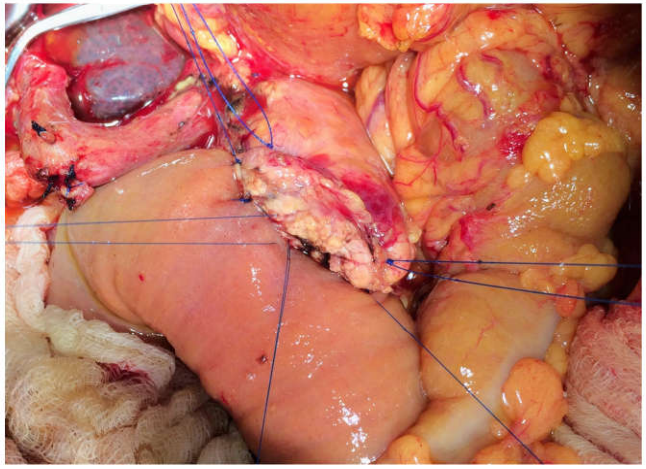
II CONGRESSO DO COMPLEXO HOSPITALAR DA UFPA/EBSERH
13 e 14 DE SETEMBRO DE 2018



METÁSTASE HEPÁTICA DE ORIGEM COLO-RETAL

Orlando Jorge M. Torres
Professor Titular e Chefe do Serviço de
Cirurgia do Aparelho Digestivo
Unidade Hepatopancreatobiliar
Universidade Federal Maranhão - Brasil

Câncer colo-retal

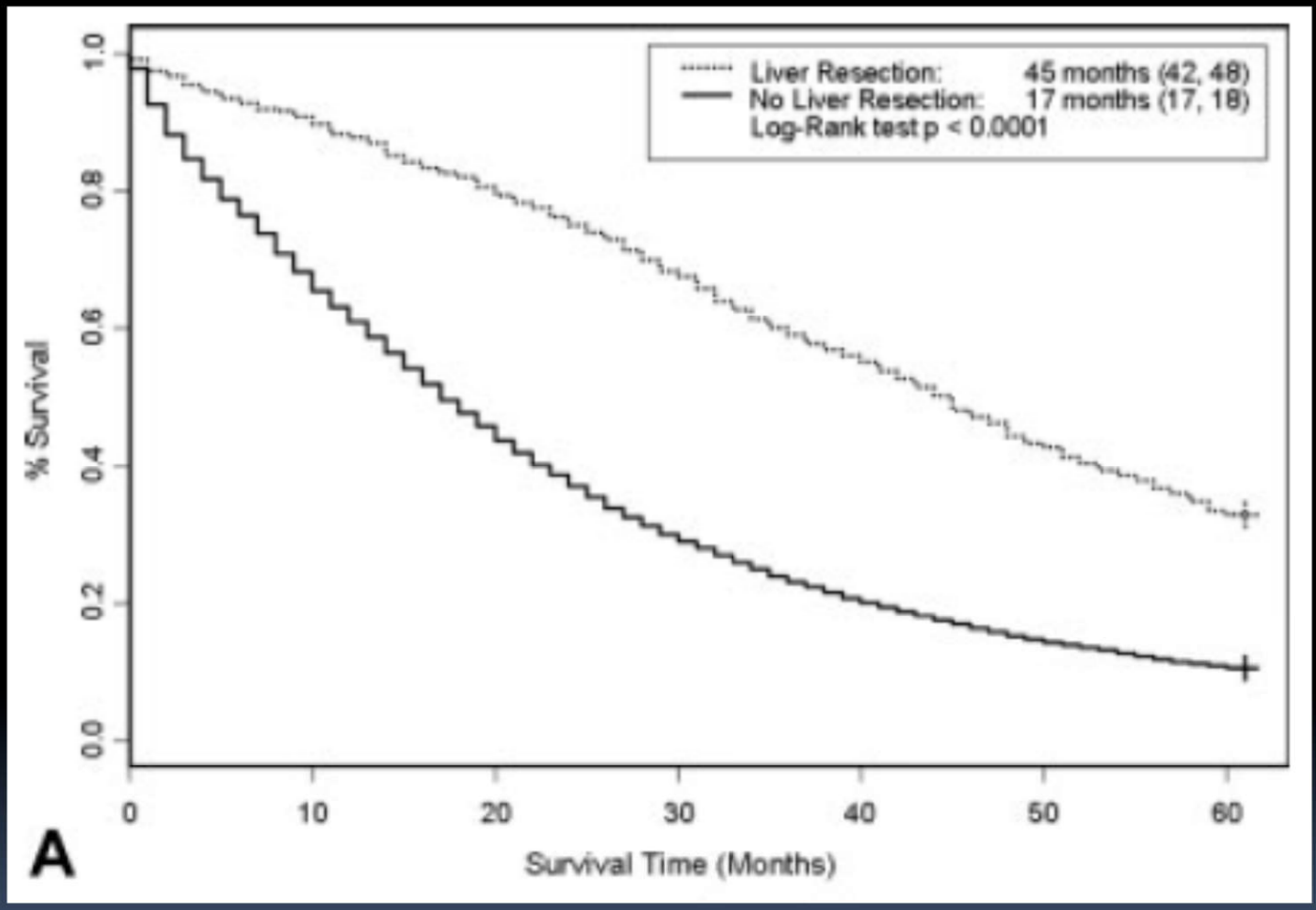
Metástase hepática colo-retal

- 150.000 novos casos/ano de câncer colo-retal (EUA)
- 40% a 70% devem apresentar metástase
- 35% dos casos é o único local
- 15 a 25 % tem metástase hepática sincrônica
- 20 a 30% desenvolve metástase metacrônica em 3 anos
- Um quarto destes são candidatos a ressecção
- Um quinto é possível ressecção R0
- Não tratado a sobrevida é de 6 a 18 meses

10.000 a 15.000 pacientes/ano são candidatos a ressecção

Adam et al - Surg Clin N Am 84:659-671,2004

Ressecção hepática



- A ressecção hepática esteve associada com aumento na sobrevida.

Cummings LC, et al. Cancer 109:718-726, 2007

Critérios de irressecabilidade

Antes

- Quatro ou mais metástases
- Tamanho > 5 cm
- Doença bilateral
- Margem cirúrgica < 1 cm
- Doença extra-hepática
- Escore prognóstico

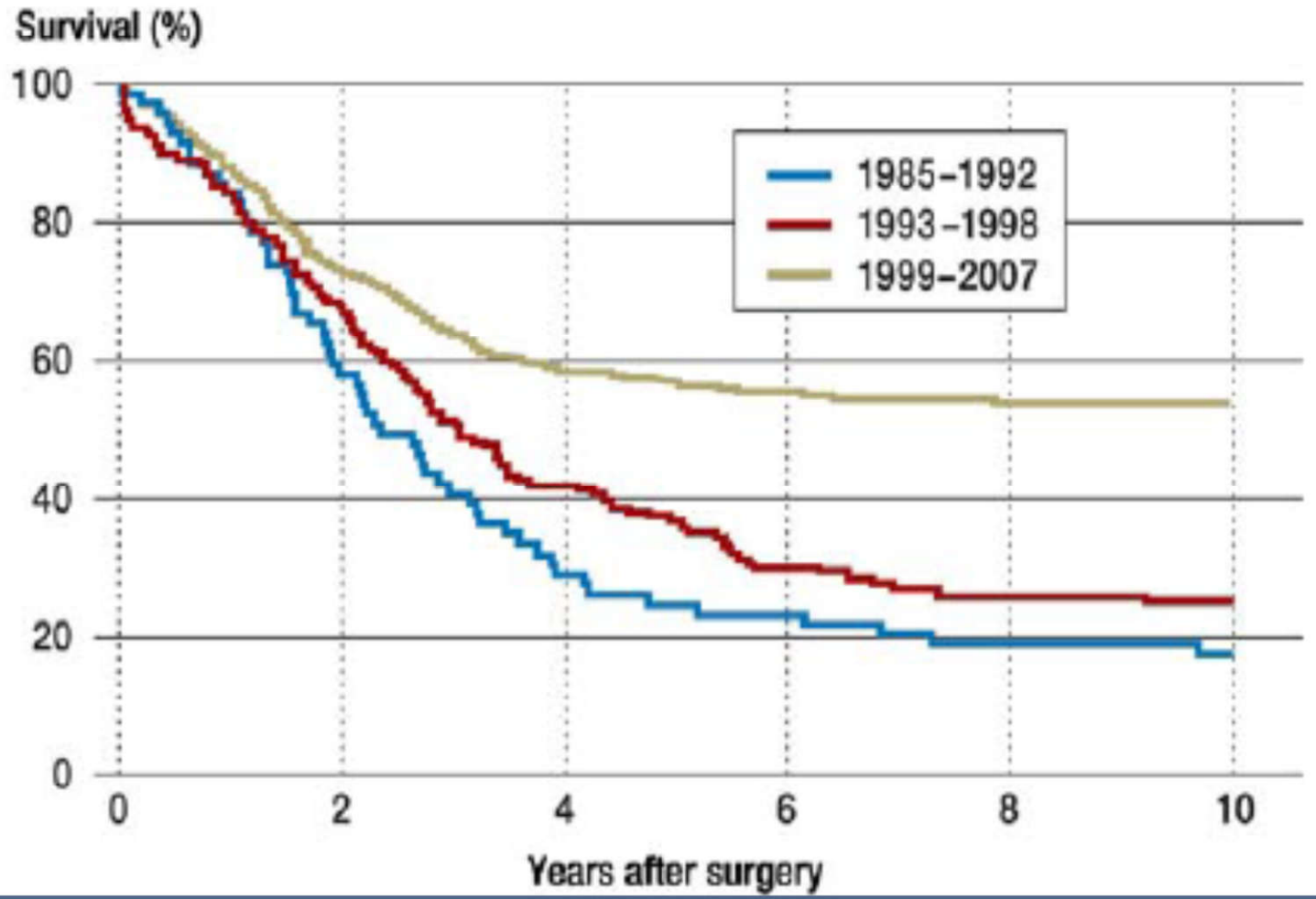
Depois

- Incapacidade de ressecção R0
- Margem histológica positiva
- Inabilidade de ressecar toda doença detectável
- Progressão da doença apesar da QT

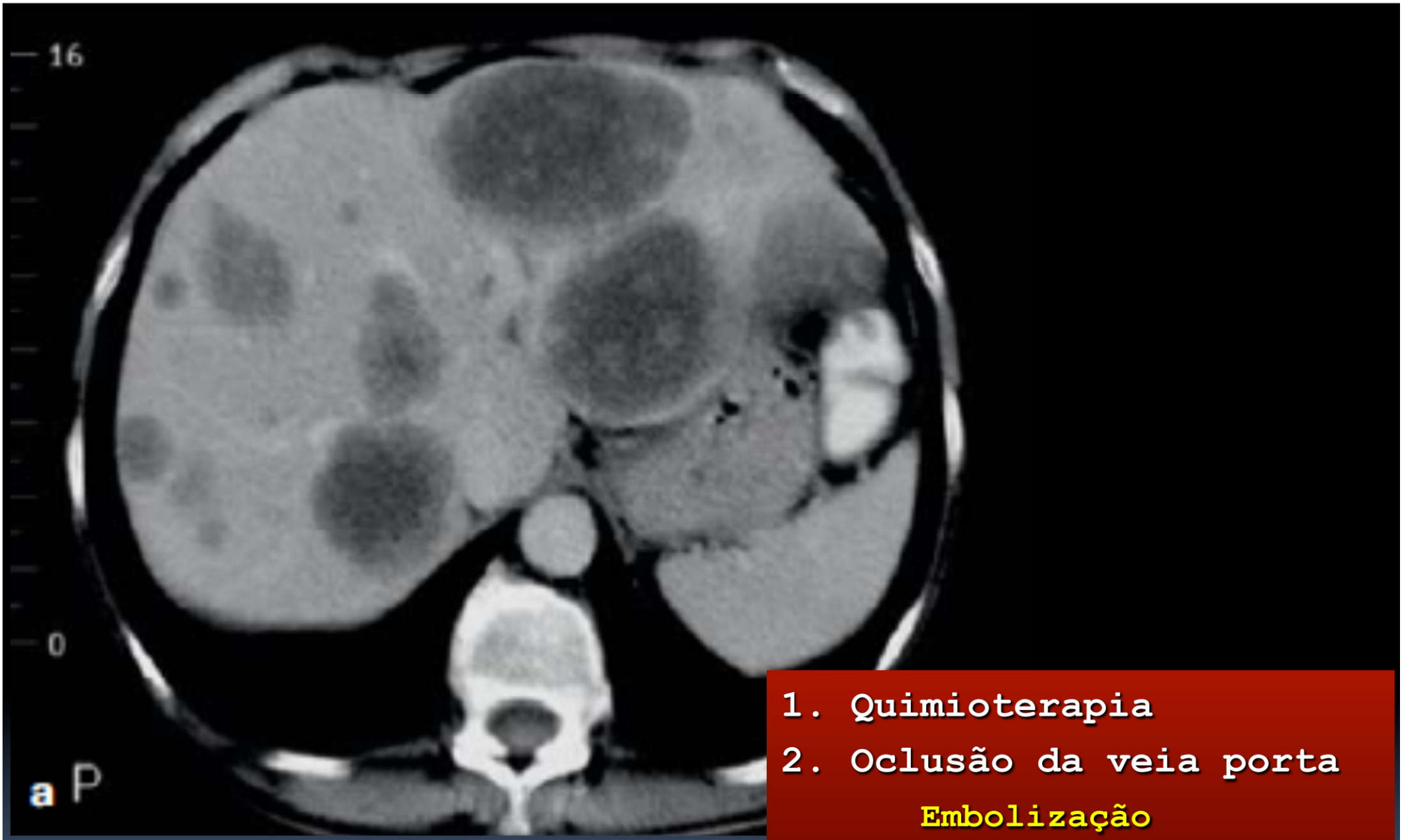
Charnsangavej C, et al. Ann Surg Oncol, 2006;13:1261-8

Resultados em meta colo-retal

FIGURE 2



Neumann UP et al - Dtsch Arztebl Int 2010;107:335-42



1. Quimioterapia
2. Oclusão da veia porta
   - Embolização
   - Ligadura
3. Operações repetidas

Neumann UP et al - Dtsch Arztebl Int 2010;107:335-42

Neumann UP et al - Dtsch Arztebl Int 2010;107:335-42

Neumann UP et al - Dtsch Arztebl Int 2010;107:335-42

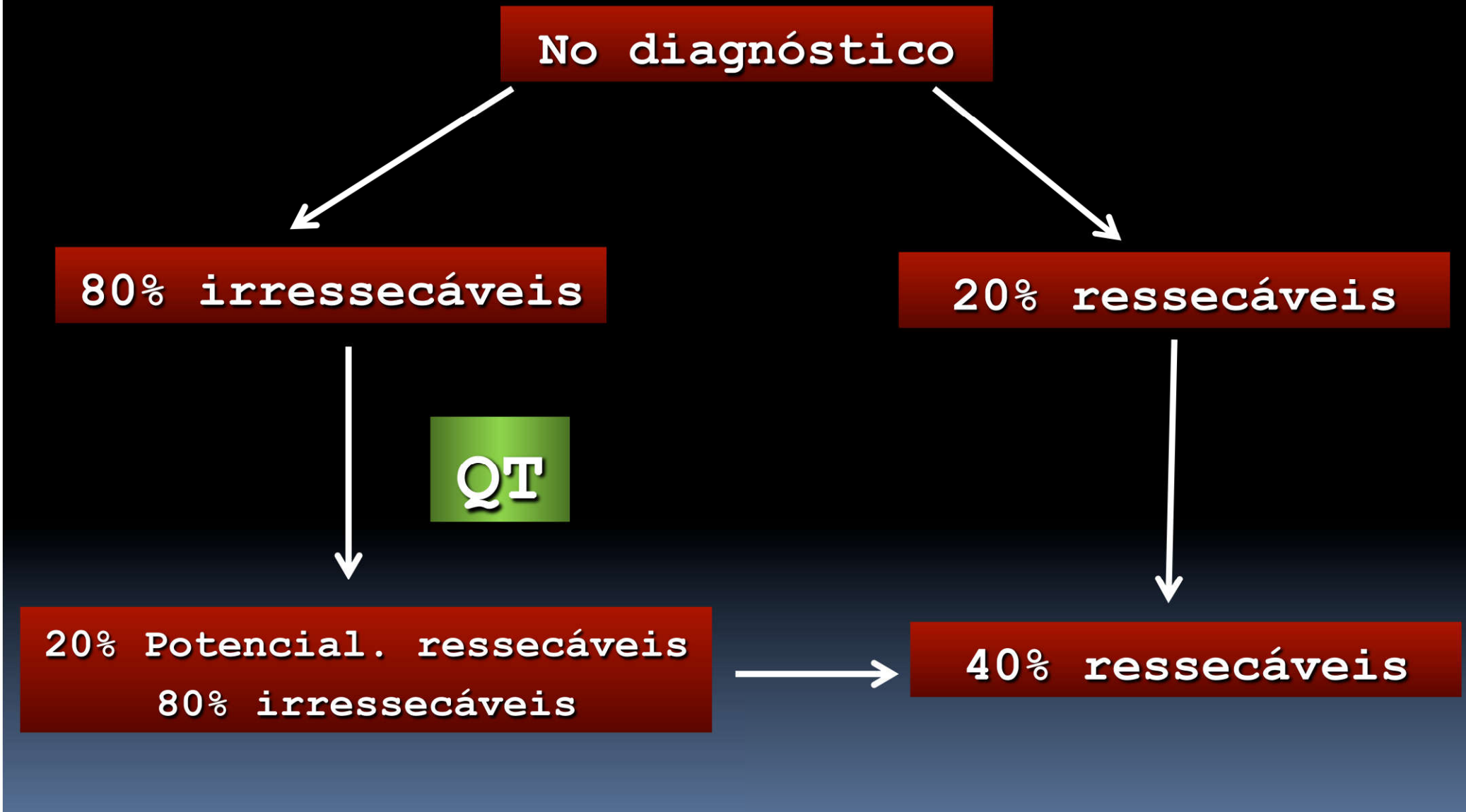
Neumann UP et al - Dtsch Arztebl Int 2010;107:335-42

“Ver a vida pelo lado bom”

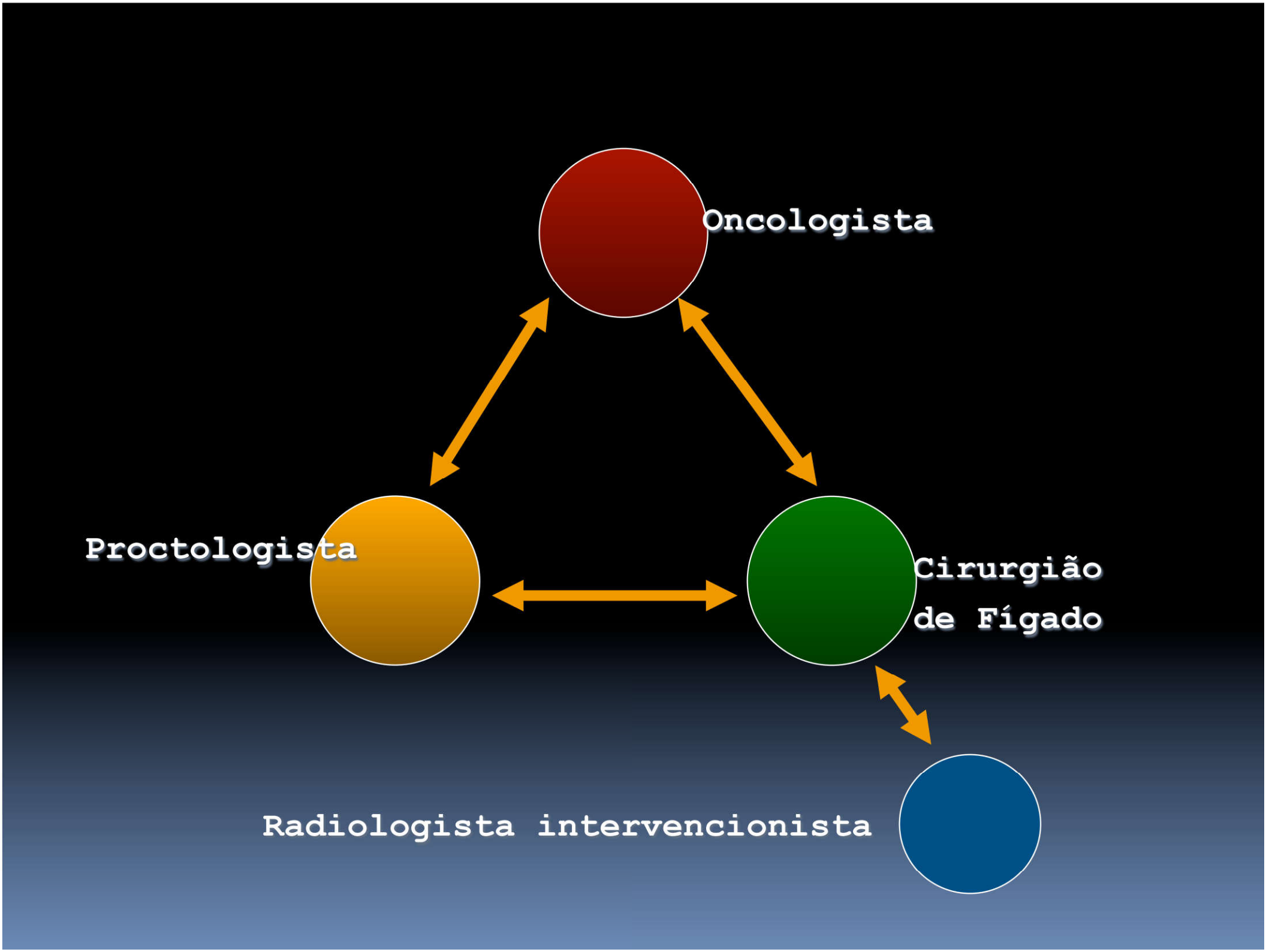
mor no
fígad … mor”

Abdalla EK, et al. Dig Surg 2008;25:421-9

Metástase hepática de origem colo-retal



European Study Group of Liver Metastasis, 2010


Oncologista
Proctologista
Cirurgião
de Fígado
Radiologista intervencionista

OPÇÕES DE TRATAMENTO EM META COLO-RETAL SINCRÔNICA

1. COLECTOMIA....QT....HEPATECTOMIA...QT
2. (COLECTOMIA + HEPATECTOMIA)...QT
3. COLECTOMIA..QT..EMBOLIZACAO PORTA..HEPATECTOMIA..QT
4. COLECTOMIA...QT....HEPATECTOMIA....HEPATECTOMIA....QT
5. COLEC....QT....HEPATEC...EMBOL PORTA...HEPATEC....QT
6. QT....(COLECTOMIA + HEPATECTOMIA)....QT
7. QT....COLECTOMIA....QT....HEPATECTOMIA....QT
8. QT...COLECTOMIA...EMBOL PORTA....HEPATECTOMIA
9. QT (+ RAD)...HEPATECTOMIA....QT...COLECTOMIA
10. QT...EMBOL PORTA...HEPATECTOMIA...COLECTOMIA
11. QT...HEPATECTOMIA....HEPATECTOMIA....COLECTOMIA
12. (COLECT + HEPAT 1° EST) + EVP...QT...HEPATEC (2° EST)

Metástase hepática

Facilmente ressecável
Marginalmente ressecável
Definitivamente irressecável

Abdalla EK, et al. Dig Surg 2008;25:421-9

Aumentar ressecabilidade

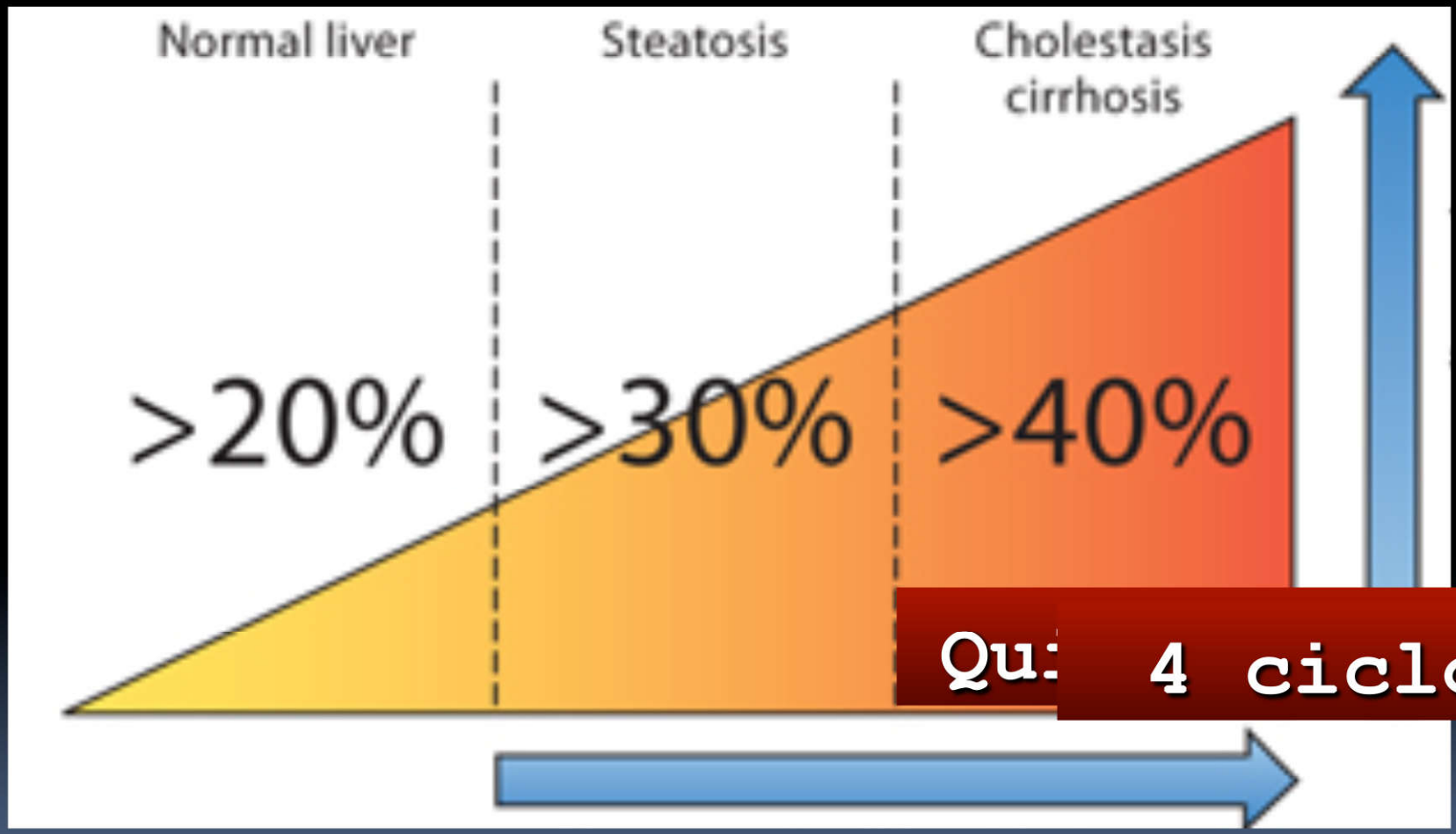
- Quimioterapia pré-operatória
- Embolização da veia porta
- Ligadura da veia porta
- Terapias ablativas
- Hepatectomia em dois tempos
- ALPPS

1. Adam et al - Surg Oncol Clin N Am 12:211-220,2004
2. de Santibanes E, et al. World J Surg 2012;36:125-8

Quimioterapia

- Promover downsize e elevar a taxa de ressecção curativa.
- Converter doença irressecável para ressecável.
- Identificar os respondedores em pacientes de risco elevado de recorrência, para pós-operatória.
- Pacientes com múltiplas lesões, selecionar quem progride apesar da QT, que podem não se beneficiar da ressecção.

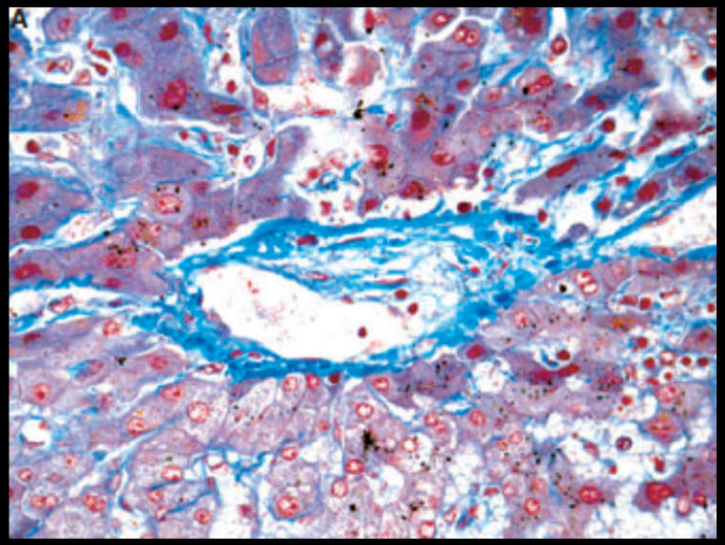
Remanescente hepático

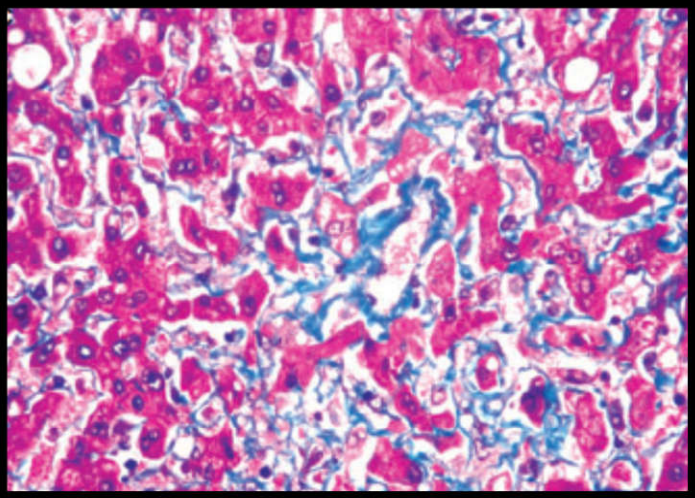


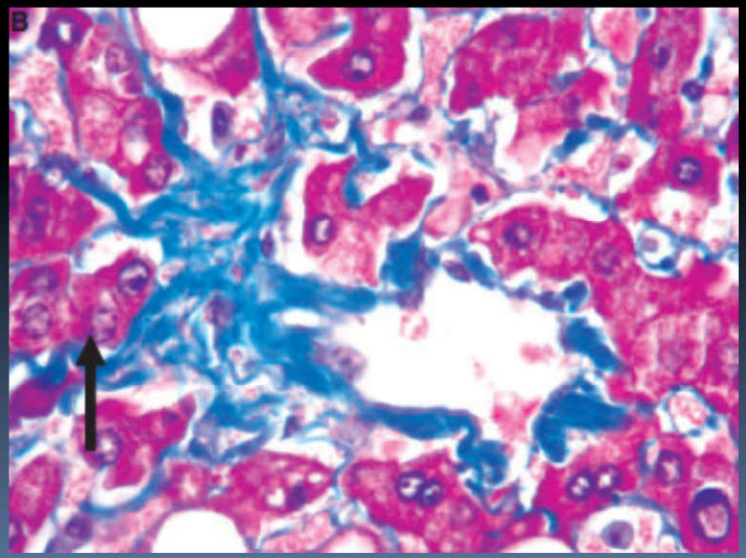
Qu: 4 ciclos

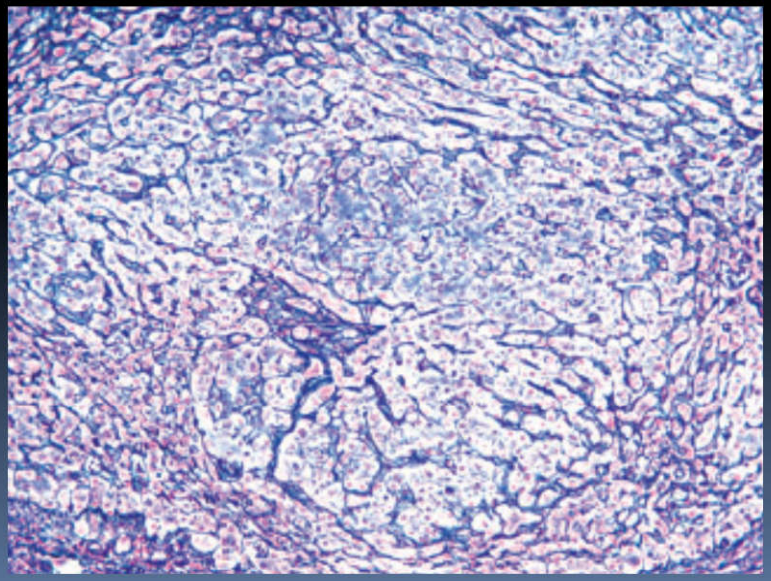
Abdalla EK, et al. Dig Surg 2008;25:421-9

Oxaliplatina e Obstrução sinusoidal



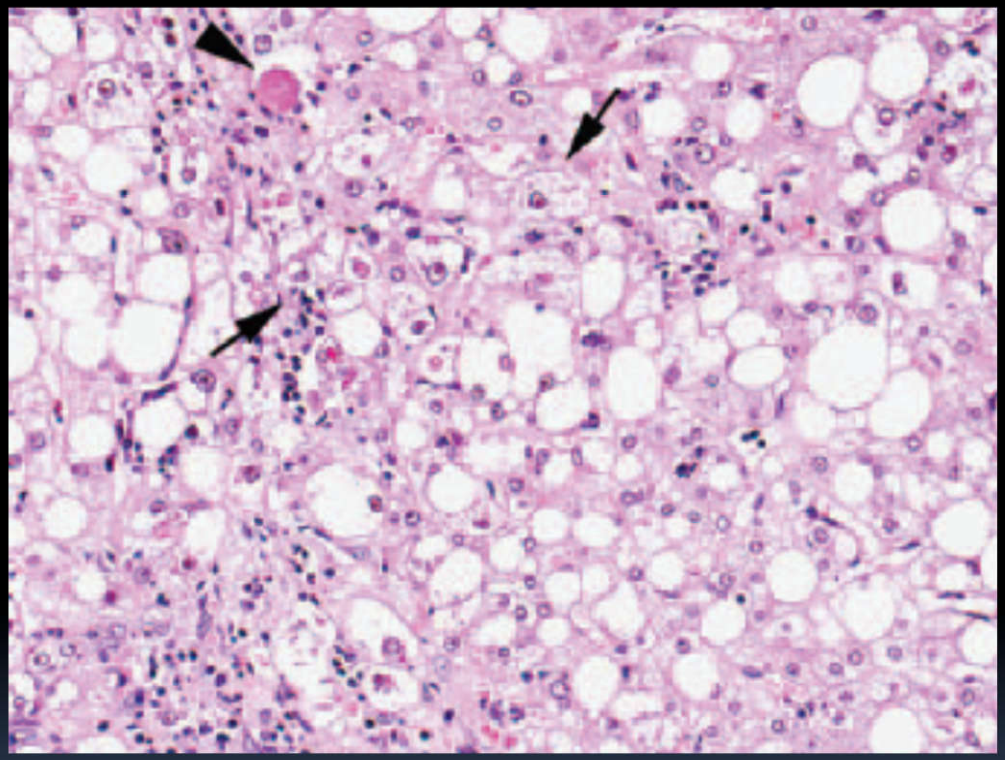


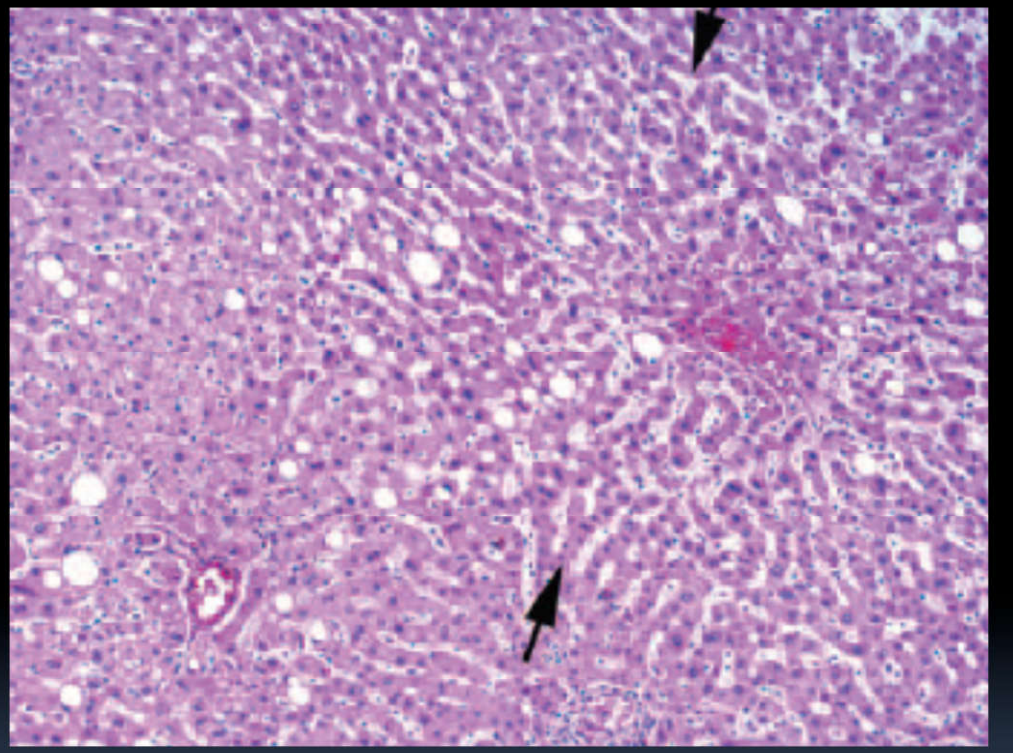




Rubbia-Brandt L et al - Histopathology 2010;56:430-9

Irinotecan e Esteatohepatite





Vauthey JN et al - J Clin Oncol 2006;24:2065-72

Metástase hepática e QT

66 metástases com resposta completa em exame de imagem

Exploração intra-operatória
Exame do fígado + US

Doença residual
Macroscópica: 20

Sem doença residual macroscópica: 46

Ressecção do local da metástase inicial:15

Célula tumoral viável:12

Sem doença:3

Local da metástase inicial acompanhado por 1 ano:31

Sem recorrência:8

Recorrência:23

55/66 (83,3%)

Benoist S et al - J Clin Oncol 2006;24:3939-45

Indução de hipertrofia

Embolização Portal (EP)

Makuuchi M, et al. *Surgery 1990*

Hepatectomia em 2 tempos

Adam R, et al. *Ann Surg. 2000*

Hepatectomia 2 tempos + EP

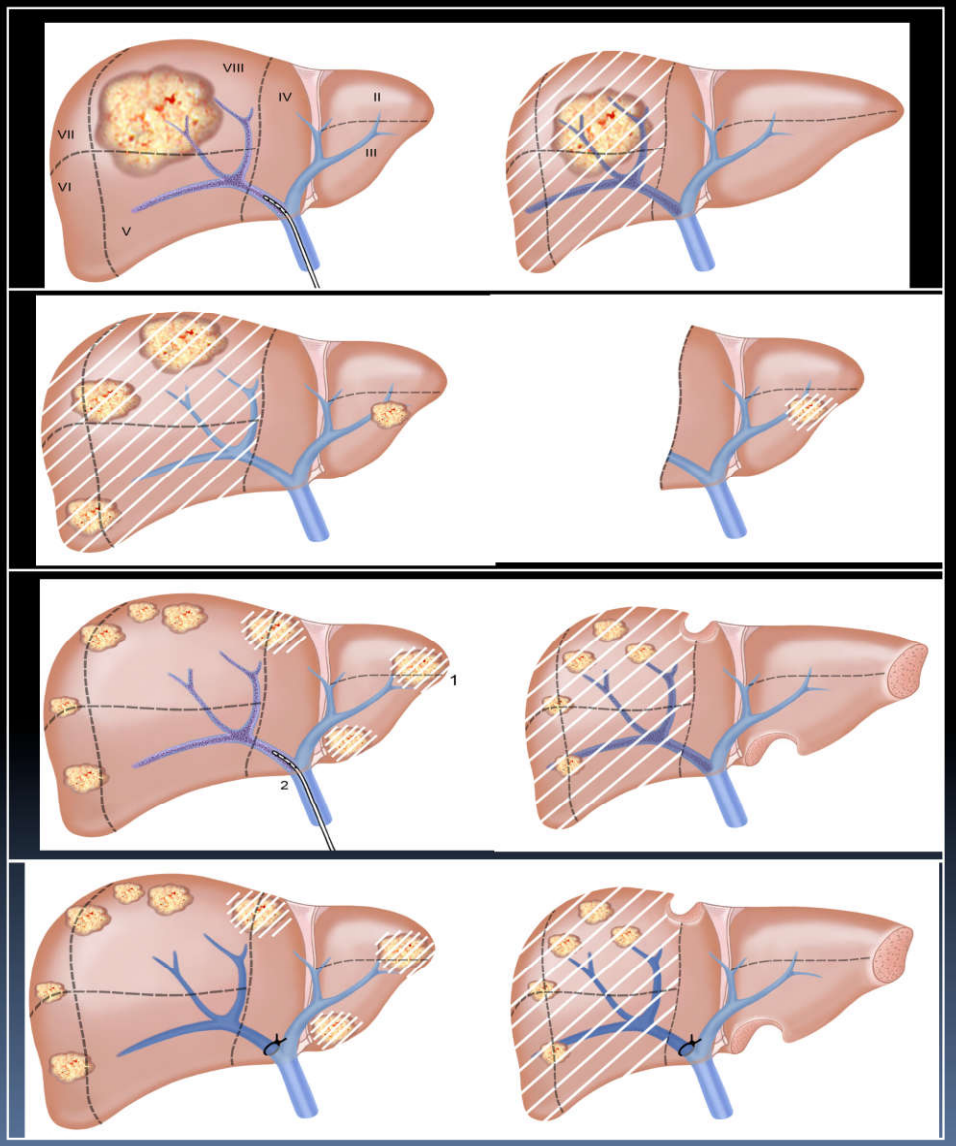
Jaeck D, et al. *Ann Surg. 2004*

Hepatectomia 2 tempos + LP

J Belghiti, Clavien AP, et al. *Hepatology 2008*

ALPPS

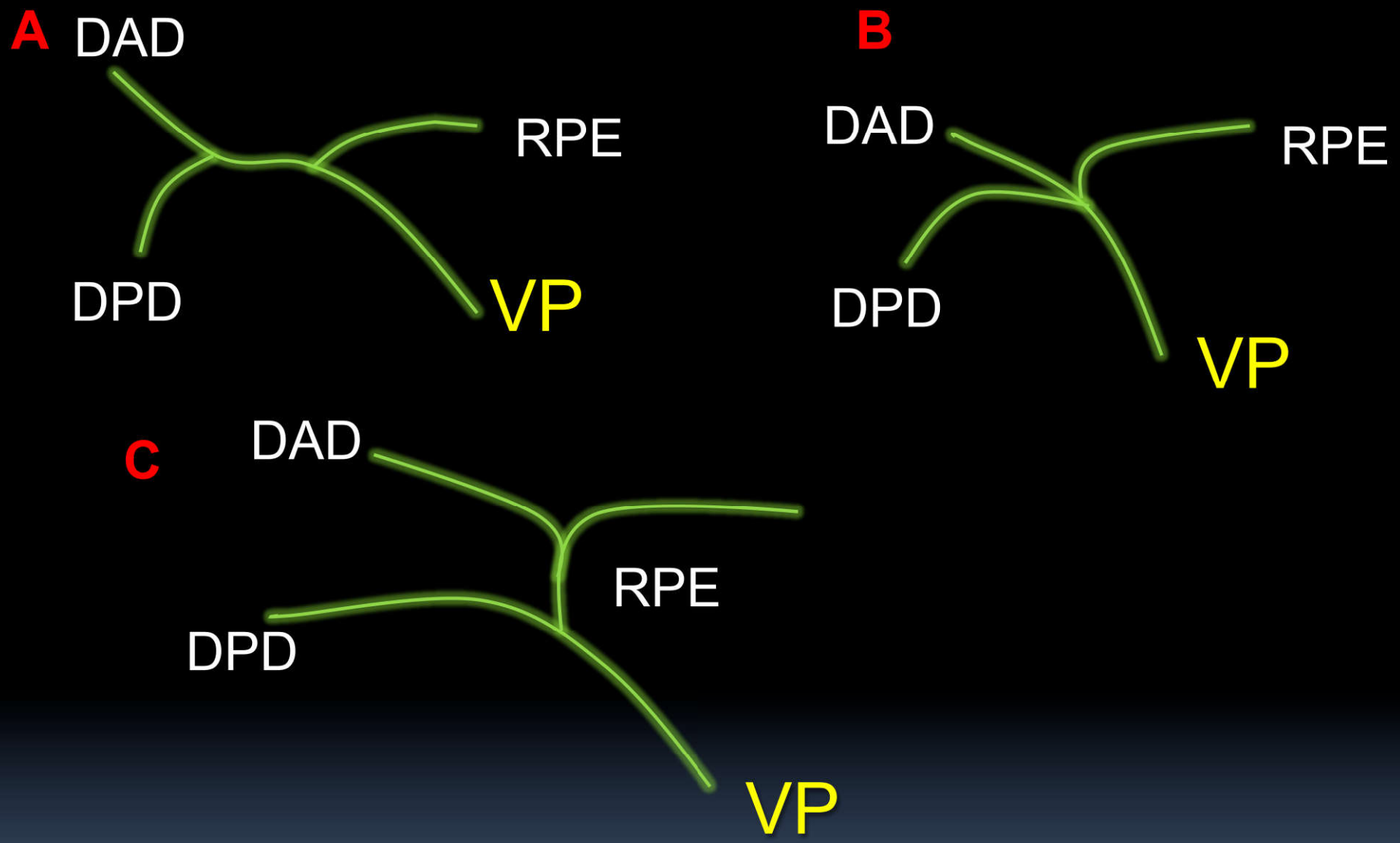
Schnitzbauer AA, et al. Ann Surg 2012



Embolização da veia porta

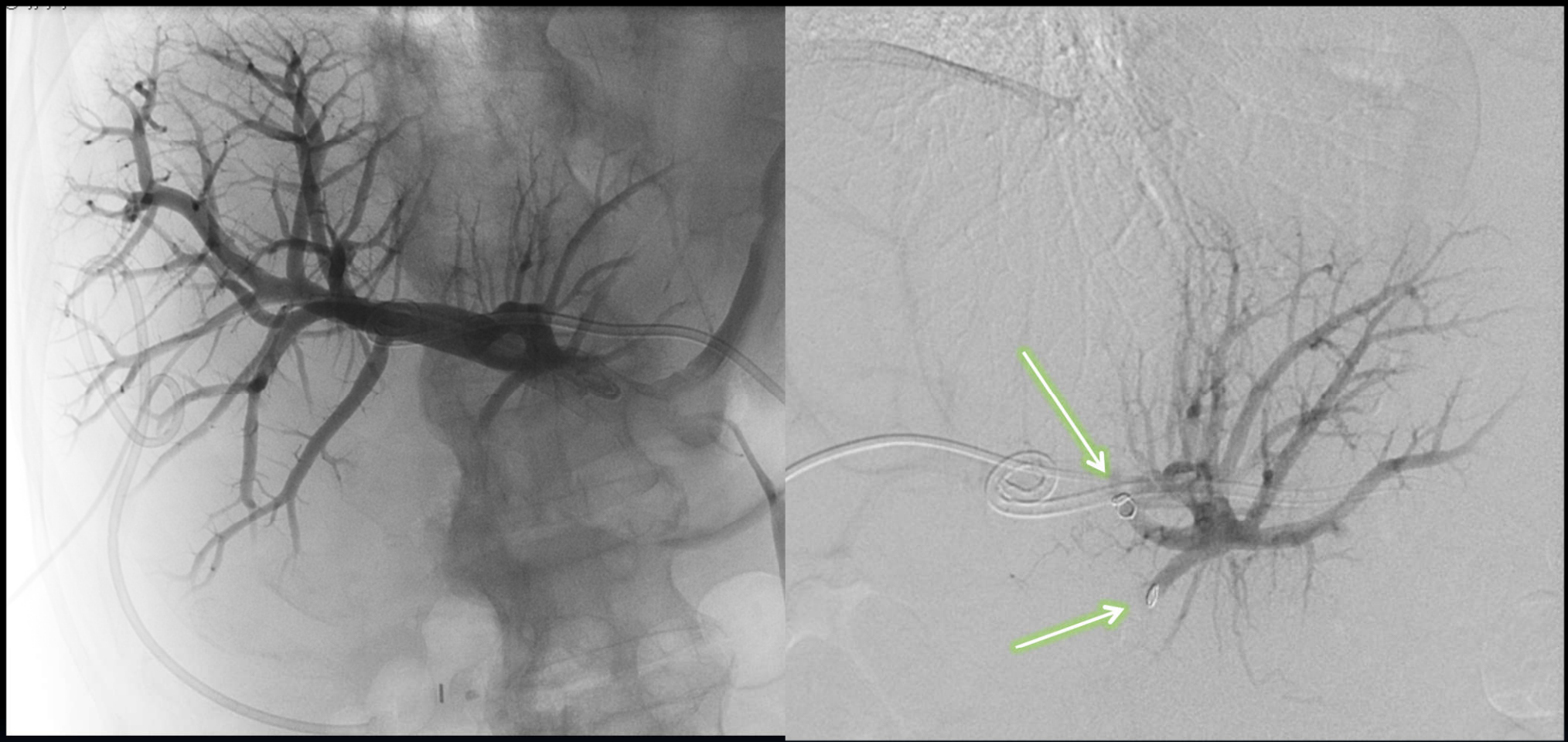
- Induz hipertrofia seletiva do fígado sem doença
- Aumenta a massa celular e o número de hepatócitos
- Transforma paciente não ressecável em ressecável
- Contra-indicado:
  - não candidatos
  - em obstrução da veia porta
  - insuficiência renal
  - remanescente > 25%
  - coagulopatia
  - hipertensão porta.
- Aumento de até 40% do volume remanescente

Madoff DC et al – Radiology 2003;227:251-60



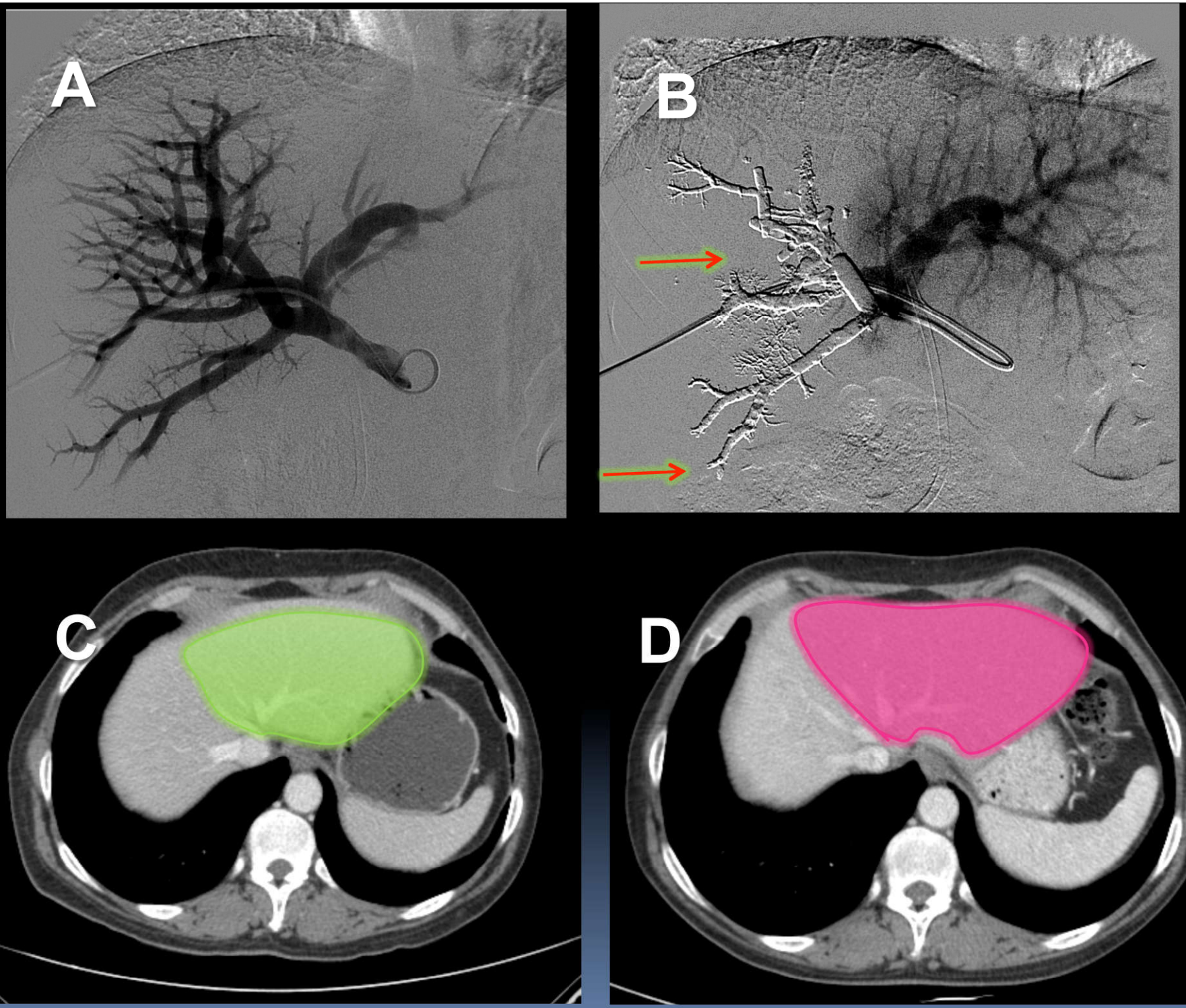
(A) Anatomia clássica (~65%). (B) Trifurcação (~9%). (C) Divisão anterior direita (segmentos 5 e 8) originada do ramo portal esquerdo (~13%). VP = Veia porta; RPE = Ramo portal esquerdo; DAD = Divisão anterior direita; DPD = Divisão posterior direita.

Carnevale F, et al, In Torres OJM - Ed Rubio. In press



(A) Portografia direita com catéter pigtail através de acesso ipsilaterial. (B) Após microcateterização seletiva dos principais ramos do segmento 4 (setas), realizada embolização com micropartículas e micromolas. Notar a preservação do fluxo portal normal nos demais ramos do lobo esquerdo. O procedimento prosseguiu com embolização dos ramos portais direitos com NBCA.

Carnevale F, et al, In Torres OJM – Ed Rubio. In press



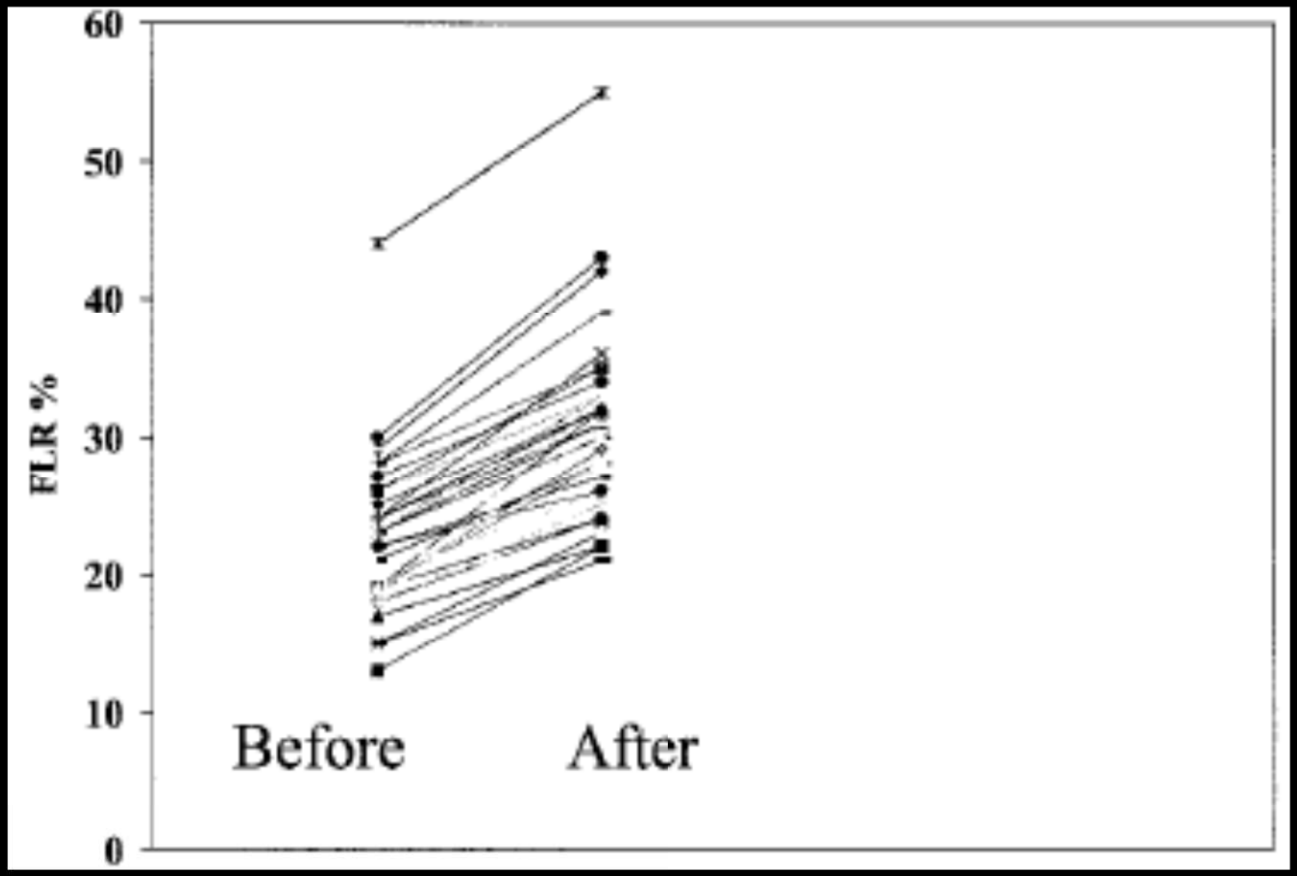
Carnevale F, et al, In Torres OJM - Ed Rubio. In press

Embolização de veia porta

Madoff DC et al - Radiology 2003;227:251-60

Embolização da veia porta

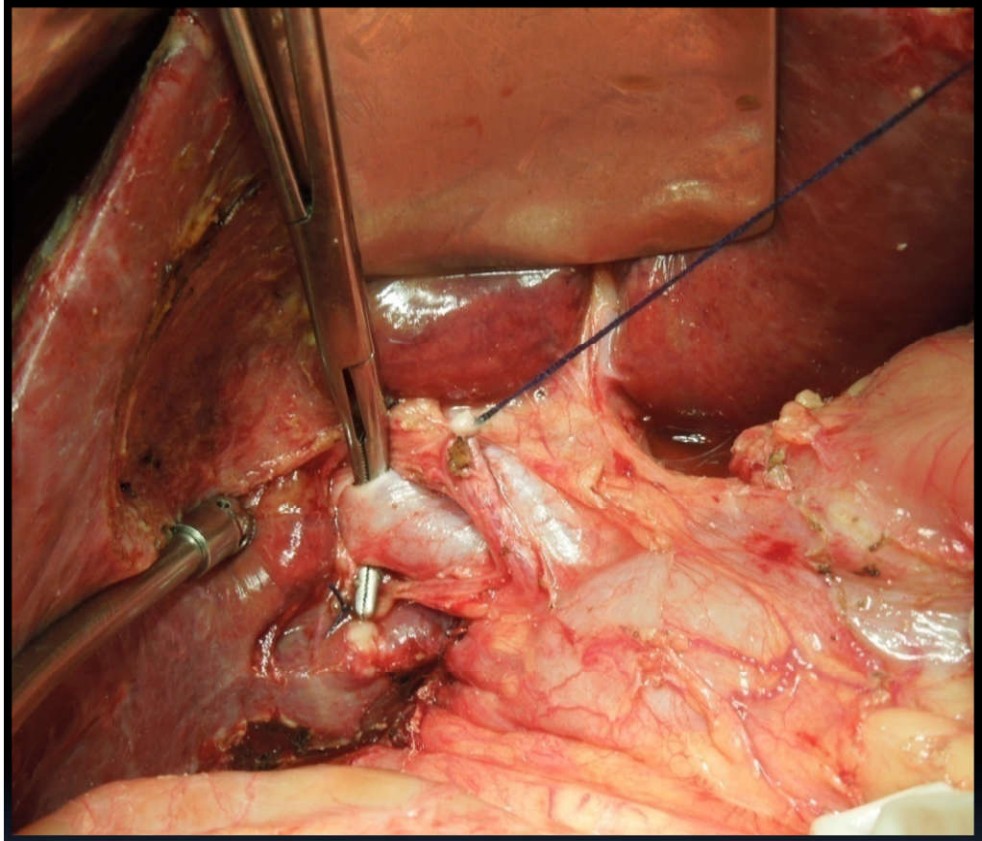
Madoff DC et al - Radiology 2003;227:251-60

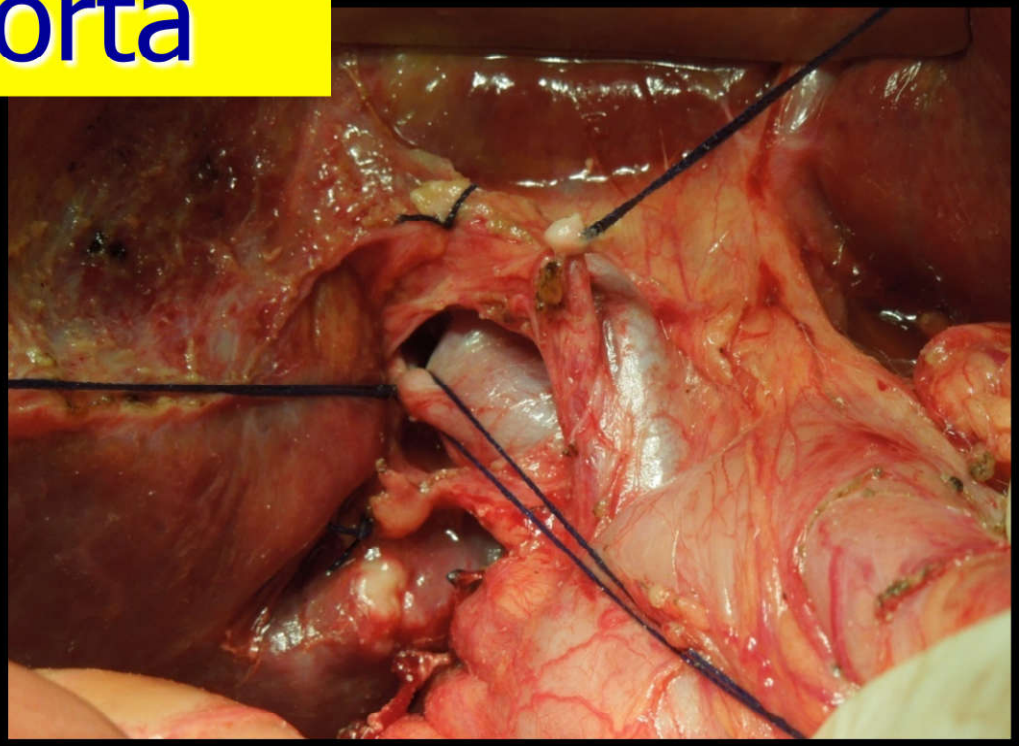


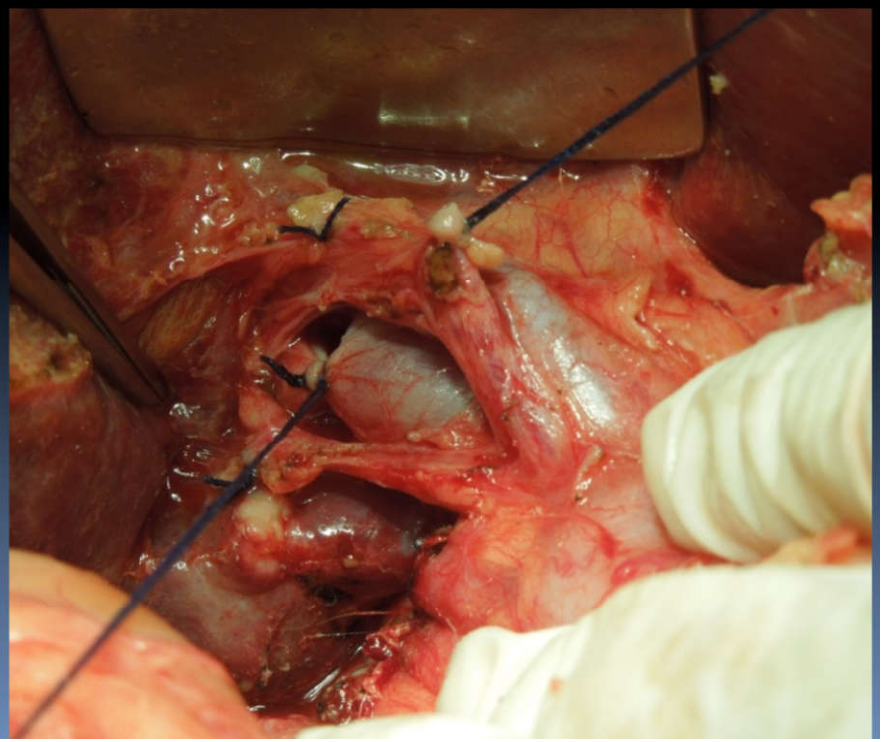
Após 4-6 semanas **35%**

Hemming AW et al - Ann Surg 2003;237:686-93

Ligadura da veia porta

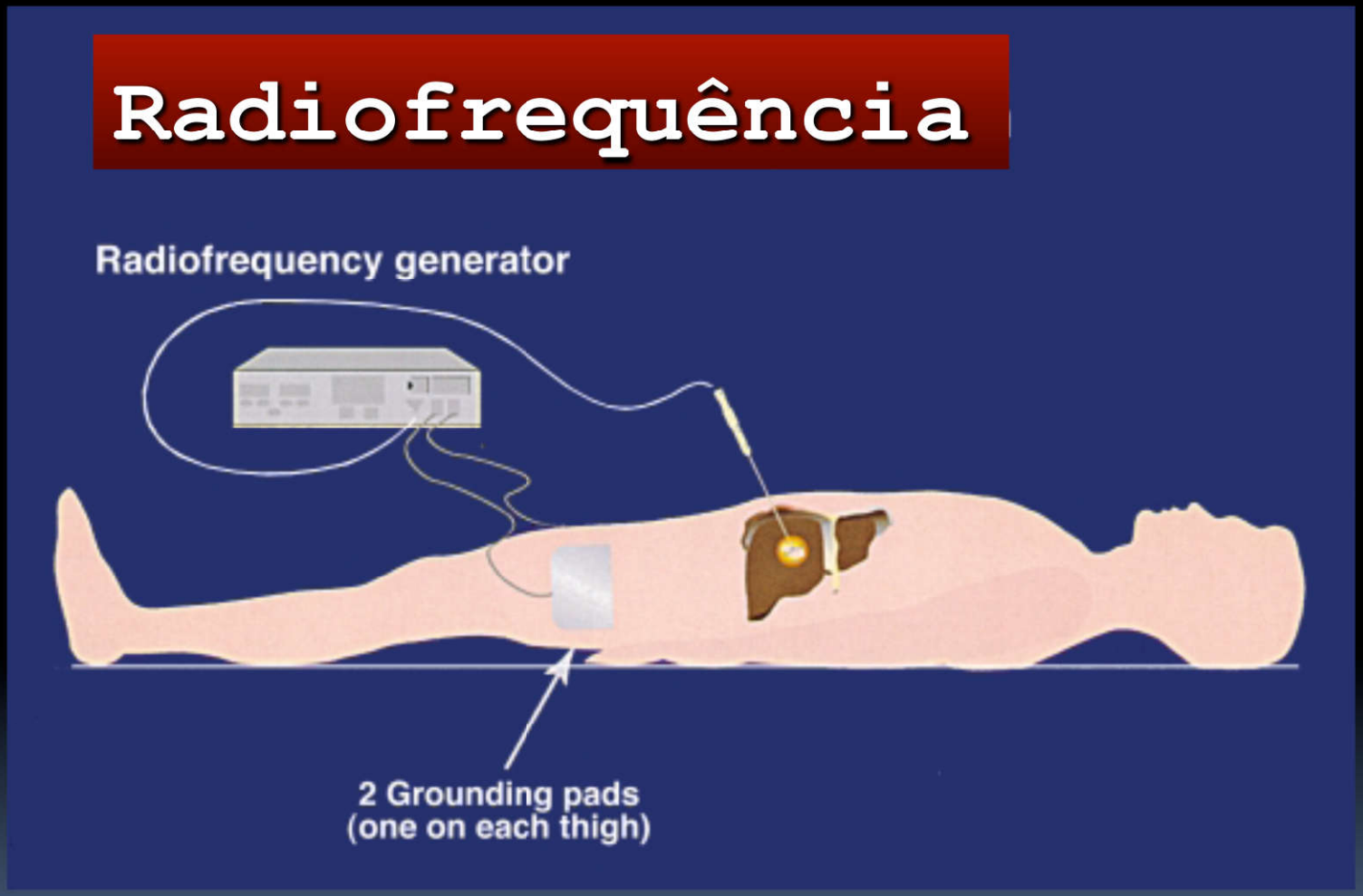






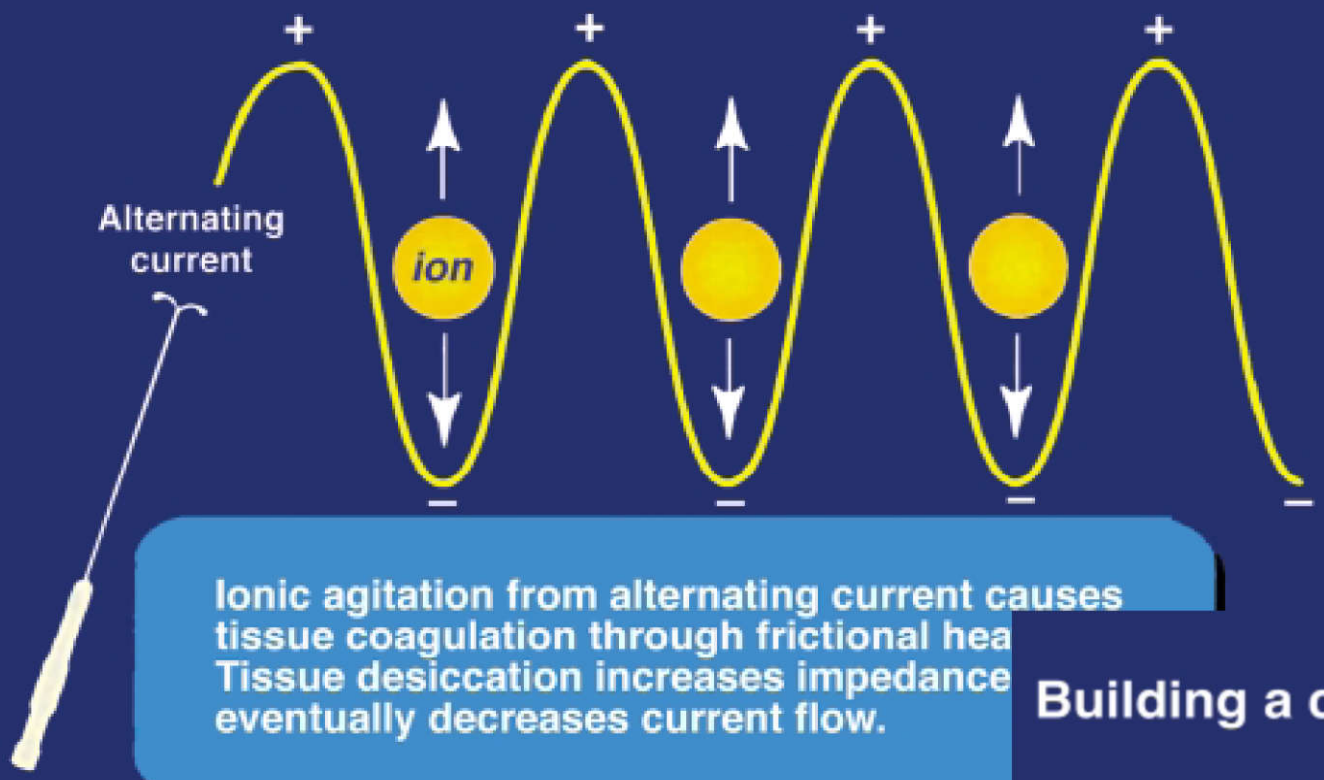
Ligadura da veia porta D

Terapias ablativas



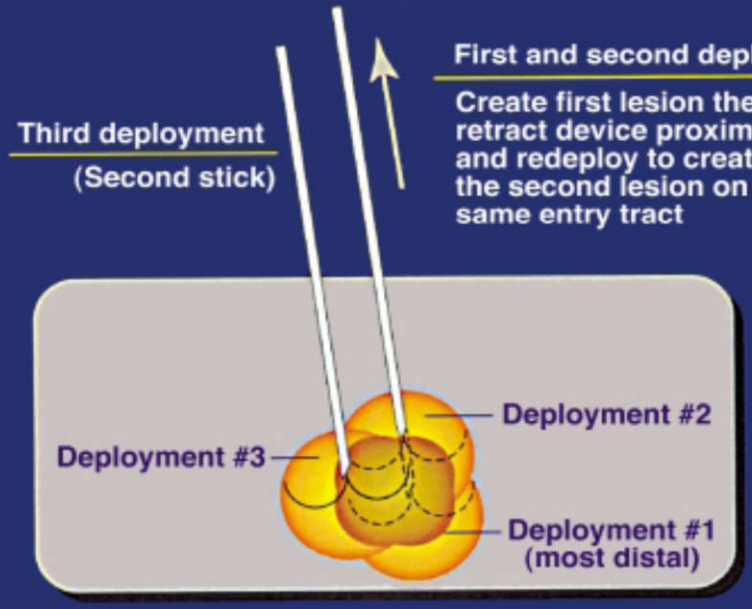
- Ablação por radiofreqüência (ARF), se faz com a passagem de corrente elétrica alternada (energia de radiofreqüência) pela área alvo, localizada no fígado.

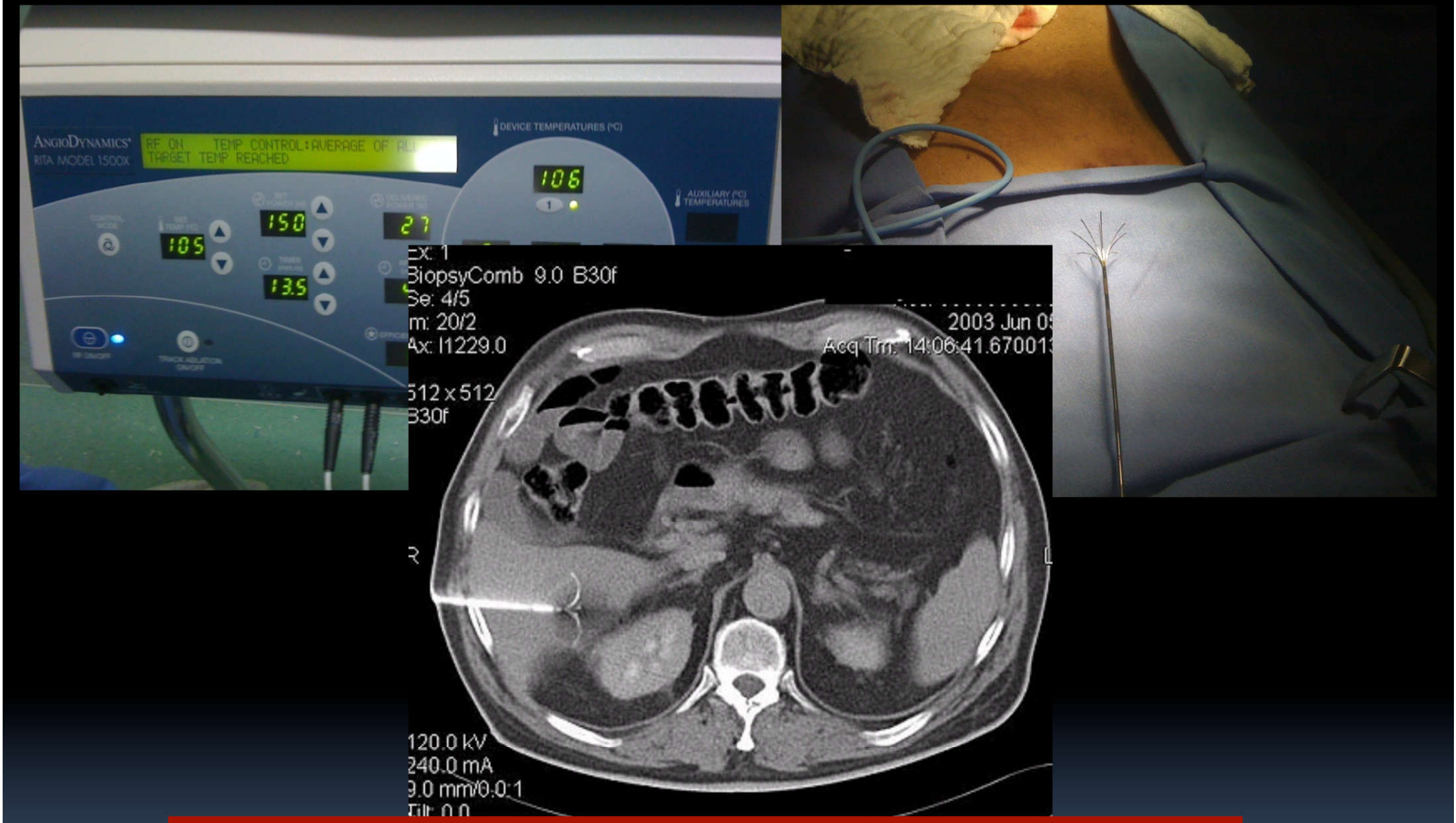
Radiofrequency ablation



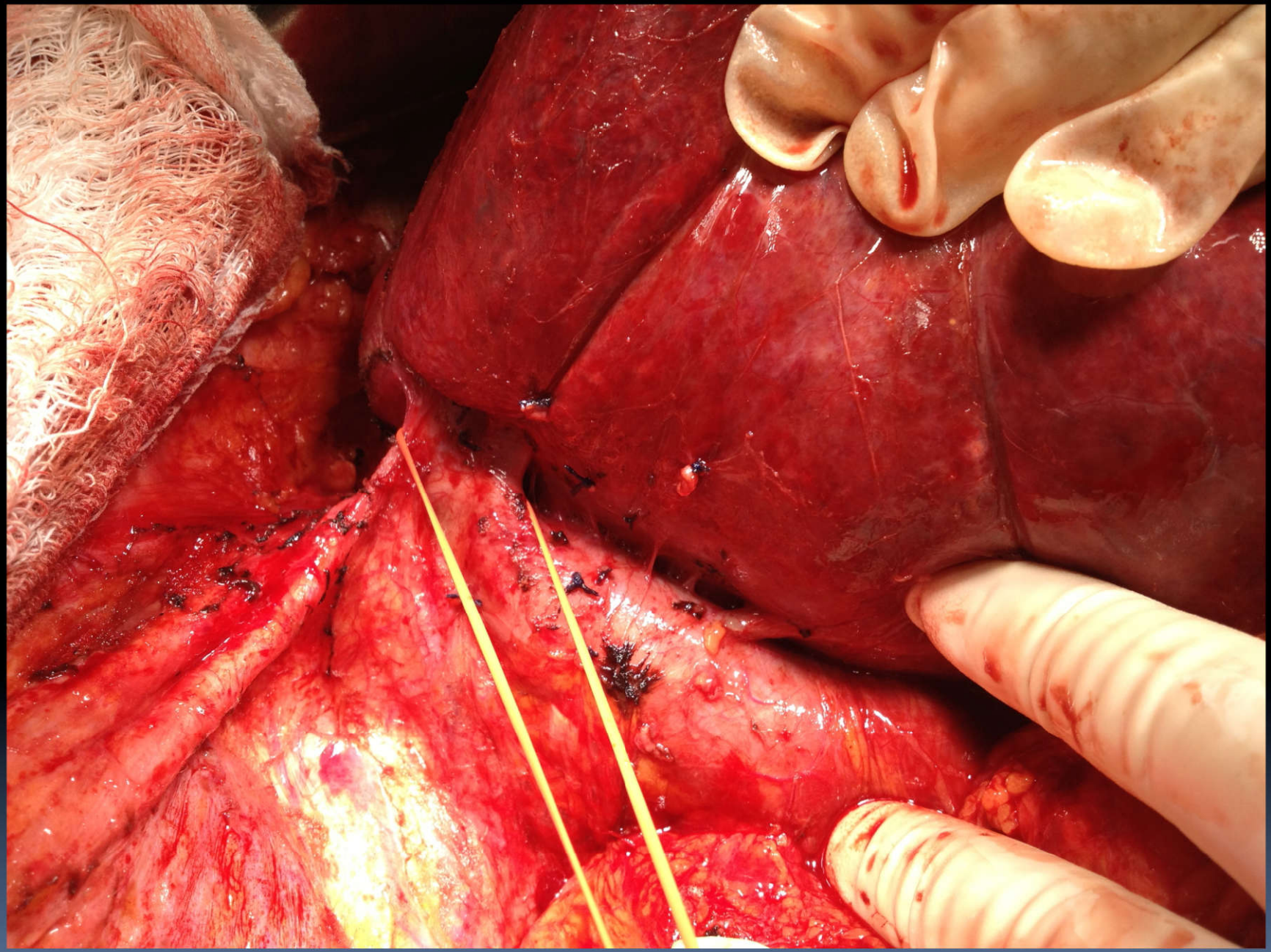
Ionic agitation from alternating current causes tissue coagulation through frictional hea
Tissue desiccation increases impedance
eventually decreases current flow.

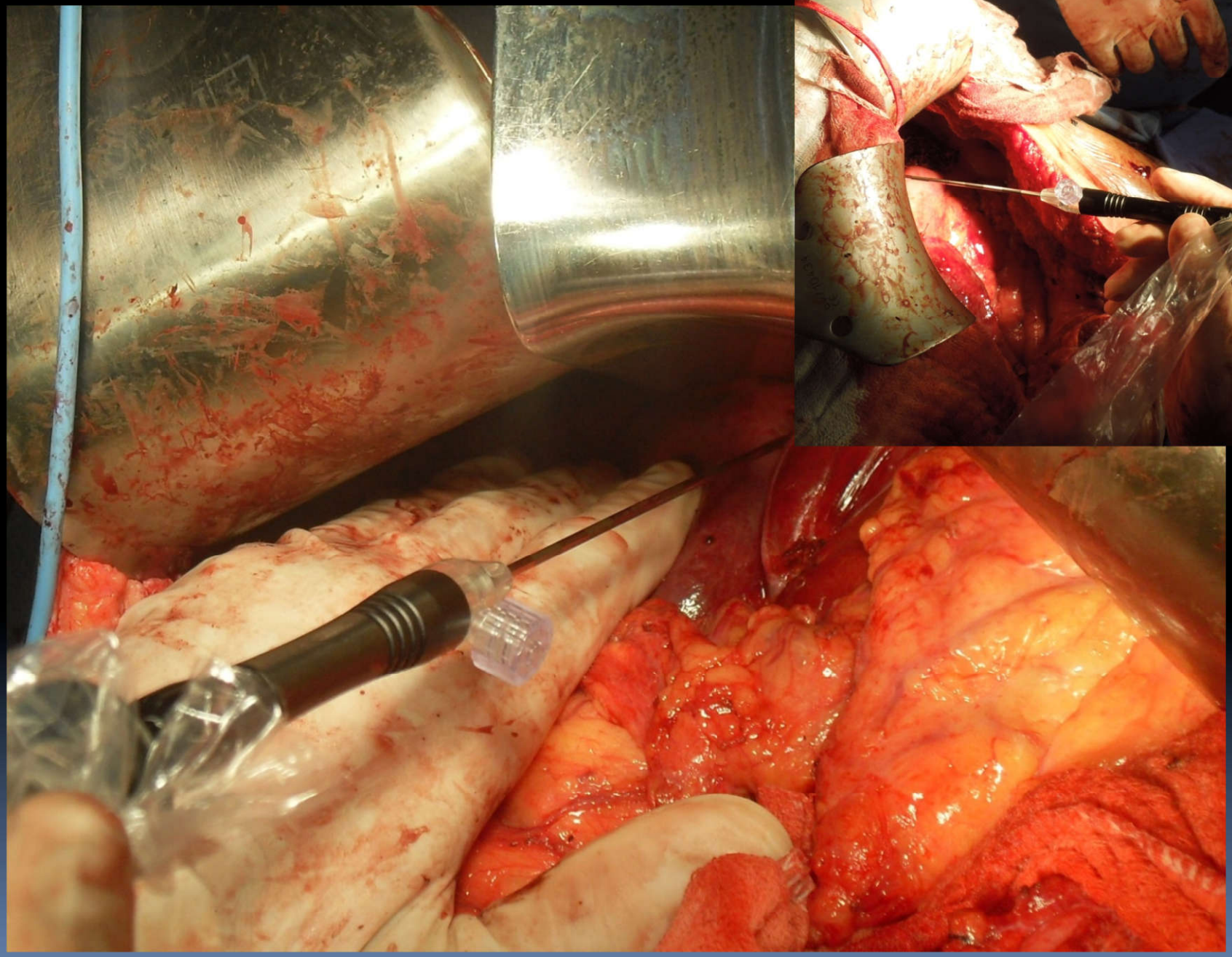
Building a compound thermal lesion

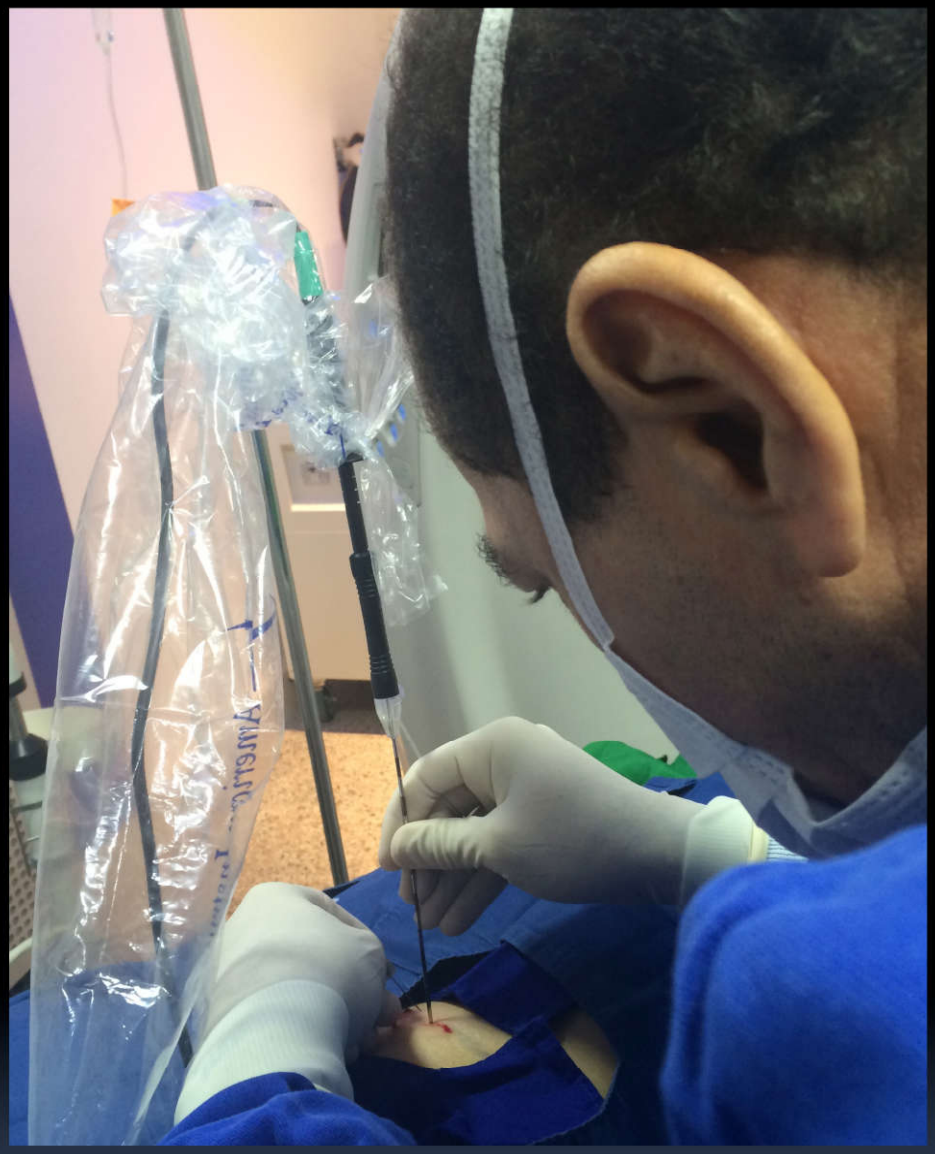


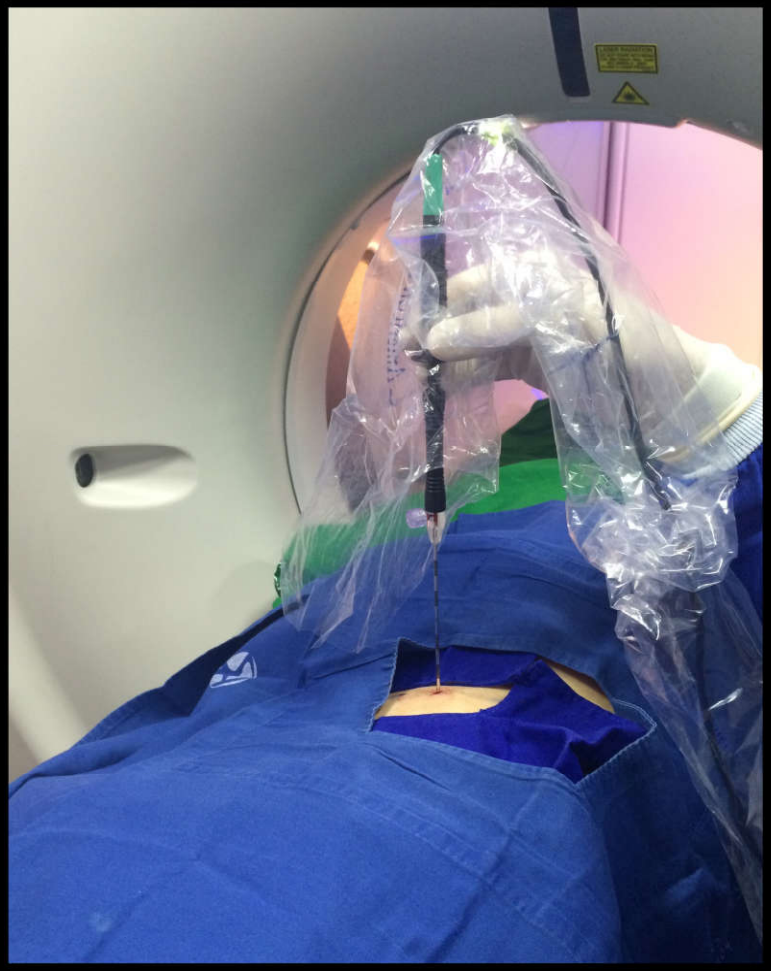


- Lesões profundas
- Perda de parênquima sadio
- Associado com ressecções maiores



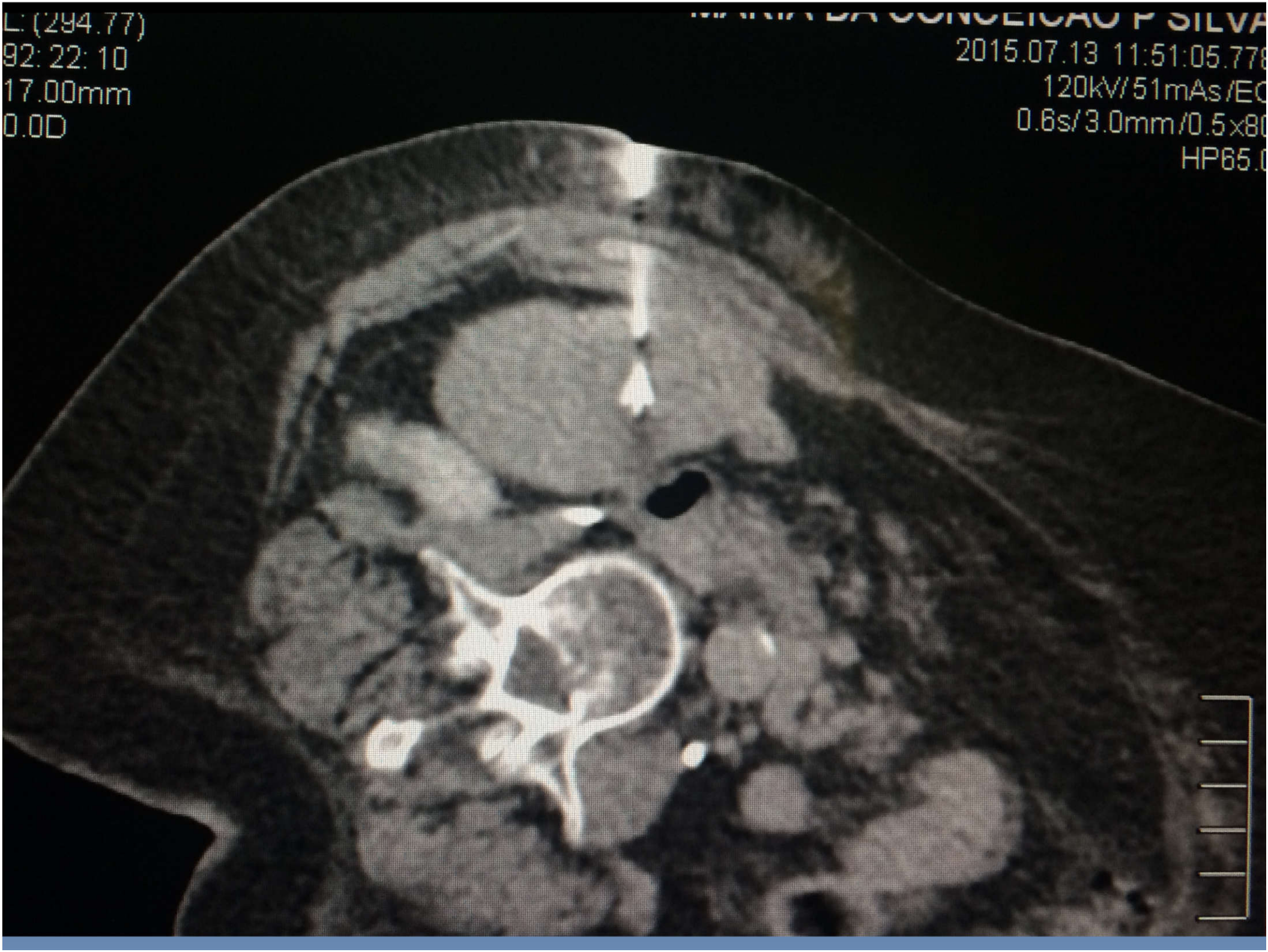


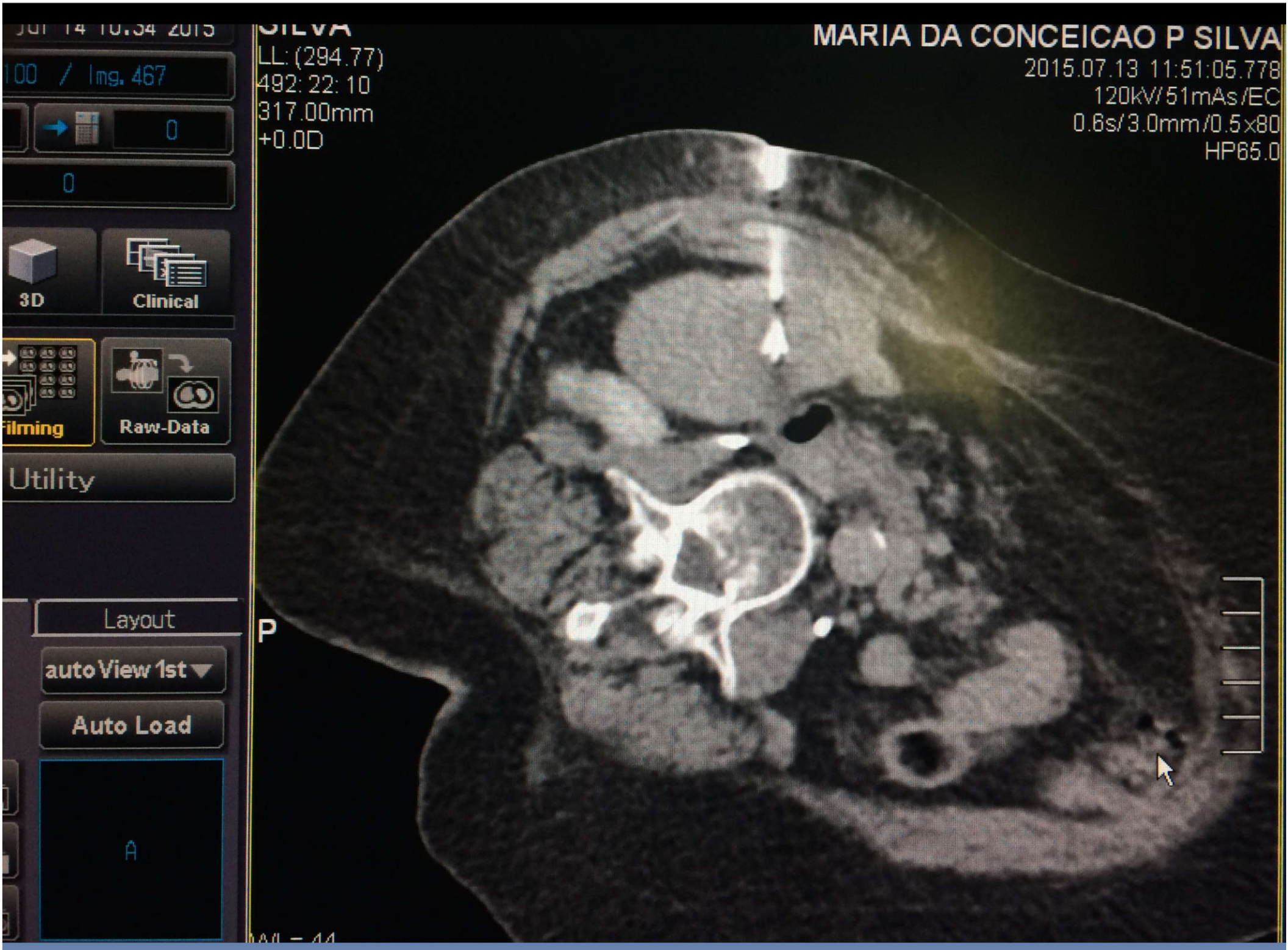





PRIME
Aquilion

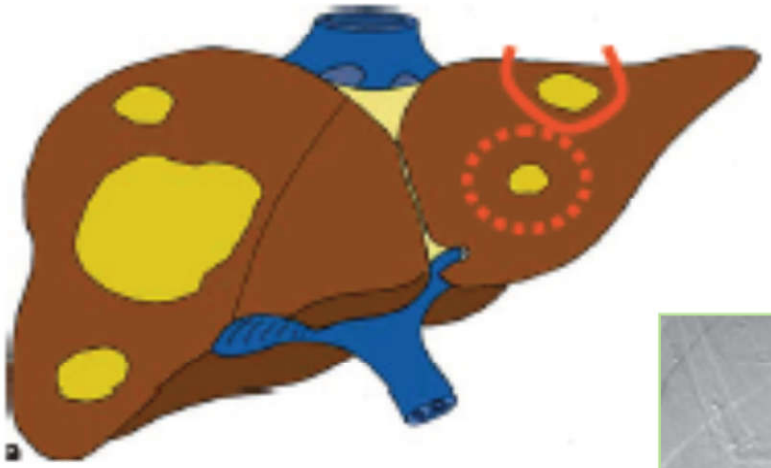

L: (294.77)
92: 22: 9
14.00mm
0.0D
MARIA DA CONCEICAO P SILVA
2015.07.13 11:51:05.723
120kV/51mAs/EC
0.6s/3.0mm/0.5x80
HP65.0


L: (294.77)
92: 22: 10
17.00mm
0.0D
2015.07.13 11:51:05.778
120kV/51mAs/EC
0.6s/3.0mm/0.5x80
HP65.0

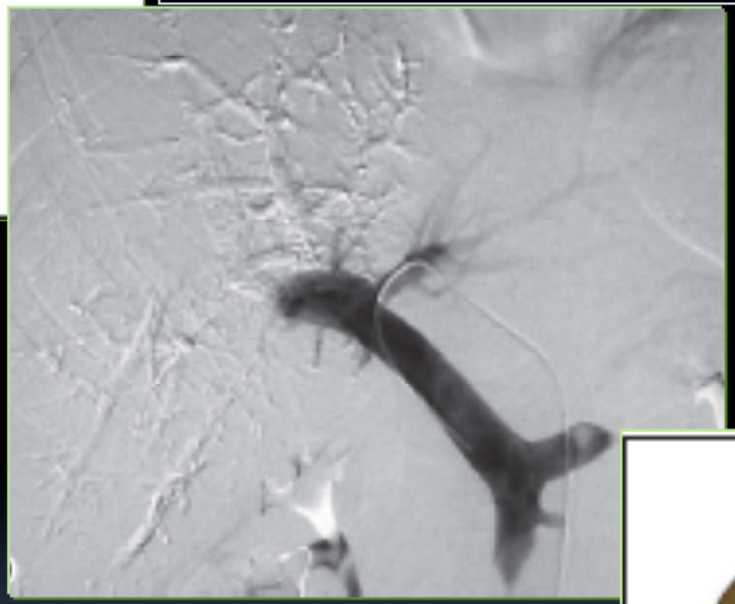

MARIA DA CONCEICAO P SILVA
2015.07.13 11:51:05.778
120kV/51mAs/EC
0.6s/3.0mm/0.5x80
HP65.0
LL: (294.77)
492: 22: 10
317.00mm
+0.0D
P
3D
Clinical
Raw-Data
Utility
Layout
auto View 1st
Auto Load

Hepatectomia em dois tempos

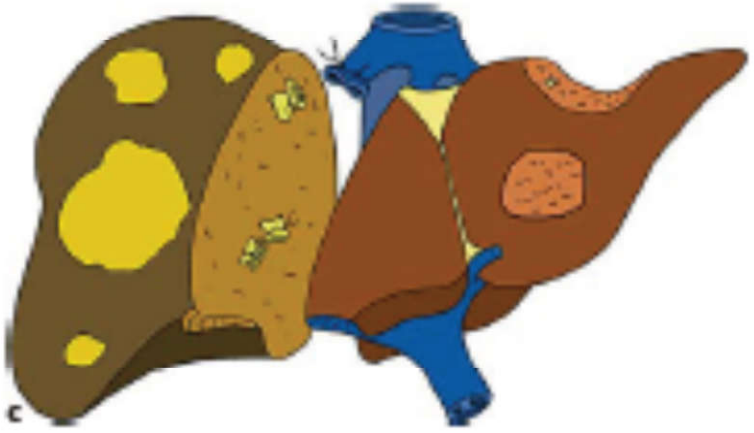
Limpeza do lobo E



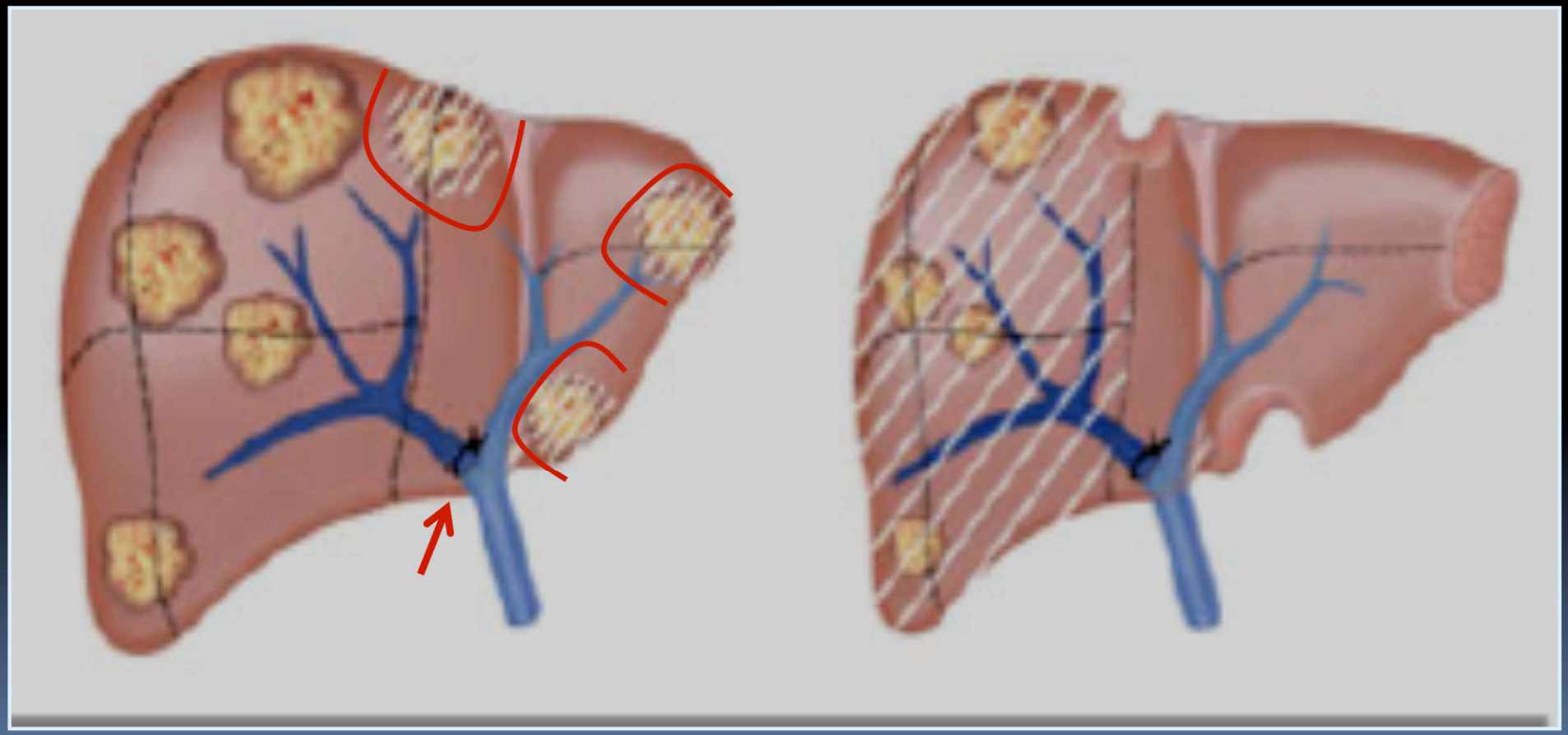
Embolização da veia Porta

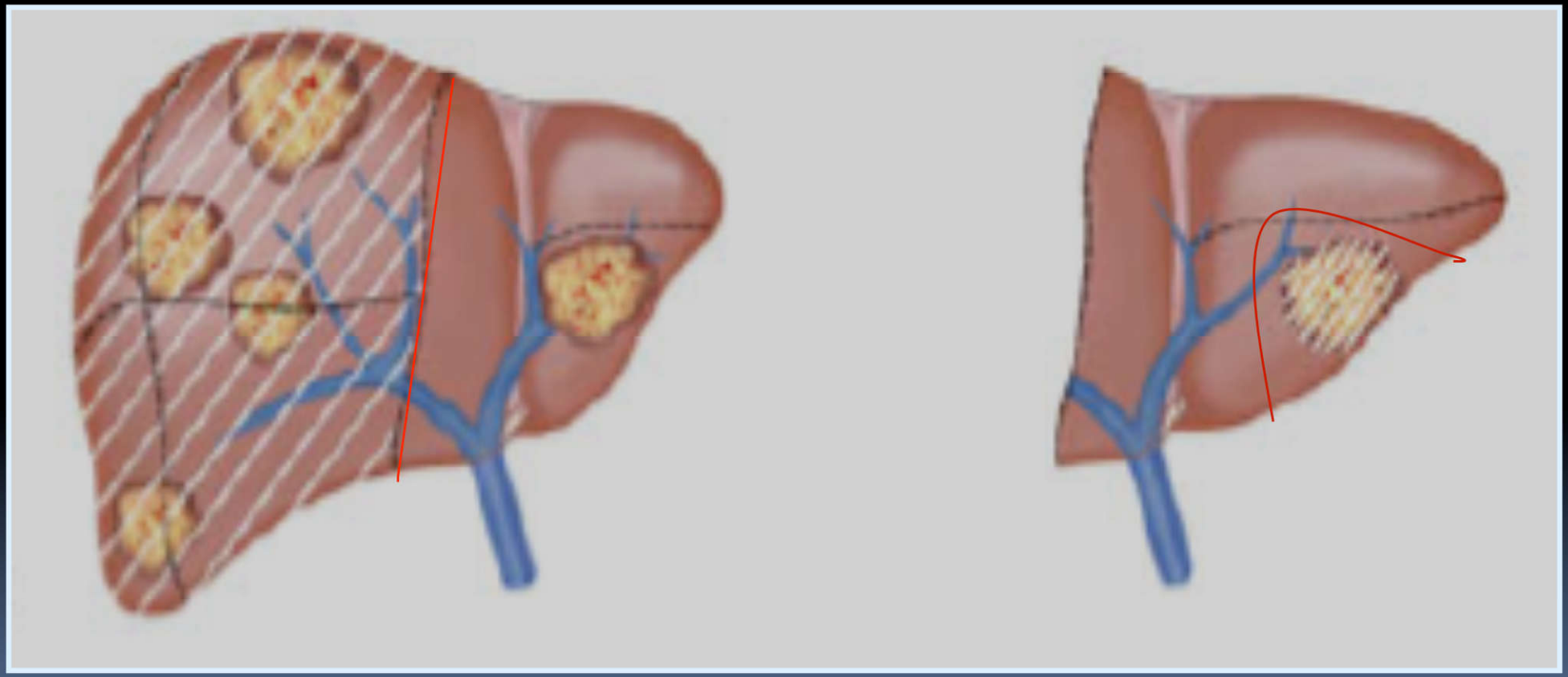


Hepatectomia D

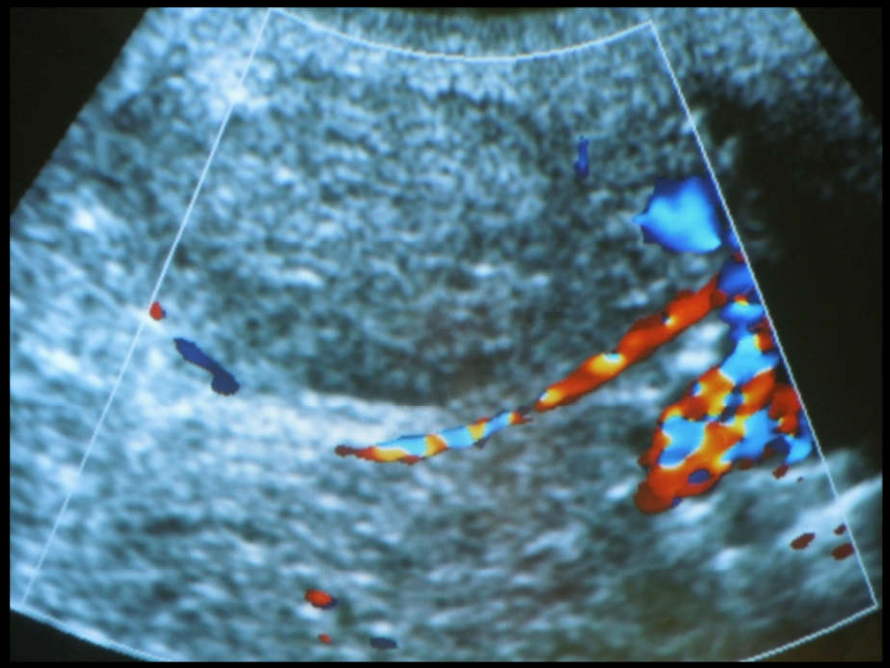


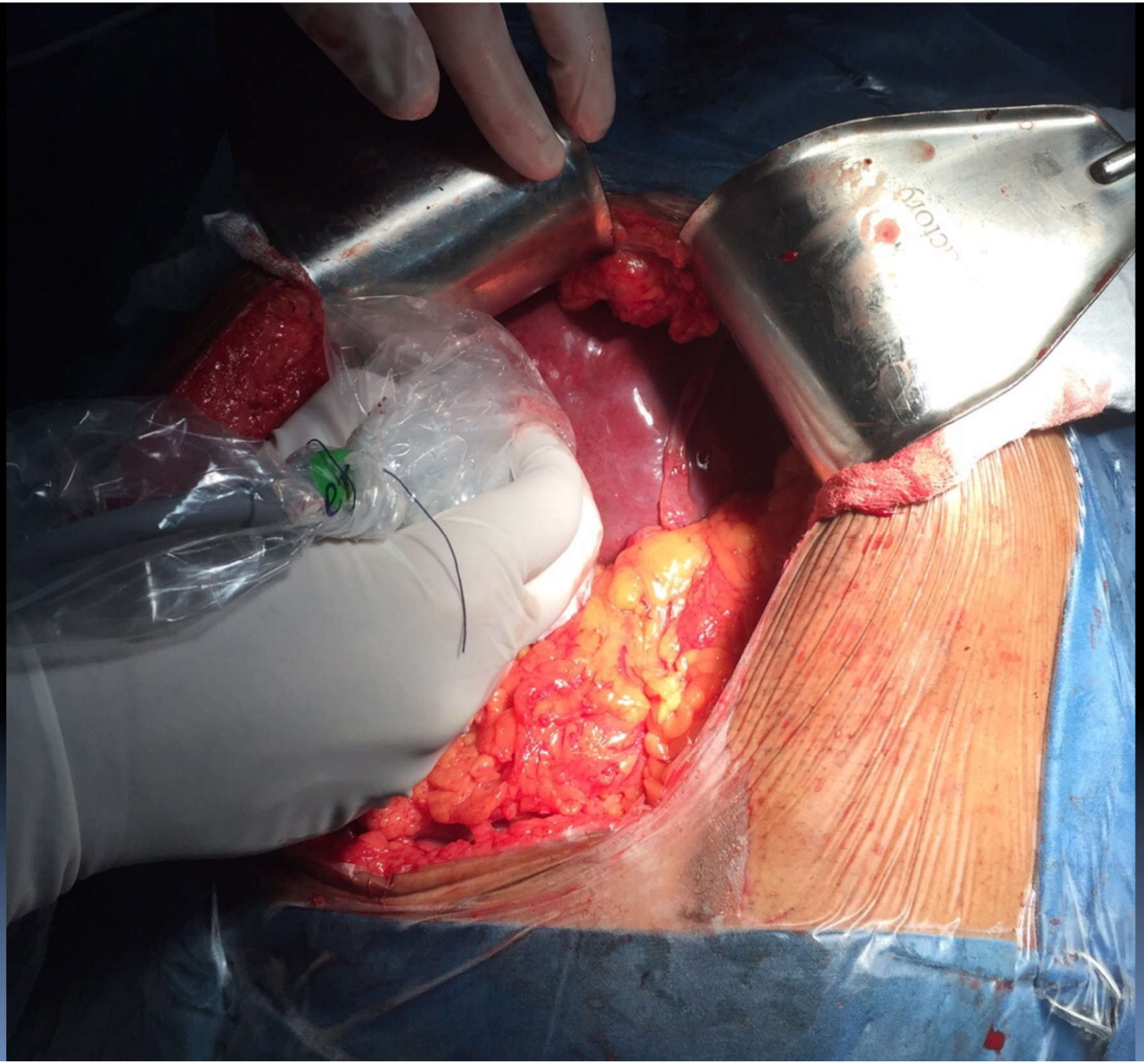
Hepatectomia em dois tempos + LVP

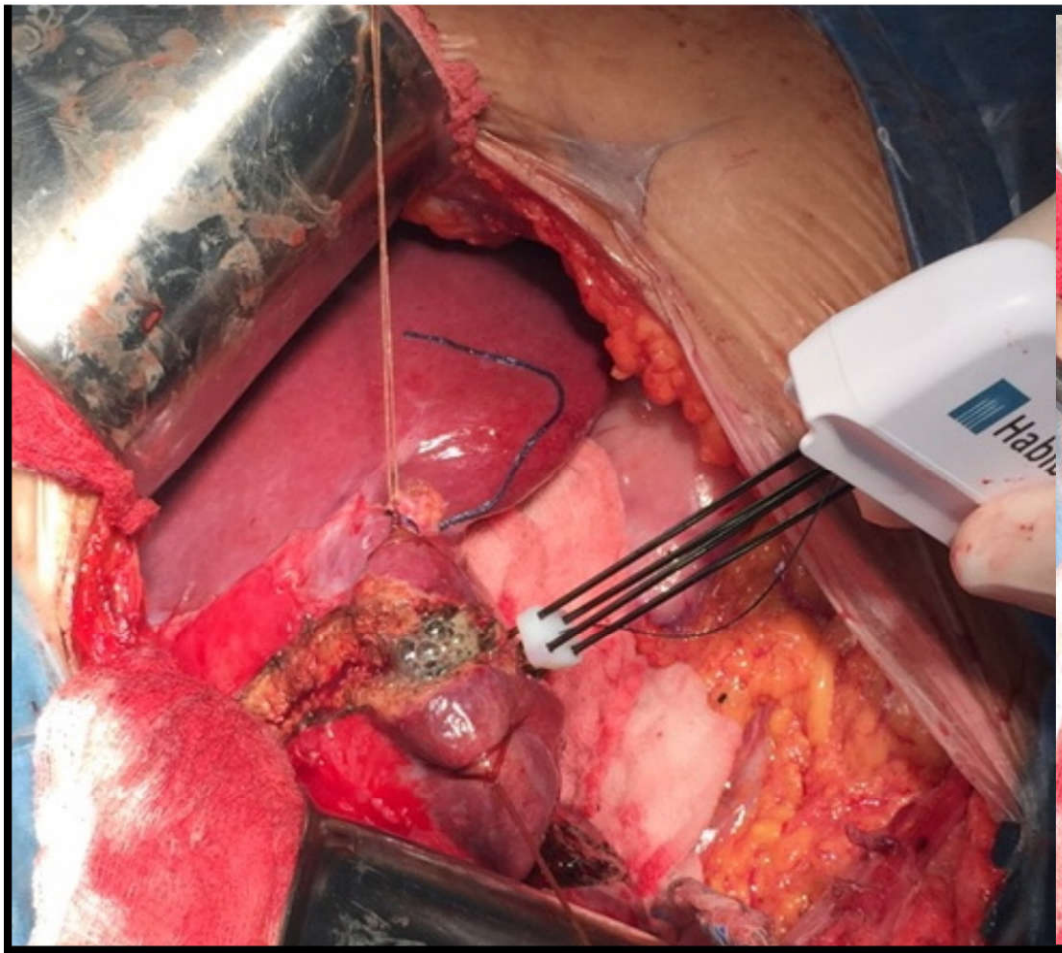


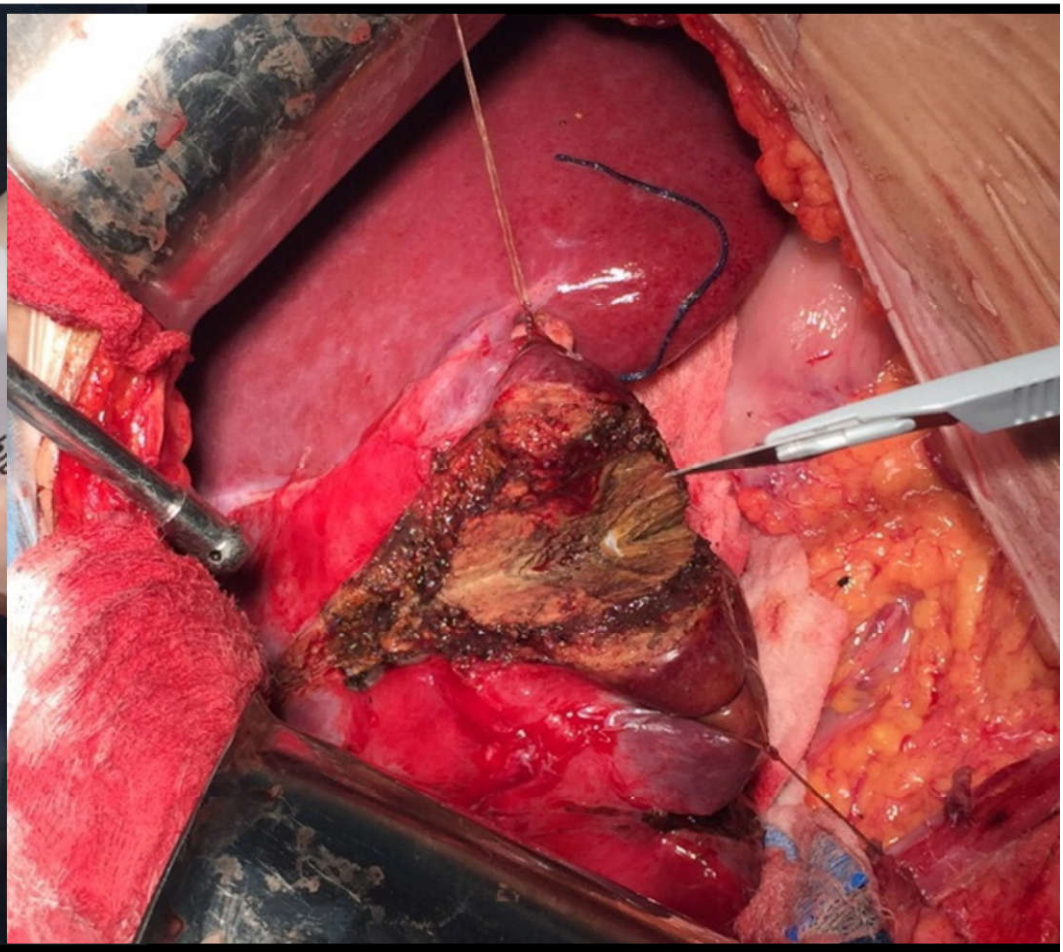


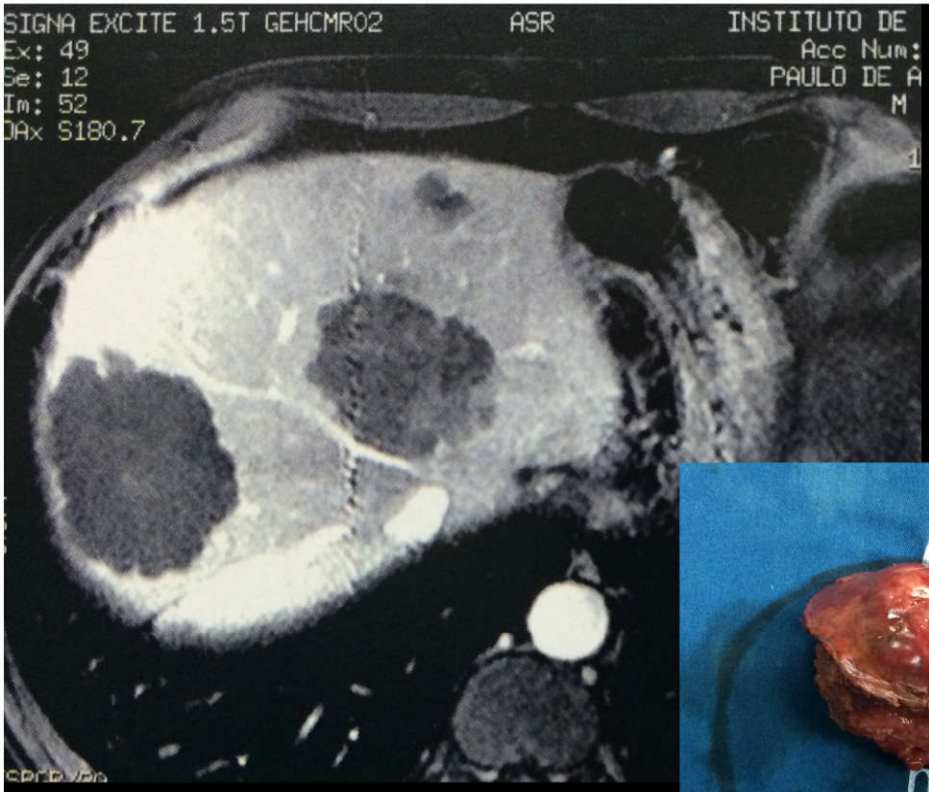
US intra-operatória

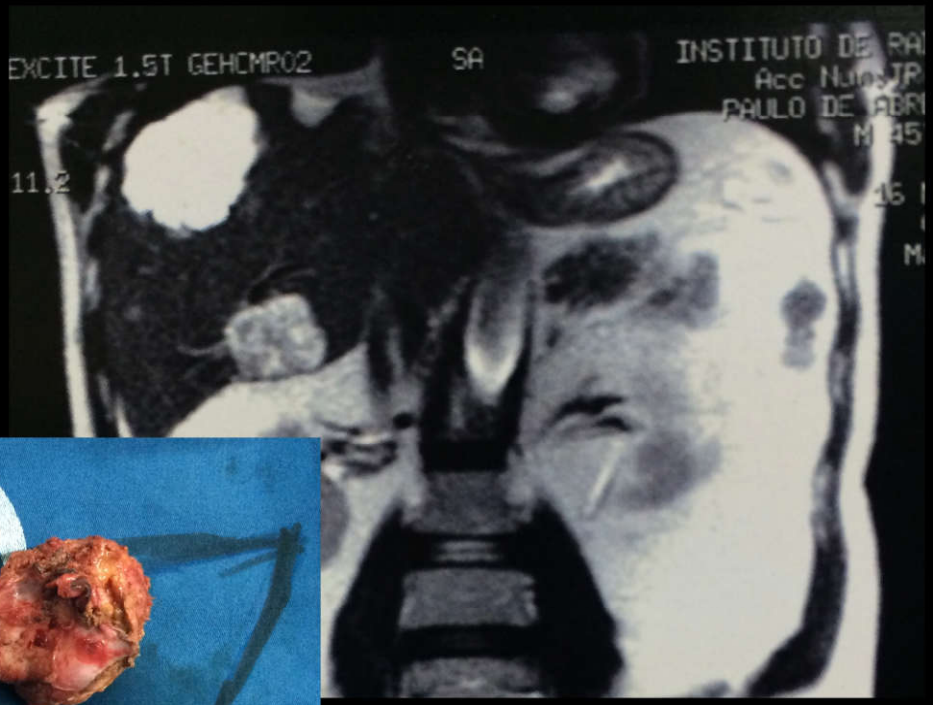




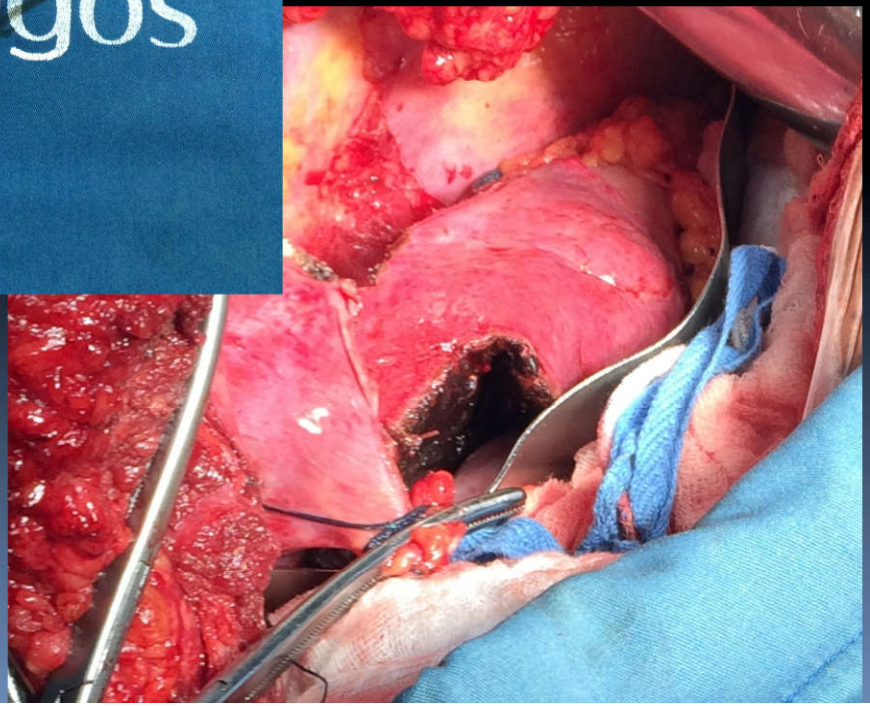





SIGNA EXCITE 1.5T GEHCMR02
ASR
INSTITUTO DE
Acc Num:
PAULO DE A
M
Ex: 49
Se: 12
Im: 52
DAx S180.7


EXCITE 1.5T GEHCMR02
SA
INSTITUTO DE RA
Acc Num:JP
PAULO DE ABR
M 45
11.2
16 I


São Dom gos



Hepatectomia em dois estágios

- Qt Ressecção Qt 166
- Qt EVP Ressecção Qt 18
- **Qt Ressecção Ressecção Qt 9**
- **Qt Ressecção PVE Ressecção Qt 12**

21 pacientes
1° Estágio – Hepatectomia menor
2° Estágio – Hepatectomia maior

Chun YS et al – J Gastrointest 2007;11-1498-1505

Hepatectomia E (II,III,IV)

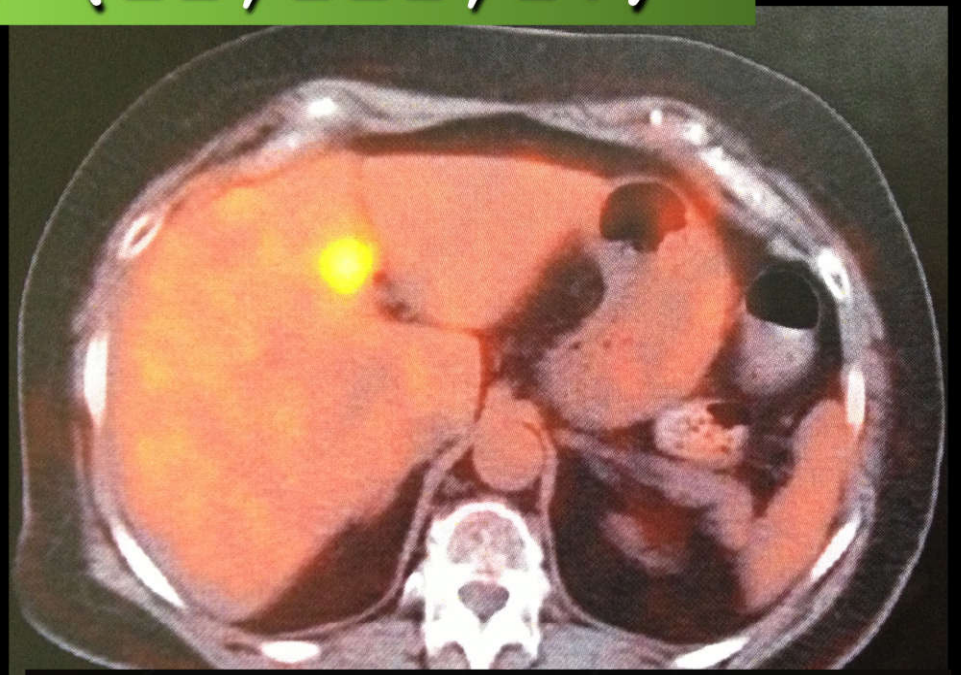
- Caso clínico

MGDS, feminino, 79 anos

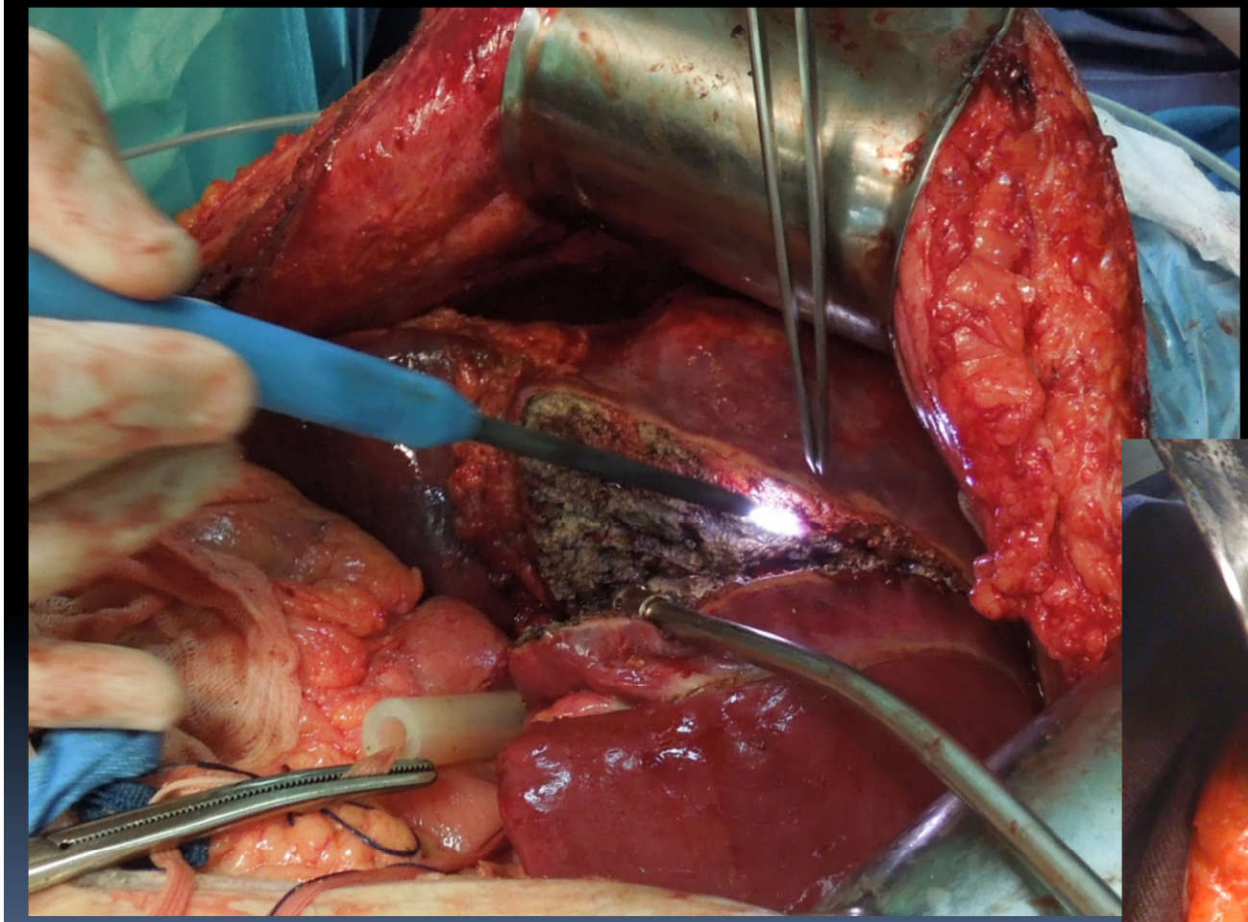
Neo de cólon

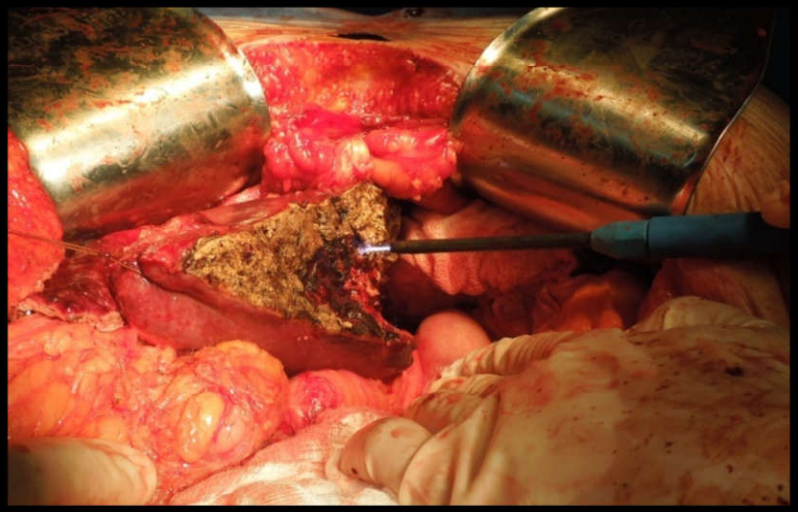
Colectomia, QT

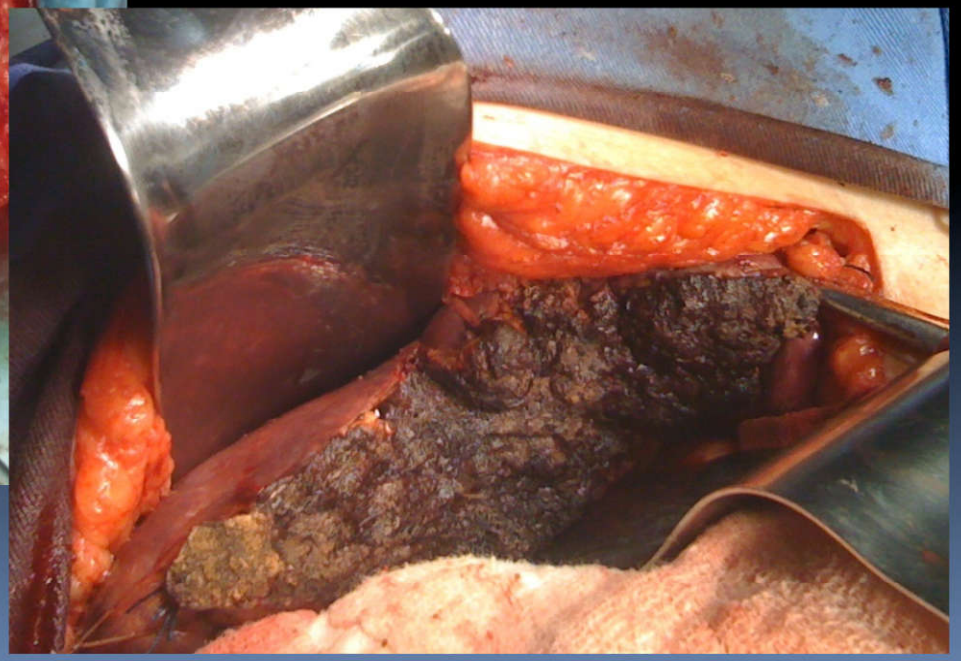
CT de abdome:



Ramo portal E








São
CENTRO CIRURGIC


ão
go
CENTRO CIRURGIC


São
CENTRO CIRURGIC

Hepatectomia repetida

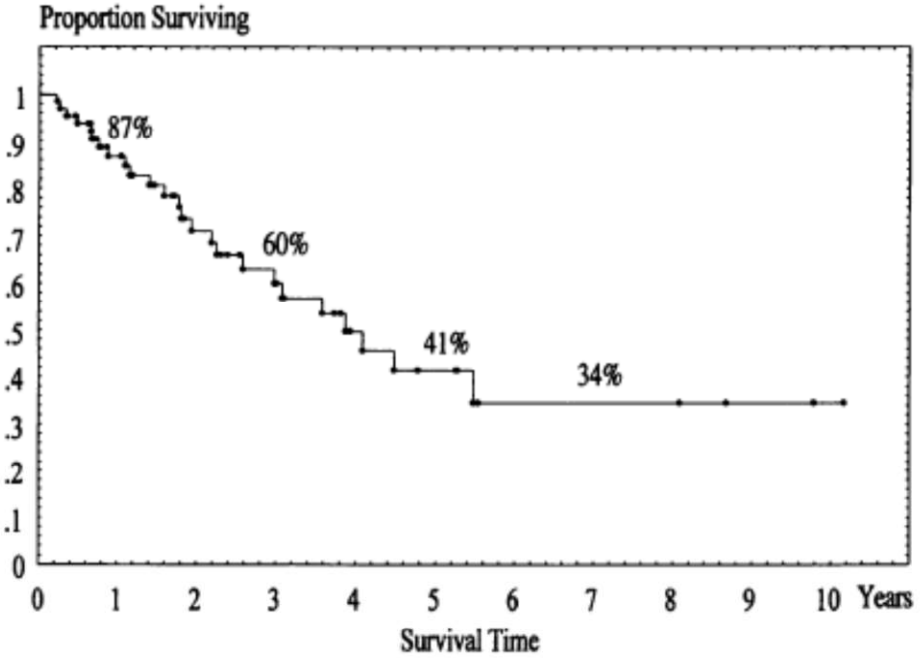


Figure 2. Cumulative survival of 64 patients with recurrent metastases of colorectal cancer after a second hepatectomy.

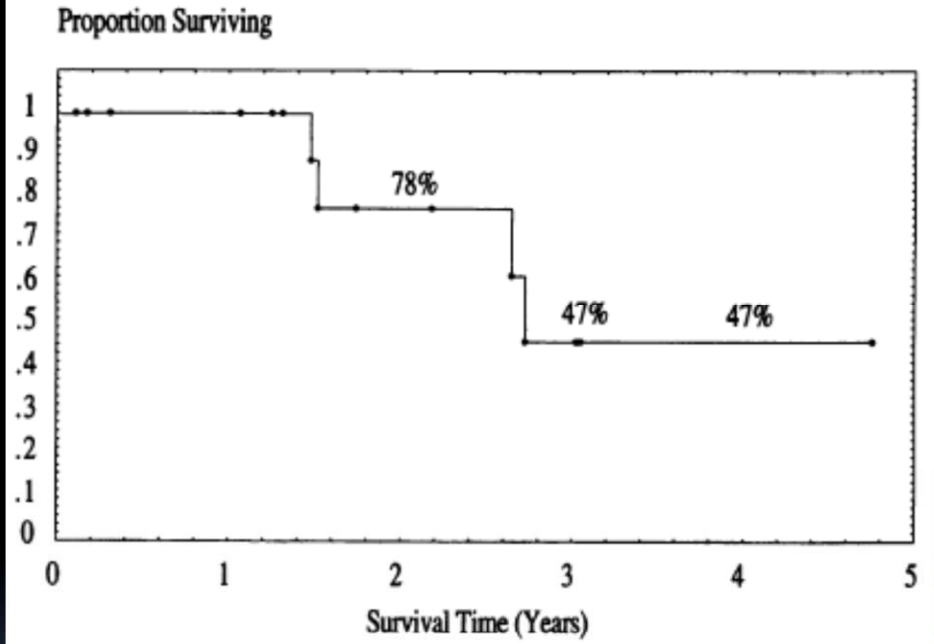
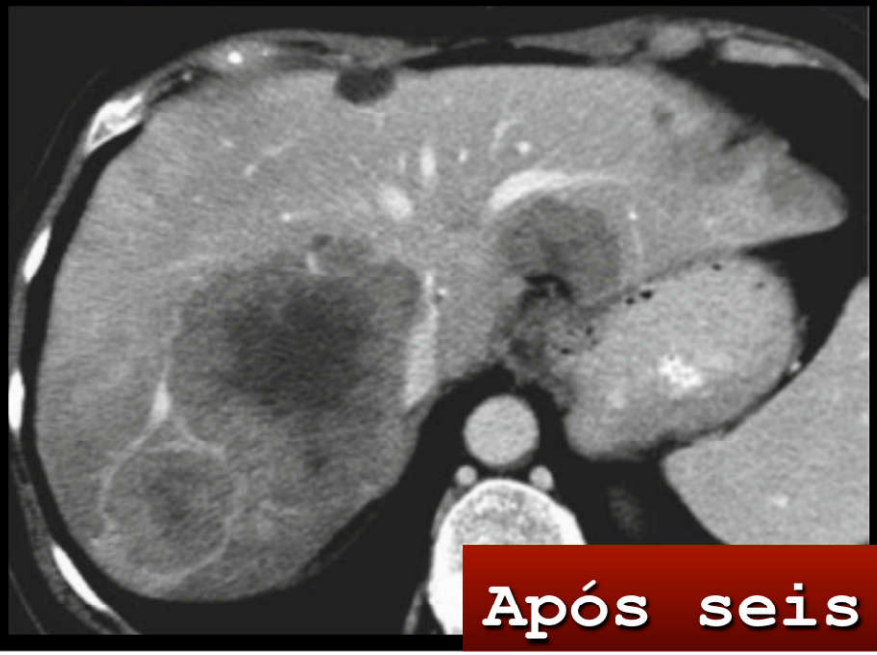


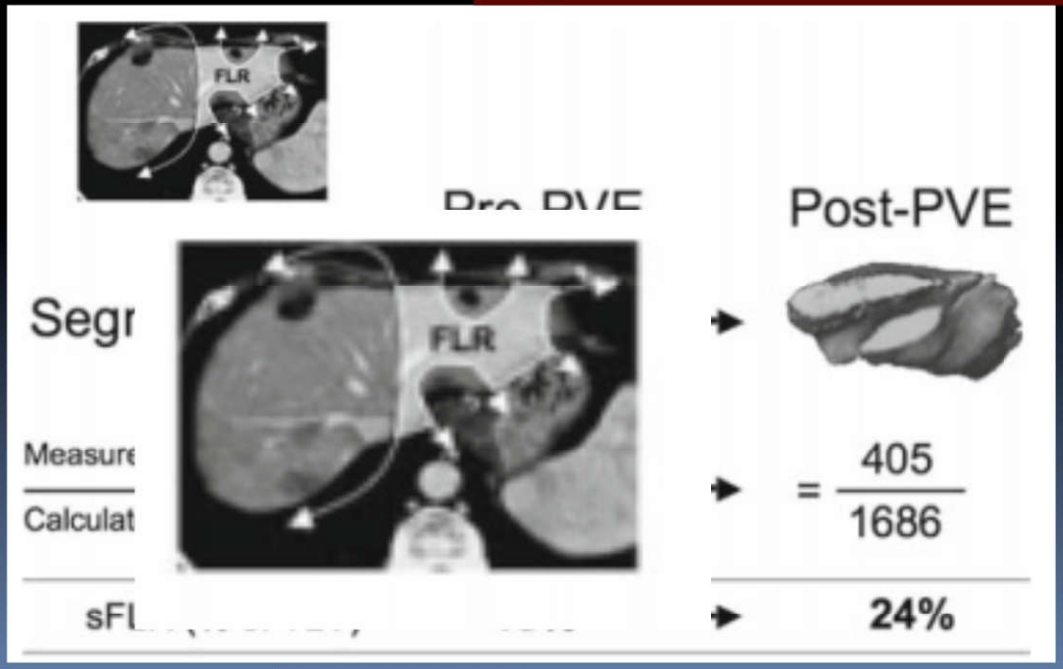
Figure 4. Cumulative survival of 15 patients with recurrent metastases of colorectal cancer after a third hepatectomy.

Adam R, et al - Ann Surg 1997;225:51-62

Hepatectomia em dois estágios

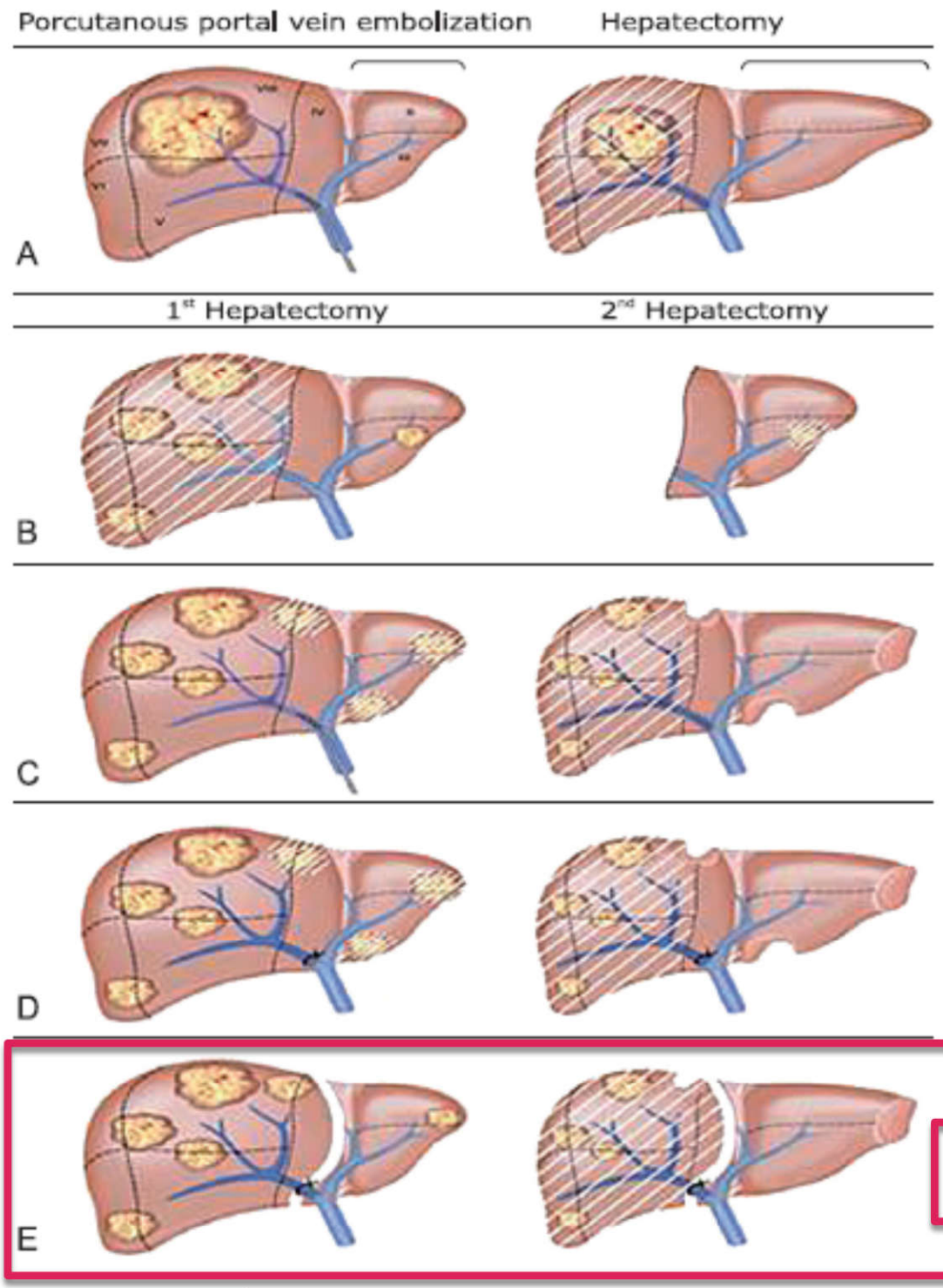


Após seis ciclos de QT



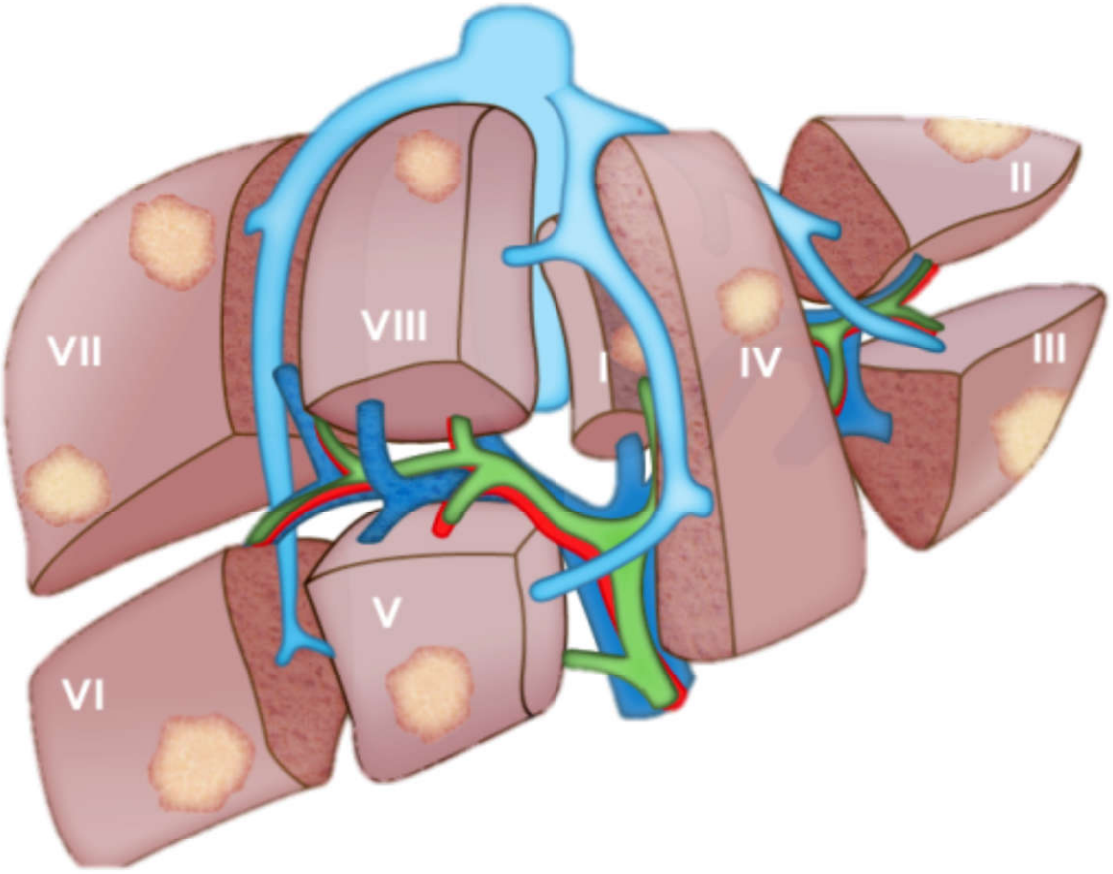
Vauthey JN, et al - Liver Metastasis 2010

ALPPS



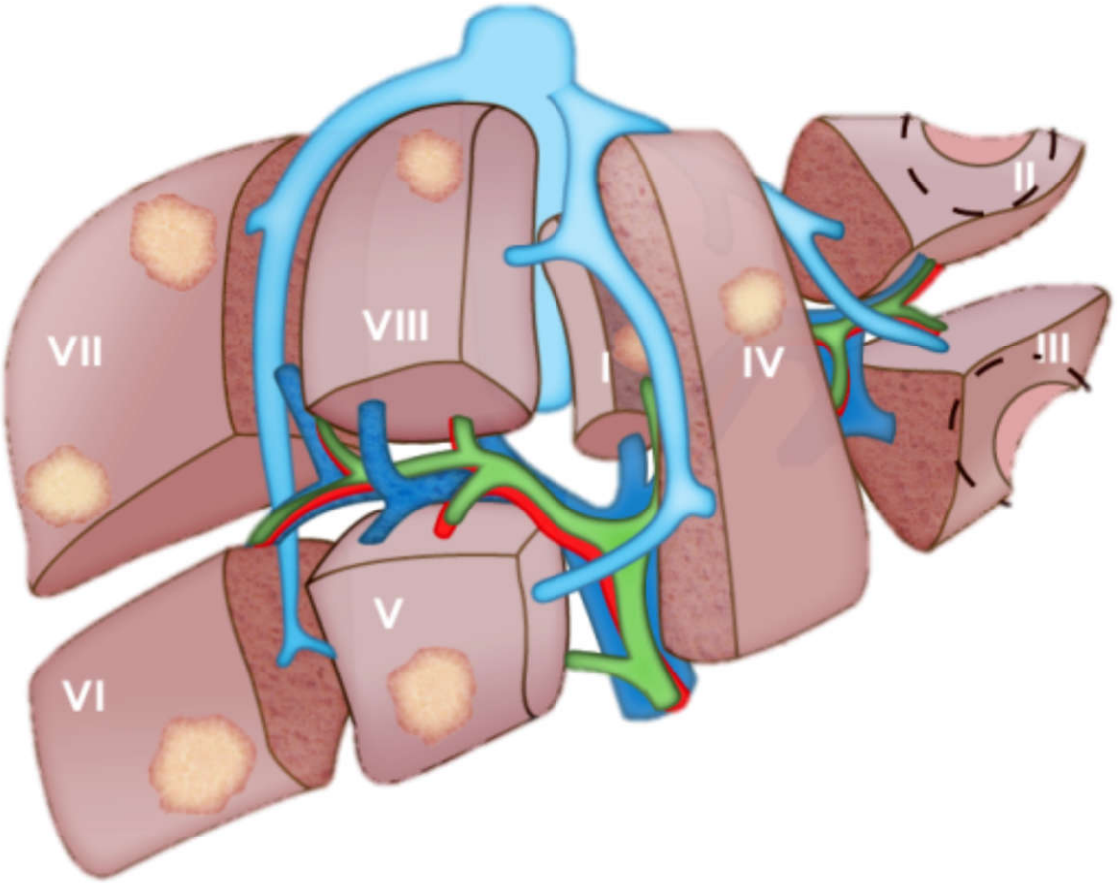
Romic B, et al. Acta Chir Croat 2016;13:15-20

ALPPS

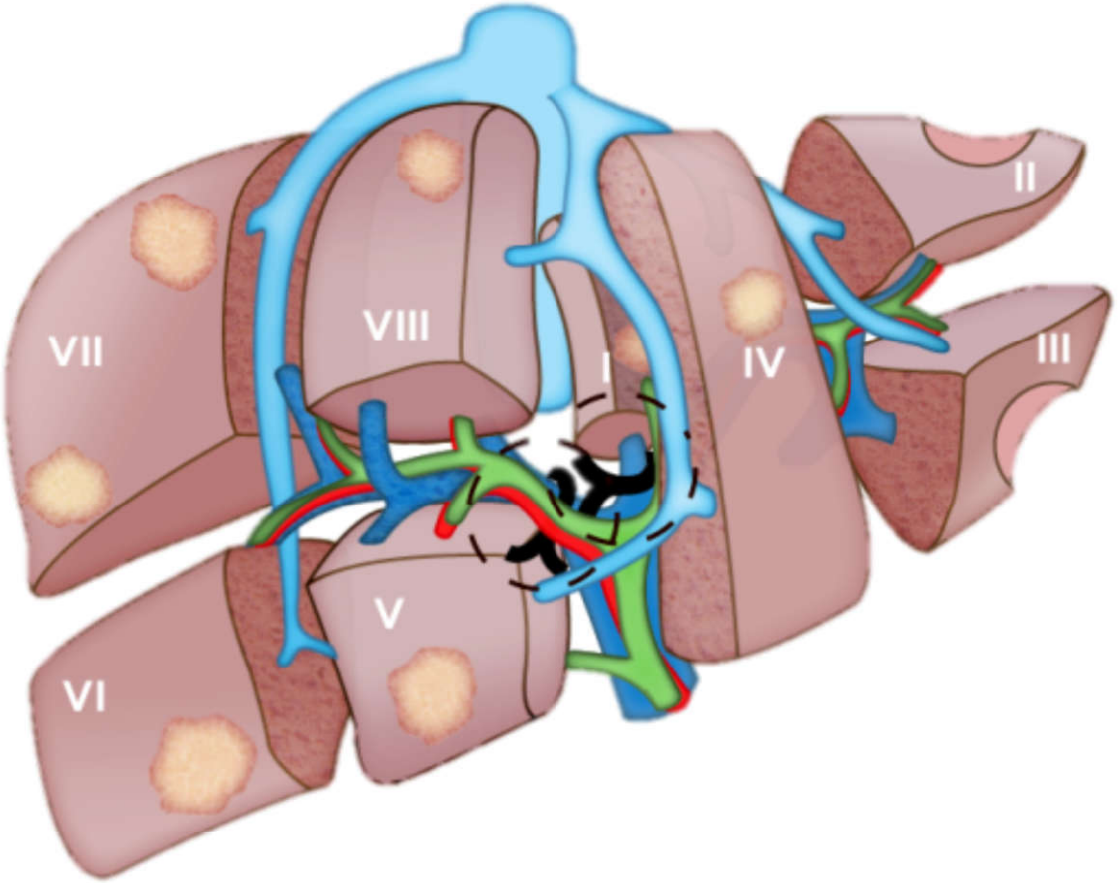


ALPPS, p-ALPPS e Mini-ALPPS: como e para quem

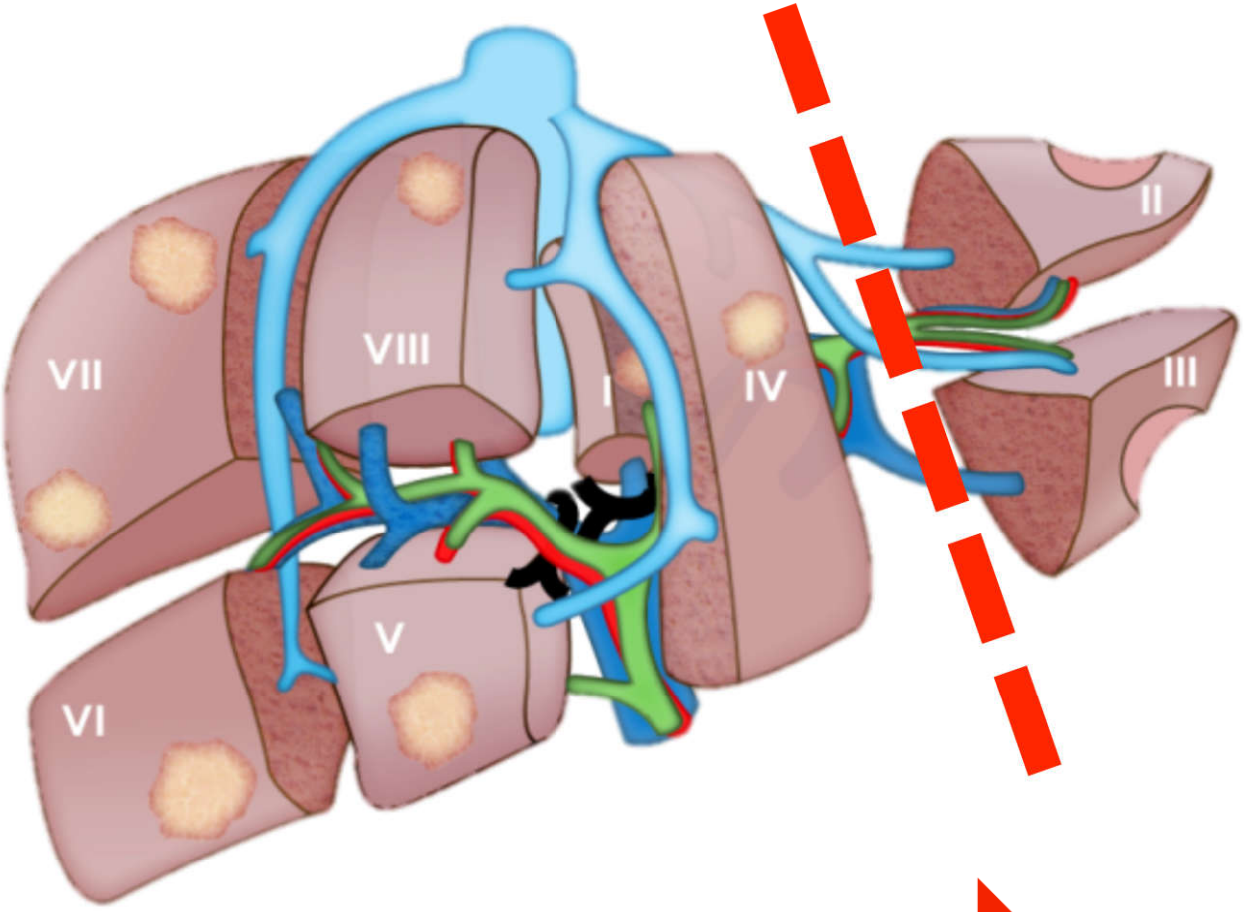
ALPPS



ALPPS

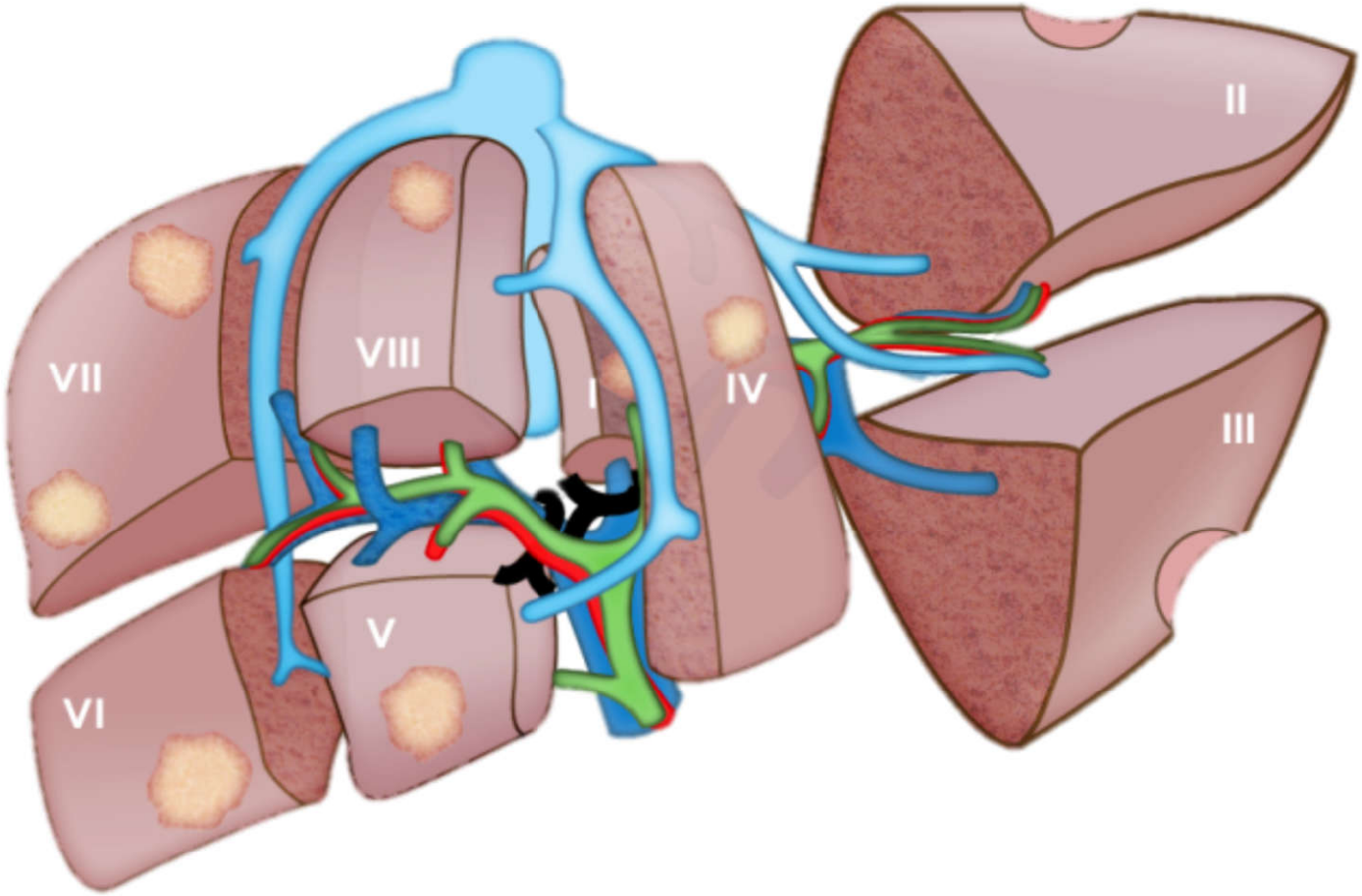


ALPPS

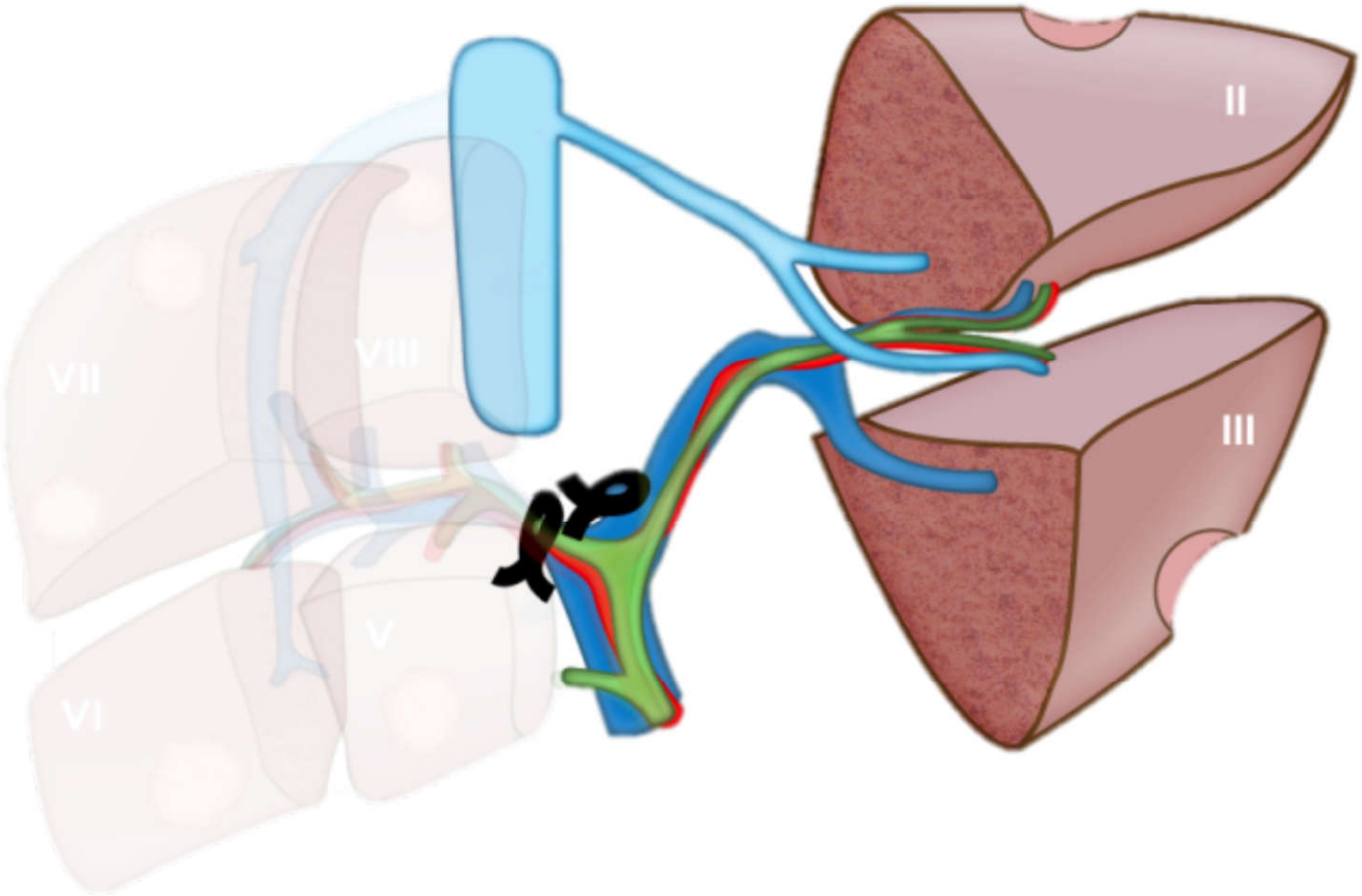


7 days

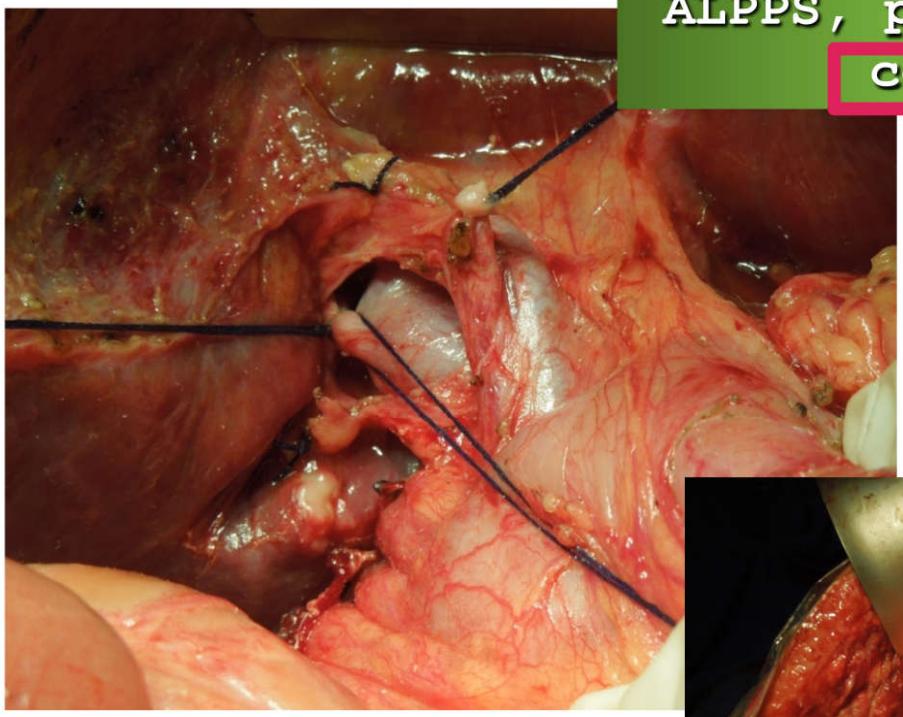
ALPPS

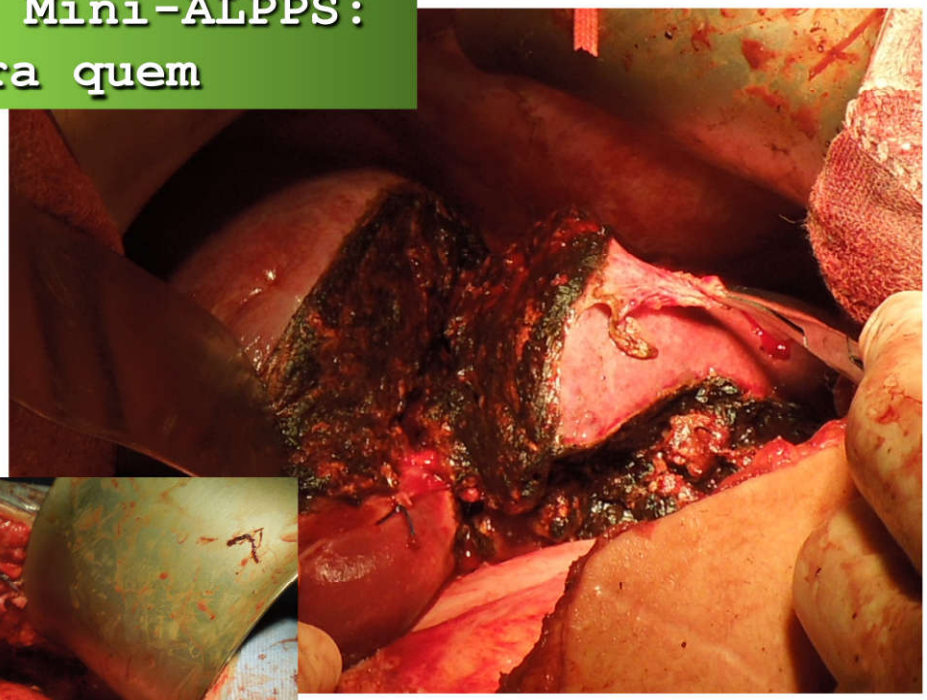


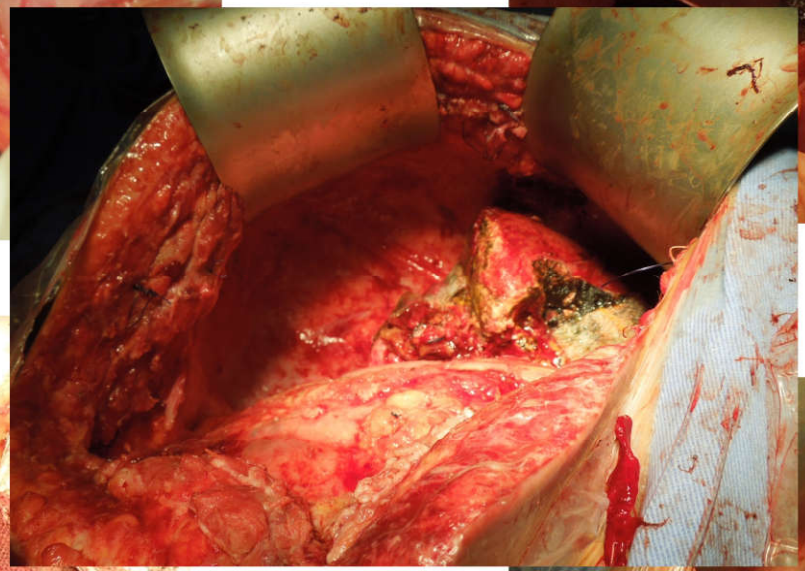
ALPPS

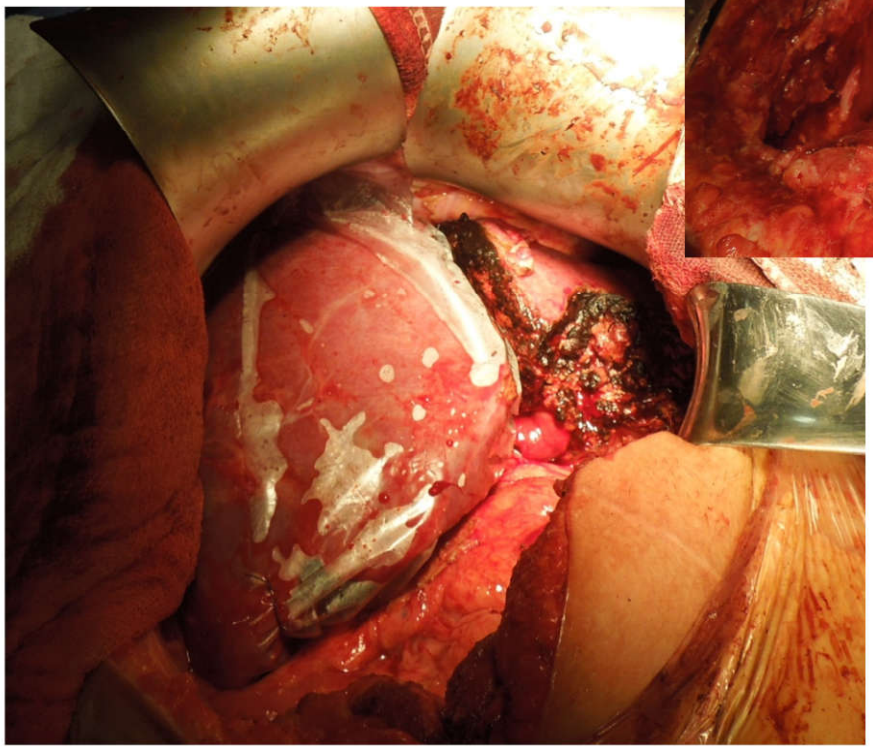


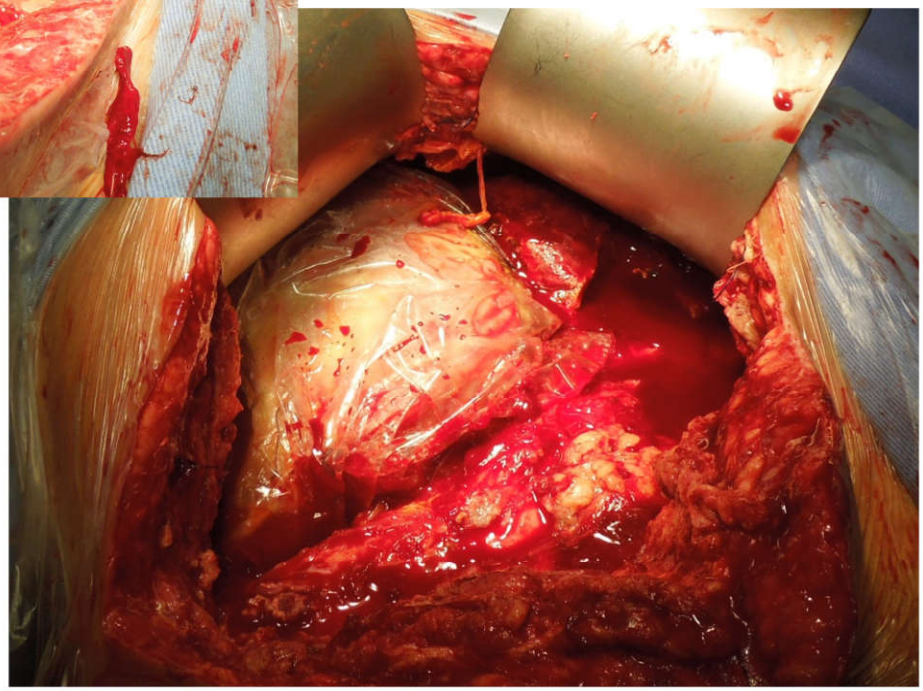
ALPPS, p-ALPPS e Mini-ALPPS: como e para quem

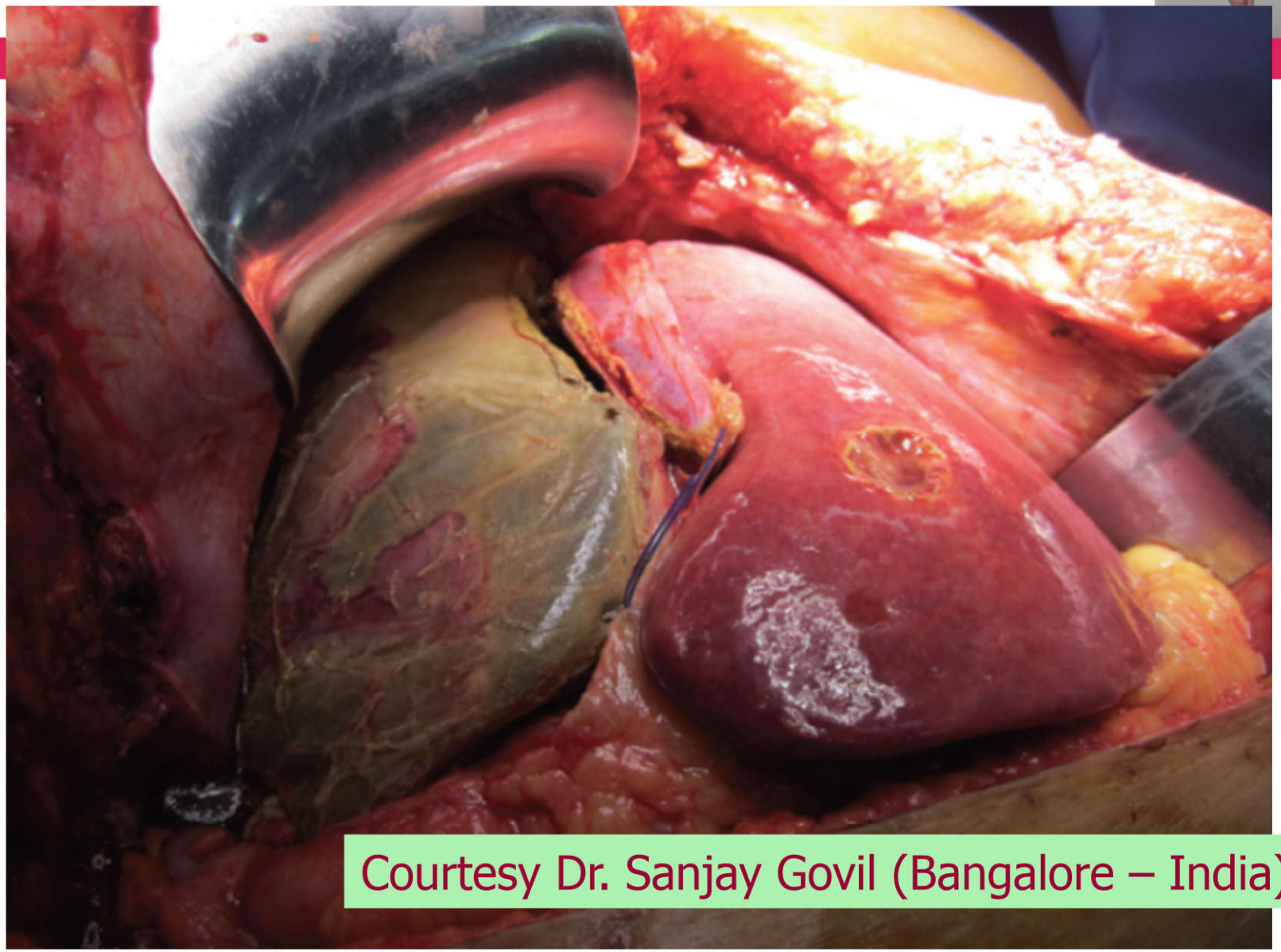












Courtesy Dr. Sanjay Govil (Bangalore – India)

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.[1] 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.[2] 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

Santibanes E, Clavien P. Ann Surg 2012;255:415-7

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.

Ardiles V, et al. In Torres OJ. 2015. In press

ABCDDV/886

ABCD Arq Bras Cir Dig
2012;25(4):290-292

Technique

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

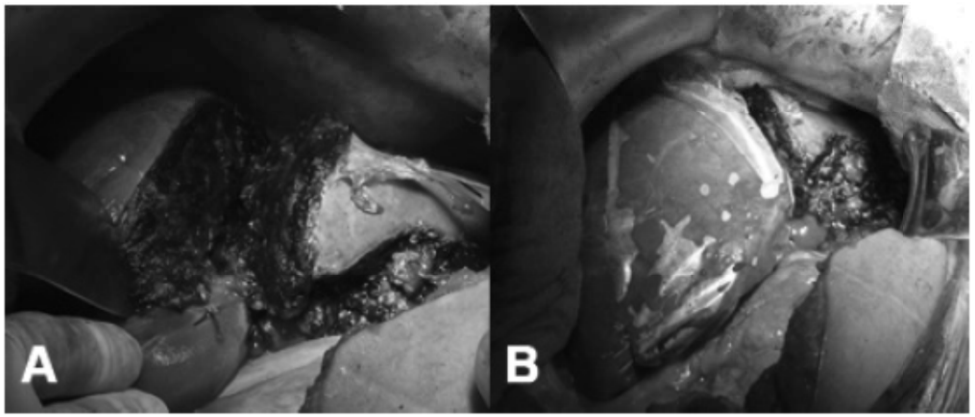


FIGURE 1 - A - Transection of the liver; B - protection with sterile bag

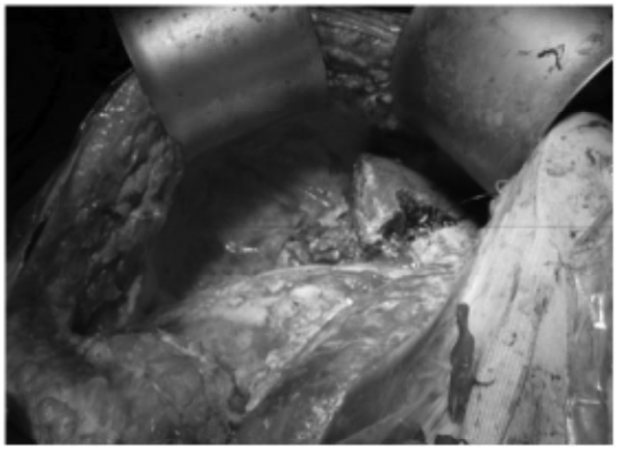
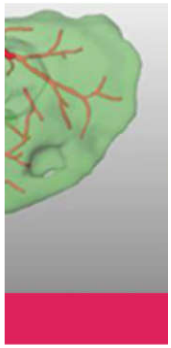


FIGURE 2 - Final aspect of the surgical procedure

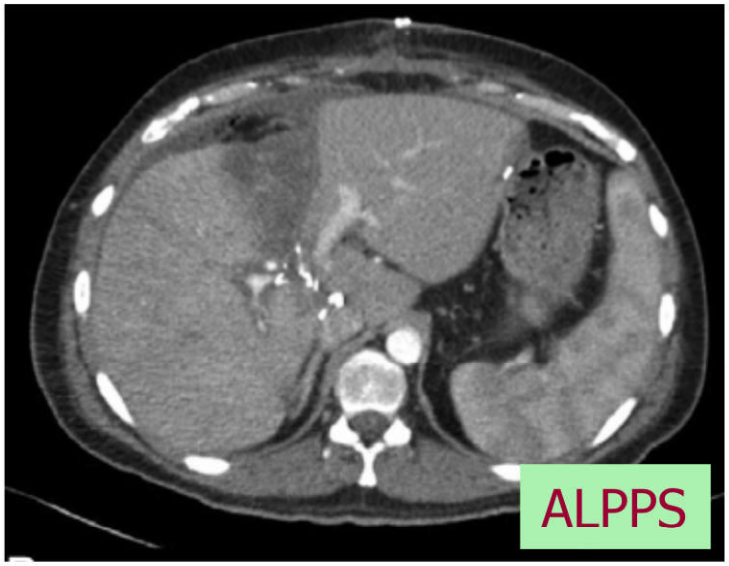
Torres OJ, et al. Arq Bras Cir Dig 2012;25:290-2

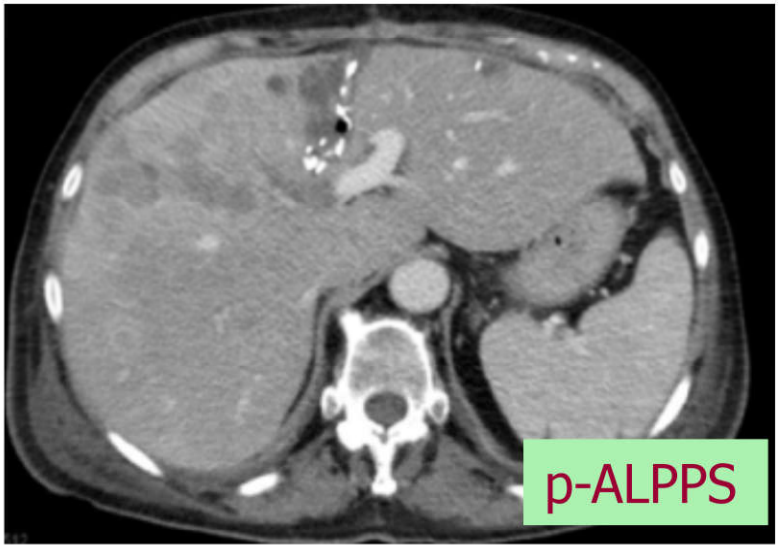


Is Partial-ALPPS Safer Than ALPPS?

A Single-Center Experience

Henrik Petrowsky, MD, FACS, Georg Györi, MD,* Michelle de Oliveira, MD, FACS,* Mickaël Lesurtel, 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

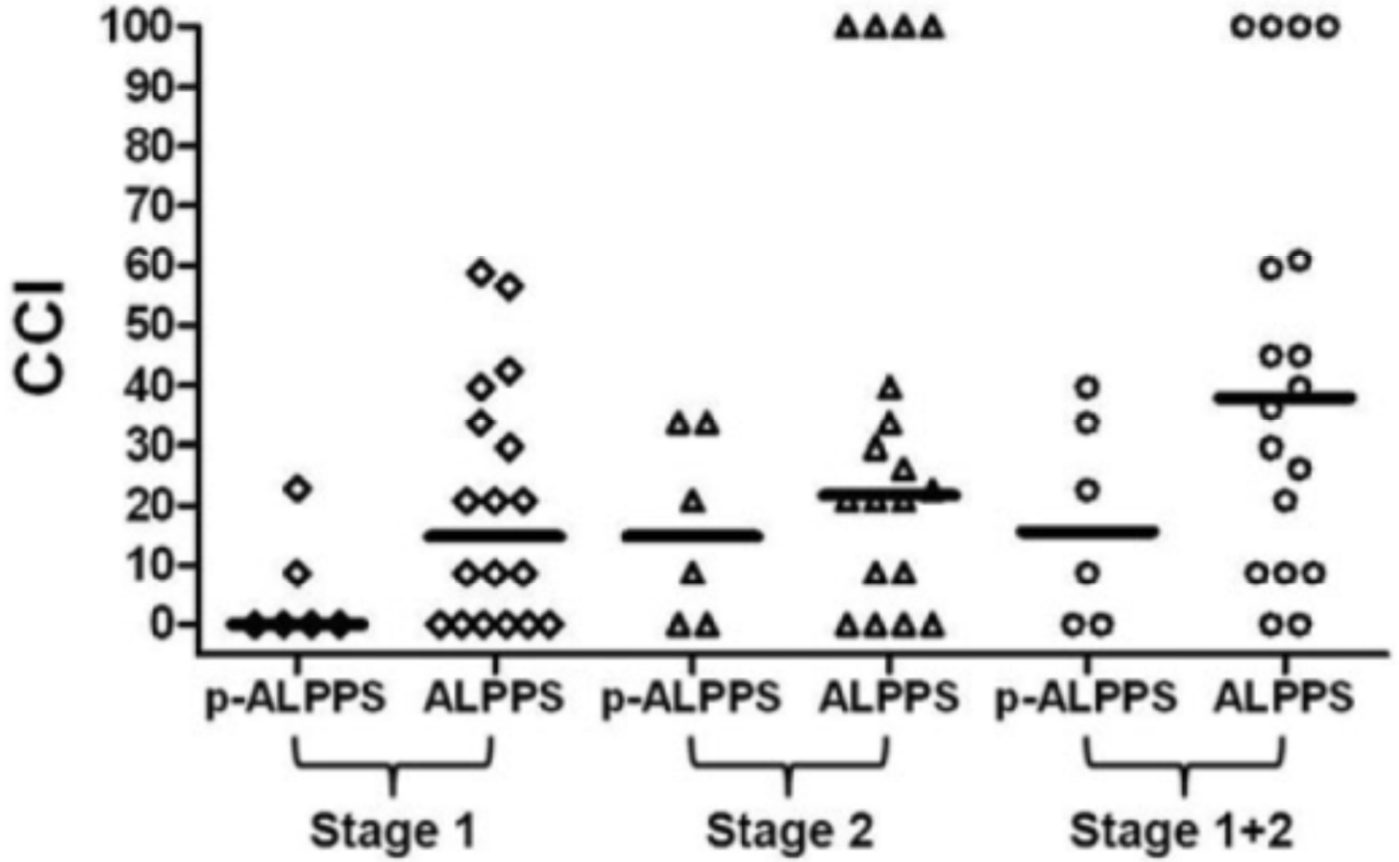
ALPPS, p-ALPPS e Mini-ALPPS: como e para quem

Petrowsky H, et al. Ann Surg 2015;261:e90-e92

Is Partial-ALPPS Safer Than ALPPS?

A Single-Center Experience

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



Petrowsky H, et al. Ann Surg 2015;261:e90-e92

LETTER-PRELIMINARY REPORT/TECHNIQUE

Is Partial-ALPPS Safer Than ALPPS?

A Single-Center Experience

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

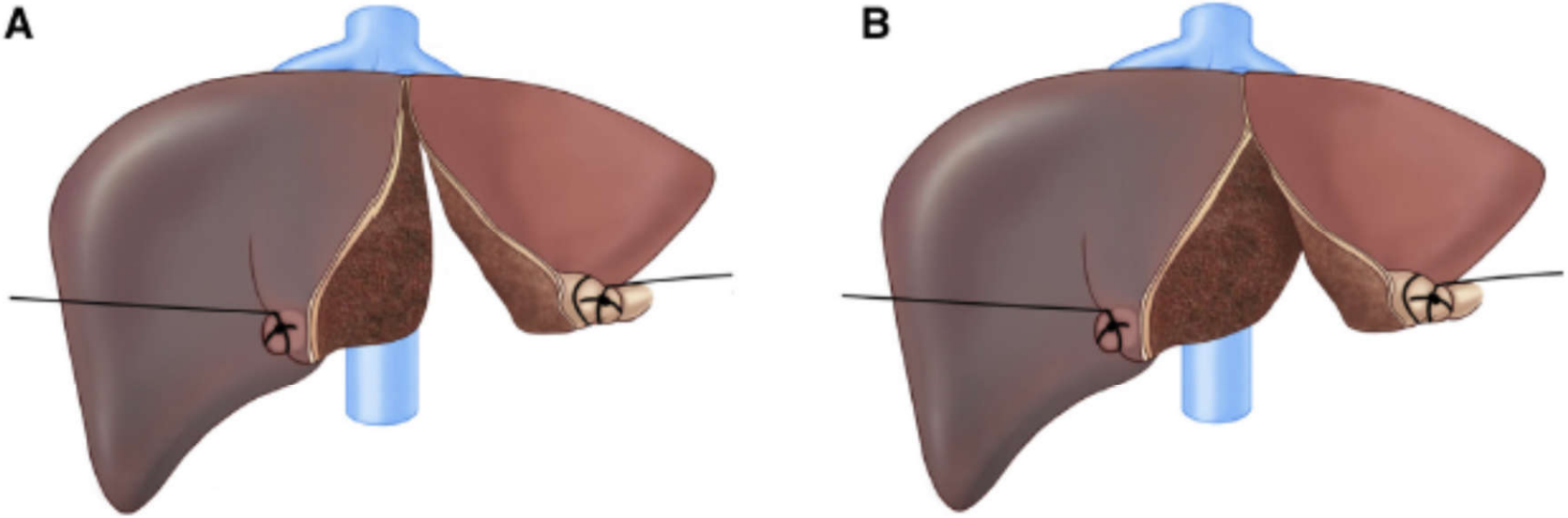
	p-ALPPS (%)	ALPPS (%)
Hipertrophy	60	61
Severe complications	0	33
Mortality	0	22

❑Risco

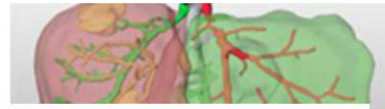
Petrowsky H, et al. Ann Surg 2015;261:e90-e92

How much liver needs to be transected in ALPPS? A translational study investigating the concept of less invasiveness

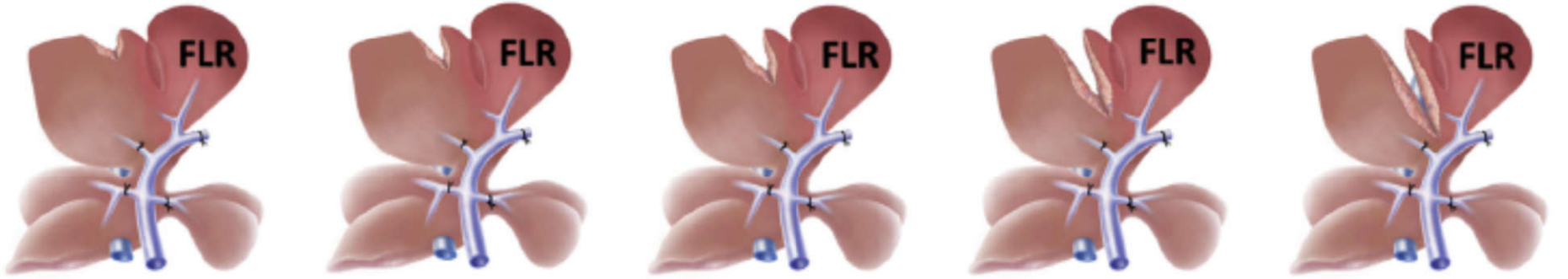
Michael Linecker, MD,[a,†] Patryk Kambakamba, MD,[a,†] Cäcilia S. Reiner, MD,[b] Thi Dan Linh Nguyen-Kim, MD,[b] Gregor A. Stavrou, MD,[c,d] Robert M. Jenner, MD,[c] Karl J. Oldhafer, MD,[c,d] Bergthor Björnsson, MD, PhD,[e] Andrea Schlegel, MD,[a] Georg Györi, MD,[a] Marcel André Schneider, MD,[a] Mickael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

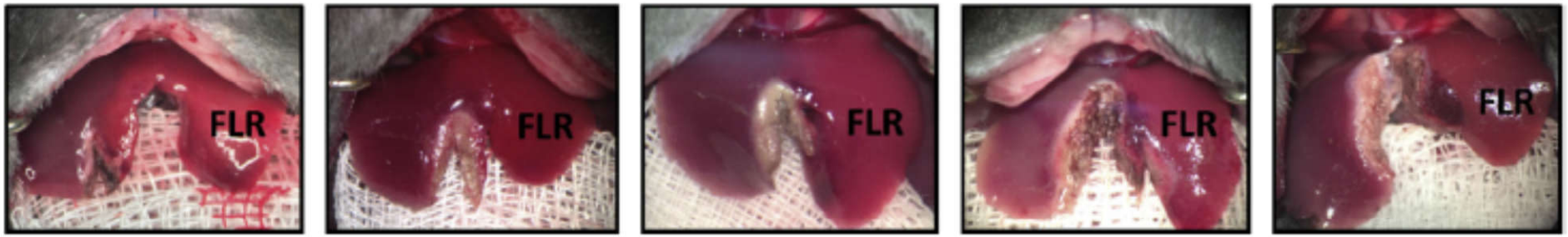


Linecker M, et al. Surgery 2016



10% transection | **25%** transection | **50%** transection | **80%** transection | **100%** transection





- ≥ 50%
- Less invasive surgery

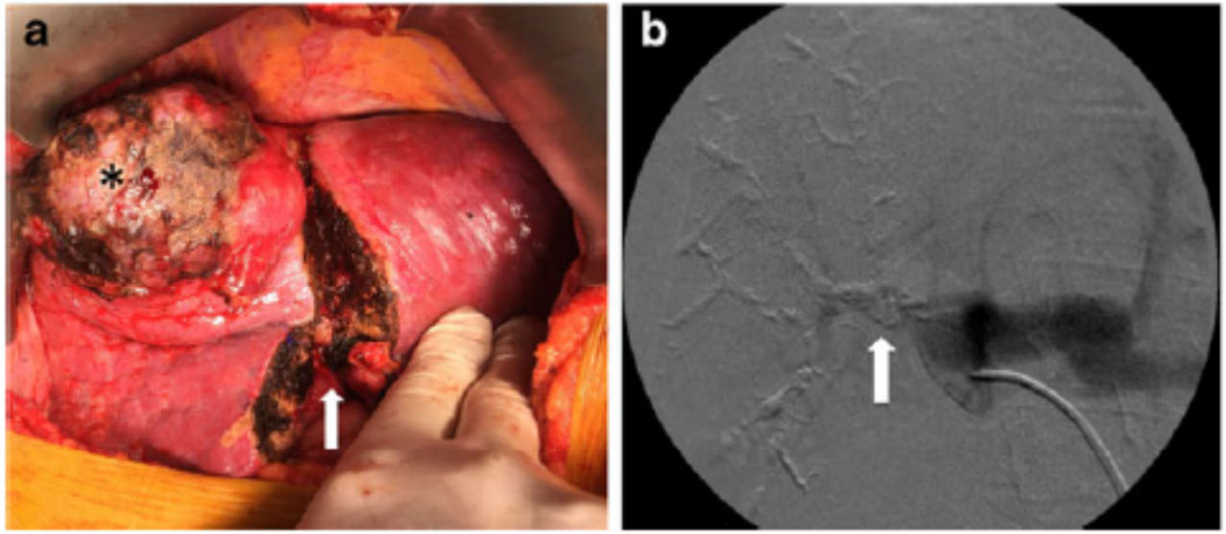
Linecker M, et al. Surgery 2016

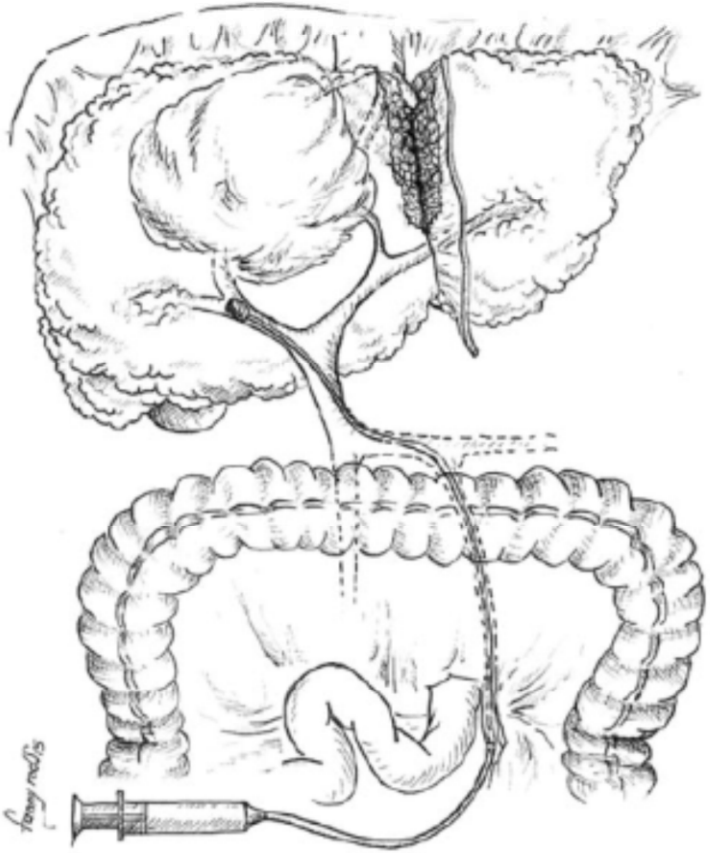
Langenbecks Arch Surg
DOI 10.1007/s00423-016-1424-1

HOW-I-DO-IT ARTICLES

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

Eduardo de Santibañes[1,2] · Fernando A. Alvarez[1] · Victoria Ardiles[1] · Juan Pekolj[1] · Martin de Santibañes[1]





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

de Santibanes E, et al. Langenbecks Arch Surg 2016

Langenbecks Arch Surg
DOI 10.1007/s00423-016-1424-1

HOW-I-DO-IT ARTICLES

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

Eduardo de Santibañes[1,2] · Fernando A. Alvarez[1] · Victoria Ardiles[1] · Juan Pekolj[1] · Martin de Santibañes[1]

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)[a]
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

[a] Internal between the first stage and the last volumetric evaluation before the second stage

de Santibanes E, et al. Langenbecks Arch Surg 2016

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 hepatectomia em dois estágios (ALPPS): experiência Brasileira

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

- 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
Nadalin 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.

Oldhafer KJ, et al. In Blumgart LH. 6th Edition, 2017

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

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

Lau WY, et al. Hepatobiliary Pancreat Dis Int 2017

ABCD Arq Bras Cir Dig
2016;29(3):173-179
DOI: /10.1590/0102-6720201600030011

Original Article

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 irressecáveis

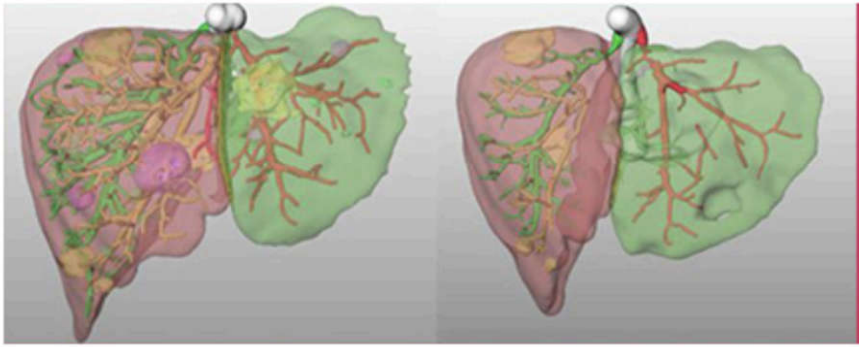
Orlando Jorge Martins **TORRES**[1,2,6], Márcio Carmona **MARQUES**[2,6], Fabio Nasser **SANTOS**[1], Igor Correia de **FARIAS**[2,6], Anelisa Kruschewsky **COUTINHO**[3], Cássio Virgílio Cavalcante de **OLIVEIRA**[1,4,5], Antonio Nocchi **KALIL**[1,2,4,6], Celso Abdon Lopes de **MELLO**[3], Jaime Arthur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

ALPPS

- Alternative for two-stage hepatectomy
- Rescue surgery – after PVE

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

Torres OJ, et al. Arq Bras Cir Dig 2016;29 (3):173-9



1 st International Consensus Meeting on ALPPS

February 27th and 28th 2015, Hamburg, Germany

HOME | COMMITEES | PROGRAMME | VIDEO BROADCASTS | FOTOS | VENUE | POSTERS | SPONSORS | CONTACTS

Karl J. Oldhafer

Thomas van Gulik

E-AHPBA

European-African Hepato-Pancreato-Biliary Association

Supported with a grant of DFG

DFG Deutsche Forschungsgemeinschaft

Brazilians in Hamburg

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)
- Remanescente hepático < 30% (ou < 0,5% do peso corporal)
- Hepatectomia direita ampliada
- Necessidade de grande hipertrofia
- Idade ≤ 60 anos
- Margem do tumor próximo ao remanescente

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

Ardiles V, et al. In Torres OJ. 2015. In press

http://dx.doi.org/10.1016/j.hpb.2017.08.013 HPB

ORIGINAL ARTICLE

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

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

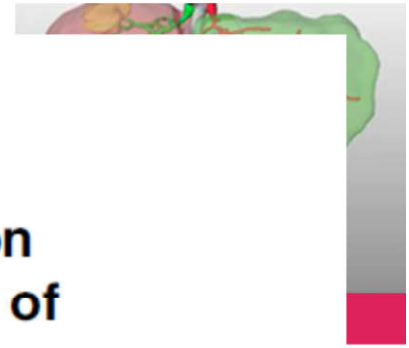
[1]Ipanema Federal Hospital, Brazil, [2]Cantonal Hospital Winterthur, Canton of Zu USA, [4]Linköping University, Sweden, [5]Department of Surgery, University of Ro Hospital, Brazil, [7]Virgen de la Arrixaca University Hospital, Spain, [8]Royal Free H Switzerland, [10]Hospital Italiano, Argentina, and [11]Institut Mutualiste Montsouris,

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

Enne M, et al. HPB 2017



Original article

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. Leclere 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%

Elias D, et al. Br J Surg 1999;86:784-8

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 hepatectomia em dois estágios (ALPPS): experiência Brasileira

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

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

- Risk score

Torres OJ, et al. Arq Bras Cir Dig 2013;26:40-3

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, Martin de Santibañes, MD, Juan Pekolj, MD, PhD, and Eduardo de Santibañes, MD, PhD

- 53% Morbidity
- 6.6% Mortality

Alvarez FA, et al. Ann Surg 2014

ALPPS Registry

PAPER OF THE 21ST ANNUAL ESA MEETING

Early Survival and Safety of ALPPS

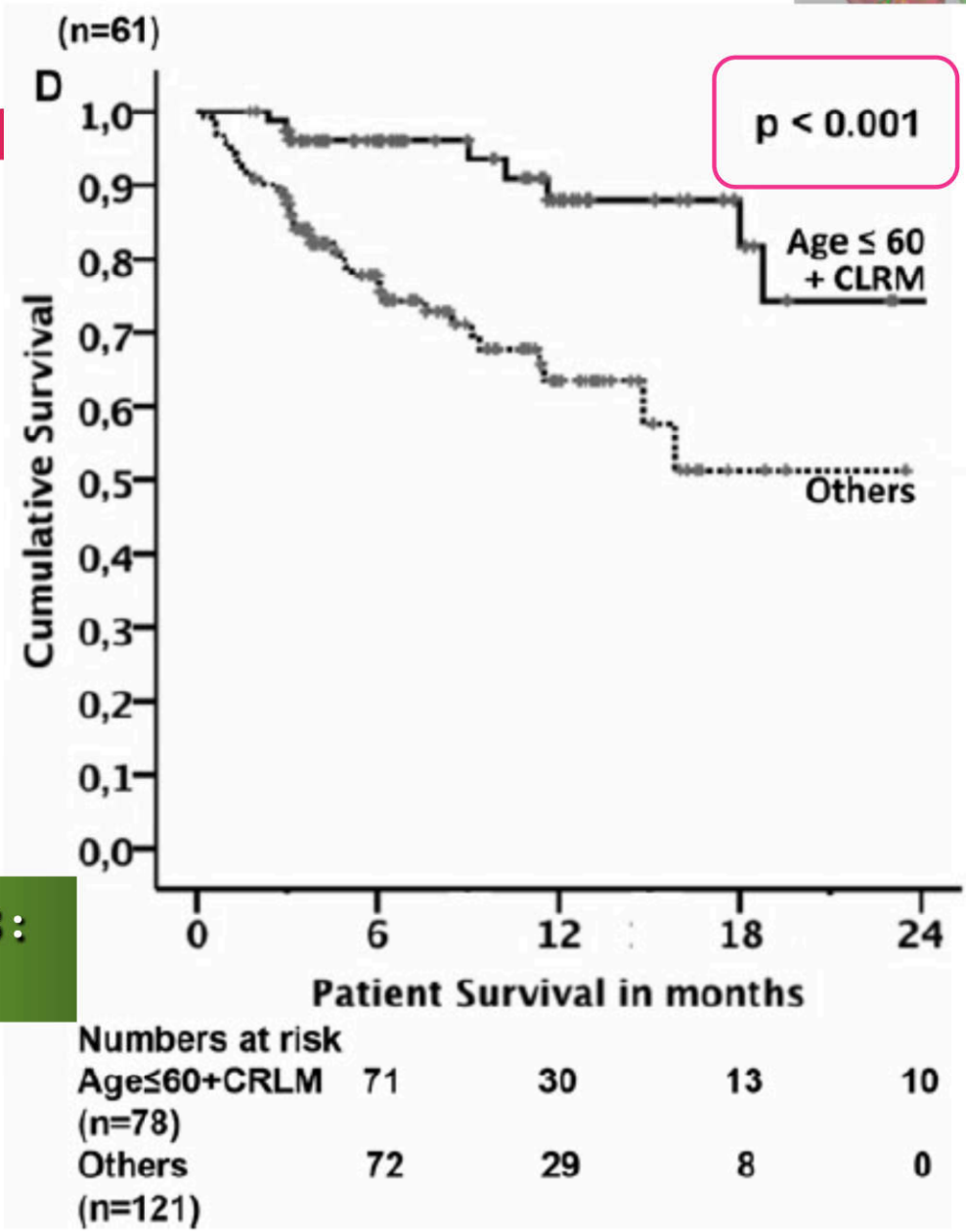
First Report of the International ALPPS Registry

Erik Schadde, MD, FACS, Victoria Ardiles, MD,† Ricardo Robles-Campos, MD,‡ Massimo Malago, MD, FACS,§ Marcel Machado, MD,¶ Roberto Hernandez-Alejandro, MD,‖ Olivier Soubrane, MD,** Andreas A. Schnitzbauer, MD,†† Dimitri Raptis, MD,* Christoph Tschuor, 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

Schadde E, et al. Ann Surg 2014;260:829-38

ALPPS Registry



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

Schadde E, et al. Ann Surg 2014;260:829-38

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

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,[a] Kimberly A. Bertens, MD, MPH,[a] Karen Pineda-Solis, MD,[a] *and* Kristopher P. Croome, MD, MS,[a,b] *London, Ontario, Canada, and Rochester, MN*

- 36 % Morbidity
- 0 % Mortality

Hernandez-Alejandro R, et al. Surgery 2014

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, date of first OR	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	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	37
Case 7	F 55 15/11/13	MCRC	Multiple mets and small FLR	14	8	None	61

Herman P, et al. J Gastroint Cancer. 2015

ABCDDV/1112

ABCD Arq Bras Cir Dig
2015;28(3):155-156
DOI: /10.1590/S0102-67202015000300001

Editorial

ALPPS: PAST, PRESENT AND FUTURE

ALPPS: passado, presente e futuro

Orlando Jorge M **TORRES**[1], Eduardo S M **FERNANDES**[2], Paulo **HERMAN**[3]

[1]Universidade Federal do Maranhão (Federal University of Maranhão), São Luís, MA; [2] Hospital Adventista Silvestre, Rio de Janeiro, RJ, Brazil; [3]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

Torres OJ, et al. Arq Bras Cir Dig 2015;28:155-6

International Journal of Surgery Case Reports 26 (2016) 113–117

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

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

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

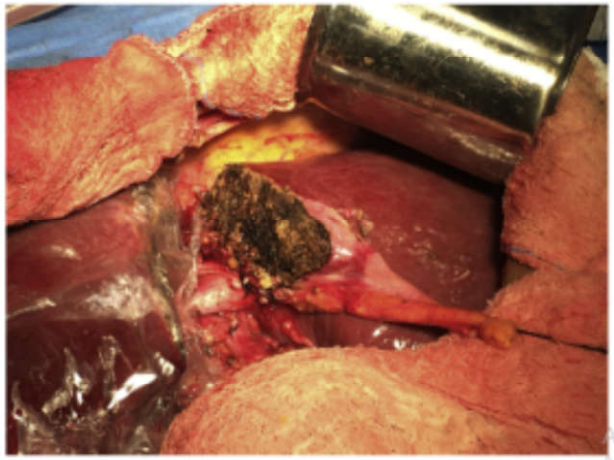


Fig. 2. ALPPS first procedure with plastic bag.

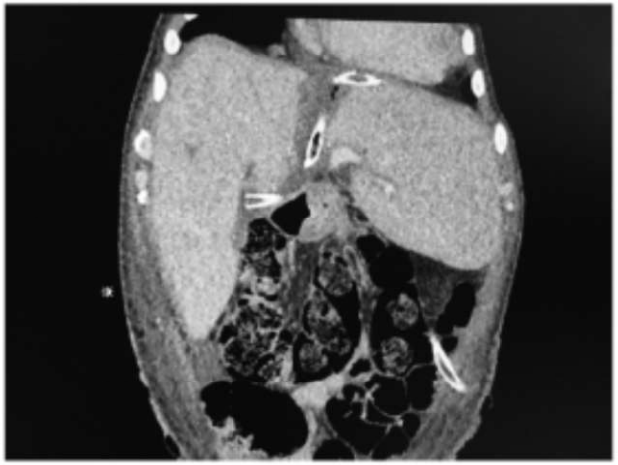


Fig. 3. CT 15 days after the first procedure.

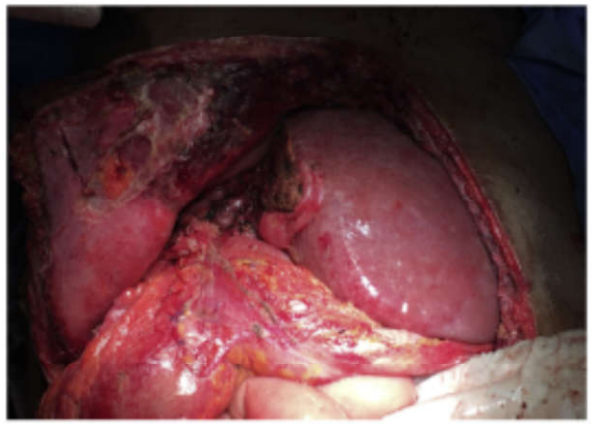


Fig. 4. Final aspect of the liver remnant.

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

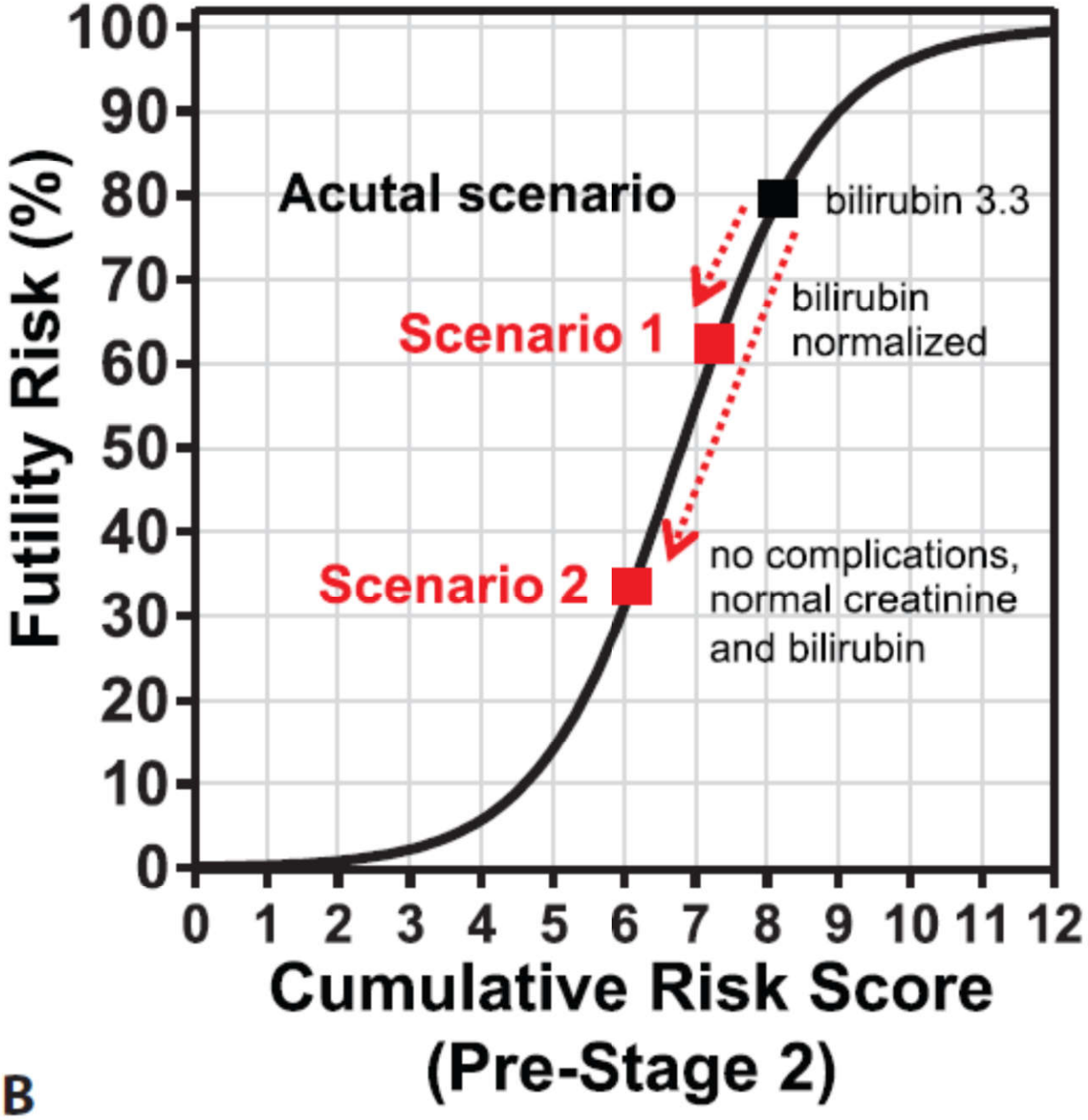
Linecker M, et al. Ann Surg 2016;264:763-71

TABLE 3. Risk Modeling

	Risk Points	Regression Coefficient	Odds Ratio (95% CI)	*P*
Pre-stage 1 variables*				
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		
Pre-stage 2 variables‡				
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 coloretal/biliar — 1
  - Biliary surgery (Cholangiocarcinoma) — 2
  - Age ≥ 67 yr — 3
- Pre-stage II
  - Complications ≥ 3b
  - Bilirubin
  - Creatinine

Linecker M, et al. Ann Surg 2016;264:763-71



B

Linecker M, et al. Ann Surg 2016;264:763-71

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

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

Linecker M, et al. Ann Surg 2016;264:763-71

12th 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[1], P. Kambakamba[1], A. Schlegel[2], P. Muiesan[2], I. Capobianco[3], S. Nadalin[3], O. Torres[4], A. Mehrabi[5], G.A. Stavrou[6, 7], K.J. Oldhafer[6, 7], G. Lurje[8], U. Neumann[8], R. Robles-Campos[9], R. Hernandez-Alejandro[10, 11], M. Malago[12], E. De Santibanes[13], P.-A. Clavien[1], H. Petrowsky[1]
[1]University Hospital Zurich, Department of Surgery and Transplantation, Zurich, Switzerland, [2]University Hospitals Birmingham NHS Foundation Trust, Liver Unit, Queen Elizabeth Hospital Birmingham, Birmingham, United Kingdom, [3]University Hospital Tübingen, Department for General, Visceral and Transplant Surgery, Tübingen, Germany, [4]Universidade Federal do Maranhão, Department of Surgery, Sao Luis-MA, Brazil, [5]University of Heidelberg, Department of General, Visceral, and Transplantation Surgery, Heidelberg, Germany, [6]Asklepios Hospital Barmbek, Department of General and Abdominal Surgery, Hamburg, Germany, [7]Semmelweis University Budapest, Campus Hamburg, Germany, [8]University Hospital Aachen, RWTH Aachen, Department of General, Visceral and Transplantation Surgery, Aachen, Germany, [9]Virgen de la Arrixaca Clinic and University Hospital, Department of Surgery and Liver and Pancreas Transplantation, Murci, Spain, [10]London Health Sciences Centre, Department of Surgery, Division of HPB Surgery and Liver Transplantation, London, Ontario, Canada, [11]University of Rochester, Division of Transplantation, Hepatobiliary Surgery, Rochester, United States, [12]University College London, Royal Free Hospitals, Department of HPB- and Liver Transplantation Surgery, London, United Kingdom, [13]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

Linecker M, et al. E-AHPBA 2017

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 hepatectomia em dois estágios (ALPPS): experiência Brasileira

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

- 83 yr
- Sarcoma
- Additional surgery:
  - Colectomy
  - Pancreatoduodenectomy

- 12.8 % Mortality

Torres OJ, et al. Arq Bras Cir Dig 2013;26:40-3

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 hepatectomia em dois estágios (ALPPS): experiência Brasileira

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

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%

Torres OJ, et al. Arq Bras Cir Dig 2013;26:40-3


Núcleo do Fígado
Hospital Universitário
Universidade Federal do Maranhão


HOSPITAL
PRESIDENTE DUTRA
HOSPITAL UNIVERSITÁRIO


Lençóis Maranhenses

Obrigado!