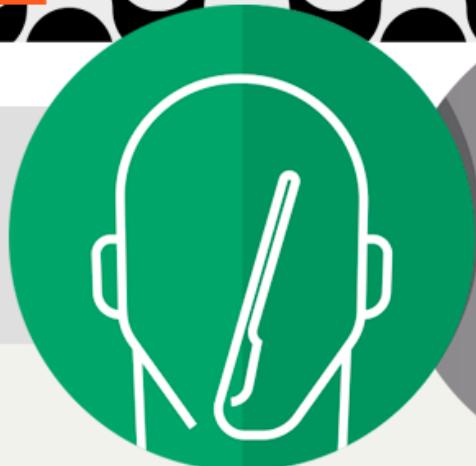


25 A 28  
OUT 2017  
RIO DE  
JANEIRO



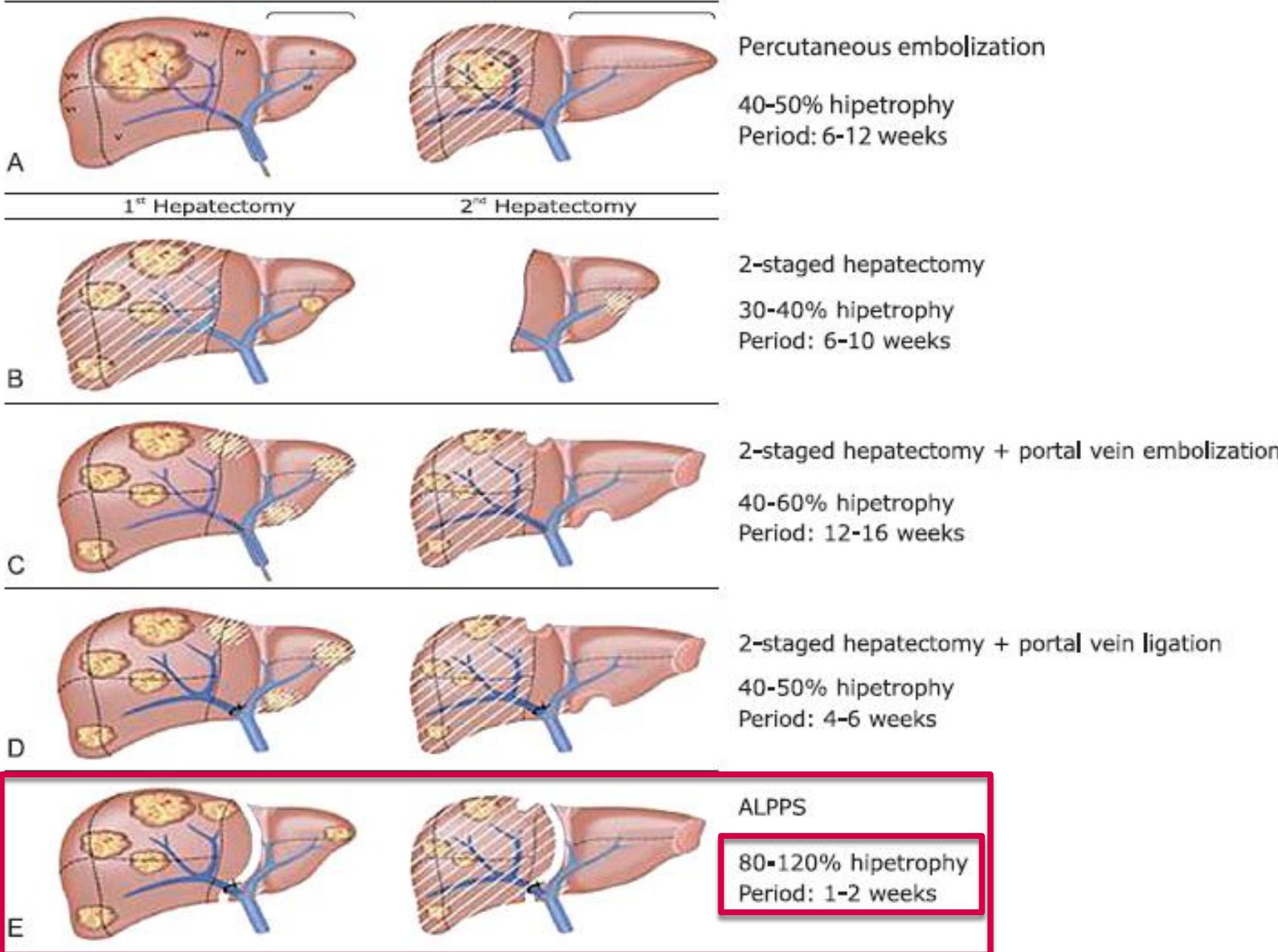
# ALPPS, p-ALPPS e Mini-ALPPS: como e para quem

**Orlando Jorge M. Torres**

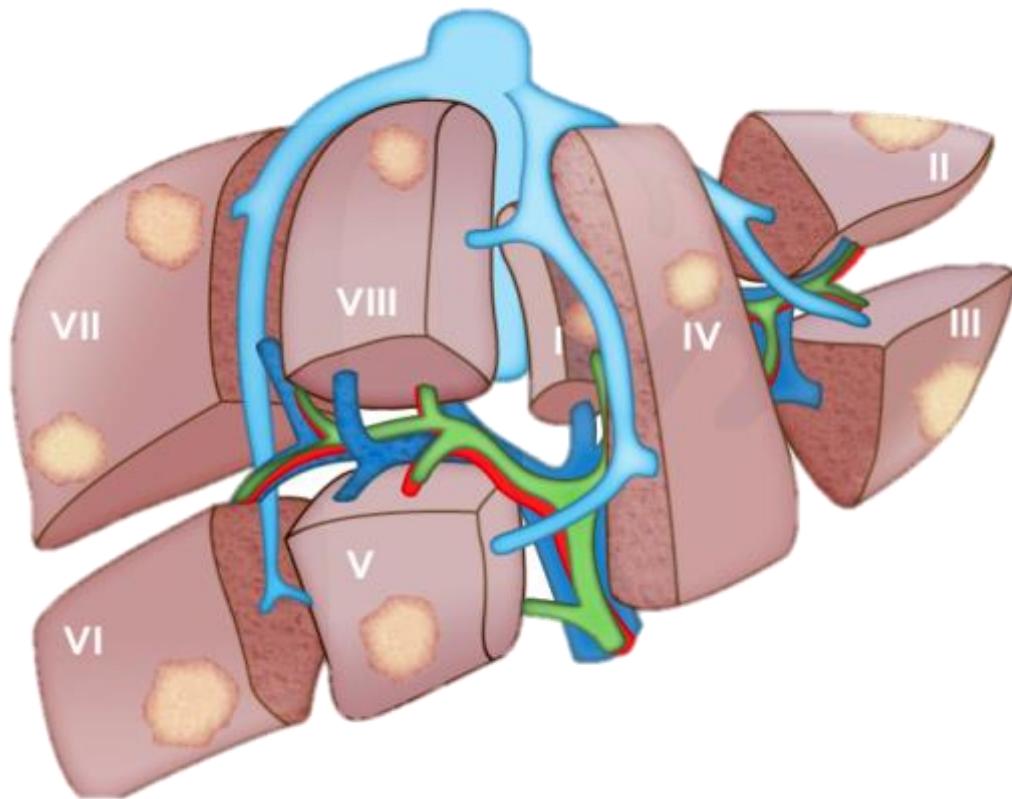
Professor Titular e Chefe do Serviço de  
Cirurgia do Aparelho Digestivo  
Universidade Federal do Maranhão - Brazil

Percutaneous portal vein embolization

Hepatectomy

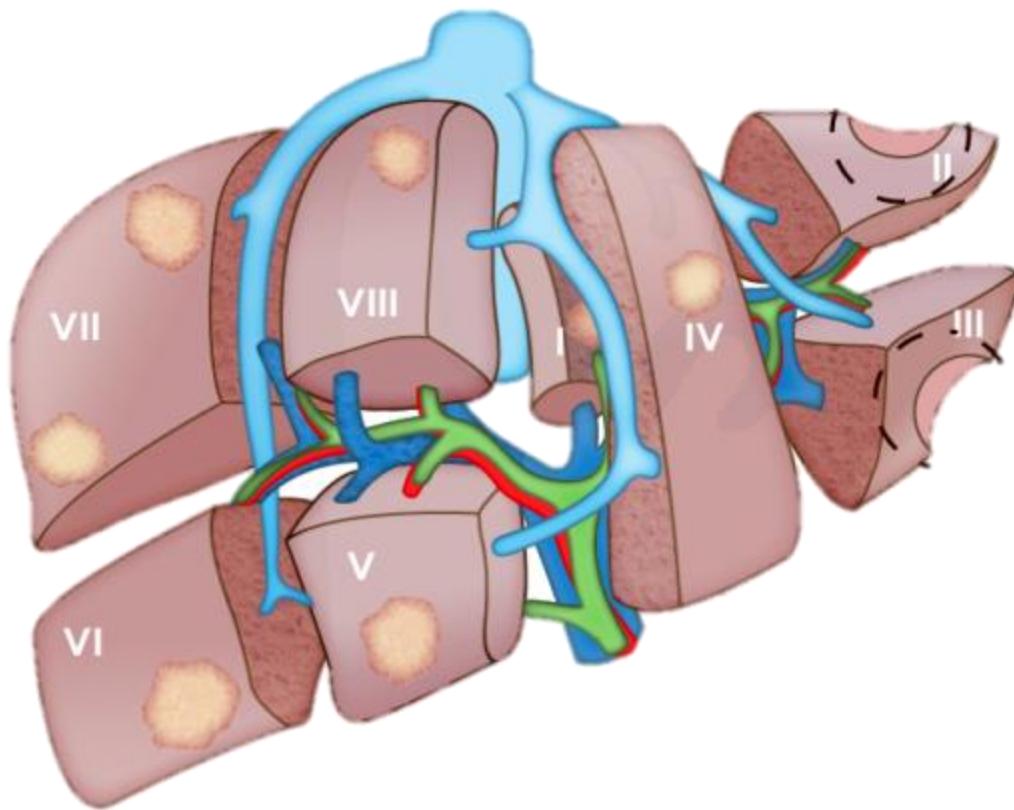


# ALPPS

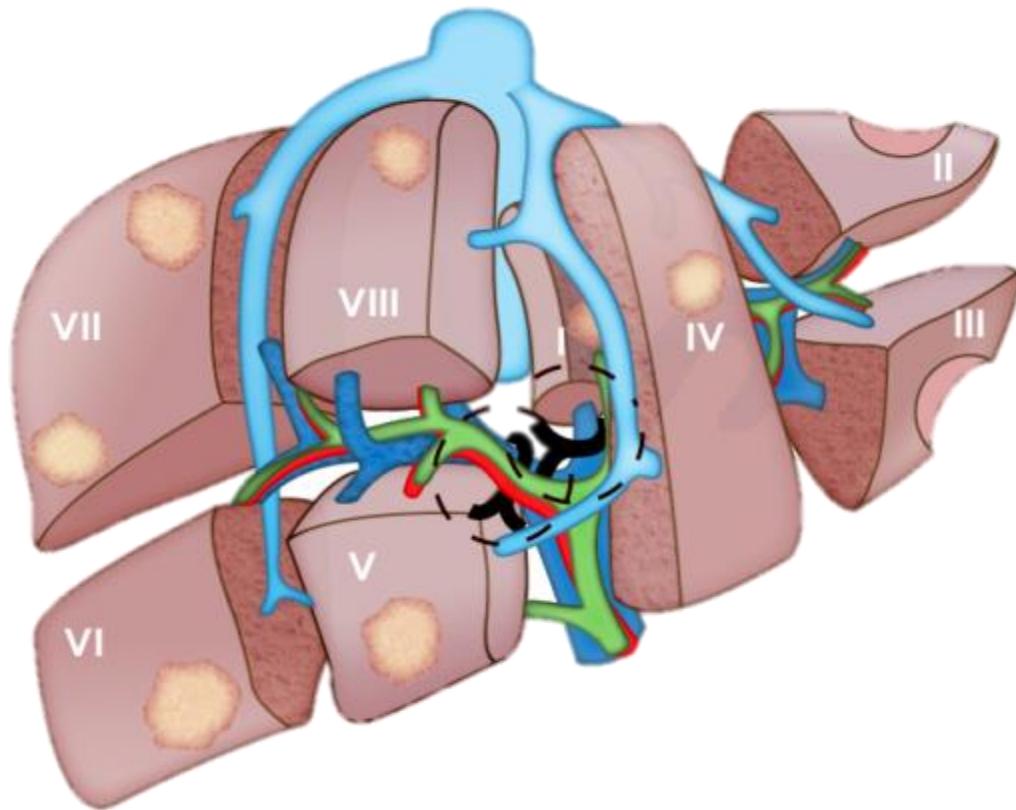


ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem

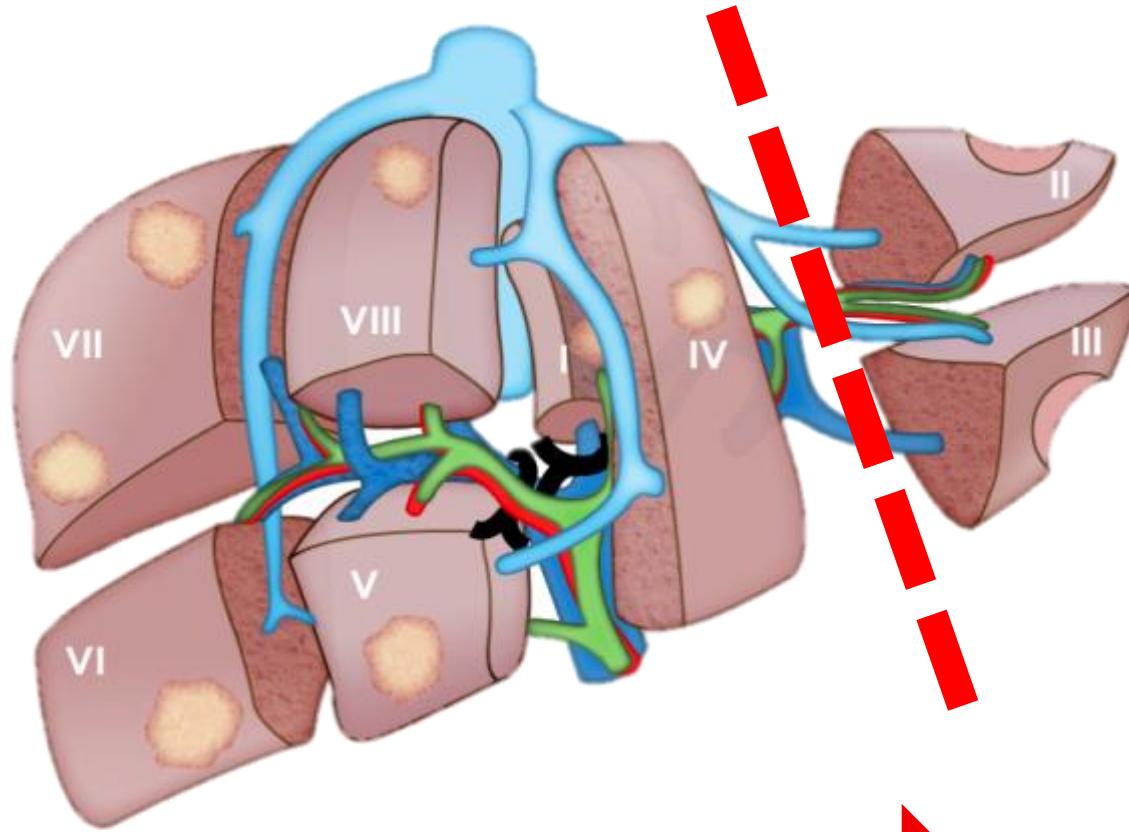
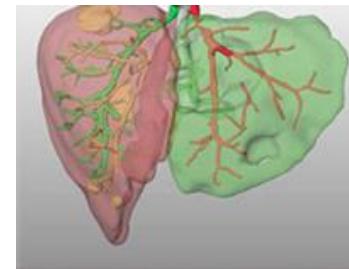
# ALPPS



# ALPPS

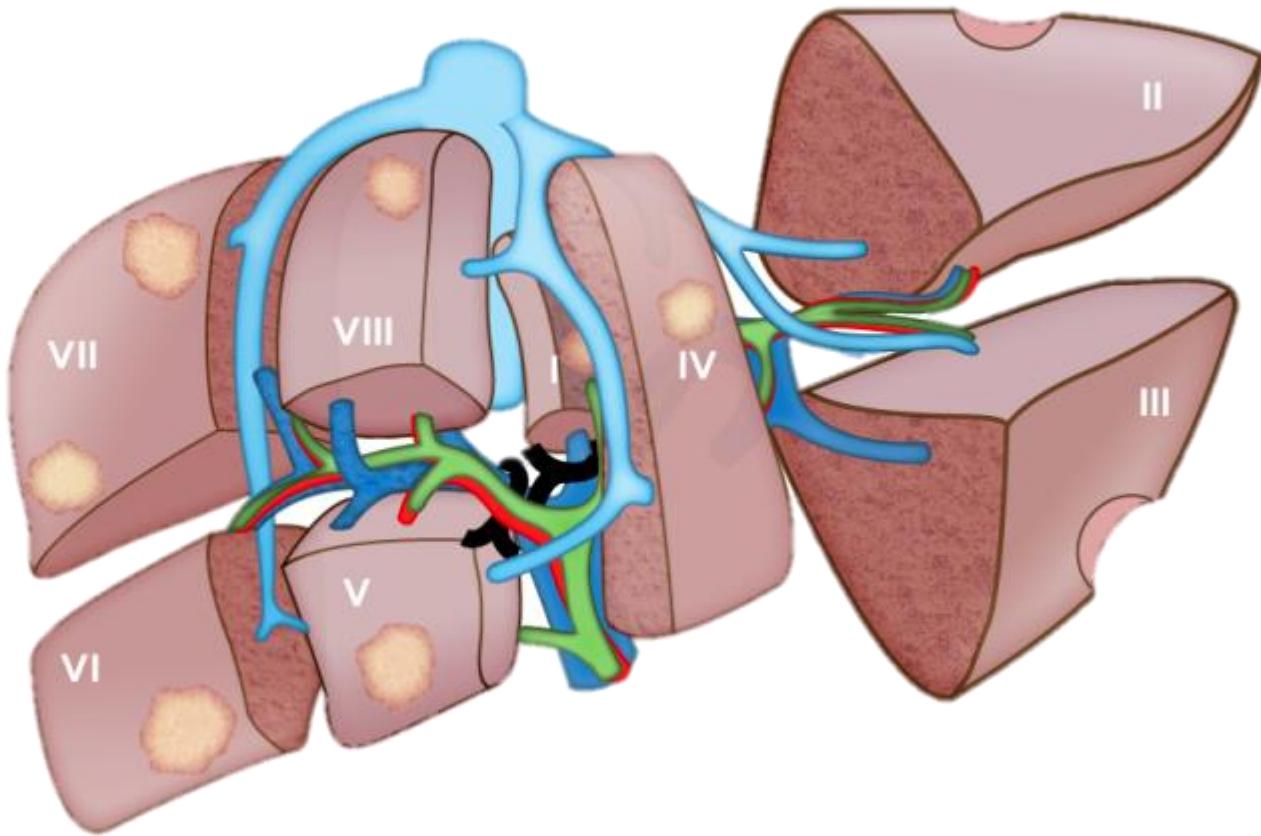


# ALPPS

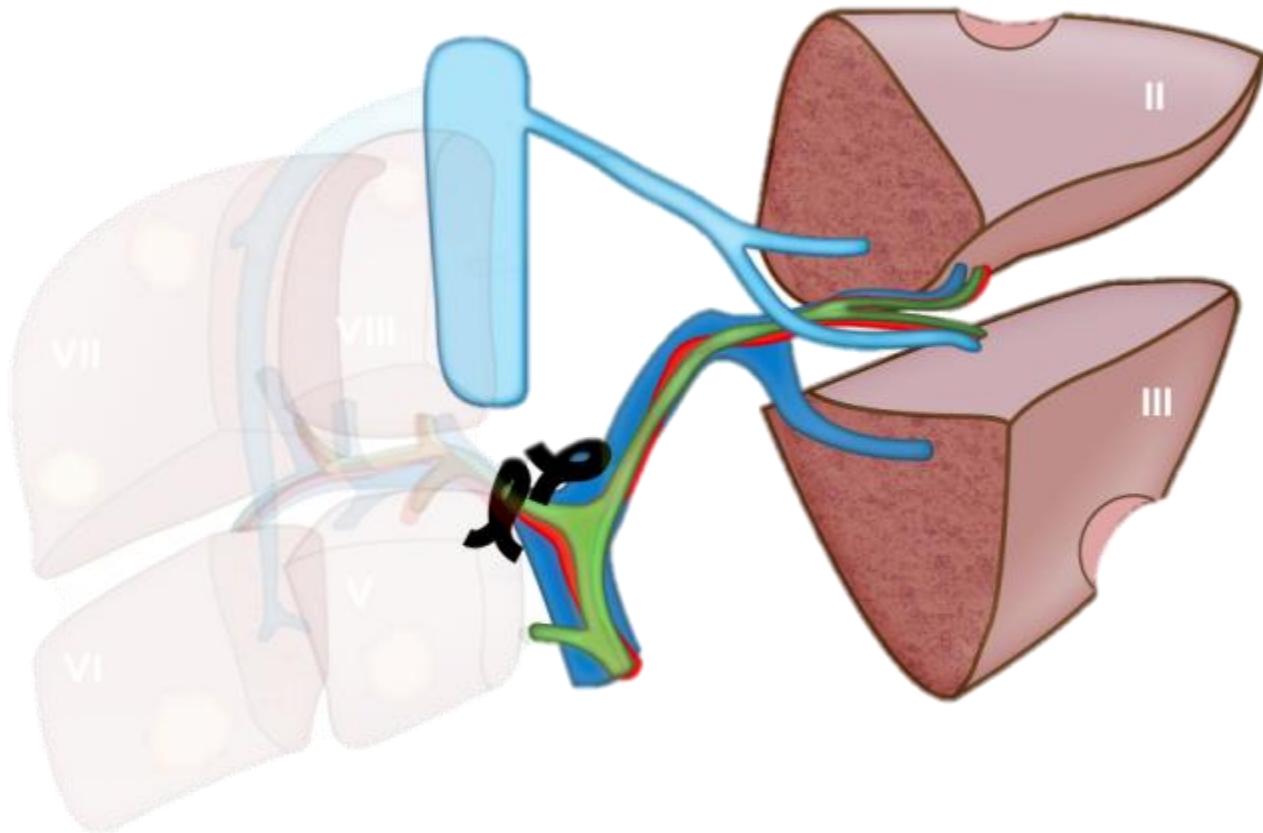
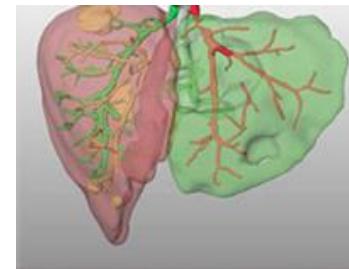


7 days

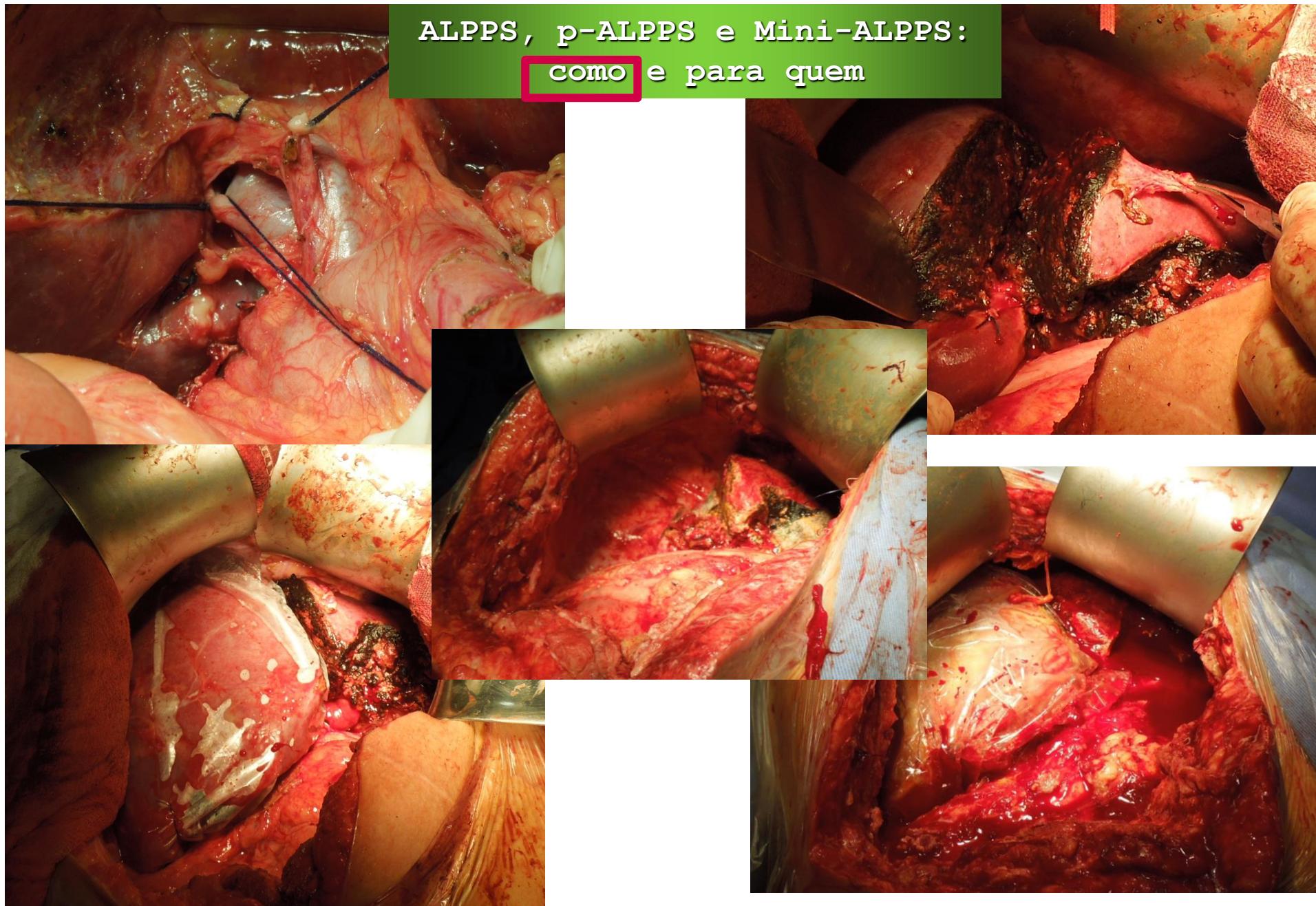
# ALPPS

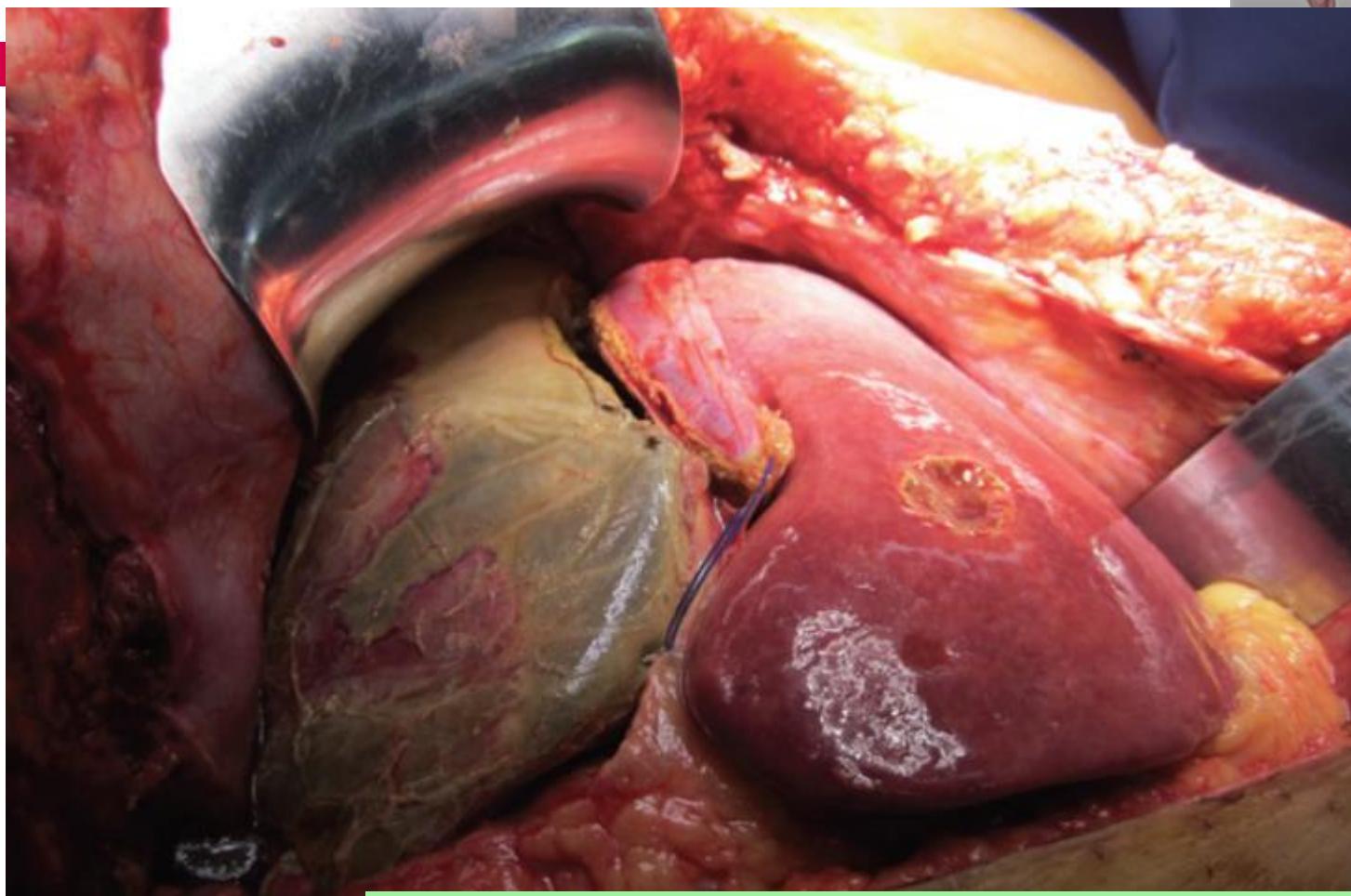
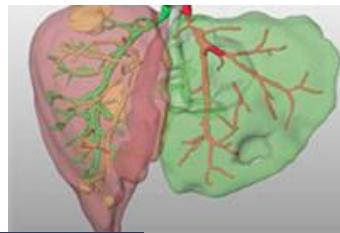


# ALPPS

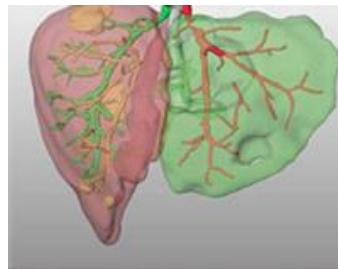


# ALPPS, p-ALPPS e Mini-ALPPS: como e para quem





Courtesy Dr. Sanjay Govil (Bangalore – India)



---

## EDITORIAL

---

# Playing Play-Doh to Prevent Postoperative Liver Failure

### *The “ALPPS” approach*

Eduardo de Santibañes, MD, PhD,\* and Pierre-Alain Clavien, MD, PhD†

The safe removal of extensive tumor load in the liver has been one of the main focuses of laboratory and clinical research for hepato-biliary surgeons over the past 3 decades.<sup>1</sup> The first breakthrough is credited to Masatoshi Makuuchi, who in 1980s, introduced the concept of the portal vein embolization (PVE) of the right portal branch to induce hypertrophy of the left side of the liver, enabling a safer removal of large or multiple tumors, mostly located in the right hemiliver and segment IV<sup>2</sup>. This technique was rapidly adopted by many to prevent liver failure after a variety of extensive

**Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy**

# ALPPS



- Hipertrofia do RHF superior EVP/LVP. Possibilidade de ressecção R0
- Adequada estratificação da doença no 1º procedimento.
- Permite limpeza agressiva do RHF.
- Ressecção simultânea na primeira operação em doença sincrônica.
- O intervalo curto torna pouco provável a progressão tumoral.
- Na progressão tumoral no hemifígado doente, não há invasão por contiguidade.
- Alternativa naqueles que não alcançaram hipertrofia suficiente após a E/LVP.

## ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS): A NEW APPROACH IN LIVER RESECTIONS

*Ligadura da veia porta associada à transecção para hepatectomia em dois estágios (ALPPS): uma nova abordagem nas ressecções hepáticas*

Orlando Jorge Martins **TORRES**, José Maria Assunção **MORAES-JUNIOR**, Nádia Caroline Lima e **LIMA**, Anmara Moura **MORAES**

From the Department of Digestive Surgery,  
UDI Hospital, São Luis, MA, Brazil.

**ABSTRACT – Background** - Postoperative liver failure consequent to insufficiency of remnant liver is a feared complication in patients who underwent extensive liver

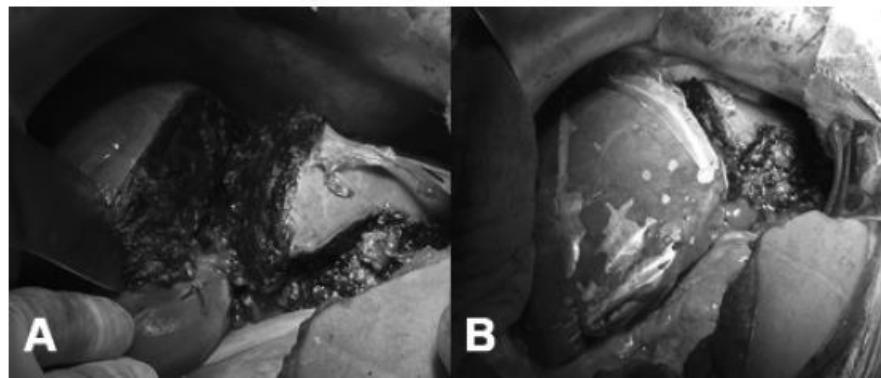


FIGURE 1 - A - Transection of the liver; B - protection with sterile bag



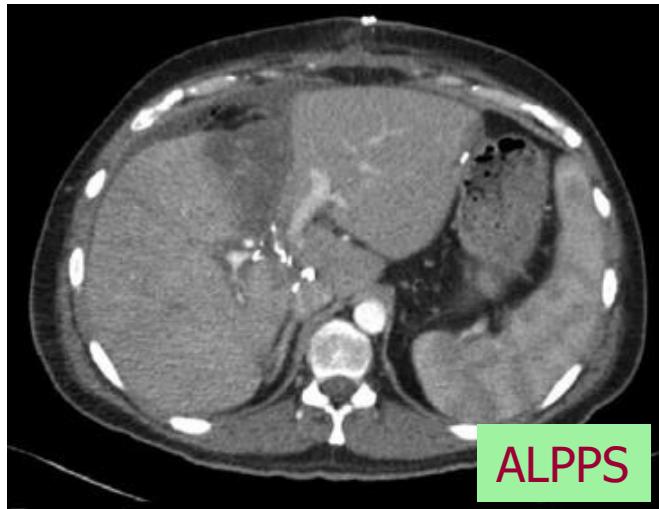
FIGURE 2 - Final aspect of the surgical procedure



## Is Partial-ALPPS Safer Than ALPPS?

*A Single-Center Experience*

Henrik Petrowsky, MD, FACS,\* Georg Györi, MD,\* Michelle de Oliveira, MD, FACS,\* Mickaël Lesurte, MD, PhD,\* and Pierre-Alain Clavien, MD, PhD, FACS†



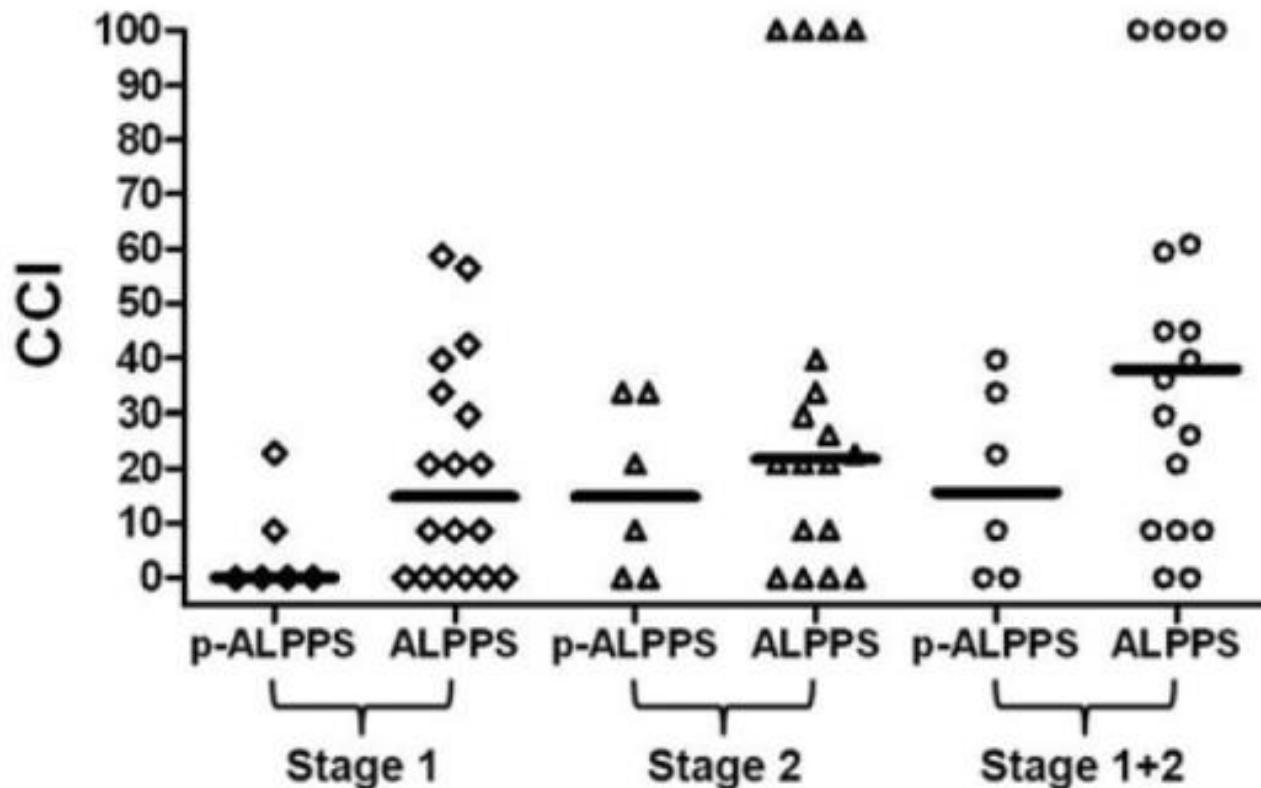
- 50- 80% transecção
- Nível das veias hepáticas
- Utilizar abordagem anterior
- Tumor localizado dentro ou próximo da linha de transecção

ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem



## Is Partial-ALPPS Safer Than ALPPS? *A Single-Center Experience*

Henrik Petrowsky, MD, FACS,\* Georg Györi, MD,\* Michelle de Oliveira, MD, FACS,\* Mickaël Lesurte, MD, PhD,\* and Pierre-Alain Clavien, MD, PhD, FACS†



# Is Partial-ALPPS Safer Than ALPPS?

*A Single-Center Experience*

Henrik Petrowsky, MD, FACS,\* Georg Györi, MD,\* Michelle de Oliveira, MD, FACS,\* Mickaël Lesurte, MD, PhD,\* and Pierre-Alain Clavien, MD, PhD, FACS†

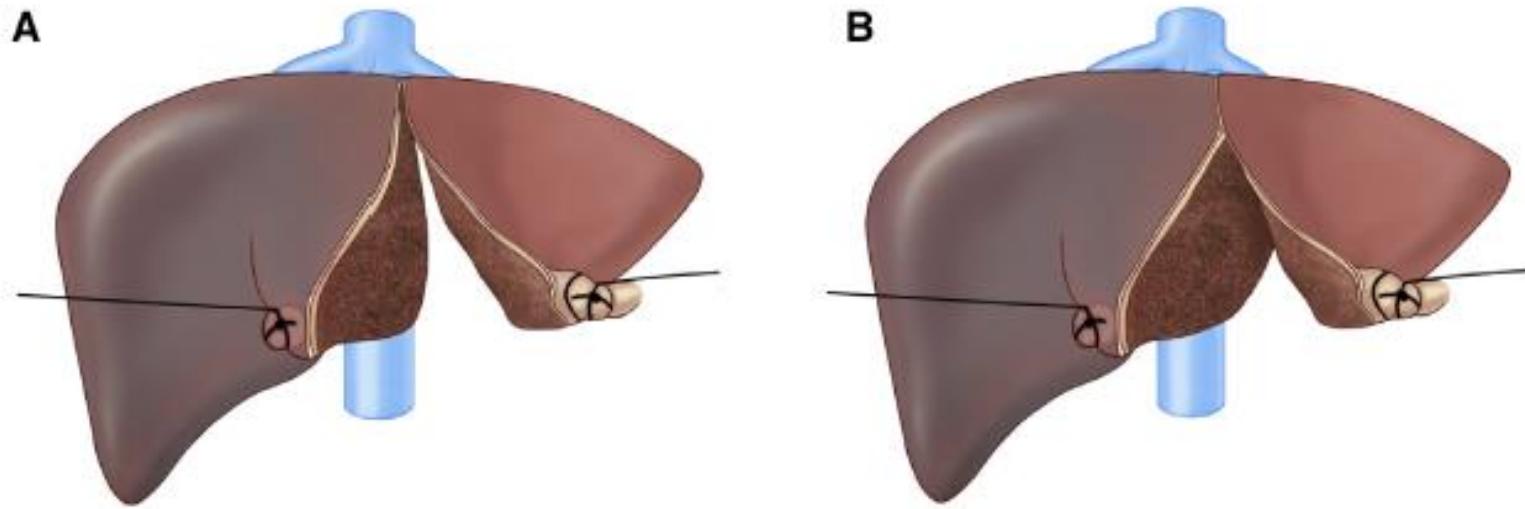
	p-ALPPS (%)	ALPPS (%)
Hipertrophy	60	61
Severe complications	0	33
Mortality	0	22

□Risco

# How much liver needs to be transected in ALPPS?

## A translational study investigating the concept of less invasiveness

Michael Linecker, MD,<sup>a,†</sup> Patryk Kambakamba, MD,<sup>a,†</sup> Cäcilia S. Reiner, MD,<sup>b</sup>  
Thi Dan Linh Nguyen-Kim, MD,<sup>b</sup> Gregor A. Stavrou, MD,<sup>c,d</sup> Robert M. Jenner, MD,<sup>c</sup>  
Karl J. Oldhafer, MD,<sup>c,d</sup> Bergthor Björnsson, MD, PhD,<sup>e</sup> Andrea Schlegel, MD,<sup>a</sup> Georg Györi, MD,<sup>a</sup>  
Marcel André Schneider, MD,<sup>a</sup> Mickael Lesurtel, MD, PhD,<sup>a,f</sup> Pierre-Alain Clavien, MD, PhD,<sup>a</sup> and  
Henrik Petrowsky, MD,<sup>a</sup> Zurich, Switzerland, Hamburg, Germany, and Linköping, Sweden





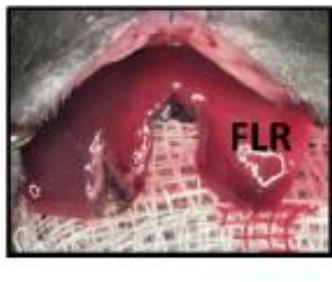
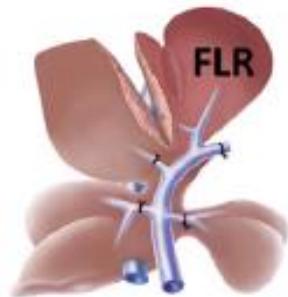
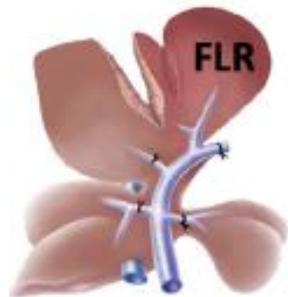
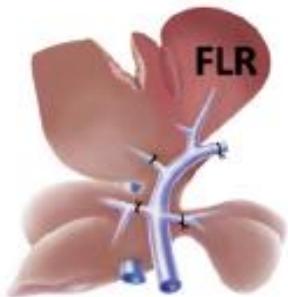
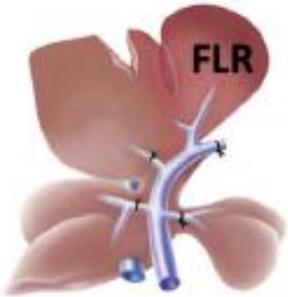
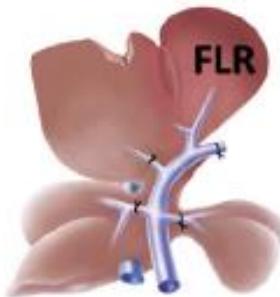
10% transection

25% transection

50% transection

80% transection

100% transection



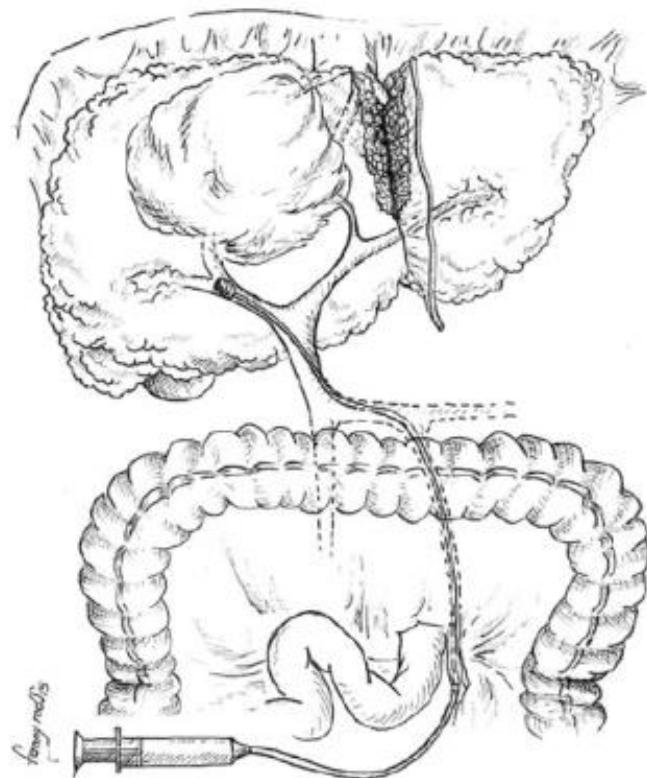
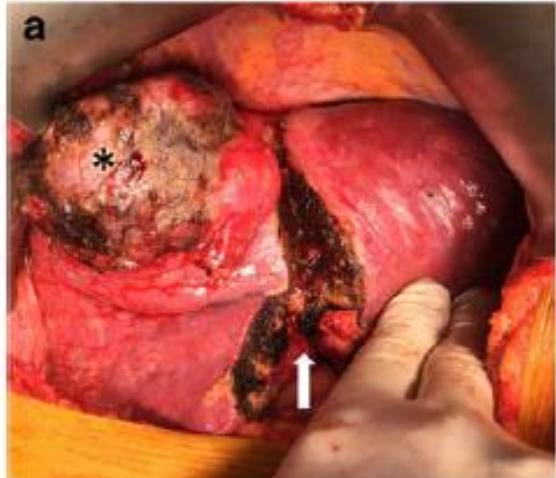
$\geq 50\%$

Less invasive surgery

HOW-I-DO-IT ARTICLES

## Inverting the ALPPS paradigm by minimizing first stage impact: the Mini-ALPPS technique

Eduardo de Santibañes<sup>1,2</sup> • Fernando A. Alvarez<sup>1</sup> • Victoria Ardiles<sup>1</sup> • Juan Pekolj<sup>1</sup> •  
Martin de Santibañes<sup>1</sup>



ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem

de Santibanes E, et al. Langenbecks Arch Surg 2016

HOW-I-DO-IT ARTICLES

## Inverting the ALPPS paradigm by minimizing first stage impact: the Mini-ALPPS technique

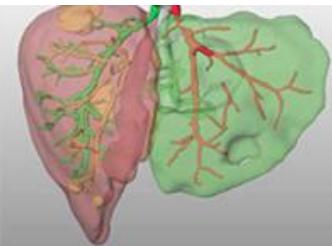
Eduardo de Santibañes<sup>1,2</sup> • Fernando A. Alvarez<sup>1</sup> • Victoria Ardiles<sup>1</sup> • Juan Pekolj<sup>1</sup> • Martin de Santibañes<sup>1</sup>

Table 1 Patients characteristics and volumetric data

Patient	Sex	Age	Diagnosis	Preop chemotherapy (cycles)	Hepatectomy type	FLR/TLV (%) pre	FLR pre (cc)	FLR post (cc)	Hypertrophy (%)	KGR (cc/day)	Interval (days) <sup>a</sup>
1	Female	66	HCC	–	RTS	40	510	778	52.5	26.8	10
2	Female	71	CRLM	FOLFOX (6)	RTS + FLR clean-up	23	235	420	78.7	12.3	15
3	Female	44	CRLM	FOLFOX + BEV (6)	RTS + FLR clean-up	27	300	427	70	9.8	13
4	Male	61	CRLM	FOLFOX (4)/FOLFIRI + BEV (3)	RH + FLR clean-up	28	530	792	49.4	43.6	6

HCC hepatocellular carcinoma, CRLM colorectal liver metastases, BEV bevacizumab, RTS right trisectionectomy, RH right hepatectomy, FLR future liver remnant, KGR Kinetic growth rate

<sup>a</sup> Internal between the first stage and the last volumetric evaluation before the second stage



# Right Portal Vein Ligation Combined With In Situ Splitting Induces Rapid Left Lateral Liver Lobe Hypertrophy Enabling 2-Staged Extended Right Hepatic Resection in Small-for-Size Settings

*Andreas A. Schnitzbauer, MD,\* Sven A. Lang, MD,\* Holger Goessmann, MD,† Silvio Nadalin, MD,§*

*Janine Baumgart, MD,|| Stefan A. Farkas, MD,\* Stefan Fichtner-Feigl, MD,\* Thomas Lorf, MD,¶*

*Armin Goralcyk, MD,¶ Rüdiger Hörbelt, MD,# Alexander Kroemer, MD,\* Martin Loss, MD,\* Petra Rümmele, MD,‡*

*Marcus N. Scherer, MD,\* Winfried Padberg, MD,# Alfred Königsrainer, MD,§ Hauke Lang, MD,||*

*Aiman Obed, MD,¶ and Hans J. Schlitt, MD\**

ABCDDV/898

ABCD Arq Bras Cir Dig  
2013;26(1):40-43

Original Article

## ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS): THE BRAZILIAN EXPERIENCE

*Ligadura da veia porta associada à bipartição do fígado para heptatectomia em dois estágios (ALPPS): experiência Brasileira*

*Orlando Jorge Martins TORRES<sup>1</sup>, Eduardo de Souza Martins FERNANDES<sup>2</sup> Cassio Virgilio Cavalcante OLIVEIRA,  
Cristiano Xavier LIMA<sup>4</sup>, Fabio Luiz WAECHTER<sup>5</sup>, Jose Maria Assunção MORAES-JUNIOR<sup>1</sup>,  
Marcelo Moura LINHARES<sup>6</sup>, Rinaldo Danese PINTO<sup>7</sup>, Paulo HERMAN<sup>8</sup>, Marcel Autran Cesar MACHAD<sup>9</sup>*

- 59 and 64% - Morbidity
- 12 and 12.8% - Mortality



**TABLE 108D.1 Degree of Hypertrophy After Stage 1 of ALPPS Procedure**

Series	No. Patients	Interval Stage (mean days)	Degree of Hypertrophy (%)
Schnitzbauer et al, 2012	25	9	74
Knoefel et al, 2013	7	6	63
Li et al, 2013	9	13	87.20
Nadalín et al, 2014	15	10	87.2
Torres et al, 2013	39	14.1	83
Robles Campos et al, 2014	22*	7	61
Alvarez et al, 2015	30	6	89.7
Hernandez-Alejandro et al, 2015	14	8	93

\*Associating liver tourniquet and portal ligation for staged hepatectomy (ALTPS).

ALPPS, Associating liver partition and portal vein ligation for staged hepatectomy.

**Table 1. Surgical outcomes of ALPPS**

Studies	n	Overall morbidity (%)	Overall mortality (%)	Success complete resection (%)	Interval (d, mean/median)	FLR regeneration rate (%), mean/median	R0 resection (%)
Schnitzbauer et al (2012) <sup>[3]</sup>	25	68	12	100	9	74	96
Sala et al (2012) <sup>[9]</sup>	10	40	0	100	7	82	100
<b>Torres et al (2013)<sup>[10]</sup></b>	<b>39</b>	<b>59</b>	<b>13</b>	<b>95</b>	<b>14</b>	<b>83</b>	<b>100</b>
Li et al (2013) <sup>[11]</sup>	9	66	22	100	13	87	100
Ielpo et al (2013) <sup>[12]</sup>	6	50	17	100	15	110	/
Troja et al (2014) <sup>[13]</sup>	5	100	20	100	16.4	/	100
Oldhafer et al (2014) <sup>[14]</sup>	7	86	0	100	13	65	100
Nadalin et al (2014) <sup>[15]</sup>	15	67	29	100	13	87	87
Robles et al (2014) <sup>[16]</sup>	22	63	9	100	7	61	100
Schadde et al (2014) <sup>[17]</sup>	202	>grade 3a: 40 >grade 3b: 28	9	98	10	86	91
Kremer et al (2015) <sup>[18]</sup>	19	68	16	100	8	74	100
Hernandez-Alejandro et al (2015) <sup>[19]</sup>	14	36	0	100	8	93	86
Truant et al (2015) <sup>[20]</sup>	62	80.6	12.9	95	8	48	/
Alvarez et al (2015) <sup>[21]</sup>	30	53	6.6	97	6	89.7	93.1
Lang et al (2015) <sup>[22]</sup>	16	64	12.5	100	9	86	100
Vivarelli (2015) <sup>[23]</sup>	9	66.7	11.1	96	10.8	96	/
Chan et al (2016) <sup>[24]</sup>	13	15.3	7.7	100	8	53	100
Røsok et al (2016) <sup>[25]</sup>	36	92	0	100	6	67	71
Serenari et al (2016) <sup>[26]</sup>	50	54	20	96	/	/	/
Björnsson et al (2016) <sup>[27]</sup>	10	100	0	100	8	64.2	90

FLR: future liver remnant; ALPPS: associating liver partition and portal vein ligation for staged hepatectomy.

Ativar o Windows  
Acesse Configurações para a  
Windows

## BRAZILIAN CONSENSUS FOR MULTIMODAL TREATMENT OF COLORECTAL LIVER METASTASES. MODULE 3: CONTROVERSIES AND UNRESECTABLE METASTASES

*Consenso brasileiro de tratamento multidisciplinar de metástase hepática de origem colorretal  
Módulo 3: Controvérsias e metástases irreessecáveis*

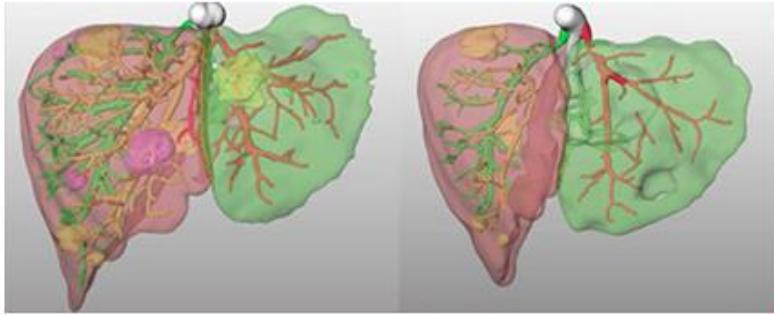
Orlando Jorge Martins **TORRES**<sup>1,2,6</sup>, Márcio Carmona **MARQUES**<sup>2,6</sup>, Fabio Nasser **SANTOS**<sup>1</sup>, Igor Correia de **FARIAS**<sup>2,6</sup>,  
Anelisa Kruschewsky **COUTINHO**<sup>3</sup>, Cássio Virgílio Cavalcante de **OLIVEIRA**<sup>1,4,5</sup>, Antonio Nocchi **KALIL**<sup>1,2,4,6</sup>,  
Celso Abdón Lopes de **MELLO**<sup>3</sup>, Jaime Arthur Pirola **KRUGER**<sup>1,4,5,6</sup>, Gustavo dos Santos **FERNANDES**<sup>3</sup>,  
Claudemiro **QUIREZE JR**<sup>1,4,5,6</sup>, André M. **MURAD**<sup>3</sup>, Milton José de **BARROS E SILVA**<sup>3</sup>,  
Charles Edouard **ZURSTRASSEN**<sup>\*</sup>, Helano Carioca **FREITAS**<sup>3</sup>, Marcelo Rocha **CRUZ**<sup>3</sup>, Rui **WESCHENFELDER**<sup>3</sup>,  
Marcelo Moura **LINHARES**<sup>1,4,5,6</sup>, Leonaldson dos Santos **CASTRO**<sup>1,2,6</sup>, Charles **VOLLMER**<sup>6</sup>,  
Elijah **DIXON**<sup>6</sup>, Héber Salvador de Castro **RIBEIRO**<sup>1,2,6</sup>, Felipe José Fernandez **COIMBRA**<sup>1,2,5,6</sup>

### ALPPS

□ Alternative for two-stage hepatectomy

□ Rescue surgery – after PVE

ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem



# 1 st International Consensus Meeting on ALPPS

February 27<sup>th</sup> and 28<sup>th</sup> 2015, Hamburg, Germany

HOME

COMMITTEES

PROGRAMME

VIDEO BROADCASTS

FOTOS

VENUE

POSTERS

SPONSORS

CONTACTS



*Karl J. Oldhafer*

*Thomas van Gulik*

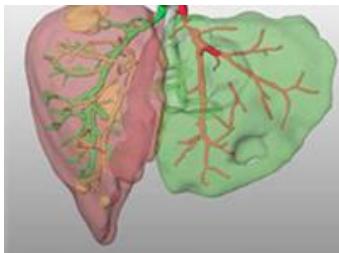


European-African Hepato-Pancreato-Biliary Association

Supported with a grant of DFG

**DFG** Deutsche  
Forschungsgemeinschaft

# Brazilians in Hamburg



Torres OJ, Herman P, Enne M, Machado M, Fernandes E.

Feb 27-28 2015



# INDICAÇÕES / SELEÇÃO



- Metástase hepática colo-retal extensa
- ALPPS de resgate (fracasso da EVP)
- Doença bilobar (contra-indicação para EVP)
- Extensão tumoral inesperada (decisão intra-operatória)
- Remanesciente hepático < 30% (ou < 0,5% do peso corporal)
- Hepatectomia direita ampliada
- Necessidade de grande hipertrofia
- Idade  $\leq$  60 anos
- Margem do tumor próximo ao remanescente

ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem

## ORIGINAL ARTICLE

# ALPPS as a salvage procedure after insufficient future liver remnant hypertrophy following portal vein occlusion

Marcelo Enne<sup>1</sup>, Erik Schadde<sup>2,3</sup>, Bergthór Björnsson<sup>4</sup>, Roberto Hernandez Alejandro<sup>5</sup>, Klaus Steinbrück<sup>6</sup>, Eduardo Viana<sup>1</sup>, Ricardo Robles Campos<sup>7</sup>, Massimo Malago<sup>8</sup>, Pierre-Alain Clavien<sup>9</sup>, Eduardo De Santibanes<sup>10</sup>, Brice Gayet<sup>11</sup> & On Behalf of ALPPS Registry Group

<sup>1</sup>Ipanema Federal Hospital, Brazil, <sup>2</sup>Cantonal Hospital Winterthur, Canton of Zürich, Switzerland, <sup>3</sup>Linköping University, Sweden, <sup>4</sup>Department of Surgery, University of Rochester Medical Center, USA, <sup>5</sup>Department of Surgery, University of São Paulo, Brazil, <sup>6</sup>Virgen de la Arrixaca University Hospital, Spain, <sup>7</sup>Royal Free Hospital, London, UK, <sup>8</sup>Royal Free Hospital, London, UK, <sup>9</sup>Hospital Italiano, Argentina, and <sup>10</sup>Institut Mutualiste Montsouris, Paris, France

**Table 3** Volumetric findings after PVO and Salvage ALPPS

FLR before PVO, ml, median (range) n = 15	339 (158–637)
FLR/SLV ratio before PVO, %, median (range) n = 15	20 (10–37)
Growth of FLR after PVO, %, median (range) n = 15	15 (−2–107)
Days from PVO to CT, median (range) n = 15	30 (15–56)
FLR before ALPPS, ml, median (range) n = 20	400 (183–707)
FLR/SLV ratio before ALPPS, %, median (range) n = 20	23 (10–41)
FLR before stage 2, ml, median (range) n = 20	786 (380–1008)
FLR/SLV ratio before stage 2, %, median (range) n = 20	41 (24–67)
Growth of FLR between stage 1 and 2, %, median (range) n = 20	88 (23–115)

ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem

## During liver regeneration following right portal embolization the growth rate of liver metastases is more rapid than that of the liver parenchyma

D. Elias, T. de Baere, A. Roche, M. Ducreux, J. Leclerc and P. Lasser

Departments of Surgical Oncology and Interventional Radiology, Institut Gustave Roussy, Rue Camille Desmoulins, 94805 Villejuif Cedex, France  
*Correspondence to:* Dr D. Elias

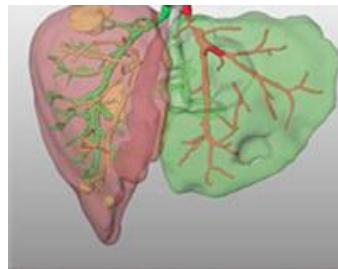
- Liver volume – 59-127%
- Tumor volume – 60-970%

## ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS): THE BRAZILIAN EXPERIENCE

*Ligadura da veia porta associada à bipartição do fígado para hepatectomia em dois estágios (ALPPS): experiência Brasileira*

Orlando Jorge Martins **TORRES**<sup>1</sup>, Eduardo de Souza Martins **FERNANDES**<sup>2</sup> Cassio Virgilio Cavalcante **OLIVEIRA**<sup>3</sup>,  
Cristiano Xavier **LIMA**<sup>4</sup>, Fabio Luiz **WAECHTER**<sup>5</sup>, Jose Maria Assunção **MORAES-JUNIOR**<sup>1</sup>,  
Marcelo Moura **LINHARES**<sup>6</sup>, Rinaldo Danese **PINTO**<sup>7</sup>, Paulo **HERMAN**<sup>8</sup>, Marcel Autran Cesar **MACHADO**<sup>9</sup>

- Morbidity – 59%
- Cholangiocarcinoma
- Other:
  - Colectomy
  - Pancreatoduodenectomy
- Risk score
- Mortality – 12.8%



---

ORIGINAL ARTICLE

---

# Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy Offers High Oncological Feasibility With Adequate Patient Safety

*A Prospective Study at a Single Center*

*Fernando A. Alvarez, MD, Victoria Ardiles, MD, Martín de Santibáñez, MD, Juan Pekolj, MD, PhD,  
and Eduardo de Santibáñez, MD, PhD*

- 53% Morbidity
- 6.6% Mortality



## PAPER OF THE 21ST ANNUAL ESA MEETING

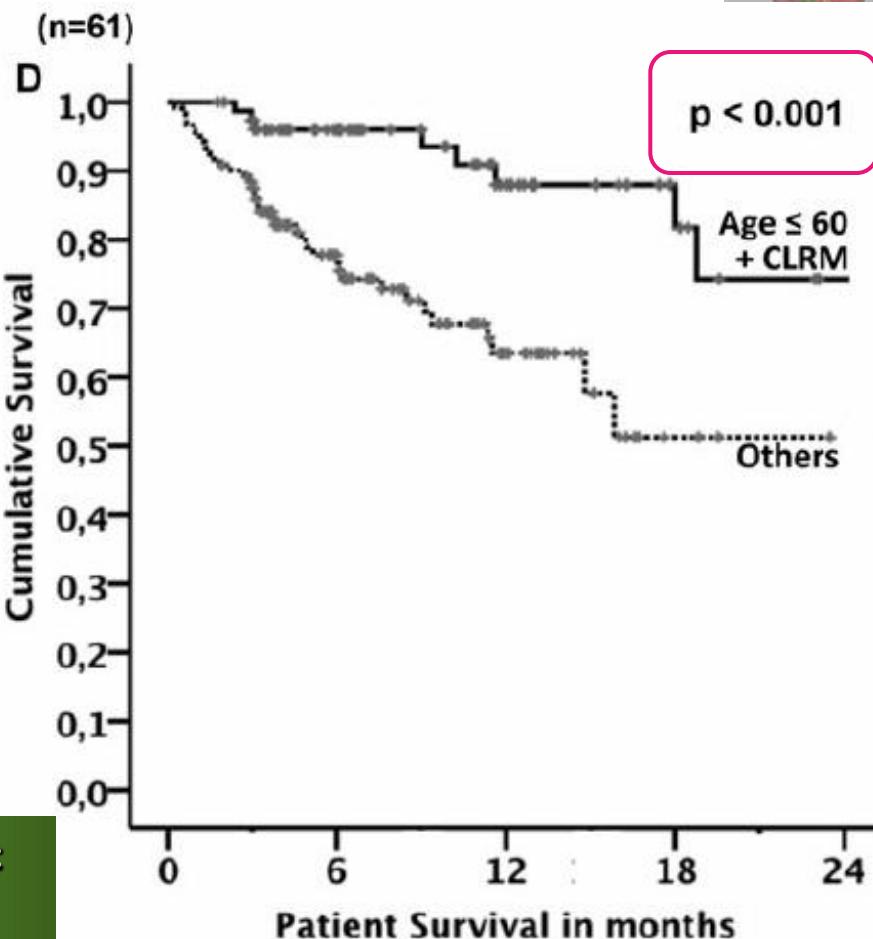
### Early Survival and Safety of ALPPS

#### *First Report of the International ALPPS Registry*

Erik Schadde, MD, FACS,\* Victoria Ardiles, MD,† Ricardo Robles-Campos, MD,‡ Massimo Malago, MD, FACS,§  
Marcel Machado, MD,¶ Roberto Hernandez-Alejandro, MD,|| Olivier Soubreane, MD,\*\*  
Andreas A. Schnitzbauer, MD,†† Dimitri Raptis, MD,\* Christoph Tschauder, MD,\* Henrik Petrowsky, MD, FACS,\*  
Eduardo De Santibanes, MD, PhD, FACS,† and Pierre-Alain Clavien, MD, PhD, FACS\*§§; On behalf of the ALPPS  
Registry Group

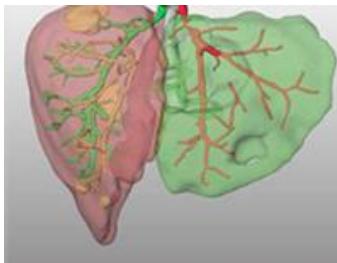
- 40 % Morbidity
- 9 % Mortality

# ALPPS Registry



ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem

Numbers at risk				
Age $\leq 60$ + CRLM (n=78)	71	30	13	10
Others (n=121)	72	29	8	0



Can we improve the morbidity and mortality associated with the associating liver partition with portal vein ligation for staged hepatectomy (ALPPS) procedure in the management of colorectal liver metastases?

Roberto Hernandez-Alejandro, MD,<sup>a</sup> Kimberly A. Bertens, MD, MPH,<sup>a</sup> Karen Pineda-Solis, MD,<sup>a</sup> and Kristopher P. Croome, MD, MS,<sup>a,b</sup> London, Ontario, Canada, and Rochester, MN

- 36 % Morbidity
- 0 % Mortality

# ALPPS, p-ALPPS e Mini-ALPPS: como e para quem



J Gastrointest Canc

DOI 10.1007/s12029-015-9691-6

## MGMT. OF COMPLEX CASES IN GI ONCOLOGY

# High Mortality Rates After ALPPS: the Devil Is the Indication

**Paulo Herman · Jaime Arthur Pirola Krüger ·  
Marcos Vinícius Perini · Fabrício Ferreira Coelho ·  
Ivan Cecconello**

0 % Mortality

**Table 1** Operative results

	Gender, age of first OR  Date	Diagnosis	Indication for ALPPS	Time between first and second OR (days)	Time from second OR to discharge (days)	Complications	FLR hypertrophy (%)
Case 1	M 48 17/11/11	MCRC	Multiple mets and small FLR	7	20	Liver failure Pulmonary sepsis None	81
Case 2	M 58 16/02/12	MCRC	Multiple mets and intraoperative decision	7	6	None	78
Case 3	M 58 23/05/12	iCCC	Proximity to the hepatic vein and small FLR	7	8	None	82
Case 4	M 58 07/11/12	MCRC	Multiple mets and small FLR	7	7	None	75
Case 5	F 38 10/04/13	MCRC	Multiple mets and small FLR	7	7		67
Case 6	M 52 17/06/13	MCRC	Multiple mets and small FLR	8	30	Biliary fistula Hepatic insufficiency None	37
Case 7	F 55 15/11/13	MCRC	Multiple mets and small FLR	14	8		61



## ALPPS: PAST, PRESENT AND FUTURE

*ALPPS: passado, presente e futuro*

Orlando Jorge M TORRES<sup>1</sup>, Eduardo S M FERNANDES<sup>2</sup>, Paulo HERMAN<sup>3</sup>

<sup>1</sup>Universidade Federal do Maranhão (Federal University of Maranhão), São Luís, MA; <sup>2</sup> Hospital Adventista Silvestre, Rio de Janeiro, RJ, Brazil;

<sup>3</sup>Universidade de São Paulo (University of São Paulo), São Paulo, SP, Brazil.

Complete tumor resection in the liver is the only chance to obtain long-term survival in patients with hepatic tumor or metastasis from other primary cancers. In patients with a large load of tumor within the liver, multiple strategies have been employed to improve resection, especially when a small liver remnant is expected. Staged hepatectomies, in

- Discutir em reunião multidisciplinar
- Remanescente < 30%
- Resgate após falha na embolização de veia porta
- Evitar em colangiocarcinoma
- Reduzir morbidade e mortalidade

ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem



## The ALPPS procedure for hepatocellular carcinoma larger than 10 centimeters



Orlando Jorge M. Torres\*, Rodrigo Rodrigues Vasques, Thiago Henrique S. Silva,  
Miguel Eugenio L. Castelo-Branco, Camila Cristina S. Torres

Department of Digestive Surgery, Federal University of Maranhão, São Luiz, MA, Brazil

### ARTICLE INFO

#### Article history:

Received 10 June 2016



Fig. 2. ALPPS first procedure with plastic bag.

### ABSTRACT

**INTRODUCTION:** The only means of achieving long-term survival in hepatocellular carcinoma is complete tumor resection or liver transplantation. Patients with large hepatocellular carcinomas are currently



Fig. 3. CT 15 days after the first procedure.



Fig. 4. Final aspect of the liver remnant.

## The ALPPS Risk Score *Avoiding Futile Use of ALPPS*

*Michael Linecker, MD,\* Gregor A. Stavrou, MD,†‡ Karl J. Oldhafer, MD,†‡ Robert M. Jenner, MD,†  
Burkhardt Seifert, PhD,§ Georg Lurje, MD,¶ Jan Bednarsch, MD,¶ Ulf Neumann, MD,¶  
Ivan Capobianco, MD,|| Silvio Nadalin, MD,|| Ricardo Robles-Campos, MD,\*\*  
Eduardo de Santibañes, MD, PhD, FACS,†† Massimo Malagó, MD,†‡ Mickael Lesurtel, MD, PhD,\*  
Pierre-Alain Clavien, MD, PhD, FACS,\* and Henrik Petrowsky, MD, FACS\**

---

**Objectives:** To create a prediction model identifying futile outcome in

**Conclusions:** Both models have an excellent prediction to assess the individual risk of futile outcome after ALPPS surgery and can be used to avoid



TABLE 3. Risk Modeling

	Risk Points	Regression Coefficient	Odds Ratio (95% CI)	P
<b>Pre-stage 1 variables*</b>				
Tumor type†				
CRLM (reference)	0	0.000	1.000	
Non-CRLM/nonbiliary	1	0.655	1.925 (0.808–4.585)	0.139
Biliary	2	1.326	3.767 (1.800–7.882)	<0.001
Age ≥67 yr	3	1.735	5.668 (2.843–11.30)	<0.001
Intercept pre-stage 1		-5.3		
<b>Pre-stage 2 variables‡</b>				
Pre-stage 1 score, per point	0.66	0.665	1.925 (1.527–2.426)	<0.001
Interstage complications ≥3b	1.2	1.209	3.350 (1.280–8.769)	0.014
Pre-stage 2 bilirubin§	1.5	1.496	4.439 (1.699–11.60)	0.002
Pre-stage 2 creatinine	1.7	1.696	5.454 (1.606–18.52)	0.007
Intercept pre-stage 2		-6.8		

□ Pre-stage I Ponto

Não colorectal/biliar 1

Biliary surgery (Cholangiocarcinoma) 2

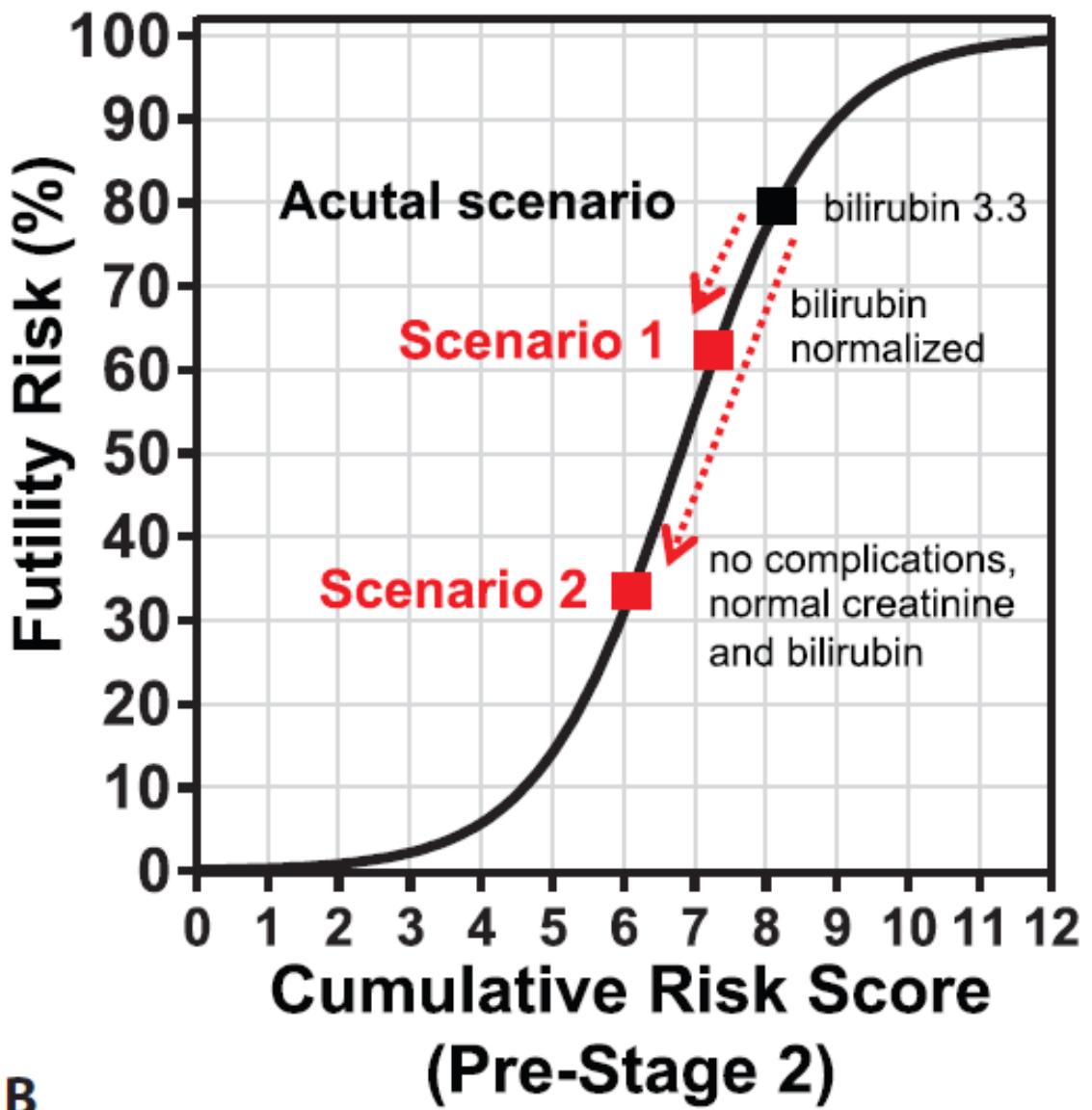
Age ≥ 67 yr 3

□ Pre-stage II

Complications ≥ 3b

Bilirubin

Creatinine





Risk	Score
5%	3.9
10%	4.7
20%	5.5
50%	6.9

**ALPPS, p-ALPPS e Mini-ALPPS:  
como e para quem**



# 12<sup>th</sup> Biennial E-AHPBA Congress 2017

European-African Hepato Pancreato Biliary Association

23 May – 26 May, 2017

Liver surgery: Clinical

FP26.08

## Performance Validation of the ALPPS Risk Model

M. Linecker<sup>1</sup>, P. Kambakamba<sup>1</sup>, A. Schlegel<sup>2</sup>, P. Muiesan<sup>2</sup>, I. Capobianco<sup>3</sup>, S. Nadalin<sup>3</sup>, O. Torres<sup>4</sup>, A. Mehrabi<sup>5</sup>, G.A. Stavrou<sup>6, 7</sup>, K.J. Oldhafer<sup>6, 7</sup>, G. Lurje<sup>8</sup>, U. Neumann<sup>8</sup>, R. Robles-Campos<sup>9</sup>, R. Hernandez-Alejandro<sup>10, 11</sup>, M. Malago<sup>12</sup>, E. De Santibanes<sup>13</sup>, P.-A. Clavien<sup>1</sup>, H. Petrowsky<sup>1</sup>

<sup>1</sup>University Hospital Zurich, Department of Surgery and Transplantation, Zurich, Switzerland, <sup>2</sup>University Hospitals Birmingham NHS Foundation Trust, Liver Unit, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom, <sup>3</sup>University Hospital Tübingen, Department for General, Visceral and Transplant Surgery, Tübingen, Germany, <sup>4</sup>Universidade Federal do Maranhão, Department of Surgery, São Luis-MA, Brazil, <sup>5</sup>University of Heidelberg, Department of General, Visceral, and Transplantation Surgery, Heidelberg, Germany, <sup>6</sup>Asklepios Hospital Barmbek, Department of General and Abdominal Surgery, Hamburg, Germany, <sup>7</sup>Semmelweis University Budapest, Campus Hamburg, Germany, <sup>8</sup>University Hospital Aachen, RWTH Aachen, Department of General, Visceral and Transplantation Surgery, Aachen, Germany, <sup>9</sup>Virgen de la Arrixaca Clinic and University Hospital, Department of Surgery and Liver and Pancreas Transplantation, Murci, Spain, <sup>10</sup>London Health Sciences Centre, Department of Surgery, Division of HPB Surgery and Liver Transplantation, London, Ontario, Canada, <sup>11</sup>University of Rochester, Division of Transplantation, Hepatobiliary Surgery, Rochester, United States, <sup>12</sup>University College London, Royal Free Hospitals, Department of HPB- and Liver Transplantation Surgery, London, United Kingdom, <sup>13</sup>Italian Hospital Buenos Aires, Department of Surgery, Division of HPB Surgery, Liver Transplant Unit, Buenos Aires, Argentina

- Autores de 8 países (1 Brasileiro)
- Estratégia para tornar o procedimento mais seguro

## ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS): THE BRAZILIAN EXPERIENCE

*Ligadura da veia porta associada à bipartição do fígado para hepatectomia em dois estágios (ALPPS): experiência Brasileira*

Orlando Jorge Martins **TORRES<sup>1</sup>**, Eduardo de Souza Martins **FERNANDES<sup>2</sup>** Cassio Virgilio Cavalcante **OLIVEIRA<sup>3</sup>**,  
Cristiano Xavier **LIMA<sup>4</sup>**, Fabio Luiz **WAECHTER<sup>5</sup>**, Jose Maria Assunção **MORAES-JUNIOR<sup>1</sup>**,  
Marcelo Moura **LINHARES<sup>6</sup>**, Rinaldo Danese **PINTO<sup>7</sup>**, Paulo **HERMAN<sup>8</sup>**, Marcel Autran Cesar **MACHADO<sup>9</sup>**

83 yr

Sarcoma

Additional surgery:

- Colectomy

+ Pancreatoduodenectomy

12.8 % Mortality

## ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS): THE BRAZILIAN EXPERIENCE

*Ligadura da veia porta associada à bipartição do fígado para hepatectomia em dois estágios (ALPPS): experiência Brasileira*

Orlando Jorge Martins **TORRES<sup>1</sup>**, Eduardo de Souza Martins **FERNANDES<sup>2</sup>** Cassio Virgilio Cavalcante **OLIVEIRA<sup>3</sup>**,  
Cristiano Xavier **LIMA<sup>4</sup>**, Fabio Luiz **WAECHTER<sup>5</sup>**, Jose Maria Assunção **MORAES-JUNIOR<sup>1</sup>**,  
Marcelo Moura **LINHARES<sup>6</sup>**, Rinaldo Danese **PINTO<sup>7</sup>**, Paulo **HERMAN<sup>8</sup>**, Marcel Autran Cesar **MACHADO<sup>9</sup>**

TABLE 1 - Complications after ALPPS approach

Complications	n	%
Surgical site infection	8	20.5
Ascites	5	12.8
Biliary fistula	4	10.2
Pneumonia	4	10.2
Abdominal hernia	4	10.2
Sepsis	3	7.7
Acute renal failure	2	5.1
Bile duct injury	1	2.5
Hepatic artery thrombosis	1	2.5
Acute liver failure	1	2.5
Others	9	23.0

- High risk score
- 4 patients
- 35 pacientes
- 1 óbito
- Mortal 2,86%



Obrigado!



Lençóis Maranhenses