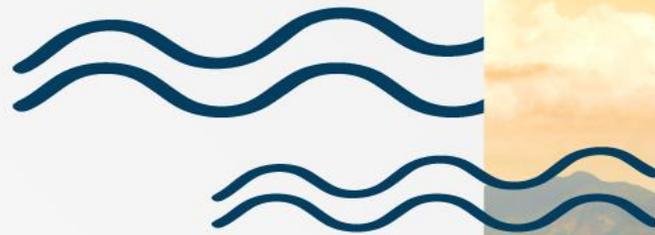




36º CONGRESSO BRASILEIRO DE
CIRURGIA
CBC - RIO DE JANEIRO-RJ
07 A 10 DE AGOSTO DE 2025



Táticas na duodenopancreatectomia que interferem no prognóstico

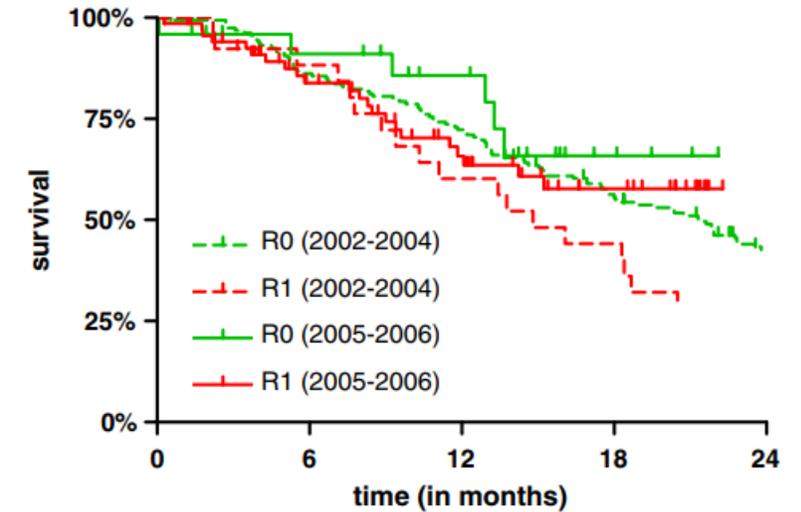
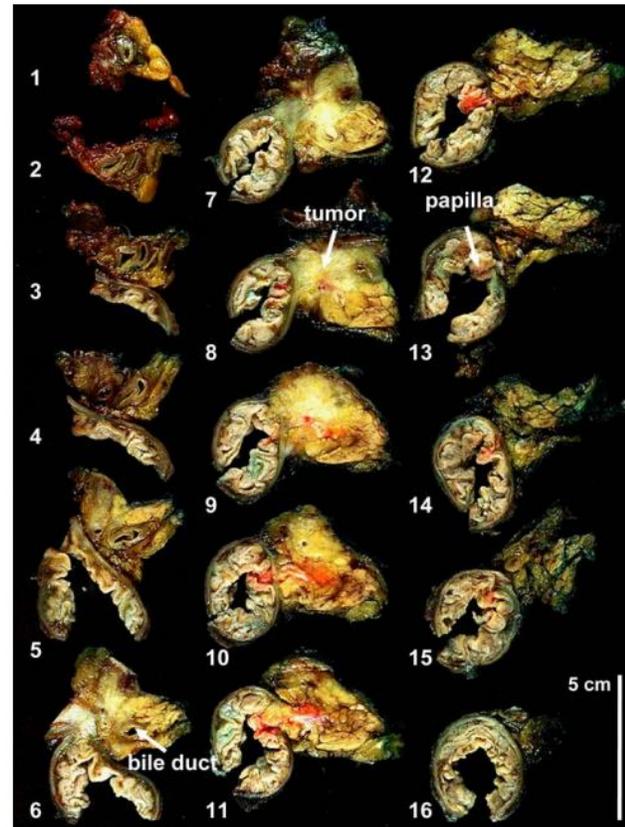
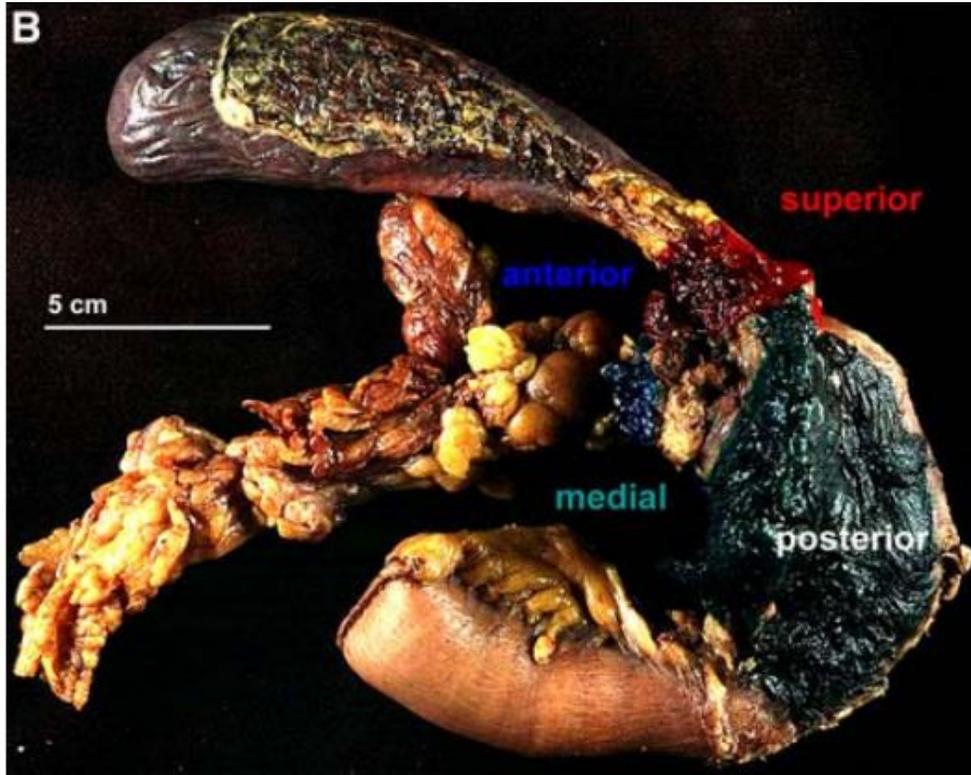
Orlando Jorge M Torres
Serviço de Cirurgia do Aparelho Digestivo
Unidade Hepatopancreatobiliar - UFMA



Most Pancreatic Cancer Resections are R1 Resections

2008

Irene Esposito, MD,^{1,3} Jörg Kleeff, MD,^{2,4} Frank Bergmann, MD,¹ Caroline Reiser, MD,^{2,4}
Esther Herpel, MD,¹ Helmut Friess, MD,^{2,4} Peter Schirmacher, MD,¹ and
Markus W. Büchler, MD²



Irene Esposito - Heidelberg (Germany)

Most Pancreatic Cancer Resections are R1 Resections

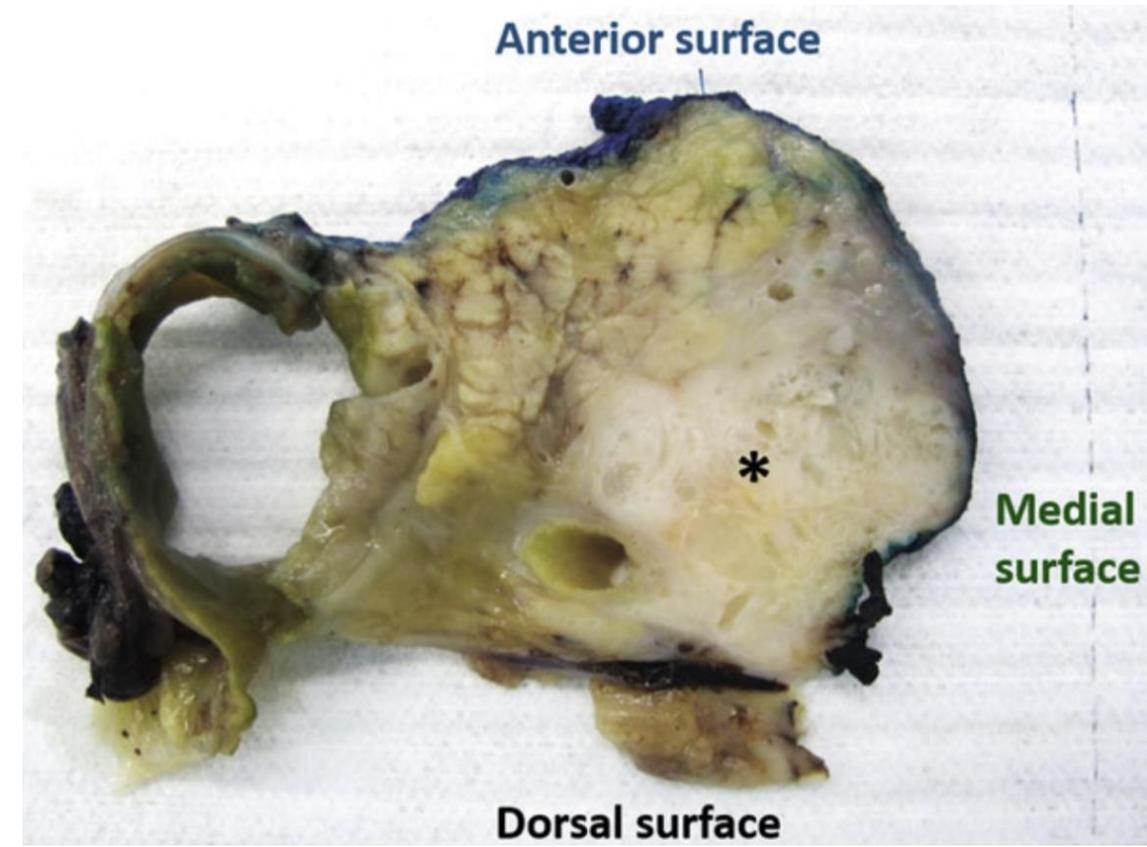
Irene Esposito, MD,^{1,3} Jörg Kleeff, MD,^{2,4} Frank Bergmann, MD,¹ Caroline Reiser, MD,^{2,4}
Esther Herpel, MD,¹ Helmut Friess, MD,^{2,4} Peter Schirmacher, MD,¹ and
Markus W. Büchler, MD²

TABLE 3. Tumor margin characteristics of 111 consecutive macroscopic complete resections for pancreatic ductal adenocarcinoma (2005–2006)

Characteristic	Value, n (%)
R classification	
R0	27 (24%)
R1	84 (76%)
RM involvement	
Posterior	39 (47%)
Medial	57 (68%)
Anterior surface	8 (10%)
Superior	0
Transection (pancreas)	3 (4%)
Bile duct	4 (5%)
Stomach/duodenum	3 (4%)
Number of margins	
1	56 (68%)
2	22 (26%)
3 or more	5 (6%)
Type of involvement	
Direct extension	78 (93%)
Locoregional spreading	6 (7%)

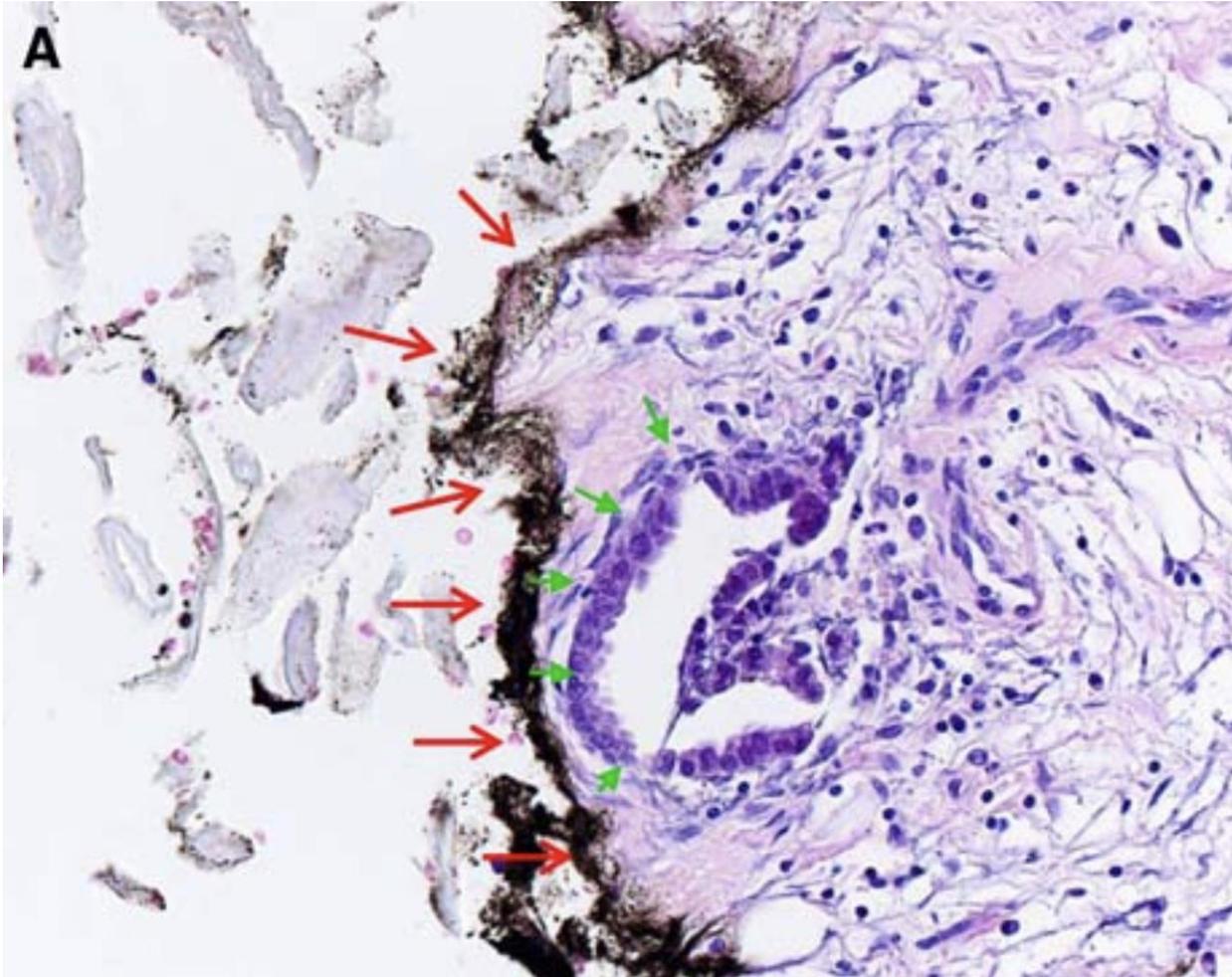
RM, resection margin.

Medial margin: Mesopancreas



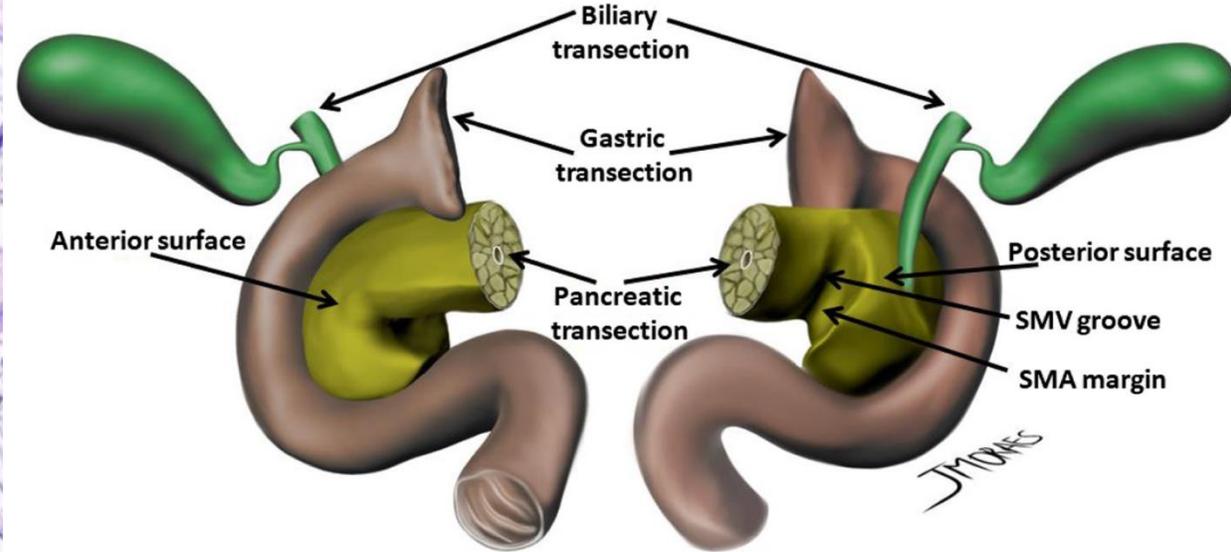
Most Pancreatic Cancer Resections are R1 Resections

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Esther Herpel, MD,¹ Helmut Friess, MD,^{2,4} Peter Schirmacher, MD,¹ and
Markus W. Büchler, MD²



Esposito I, et al. Ann Surg Oncol 2008; 15:1651-60

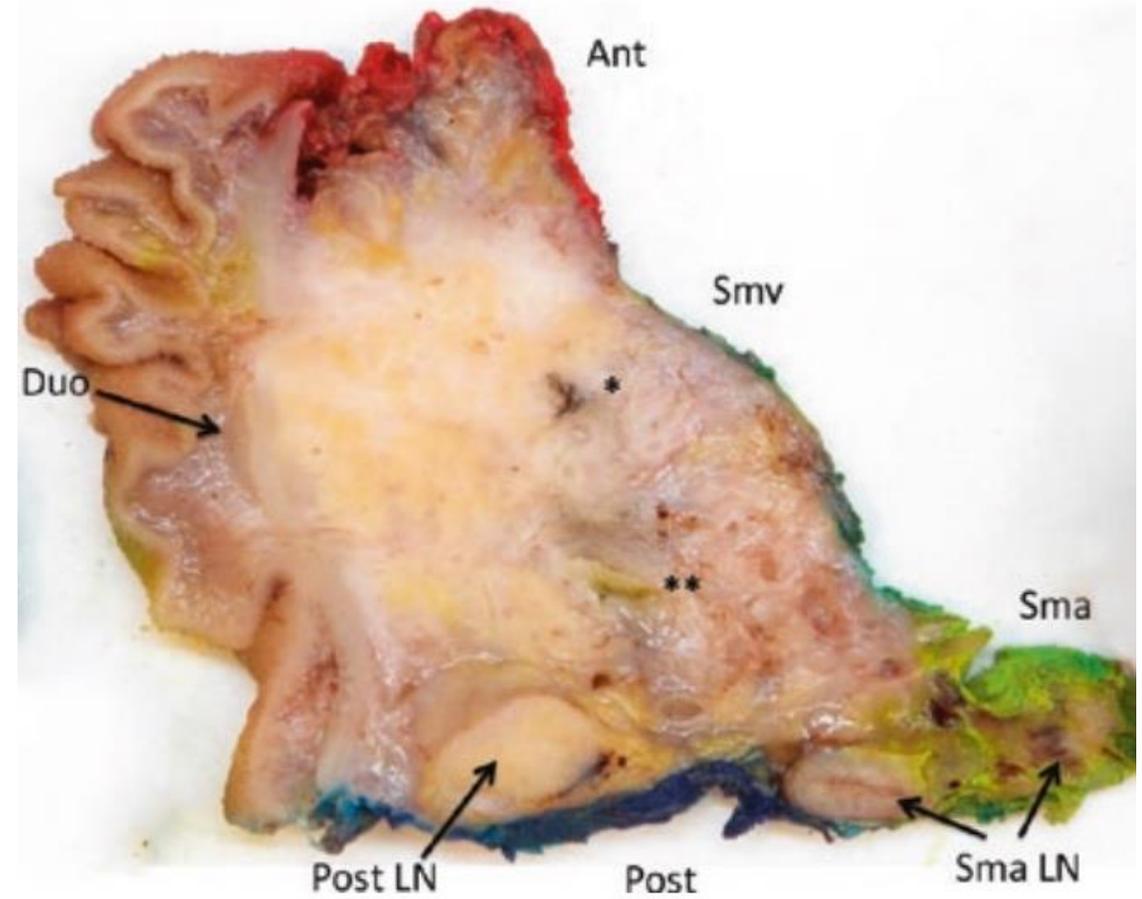
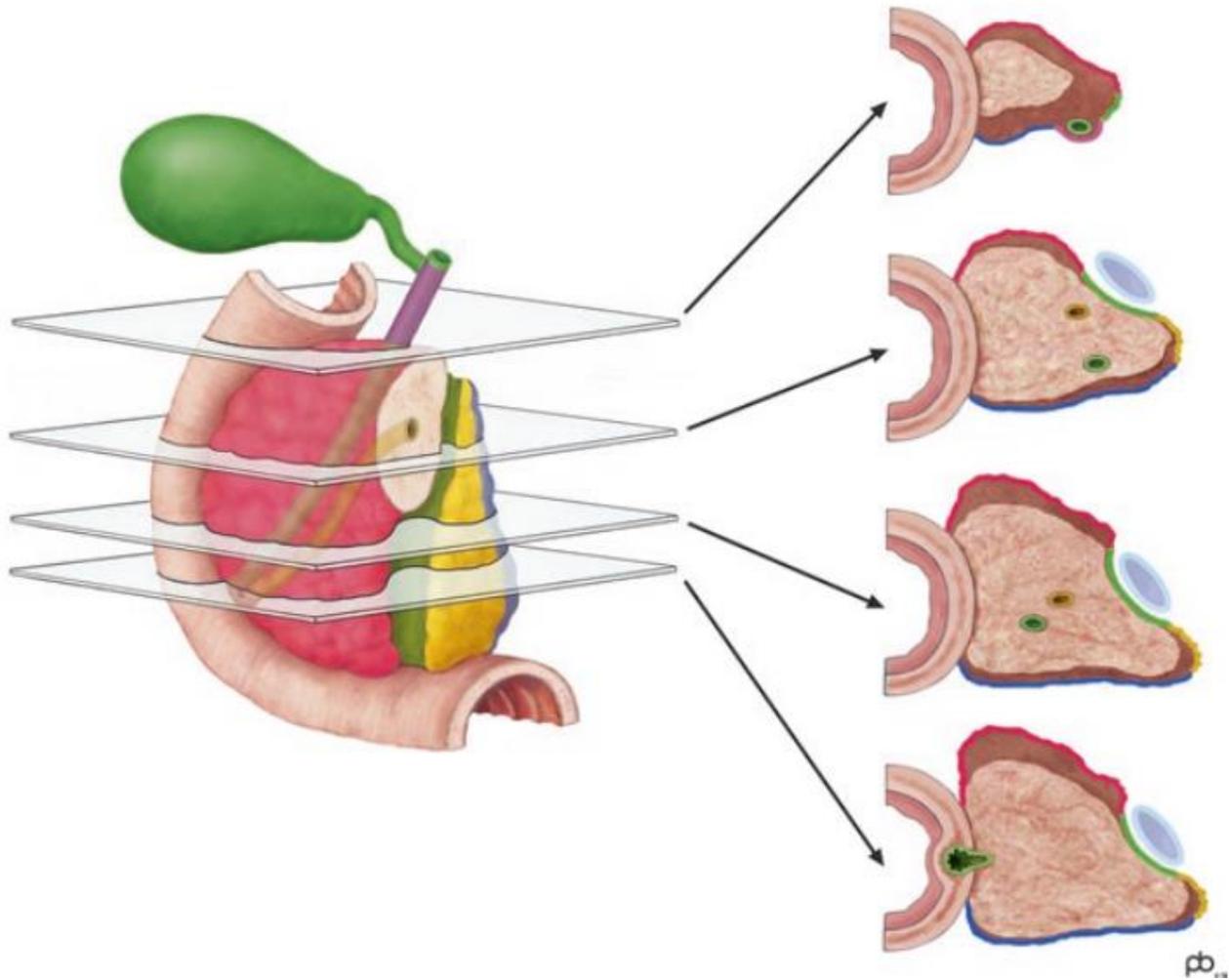
Mesopancreas



Fernandes ESM, et al. Langenbeck's Arch Surg 2021

R1 – Margem \leq 1 mm
Seta verde – Neoplasia
Seta vermelha - margem

Mesopancreas

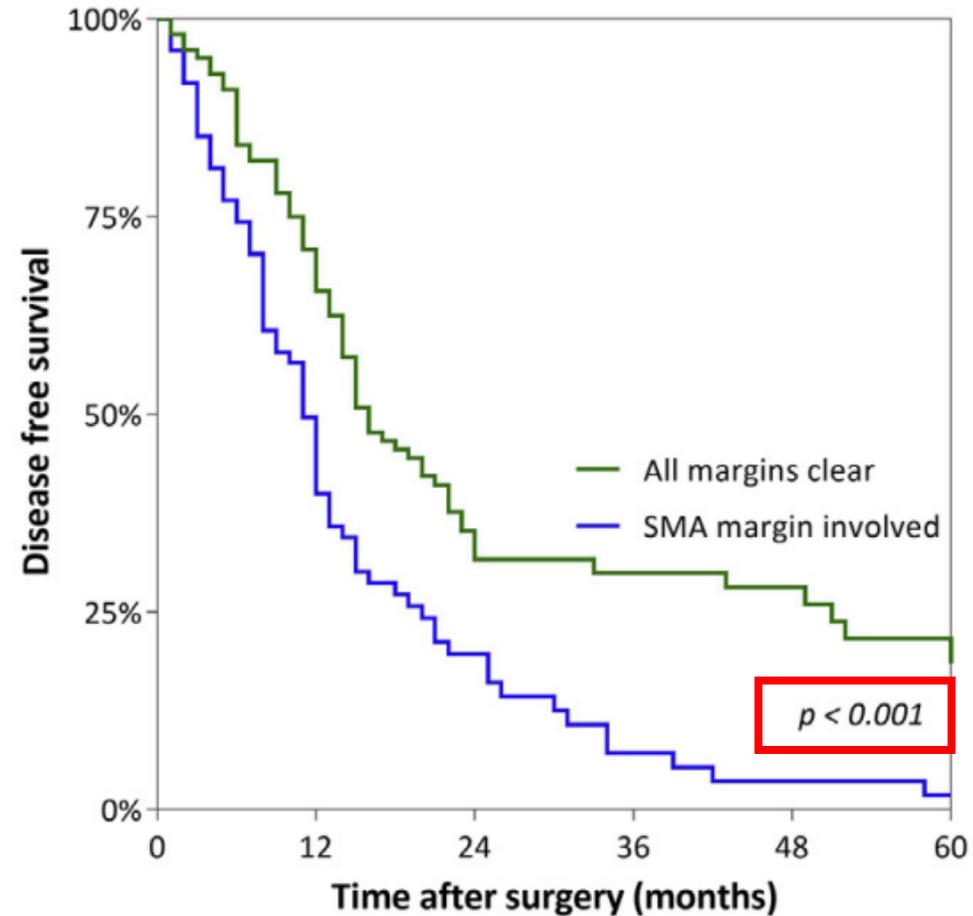


**Veia mesentérica superior (SMV)
Artéria mesentérica superior (SMA)**

ORIGINAL ARTICLE

Recurrence patterns of pancreatic cancer after pancreatoduodenectomy: systematic review and a single-centre retrospective study

d - SMA margin clearance & disease free survival



ORIGINAL ARTICLE

Recurrence patterns of pancreatic cancer after pancreatoduodenectomy: systematic review and a single-centre retrospective study

Conclusion: Local recurrence of pancreatic cancer is common and associated with similar mortality rates as those who present with simultaneous or metastatic recurrence. Involvement of the SMA margin is an independent predictor for disease progression :



Optimal Lymphadenectomy of the Mesopancreas Based on Fluorescence Imaging During Pancreaticoduodenectomy

Ryota Matsuki¹ · Masanori Sugiyama² · Masaharu Kogure¹ · Masaaki Yokoyama³ · Tetsuya Nakazato¹ · Yutaka Suzuki¹ · Toshiyuki Mori¹ · Nobutsugu Abe¹ · Yoshihiro Sakamoto¹

Fig. 1 Lymphatic pathways from the pancreatic head. The first JA is taped. Fluorescence is seen in the mesentery of the IPDA and first JA (arrow), but not in that of the second JA or more distant

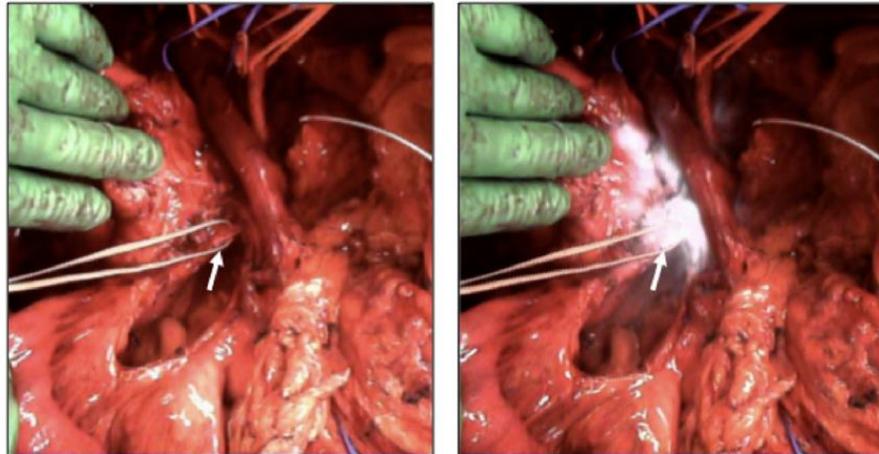


Table 2 Lymphatic pathways around the mesopancreas in the patients injected with ICG

No	Time after injection of ICG (min)	Mesentery along the IPDA-J1A	Mesentery along the J2A	Mesentery along the middle colic artery	Along the SMA
1	112	○	×	×	○
2	117	○	×	×	○
3	145	○	×	×	○
4	217	○	×	×	○
5	170	○	×	×	○
6	246	○	×	×	○
7	157	○	×	×	○
8	175	×	×	×	○
9	280	○	×	×	○
10	180	○	×	×	○

○: Positive staining

×: Negative staining

ICG indocyanine green, IPDA inferior pancreaticoduodenal artery, JA jejunal artery, SMA superior mesenteric artery



PANCREATIC CANCER

ORIGINAL SCIENTIFIC REPORT

Complete Lymphadenectomy Around the Entire Superior Mesenteric Artery Improves Survival in Artery-First Approach Pancreatoduodenectomy for T3 Pancreatic Ductal Adenocarcinoma

<http://dx.doi.org/10.1016/j.hpb.2015.11.009>

HPB

REVIEW ARTICLE

A systematic review of the role of periaortic dissection of the superior mesenteric artery in affecting margin status after pancreatoduodenectomy for pancreatic adenocarcinoma

Journal of Surgical Oncology 2016;113:668–671

HOW I DO IT

Top-Down Approach to the Superior Mesenteric Artery and the Mesopancreas During Pancreatoduodenectomy for Pancreatic Cancer

THILO WELSCH, MD,* ULRICH BORK, MD, MARIUS DISTLER, MD, AND JÜRGEN WEITZ, MD

www.impactjournals.com/oncotarget/

Oncotarget, 2017, Vol. 8, (No. 5), pp: 7766-7776

Research Paper

Superior mesenteric artery margin in pancreaticoduodenectomy for pancreatic adenocarcinoma

Dao-ning Liu¹, Ang Lv¹, Zhi-hua Tian², Xiu-yun Tian¹, Xiao-ya Guan¹, Bin Dong², Min Zhao³, Chun-yi Hao¹

SUPERIOR MESENTERIC ARTERY

DOI: 10.1002/jhpb.725

ORIGINAL ARTICLE

Precise anatomical resection based on structures of nerve and fibrous tissue around the superior mesenteric artery for mesopancreas dissection in pancreaticoduodenectomy for pancreatic cancer

Yuichi Nagakawa¹ | Shuang-Qin Yi² | Chie Takishita¹ | Yatsuka Sahara¹ |

Surgical Endoscopy
<https://doi.org/10.1007/s00464-019-06994-6>

DYNAMIC MANUSCRIPT

Follow “the superior mesenteric artery”: laparoscopic approach for total mesopancreas excision during pancreaticoduodenectomy

Edouardo Morales¹ · Giuseppe Zimmitti¹ · Claudio Codignola¹ · Alberto Manzoni¹ · Marco Garatti¹ · Valentina Segà¹ · Edoardo Rosso¹

Anatomical Science International
<https://doi.org/10.1007/s12565-020-00597-1>

ORIGINAL ARTICLE

What comprises the plate-like structure between the pancreatic head and the celiac trunk and superior mesenteric artery? A proposal for the term “P–A ligament” based on anatomical findings

Satoru Muro¹ · Wachirawit Sirirat¹ · Daisuke Ban² · Yuichi Nagakawa³ · Keiichi Akita¹

J Gastrointest Surg (2014) 18:1209–1215
DOI 10.1007/s11605-014-2495-3

HOW I DO IT

Anterior Approach to the Superior Mesenteric Artery by Using Nerve Plexus Hanging Maneuver for Borderline Resectable Pancreatic Head Carcinoma

Shugo Mizuno · Shuji Isaji · Akihiro Tanemura · Masashi Kishiwada ·

Journal of Gastrointestinal Surgery
<https://doi.org/10.1007/s11605-018-3995-3>

ORIGINAL ARTICLE

Optimal Extent of Superior Mesenteric Artery Dissection during Pancreatoduodenectomy for Pancreatic Cancer: Balancing Surgical and Oncological Safety

Yosuke Inoue¹ · Akiyo Saiura¹ · Atsushi Oba¹ · Shoji Kawakatsu¹ · Yoshihiro Ono¹ · Takafumi Sato¹ · Yoshihiro Mise¹ ·

EDIAN WING 中環 2013.11.27 13:56:13 Page 2/11
cyorinwps/22511-3682/nide06-07/ky017531368200045246

—Report on Experiments and Clinical Cases—

Left Posterior Approach Pancreatoduodenectomy with Total Mesopancreas Excision and Circumferential Lymphadenectomy Around the Superior Mesenteric Artery for Pancreatic Head Carcinoma

Takayuki Aimoto¹, Satoshi Mizutani¹, Youichi Kawano¹, Akira Matsushita¹, Naoyuki Yamashita¹, Hideyuki Suzuki¹ and Eiji Uchida¹

International Journal of Surgery 73 (2020) 14–24

Contents lists available at ScienceDirect

International Journal of Surgery

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



Review

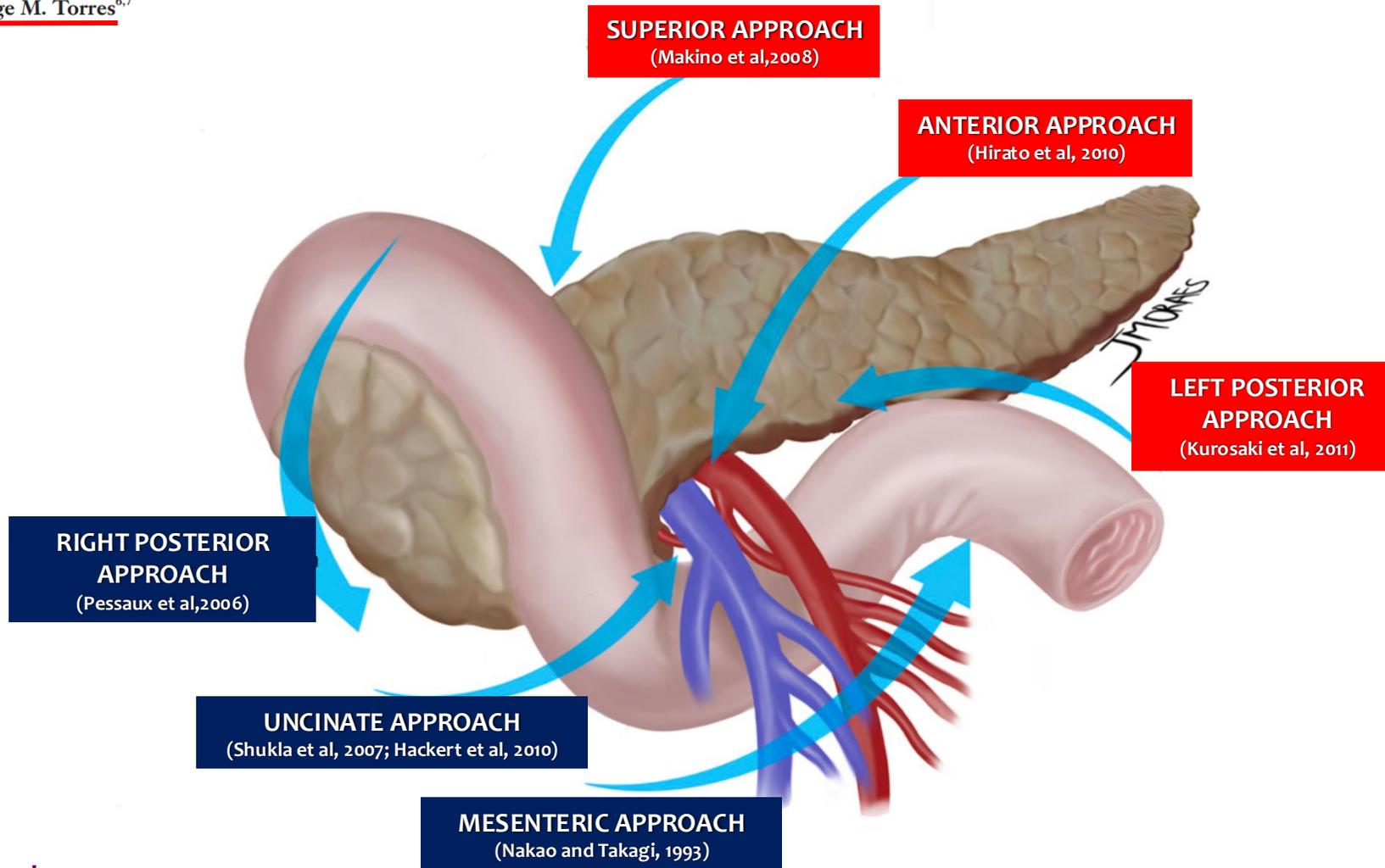
Superior mesenteric artery first approach can improve the clinical outcomes of pancreaticoduodenectomy: A meta-analysis



A more radical perspective on surgical approach and outcomes in pancreatic cancer – a narrative review

ARTERY FIRST

Eduardo de Souza M. Fernandes^{1,2,3}, Felipe Pedreira T. de Mello^{1,2}, Eduardo Pinho Braga¹, Gabrielle Oliveira de Souza¹, Ronaldo Andrade^{1,2}, Leandro Savatone Pimentel^{1,2}, Camila Liberato Girão^{1,2}, Munique Siqueira^{1,2}, José Maria A. Moraes-Junior^{6,7}, Romulo Varela de Oliveira⁴, Nicolas Goldaracena⁵, Orlando Jorge M. Torres^{6,7}



ARTERY FIRST

Left renal vein

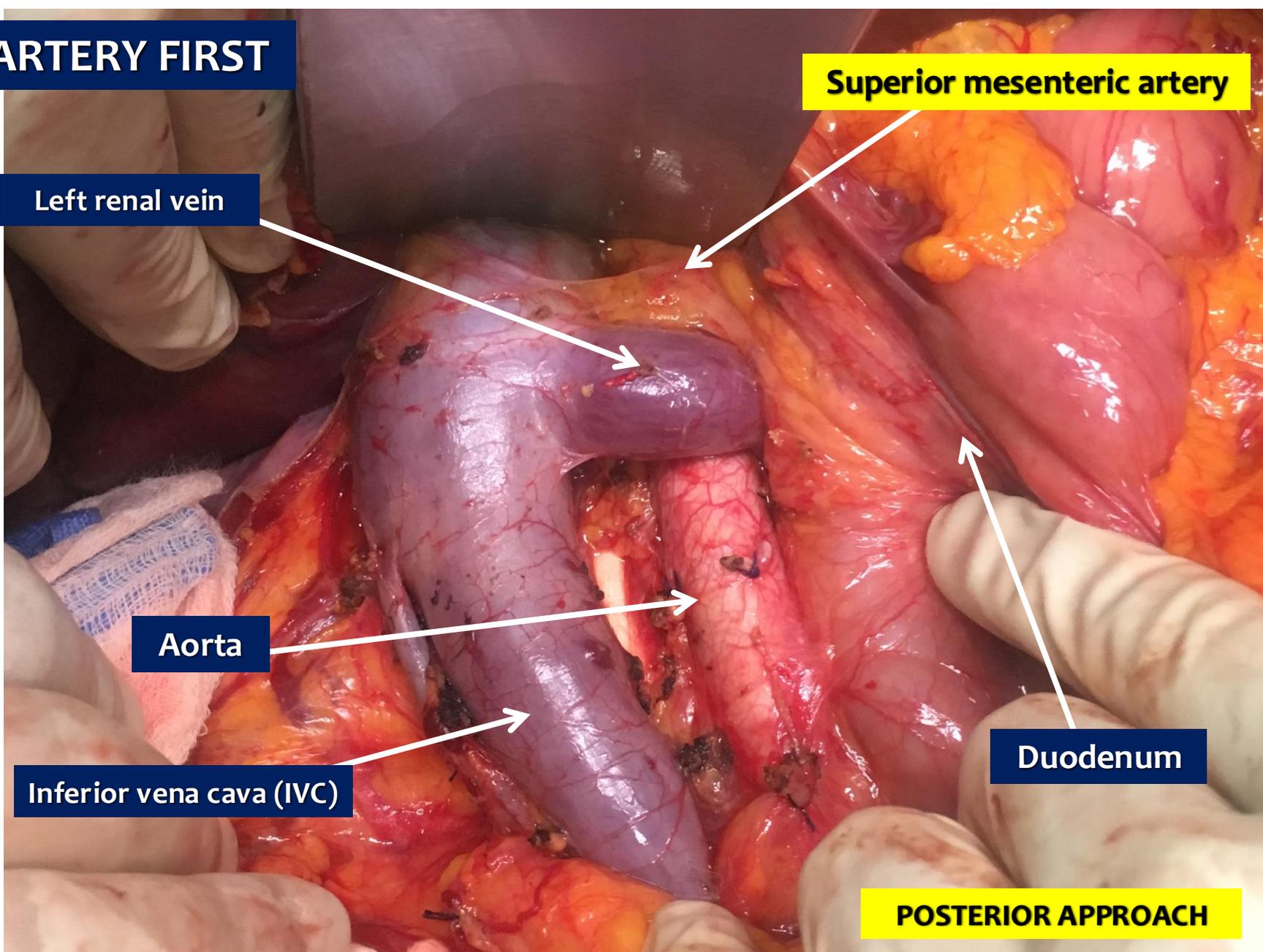
Superior mesenteric artery

Aorta

Inferior vena cava (IVC)

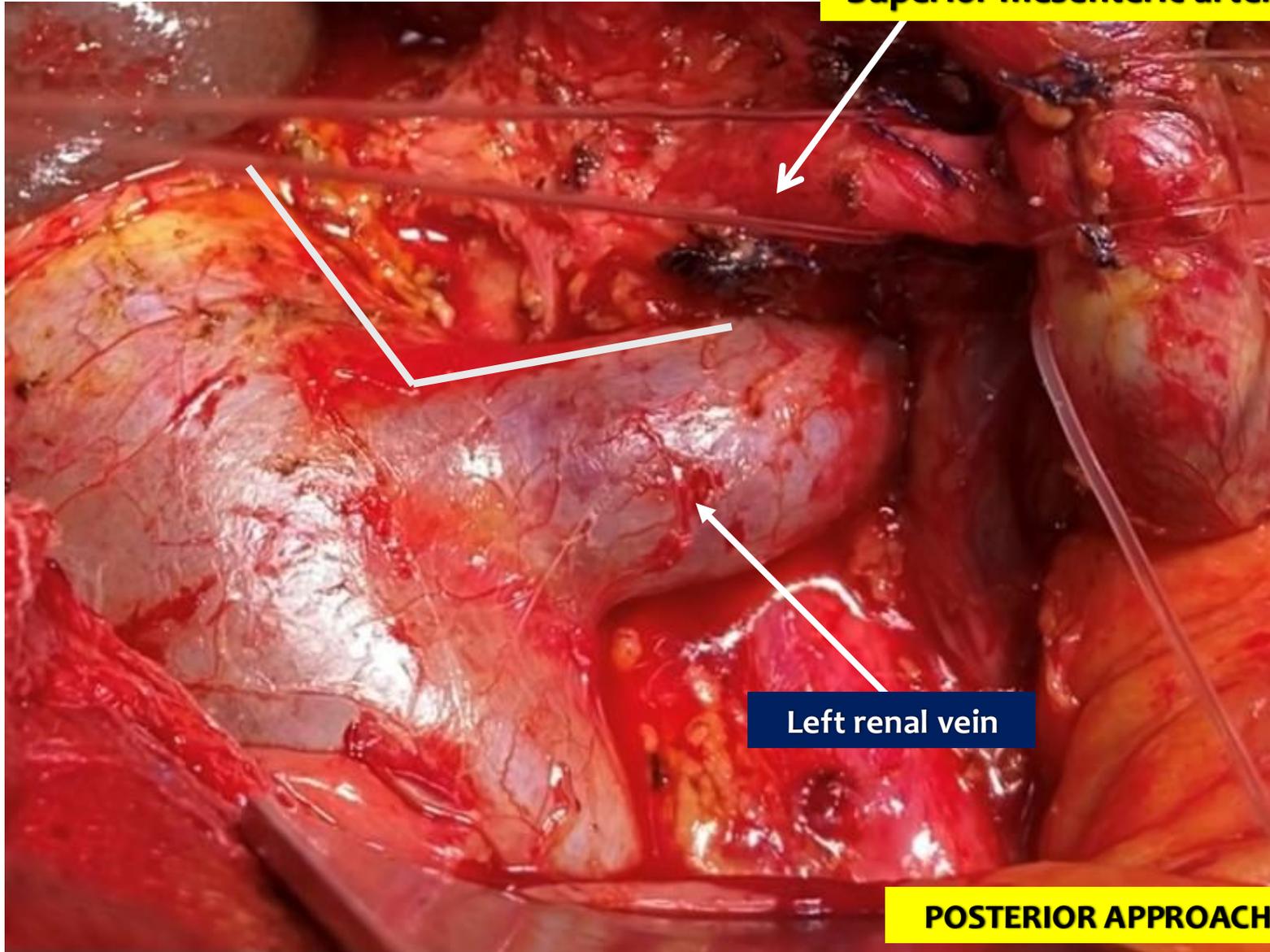
Duodenum

POSTERIOR APPROACH



ARTERY FIRST

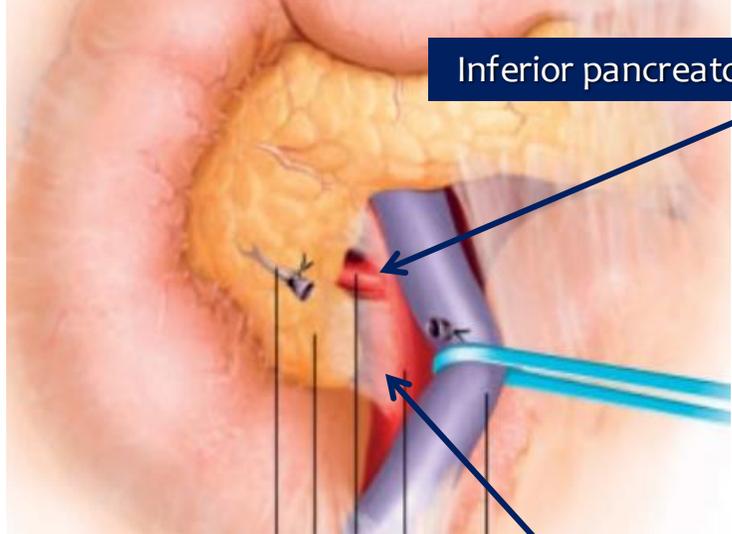
Superior mesenteric artery



Left renal vein

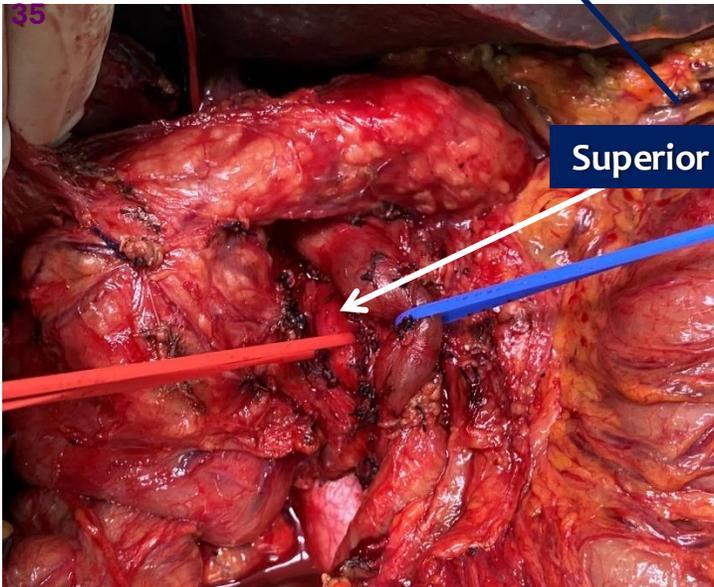
POSTERIOR APPROACH

ARTERY FIRST

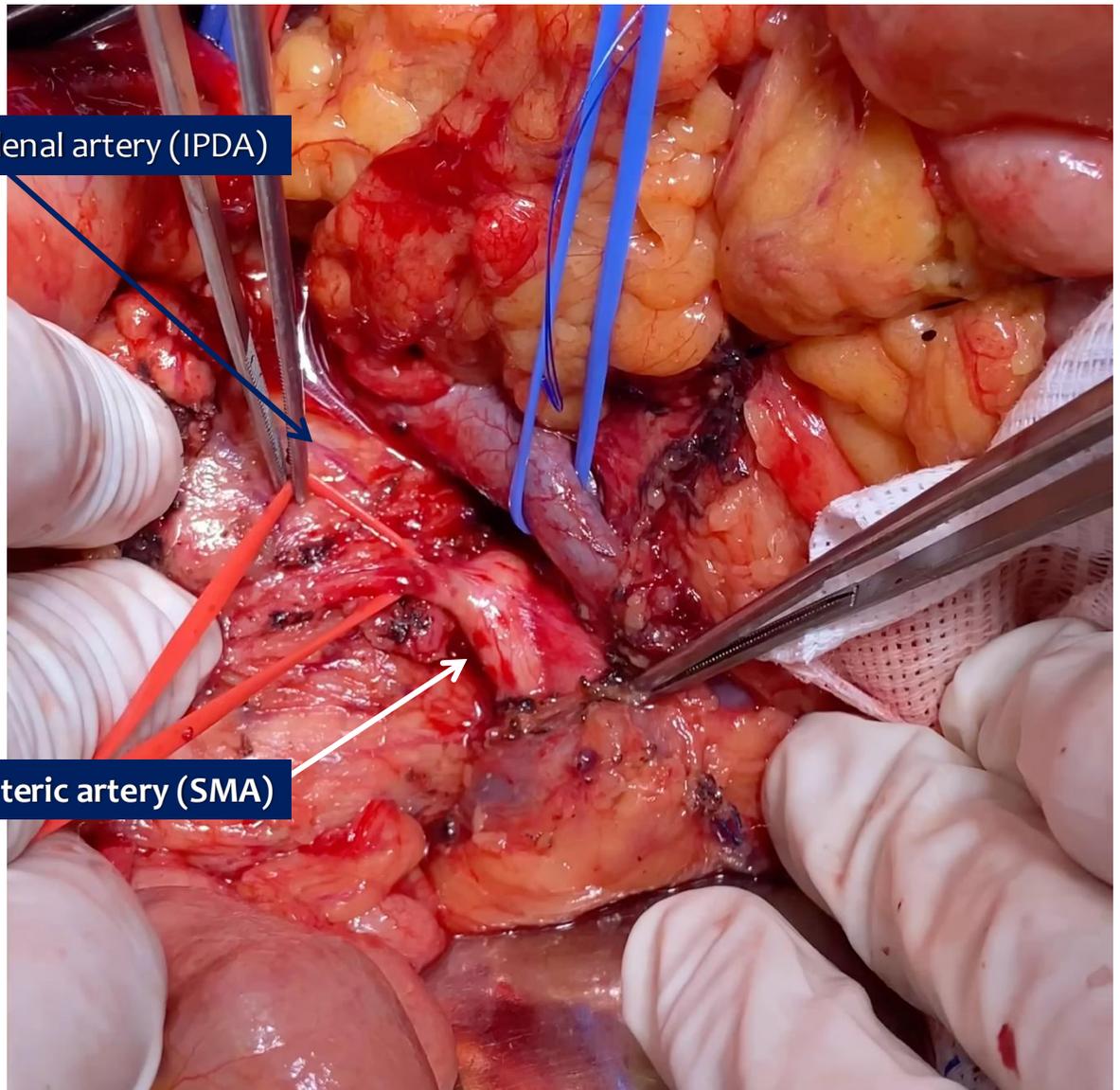


Inferior pancreaticoduodenal artery (IPDA)

Pandanaboyana S, et al. Br J Surg 2012;99:1027-35

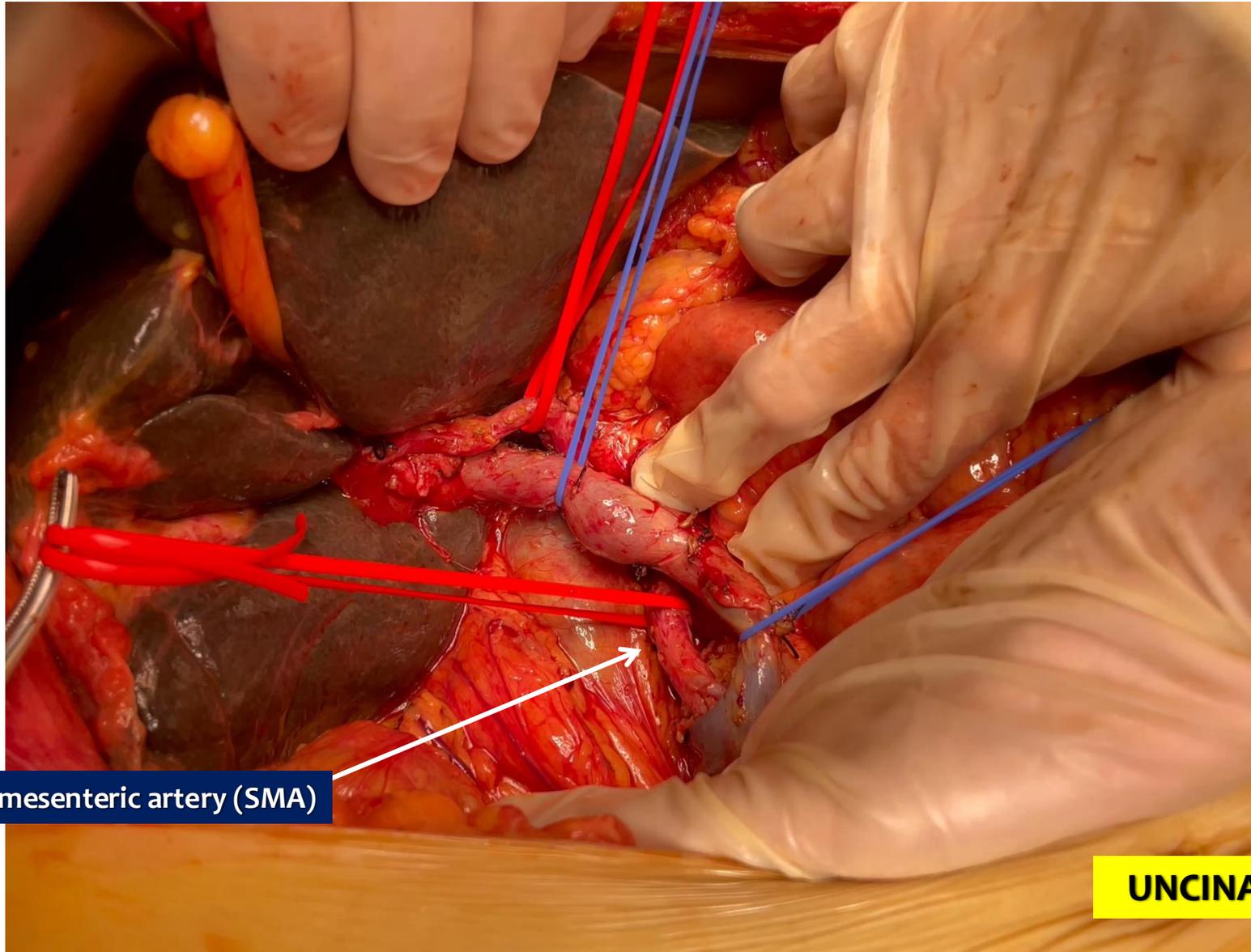


Superior mesenteric artery (SMA)



UNCINATE FIRST

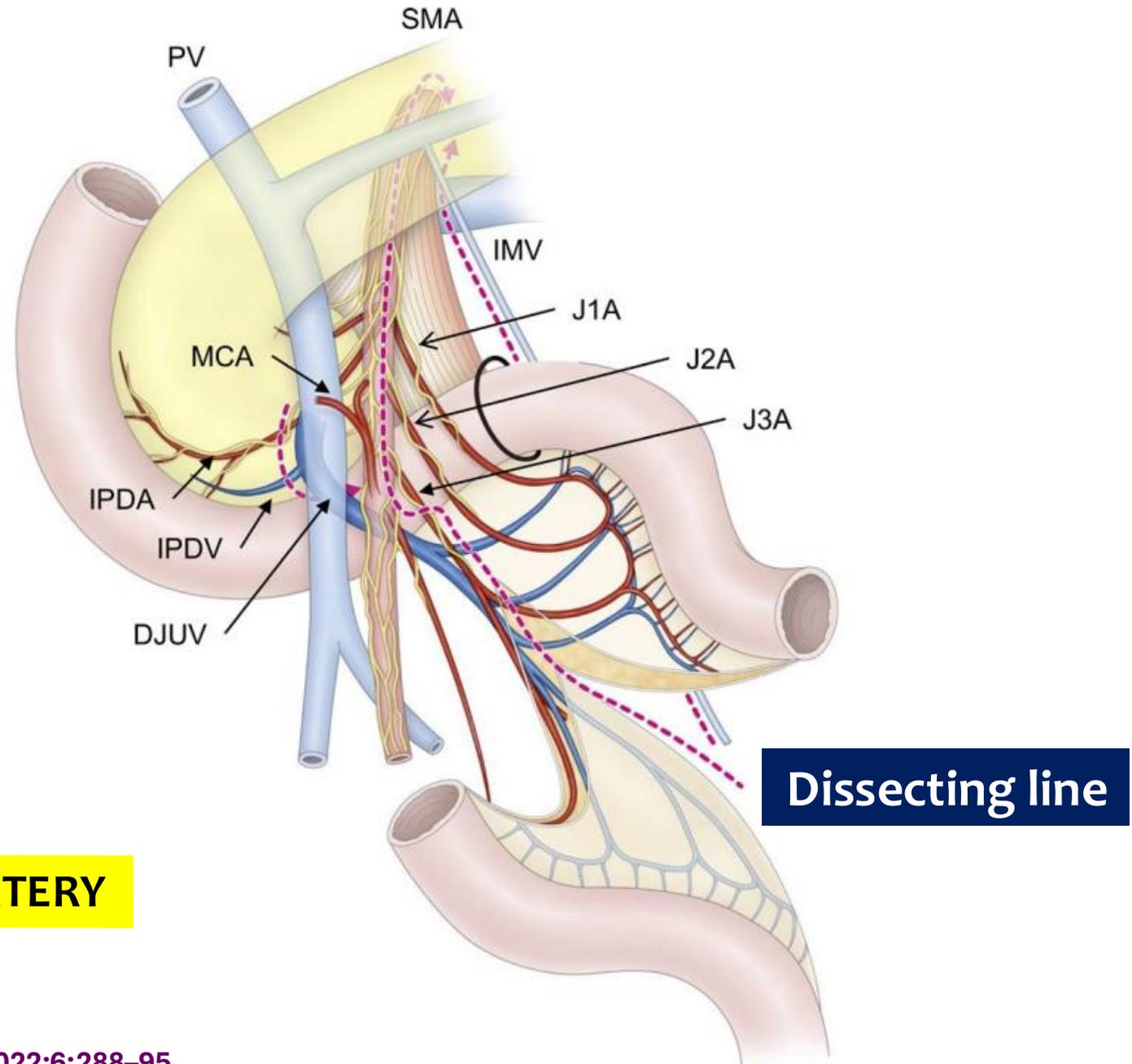
ARTERY FIRST



Superior mesenteric artery (SMA)

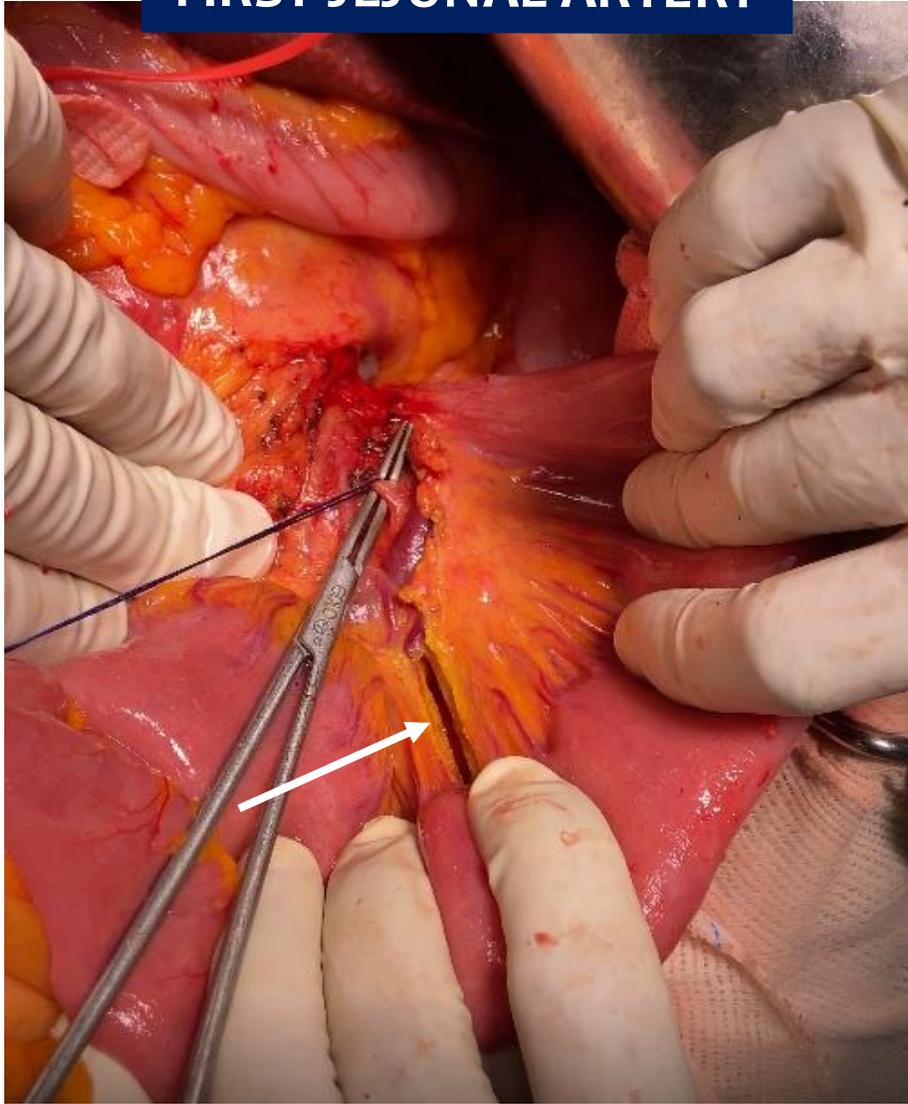
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MESOPANCREAS

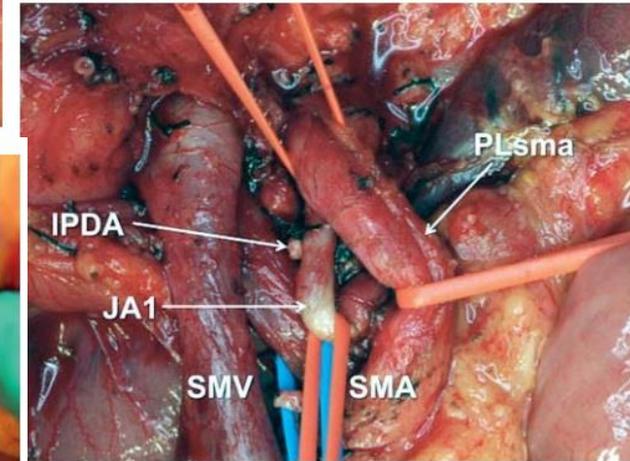
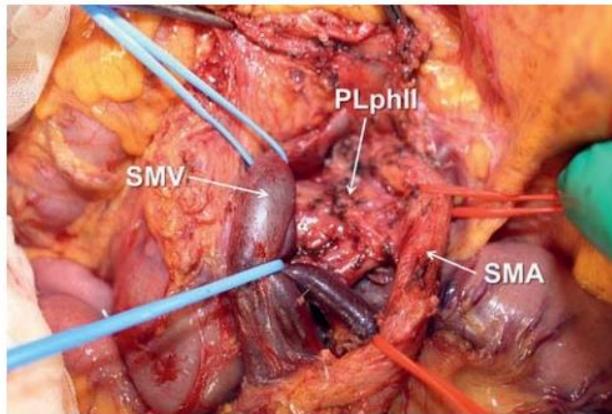
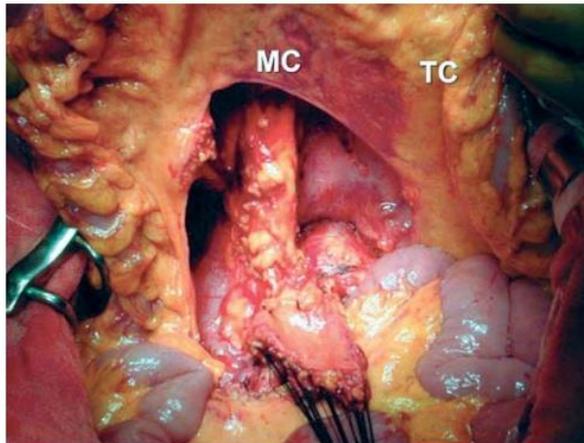
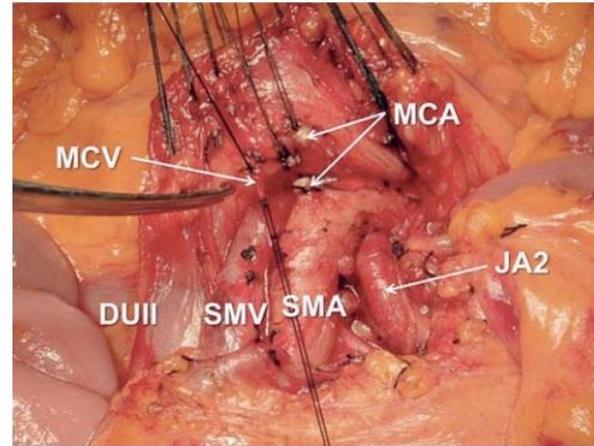
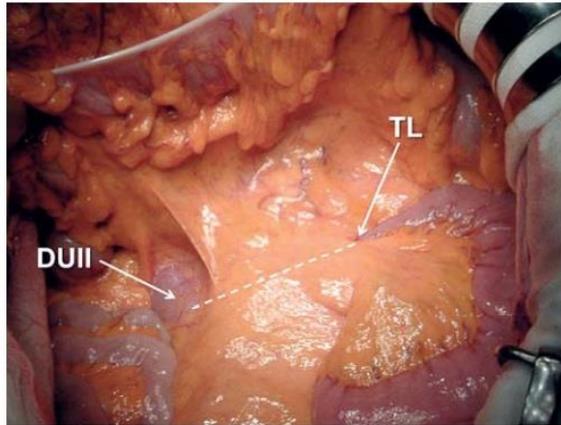


FIRST JEJUNAL ARTERY

FIRST JEJUNAL ARTERY



The Mesenteric Approach in Pancreatoduodenectomy



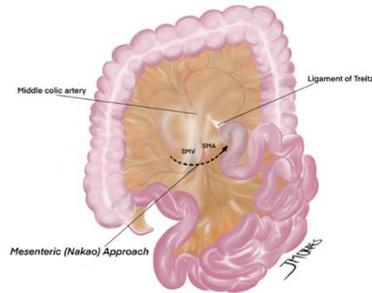
MESENTERIC APPROACH

A more radical perspective on surgical approach and outcomes in pancreatic cancer—a narrative review

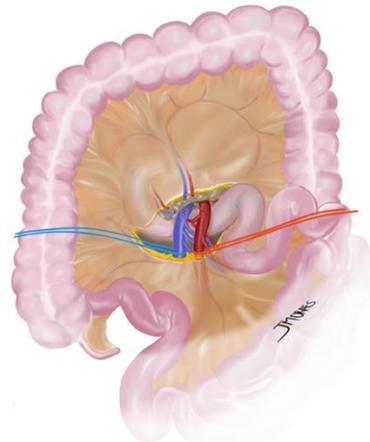
MESENTERIC APPROACH

Eduardo de Souza M. Fernandes^{1,2,3}, Felipe Pedreira T. de Mello^{1,2}, Eduardo Pinho Braga¹, Gabrielle Oliveira de Souza¹, Ronaldo Andrade^{1,2}, Leandro Savatone Pimentel^{1,2}, Camila Liberato Girão^{1,2}, Munique Siqueira^{1,2}, José Maria A. Moraes-Junior^{6,7}, Romulo Varella de Oliveira⁴, Nicolas Goldaracena⁵, Orlando Jorge M. Torres^{6,7}

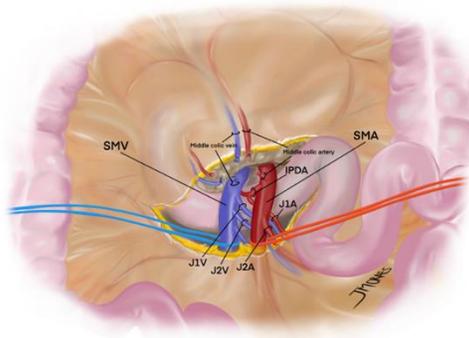
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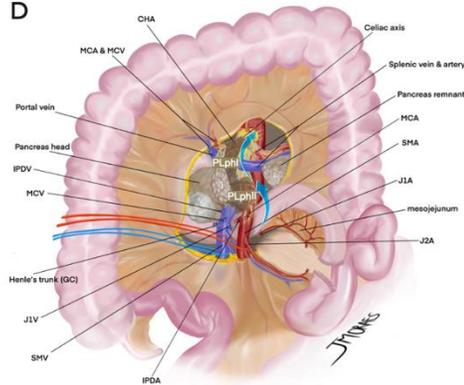
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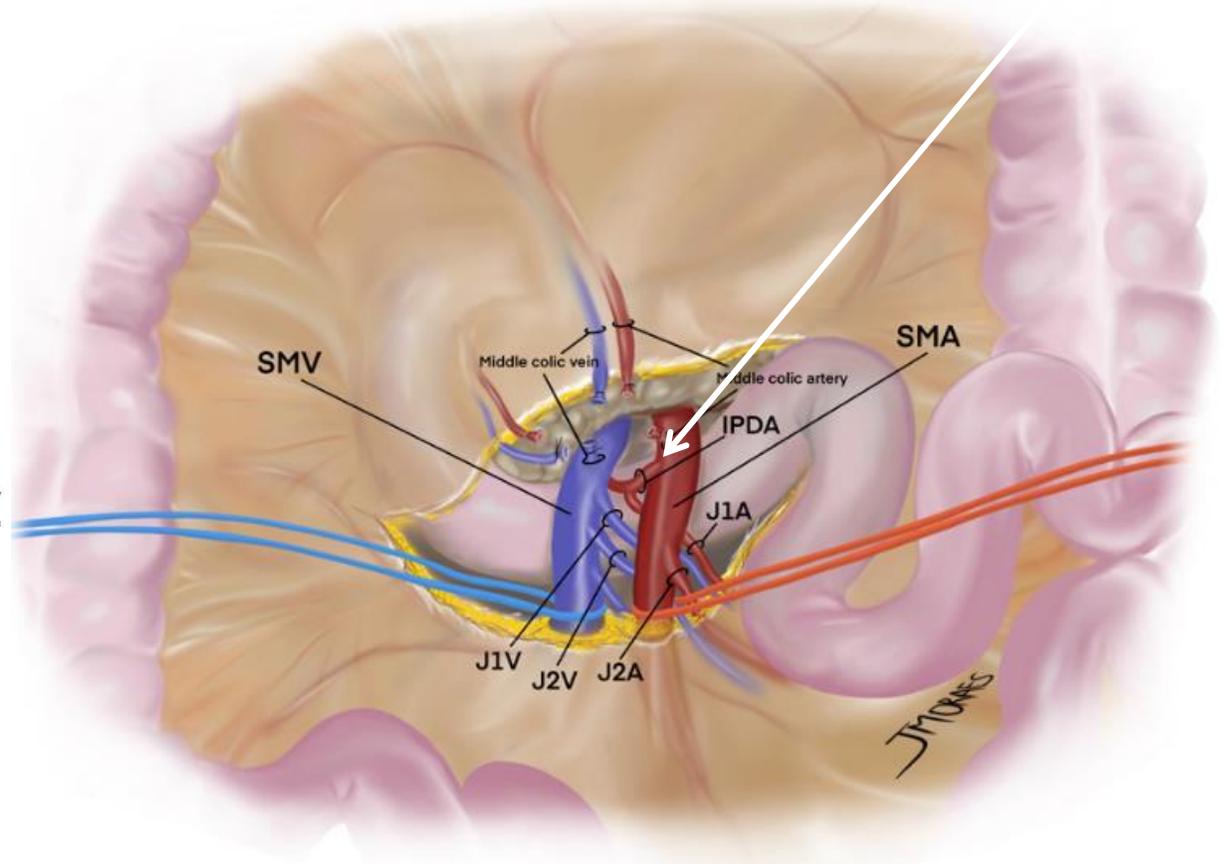
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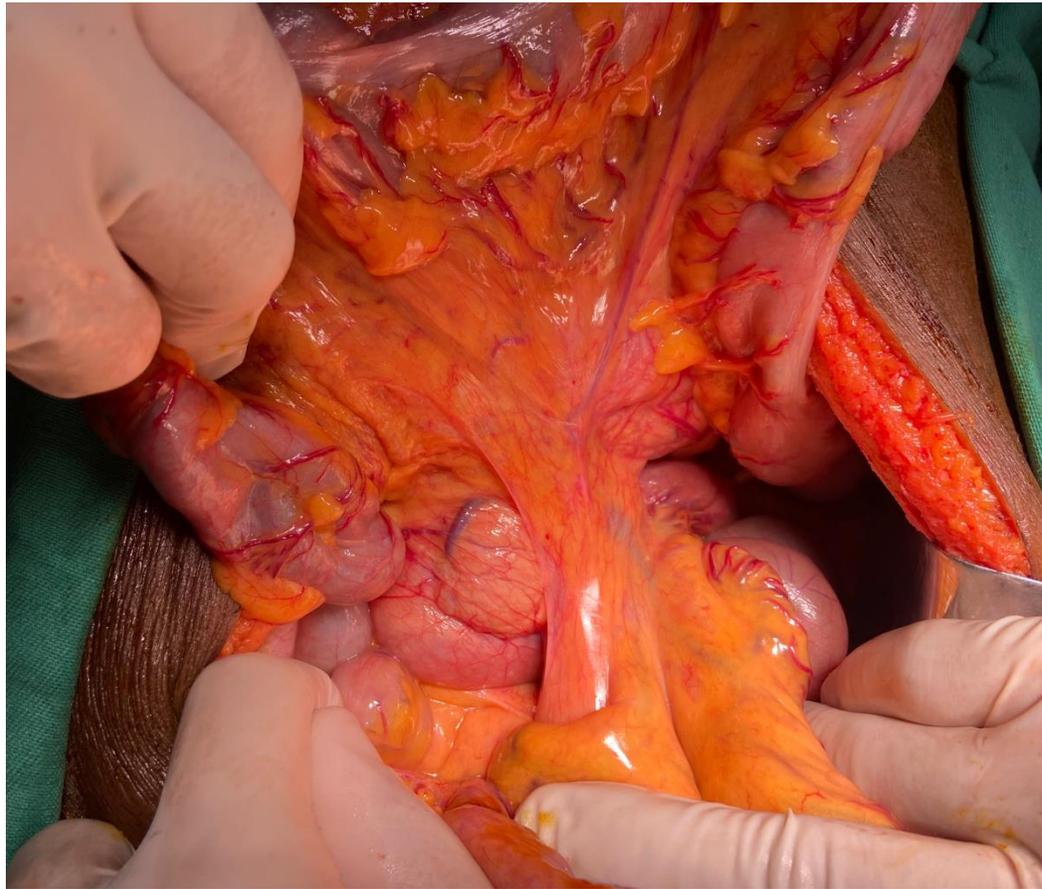


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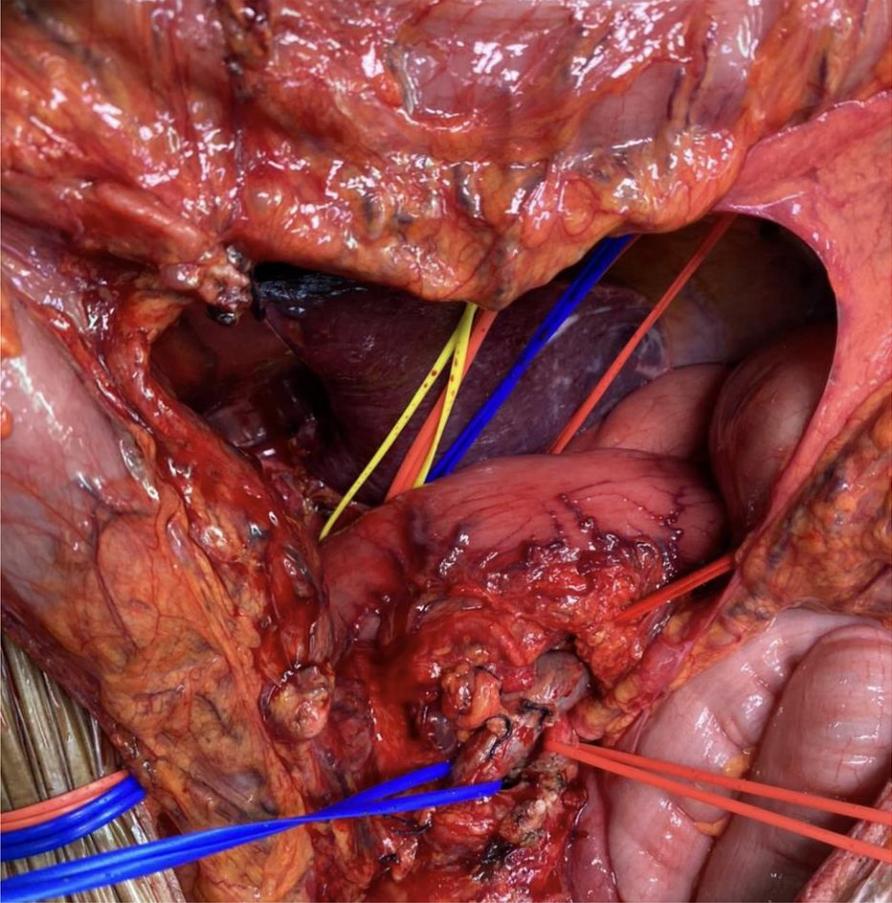


Inferior pancreaticoduodenal artery (IPDA)



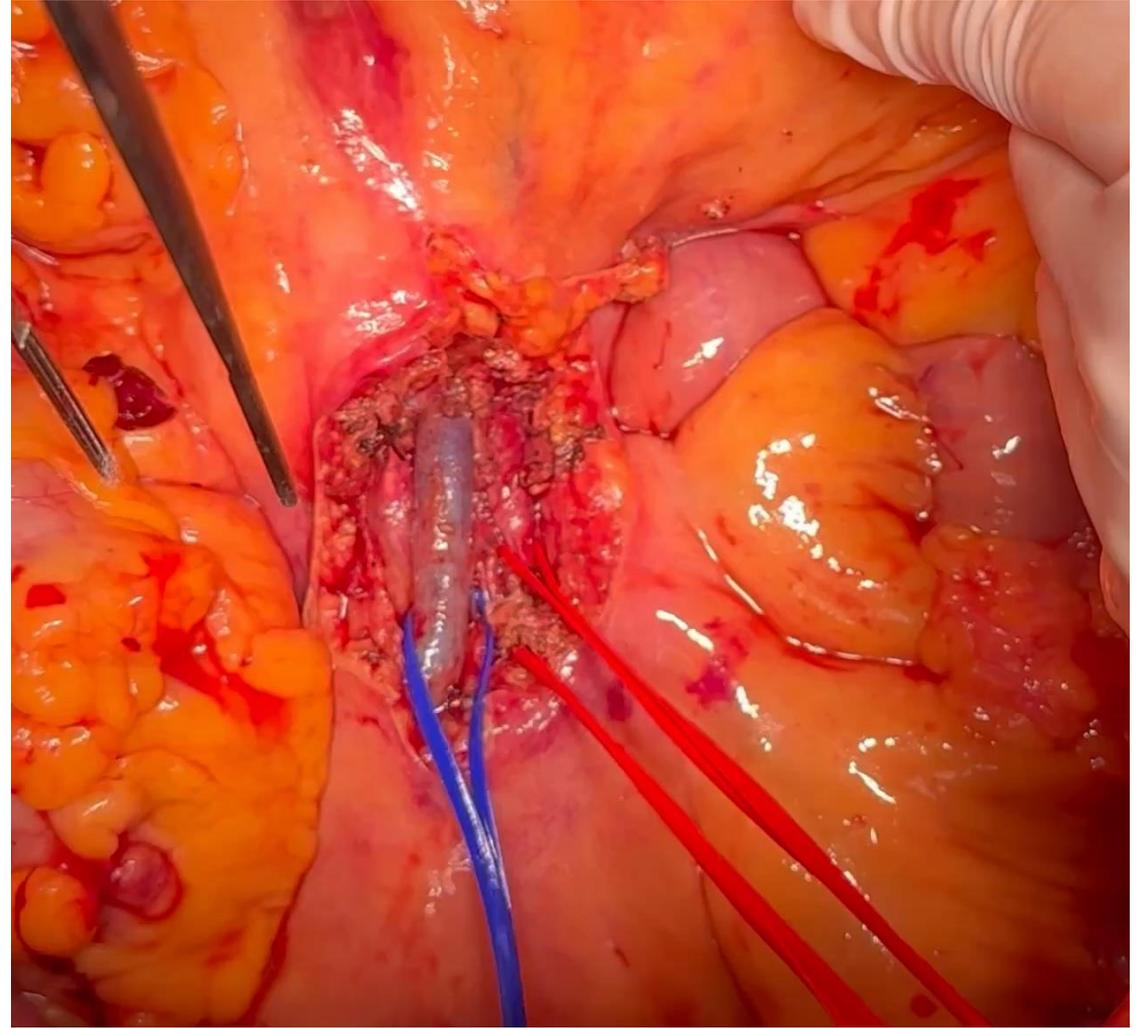
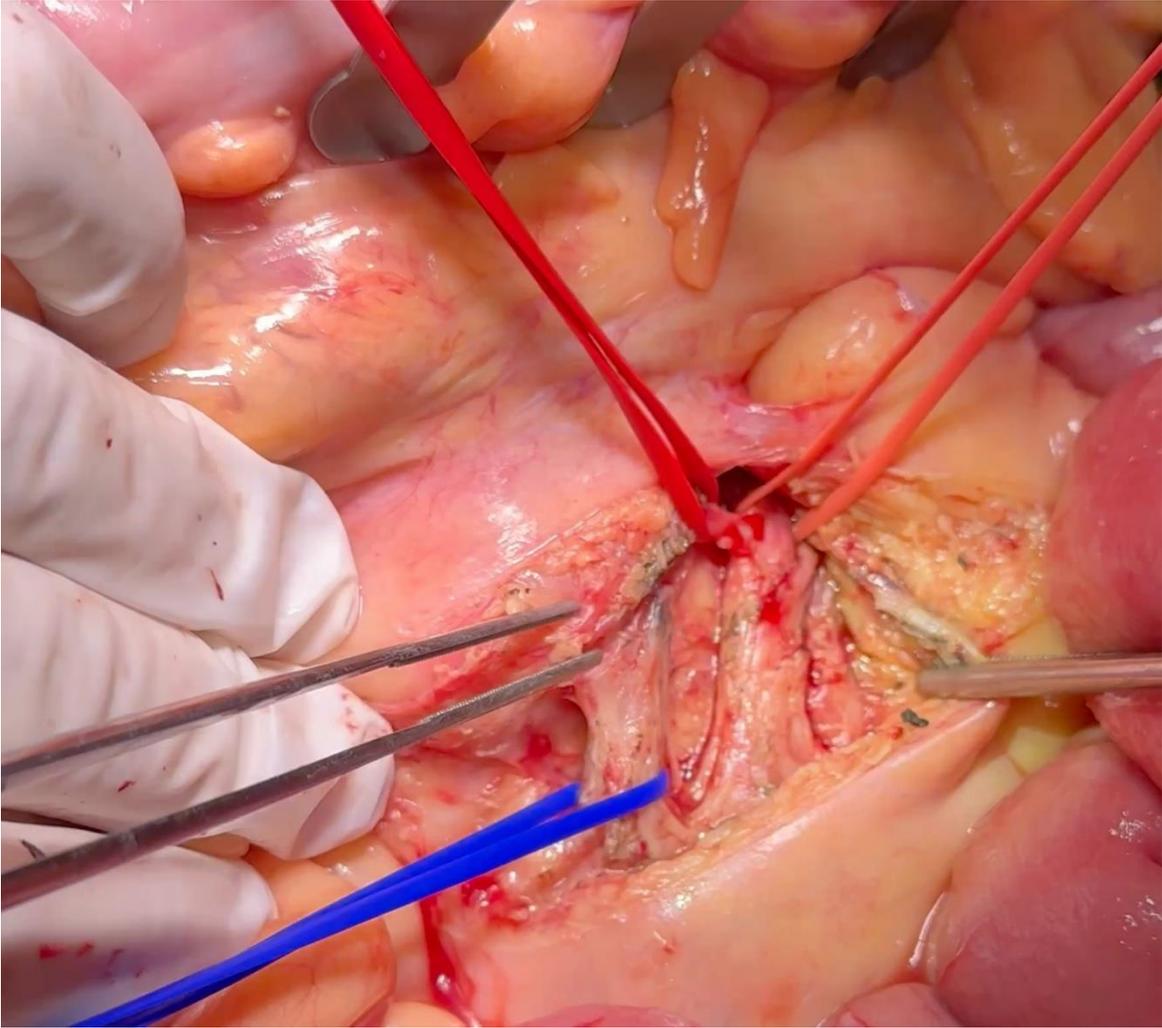


Infracolic approach



MESENTERIC APPROACH

INFRACOLIC APPROACH

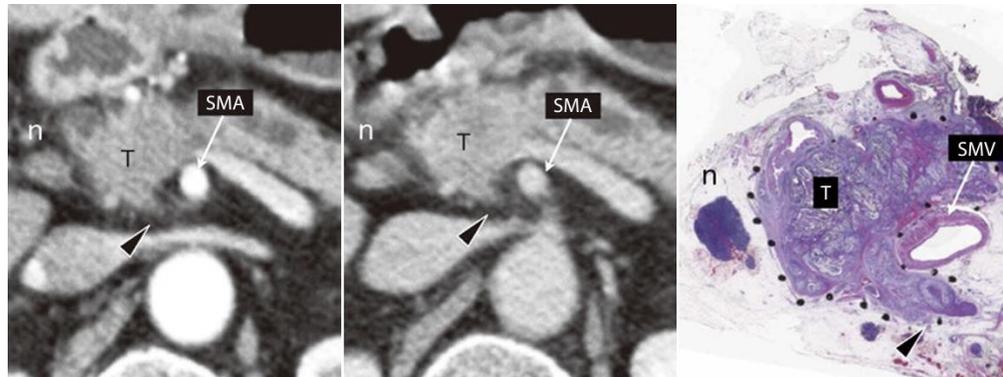
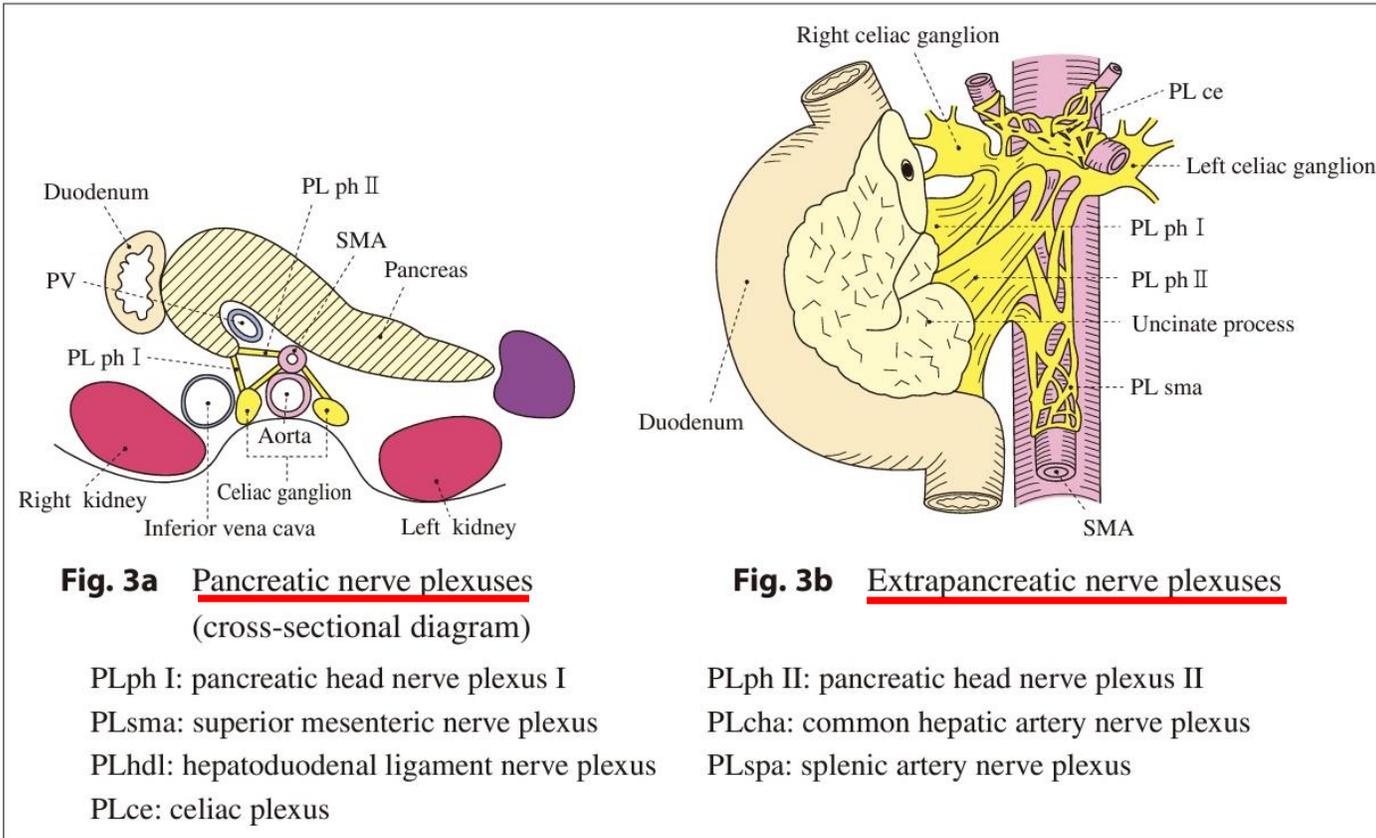


MESENTERIC APPROACH

Classification of Pancreatic Carcinoma

Japan Pancreas Society
Fourth English Edition

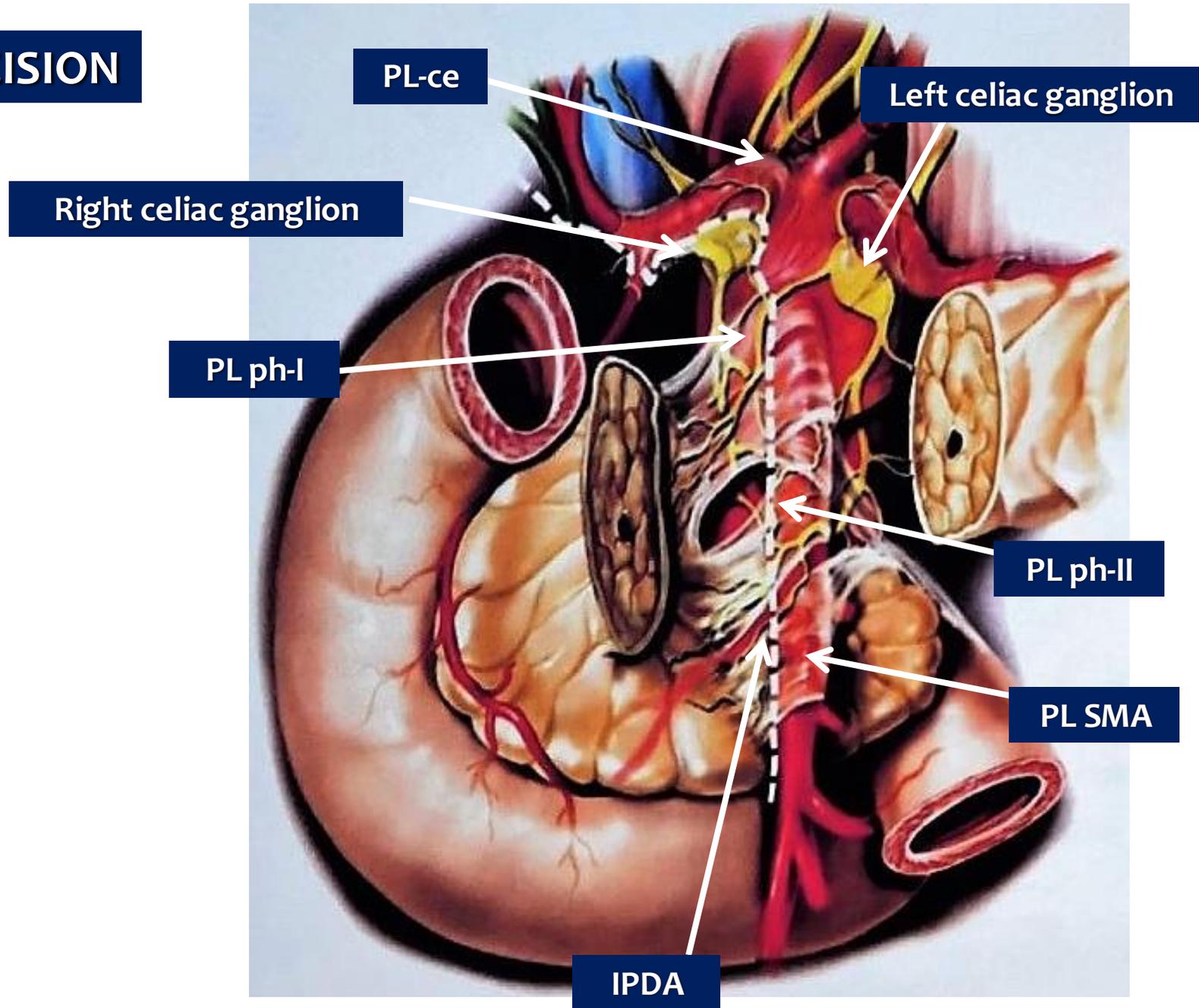
Kanehara & Co., Ltd.



TOTAL MESOPANCREAS EXCISION

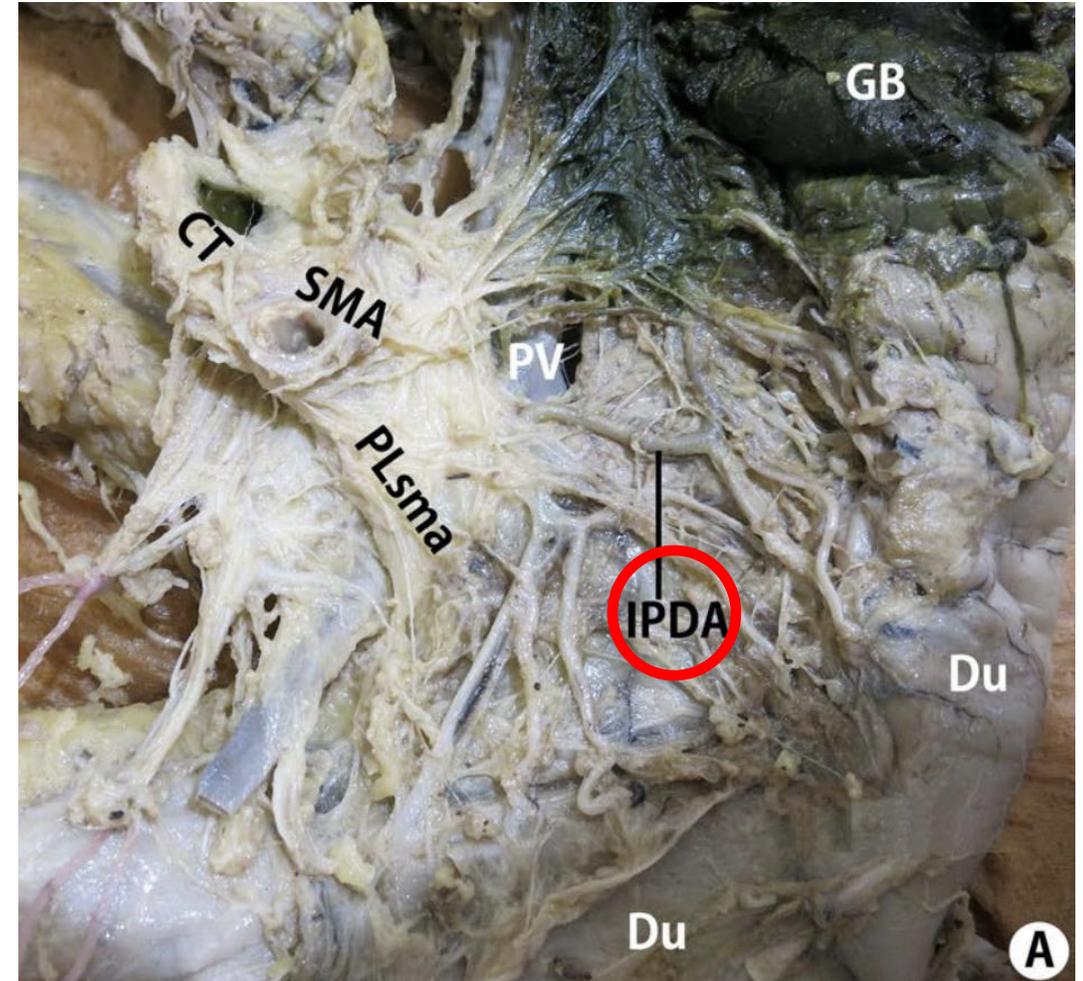
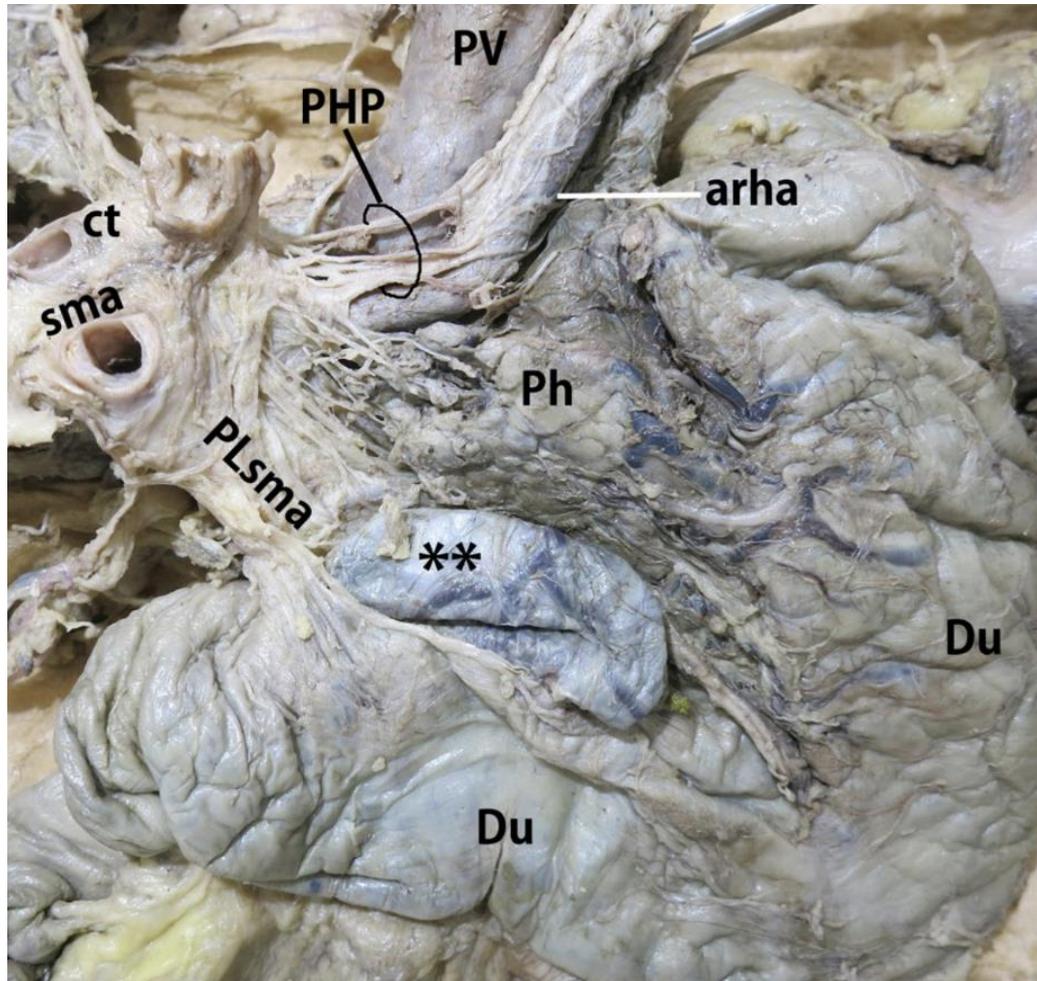
MESOPANCREAS

- pIph-I
- pIph-II
- IPDA
- Jejunal arteries
- Jejunal veins
- Lymph nodes



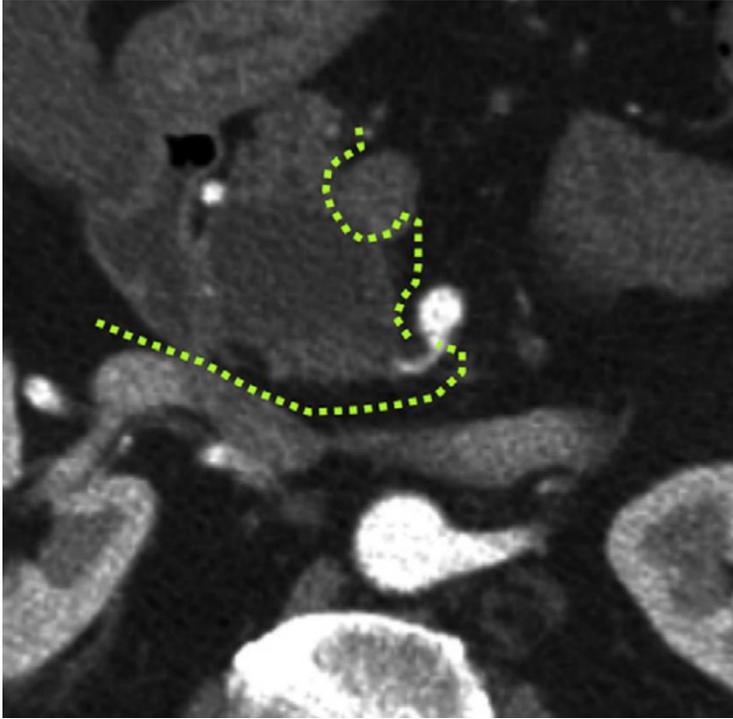
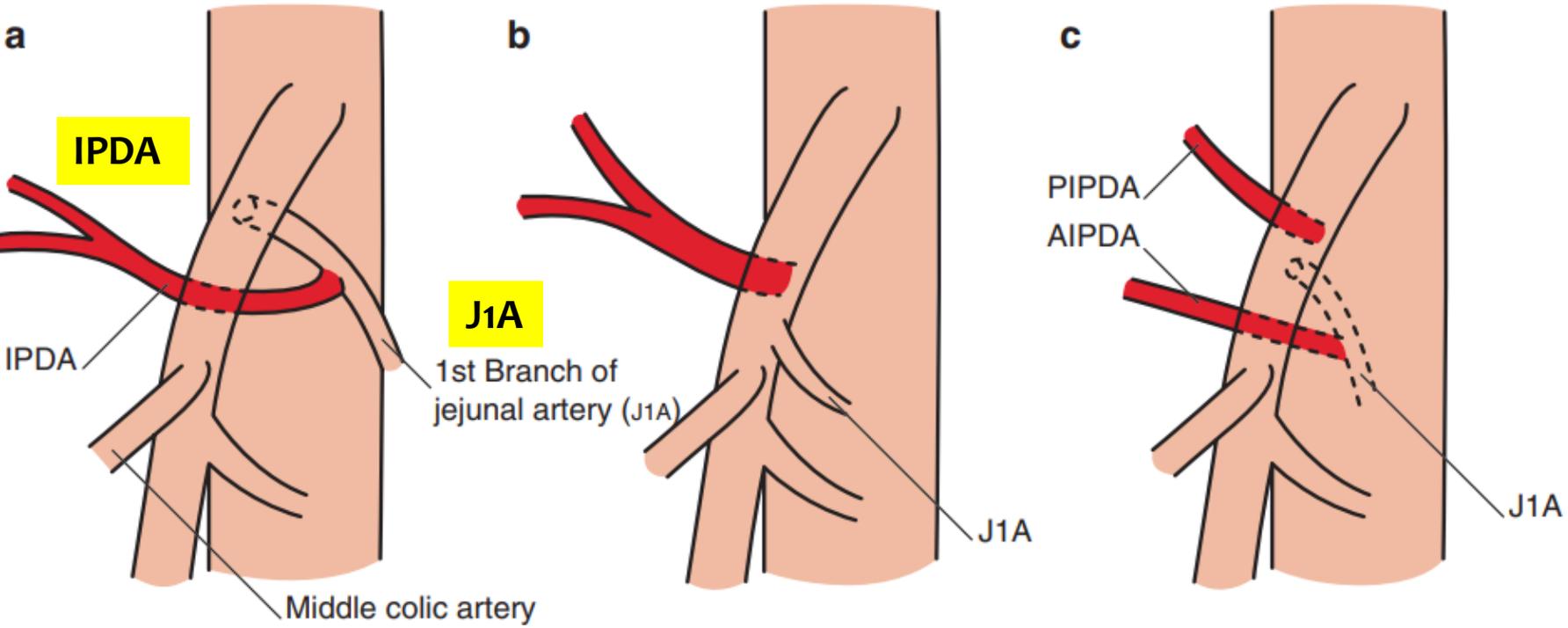


The mesopancreas and pancreatic head plexus: morphological, developmental, and clinical perspectives



ARTERIES

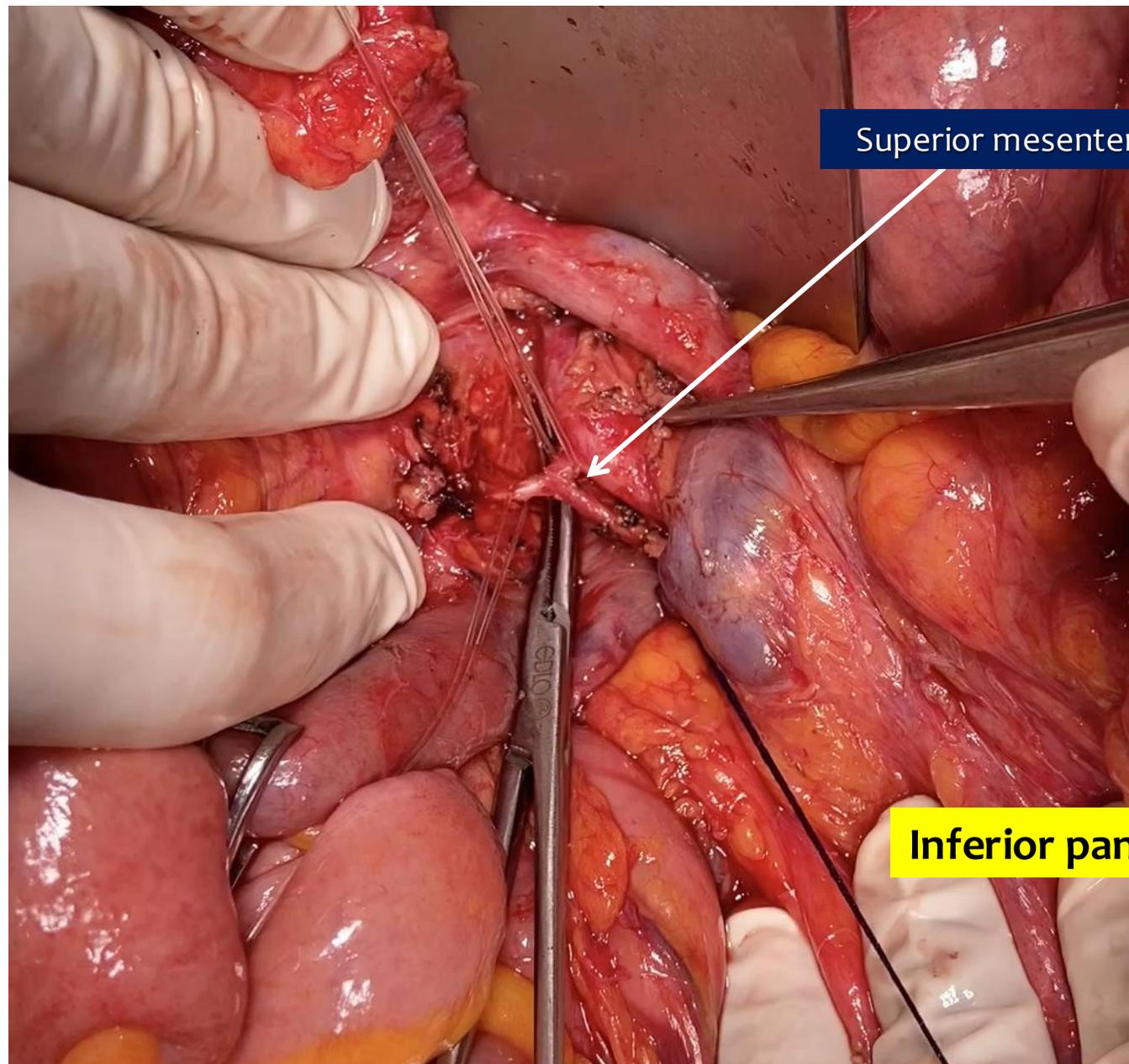
INFERIOR PANCREATODUODENAL ARTERY (IPDA)



Common trunk

EPICENTRO DA DUODENOPANCREATECTOMIA

IPDA



Superior mesenteric artery

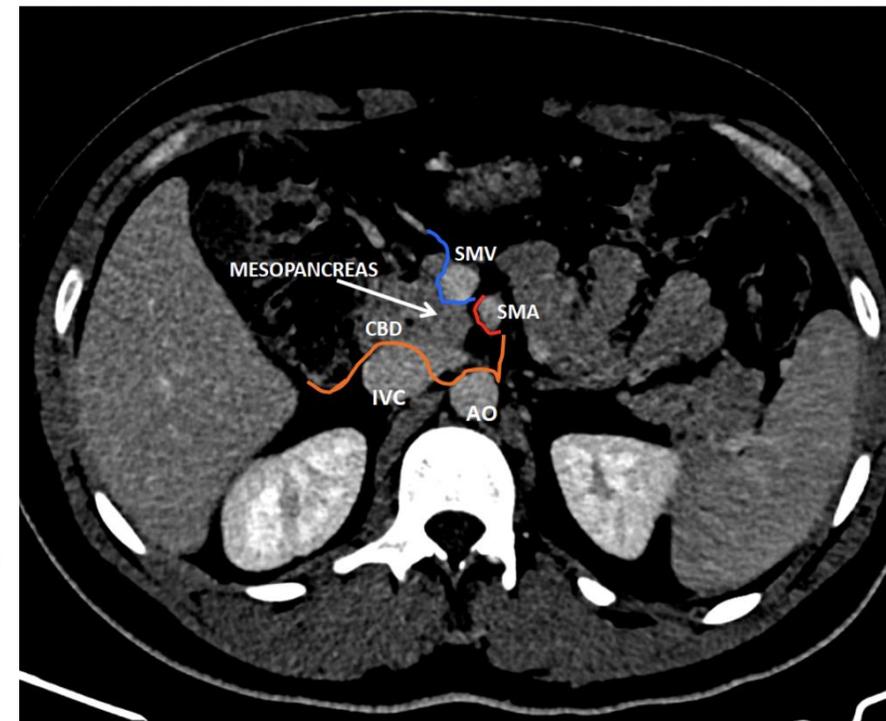
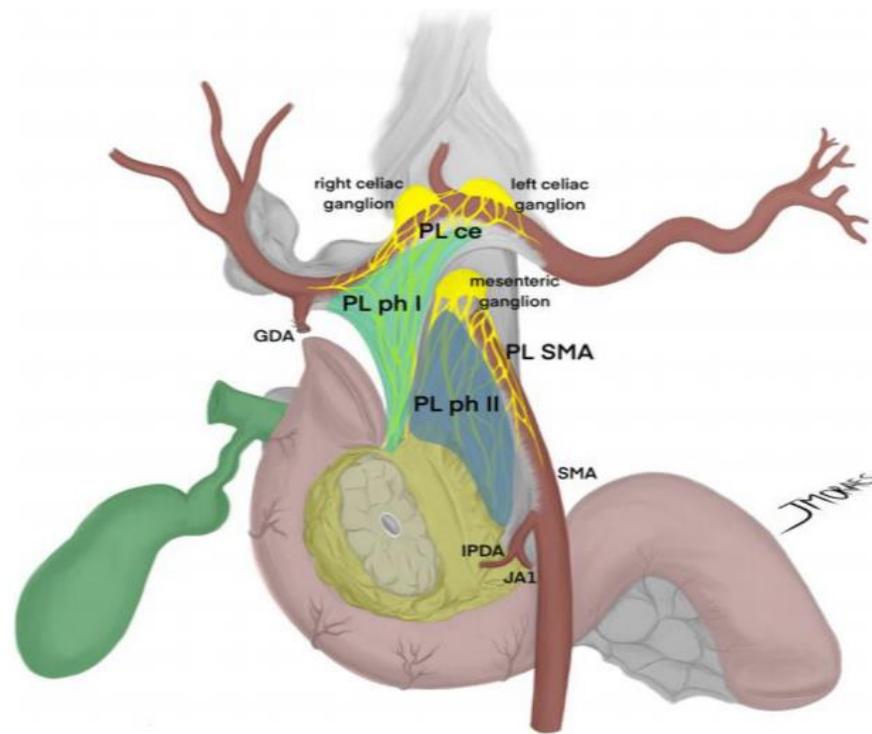
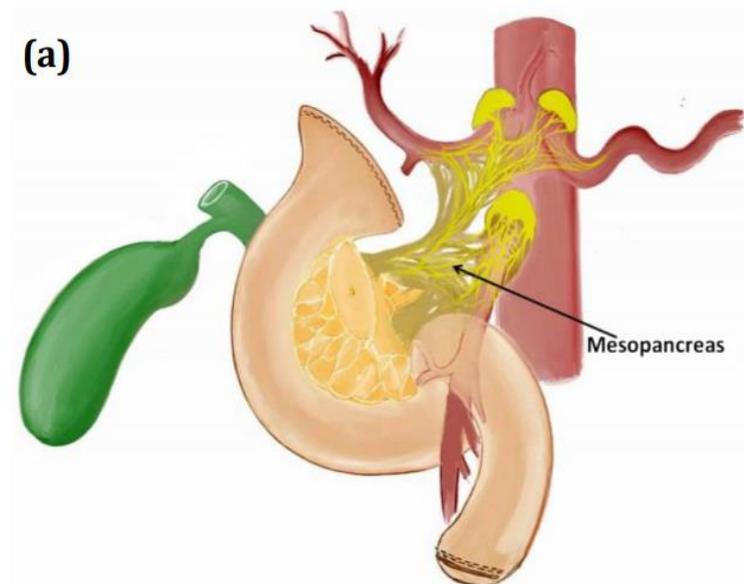
UNCINATE FIRST

Inferior pancreaticoduodenal artery



What do surgeons need to know about the mesopancreas

Eduardo de Souza M. Fernandes^{1,2} · Oliver Strobel^{3,4} · Camila Girão^{1,2} · Jose Maria A. Moraes-Junior^{5,6} · Orlando Jorge M. Torres^{5,6} 



PANCREATIC HEAD PLEXUS (PL ph)

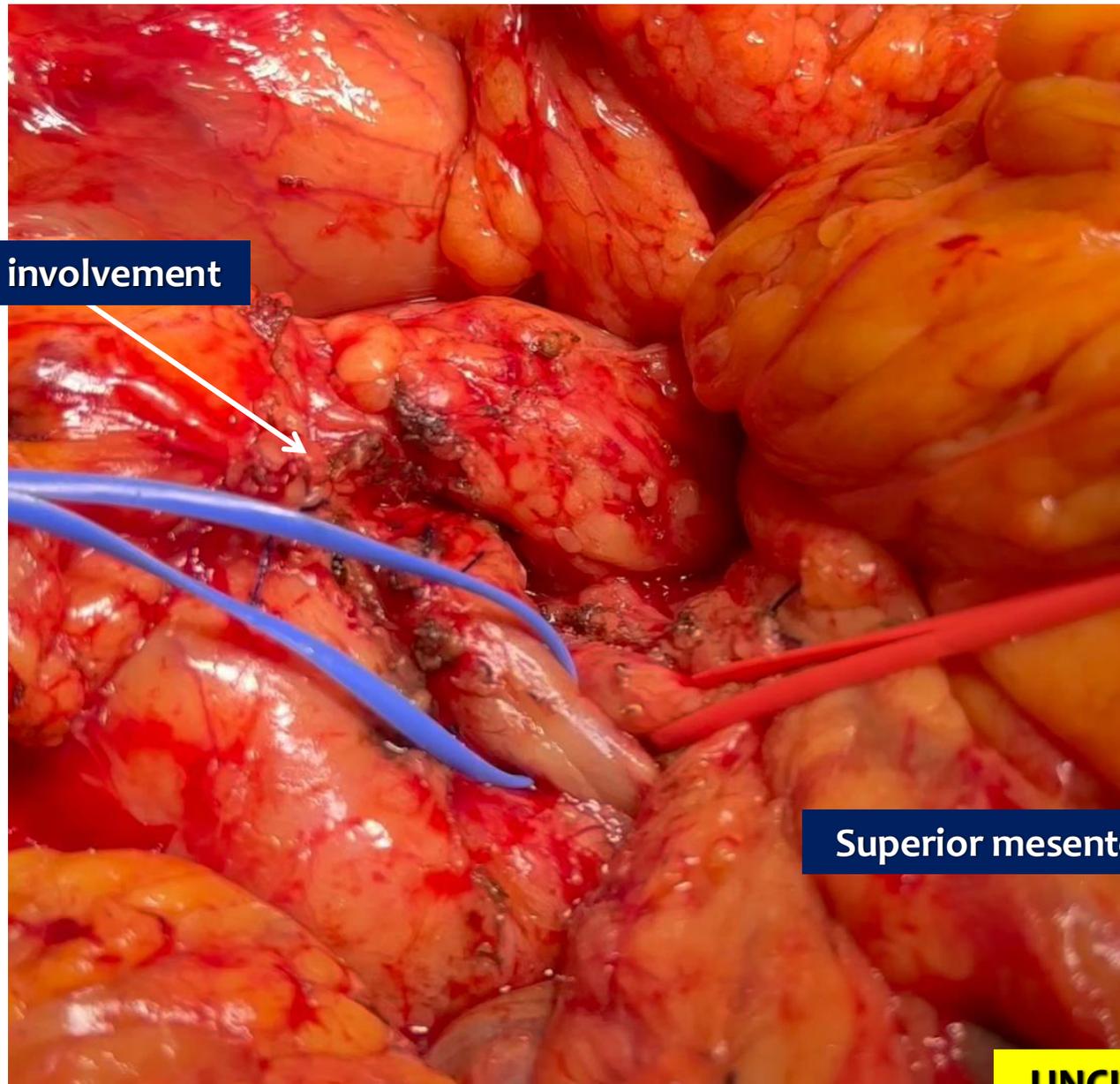
ADVANTAGES OF ARTERY FIRST APPROACH

Table 3 Advantages of the artery-first approach (SHARMA) [35]

1. Resection without breaching the tumor extension plane, thereby minimizing cell spillage
2. Increases curative (R0) resection, decreases local recurrence
3. Complete resection of peripancreatic retroperitoneal tissue around the plexuses
4. Increased lymph nodal clearance
5. Early assessment of non-resectability (SMA involvement), avoiding useless R2 resections
6. Better delineation of SMA and identification of RHA anomalies
7. Easier en bloc resection and reconstruction of SMV-PV by “no touch” technique
8. Reduced need for graft substitutions
9. Reduced operative time and blood loss (early ligation of IPDA/JA1)

Superior mesenteric artery

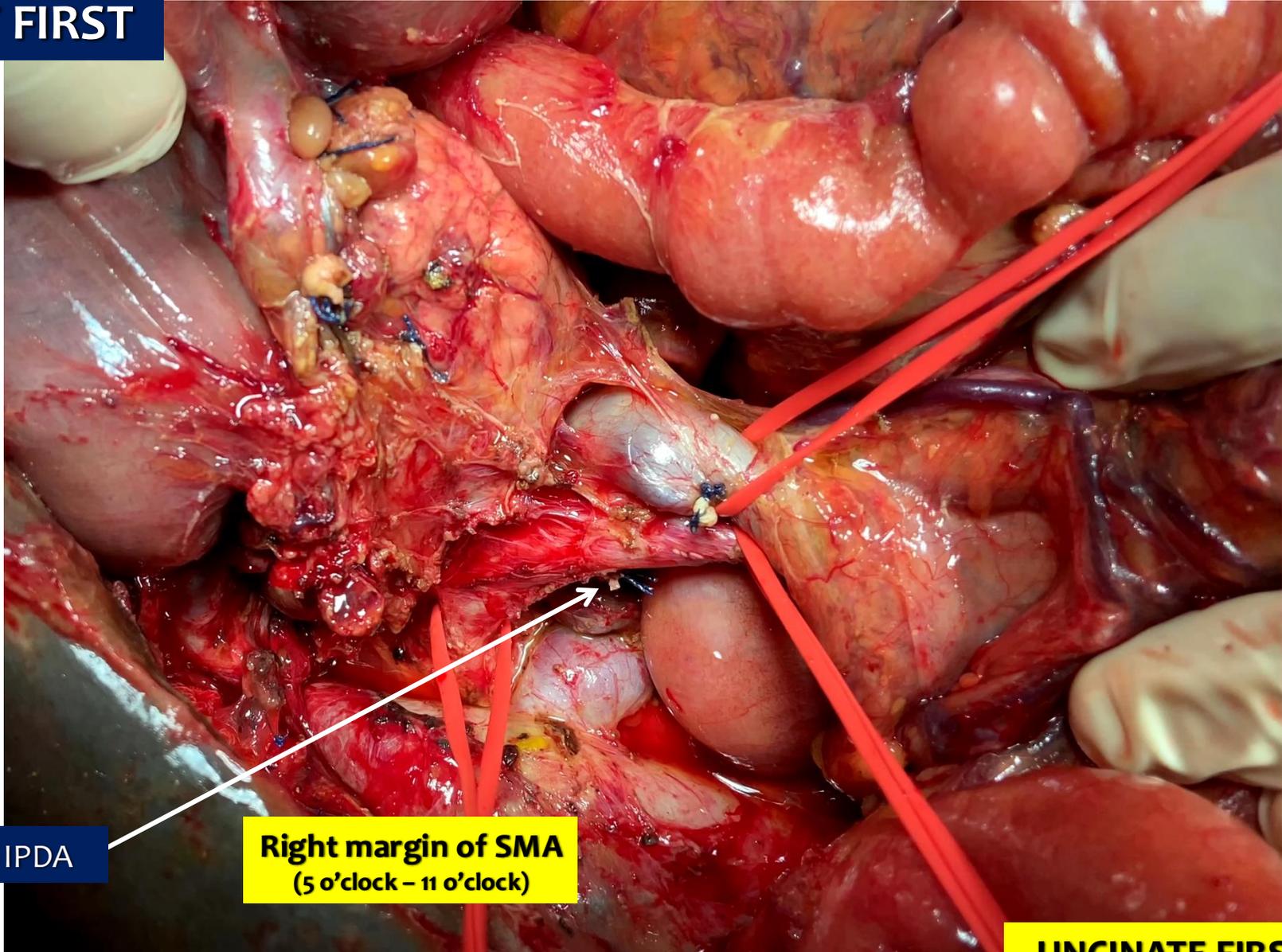
Portal vein involvement



Superior mesenteric artery

UNCINATE FIRST

ARTERY FIRST



IPDA

**Right margin of SMA
(5 o'clock - 11 o'clock)**

UNCINATE FIRST

ADVANTAGES OF ARTERY FIRST APPROACH

Table 3 Advantages of the artery-first approach (SHARMA) [35]

-
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-

ARTERY FIRST



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Review

Superior mesenteric artery first approach can improve the clinical outcomes of pancreaticoduodenectomy: A meta-analysis



- Higher R0 resection rate ($p < 0.001$)
- Lower local recurrence rate ($p < 0.0001$)
- Higher overall survival:
 - 1-year $p = 0.015$
 - 2-year $p = 0.005$
 - 3-year $p = 0.001$

Meta-analysis - 18 studies

Complete Lymphadenectomy Around the Entire Superior Mesenteric Artery Improves Survival in Artery-First Approach Pancreatoduodenectomy for T3 Pancreatic Ductal Adenocarcinoma

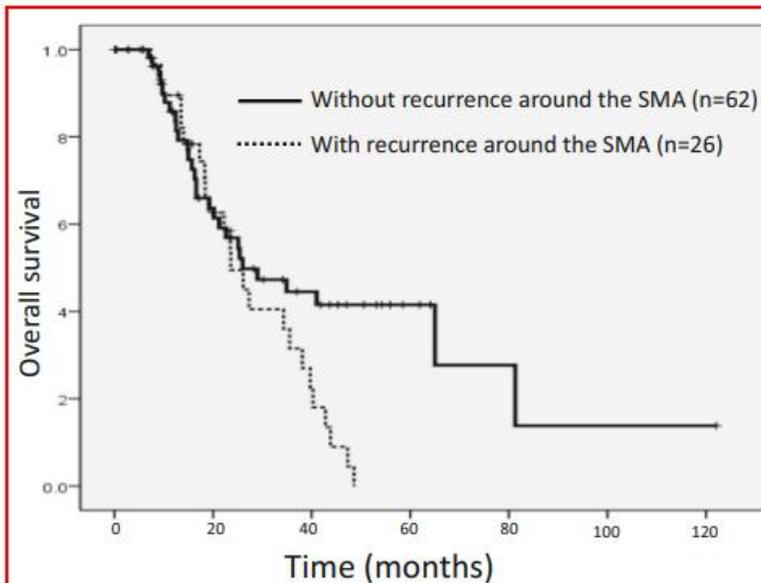


Fig. 1 Overall survival according to recurrence around the SMA. The median survival was 23.6 months in patients with recurrence around the SMA and 26 months in patients without recurrence around the SMA ($p = 0.0367$) SMA: superior mesenteric artery

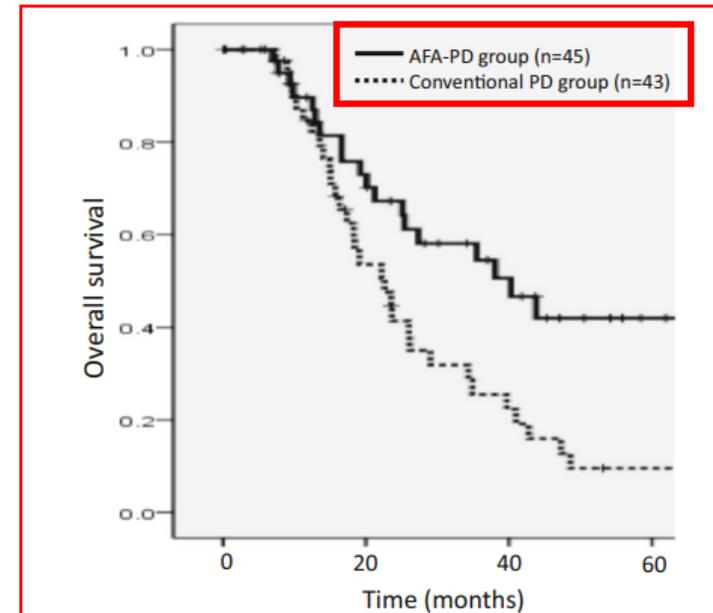


Fig. 2 Overall survival according to the type of the surgery. The median survival was 40.3 months in the AFA-PD group and 22.6 months in the conventional PD group ($p = 0.005$) AFA-PD: artery-first approach pancreatoduodenectomy

40.3 months vs 22.6 months ($p = 0.005$)

OVERALL SURVIVAL

ADVANTAGES OF ARTERY FIRST APPROACH

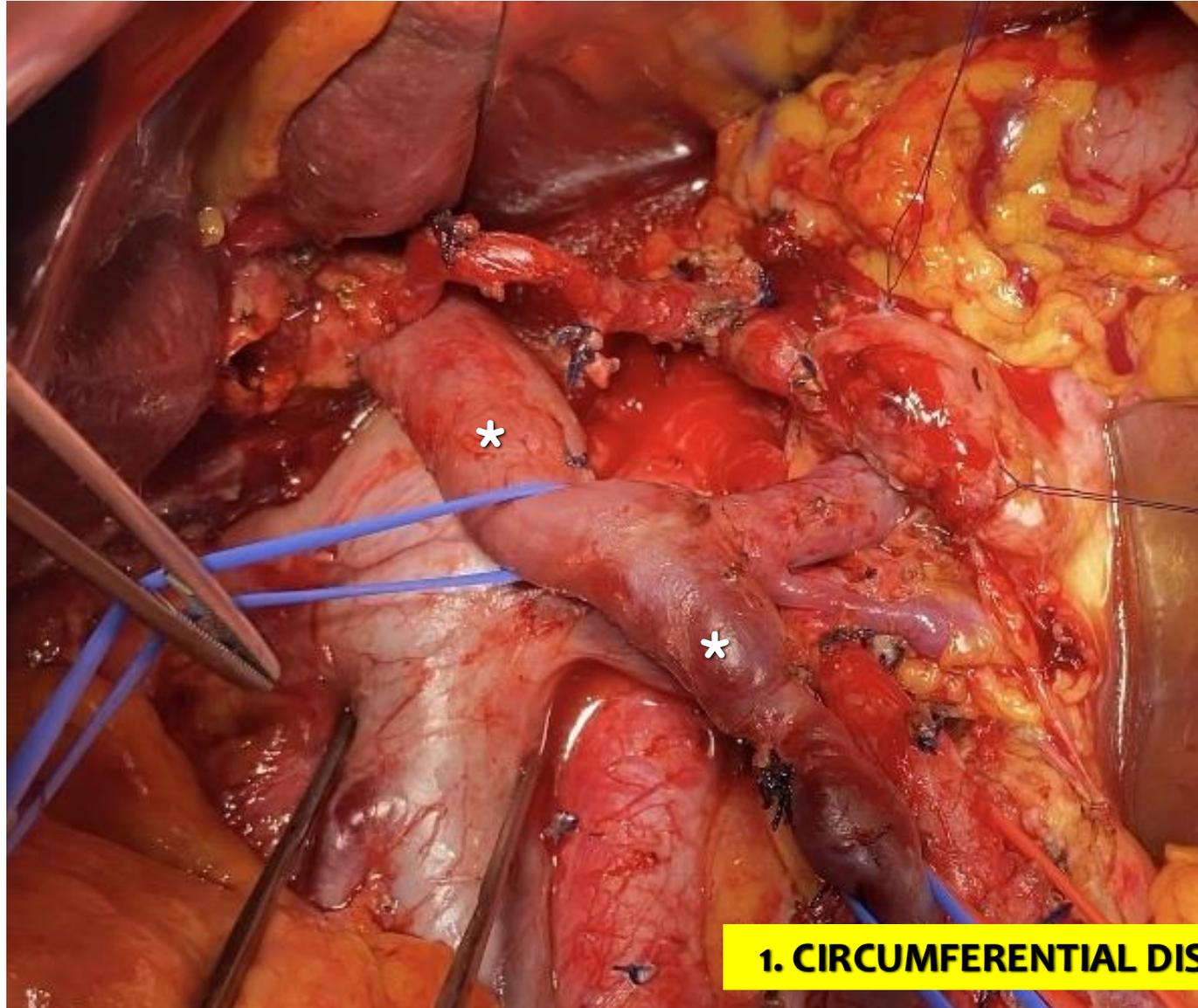
Table 3 Advantages of the artery-first approach (SHARMA) [35]

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1. Resection without breaching the tumor extension plane, thereby minimizing cell spillage
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PANCREATIC HEAD PLEXUS (PL ph)

ARTERY FIRST

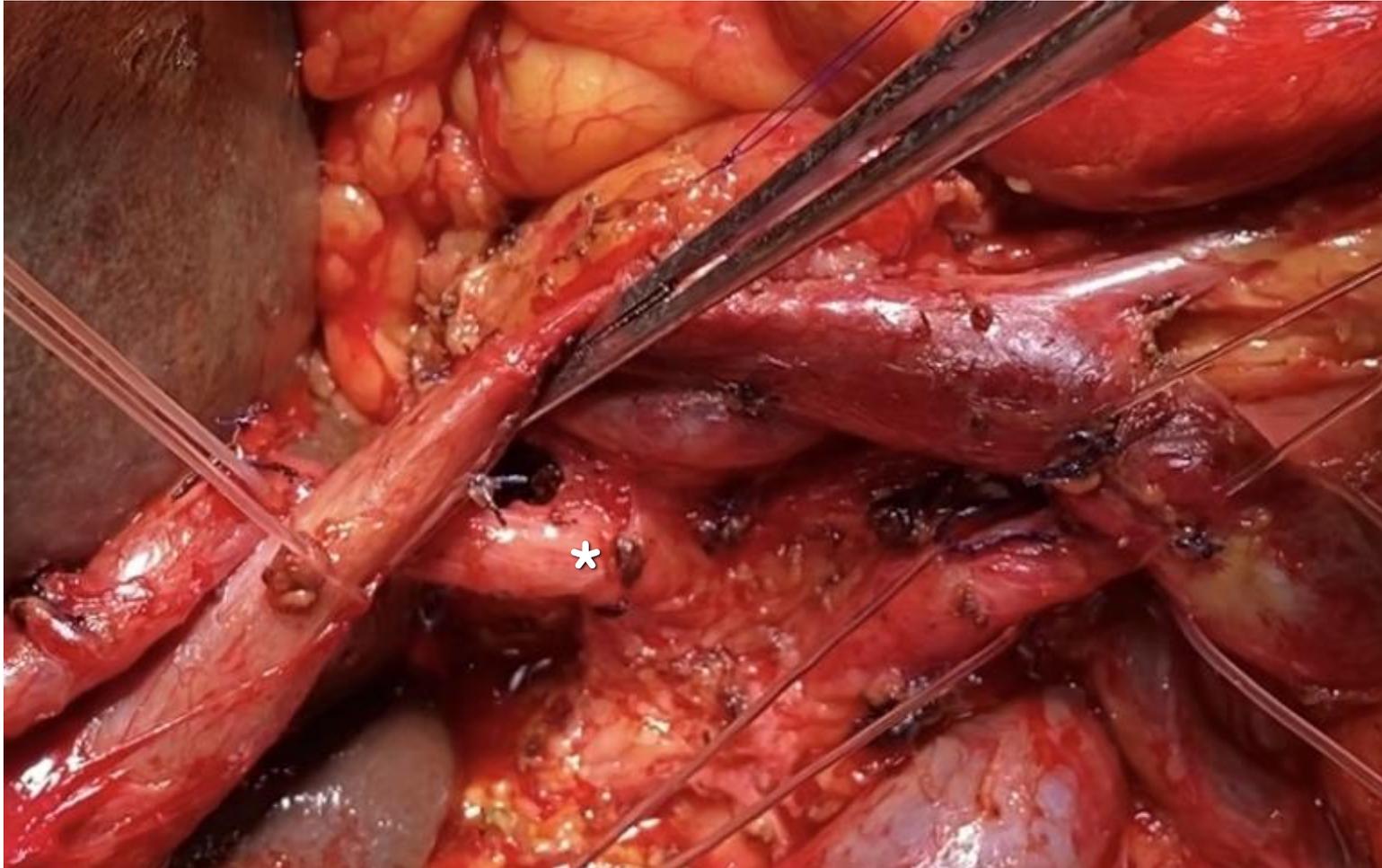
TOTAL MESOPANCREAS EXCISION



1. CIRCUMFERENTIAL DISSECTION OF SMV/PV

TOTAL MESOPANCREAS EXCISION

□ Common hepatic artery lymph nodes 8a, 8p



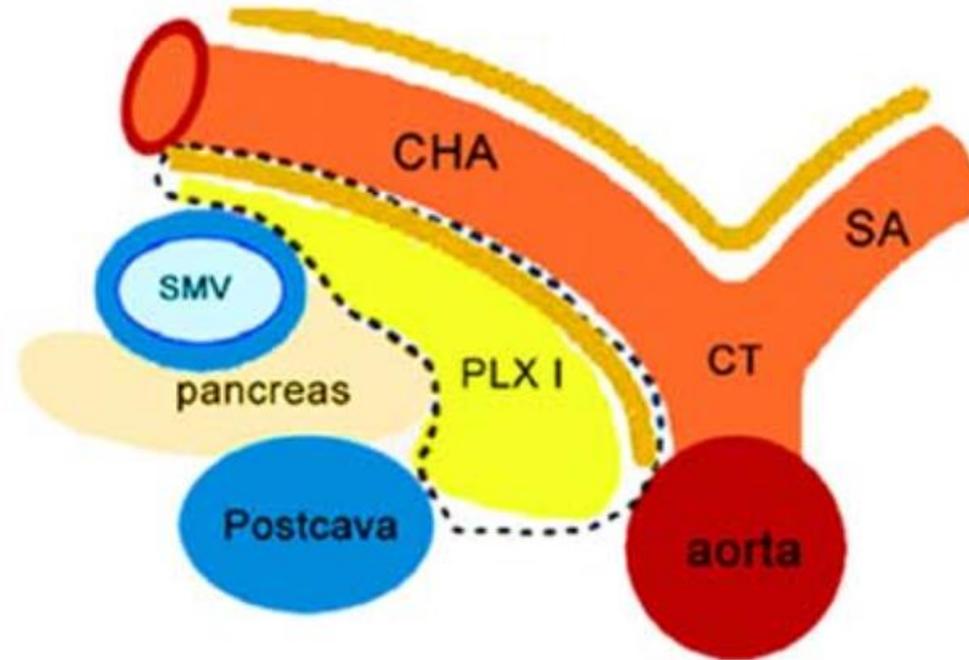
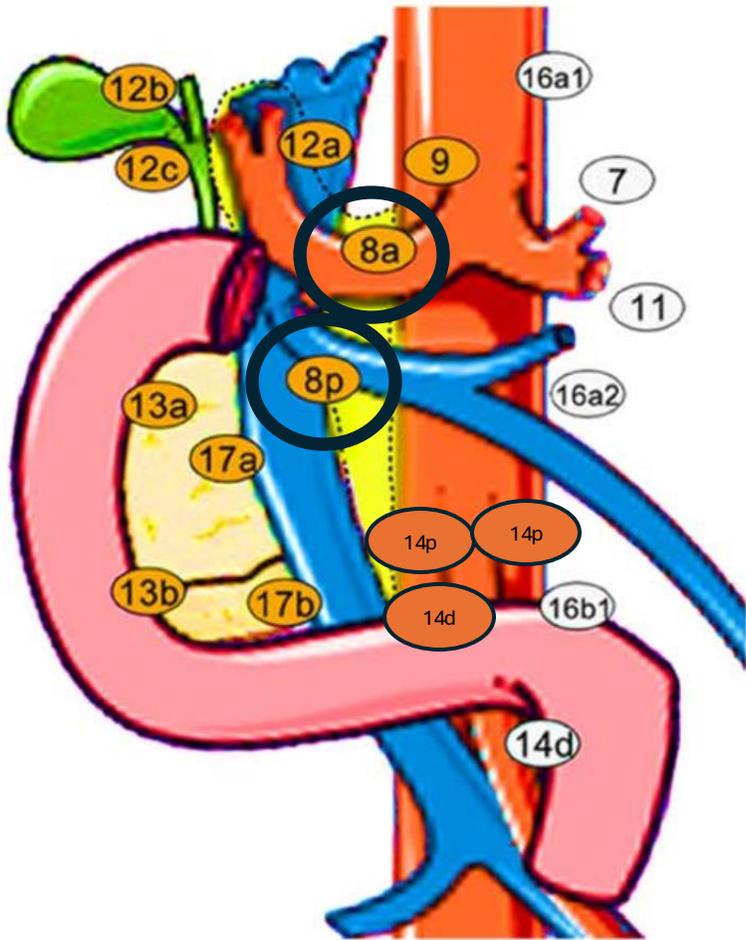
2. HEMICIRCUMFERENTIAL DISSECTION OF CHA

COMMON HEPATIC ARTERY LYMPH NODES

□ 8a

□ 8p

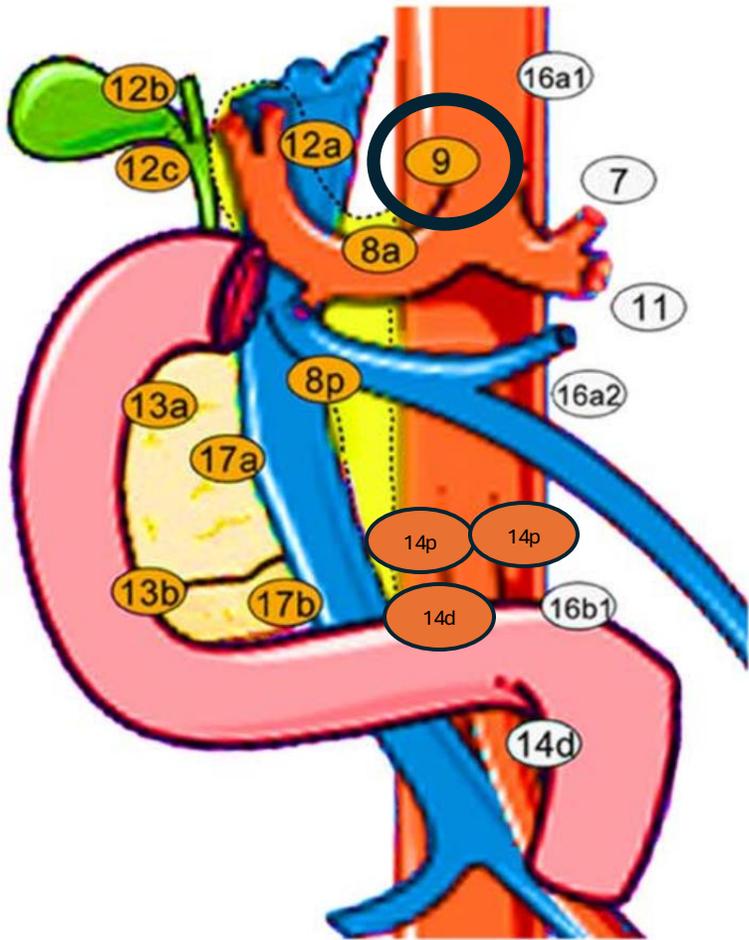
A



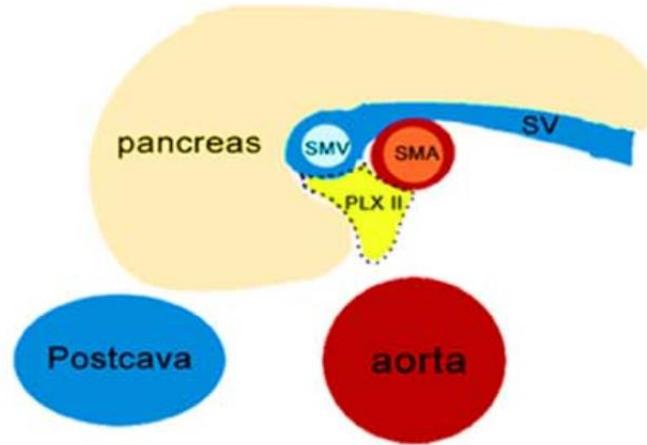
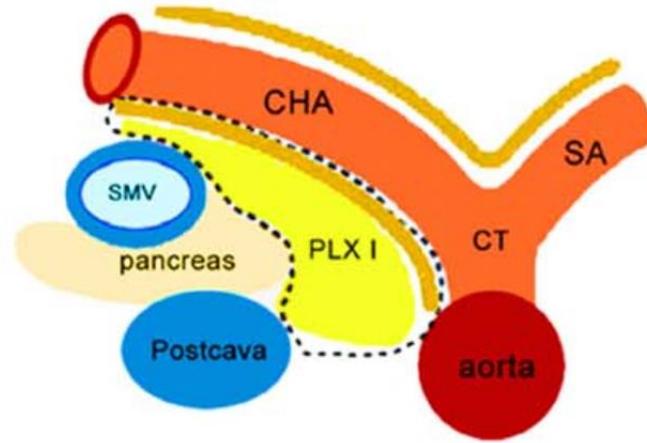
CELIAC TRUNK LYMPH NODES

□ Celiac trunk lymph nodes 9

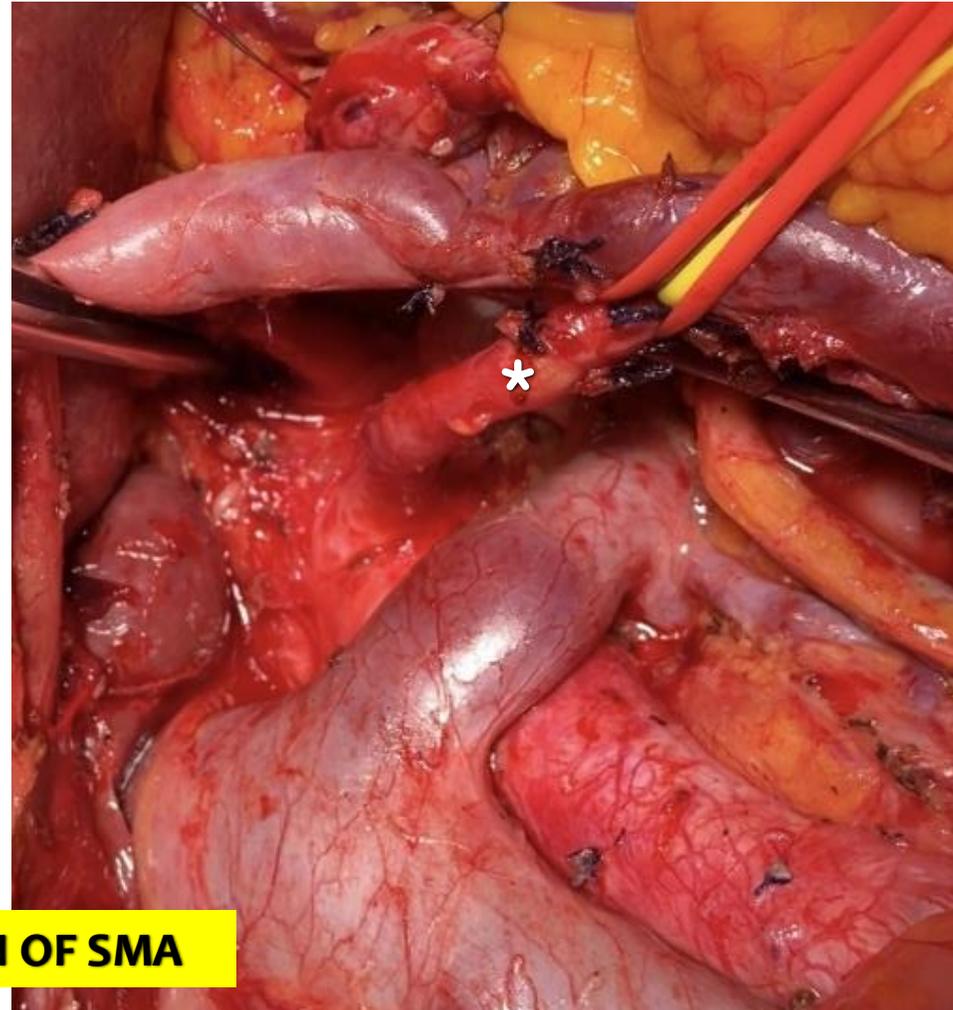
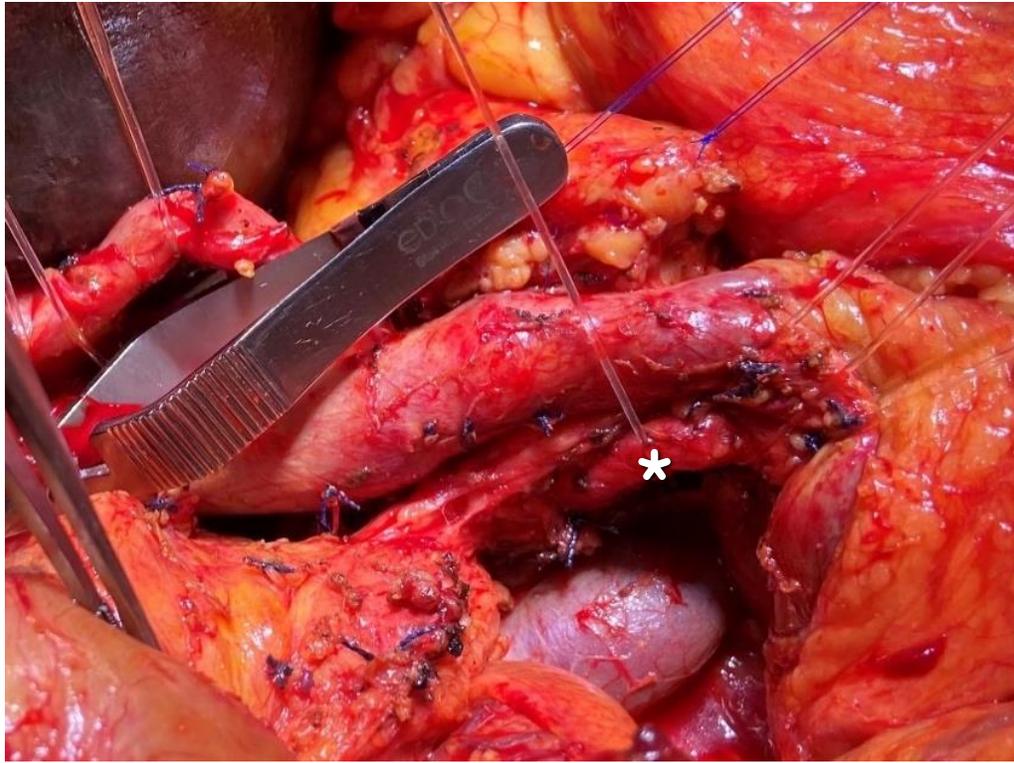
A



□ 9



TOTAL MESOPANCREAS EXCISION

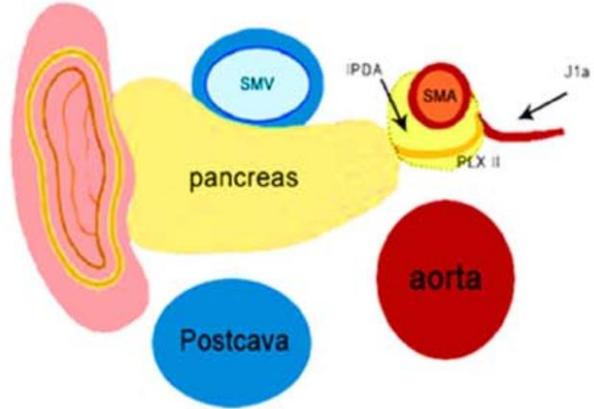
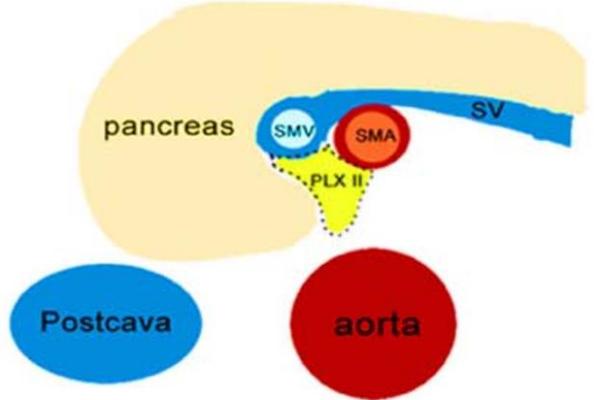
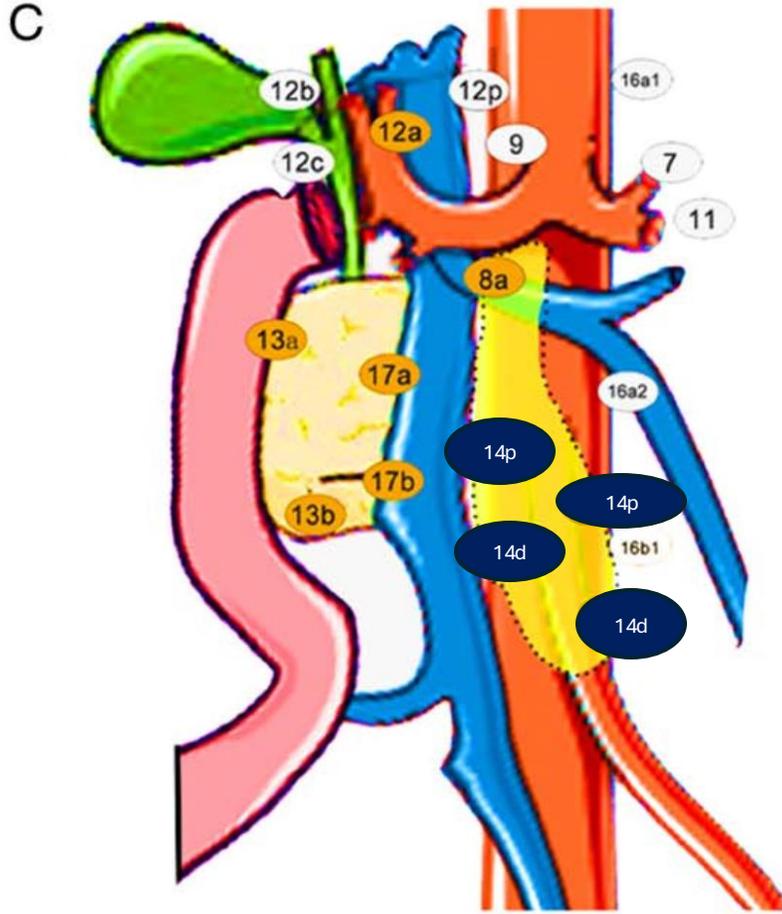


3. HEMICIRCUMFERENTIAL DISSECTION OF SMA

SUPERIOR MESENTERIC ARTERY LYMPH NODES

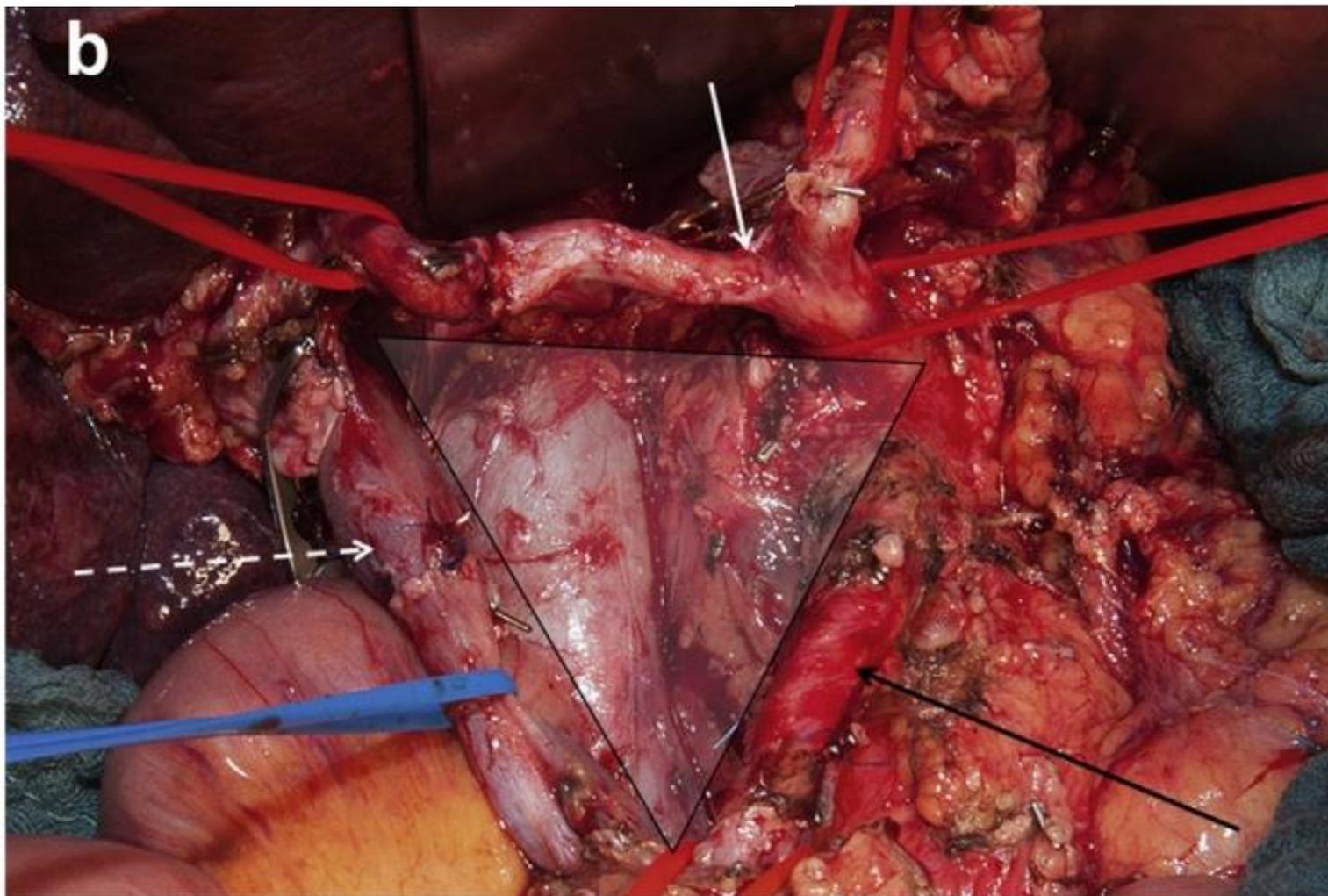
□14p

□14d

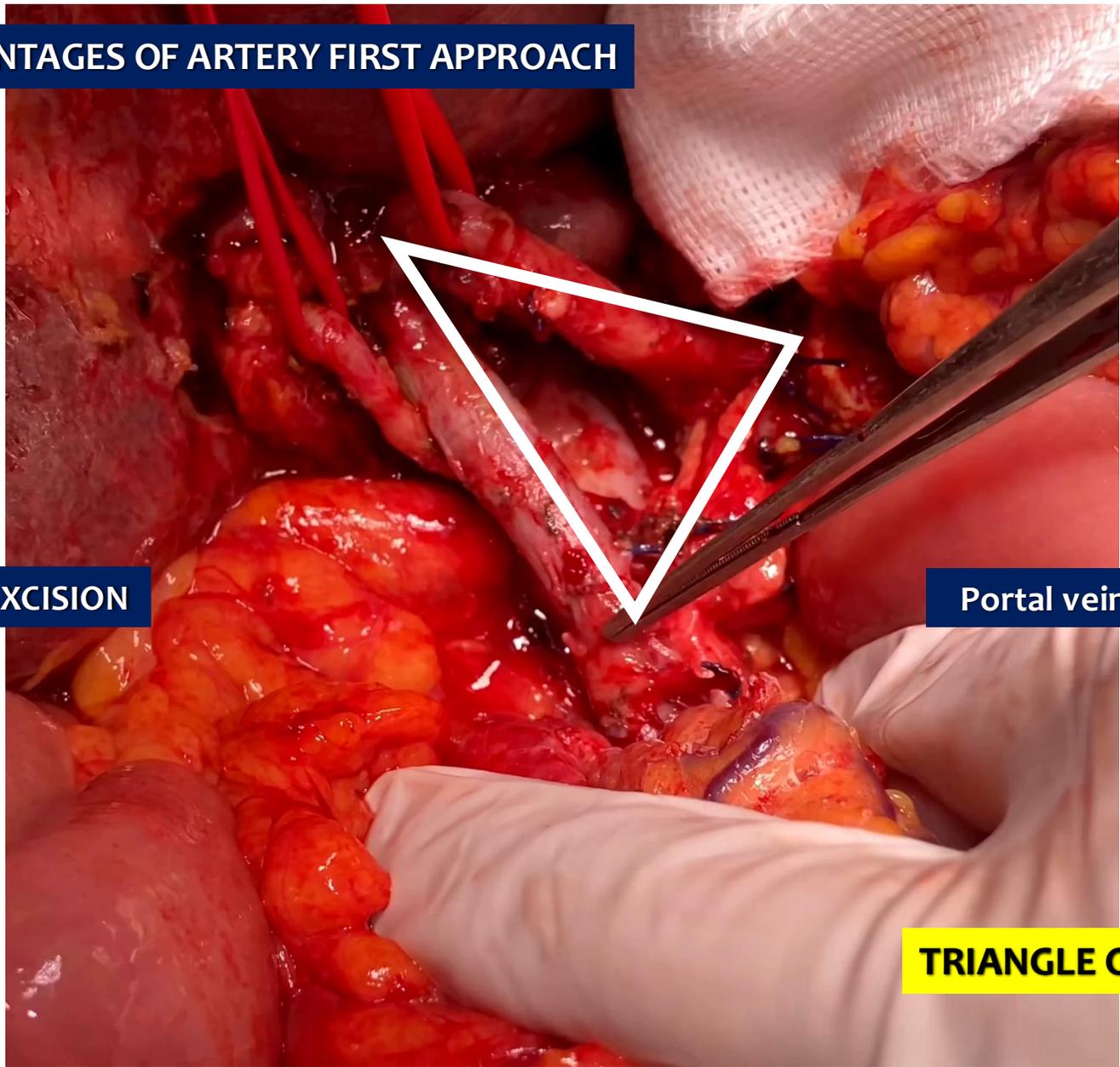


ORIGINAL ARTICLE

The TRIANGLE operation – radical surgery after neoadjuvant treatment for advanced pancreatic cancer: a single arm observational study



ADVANTAGES OF ARTERY FIRST APPROACH

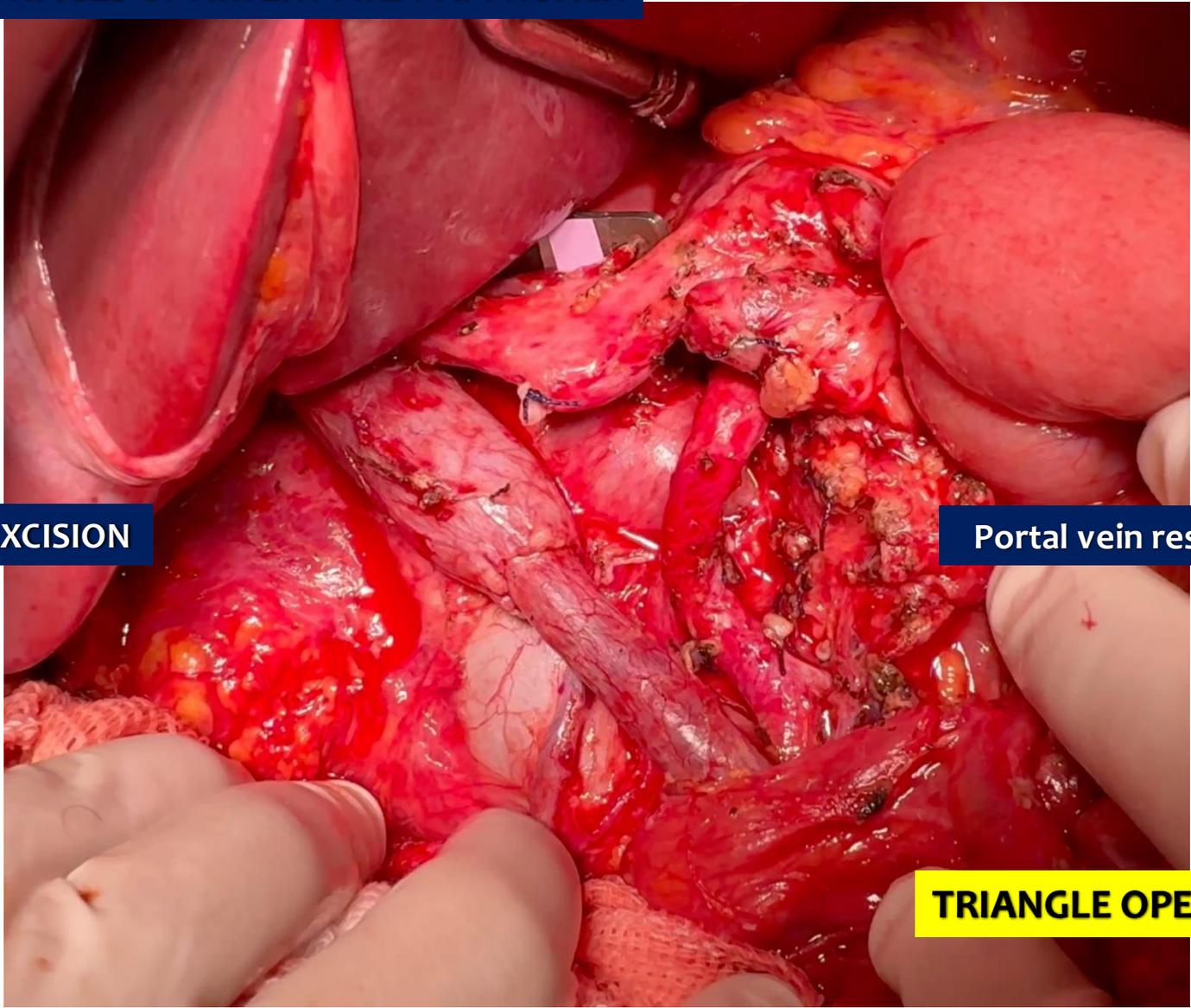


TOTAL MESOPANCREAS EXCISION

Portal vein resection

TRIANGLE OPERATION

ADVANTAGES OF ARTERY FIRST APPROACH



TOTAL MESOPANCREAS EXCISION

Portal vein resection

TRIANGLE OPERATION

REVIEW ARTICLE

A systematic review of the role of periadventitial dissection of the superior mesenteric artery in affecting margin status after pancreatoduodenectomy for pancreatic adenocarcinoma

James R. Butler¹, Syed A. Ahmad², Matthew H. Katz³, Jessica L. Cioffi¹ & Nicholas J. Zyromski¹

¹Indiana University School of Medicine, Department of Surgery, Indianapolis IN, ²The University of Cincinnati Cancer Institute, Cincinnati OH, and ³Department of Surgical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

- R0 resection 16–79%**
- SMA most often positive (15–45%)**
- Positive margin was associated with decreased survival.**

Conclusions: Margin positivity in resectable pancreatic adenocarcinoma is associated with poor survival. Inability to clear the SMA margin is the most common cause of incomplete resection.

STATE OF THE ART

Pancreatoduodenectomy

Total mesopancreas excision¹

“Artery first”²

Level 3 dissection³

“Triangle operation”⁴

Extended resection⁵

+/- portal/SM vein

Liver metastasis

1. Fernandes ES, et al. Langenbecks Arch Surg 2021

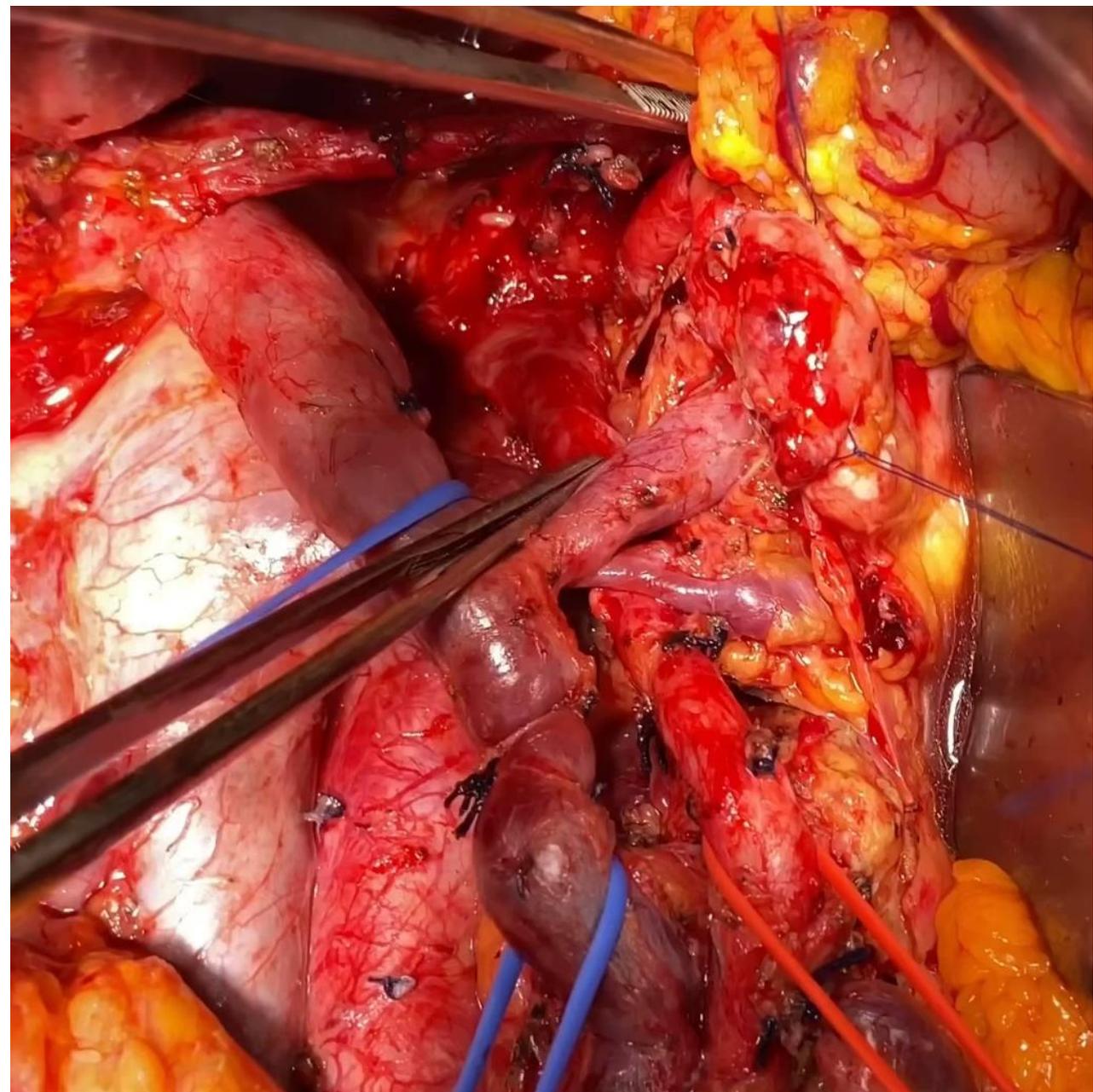
2. Inoue Y, et al. J Gastrointest Surg 2018

3. Niesen W, et al. Ann Gastroenterol Surg. 2019

4. Hackert T, et al. HPB 2017

5. Fernandes ES, et al. J Gastrointest Oncol 2023

6. Torres OJ, Zurich and Cape Town



ADVANTAGES OF ARTERY FIRST APPROACH

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-

ARTERY FIRST

LYMPHATICS

Lymph node stations pancreatic cancer

□ Hepatoduodenal ligament
12a, 12b1, 12b2, 12p, 12c

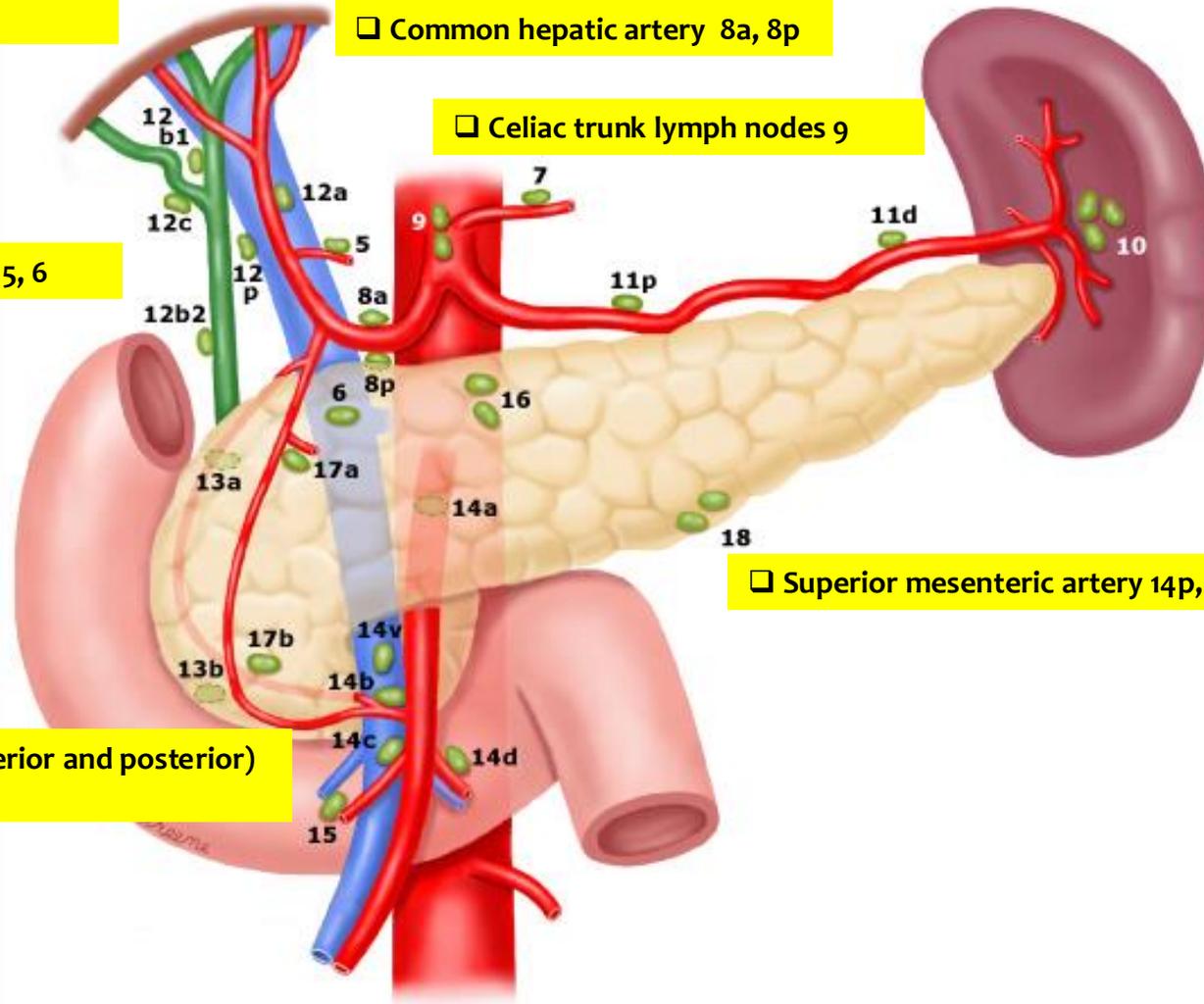
□ Common hepatic artery 8a, 8p

□ Celiac trunk lymph nodes 9

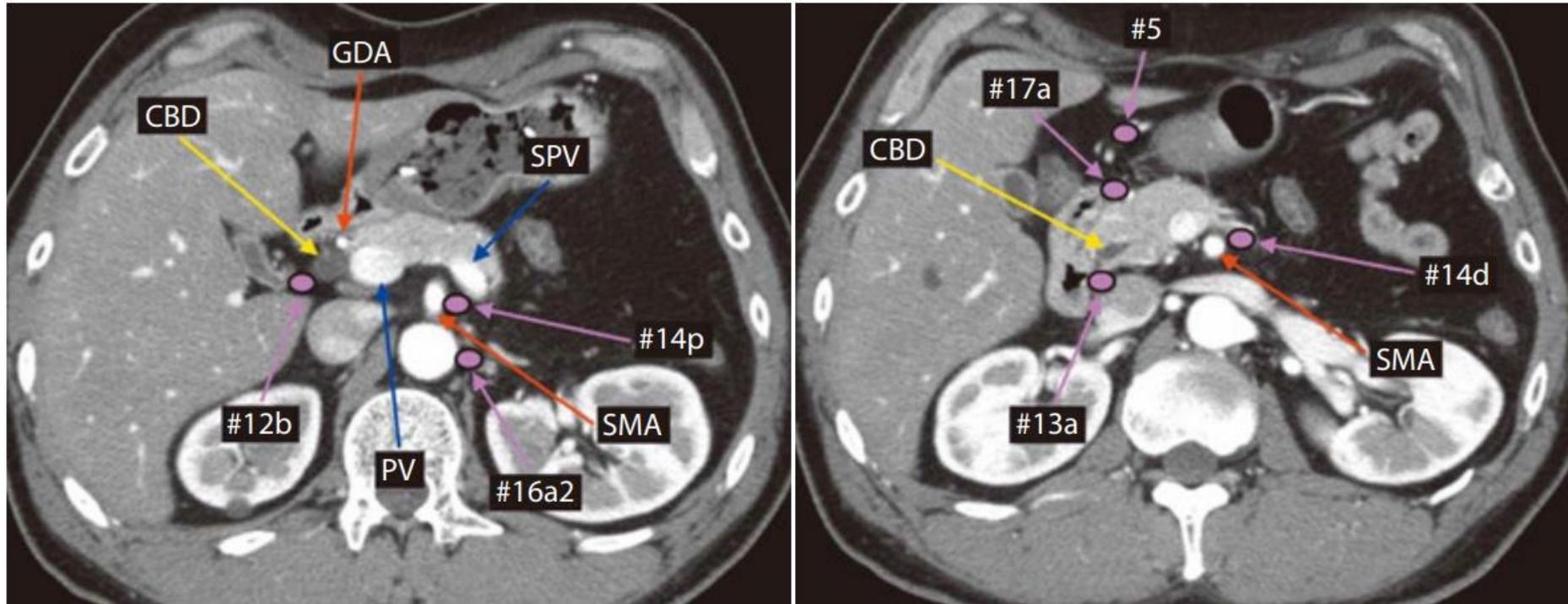
□ Pyloric 5, 6

□ Superior mesenteric artery 14p, 14d

□ Pancreatoduodenal (anterior and posterior)
13a, 13b, 17a, 17b

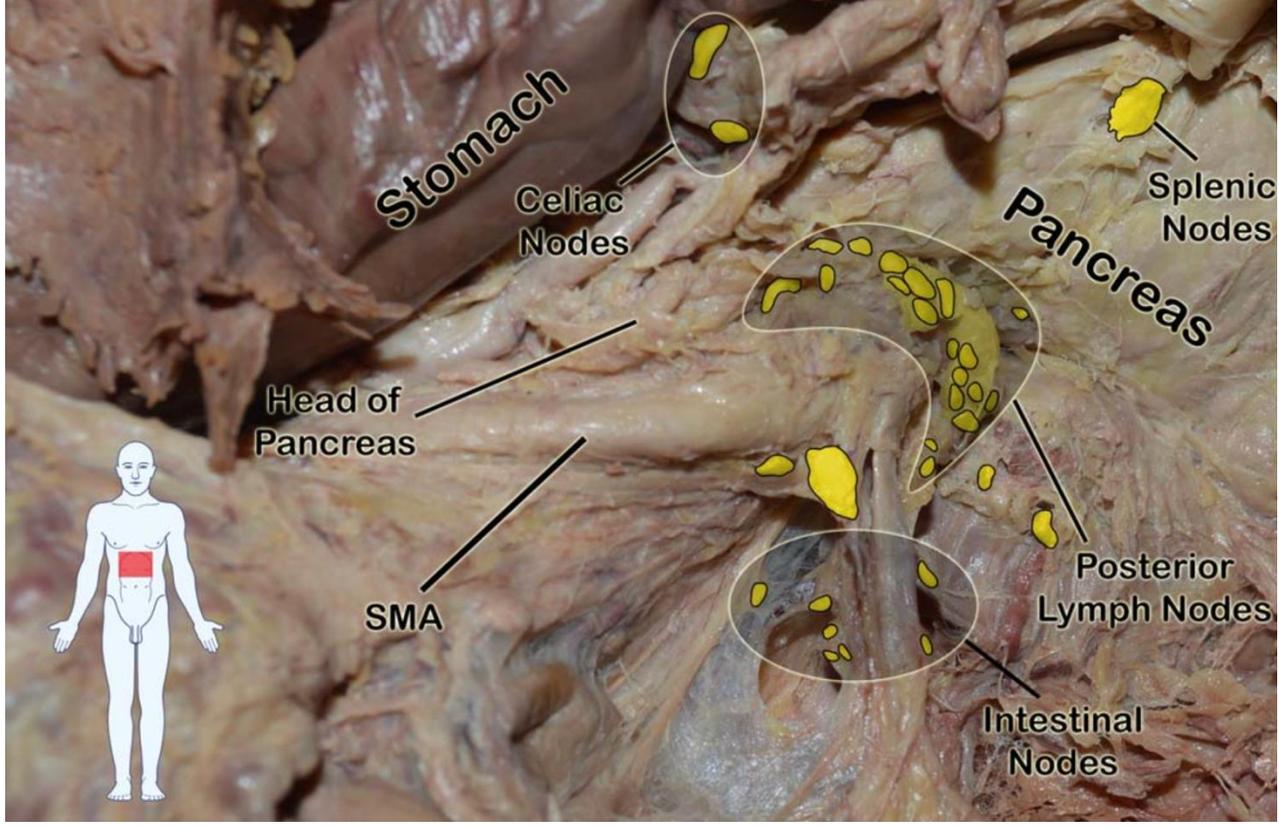
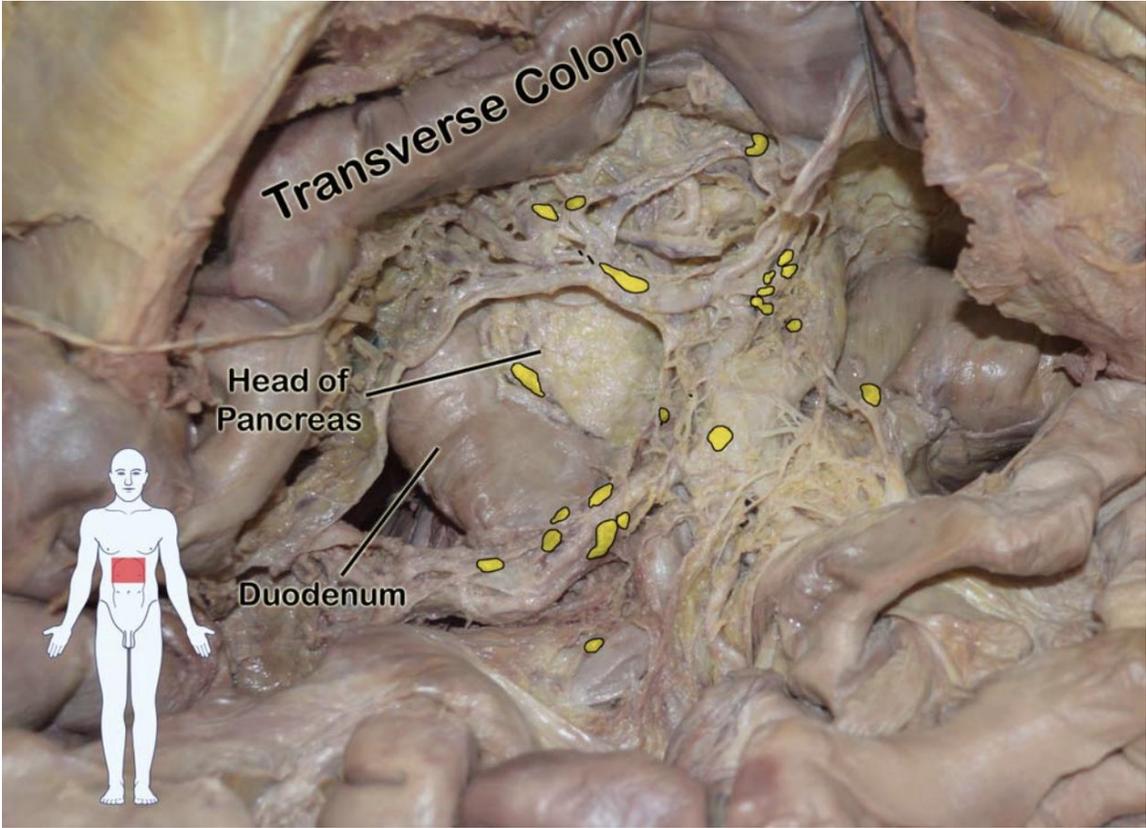


LYMPHADENECTOMY



14p, 14d

LYMPHADENECTOMY



Cesmebasi A, et al. *Clinical Anatomy* 28:527-537 (2015)



Complete Lymphadenectomy Around the Entire Superior Mesenteric Artery Improves Survival in Artery-First Approach Pancreatoduodenectomy for T3 Pancreatic Ductal Adenocarcinoma

ARTERY FIRST

Table 2 Comparison of perioperative and oncological outcomes between the AFA-PD group and the conventional PD group

	AFA-PD group	Conventional PD group	<i>P</i>
	<i>n</i> = 45	<i>n</i> = 43	
Operative time, median (range), min	443 (390–497)	467 (414–530)	0.1312
Intraoperative blood loss, median (range), mL	811 (520–1150)	899 (720–1443)	0.0210
Transfusion, <i>n</i> (%)	19 (42.2)	22 (51.2)	0.5178
Portal vein resection, <i>n</i> (%)	12 (26.7)	13 (30.2)	0.8147
Postoperative complications, \geq grade IIIa, <i>n</i> (%)	3 (6.7)	5 (11.6)	0.4794
Curative resection R0, <i>n</i> (%)	35 (77.8)	28 (65.1)	0.3423
No. harvested lymph nodes, median (range)	23 (14–37)	19 (12–22)	0.0165
No. harvested lymph nodes of #14p, median (range)	4 (2–5)	1 (0–3)	< 0.001
No. harvested lymph nodes of #14d, median (range)	4 (2–5)	2 (0–3)	0.0146
Lymph node metastasis, <i>n</i> (%)	27 (60)	30 (69.8)	0.3376

Bold values are statistically significant ($p < 0.05$)

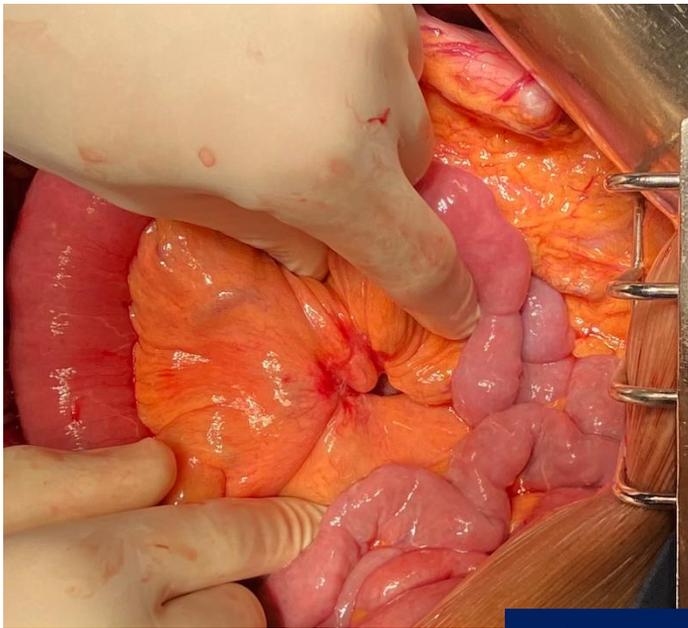
AFA-PD - Artery first approach pancreatoduodenectomy

ADVANTAGES OF ARTERY FIRST APPROACH

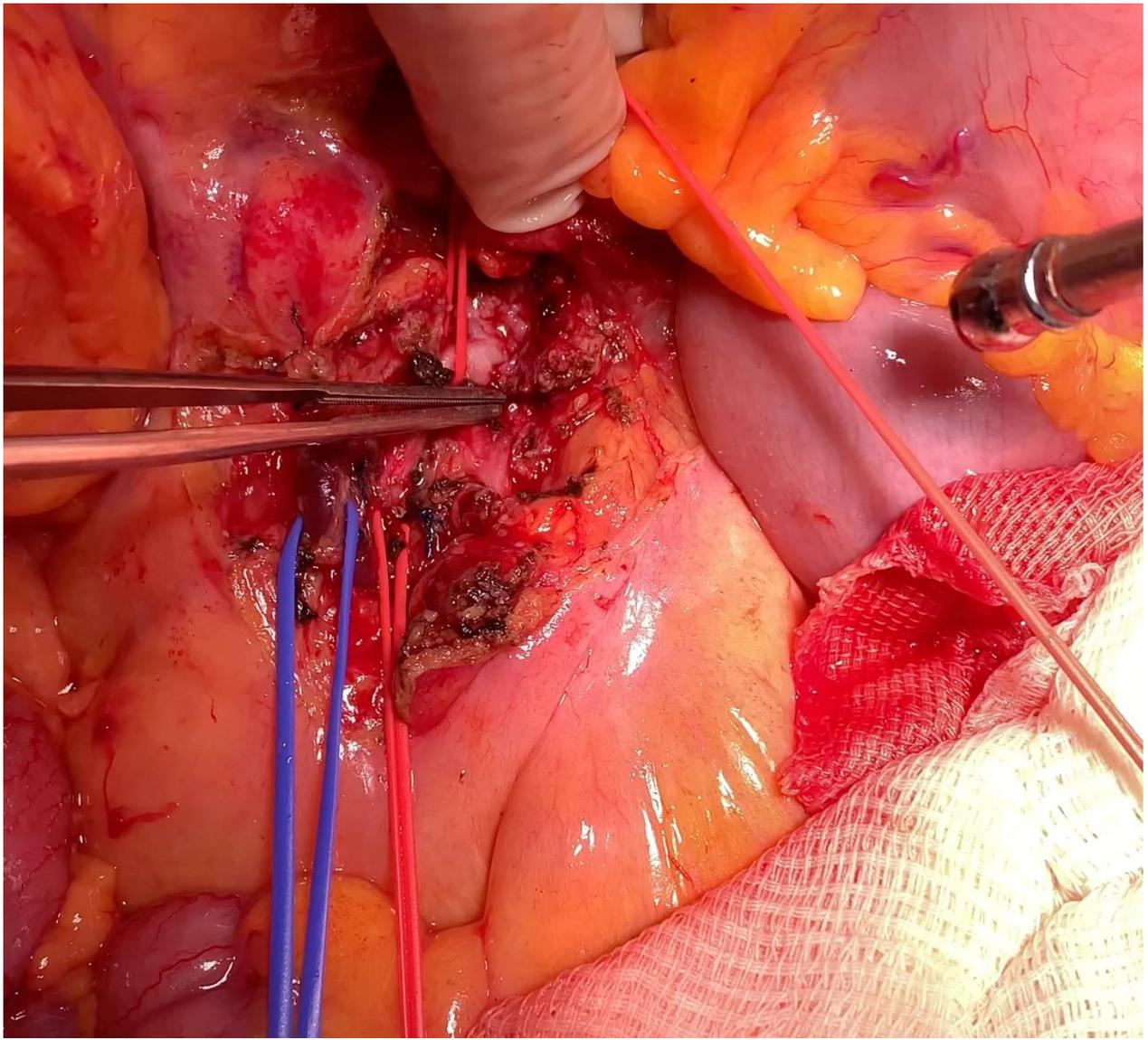
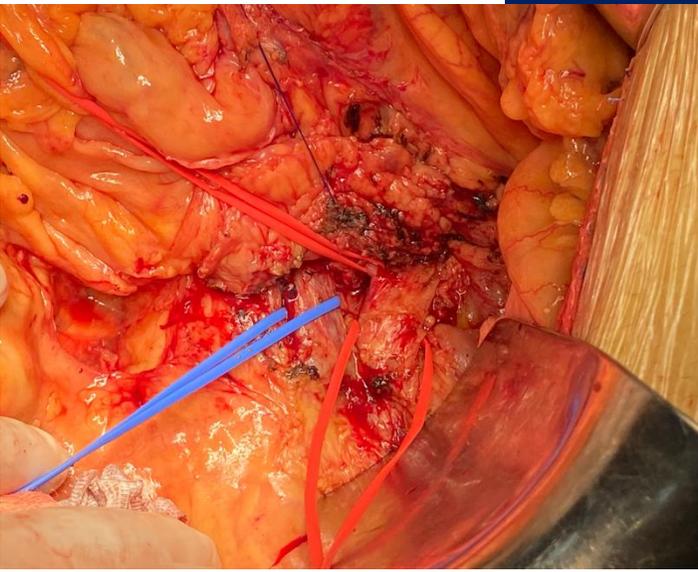
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ARTERY FIRST



SMA INVOLVEMENT



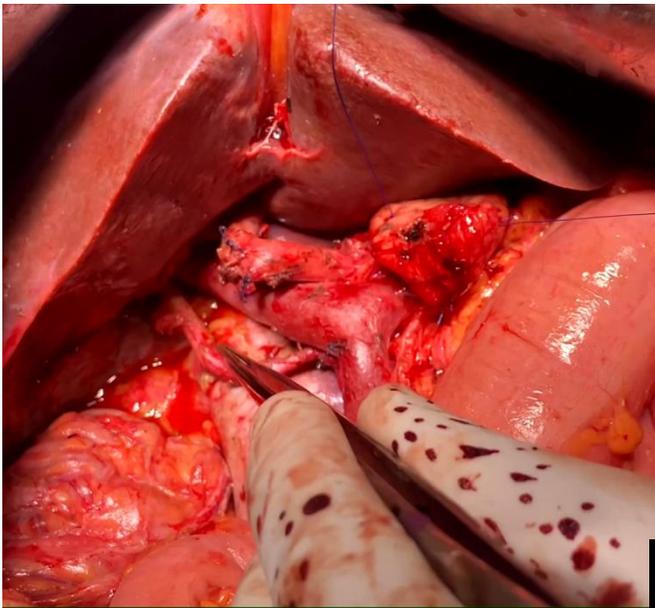
MESENTERIC APPROACH

ADVANTAGES OF ARTERY FIRST APPROACH

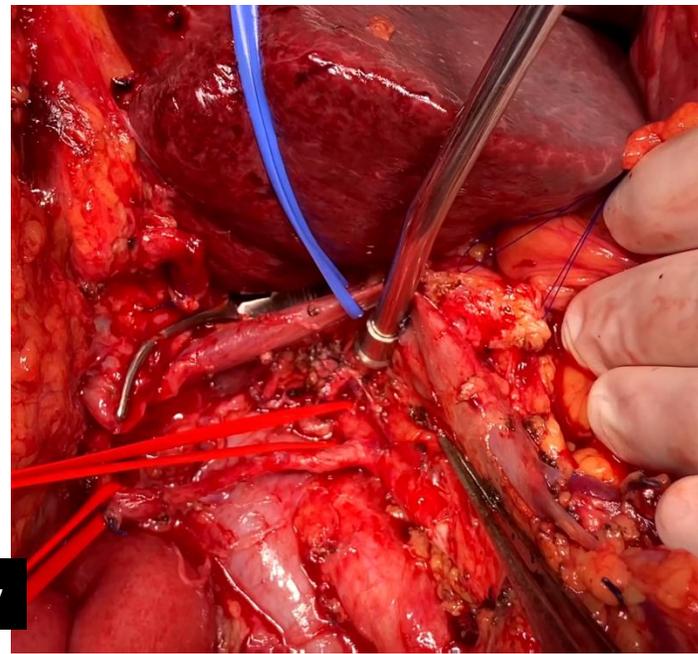
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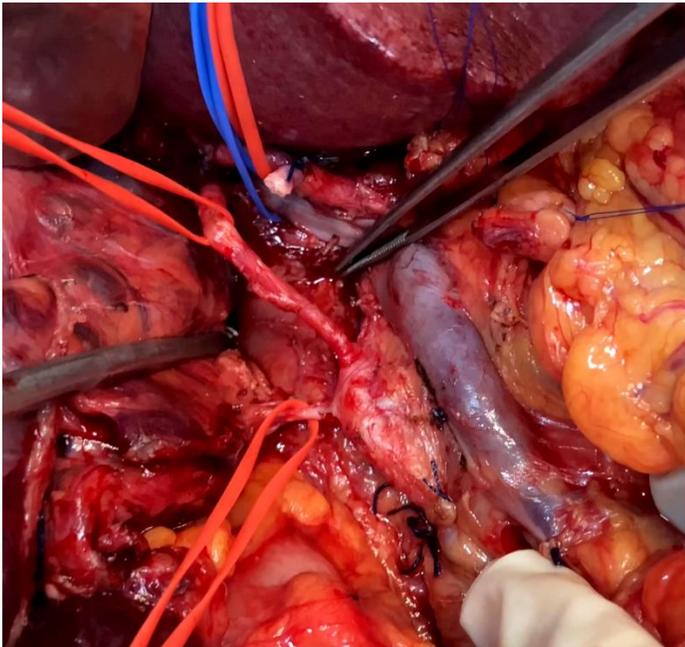
ARTERY FIRST



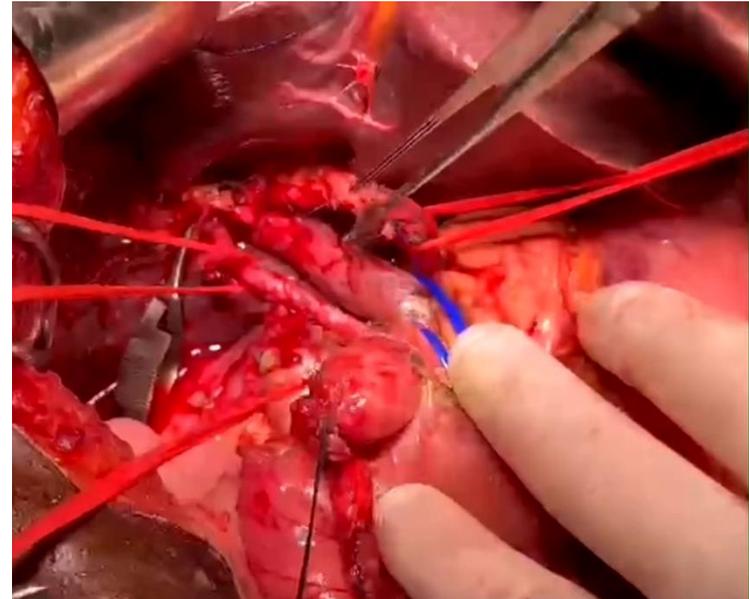
Right hepatic artery



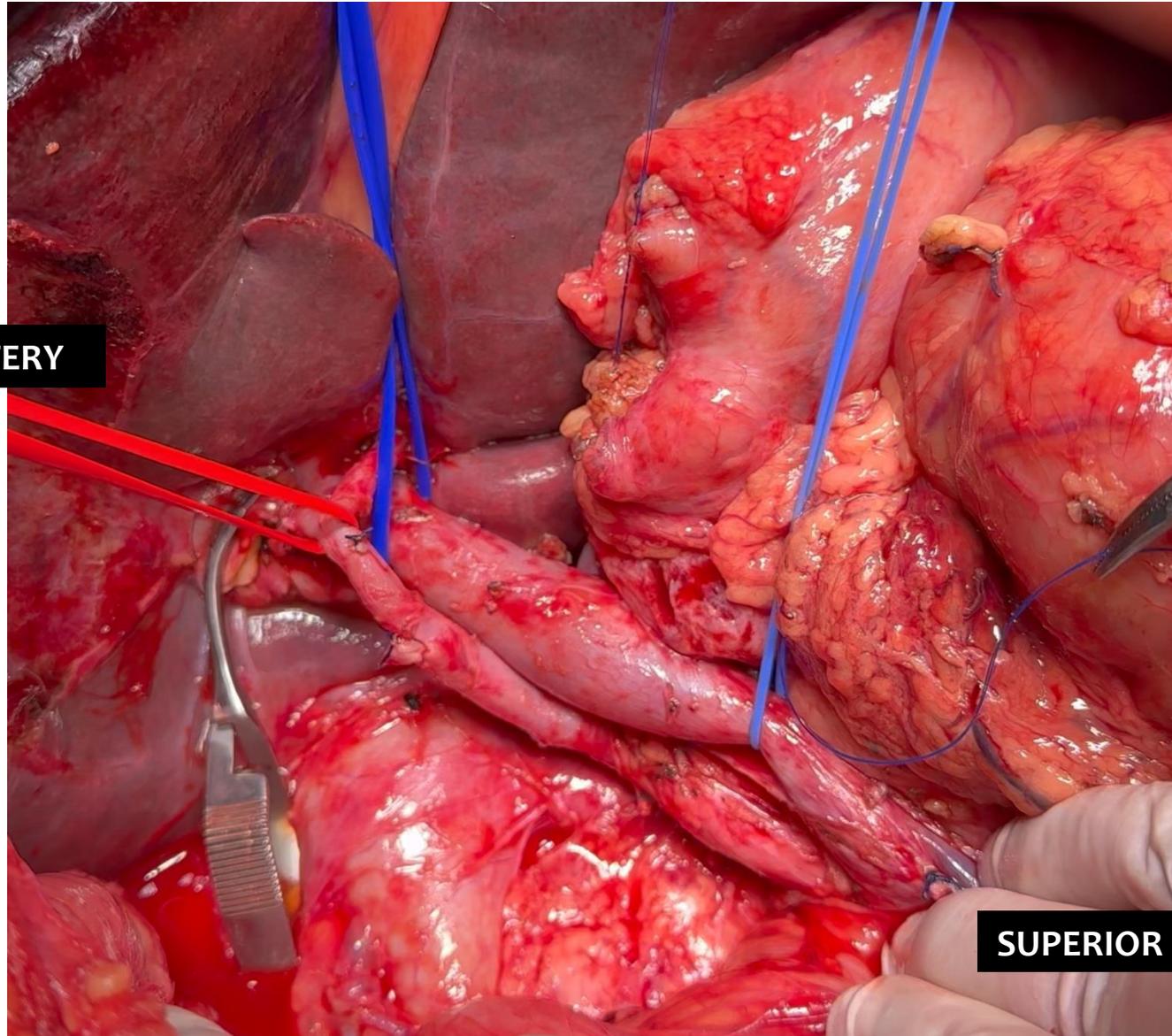
Superior mesenteric artery



ARTERY FIRST



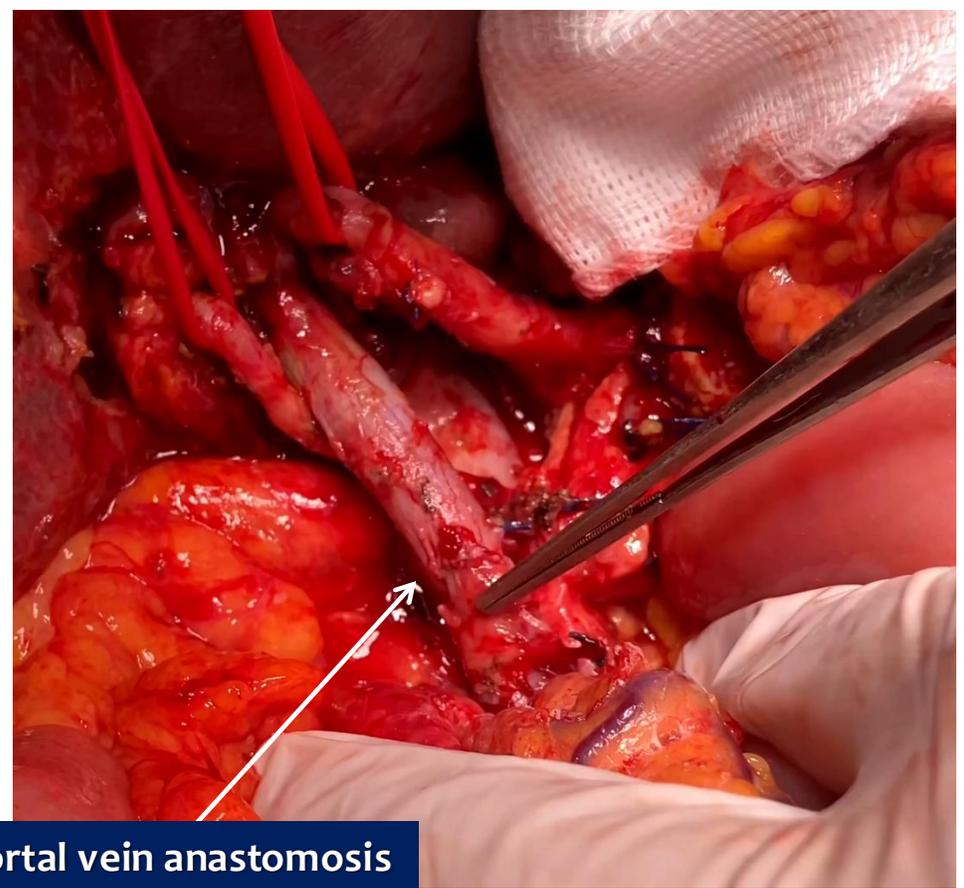
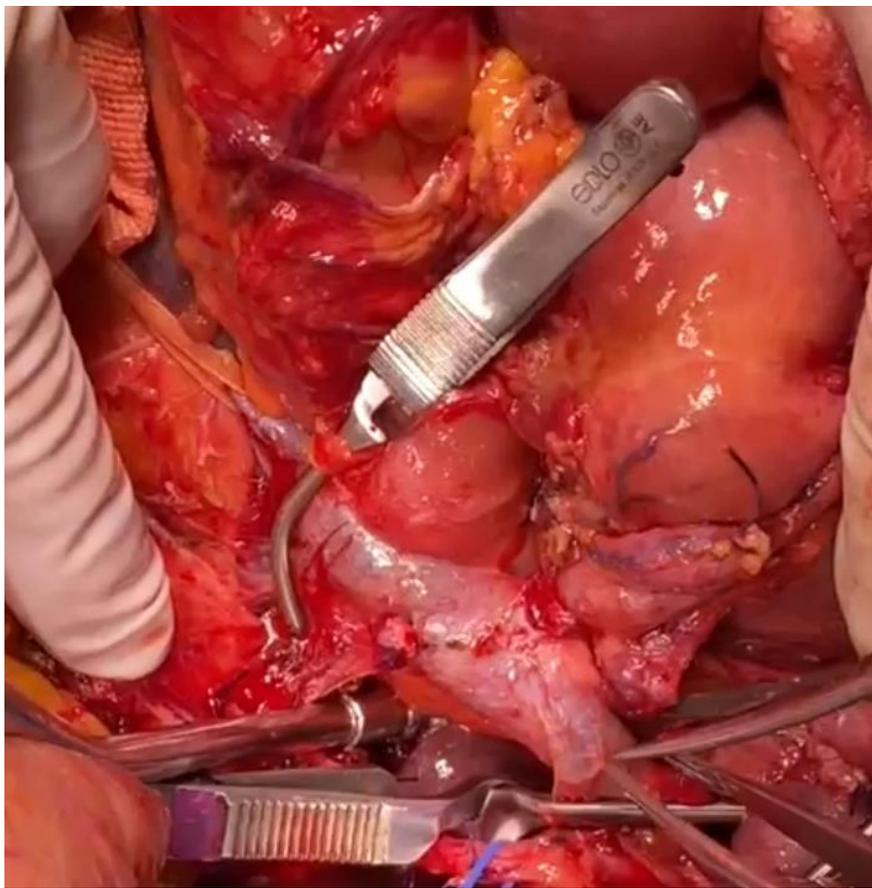
HEPATIC ARTERY



SUPERIOR MESENTERIC ARTERY

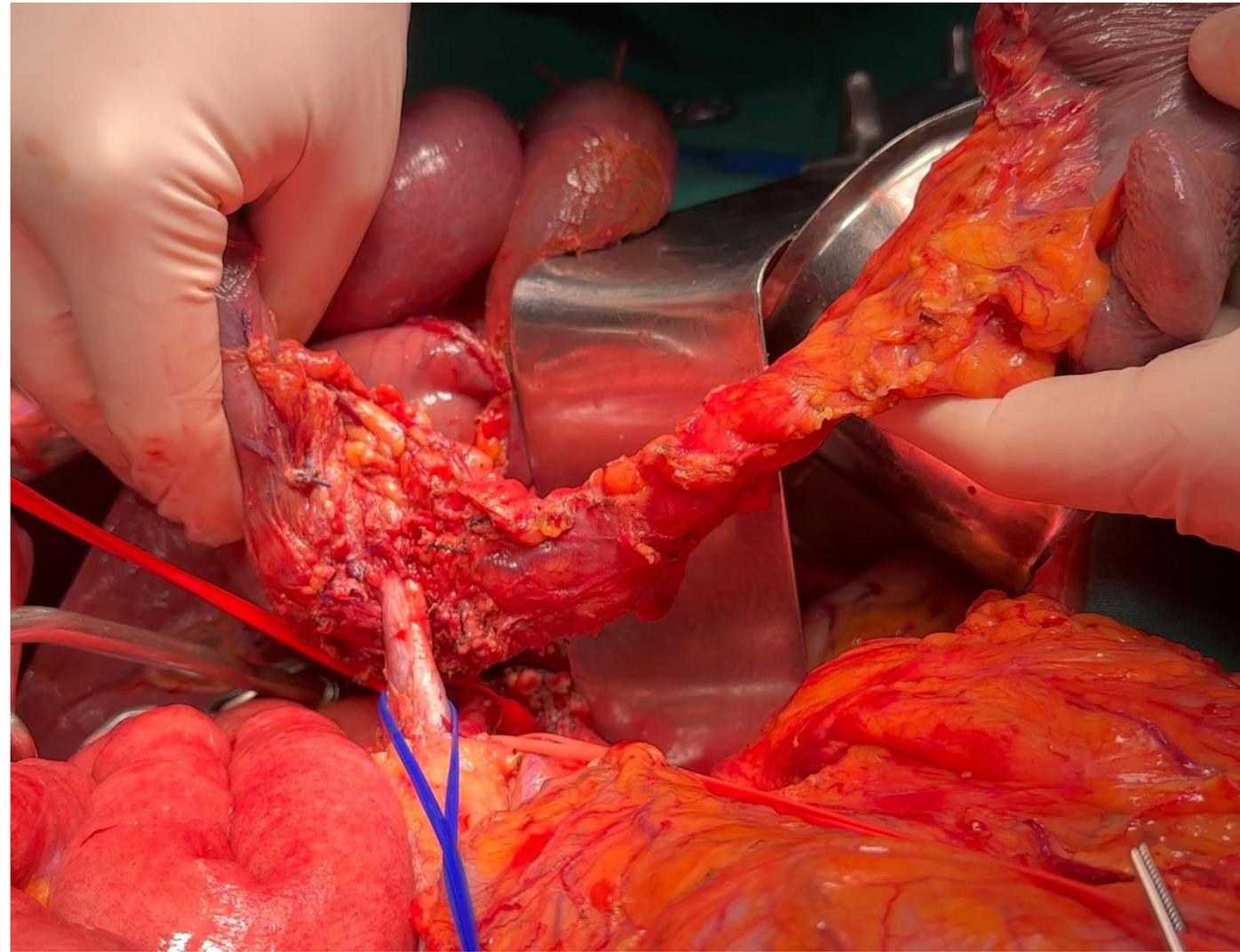
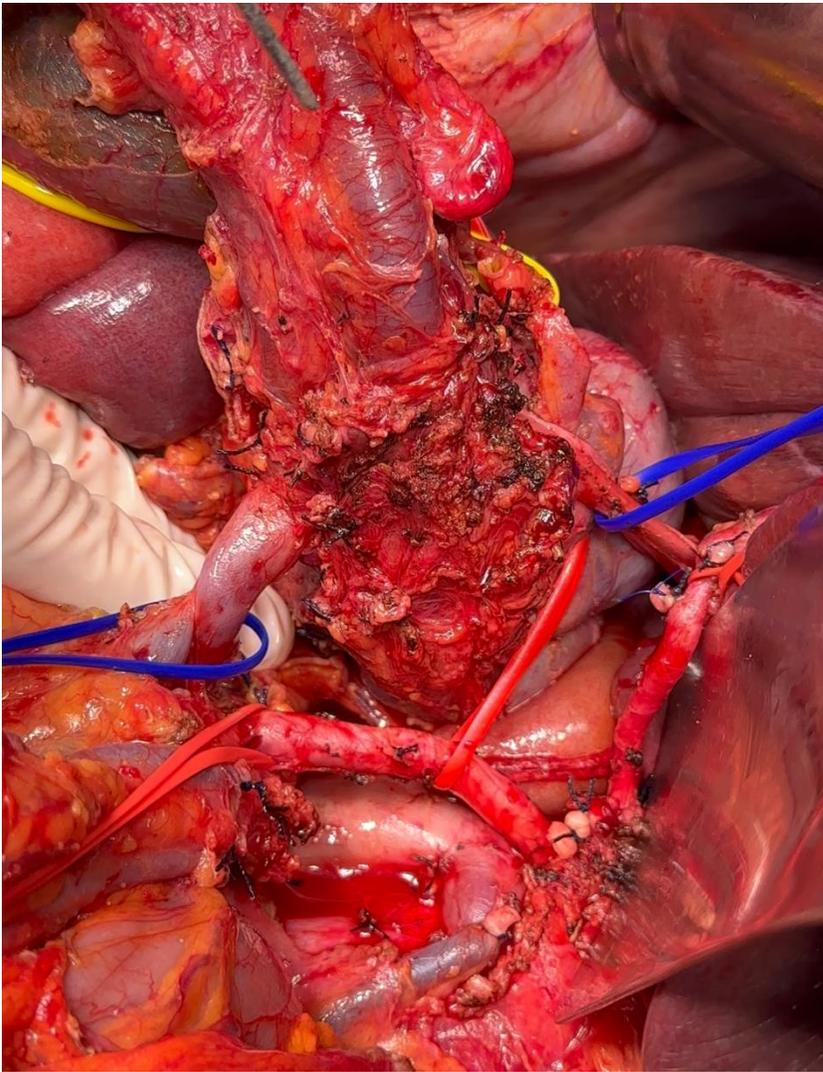
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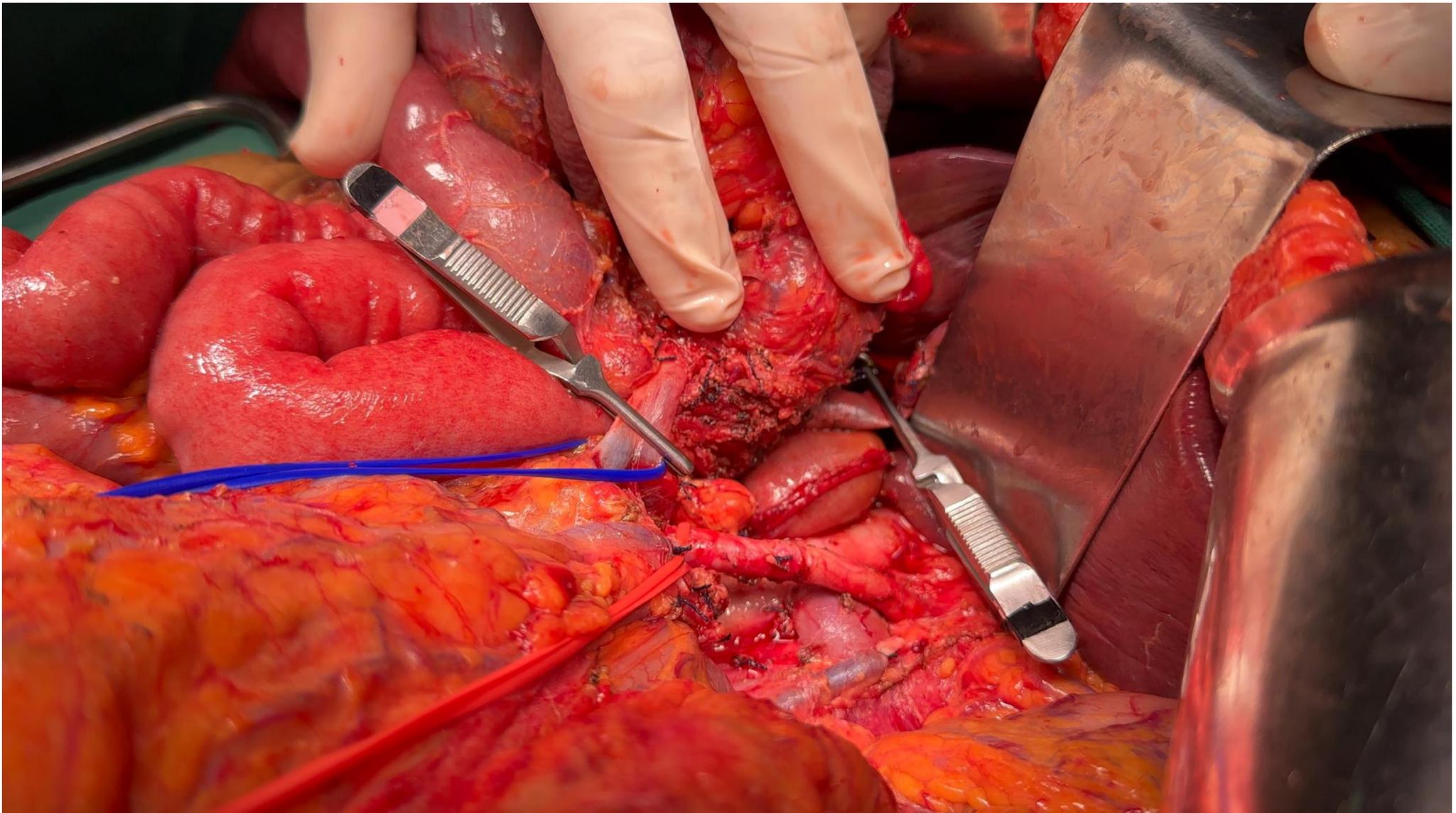


Portal vein anastomosis

Portal vein/superior mesenteric vein resection/reconstruction



Portal vein/superior mesenteric vein resection/reconstruction

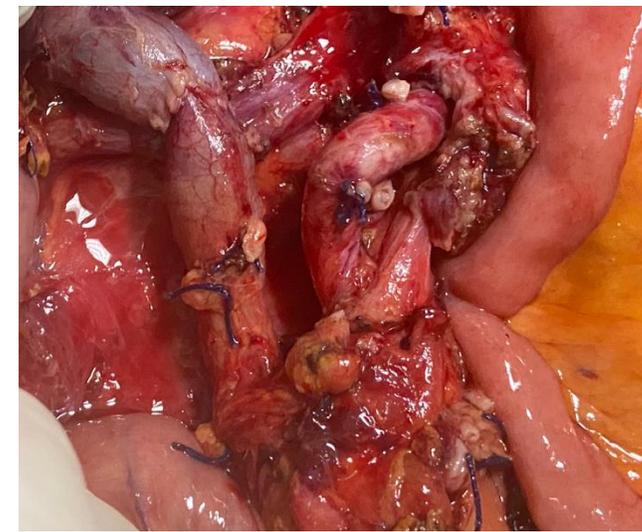


Portal vein/superior mesenteric vein resection/reconstruction

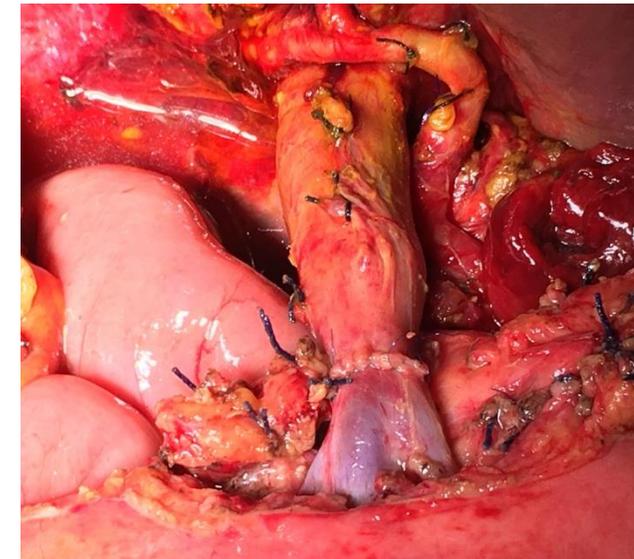
ADVANTAGES OF ARTERY FIRST APPROACH

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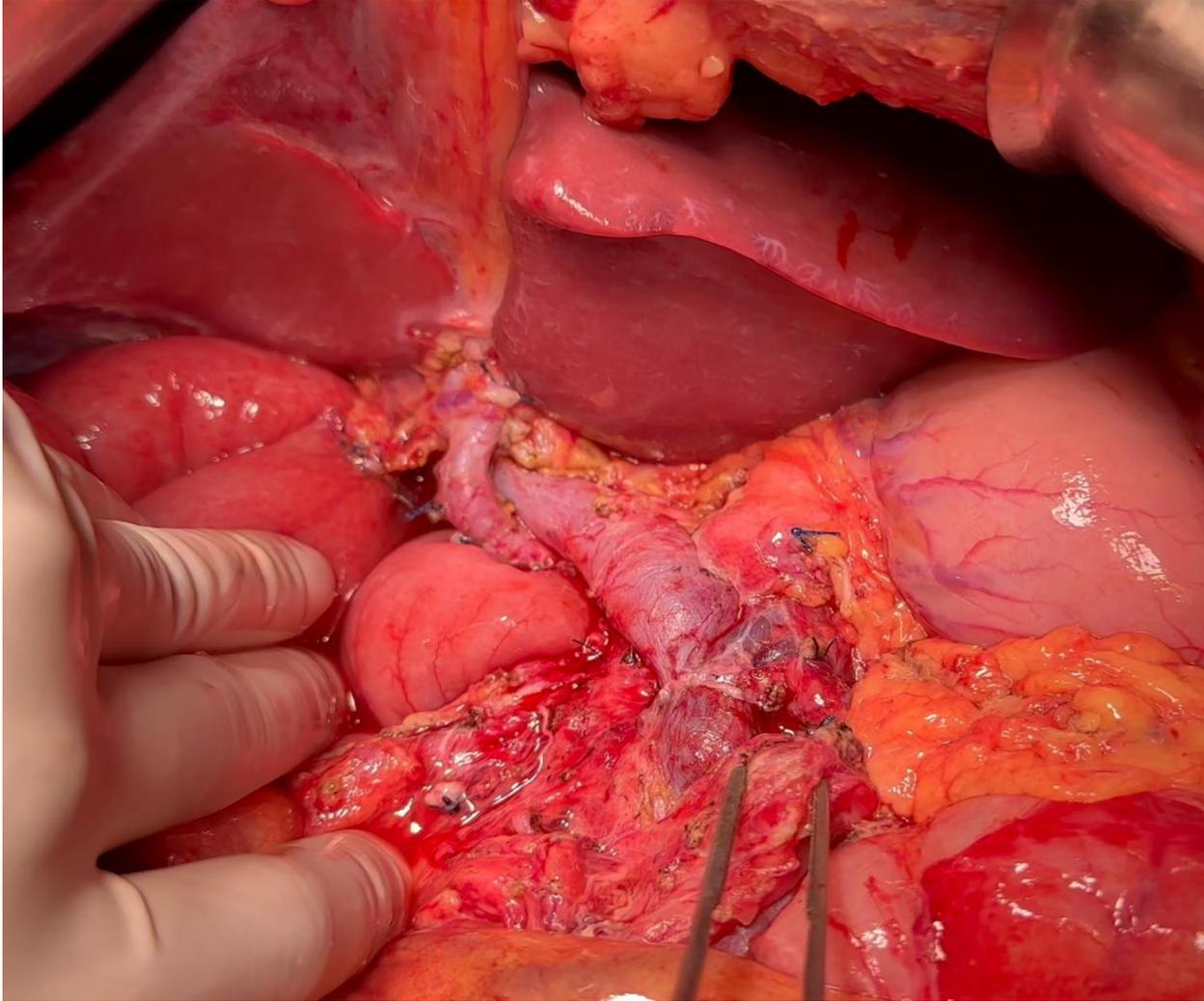
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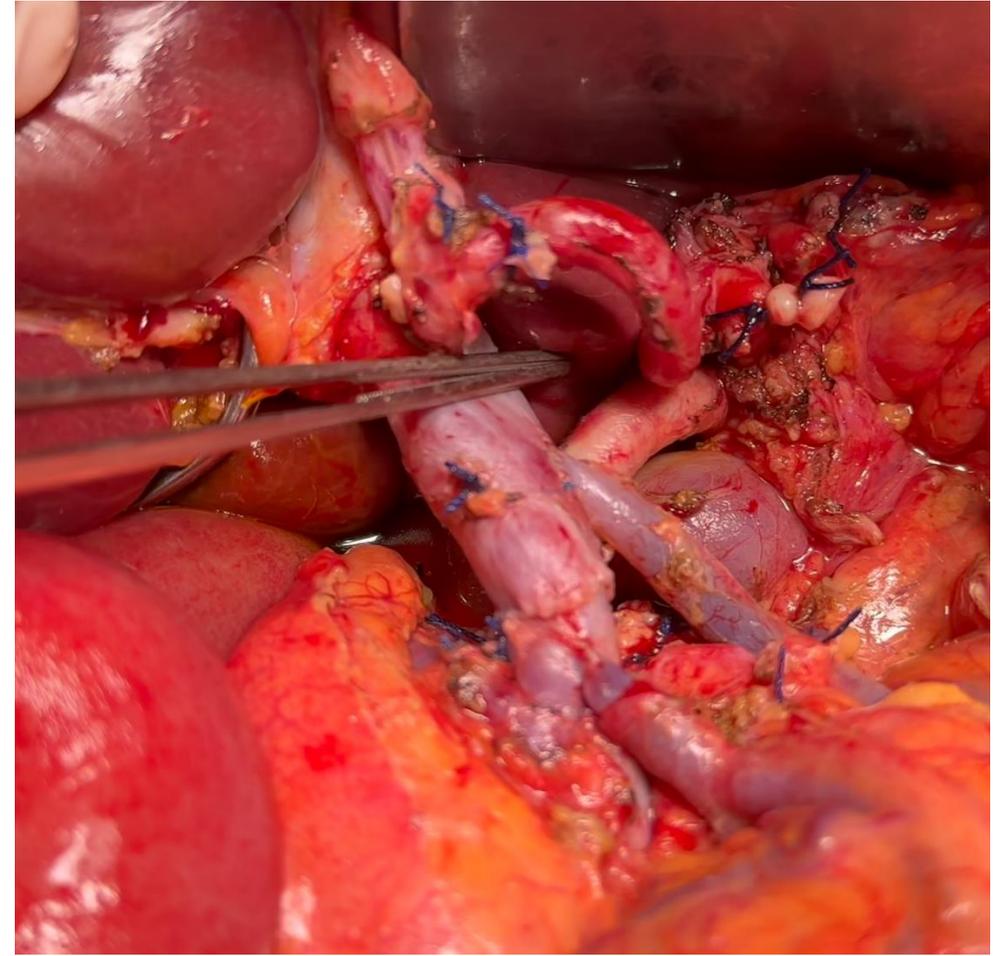
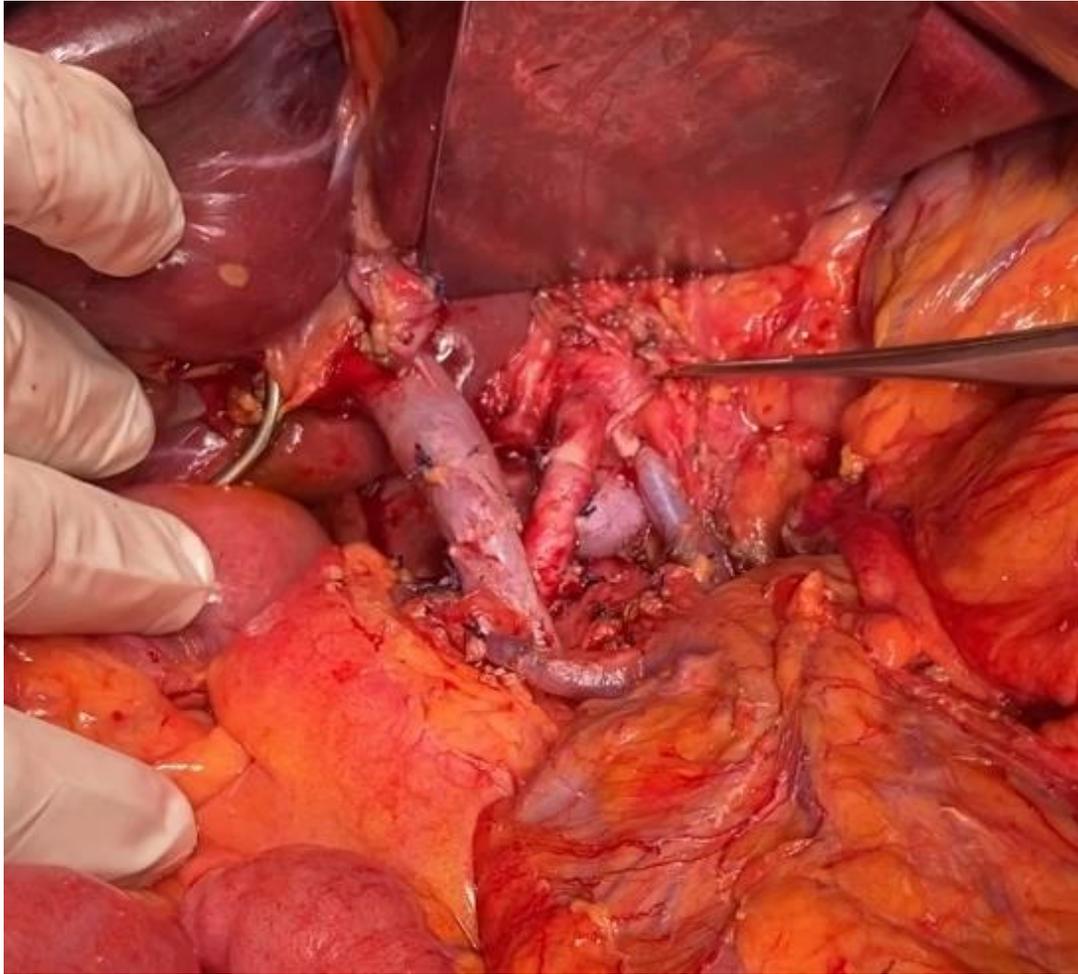
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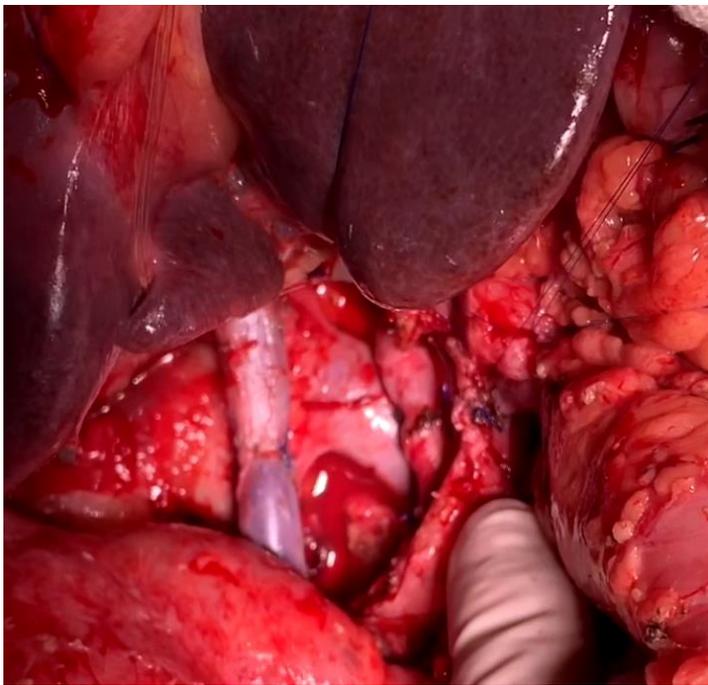
ARTERY FIRST



Portal vein/superior mesenteric vein resection/reconstruction



Portal vein/superior mesenteric vein resection/reconstruction



NO GRAFT

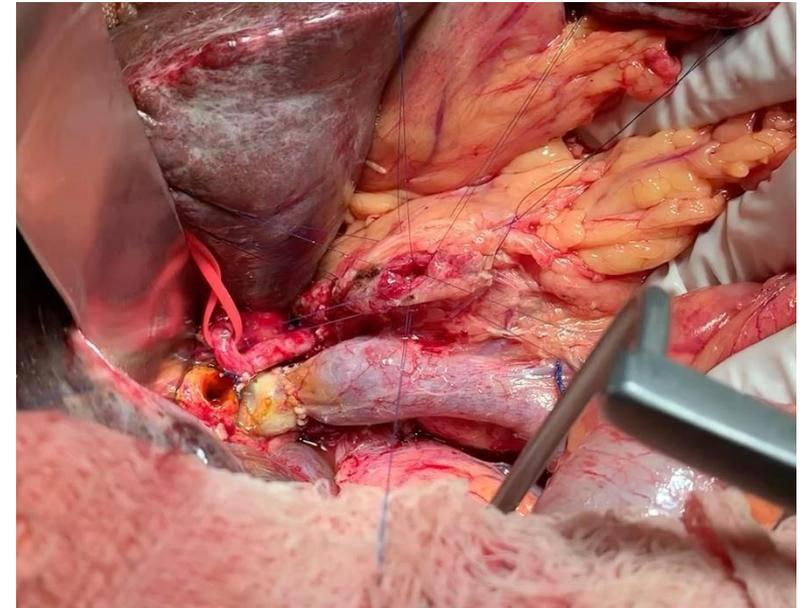
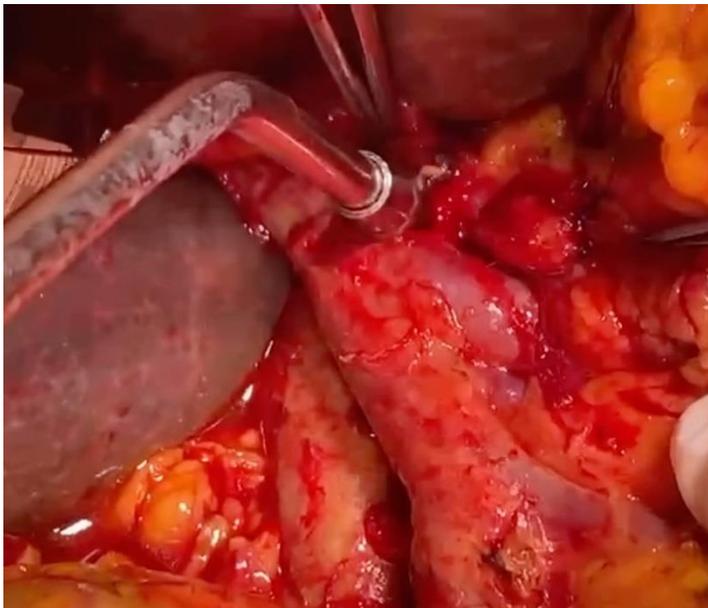
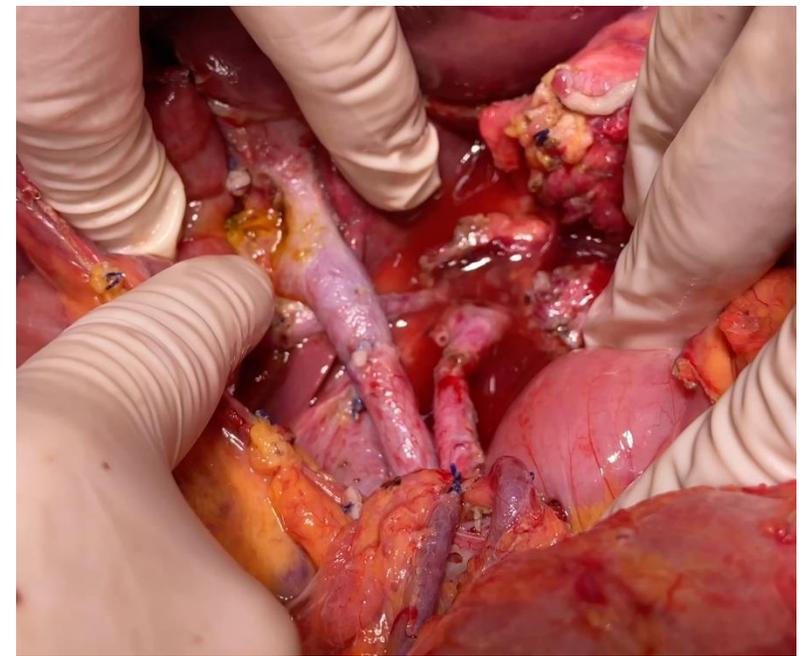
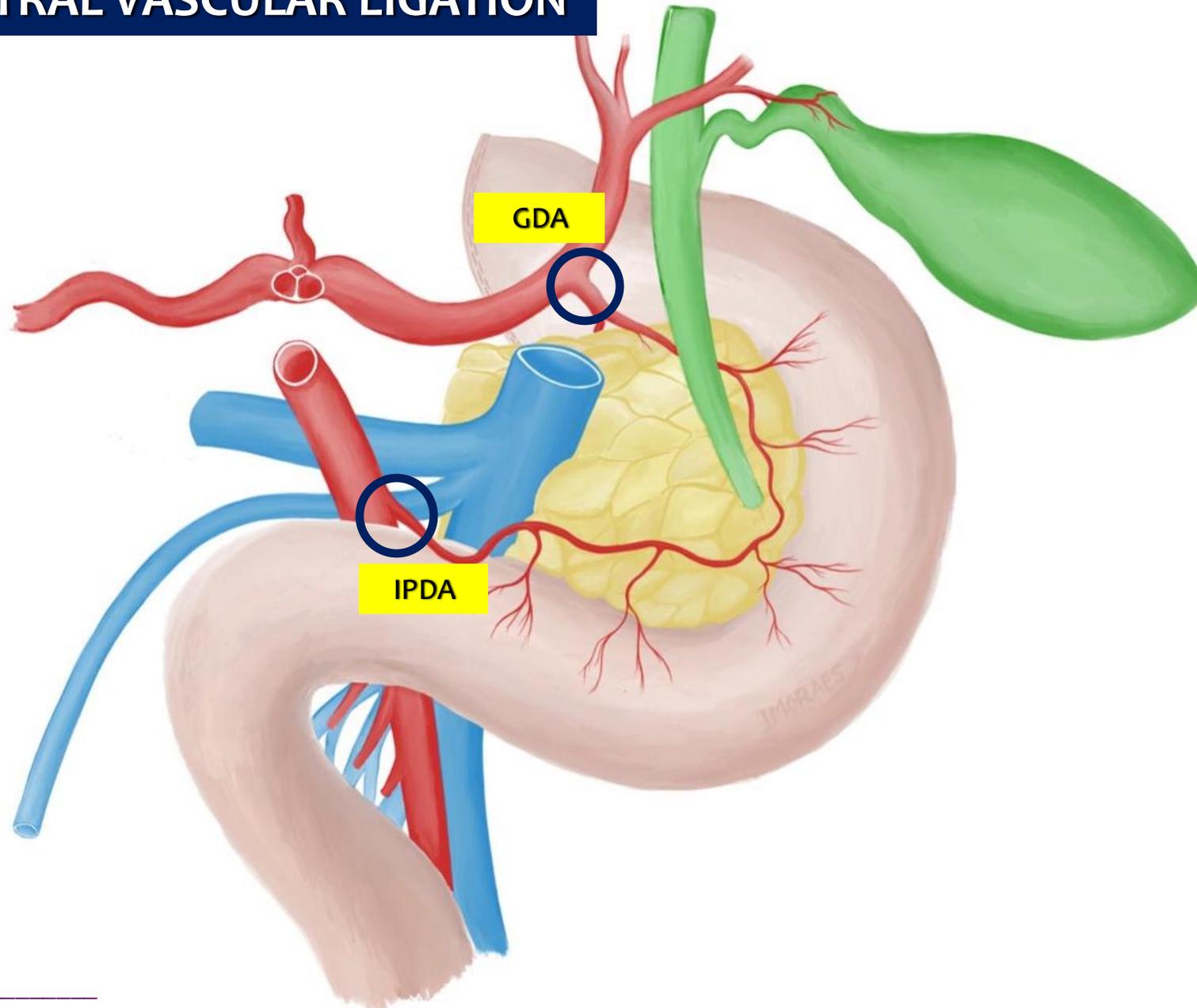


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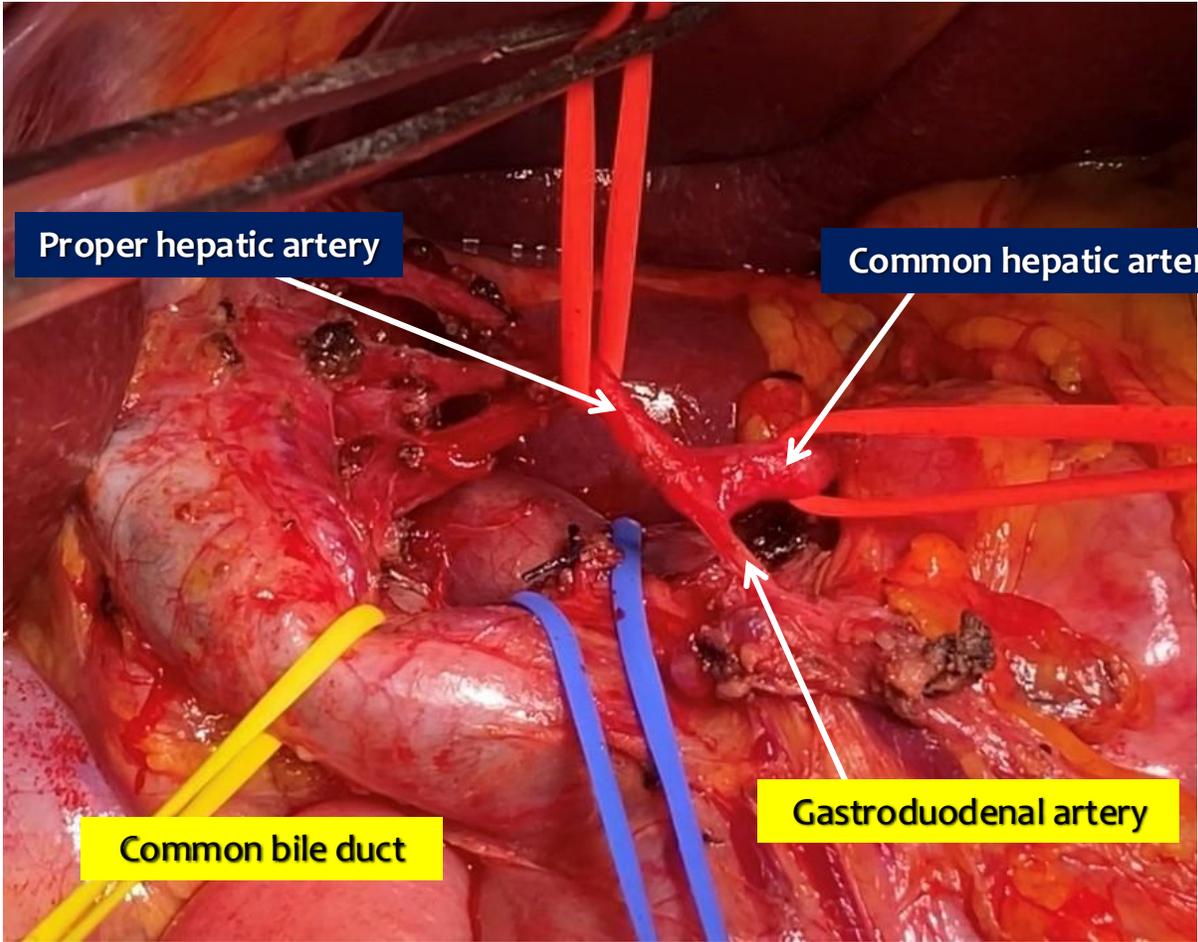
MENOR TEMPO OPERATÓRIO

CENTRAL VASCULAR LIGATION

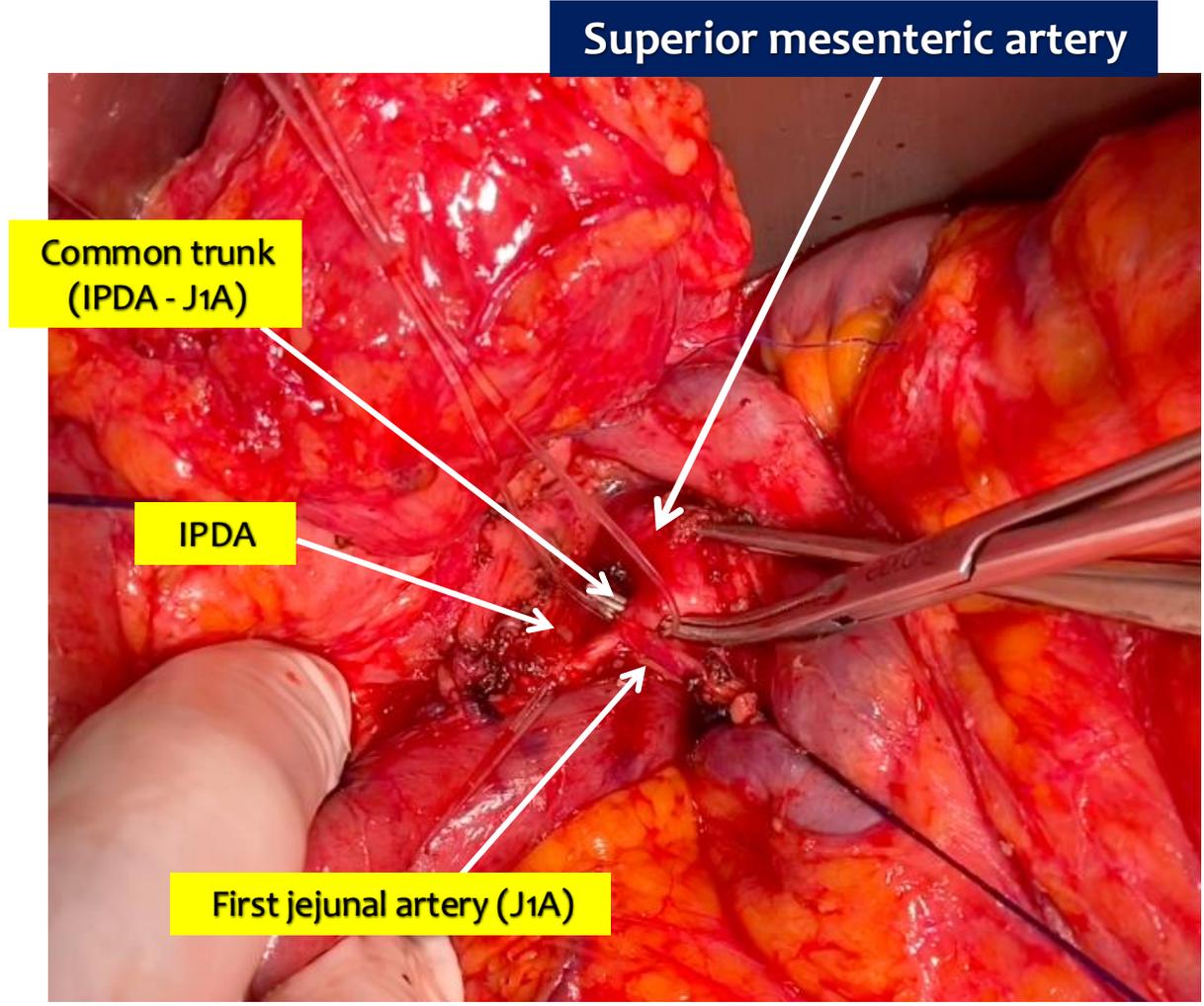


- Bleeding
- Pancreatic fistula
- Delayed gastric emptying
- Oncology

ARTERY FIRST

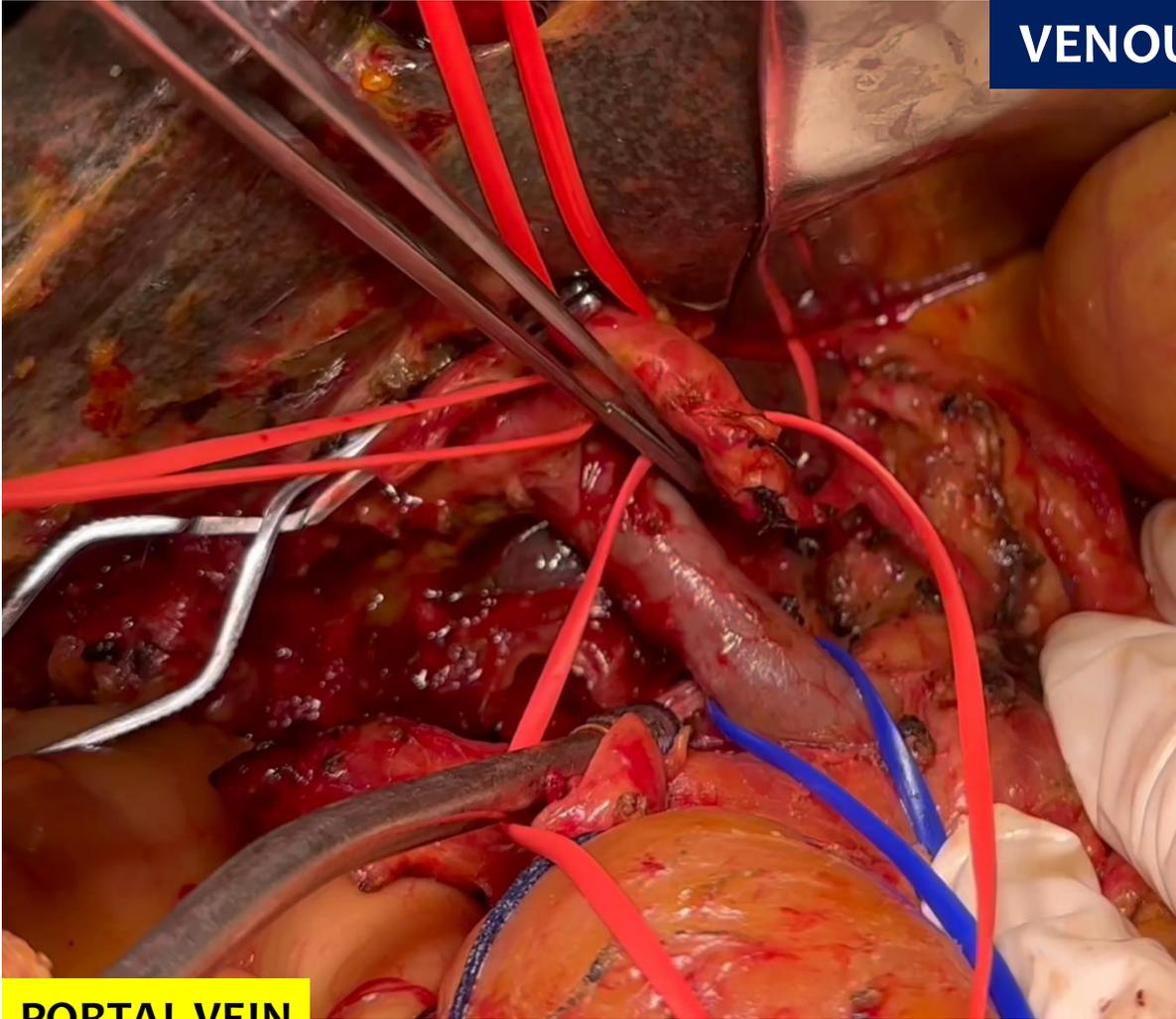


ARTERIAL CONTROL

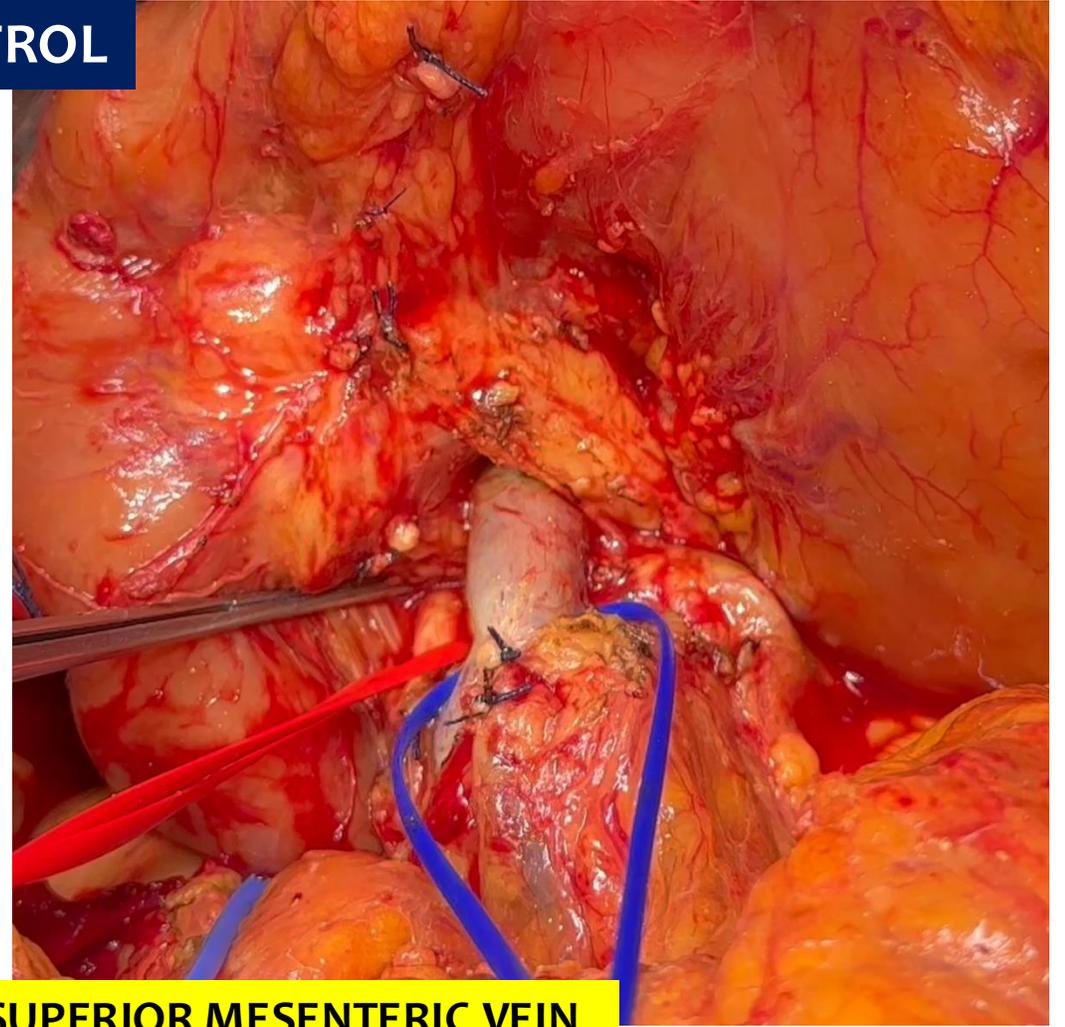


UNCINATE FIRST

VENOUS CONTROL



PORTAL VEIN



SUPERIOR MESENTERIC VEIN

DIVESTMENT

A) Grade 0 (No tumor)

B) Grade I (Invasion of the tunica adventitia).
Tumor free distance from external elastic lamina ≥ 1 mm.

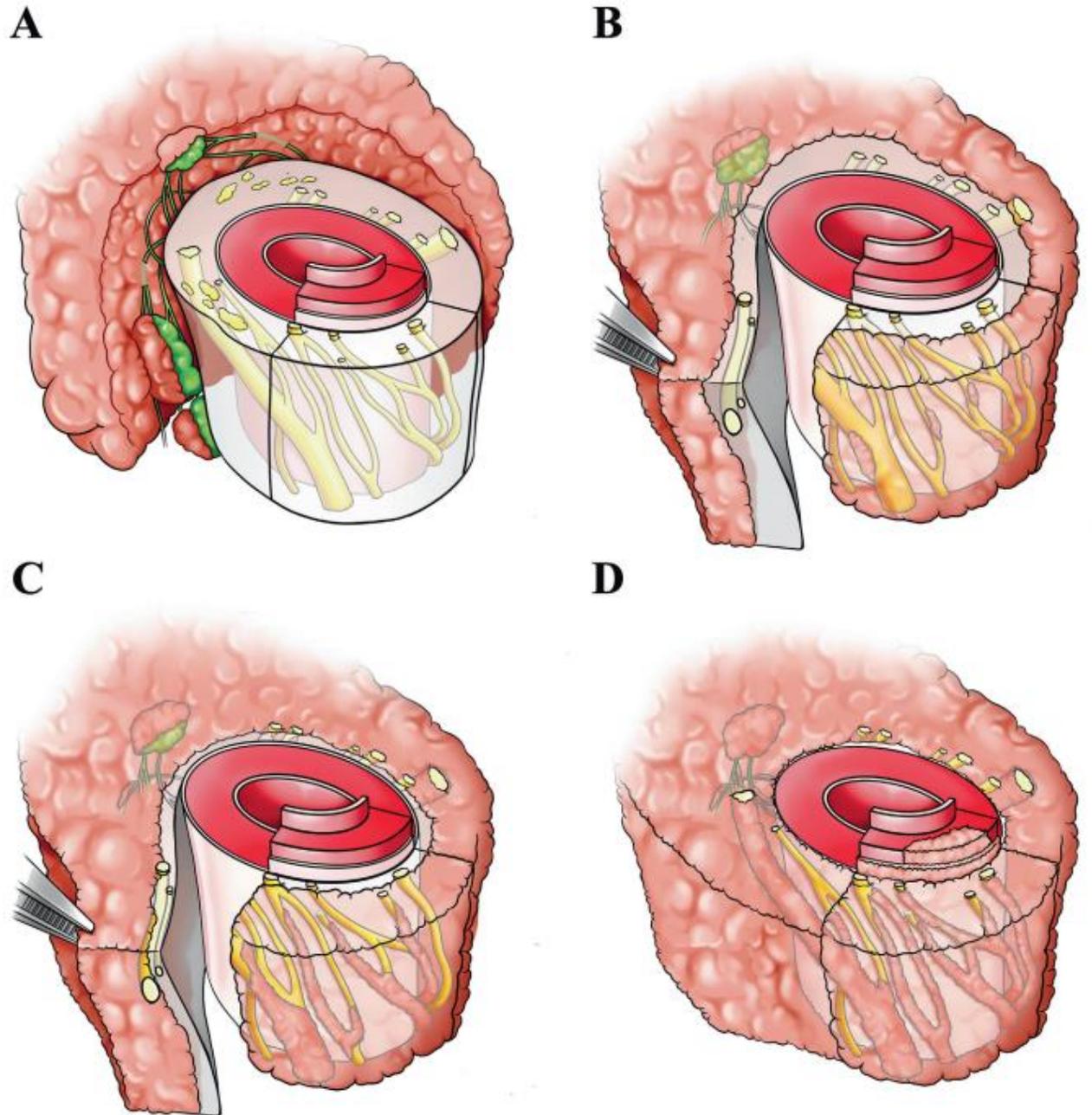
R0 – Periarterial divestment

C) Grade II (Tumor invasion of the tunica adventitia < 1 mm of the external elastic lamina).

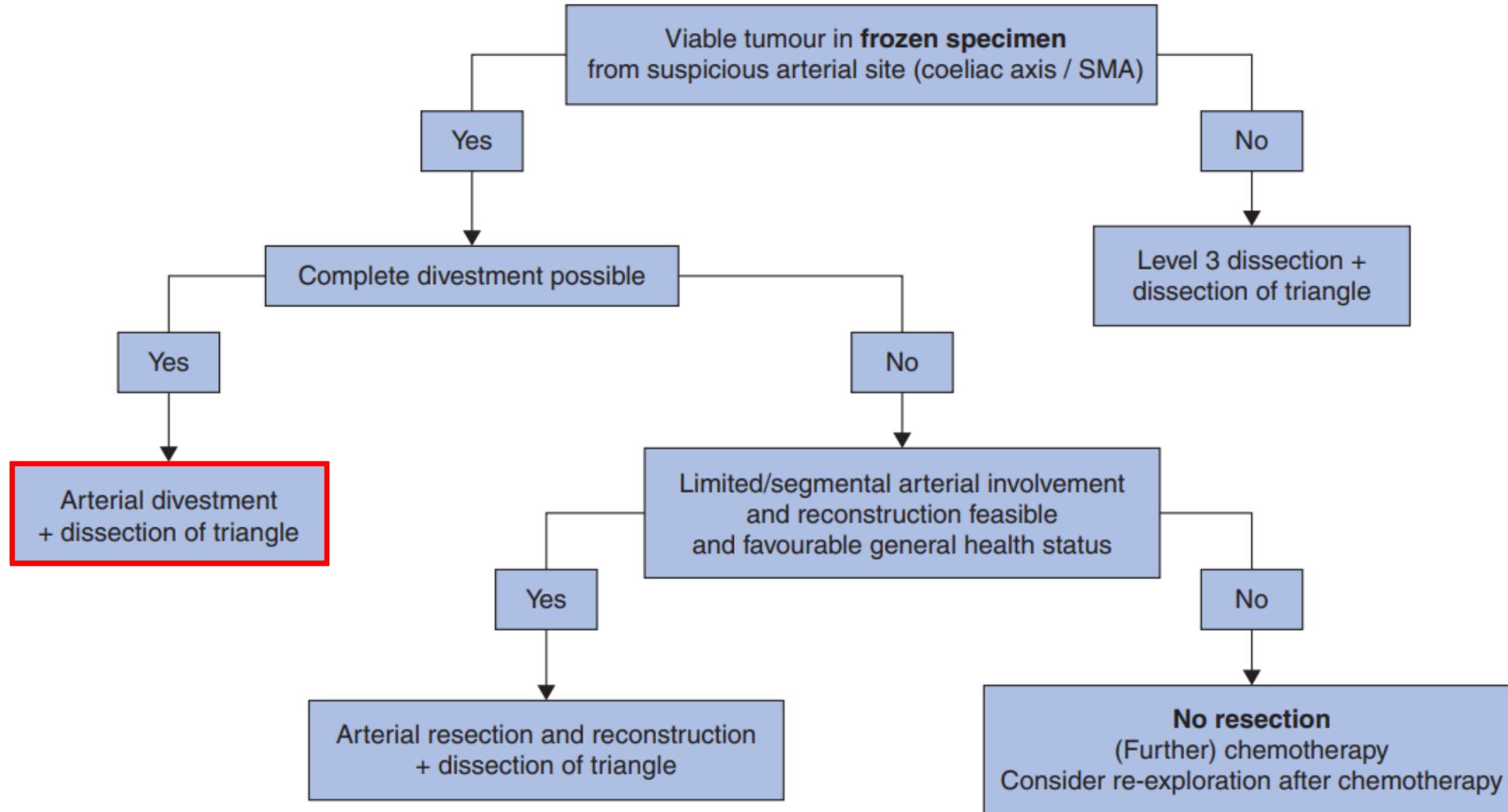
**R1 – Sub-adventitial divestment
Or
Arterial resection**

D) Grade III (Tumor invasion of the external elastic lamina).

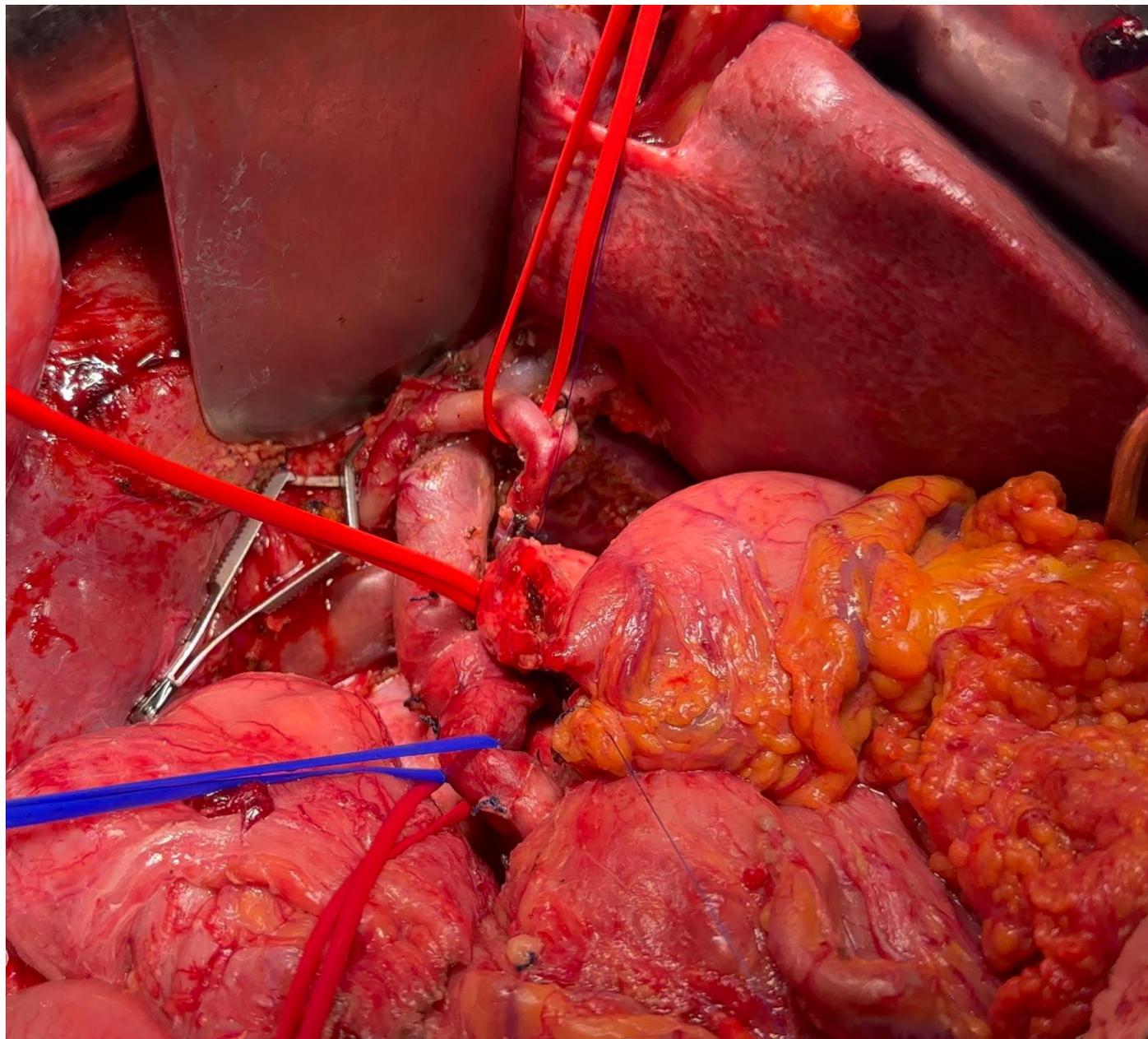
**Arterial resection
Or
Case unresectable**

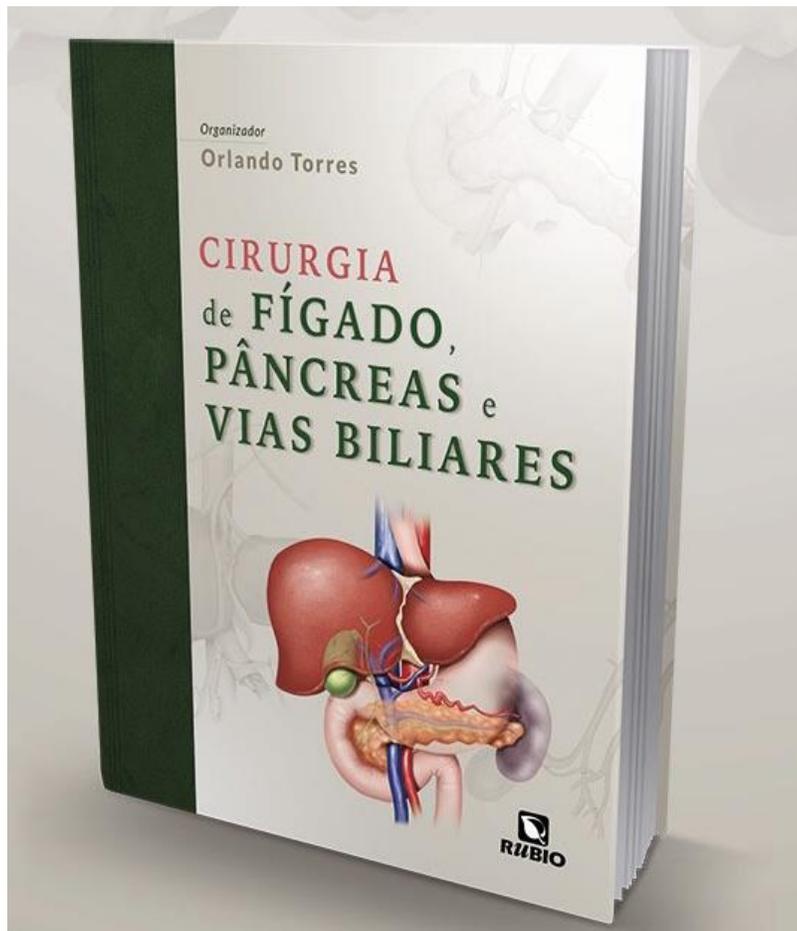


DIVESTMENT



DIVESTMENT





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Obrigado!

Lençóis Maranhenses



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07 A 10 DE AGOSTO DE 2025

Realização:

