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Liver Resection in the Era of Locoregional Therapy: *A surgeon's Perspective*

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Division of Hepatobiliary and Pancreas Surgery

Disclosures

Boston Scientific

Olympus

Verb J&J

Stryker

NO CONFLICTS WITH THIS PRESENTATION

LIMITS TO RESECTABILITY OF LIVER METASTASES: The New

1- **Related to metastases :**
   - Number of tumors
   - Tumor Size…

2- **Oncological :** (*curative pattern of resection*)
   - Resection margin > 1cm
   - Extrahepatic site

3- **Technical :** Small-size remnant liver

4- **Biology:** Progression of disease while on Chemo

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Major Liver Resection

Adequate Liver Volume depends in underlying hepatic dysfunction

- 20% for normal liver
- 30-60% for chemo/steatosis/hepatitis
- 40-70% in cirrhosis

Ferrero et.al. World J Surg 2007

Strategies to Secure Future Remnant Liver

Remnant liver < 30 %

↓

TUMOR REDUCTION

Neo adjuvant chemotherapy

↓

- Resection combined with ablation
- Staged hepatectomy
- ALPPS
- Portal Vein embolization
- Intra arterial Y-90
- Liver Venous Deprivation

REVIEW ARTICLE

WILEY AGSurg Annals of Gastroenterological Surgery Open Access

Ann Gastroenterol Surg. 2019;3:50–56.

Multidisciplinary approach of liver metastases from colorectal cancer

René Adam[1] | Yuki Kitano[1,2]

International registry 25000 patients

326 centers in 71 countries

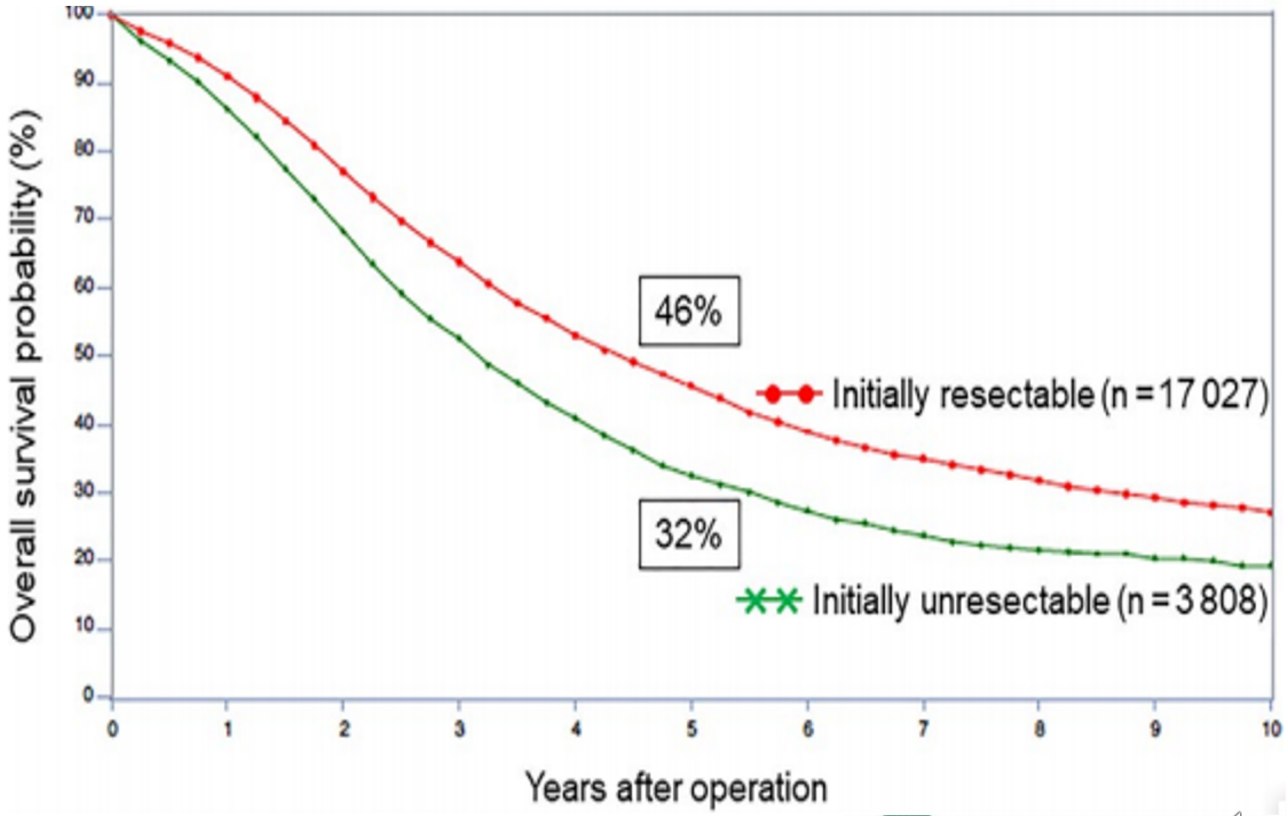

FIGURE 1 Overall survival probability after hepatic resection of initially resectable vs unresectable colorectal cancer liver metastases

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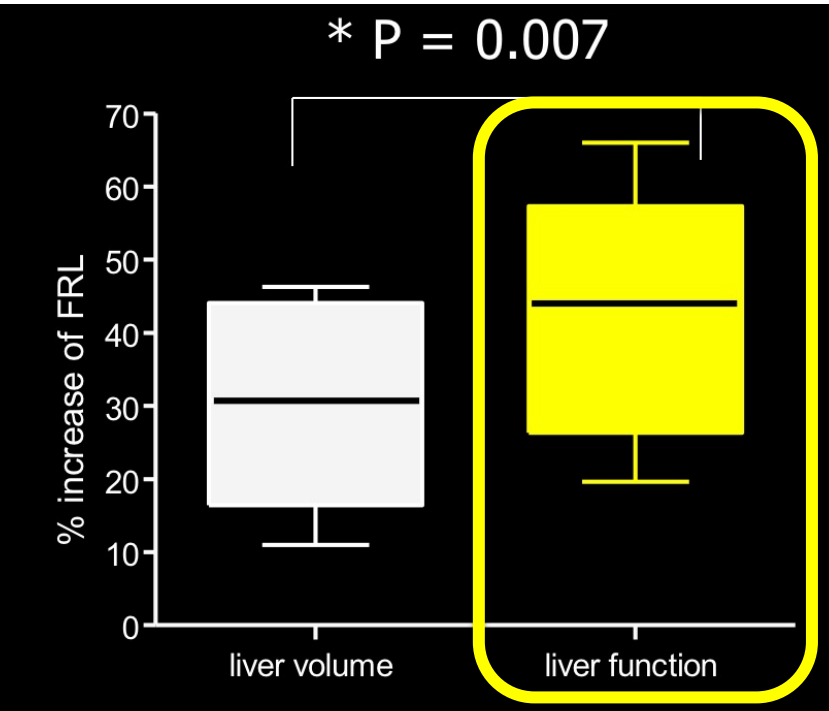
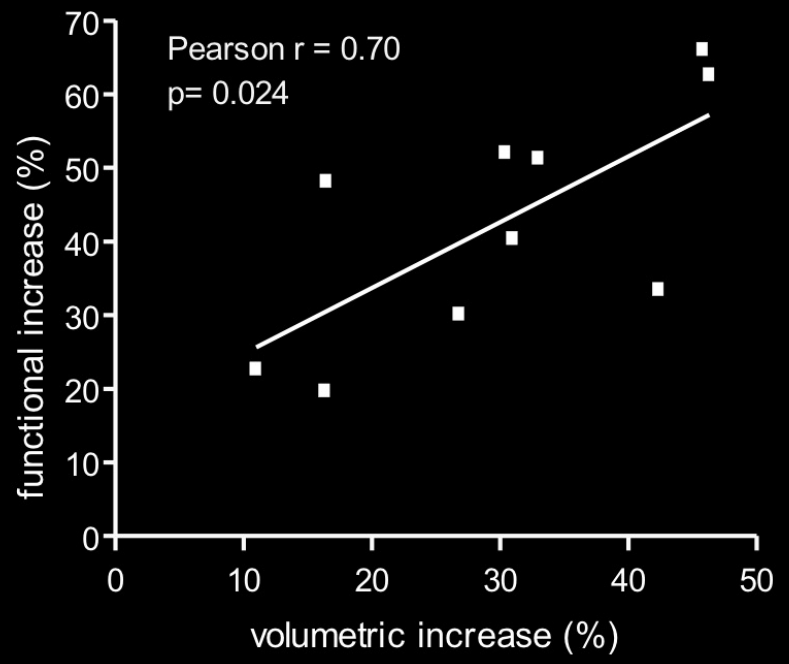
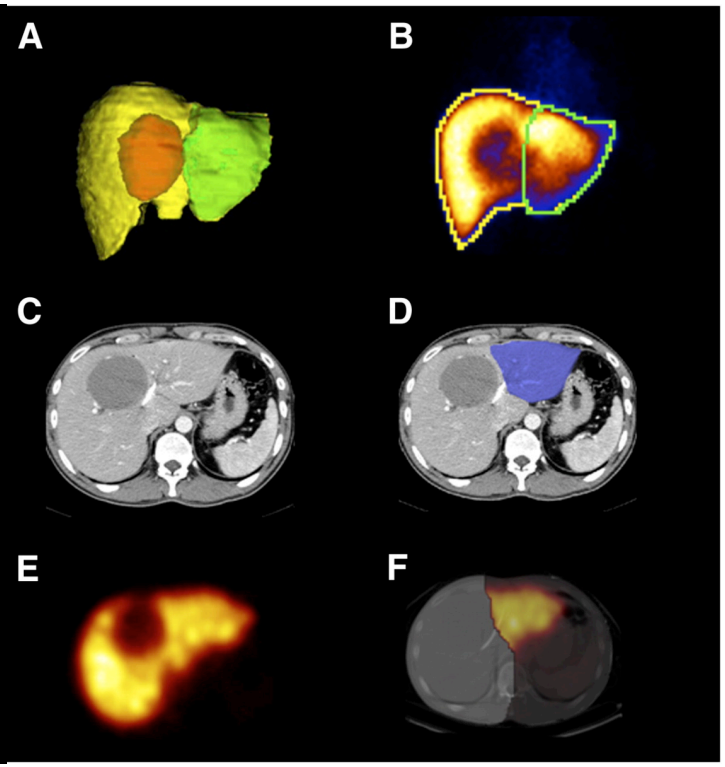
PVE

Increase of liver function > liver volume (CT) after PVE (^{99m}Tc-mebrofenin uptake)







After PVE gain in function > volume

de Graaf , EHPBA 2007

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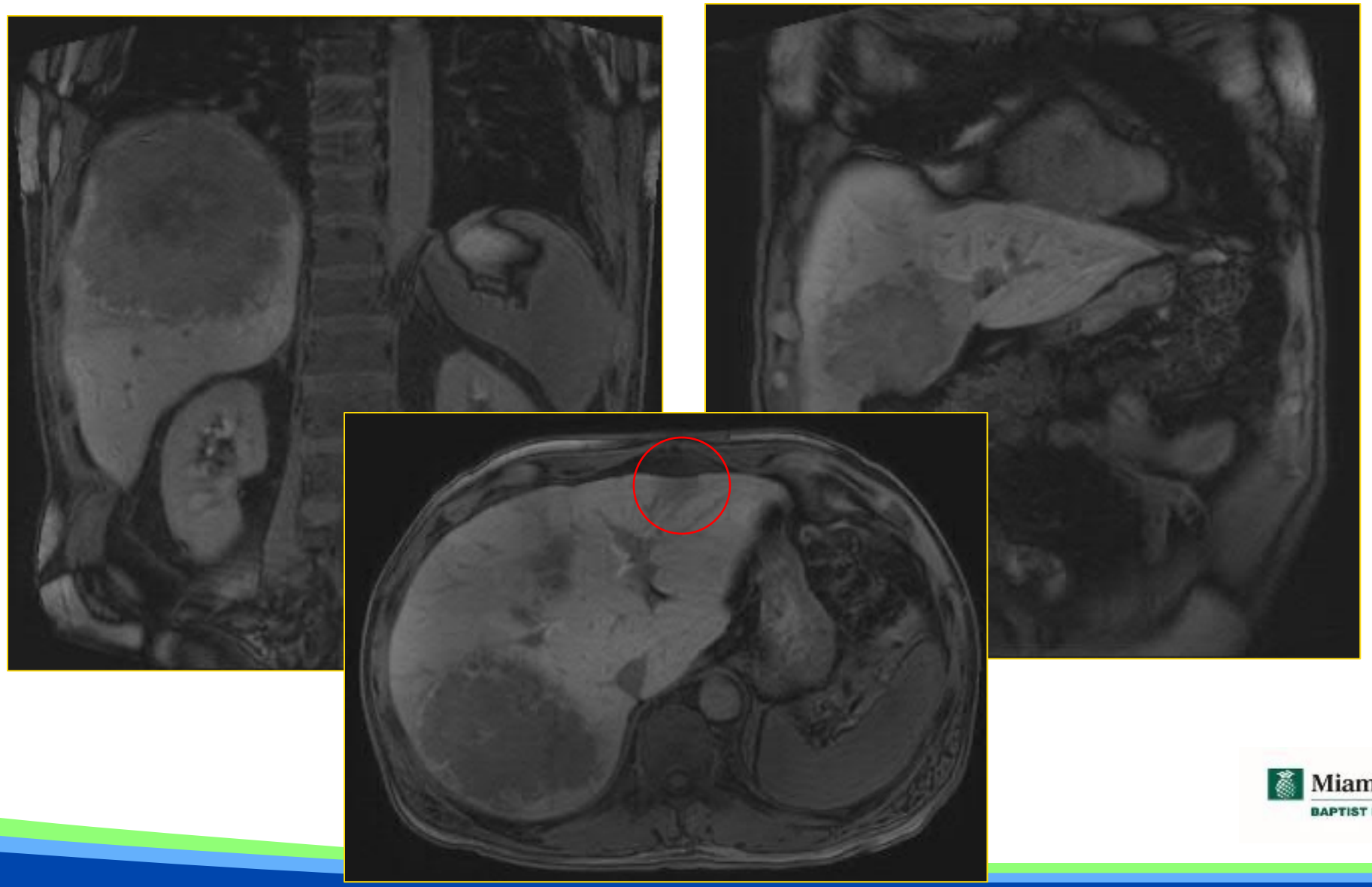
Can PVE outcome be improved?

- ALPPS
- PVE-Y90
- Liver venous deprivation: *PVE* & *HVE*

Liver Metastases

54 yo with newly diagnosed colon cancer and liver metastases



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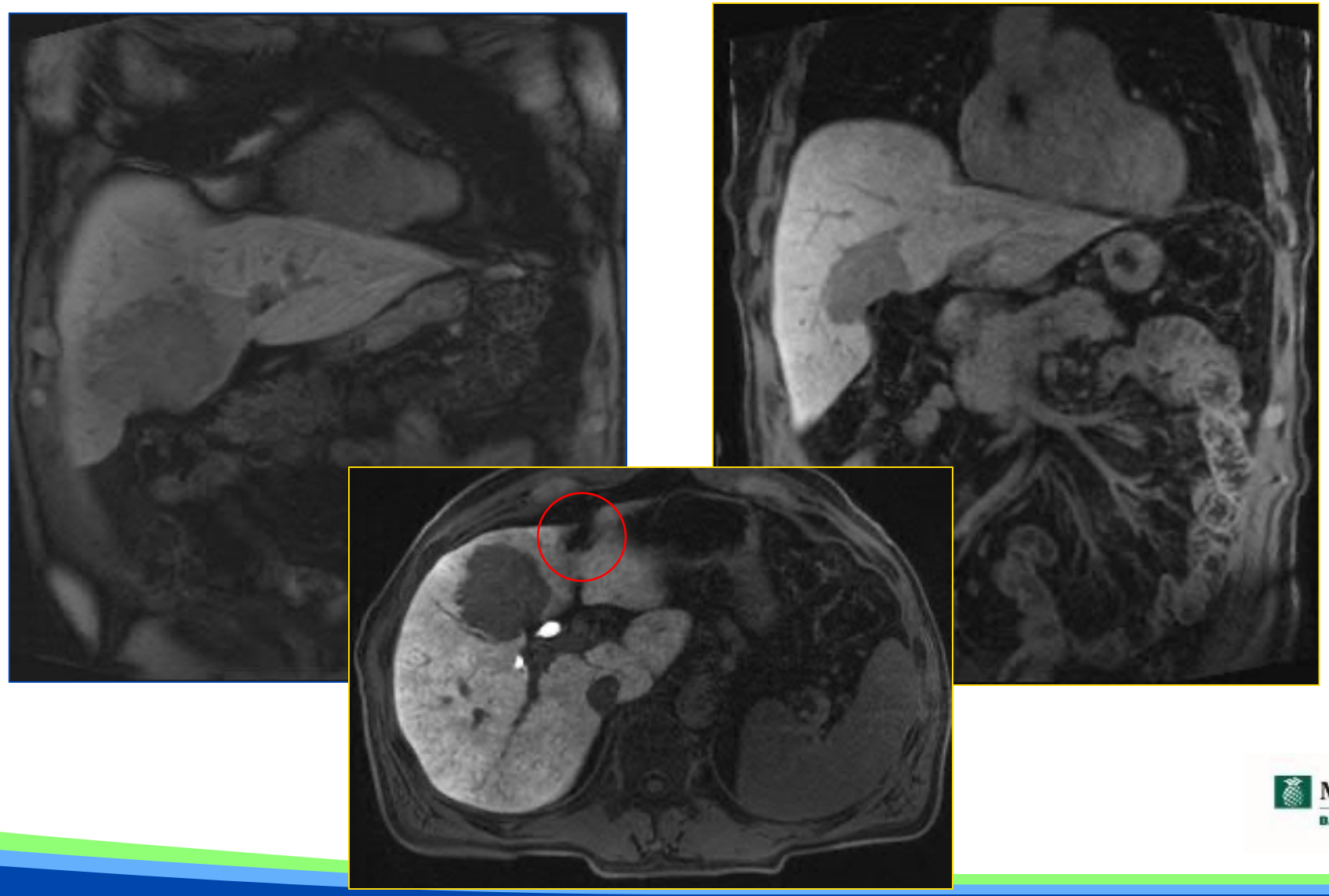

Liver Metastases

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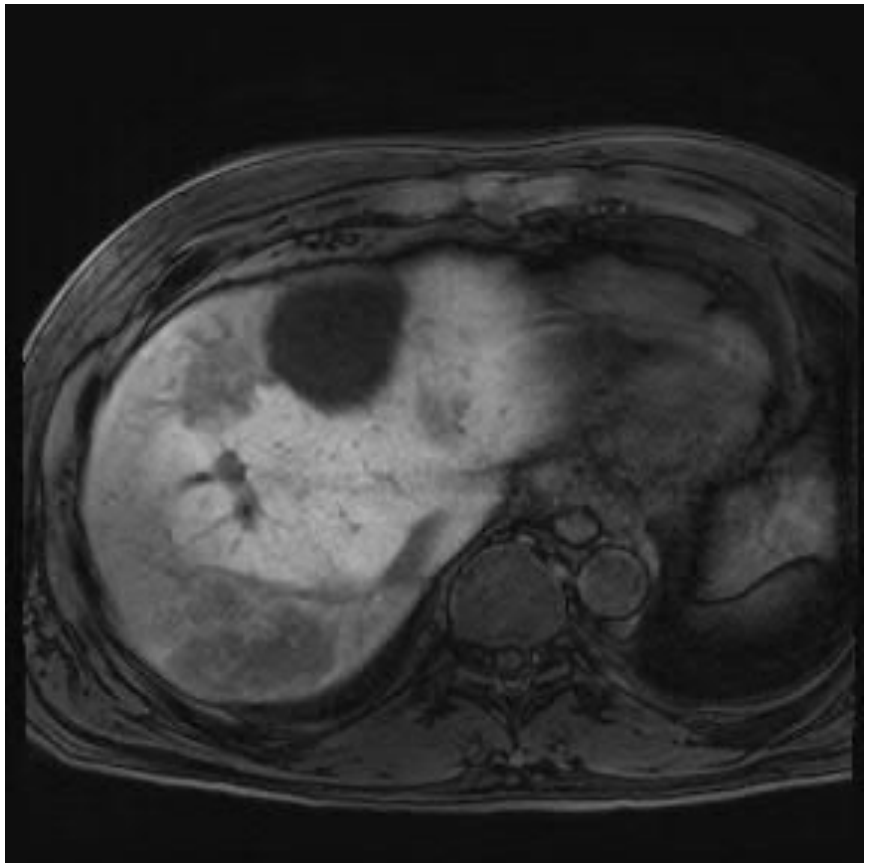
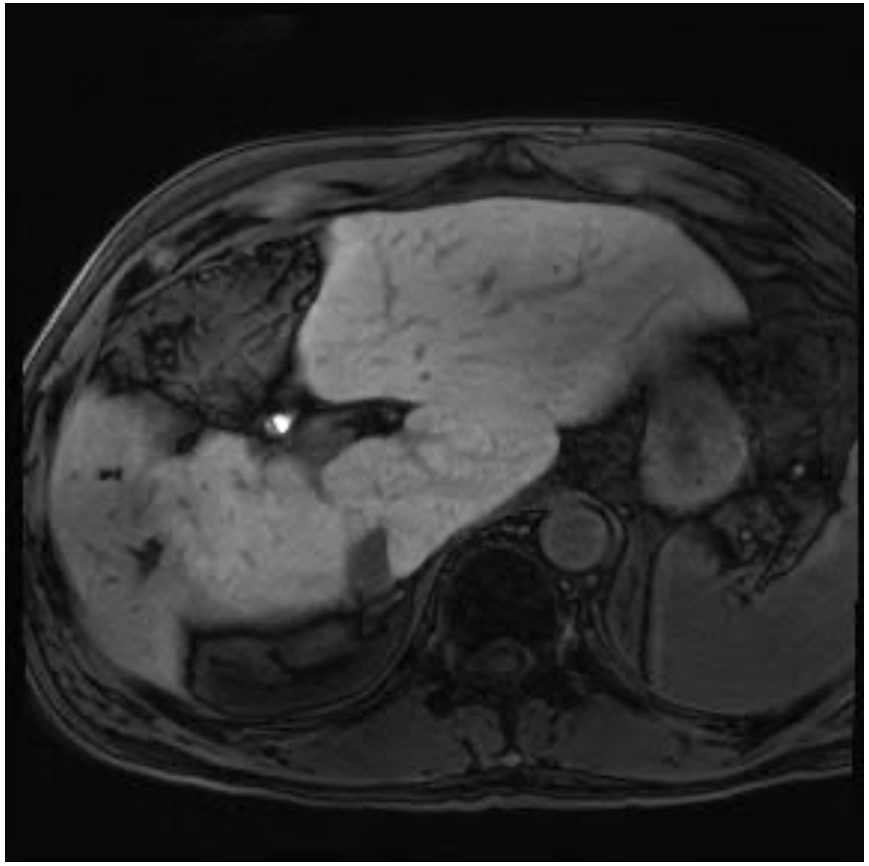




MAYO CLINIC

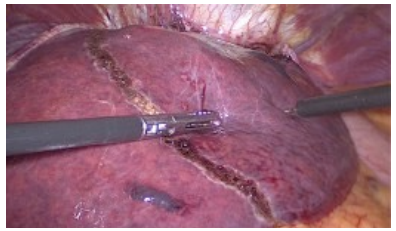
Laparoscopic ALPPS part I

Horacio J. Asbun, John A. Stauffer, Edwin Onkendi, Justin Burns, Kris Croome

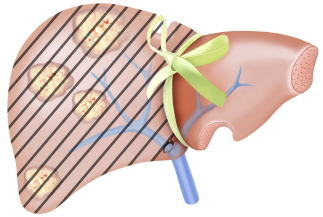
IHPBA 2016, Sao Paulo

Less Invasive ALPPS Variants

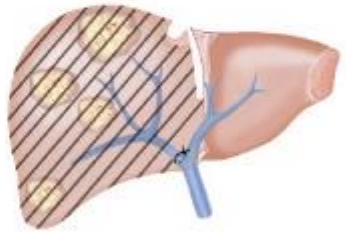
Laparoscopic ALPPS



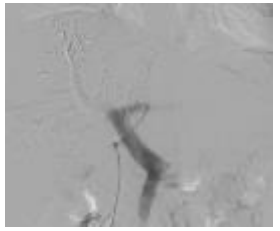
Tourniquet ALPPS



Partial ALPPS



PVE & Percutaneous ALPPS



Mini ALPPS

Slide Courtesy of N. Demartines (modified)

PVE & Y-90

- 48 yo F
- Synchronous left colon CA and bilobar CRLM

- 48 yo F
- Synchronous left colon CA and bilobar CRLM

FOLFOX

↘

Y90

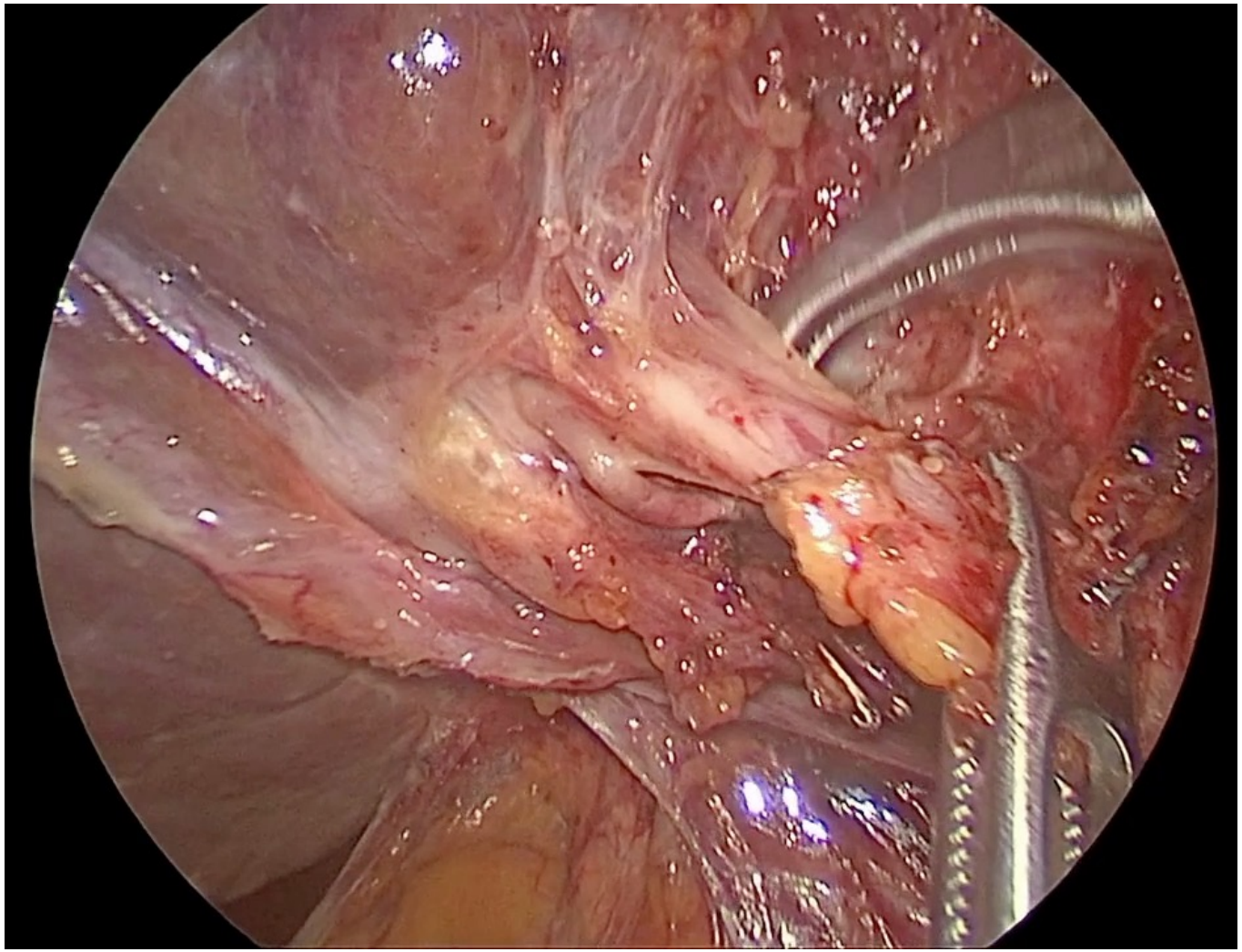
↘

PVE

↘

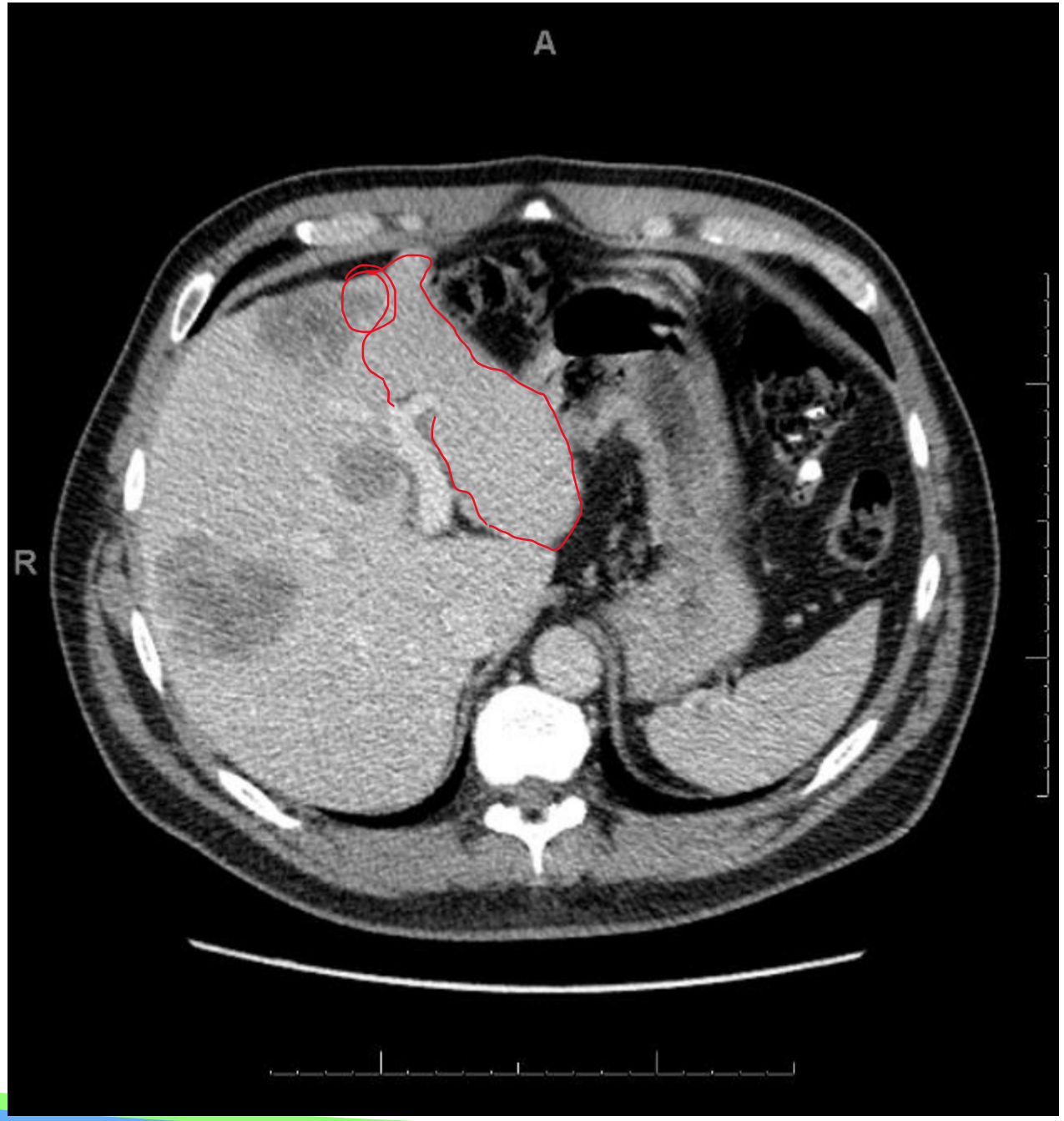
Liver first

Lap Extended Right hepatecrtomy



Y-90 & Liver Venous Deprivation (*PVE* & *HVE*)

- 55 yo CLM



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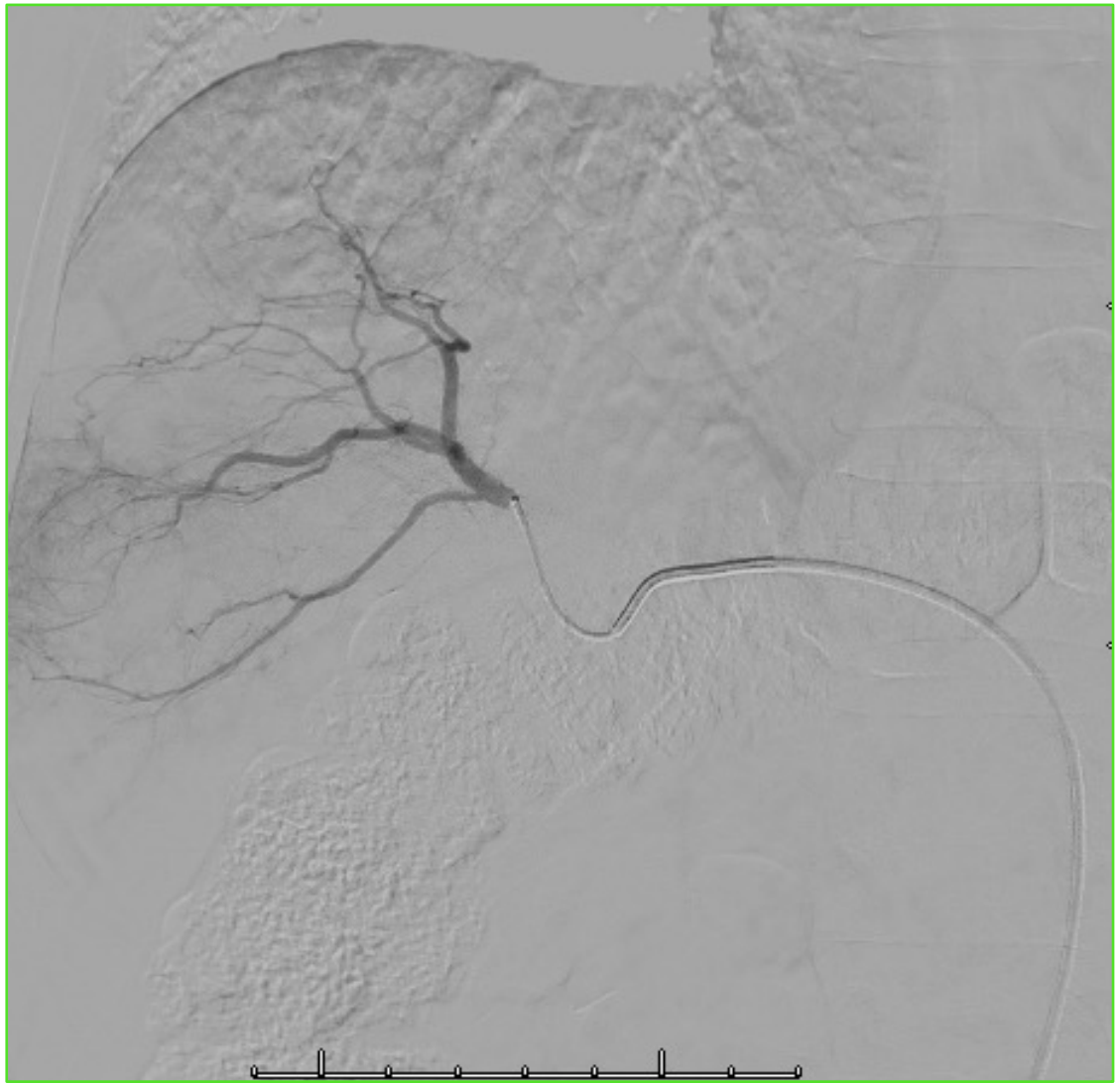
Y-90 R Lobe



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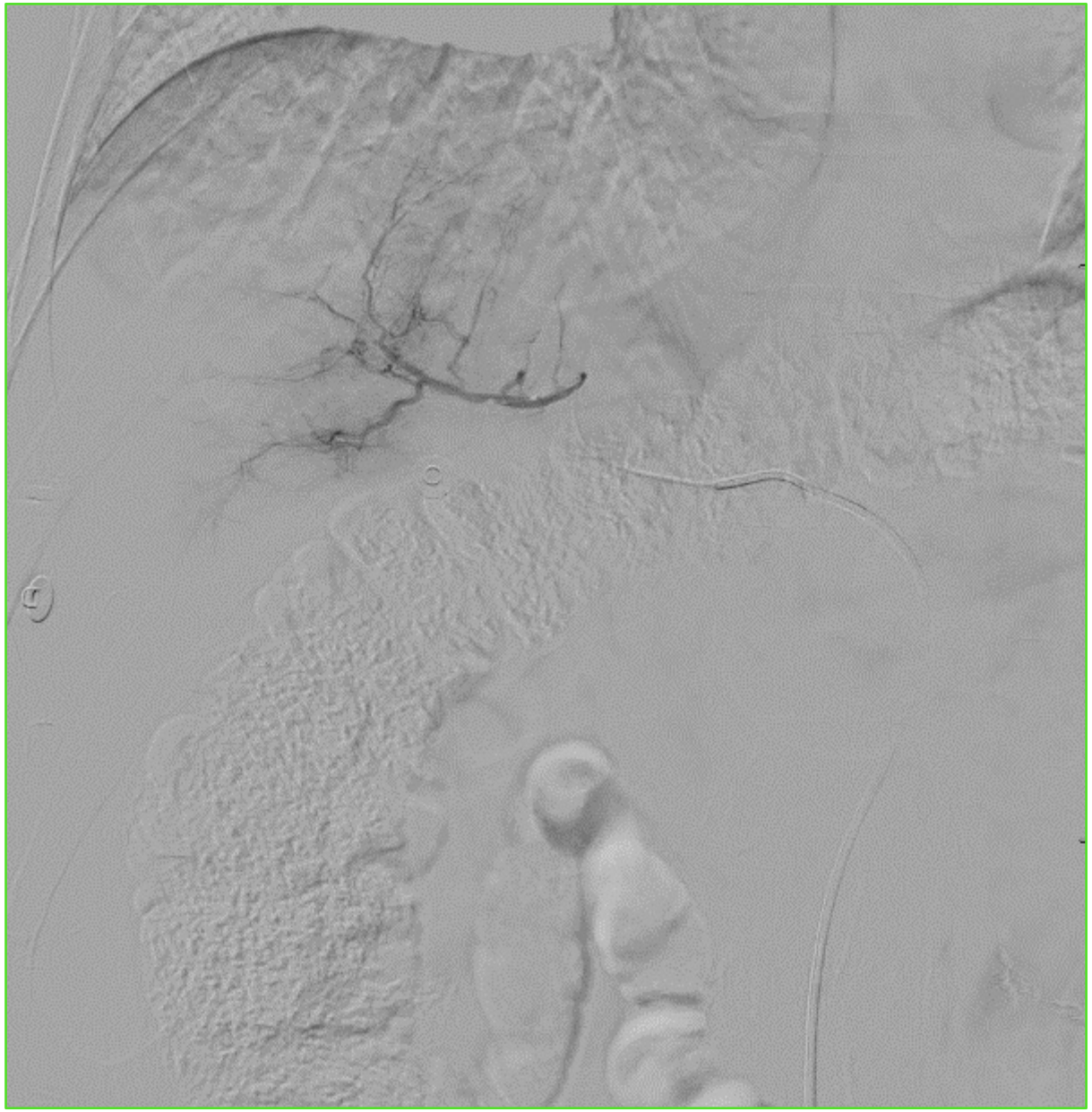
Y-90 Seg IV



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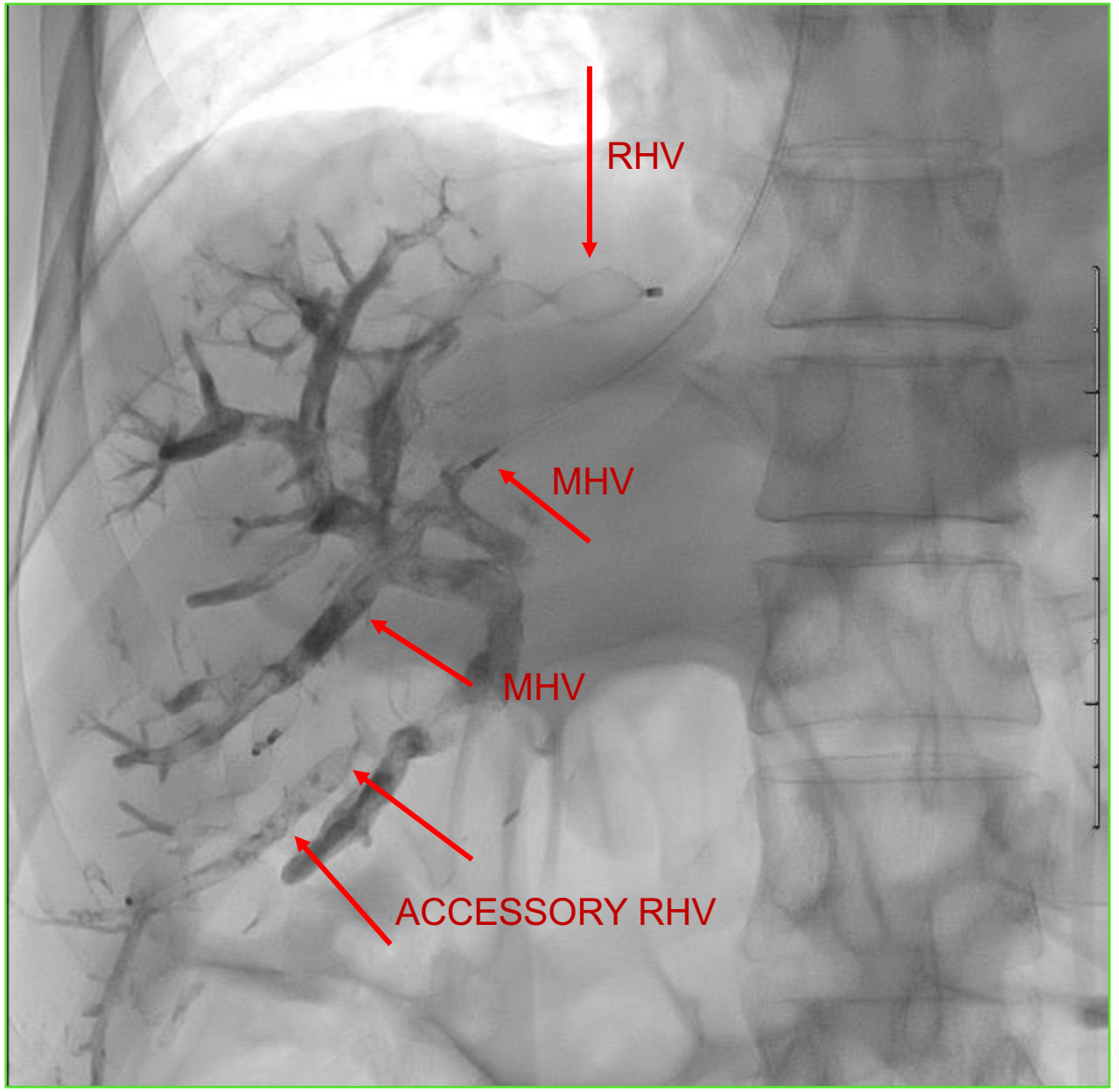
LVD

HVE: Placement of Amplatzer plugs



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Post Y-90,
PVE & HVE

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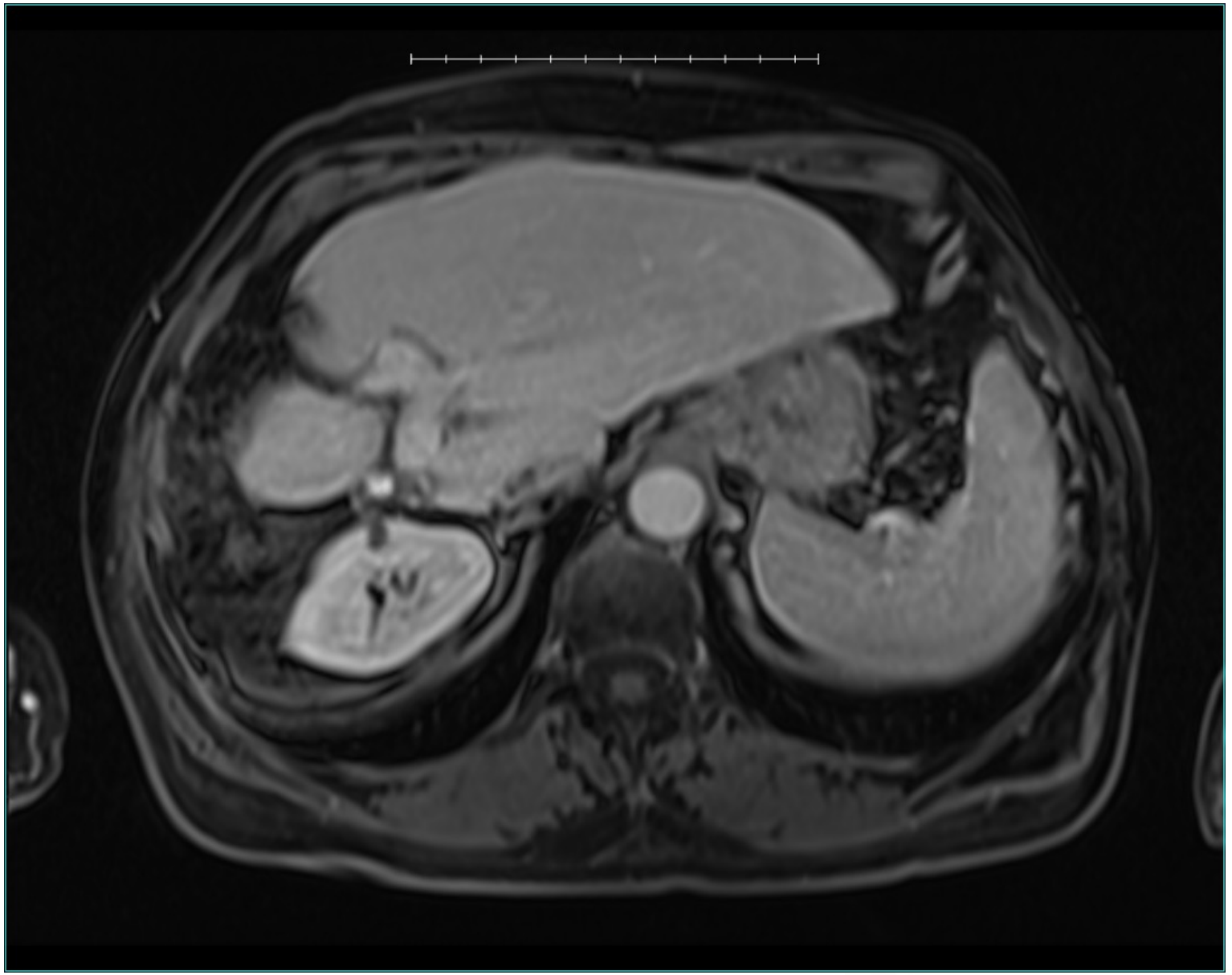
3 months Post extended RH



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Liver Venous Deprivation
Increased liver function & liver volume

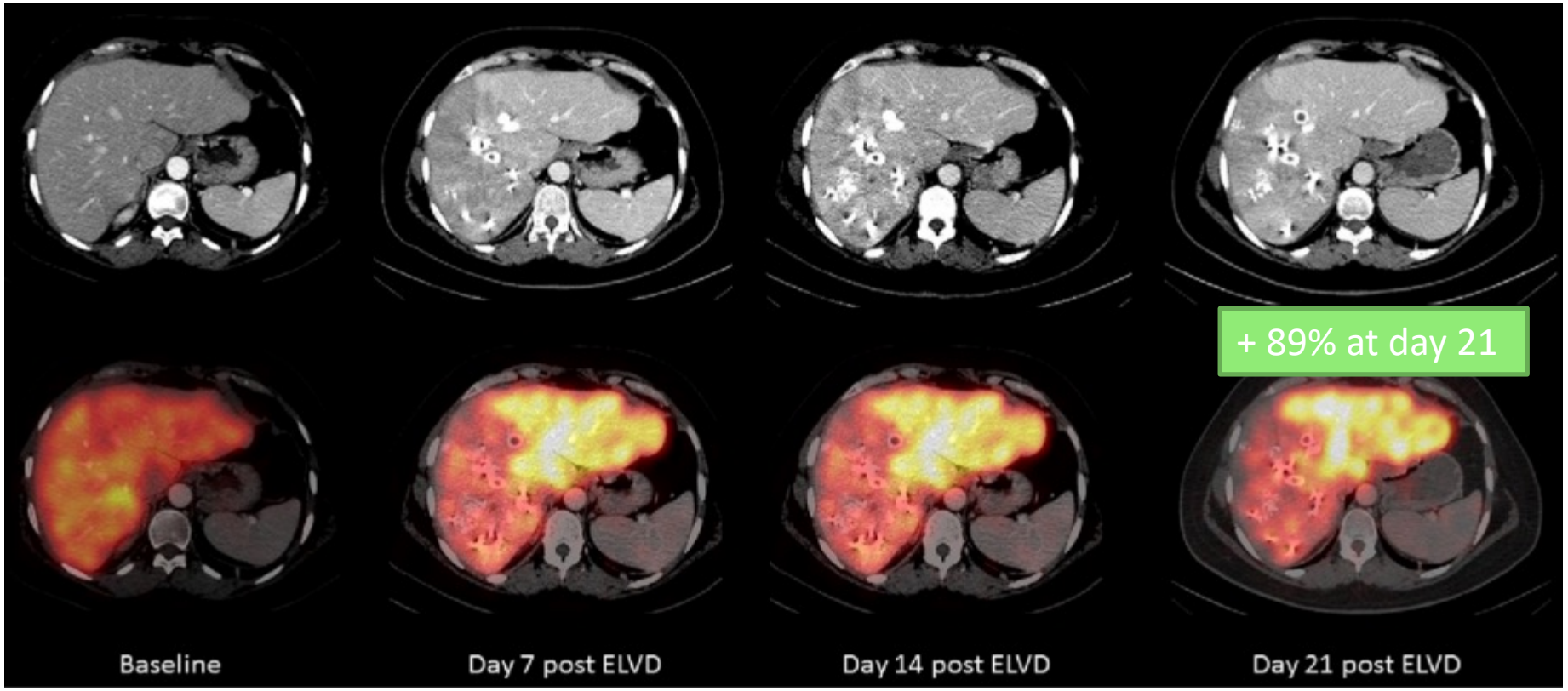
Candidate to resection FRL <25% or FRL function <2.69%/min/m2
Mebubronin scintigraphy (VanGulik criteria)

PVE + Right AND middle hepatic vein simultaneous embolization

Results:

FRL function increased	**+ 64% (range 28-107%) at day 21**
FRL volume increased	**+ 53% at 7 days (25+/-8 days a week)**

Guiu Eur Radiol 2017



Sex	Age	Diagnosis	Baseline FLR function (%/min/m^2)	Baseline FLR volume (ml)	Day 21 FLR function (%/min/m^2, % *increase*)	Day 21 FLR volume (ml, % *increase*)	Treatment	Resection (R0/R1/R2)
M	52	CRC liver mets	1.74	421	2.82 *(+62.3%)*	670 *(+59.1%)*	S4-8	R0
M	52	CRC mets	2.48	320	3.84 *(+54.7%)*	581 *(+81.6%)*	S4-8	R0
F	68	Klatskin (IIIA)	1.59	421	3.31 *(+107.5%)*	606 *(+43.9%)*	S1, 4-8 and PVA and BDR/HJ	R0
M	61	CRC mets	1.54	266	2.84 *(+84.7%)*	446 *(+67.7%)*	S4-8	R0
F	60	Breast, liver mets	2.09	327	3.28 *(+56.8%)*	526 *(+60.9%)*	S1, 4-8	R0
F	69	Gallbladder carcinoma	1.26	302	1.86 *(+47.9%)*	438 *(+45%)*	Not resected	Not resected
M	71	CRC mets	1.9	241	2.99 *(+55.8%)*	520 *(+115.8%)*	S5-8	R0
M	64	CRC mets	2.08	314	2.69 *(+28.1%)*	437 *(+39.2%)*	S4-8	R0
F	53	CRC mets	2.15	332	3.66 *(+70.6%)*	484 *(+45.8%)*	S4-8	R0
F	46	CRC mets	1.64	371	2.86 *(+74.9%)*	645 *(+73.9%)*	S4-8	R0

Slide Courtesy of N. Demartines

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Guiu Eur Radiol 2017

Liver Venous Deprivation Vs PVE

Contents lists available at ScienceDirect

Surgery

journal homepage: www.elsevier.com/locate/surg

Liver venous deprivation compared to portal vein embolization to induce hypertrophy of the future liver remnant before major hepatectomy: A single center experience

Kosuke Kobayashi, MD[a], Takamune Yamaguchi, MD[a], Alban Denys, MD[b], Lindsay Perron, MD[b], Nermin Halkic, MD[a], Nicolas Demartines, MD[a,*], Emmanuel Melloul, MD[a]

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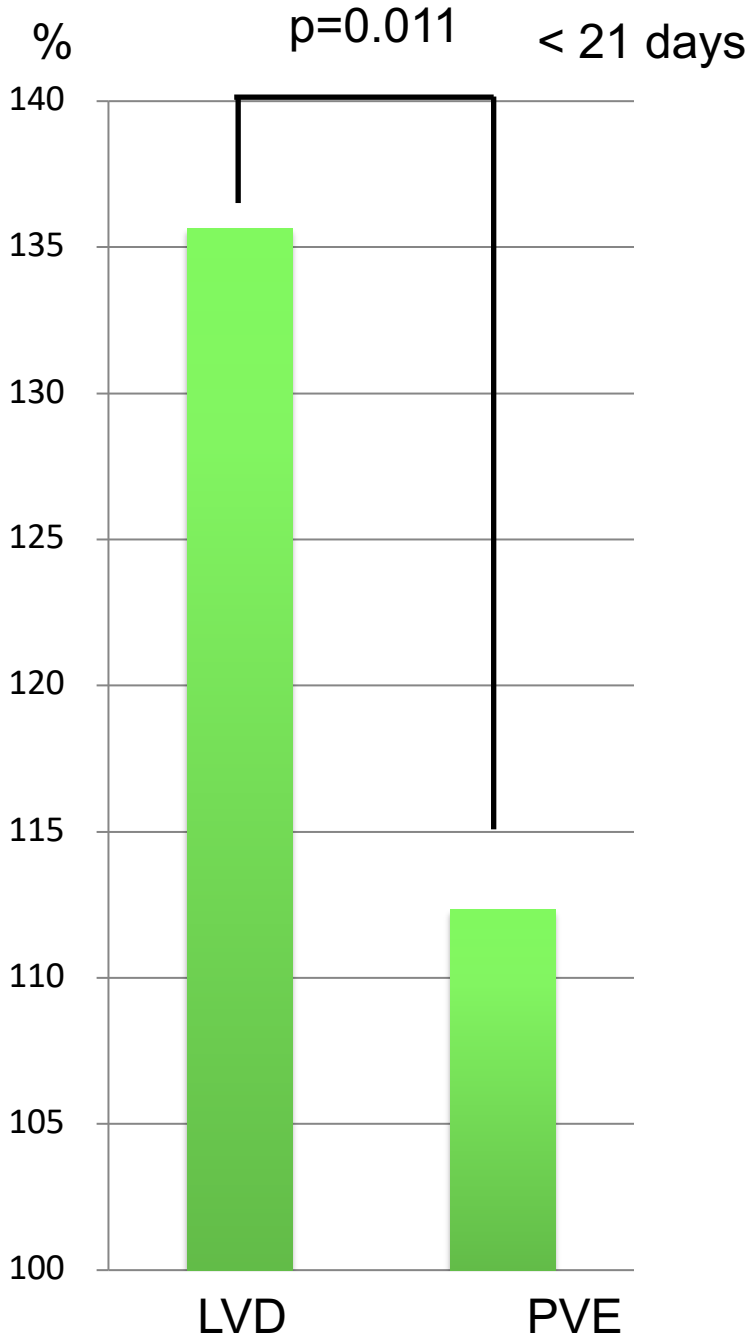
Kobayashi, Surgery 2020

Liver Venous Deprivation Vs PVE Volumes

	LVD (n=20)	PVE (n=30)	p value
TL	1859 ml	1620 ml	0.045
FRL volume +	195 ml	109 ml	0.002

Kobayashi, Surgery 2020



Kobayashi, Surgery 2020

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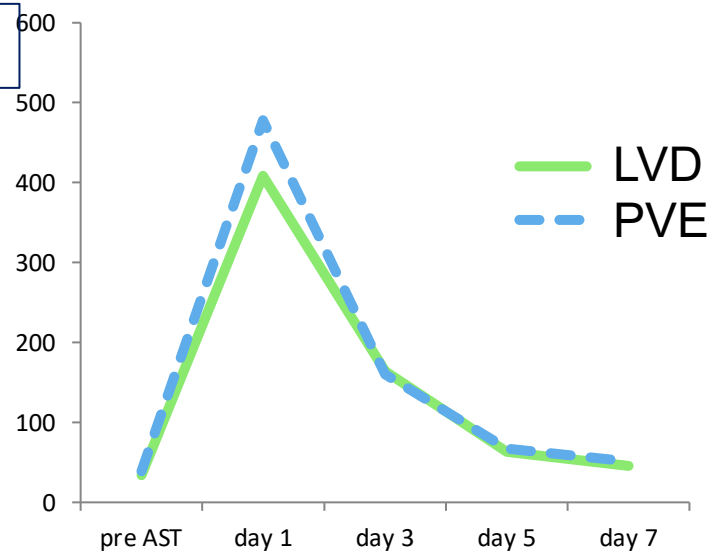
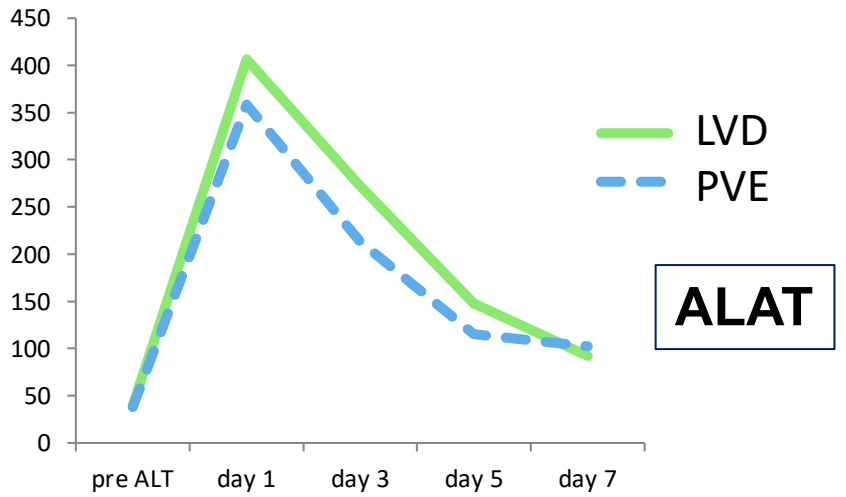
Liver function after Hepatectomy (in LVD and PVE)

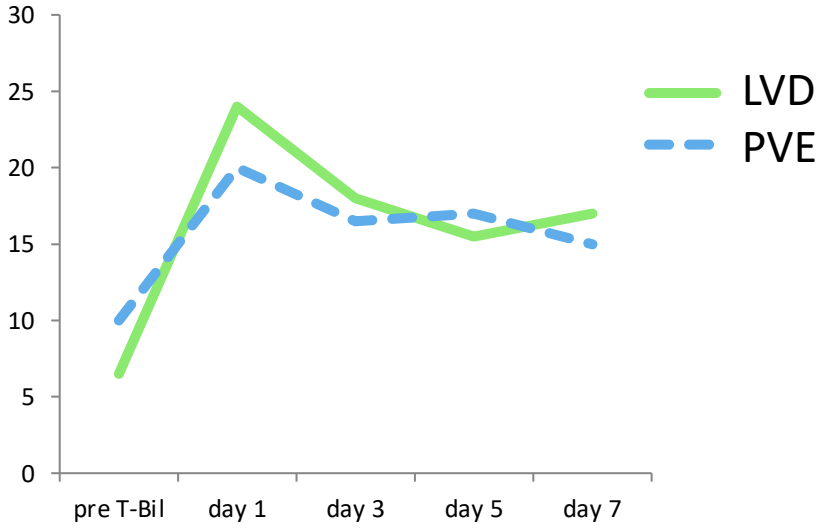
ASAT

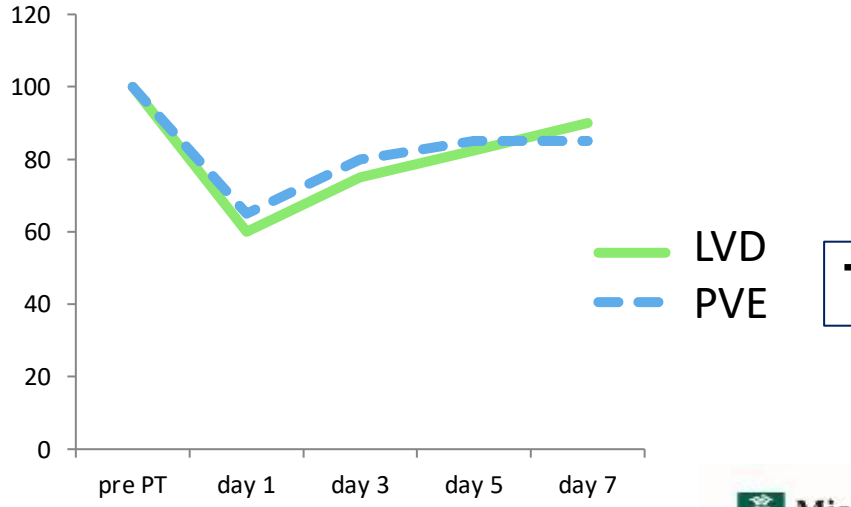




ALAT

Bili





TP

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Kobayashi, Surgery 2020

Take Home Message

- Tailor management to each patient
- Y-90 + LVD (*PVE & HVE*) appear to have at least a similar than ALPPS without the associated morbidity
- Multidisciplpinary team approach is a must
  - *The surgeon no longer makes the decision in isolation*