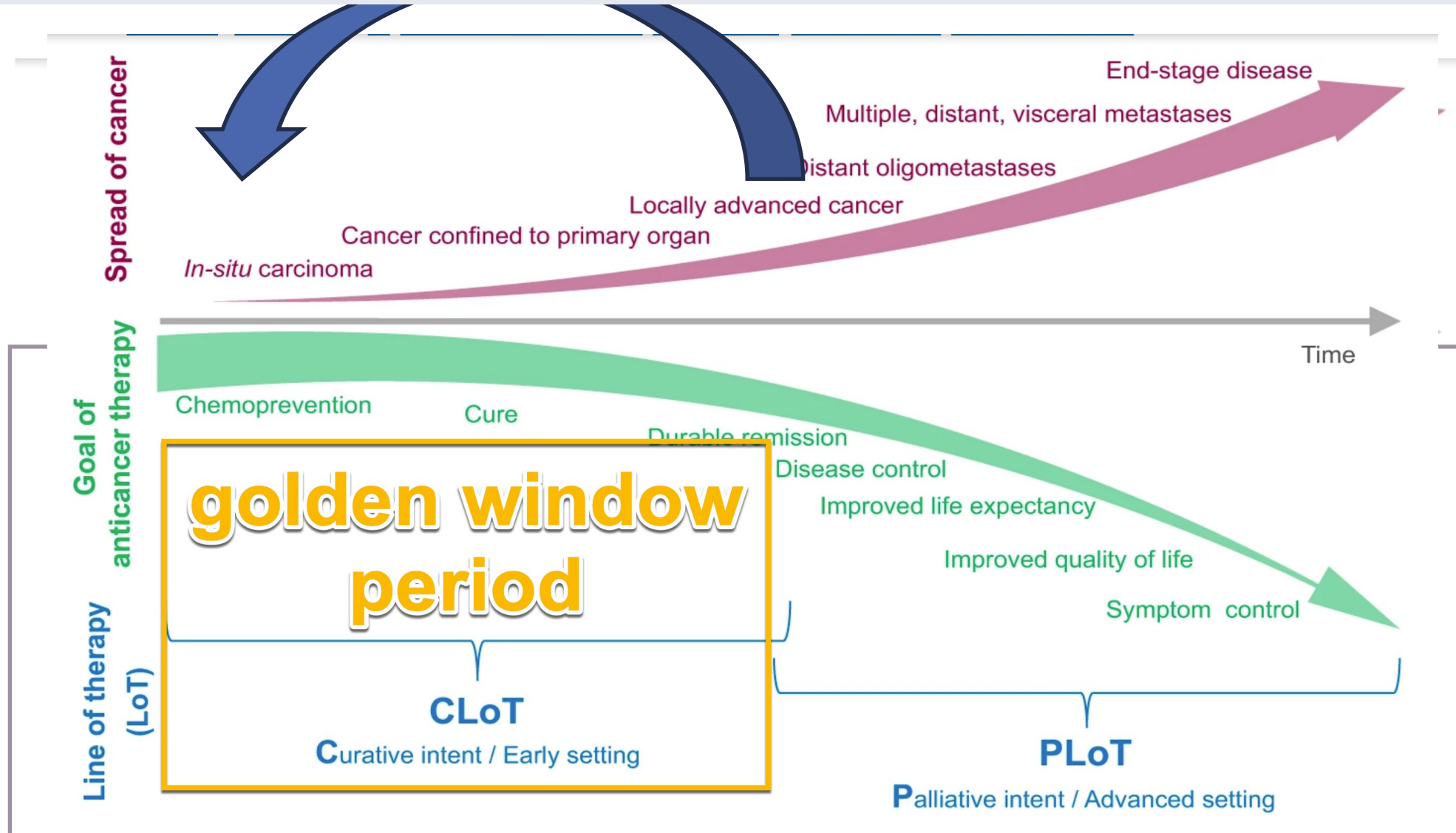


Cirrhosis + HCC

1 Patient
2 Disease

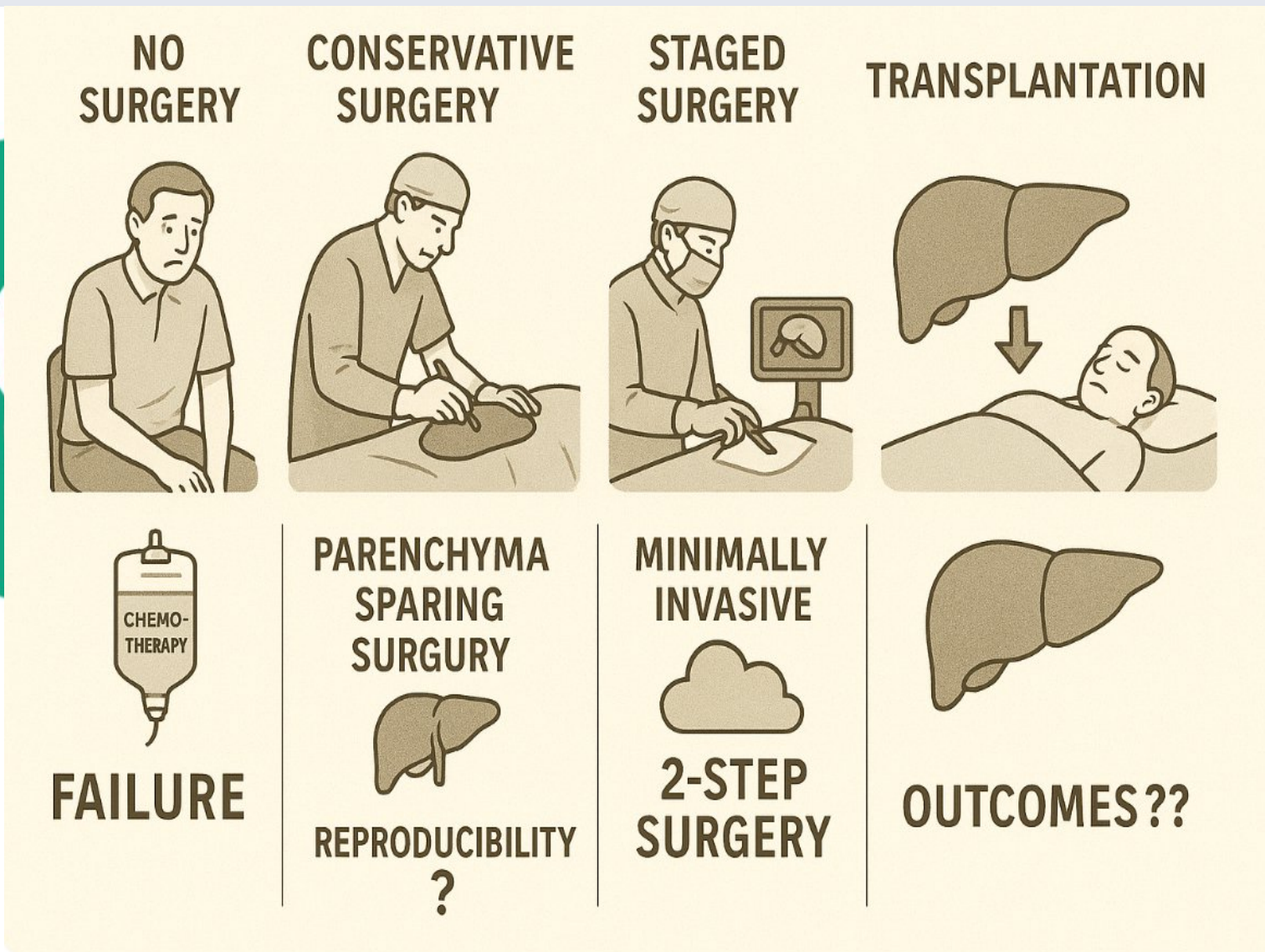


Curative intent or Lost opportunity !



Liver Cancer Treatment

Where are we @2025 ?



PT

- How can we increase Survival ?

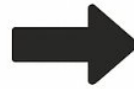
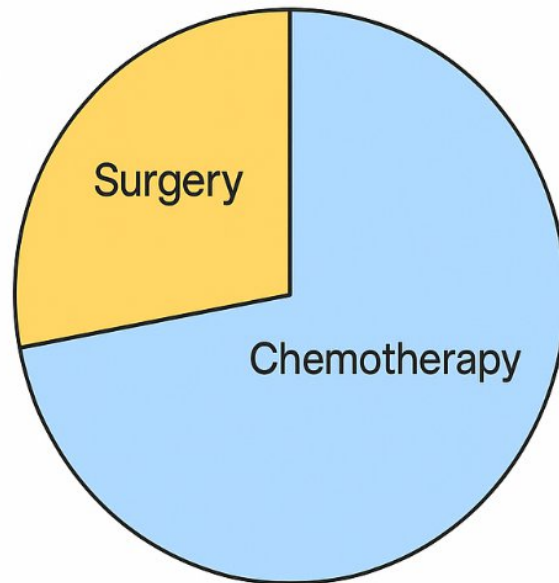


ChatGPT

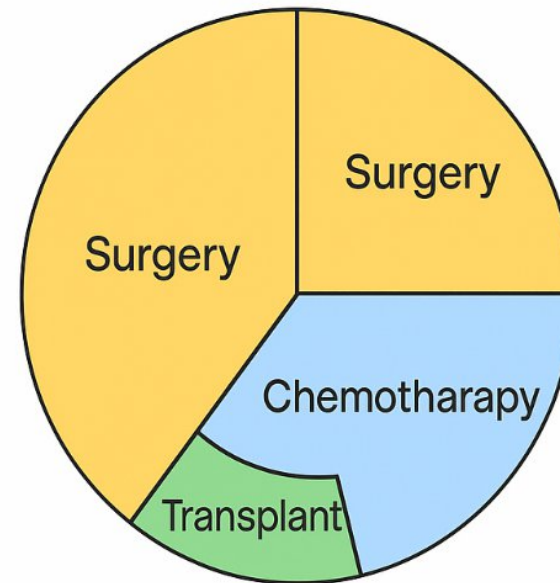
--Increase resectability increase surgery

--Add liver transplant

The reality !



The need !

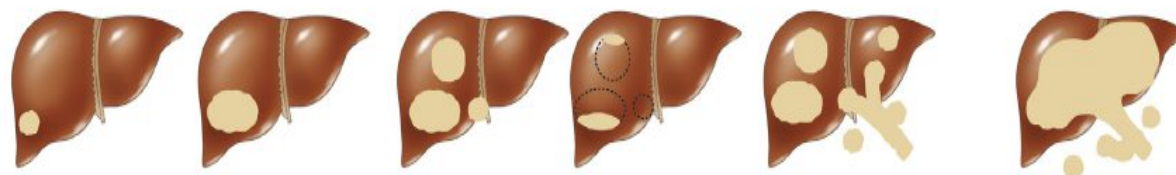


BARCELONA CLINIC LIVER CANCER

RECURRENCE

PORTAL HT

- Therapy is decided according to tumor burden, liver function, and PS
- Patients: Child-Pugh A/B, preserved ECOG PS, absence of severe comorbidities



Diagnosis

BCLC 0

BCLC A

BCLC B

BCLC C

BCLC D

Surgery
Ablation

TACE

Sorafenib

Best
supportive
care

Death

CURATIVE TREATMENT

BCLC strategy for prognosis prediction and treatment recommendation: The 2022 update ☆



RETURN OF THE
NO FLY ZONE



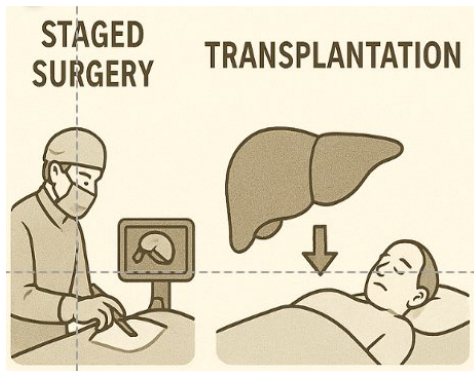
GVR
GRAND VIEW RESEARCH

How are
Smart Pills Revolutionizing
the Pharmaceutical Industry?



BCLC strategy for prognosis prediction and treatment recommendation: The 2022 update ☆

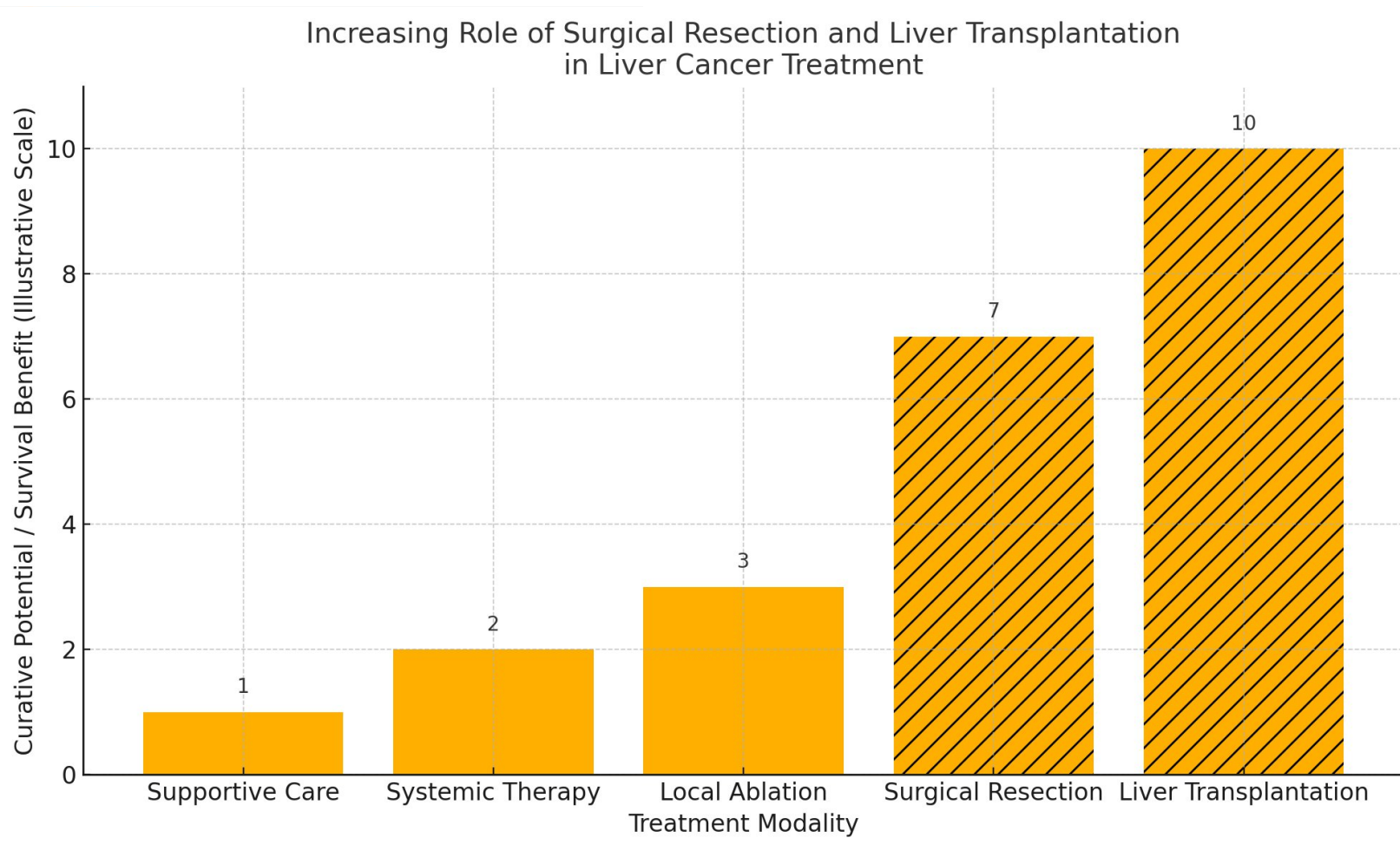




BCLC
0-A

BCLC B

BCLC -C



European Association for the Study of the Liver (EASL) Clinical Practice Guidelines on the management of hepatocellular carcinoma.
Journal of Hepatology, Volume 82, 4, 2025.



Cancer Stat Facts: Liver and Intrahepatic Bile Duct Cancer

Expand All

Collapse All



Reports on Cancer

Annual Report to the Nation

Cancer Stat Facts

Cancer Statistics Review

+

Preliminary Cancer Incidence Rates and Trends

+

SEER Publications

+

Statistics at a Glance

At a Glance

Estimated New Cases in 2025

42,240

% of All New Cancer Cases

2.1%

Estimated Deaths in 2025

30,090

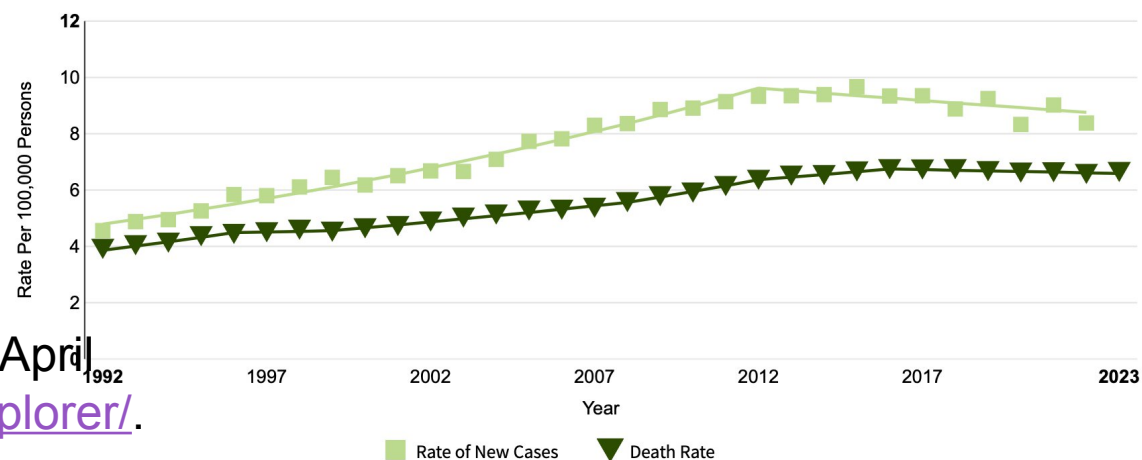
% of All Cancer Deaths

4.9%

5-Year
Relative Survival

22.0%

2015–2021

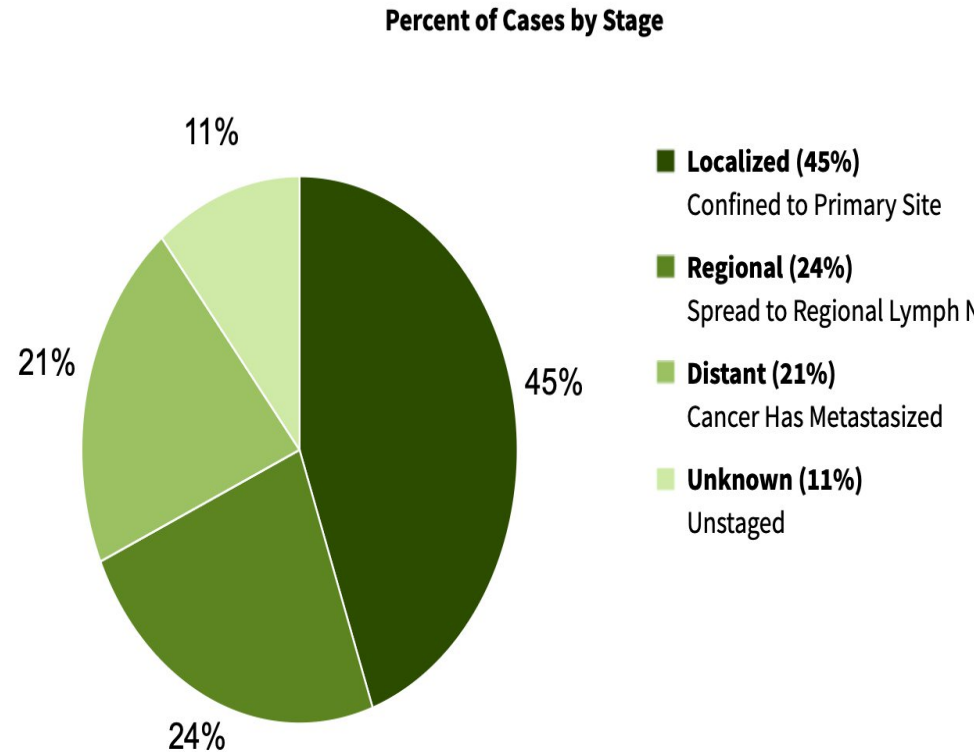


SEER cancer National Cancer Institute; 2025 April
[: <https://seer.cancer.gov/statistics-network/explorer/>].

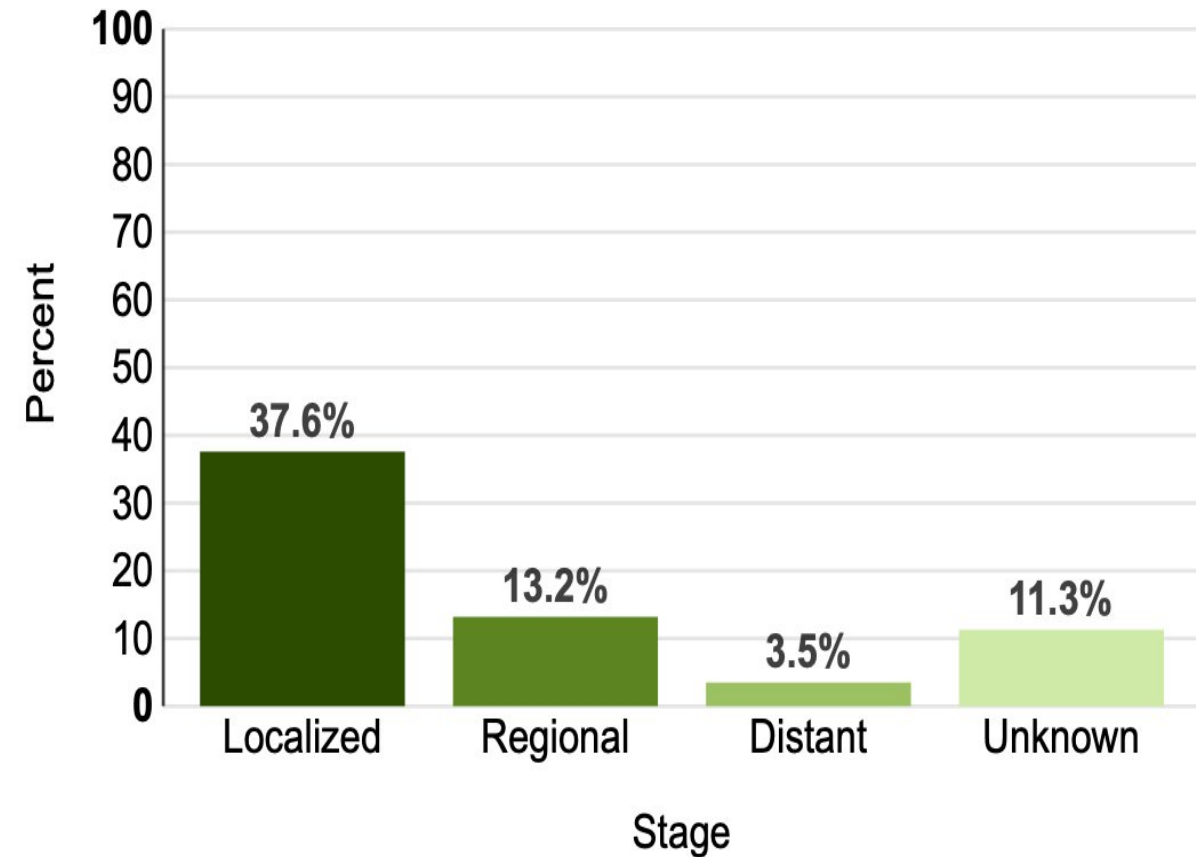


Something Wrong !

Percent of Cases & 5-Year Relative Survival by Stage at Diagnosis: Liver and Intrahepatic



5-Year Relative Survival



We are performing less and less surgery,

DESPITE THERE IS STRONG DATA AND EVIDENCE

- *Surgery results are good,*
- *better than any other modality,*
- *getting even better DAY BY DAY*

ORIGINAL ARTICLE

Global and regional long-term survival following resection for HCC in the recent decade: A meta-analysis of 110 studies



**Rosyli F. Reveron-Thornton¹ | Margaret L. P. Teng² | Eunice Yewon Lee³ |
Andrew Tran⁴ | Sean Vajanaphanich⁵ | Eunice X. Tan² | Sanjna N. Nerurkar⁶ |
Rui Xin Ng² | Readon Teh² | Debi Prasad Tripathy⁷ | Takanori Ito⁸ |
Taku Tanaka⁸ | Nozomi Miyake⁹ | Biyao Zou^{3,10} | Connie Wong¹¹ |
Hidenori Toyoda¹² | Carlos O. Esquivel¹³ | C. Andrew Bonham¹³ |
Mindie H. Nguyen^{3,10}  | Daniel Q. Huang^{2,14}**

¹Stanford University School of Medicine, Stanford, California, USA

²Division of Gastroenterology and Hepatology, Department of Medicine, National University Hospital, Singapore

Global 5 year survival after HCC resection

HEPATOLOGY COMMUNICATIONS

Overall Survival: West %45-50

East % 60-70

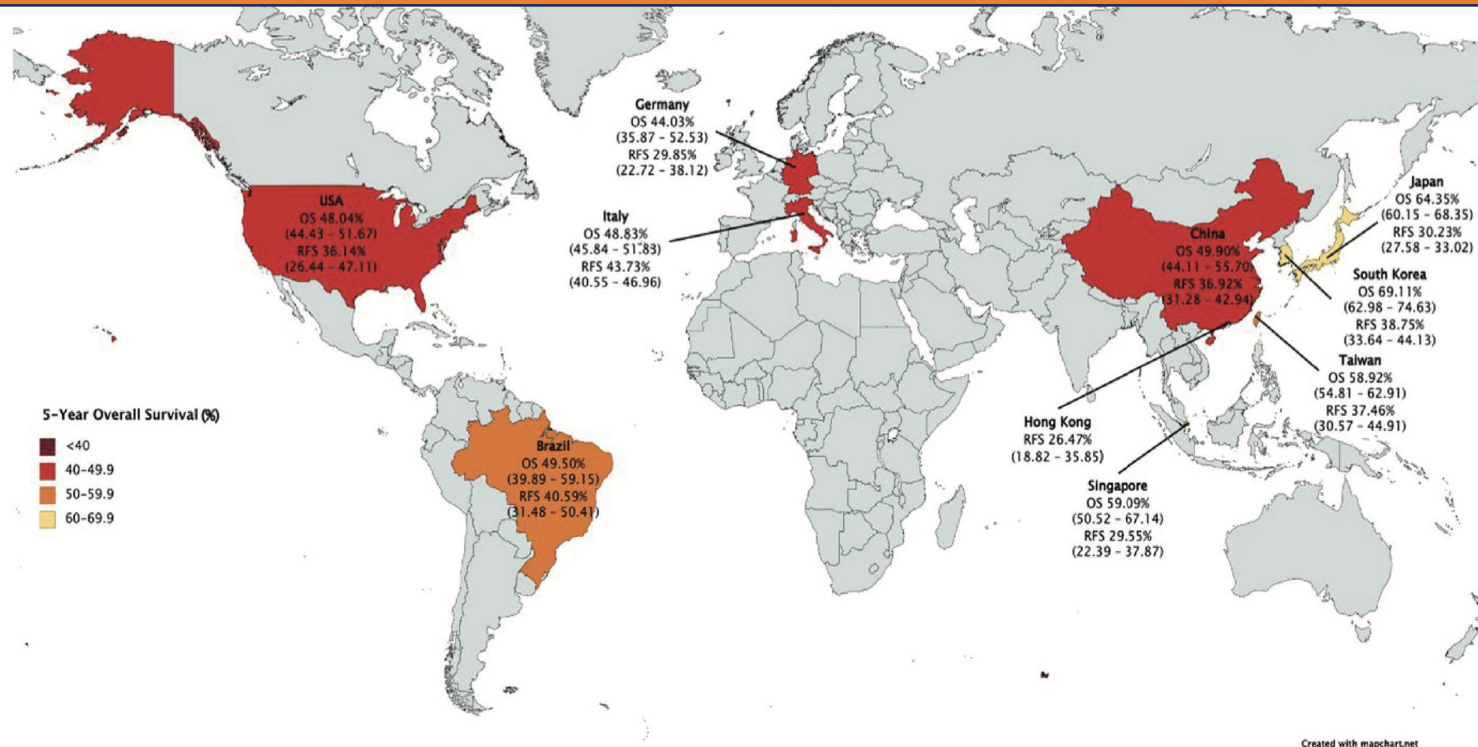


FIGURE 2 Country-level 5-year overall and recurrence free survival (RFS) after curative resection for hepatocellular carcinoma (HCC)

- One-year OS after surgical resection for HCC is excellent (~90%).
- However, 5-year OS (~55%) and RFS (~35%) are still poor, suggesting that long-term care is sub-optimal.
- improve survival through enhanced surveillance and preventing recurrence through antiviral therapy.

OLD

What is
REMOVED

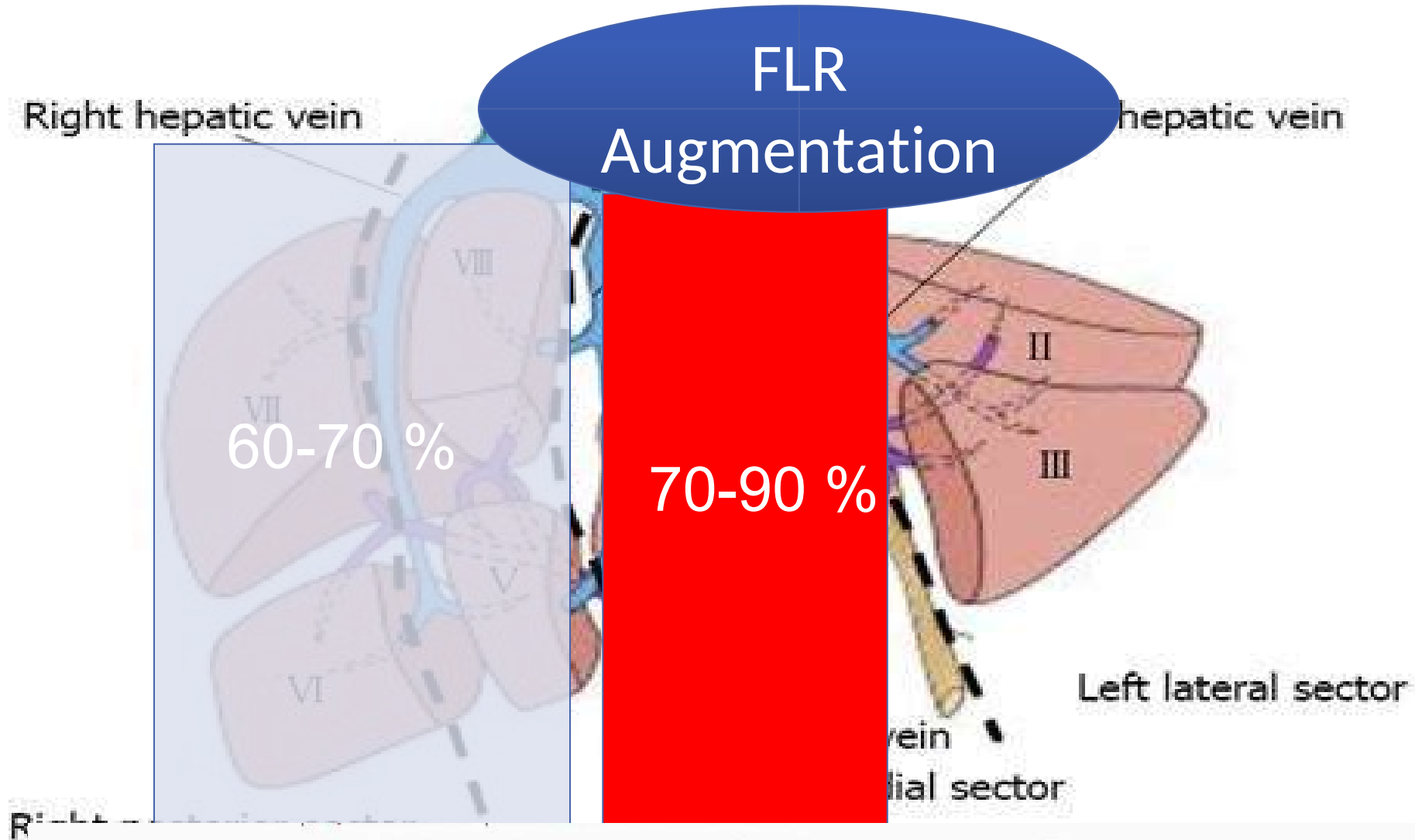
- Number of Tumor
- Size, location of



NEW

What
REMAINS

- R0 Resection
- Adequate Future Liver remnant



Induction of liver hypertrophy for extended liver surgery and partial liver transplantation: State of the art of parenchyma augmentation—assisted liver surgery

Philip C. Müller, Michael Linecker, Elvan O. Kirimker, Christian E. Oberkofler, Pierre-Alain Clavien, Deniz Balci & Henrik Petrowsky ✉

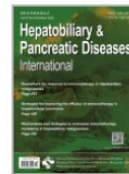
Langenbeck's Archives of Surgery (2021) | [Cite this article](#)

Using 3D-Surgical Simulation with Augmented and Mixed Reality for Advanced Liver Surgery and Living Donor Liver Transplantation





Hepatobiliary & Pancreatic Diseases
International

Volume 21, Issue 5, October 2022, Pages 455-461

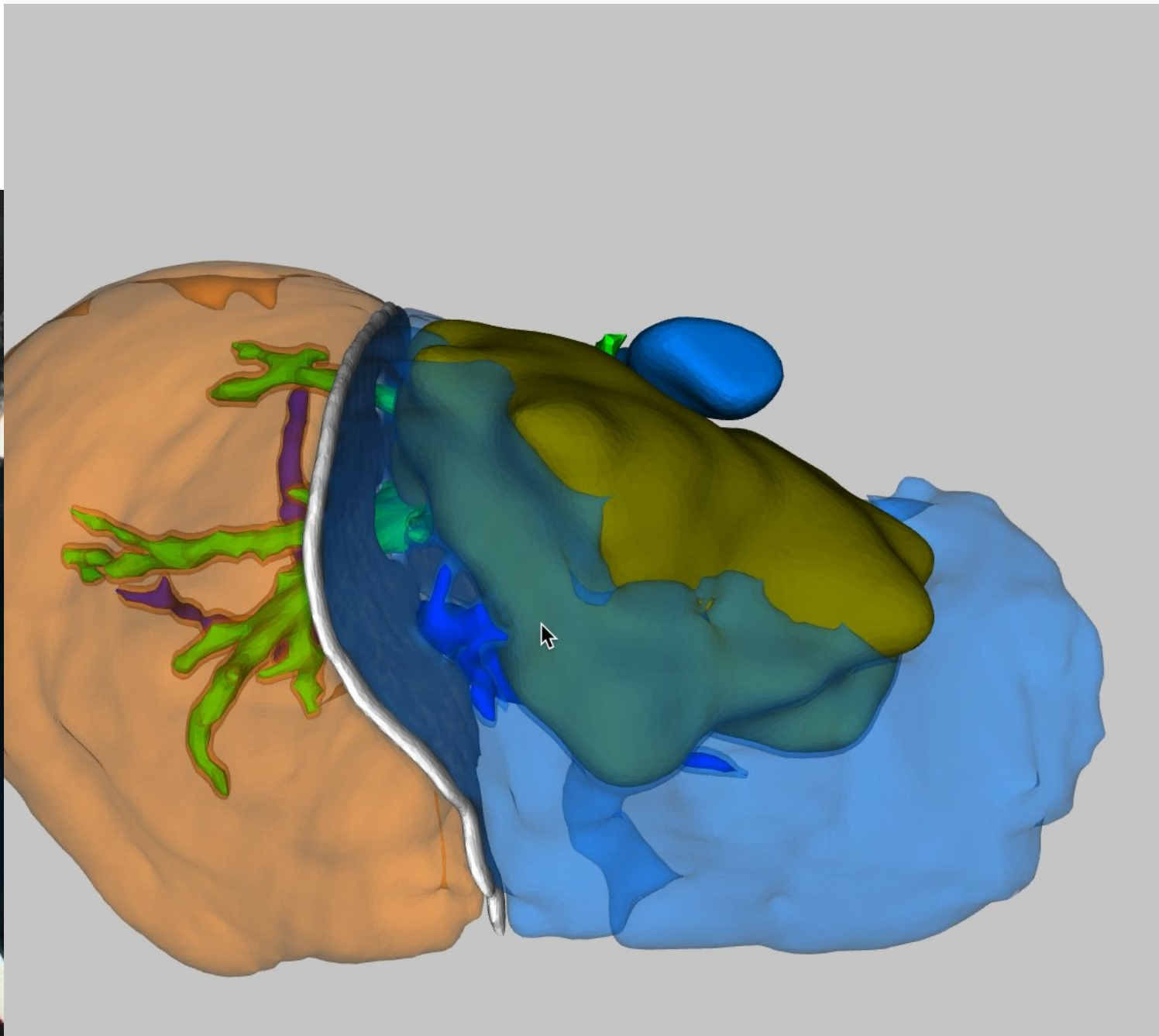


Review Article on Modern Technology in Liver Surgery and Transplantation

Uses of a dedicated 3D reconstruction software with augmented and mixed reality in planning and performing advanced liver surgery and living donor liver transplantation (with videos)

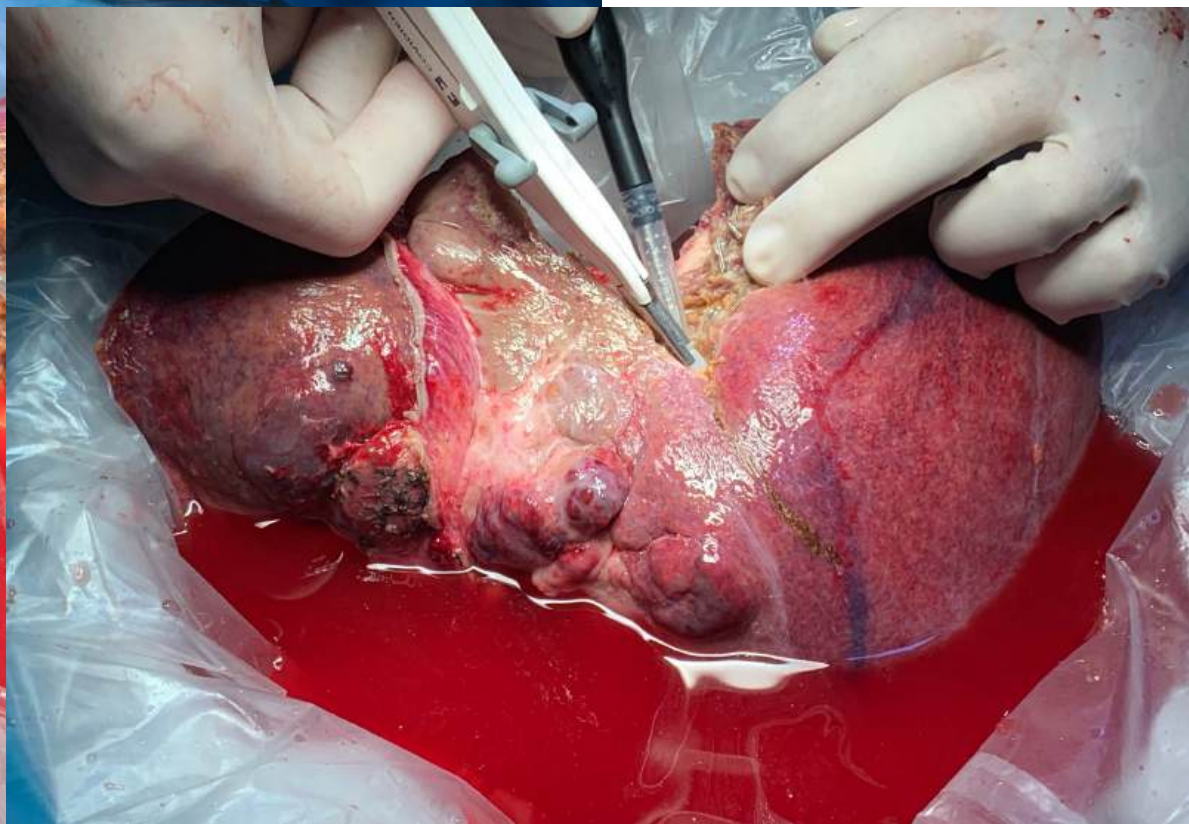
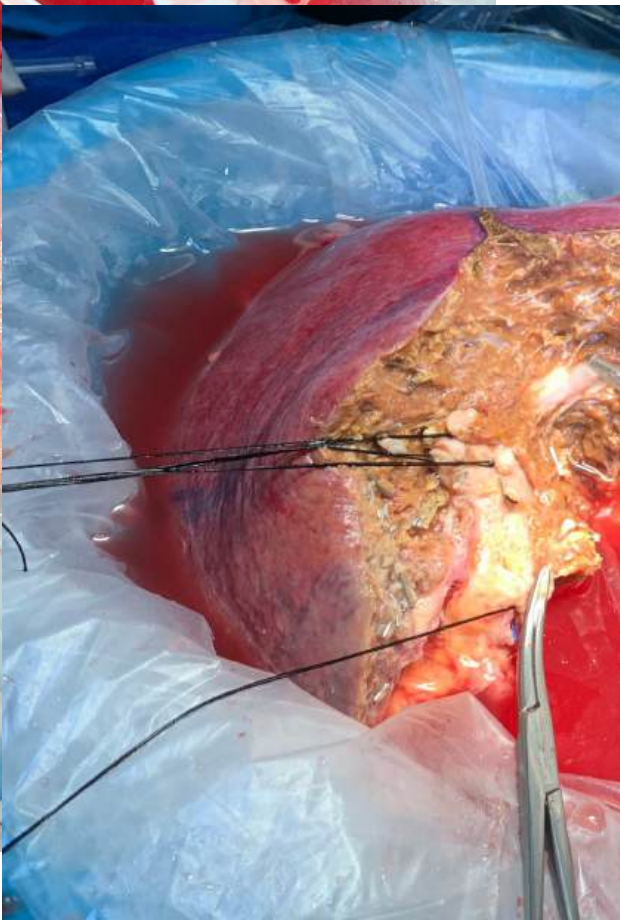
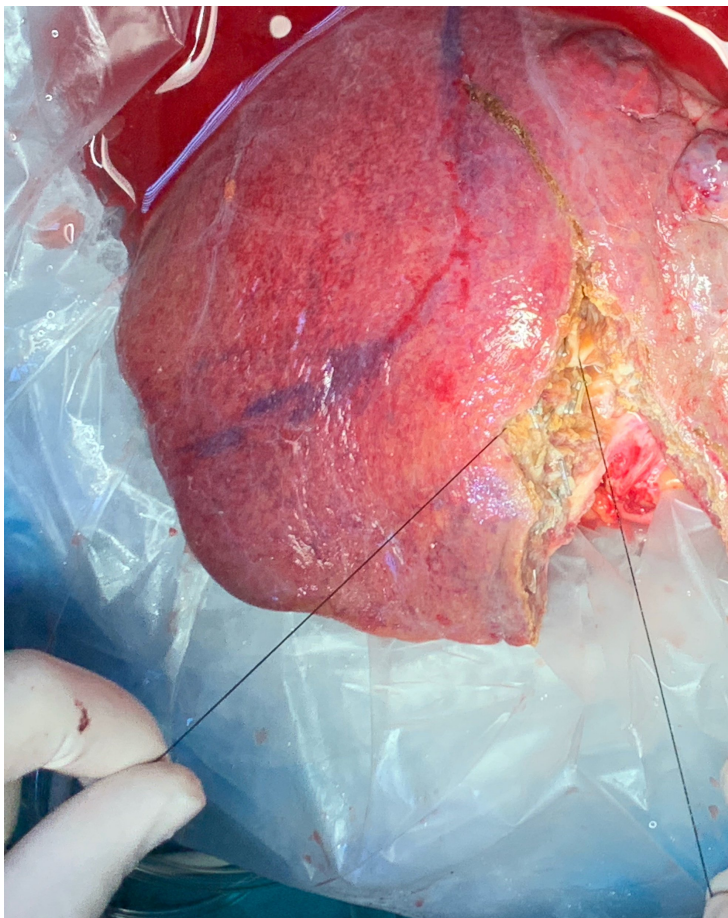
Deniz Balci^a  , Elvan Onur Kirimker^b, Dimitri Aristotle Raptis^{c d}, Yujia Gao^{e f}, Alfred Wei Chieh Kow^{e f}

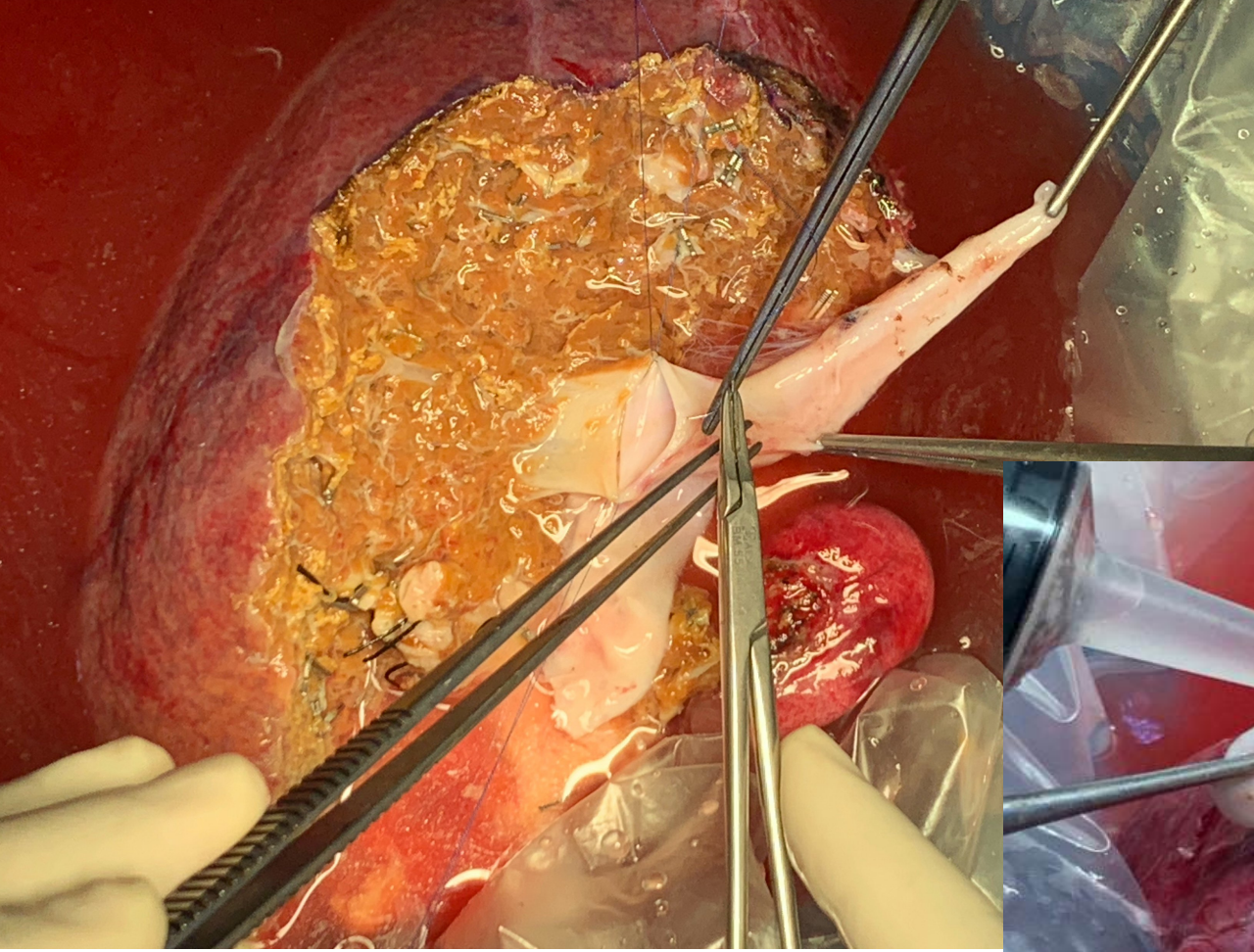


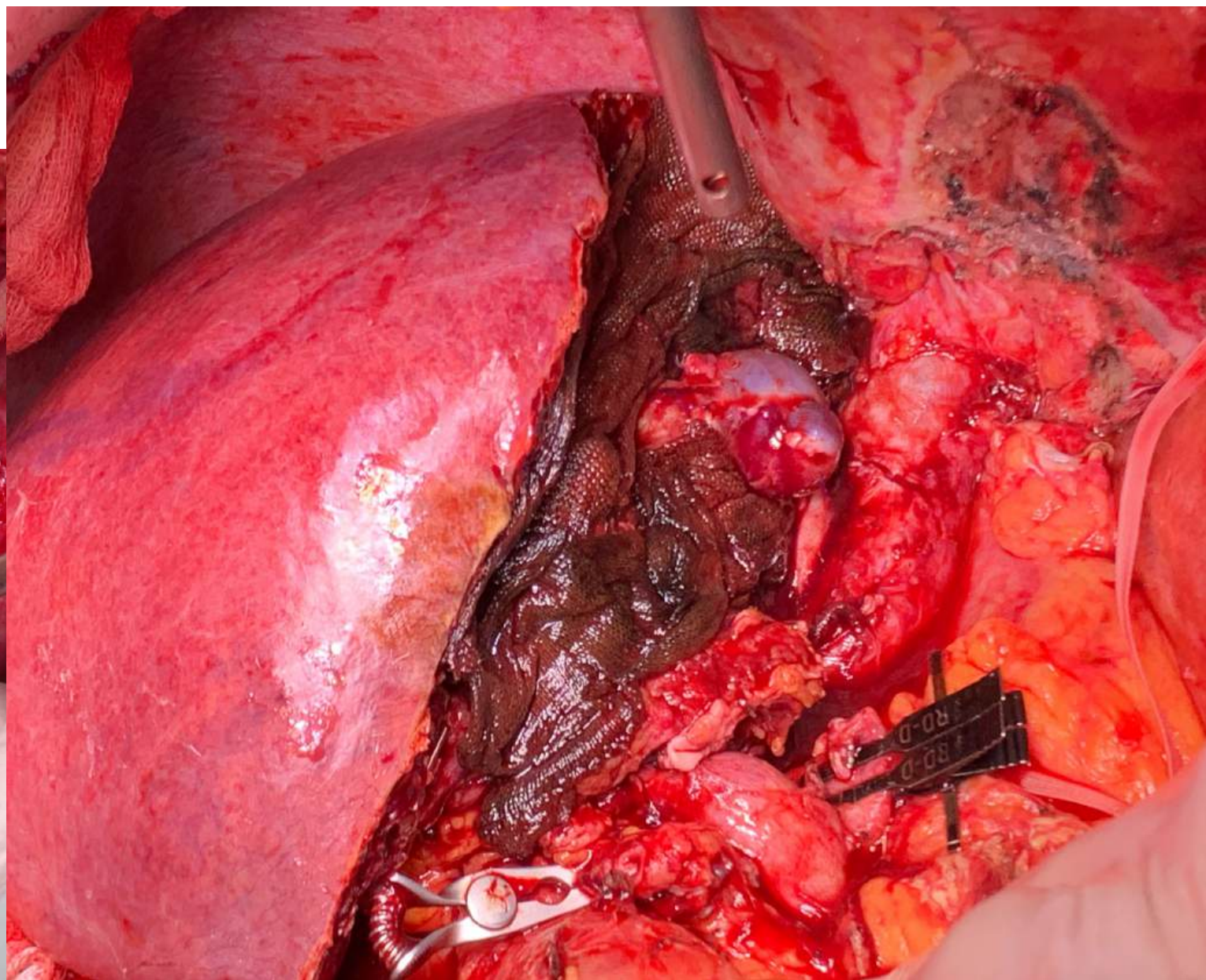
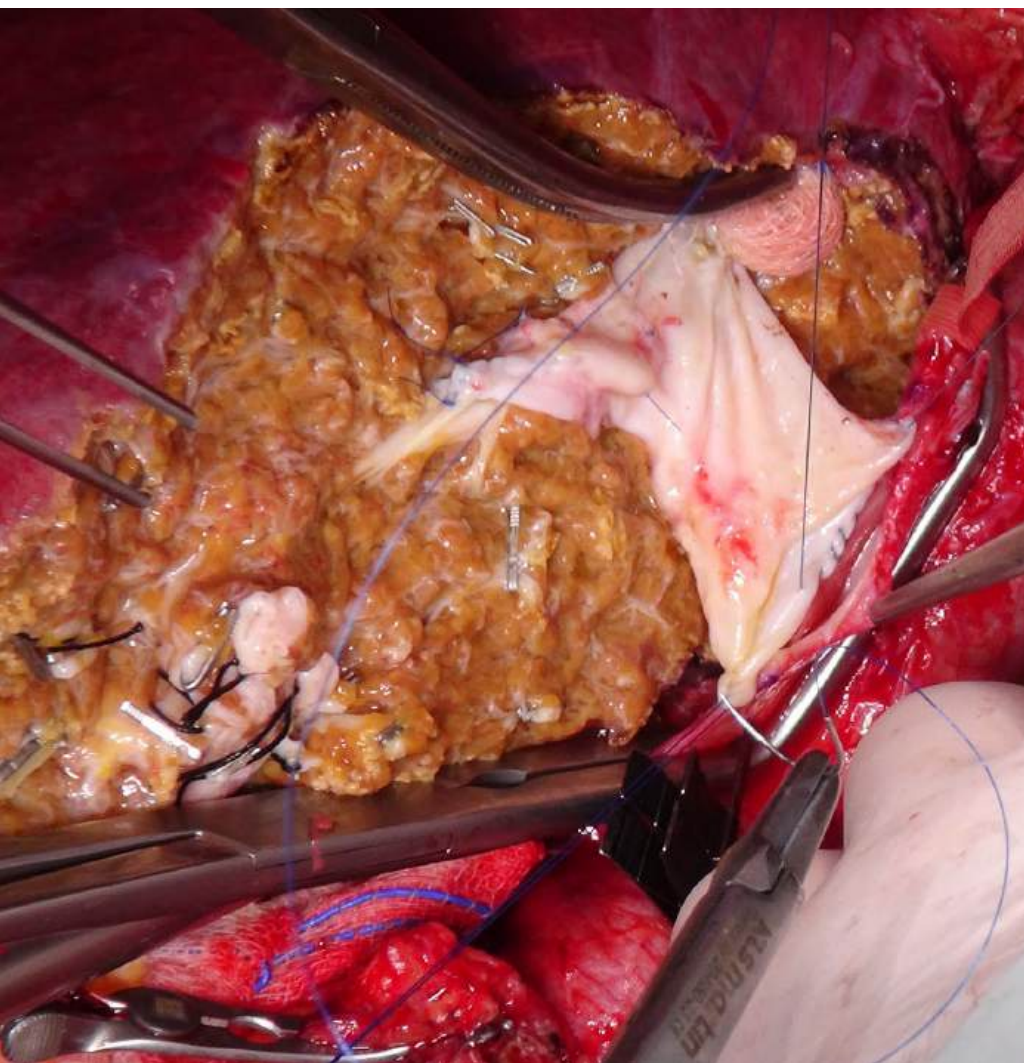


LIVER VISION

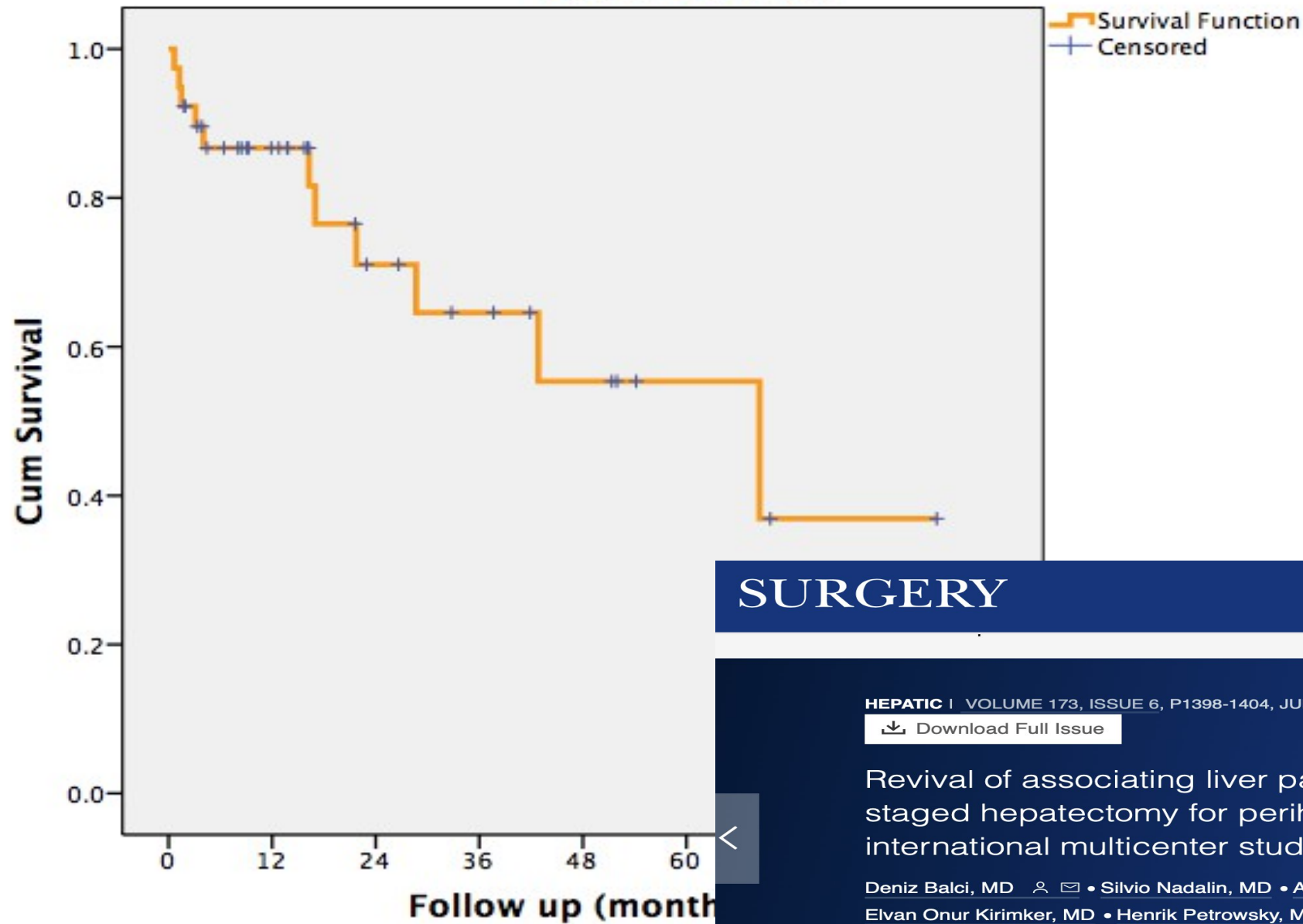
Name	Erdogan^Eren
Gender, Age	M , 037Y
Date	27.10.2018
Liver :1197 ml	<input type="checkbox"/>
CUT Liver :772 ml / %64	<input checked="" type="checkbox"/>
FLR :397 ml / %33	<input checked="" type="checkbox"/>
IVC :40 ml	<input checked="" type="checkbox"/>
Hepatic :15 ml	<input checked="" type="checkbox"/>
Portal :29 ml	<input checked="" type="checkbox"/>
ClippPlane :29 ml	<input checked="" type="checkbox"/>
Tumor1 :215 ml	<input checked="" type="checkbox"/>







Overall Survival



SURGERY

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Log

HEPATIC | VOLUME 173, ISSUE 6, P1398-1404, JUNE 2023

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Revival of associating liver partition and portal vein ligation for staged hepatectomy for perihilar cholangiocarcinoma: An international multicenter study with promising outcomes

Deniz Balci, MD • [Silvio Nadalin, MD](#) • [Arianeb Mehrabi, MD](#) • ... [Pierre-Alain Clavien, MD](#) • [Elvan Onur Kirmker, MD](#) • [Henrik Petrowsky, MD](#) • [Show all authors](#)

Published: March 22, 2023 • DOI: <https://doi.org/10.1016/j.surg.2023.02.008> •

[Check for updates](#)

WHAT WOULD *YOU CHOOSE?*

RED PILL BLUE PILL



FEARLESSMOTIVATION.COM

Surgery is more than cutting in 2025 !

Transplantation

ction



Downstaging

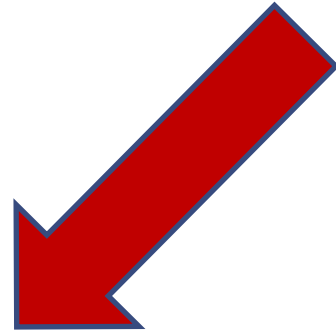
Transplanting patients within the Milan Criteria provides excellent outcomes but...

Milan Criteria

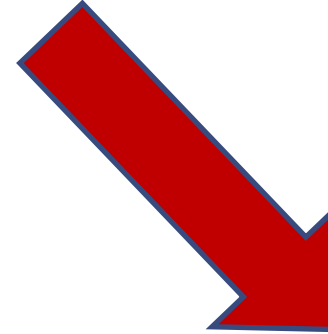


- Too restrictive
- Denies transplant to patients that will have excellent outcomes
- Alternative treatments?

How do we Transplant Patients Beyond Milan Criteria?

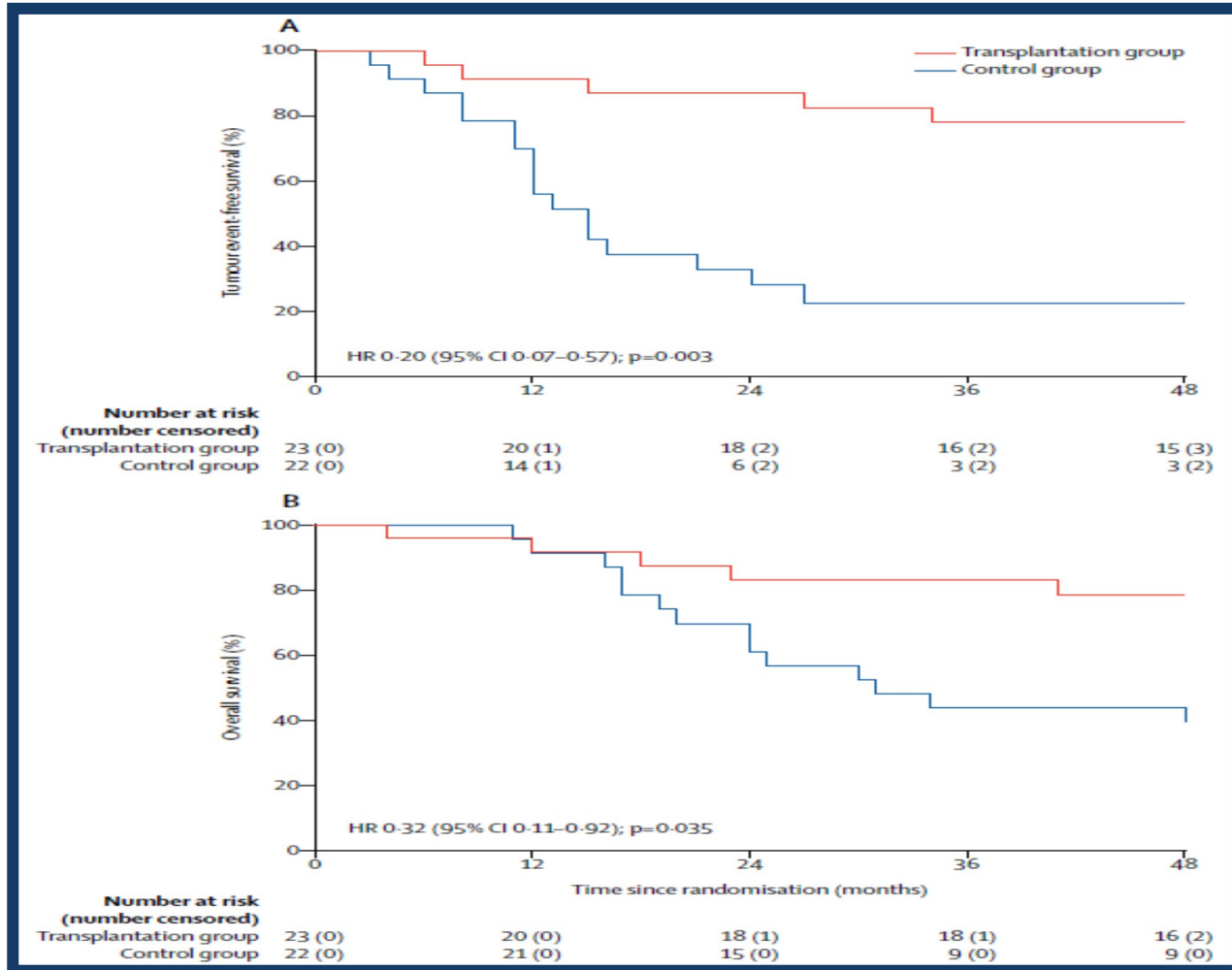


**Extended Criteria
(biological markers?)**



Downstaging

Liver transplantation in hepatocellular carcinoma after tumour downstaging (XXL): a randomised, controlled, phase 2b/3 trial





DEFINITION OF DOWN-STAGING

- Down-staging is a process that combines expanded criteria with the effects of local regional therapy.
- Definition of down-staging: Reduction in the size of tumor using local regional therapy to meet acceptable criteria for liver transplant.¹
- Tumor response to down-staging treatments: Should be based on radiographic measurement of the size of all viable tumors, not including the area of necrosis from local regional therapy.²

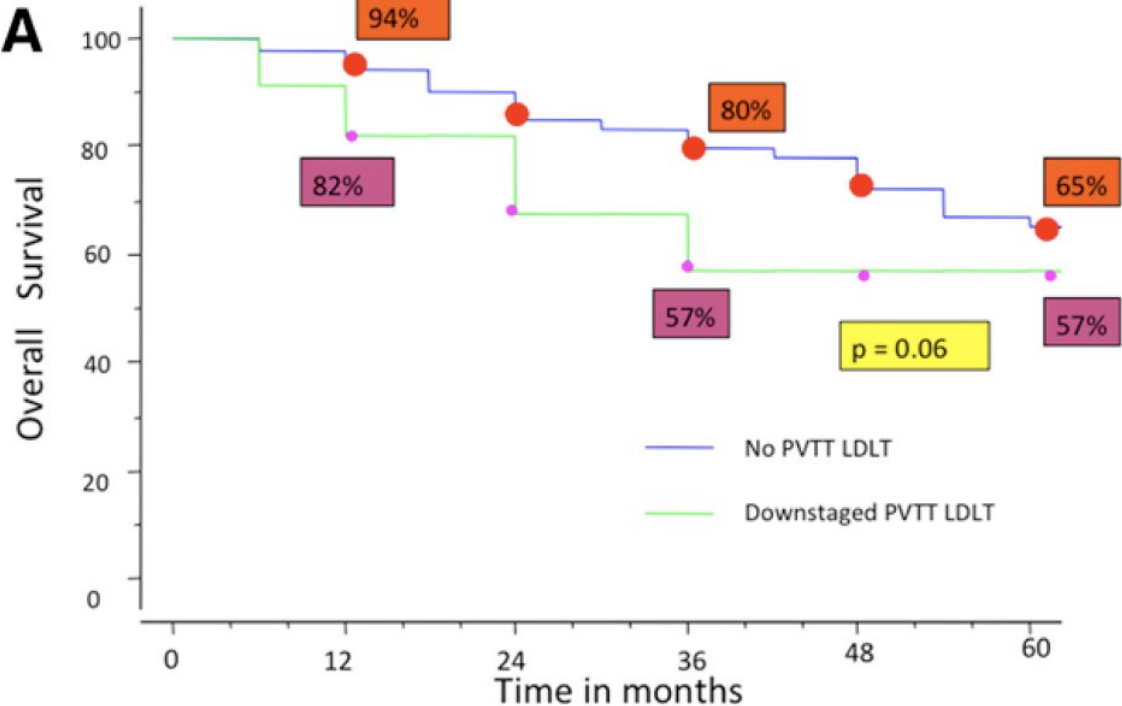
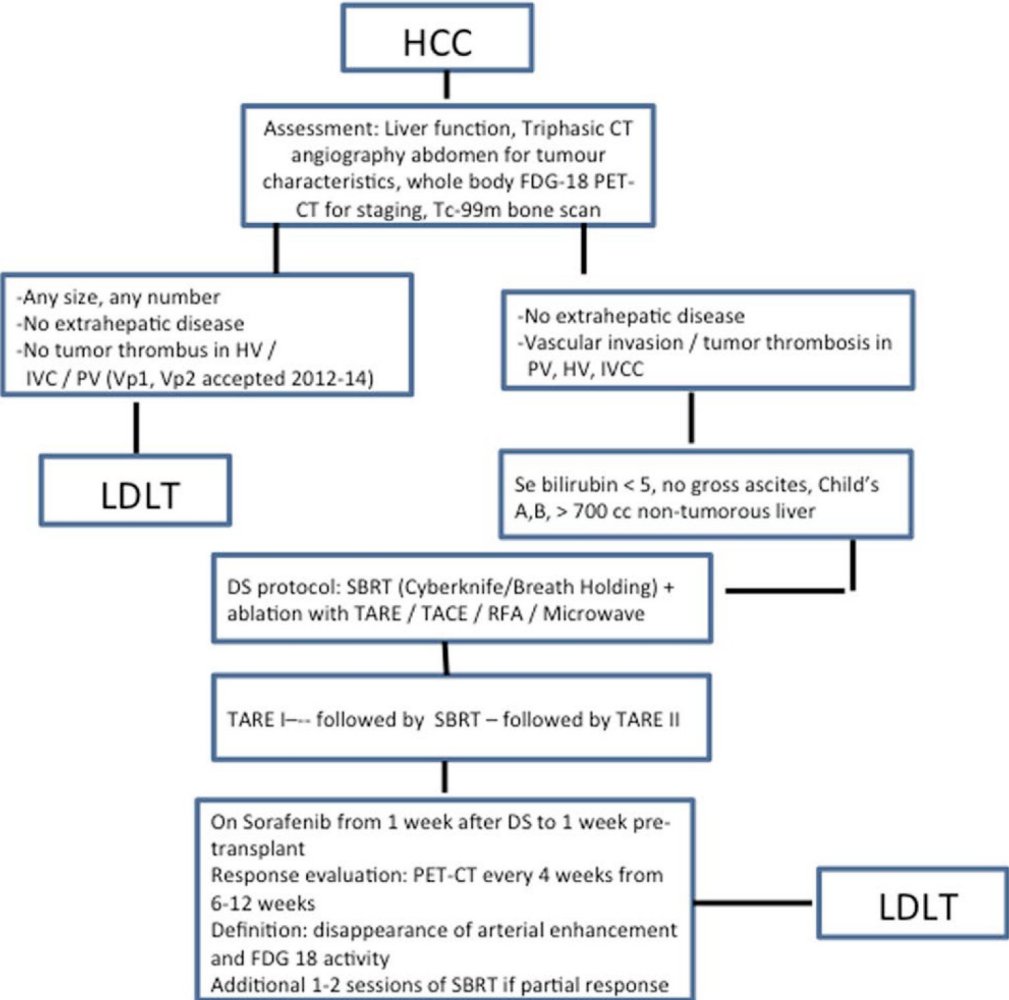


1. Yao FY, Breitenstein S, Broelsch CE, Dufour JF, Sherman M.
Liver Transpl 2011; 17 (Suppl 2) : S109-116

2. EASL Guidelines - Briux J. et al. *J Hepatol* 2001;35: 421–430

Experience With LDLT in Patients With Hepatocellular Carcinoma and Portal Vein Tumor Thrombosis Postdownstaging

Arvinder S. Soin, MS, FRCS,¹ Prashant Bhangui, MS,¹ Tejinder Kataria, MD,² Sanjay S. Baijal, MD,³ Tarun Piplani, MD,³ Dheeraj Gautam, MD,⁴ Narendra S. Choudhary, MD,⁴ Amit Rastogi, MS,¹ Neeraj Saraf, MD,¹ and Sanjiv Saigal, DM¹ **Transplantation** ■ November 2020 ■ Volume 104 ■ Number 11





Social, economic, and policy implications of organ preservation advances

GLOBAL ORGAN SHORTAGE 2023



World Health Organization:

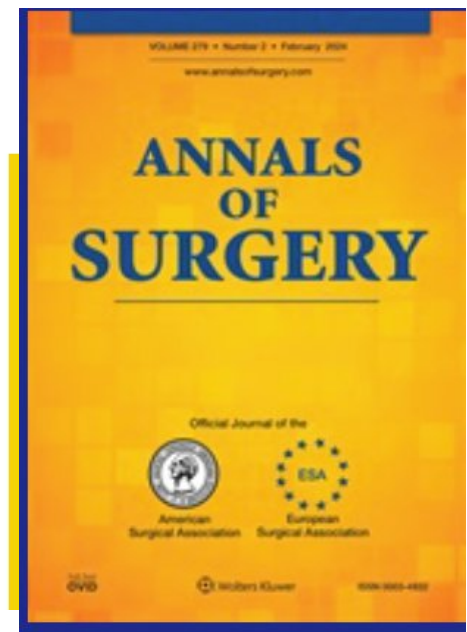
<10% of the global organ transplantation need is met.

The Development of Transplant Oncology May Worsen the Liver Gap and Needs New Technical Options in Liver Transplantation

Soubrane, Olivier MD, PhD^{*}; Scatton, Olivier MD, PhD[†]

[Author Information](#) ☑

Annals of Surgery 279(2):p 226-227, February 2024. | DOI: 10.1097/SLA.0000000000006086

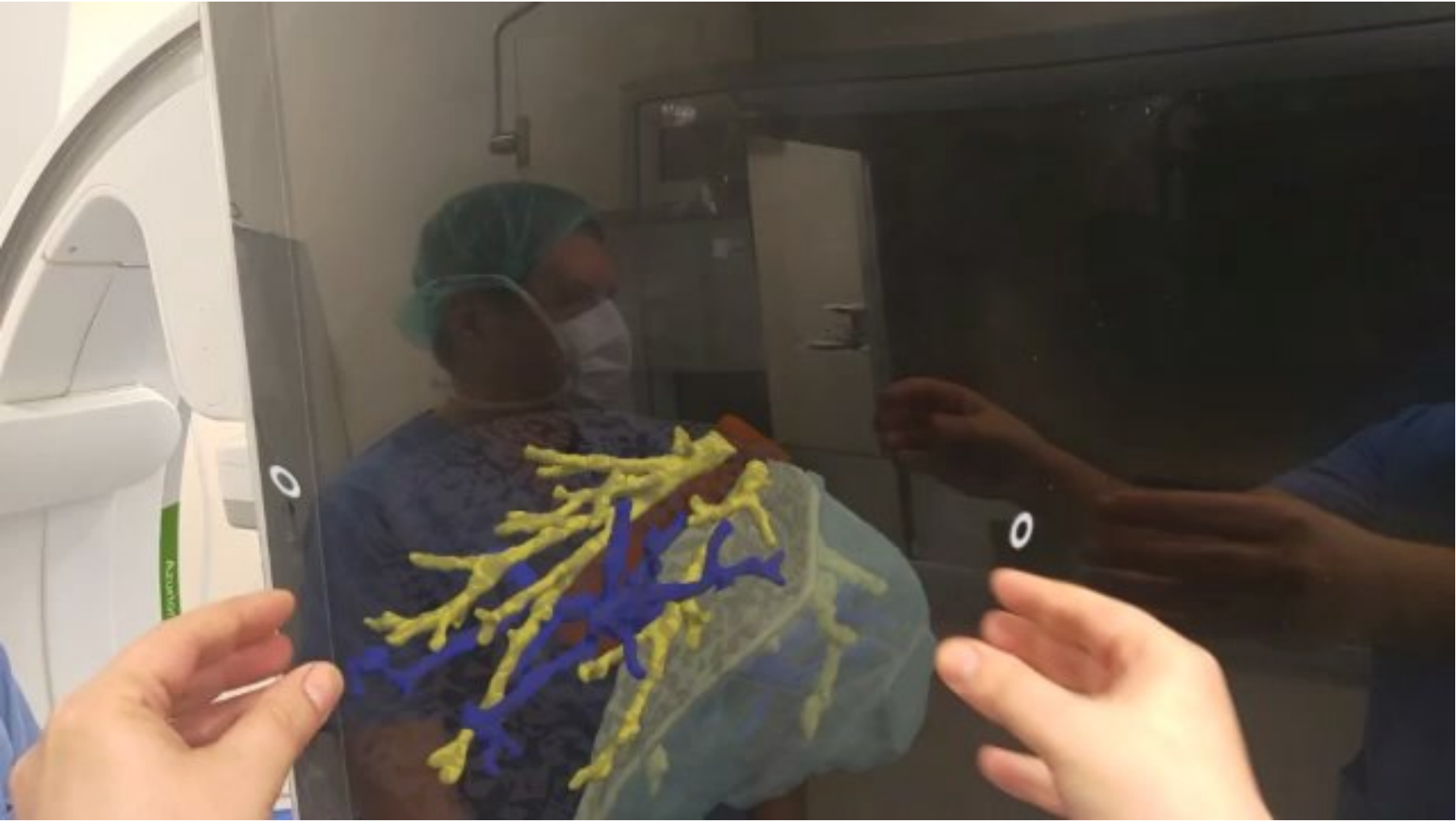


- Transplant ONCOLOGY concept:
- ...never-ending increase in the demand for liver grafts... !!!
- .



22nd Annual Summer Winter Symposium
August 4 - 7, 2022 | Loews Miami Beach Hotel

Where are we at now? Mixed



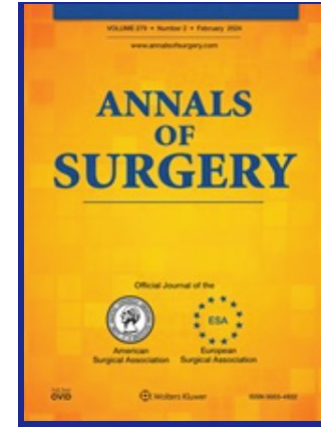
SURGICAL PERSPECTIVES

The Development of Transplant Oncology May Worsen the Liver Gap and Needs New Technical Options in Liver Transplantation

Soubrane, Olivier MD, PhD^{*}; Scatton, Olivier MD, PhD[†]

[Author Information](#) ☺

Annals of Surgery 279(2):p 226-227, February 2024. | DOI: 10.1097/SLA.0000000000006086



- Transplant ONCOLOGY concept:
- never-ending increase in the demand for liver grafts
- **Rapid Procedure** could be answer both in cirrhotic and non-cirrhotic settings.



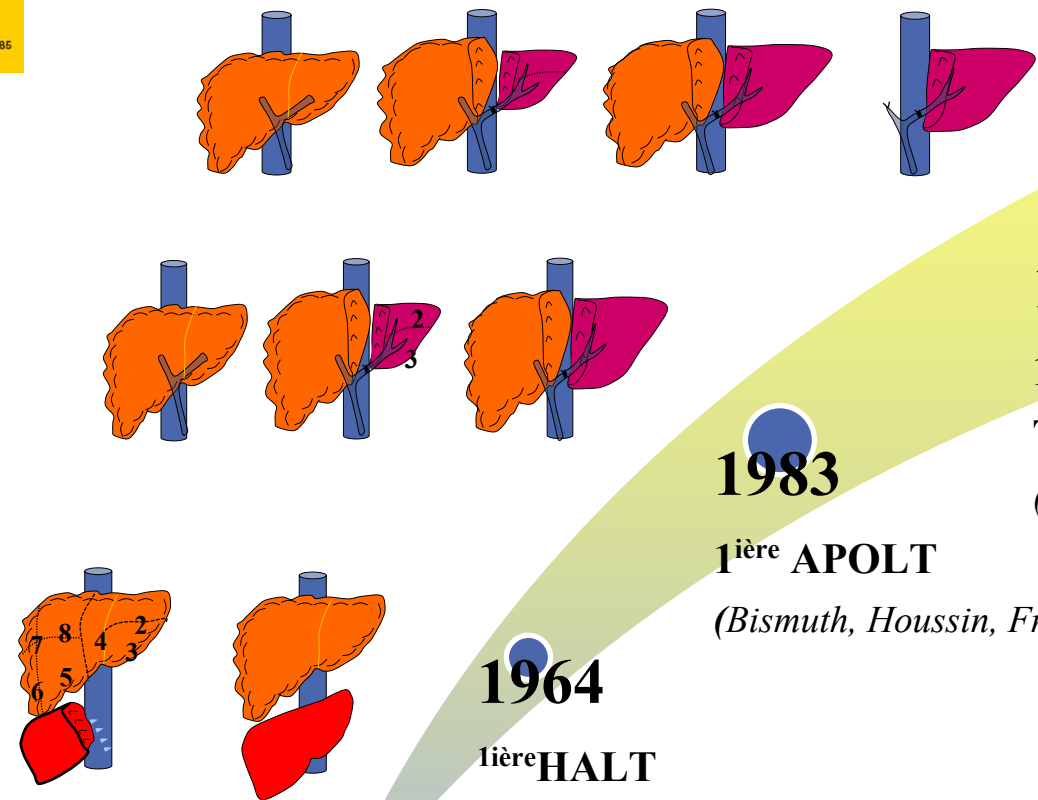
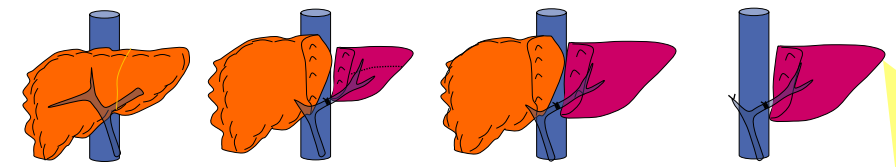
History APOLT/ Chronic liver diseases : a stepwise evolution

Auxiliary Liver Transplantation for Cirrhosis: From APOLT to RAPID

A Scoping Review

Chetana Lim, MD, PhD,* Celia Turco, MD,*†‡ Deniz Balci, MD, PhD,§ Eric Savier, MD,*†
Claire Goumard, MD,*†¶ Fabiano Perdigao, MD,* Geraldine Rousseau, MD,*
Olivier Soubrane, MD,|| and Olivier Scatton, MD, PhD*†¶☒

2022



1964

1^{ière} HALT

(Halgrimson, Starzl, USA published in 1966)

1983

1^{ière} APOLT

(Bismuth, Houssin, France published in 1985)

1999

1^{ière} APOLT

Two stage
(Ikegami, Japan published in 1998)

2015

1^{ier} « RAPID »

Mets normal liver
(Line, Norway)

2017

1^{ier} « LD-RAPID »

/ cirrhosis
(Balci, Turkey)

Systematic short delay between 1 and 2nd stage
Systematic native liver “deportalization”
Systematic portal flow modulation

Auxilliary Liver Transplantation According to the RAPID Procedure in Noncirrhotic Patients

Technical Aspects and Early Outcomes

Utz Settmacher, MD,* Aladdin Ali-Deeb, MD,* Laurent Coubeau, MD,†
 Umberto Cillo, MD,‡ Pål-Dag Line, MD,§|| Markus Guba, MD,¶
 Silvio Nadalin, MD,# and Falk Rauchfuß, MD*✉

Annals of Surgery • Volume 277, Number 2, February 2023

Annals of Surgery • Volume 277, Number 2, February 2023

RAPID Procedure in Non-cirrhotic Indications

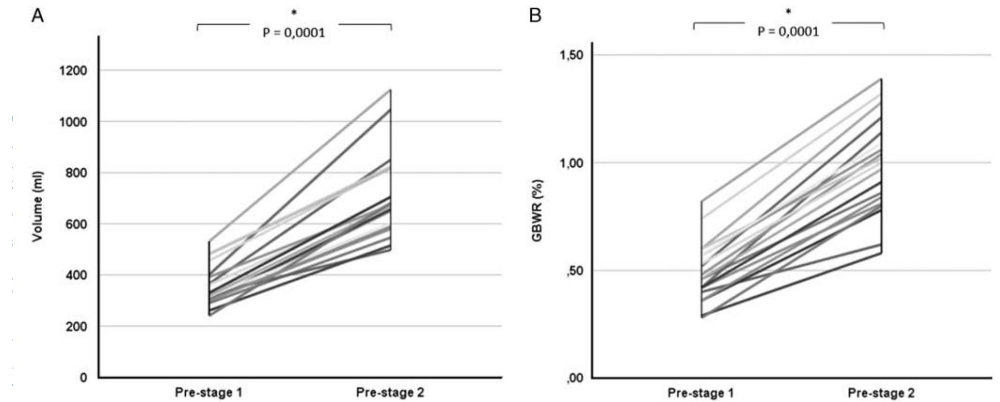
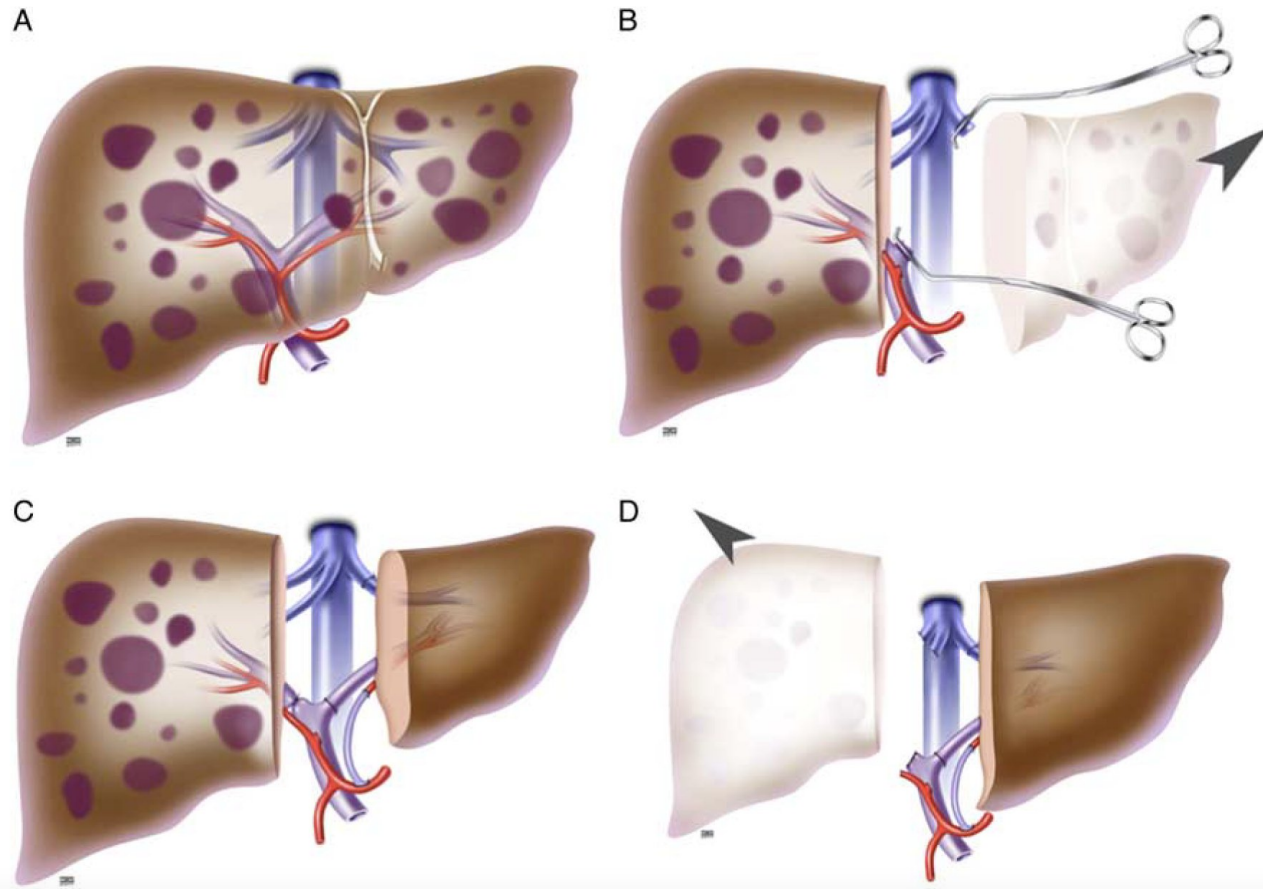
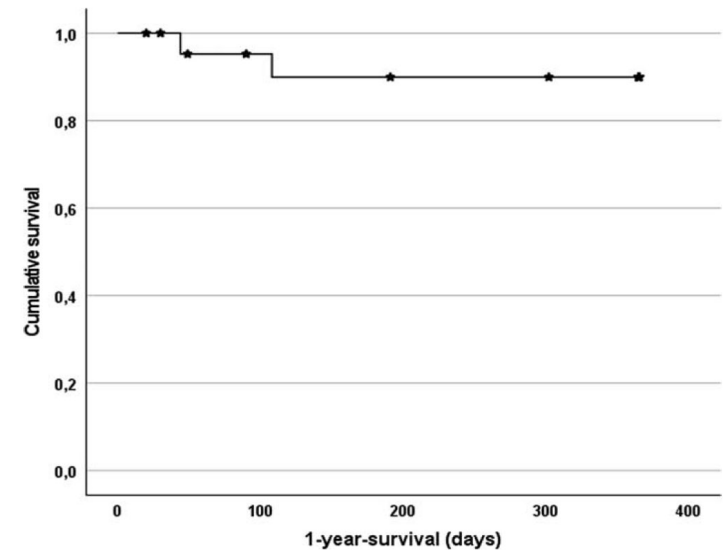


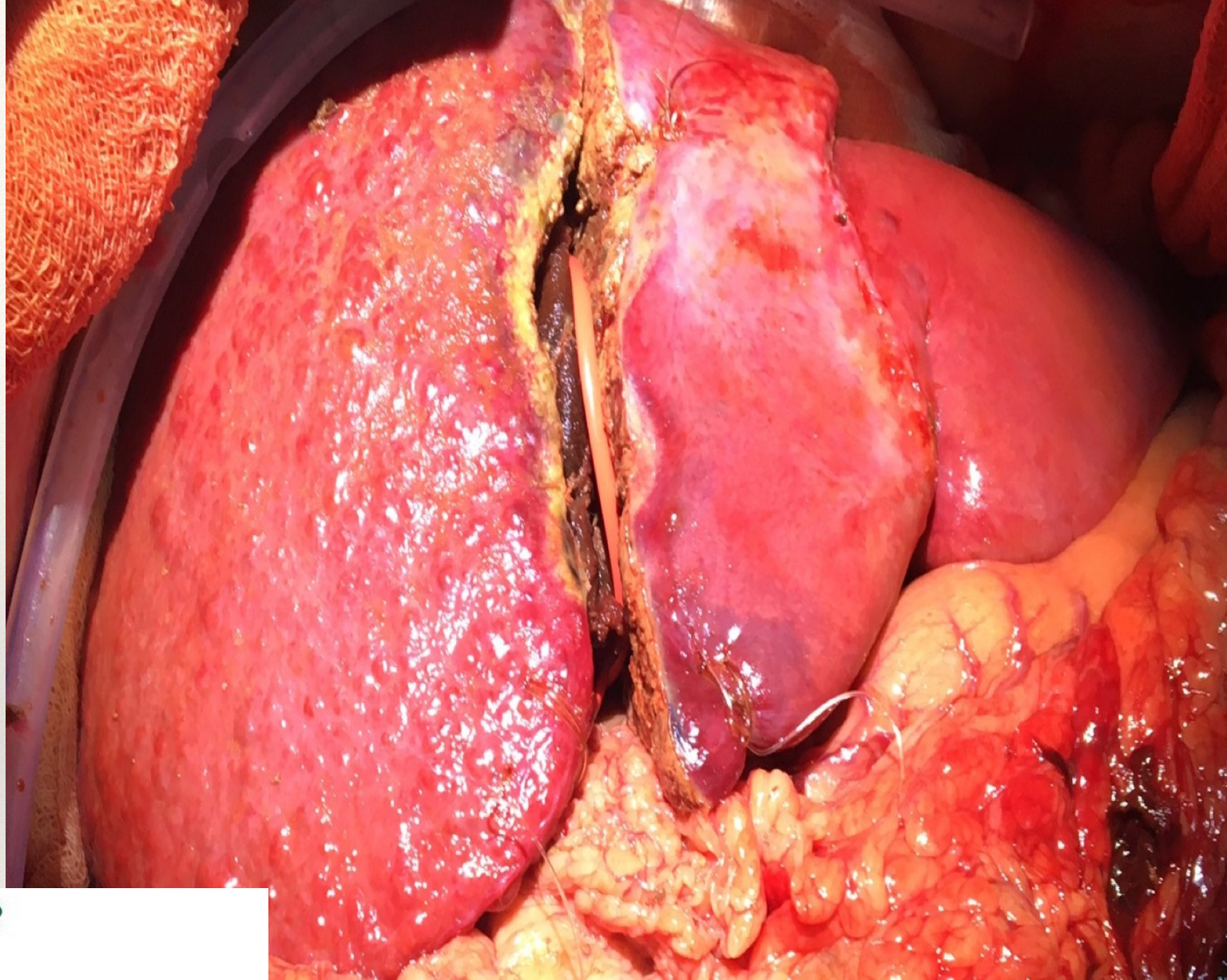
FIGURE 2. Increase of graft volume (A) and GBWR (B) between stage 1 and 2.

Annals of Surgery • Volume 277, Number 2, February 2023



What's next ?

LDLT GRWR < 0.36



**Liver
Transplantation**

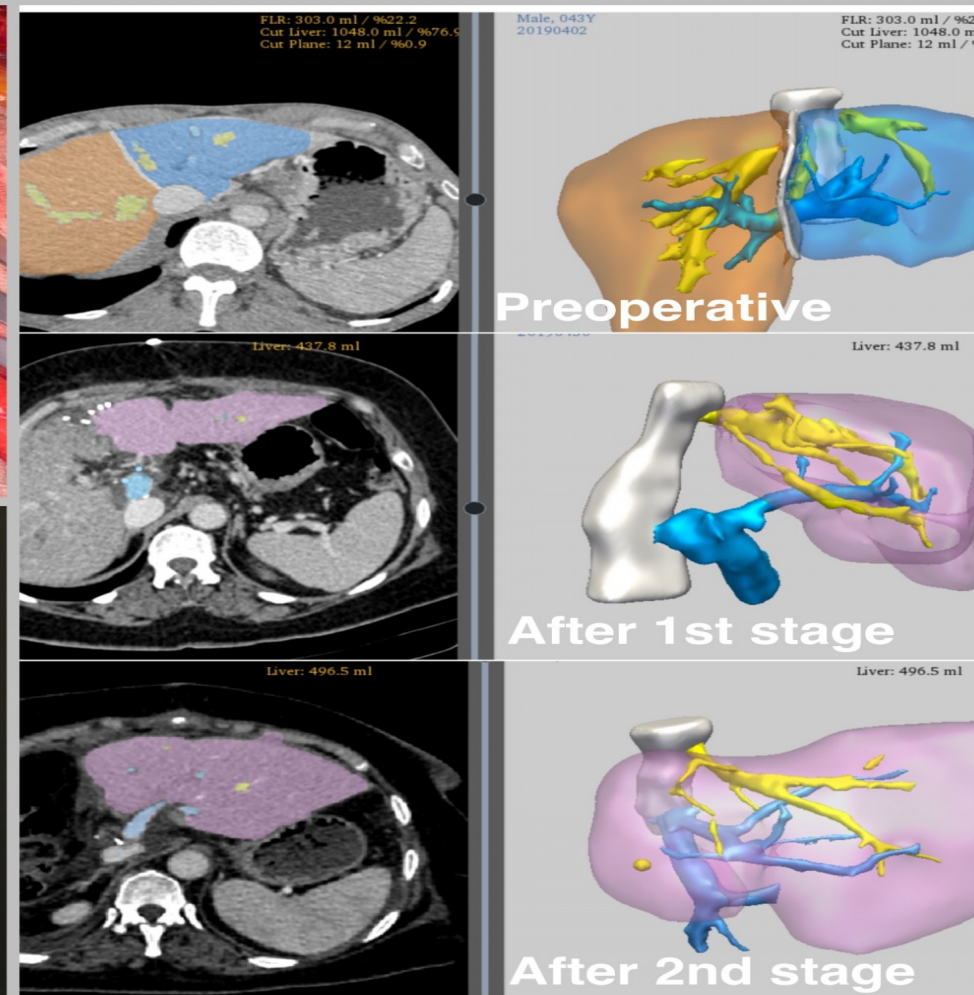
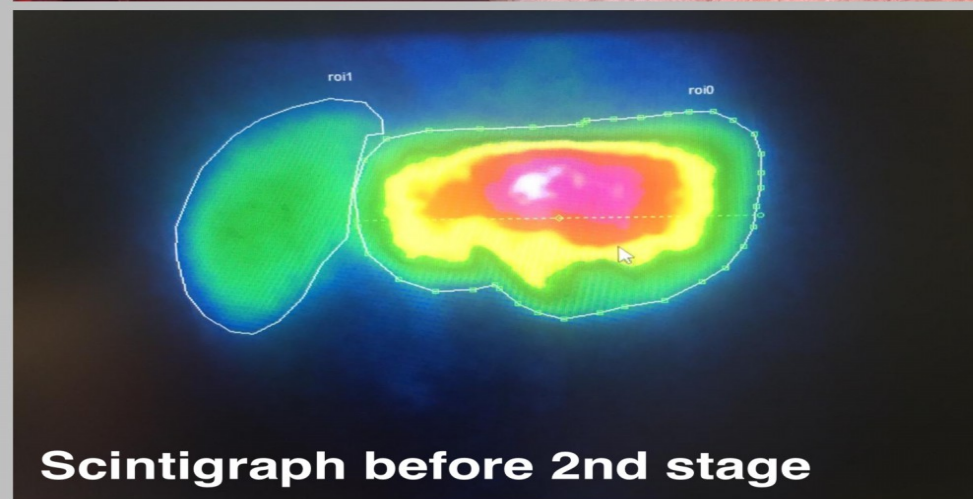
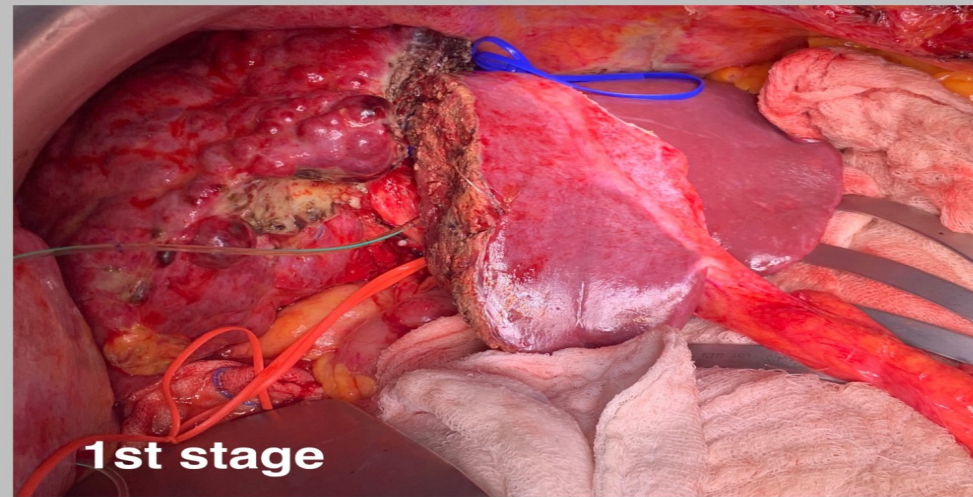
AASLD
AMERICAN ASSOCIATION FOR
THE STUDY OF LIVER DISEASES

Letters from the Frontline

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. ... [See all authors](#)

First published: 31 July 2020 | <https://doi.org/10.1002/lt.25855>



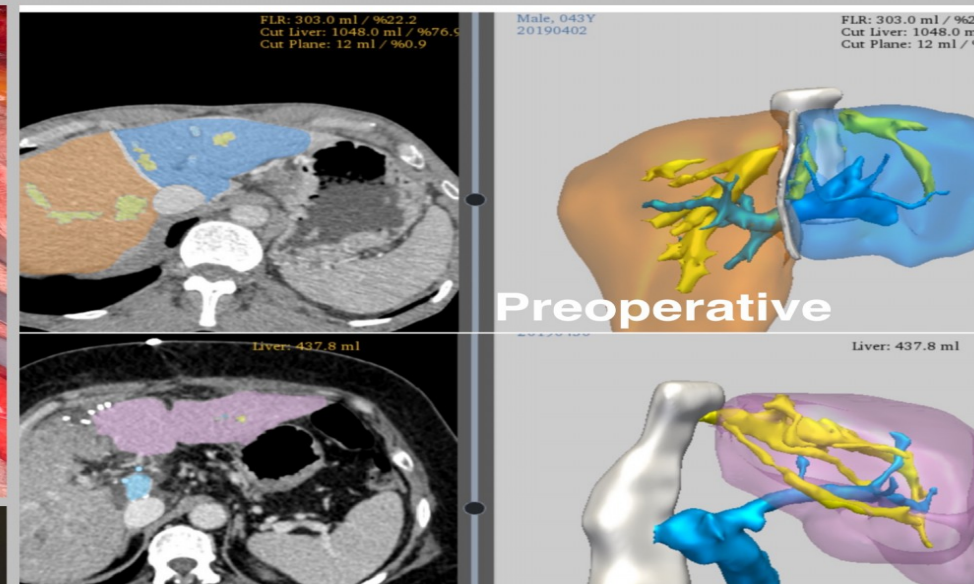
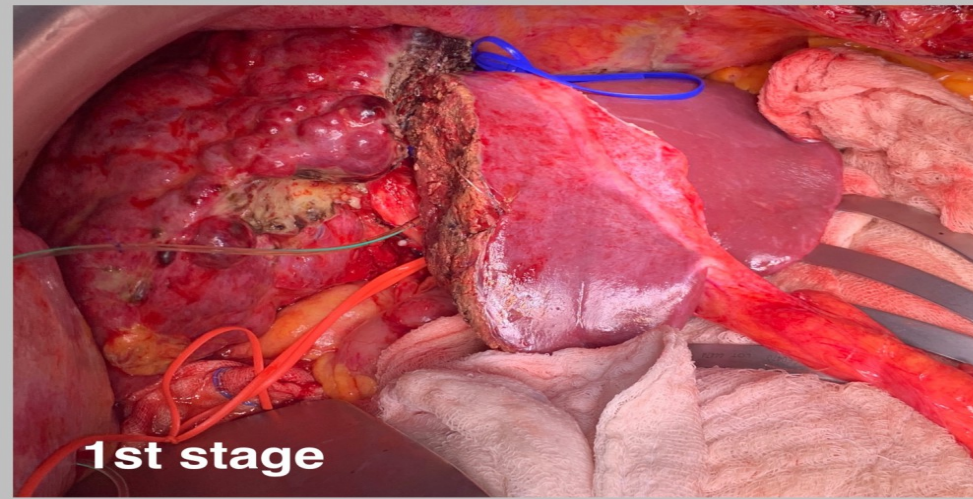
Left Lobe Living Donor Liver Transplantation using Rapid Procedure in a Cirrhotic Patient with Portal Vein Thrombosis

Balci, Deniz Prof^{*}; Kirimker, Elvan Onur MD^{*}; Kologlu, Meltem Bingol Prof[†]; Ustuner, Evren Prof[‡]; Erkoc, Suheyly Karadag MD[§]; Cinar, Gule MD[¶]; Yilmaz, Ali Abbas Prof[§]; Kucuk, Ozlem Prof^{||}; Azap, Alpay Prof[¶];

Picture at March 2022

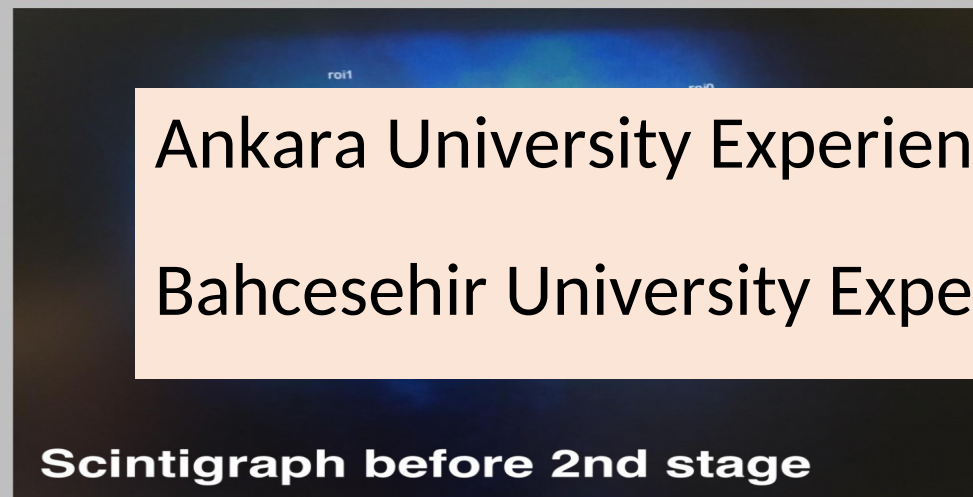
March 2024:
5th year follow up complete
NO recurrence, normal AFP





Ankara University Experience 5 cases 2019-2021

Bahcesehir University Experience 5 cases 2022-..



**ANNALS
OF
SURGERY**

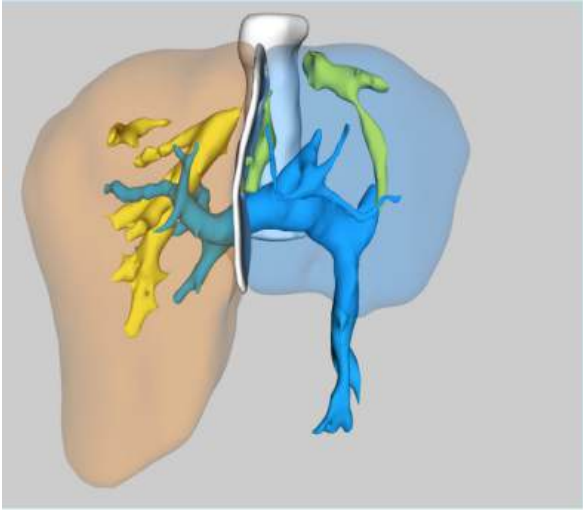
Articles & Issues ▼ COVID-19

Annals of Surgery: July 29, 2021 - Volume - Issue -
doi: 10.1097/SLA.00000000000005107

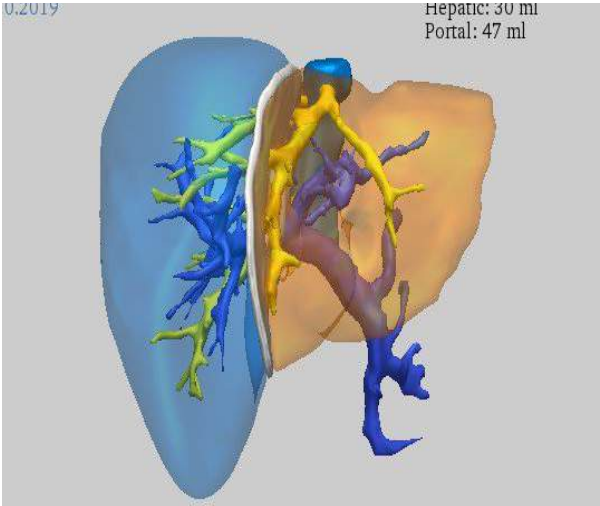
Left Lobe Living Donor Liver Transplantation using Rapid Procedure in a Cirrhotic Patient with Portal Vein Thrombosis

Balci, Deniz Prof^{*}; Kirimker, Elvan Onur MD^{*}; Kologlu, Meltem Bingol Prof[†]; Ustuner, Evren Prof[‡]; Erkoc, Suheyra Karadag MD[§]; Cinar, Gule MD[¶]; Yilmaz, Ali Abbas Prof[§]; Kucuk, Ozlem Prof^{||}; Azap, Alpay Prof[¶];

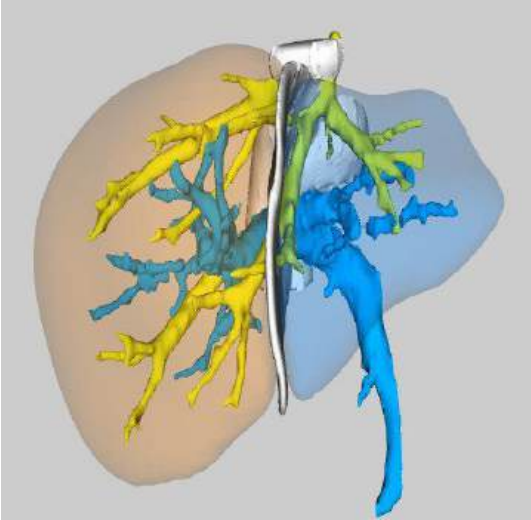
Patient1 GRWR: 0.36



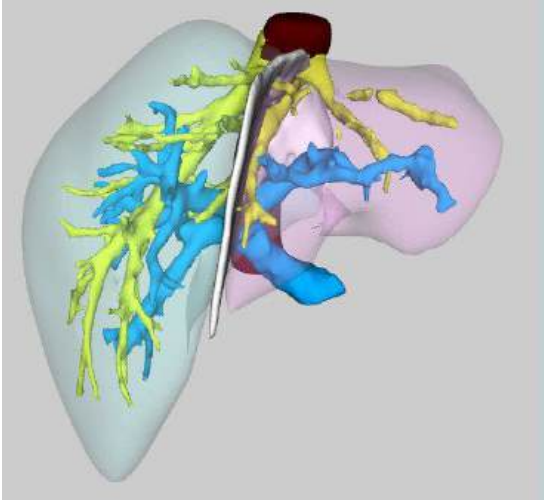
Patient2 GRWR: 0.45



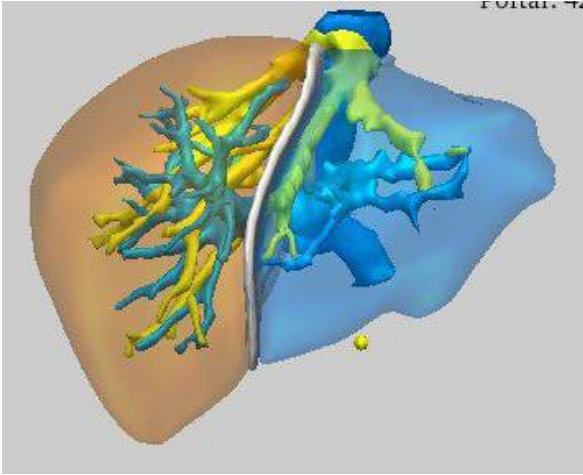
Patient3 GRWR: 0.51



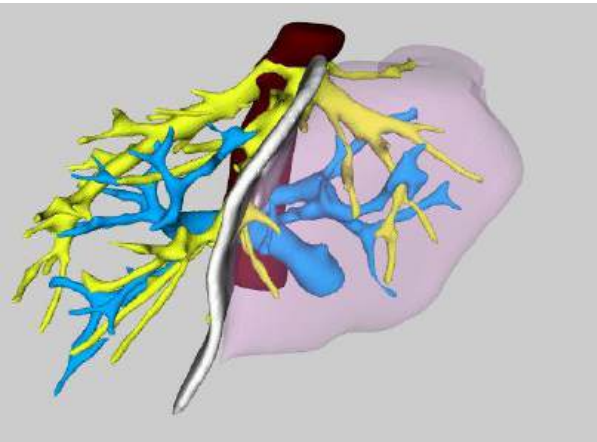
Patient4 GRWR: 0.45



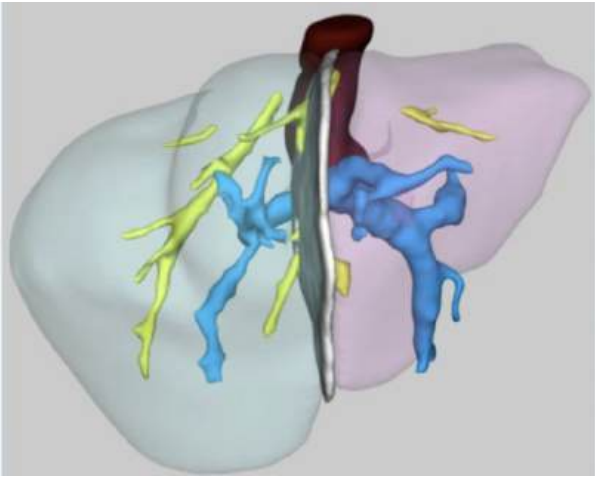
Patient5 GRWR: 0.43



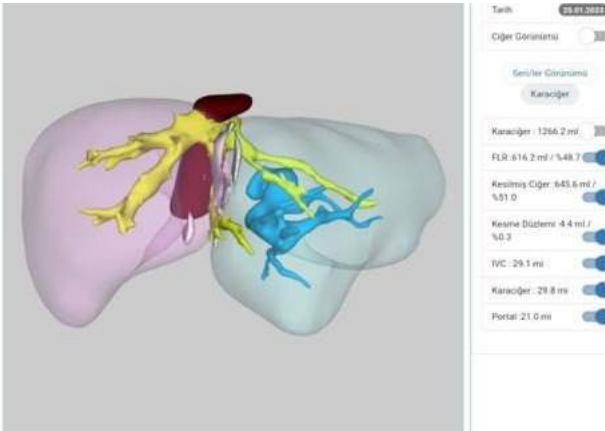
Patient6 GRWR 0.40



Patient7 GRWR: 0.47

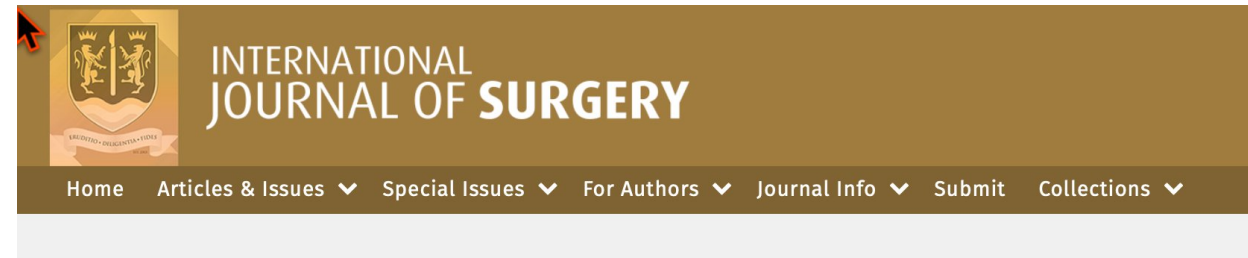


Patient8 GRWR 0.41



Rapid Procedure in Cirrhotic Setting

- Technically challenging, require both LDLT and advanced HPB experience
- Rapid Procedure can be implemented across all cirrhotic liver disease scenarios with various degrees of portal hypertension
- Beginning of a new era ! ??



INVITED SPECIAL PAPER

International consensus recommendations for the RAPID procedure in liver transplantation The RAPID Consensus ISLS 2023 Zurich Collaborative*

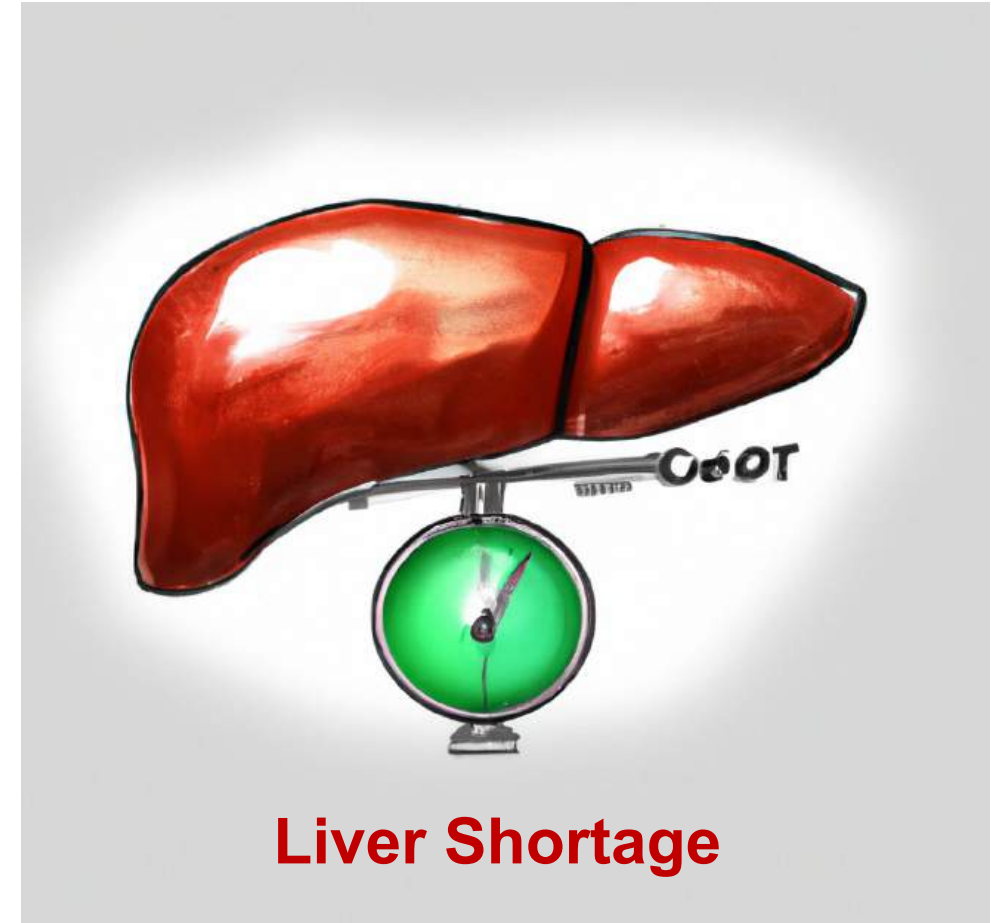
[Author Information](#)

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1. Why RAPID?

- **Organ Shortage:** One of the biggest challenges in transplantation.
- **Historical Context:** RAPID emerged in a unique environment:
 - **Oslo, Norway:** A place with surplus organs.
 - **Pioneering liver transplantation for colorectal liver metastases.**
- **Beyond “Standard Indications”:** No justification of RAPID out of traditional transplant indications. It is not a shortcut, a tool to cheat...
- **Solution to the Crisis?** RAPID might offer a way out of the organ shortage crisis.
- **Objective of Today:** Examining the RAPID approach in the **MOST NEUTRAL WAY.**
- **Danish Model of Consensus:** “Unbiased” recommendations



Rapid Procedure may change the way we do LT

- Decreases donor risk with donation of small volume Left Lobe-LLS
- Potentially increase donor pool in both DD and LDLT
- Timely transplantation as a curative option for primary and secondary malignancies

**Liver
Transplantation**

LETTERS TO THE EDITOR

Living Donor Liver Transplantation using the RAPID Technique in the Cirrhotic Setting with Portal Hypertension: A New Hope

Deniz Balci ✉

 **AASLD**
AMERICAN ASSOCIATION FOR
THE STUDY OF LIVER DISEASES

Rapid Procedure in Liver Transplantation

GRAFT VOLUME IS NOT IMPORTANT; GRWR becomes obsolete

SMALL FOR SIZE SYNDROME may BECOME HISTORY !!

ANATOMY IS NOT A LIMITATION IN MOST CASES

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HoursMinutesSeconds

This event will be online at metaverse. Technology Sponsor

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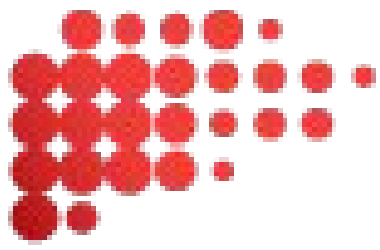
EMERGING TECHNIQUES IN PARTIAL LIVER TRANSPLANTATION AND LIVER TRANSPLANT ONCOLOGY



ISLS Study Groups

From 2021 to 2024





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ISLS 2025
TORONTO



The 6th ISLS Congress
of Advanced HBP Surgery

October 2025
Toronto, Canada

Congress President **G. Sapisochin**

**Detailed information on the venue and program will be
announced at a later time.*



The 6th ISLS Congress of Advanced HBP Surgery (ISLS 2025)

October, 2025
Toronto, Canada

Rahmat...

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