COMO E PORQUE AUMENTAR A RADICALIDADE NO CÂNCER DE PÂNCREAS

Orlando Jorge M. Torres
Department of Gastrointestinal Surgery
Hepatopancreatobiliary and Liver Transplant Unit
Universidade Federal do Maranhão - Brazil

SIMPÓSIO elora de Oncologia e Hematologia

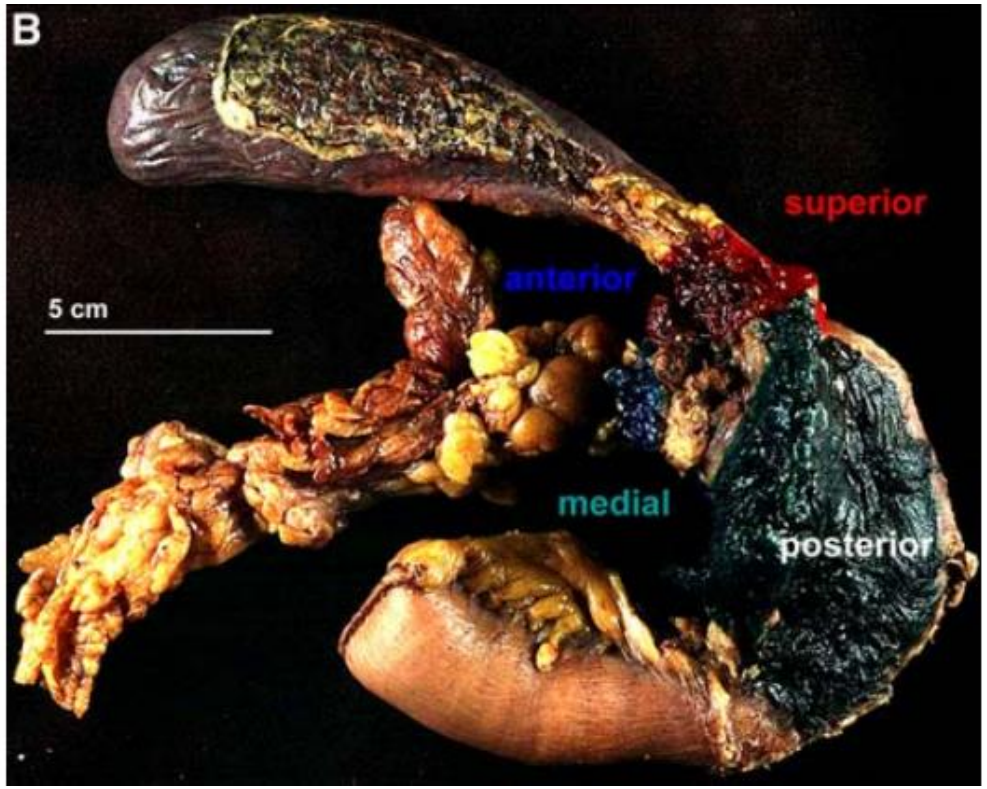
REALIZAÇÃO: GRUPO elora

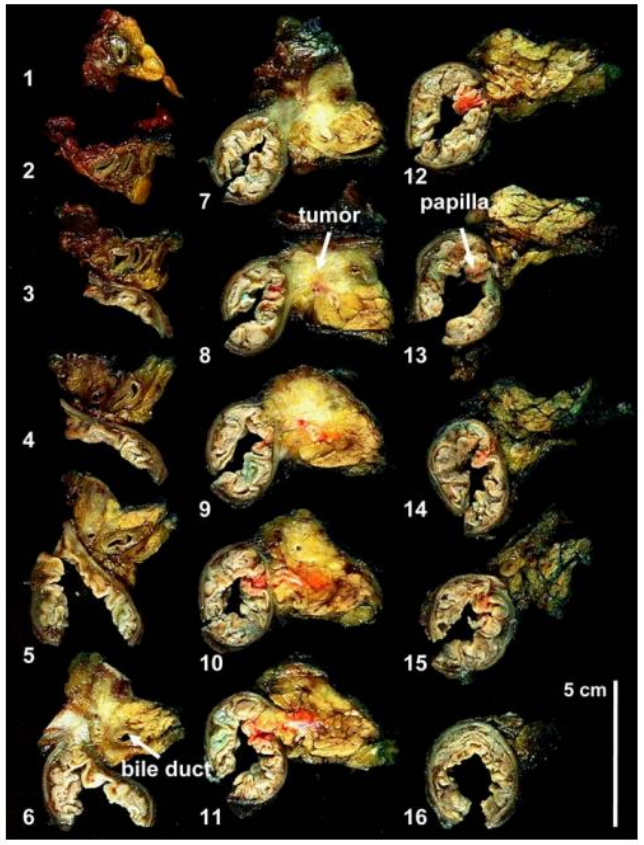
Annals of Surgical Oncology **15**(6):1651–1660
DOI: 10.1245/s10434-008-9839-8

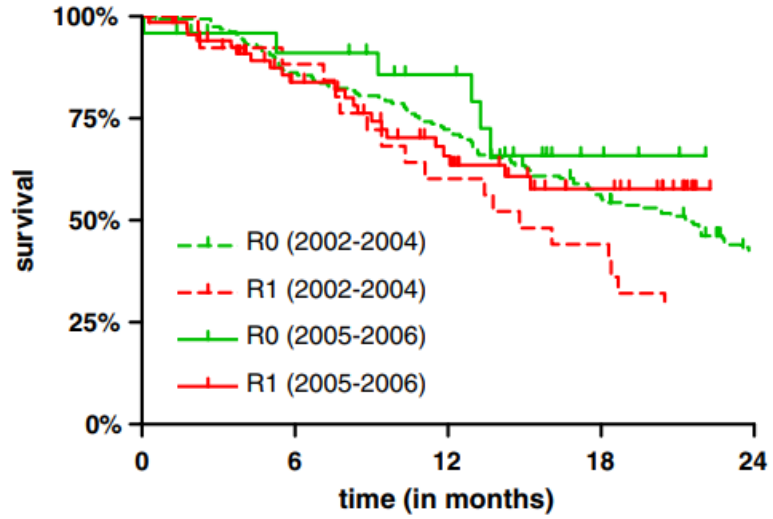
Most Pancreatic Cancer Resections are R1 Resections

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, MD[2]







Irene Esposito - Heidelberg (Germany)

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

Annals of Surgical Oncology **15**(6):1651–1660
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Most Pancreatic Cancer Resections are R1 Resections

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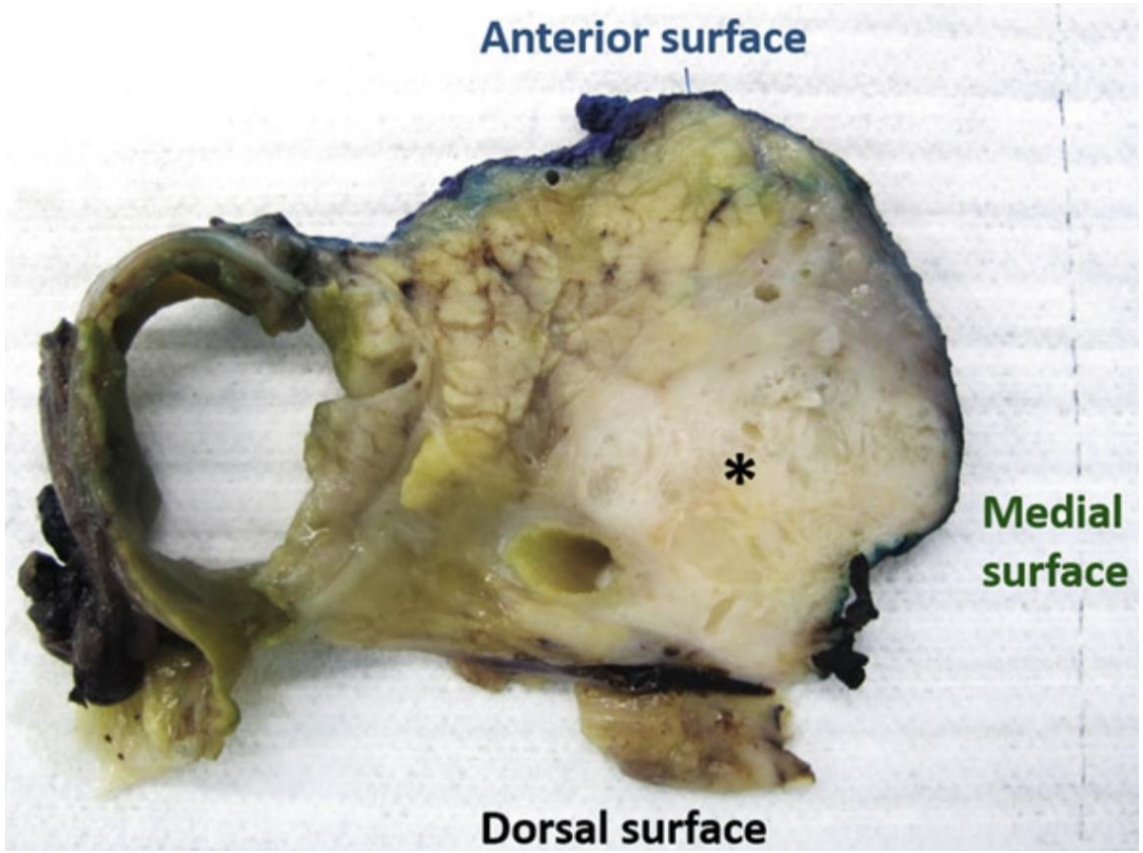
TABLE 3. *Tumor margin characteristics of 111 consecutive macroscopic complete resections for pancreatic ductal adenocarcinoma (2005–2006)*

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



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

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Most Pancreatic Cancer Resections are R1 Resections

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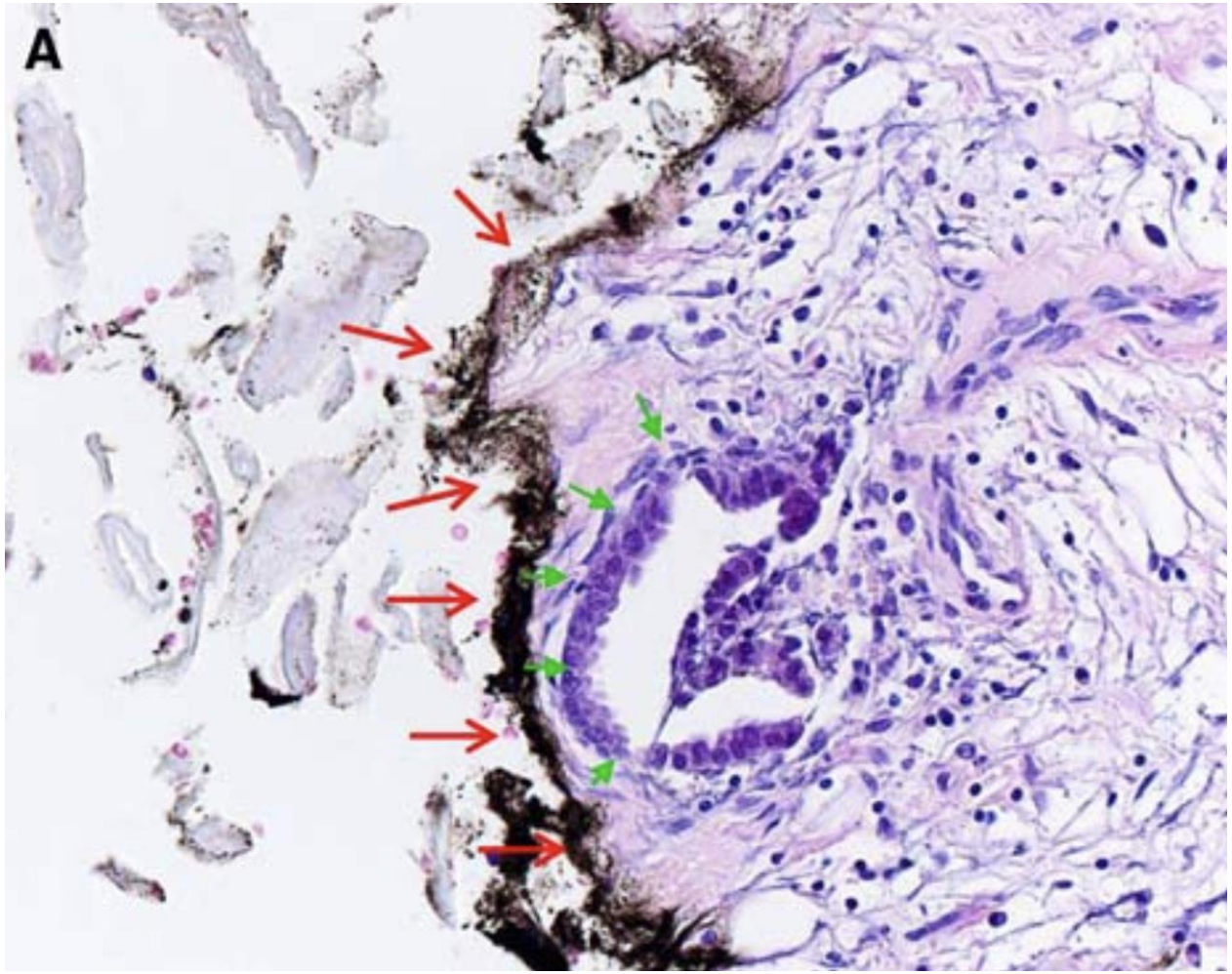
Mesopancreas



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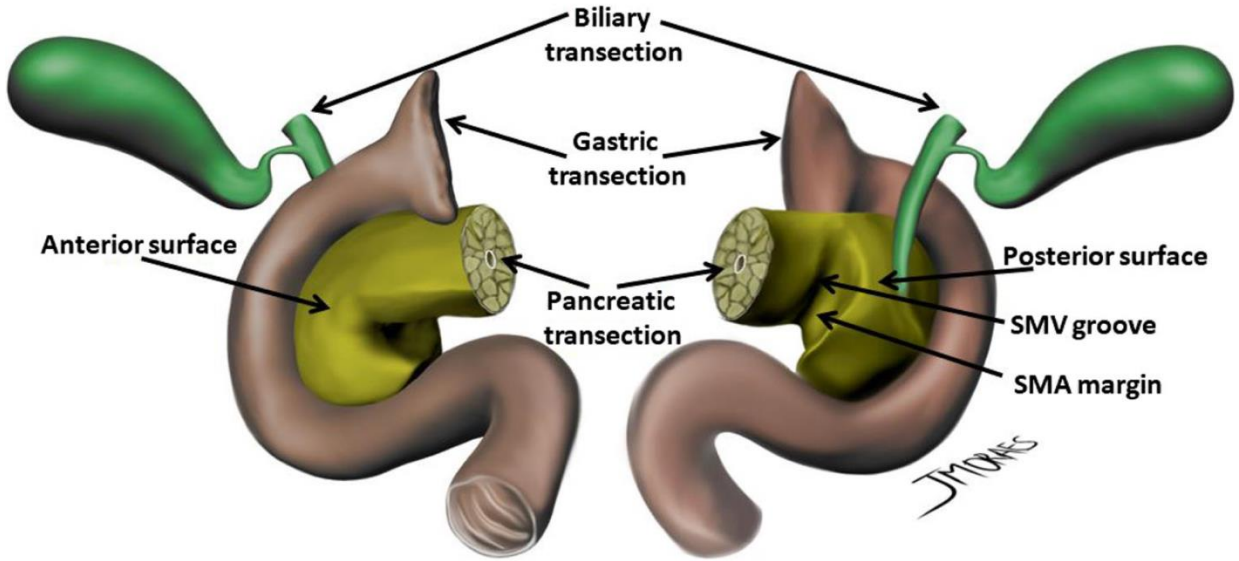


Fernandes ESM, et al. Langenbeck's Arch Surg 2021

R1 – Margem ≤ 1 mm
Seta verde – Neoplasia
Seta vermelha - margem

ORIGINAL ARTICLE

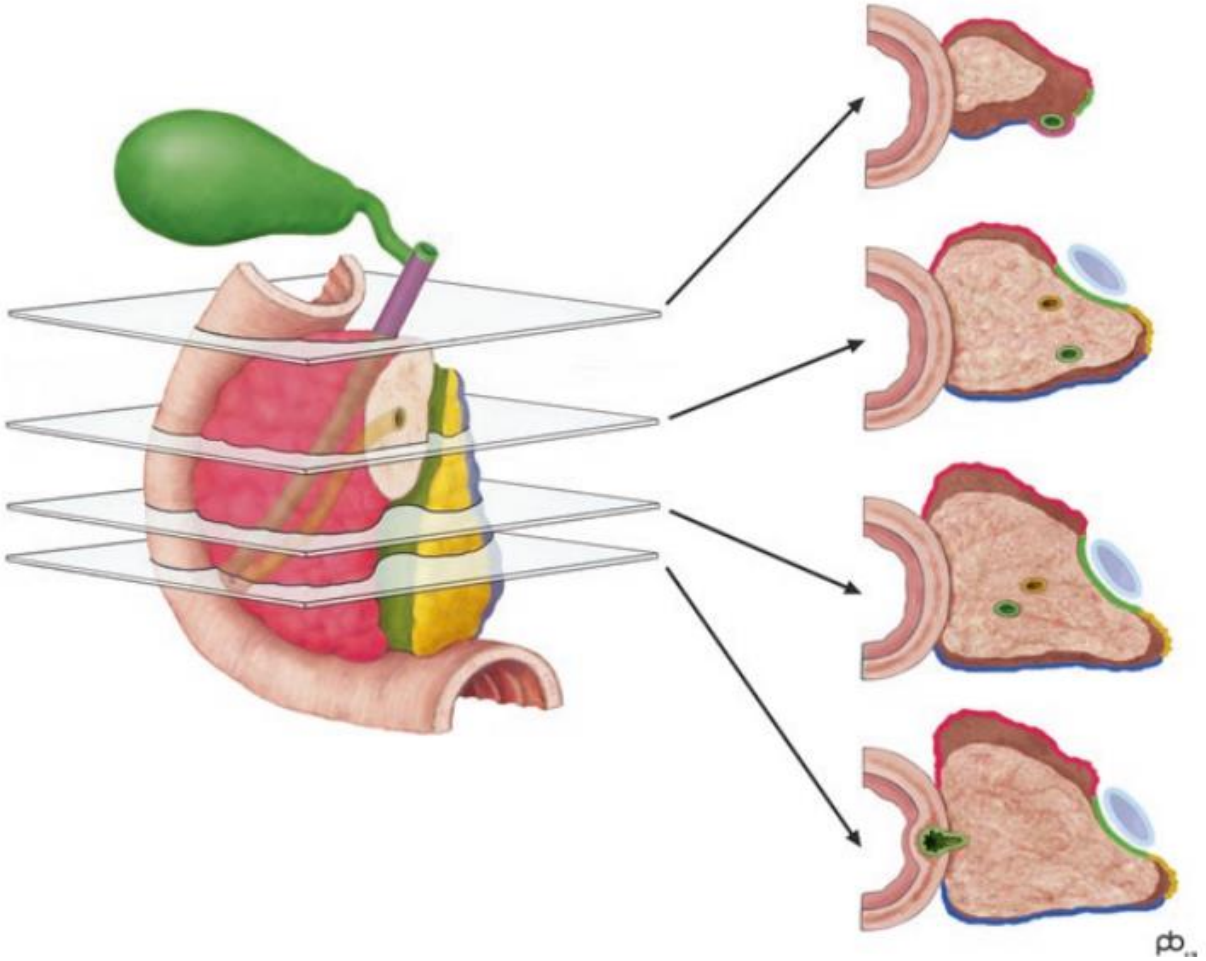
Recurrence patterns of pancreatic cancer after pancreatoduodenectomy: systematic review and a single-centre retrospective study

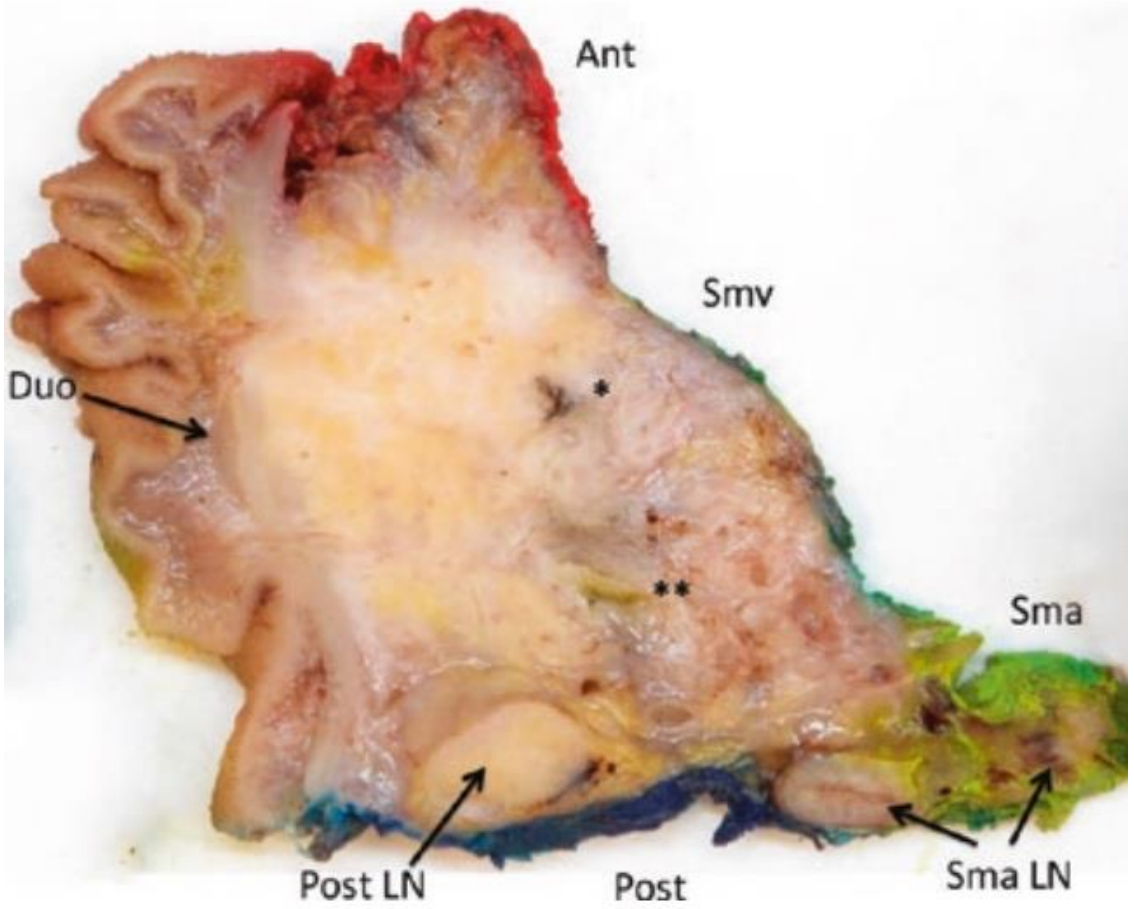
Table 3 Patterns of pathologic margin involvement and recurrence of pancreatic cancer after pancreatoduoden

Recurrence	Overall (n = 204)	R0 (clear margins n = 101)	R1 any margin (n = 103)	p-value (R0 vs. R1 overall)	R1 including SMA margin (n = 74)	p-value (R0 vs. R1 incl SMA)
Overall	163 (79%)	72 (71%)	91 (88%)	*0.002*	68 (92%)	*0.001*
Local	109 (53%)	45 (45%)	64 (62%)	*0.012*	49 (66%)	*0.005*
Metastatic disease	106 (52%)	50 (50%)	56 (54%)	*0.487*	41 (55%)	*0.44*
Lymph nodes	25 (12%)	11 (11%)	14 (14%)	–	10 (14%)	–
Peritoneal	23 (11%)	*8 (8%)*	*15 (15%)*	–	12 (16%)	–
Liver	58 (28%)	27 (27%)	31 (30%)	–	23 (31%)	–
Distant metastases	34 (17%)	23 (23%)	11 (11%)	–	10 (14%)	–
Recurrence pattern				*0.013*		*0.004*
No Recurrence	41 (20%)	29 (29%)	12 (12%)	–	6 (8%)	–
Only local	56 (28%)	22 (22%)	34 (33%)	–	27 (37%)	–
Only metastases	53 (26%)	27 (27%)	26 (25%)	–	19 (26%)	–
Simultaneous	54 (26%)	23 (23%)	31 (30%)	–	22 (30%)	–
Timing of recurrence				*0.009*		*0.003*
≤18 months	123 (60%)	53 (53%)	69 (67%)	–	52 (70%)	–
>18 months	40 (20%)	19 (19%)	22 (21%)	–	16 (22%)	–

Kalisvaart M, et al. HPB 2020

Mesopancreas



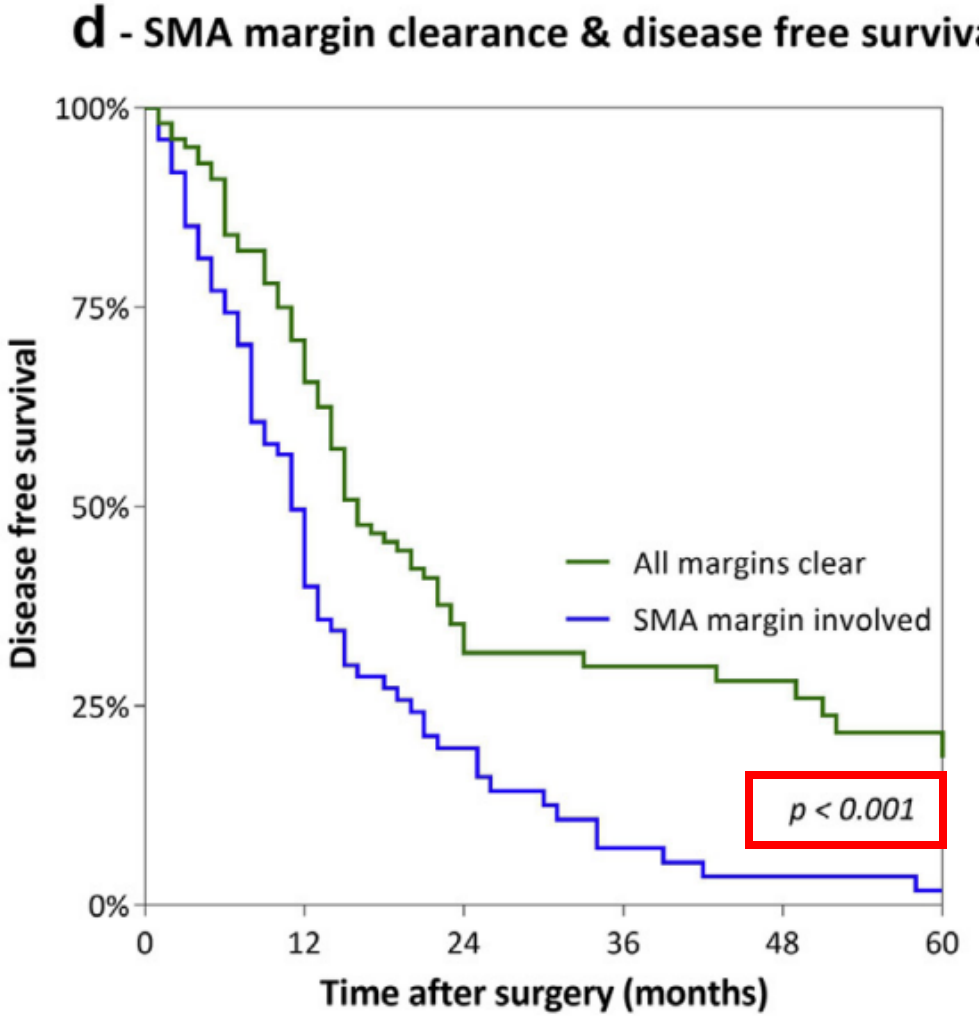


Verbeke C, et al. Cancer Treat Rev. 2015;41:17–26

https://doi.org/10.1016/j.hpb.2020.01.005 HPB

ORIGINAL ARTICLE

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



Kalisvaart M, et al. HPB 2020

https://doi.org/10.1016/j.hpb.2020.01.005 HPB

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 and should be the target of future adjuvant local therapies.

Kalisvaart M, et al. HPB 2020

Journal of Gastrointestinal Surgery
https://doi.org/10.1007/s11605-020-04619-1

ORIGINAL ARTICLE

Optimal Lymphadenectomy of the Mesopancreas Based on Fluorescence Imaging During Pancreaticoduodenectomy

Ryota Matsuki[1] · Masanori Sugiyama[2] · Masaharu Kogure[1] · Masaaki Yokoyama[3] · Tetsuya Nakazato[1] · Yutaka Suzuki[1] · Toshiyuki Mori[1] · Nobutsugu Abe[1] · Yoshihiro Sakamoto[1]

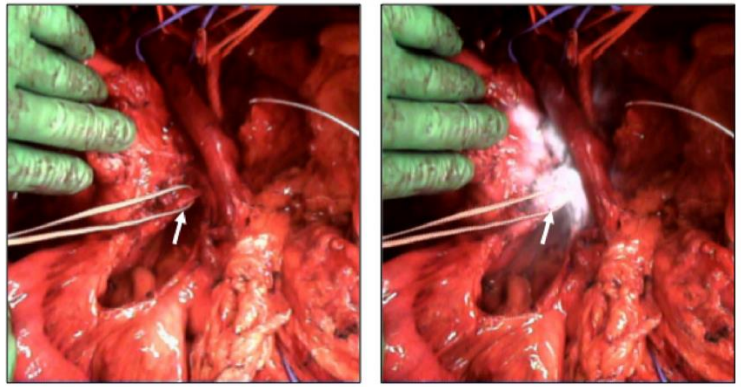


Fig. 1 Lymphatic pathways from the pancreatic head. The first JA is taped. Fluorescence is seen in the mesentery of the IPDA and first JA (arrow), but not in that of the second JA or more distant

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 pancreatoduodenal artery, *JA* jejunal artery, *SMA* superior mesenteric artery

Matsuki R, et al. J Gastrointest 2020

PANCREATIC CANCER

World J Surg
https://doi.org/10.1007/s00268-020-05856-w

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 periadventitial 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

DOI: 10.1002/jhbp.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 Nagakawa[1] | Shuang-Qin Yi[2] | Chie Takishita[1] | Yatsuka Sahara[1] |

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 Morales[1] · Giuseppe Zimmitti[1] · Claudio Codignola[1] · Alberto Manzoni[1] · Marco Garatti[1] · Valentina Sega[1] · Edoardo Rosso[1]

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 Muro[1] · Wachirawit Sirirat[1] · Daisuke Ban[2] · Yuichi Nagakawa[3] · Keiichi Akita[1]

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 Liu[1], Ang Lv[1], Zhi-hua Tian[2], Xiu-yun Tian[1], Xiao-ya Guan[1], Bin Dong[2], Min Zhao[3], Chun-yi Hao[1]

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 Pancreaticoduodenectomy for Pancreatic Cancer: Balancing Surgical and Oncological Safety

Yosuke Inoue[1] · Akio Saiura[1] · Atsushi Oba[1] · Shoji Kawakatsu[1] · Yoshihiro Ono[1] · Takafumi Sato[1] · Yoshihiro Mise[1] ·

—Report on Experiments and Clinical Cases—

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

Takayuki Aimoto[1], Satoshi Mizutani[2], Youichi Kawano[1], Akira Matsushita[1], Naoyuki Yamashita[1], Hideyuki Suzuki[2] and Eiji Uchida[1]

International Journal of Surgery 73 (2020) 14–24

Contents lists available at ScienceDirect

International Journal of Surgery

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

Review

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

SUPERIOR MESENTERIC ARTERY

Vocês estão operando errado!

Irene Esposito
Patologista – Heidelberg, Alemanha

frontiers in Oncology

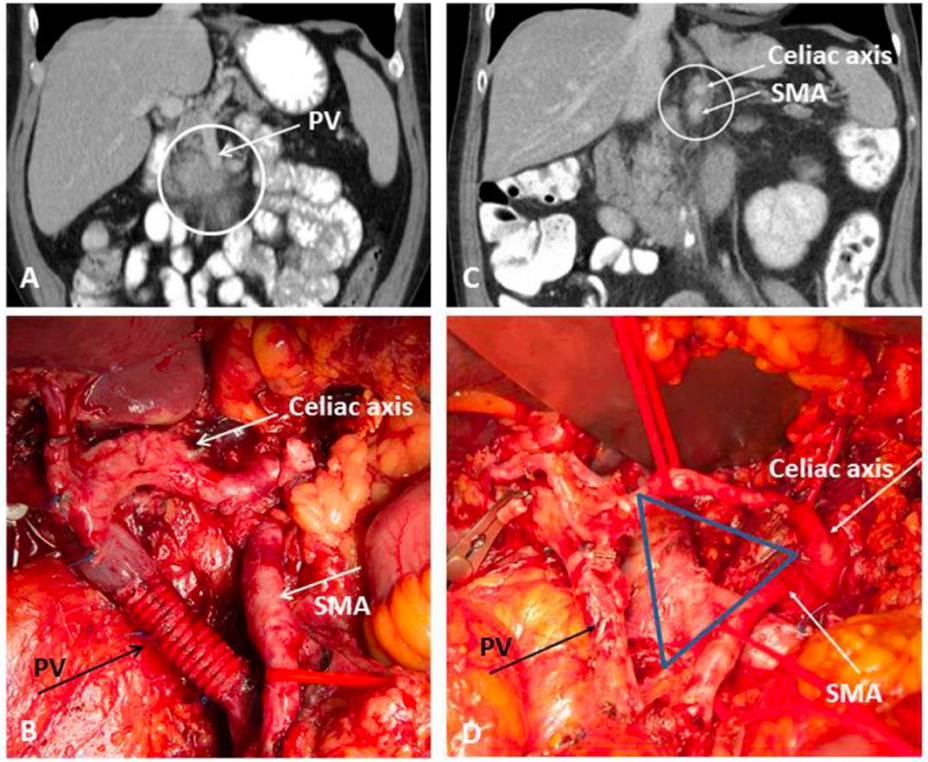
REVIEW
published: 14 January 2020
doi: 10.3389/fonc.2019.01501

Conversion Surgery for Pancreatic Cancer—The Impact of Neoadjuvant Treatment

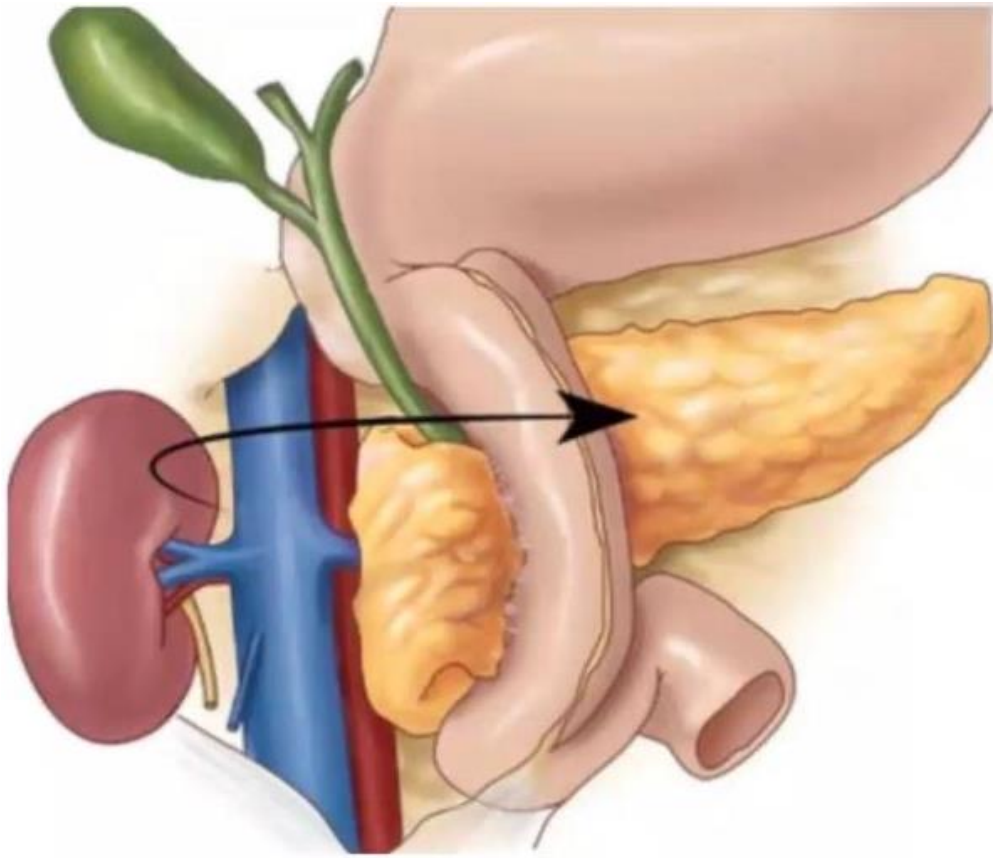
*Ulla Klaiber and Thilo Hackert**

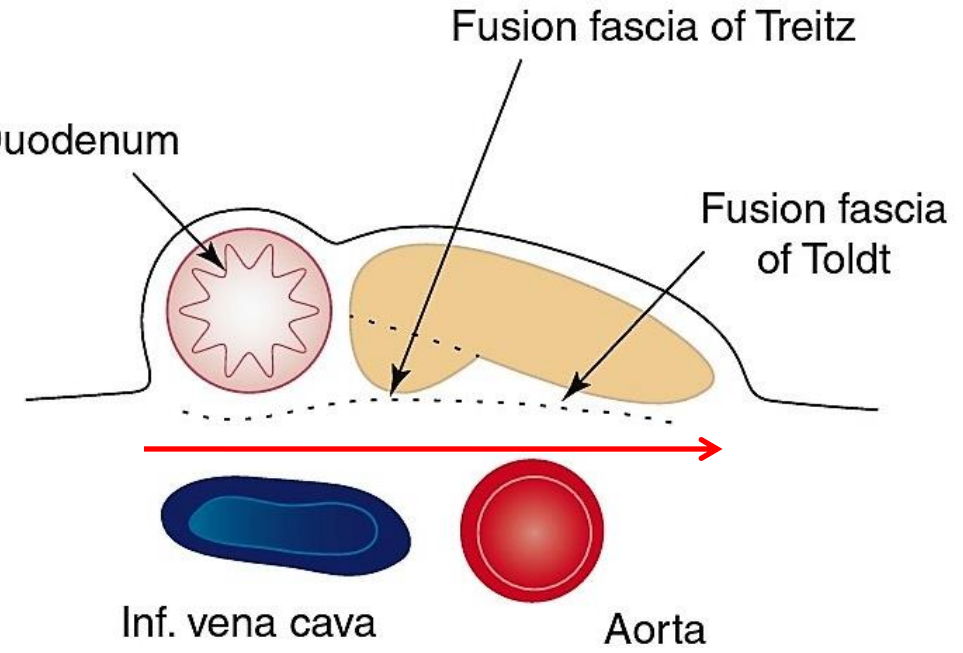
Department of General, Visceral and Transplantation Surgery, University of Heidelberg, Heidelberg, Germany

Pancreatic ductal adenocarcinoma (PDAC) has still a dismal prognosis, mainly because only 15–20% of all patients present with resectable tumor stages at the time of diagnosis. Due to locally extended tumor growth or distant metastases upfront resection is not

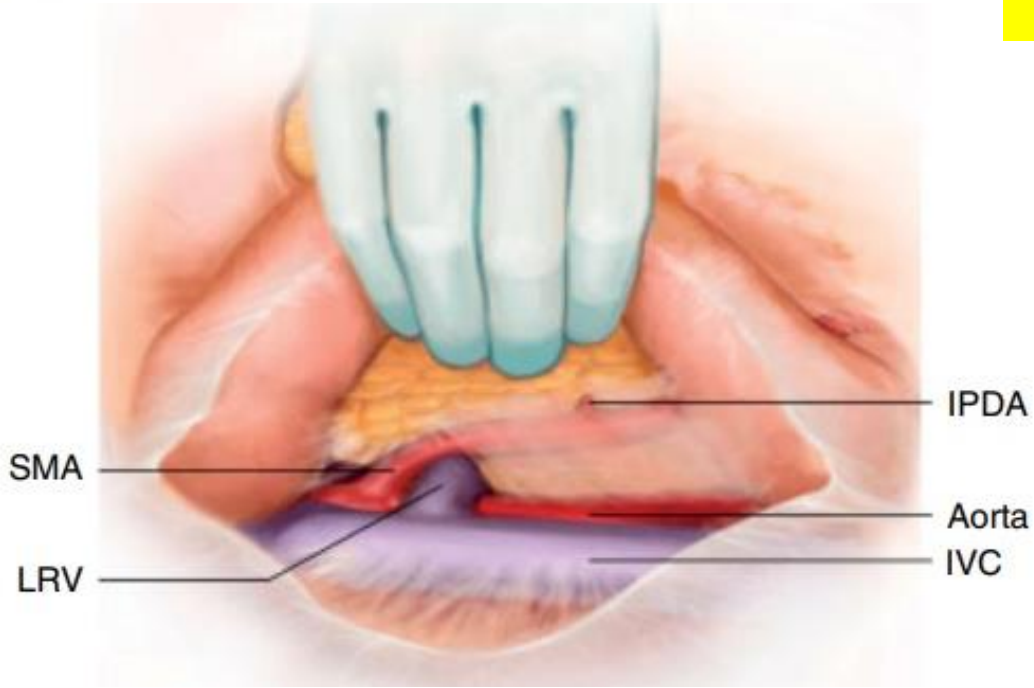


ARTERY FIRST





POSTERIOR APPROACH



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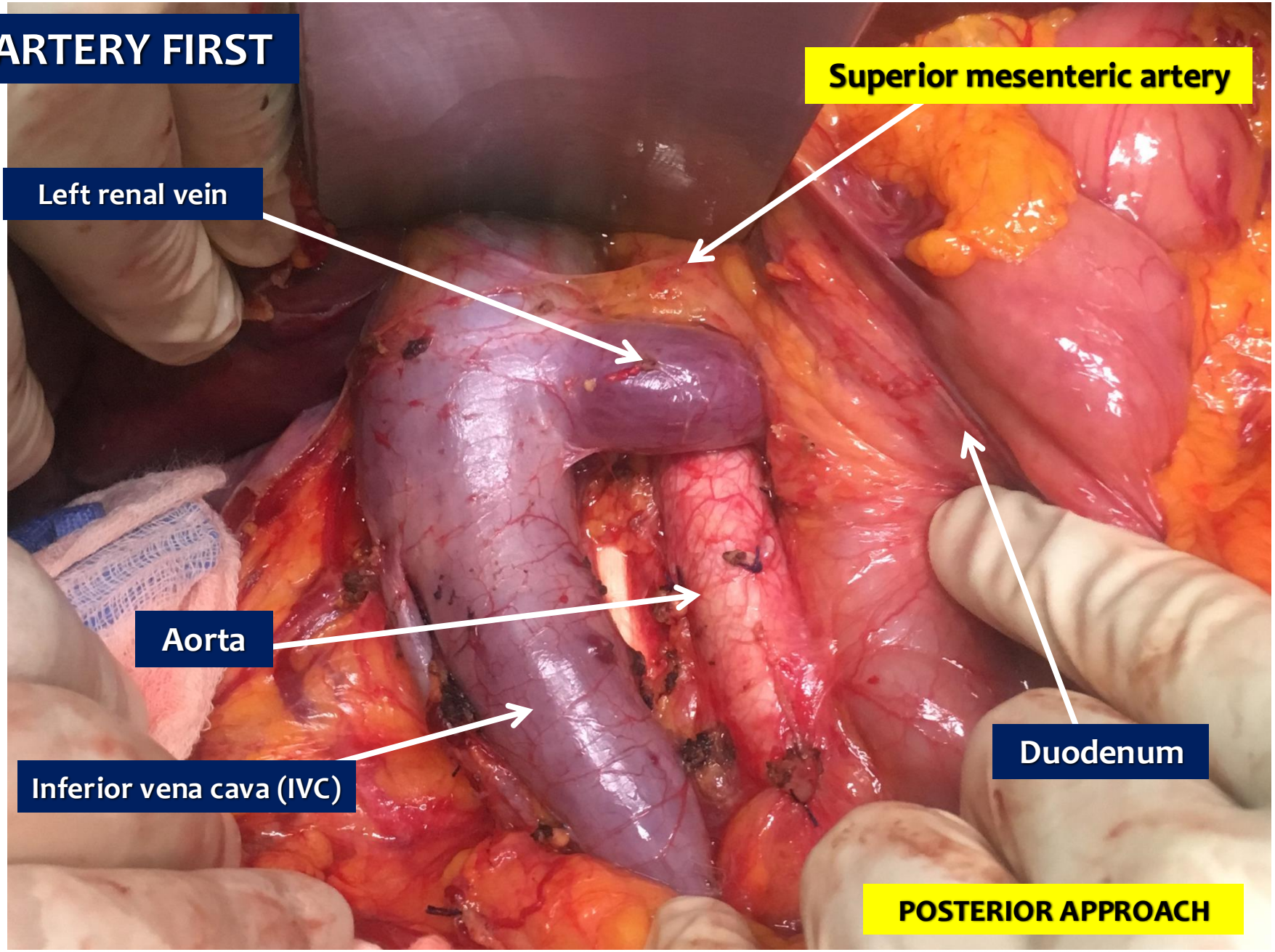

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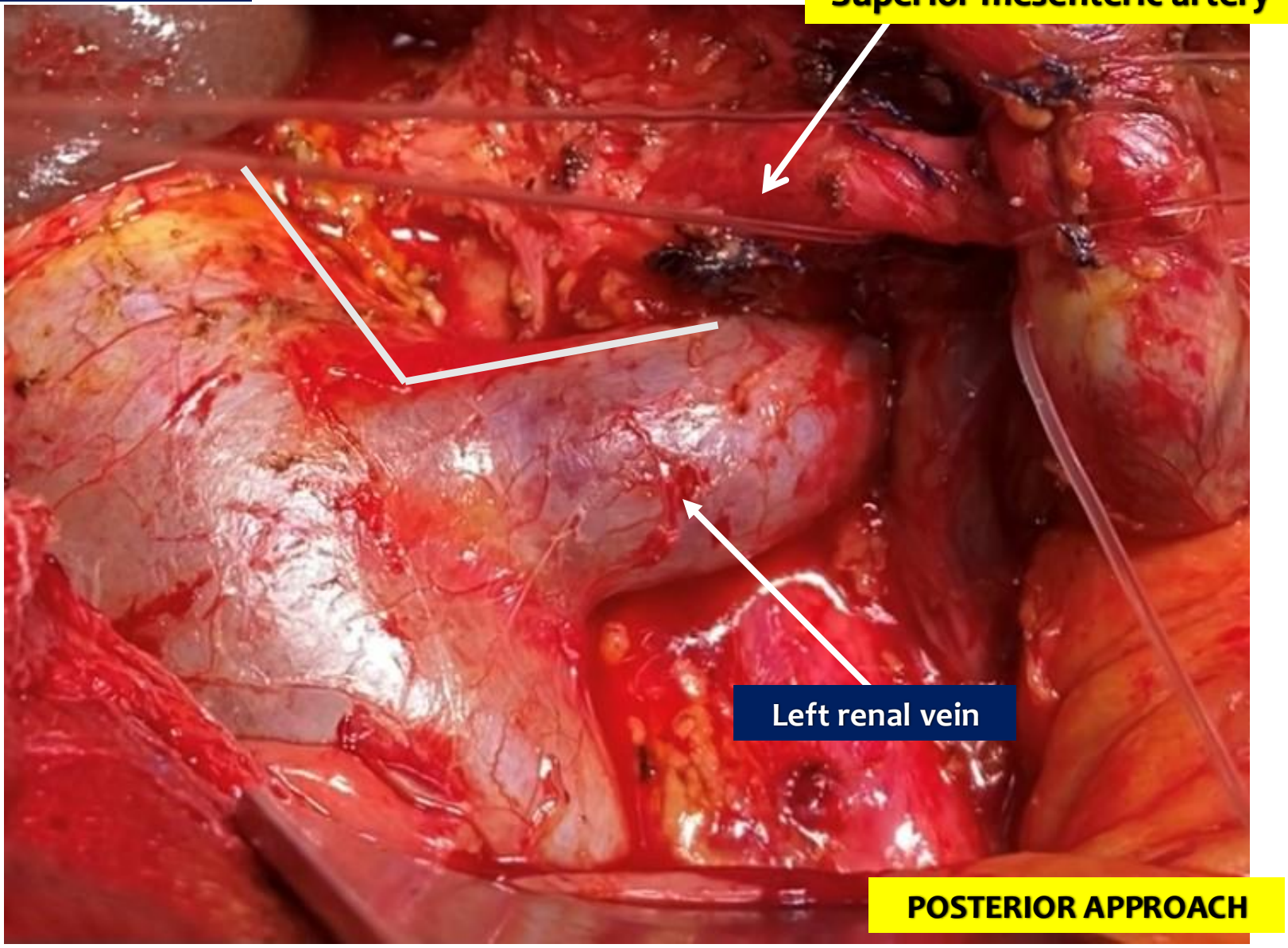

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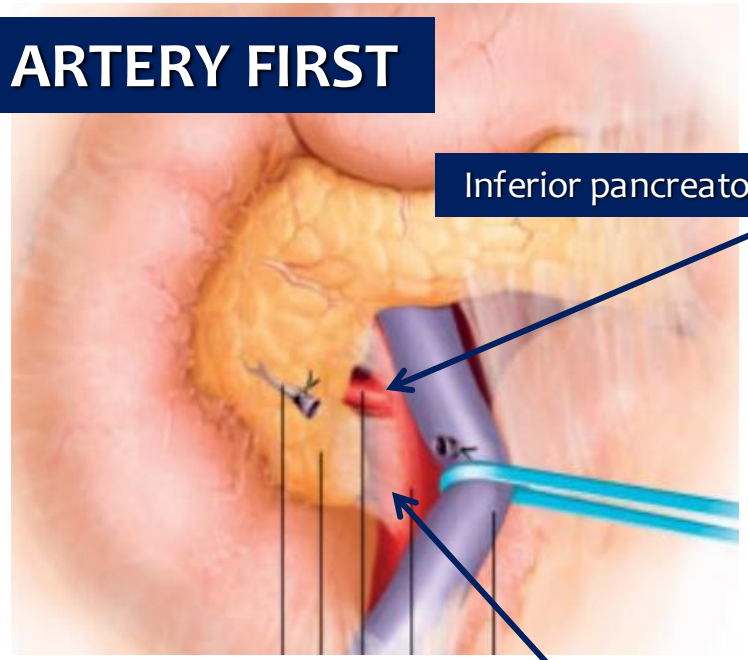
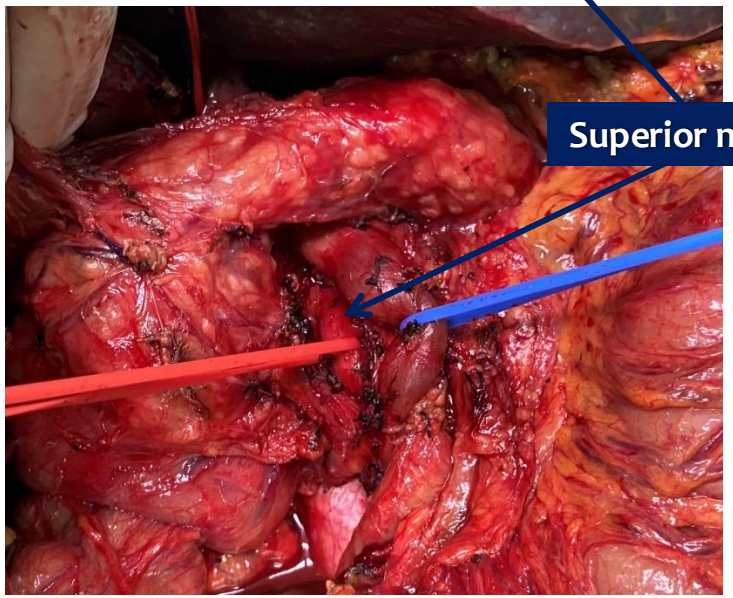
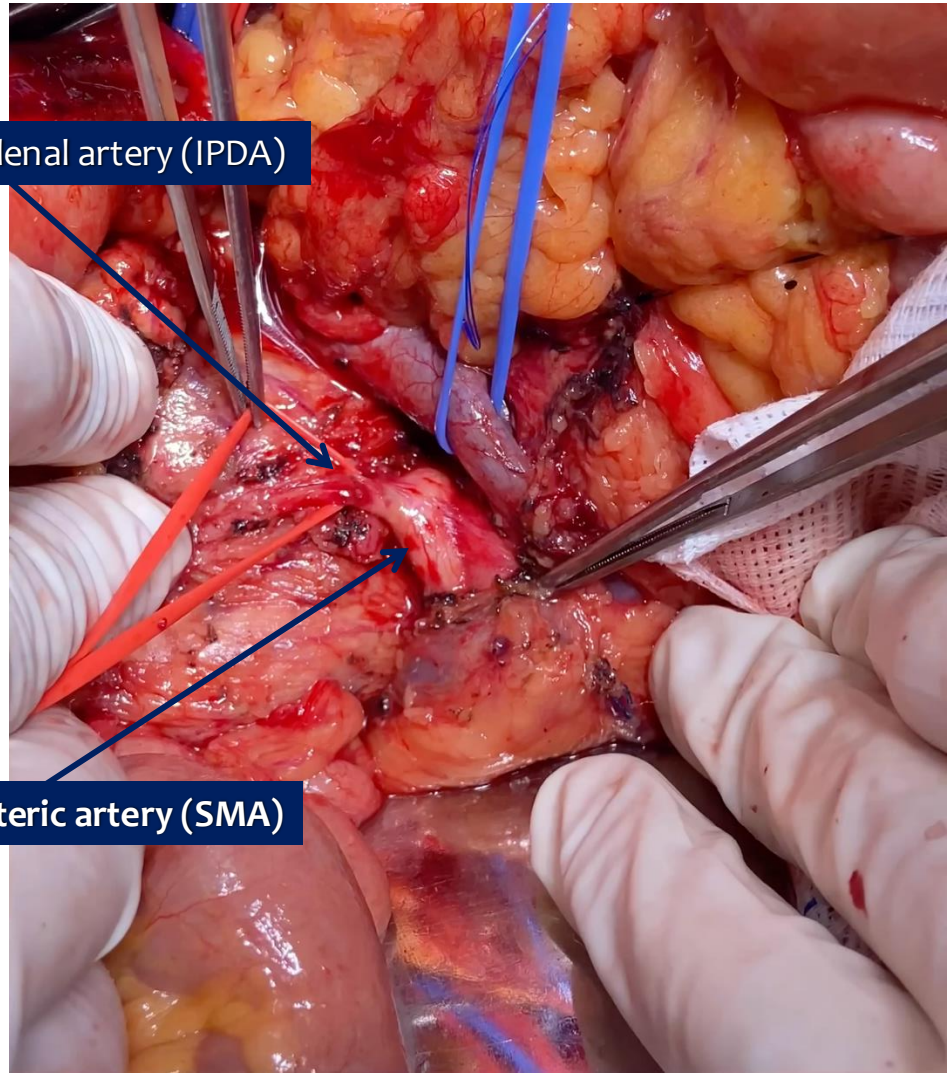


Pandanaboyana S, et al. Br J Surg 2012;99:1027–35



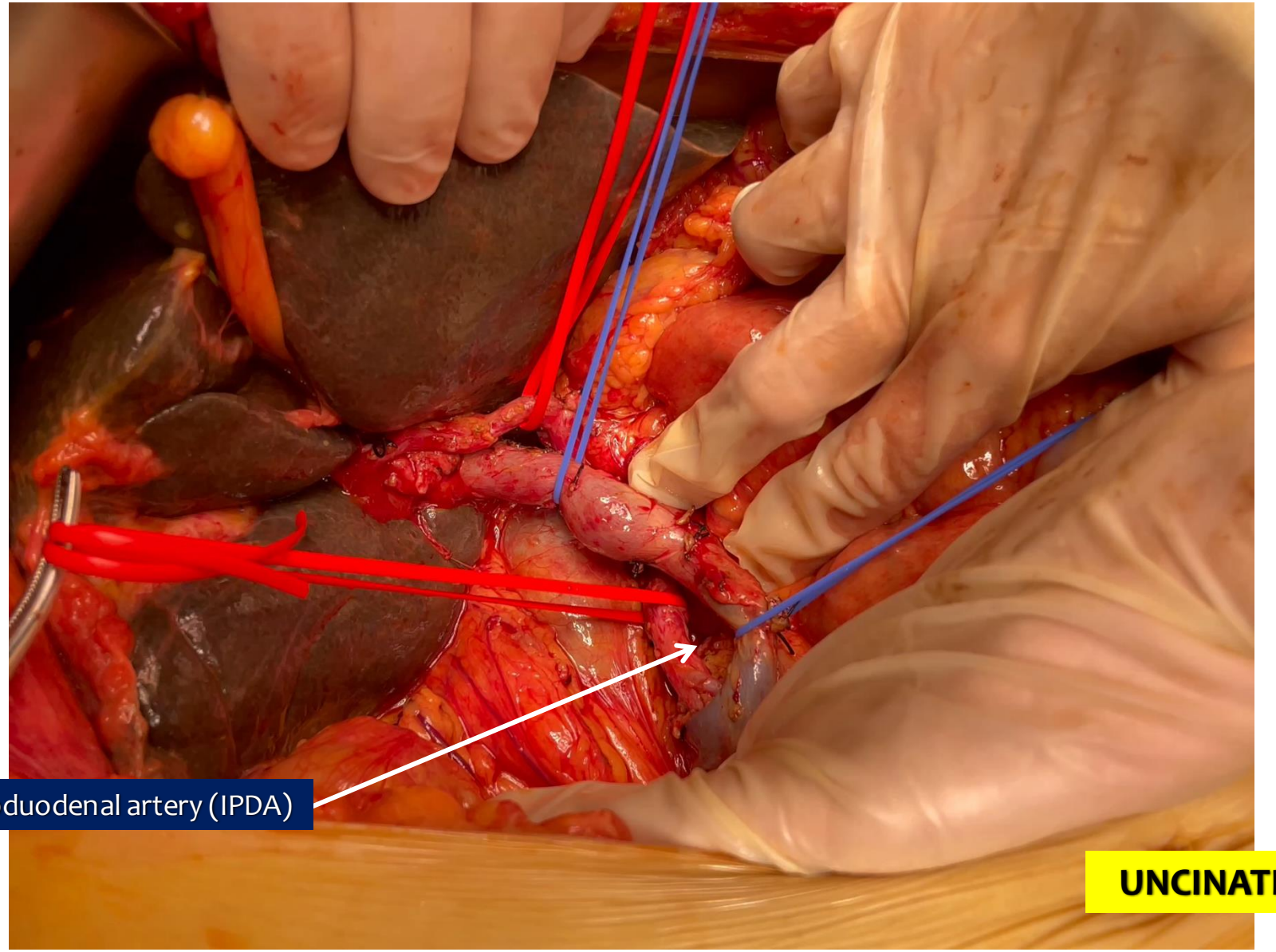
Inferior pancreatoduodenal artery (IPDA)



Superior mesenteric artery (SMA)

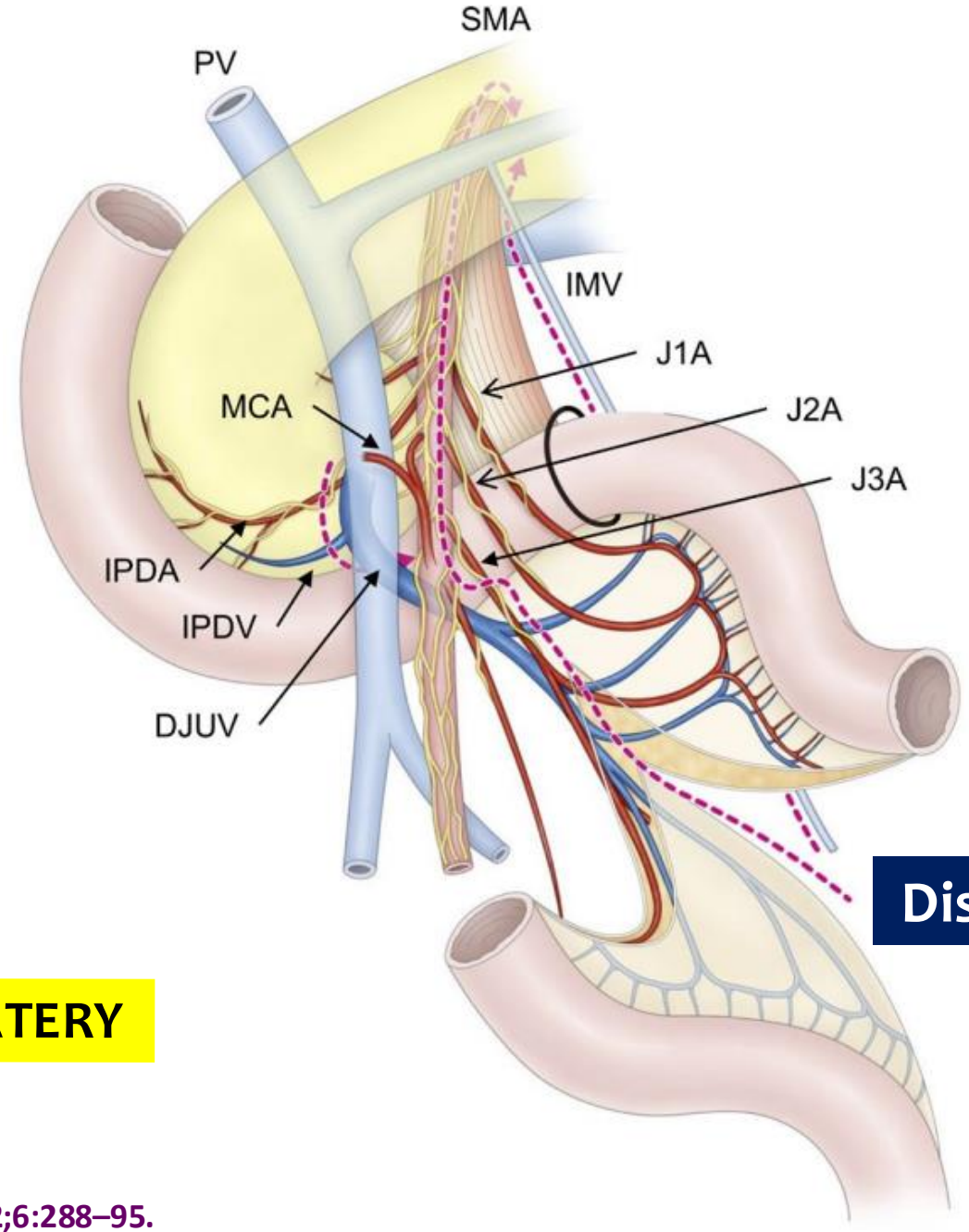
UNCINATE FIRST

ARTERY FIRST



UNCINATE FIRST

MESOPANCREAS

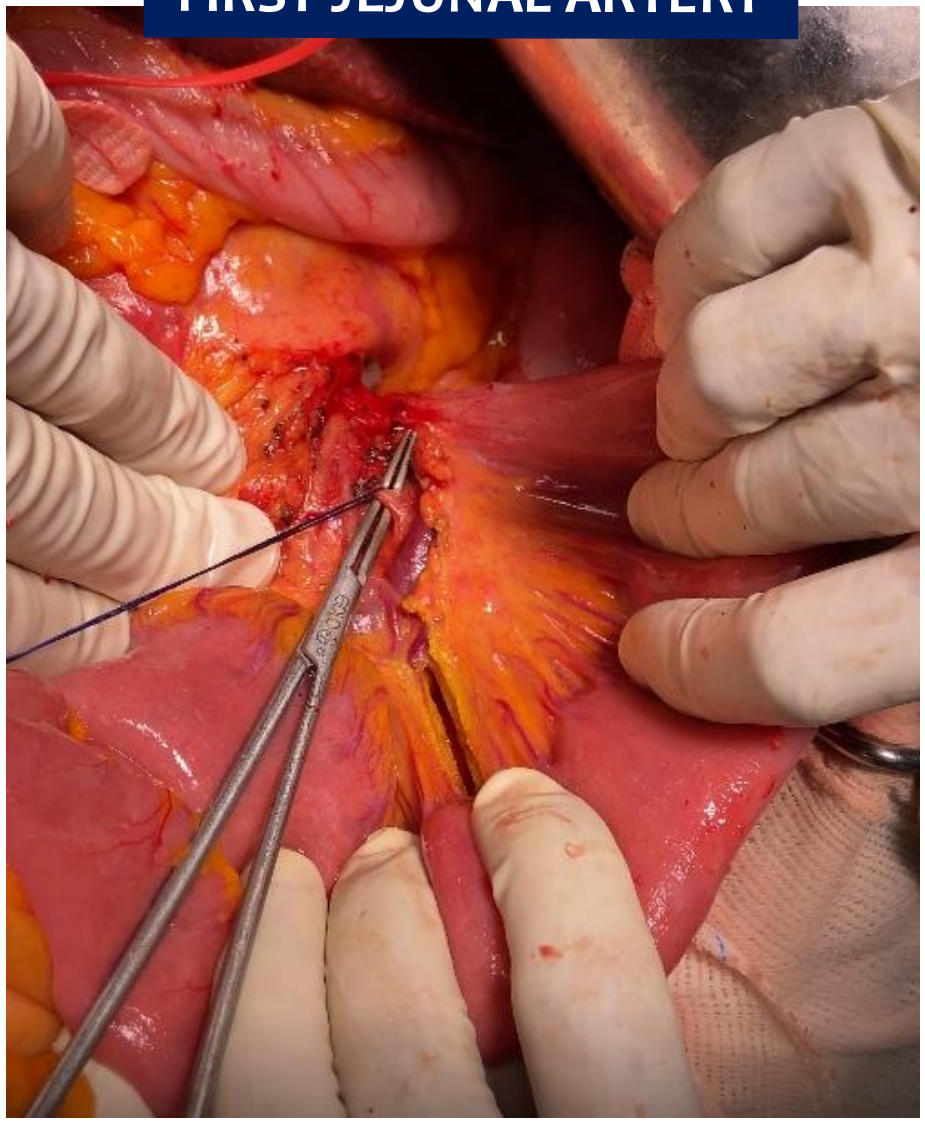


Dissecting line

FIRST JEJUNAL ARTERY

Honjo M, et al. Ann Gastroenterol Surg. 2022;6:288–95.

FIRST JEJUNAL ARTERY



ARTERY FIRST

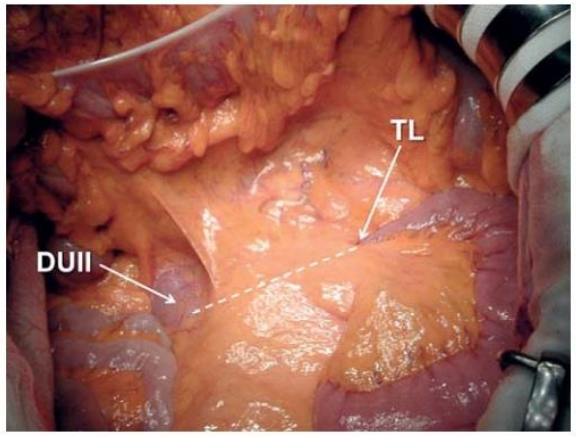
Digestive Surgery

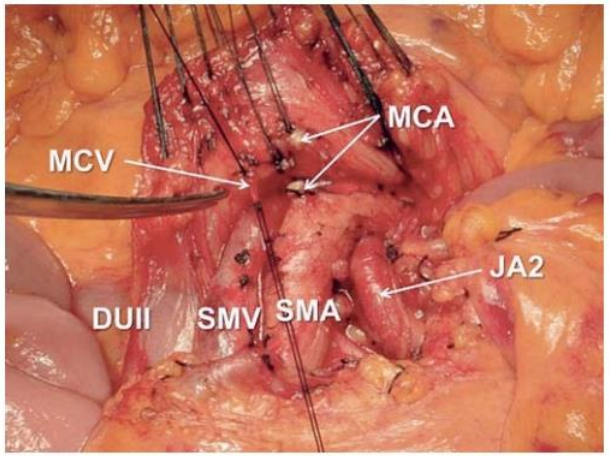
How I Do It

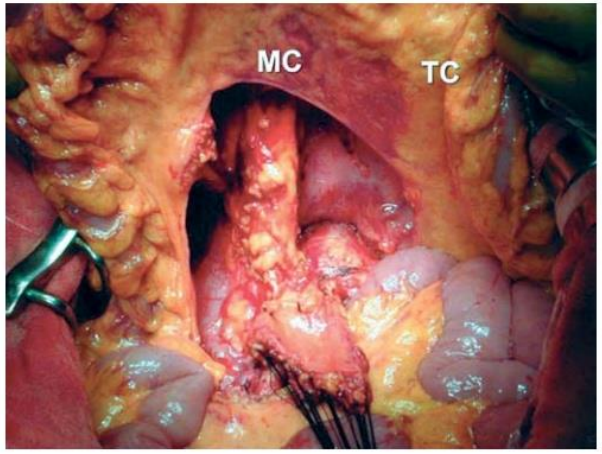
Dig Surg 2016;33:308–313
DOI: 10.1159/000445014

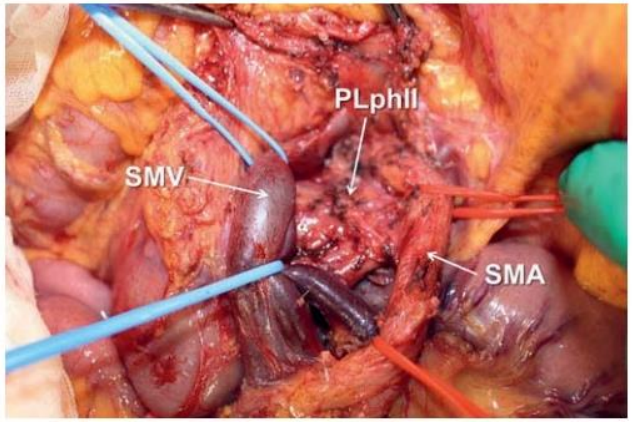
Published online: May 25, 2016

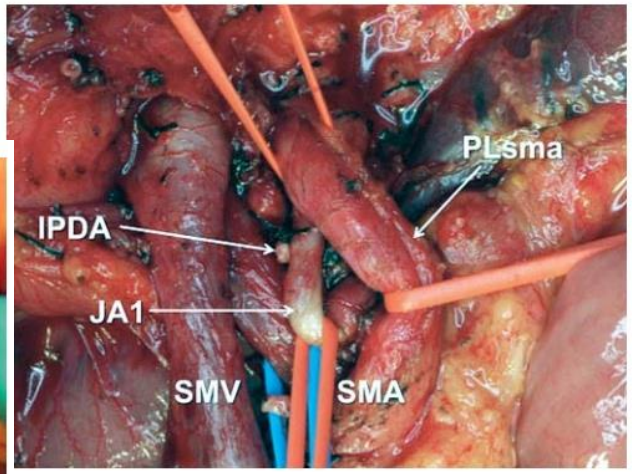
The Mesenteric Approach in Pancreatoduodenectomy











MESENTERIC APPROACH

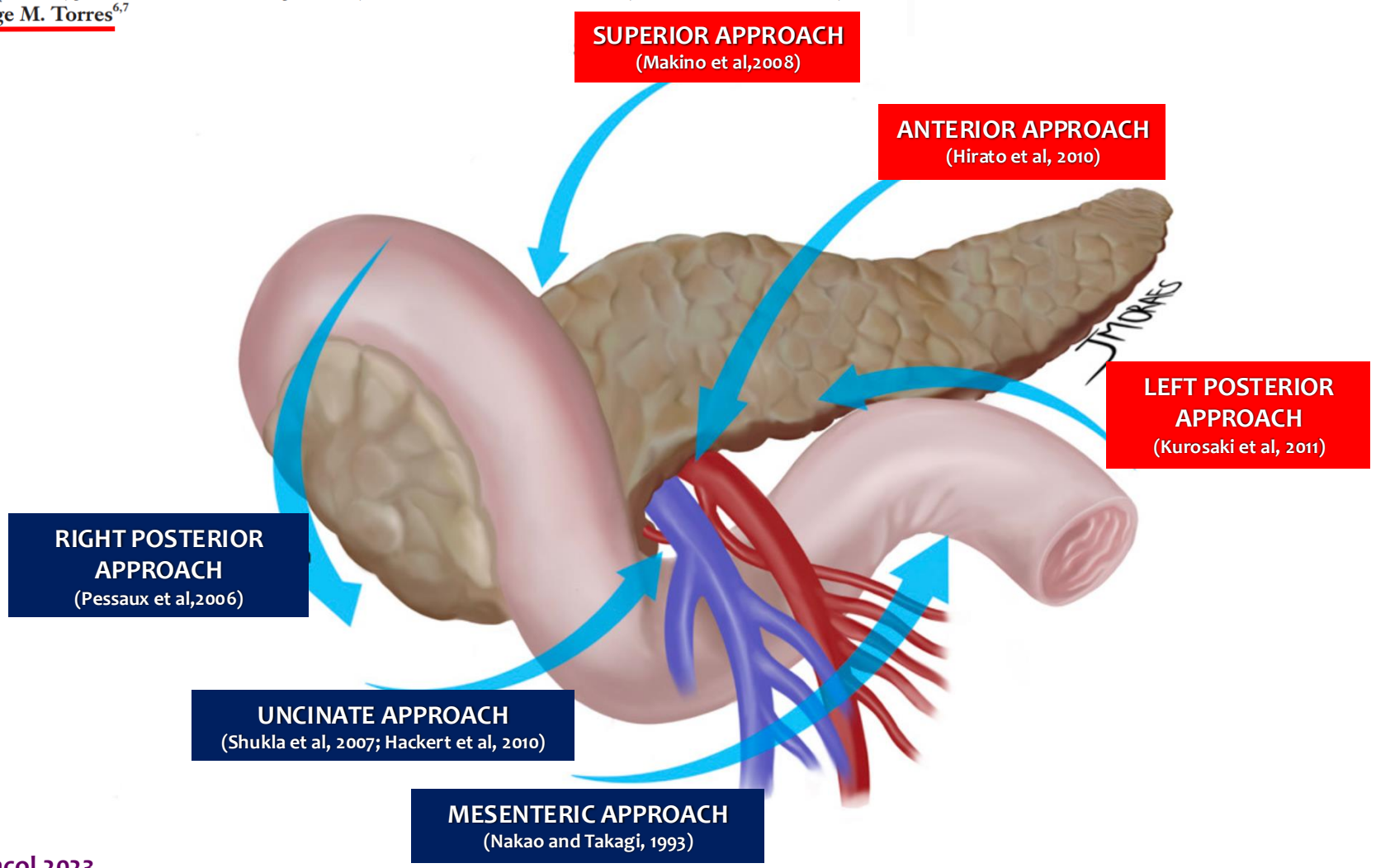
Nakao A, et al. Dig Surg 2016;33:308-13

Review Article

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

Eduardo de Souza M. Fernandes[1,2,3], Felipe Pedreira T. de Mello[1,2], Eduardo Pinho Braga[1], Gabrielle Oliveira de Souza[1], Ronaldo Andrade[1,2], Leandro Savattone Pimentel[1,2], Camila Liberato Girão[1,2], Munique Siqueira[1,2], José Maria A. Moraes-Junior[6,7], Romulo Varella de Oliveira[4], Nicolas Goldaracena[5], Orlando Jorge M. Torres[6,7]

ARTERY FIRST



Fernandes ESM, et al. J Gastrointest Oncol 2023

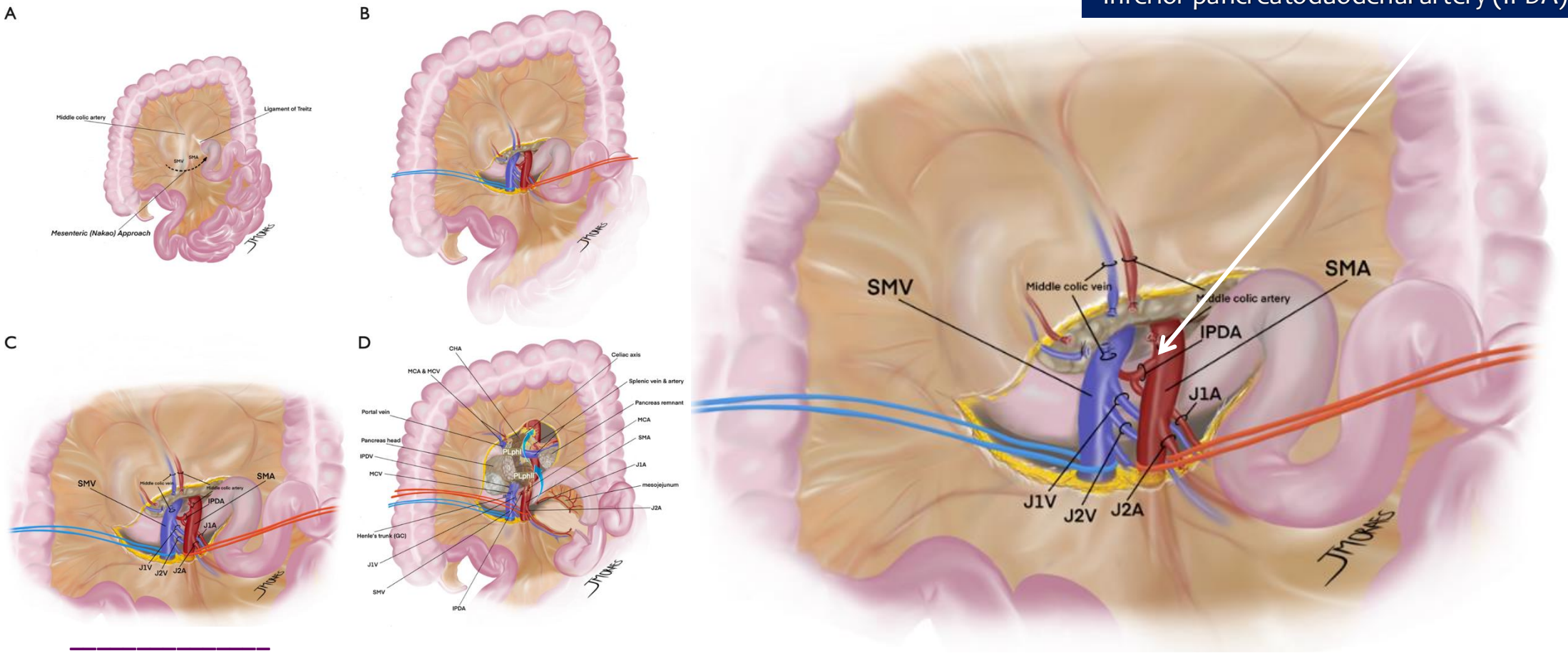
Review Article

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

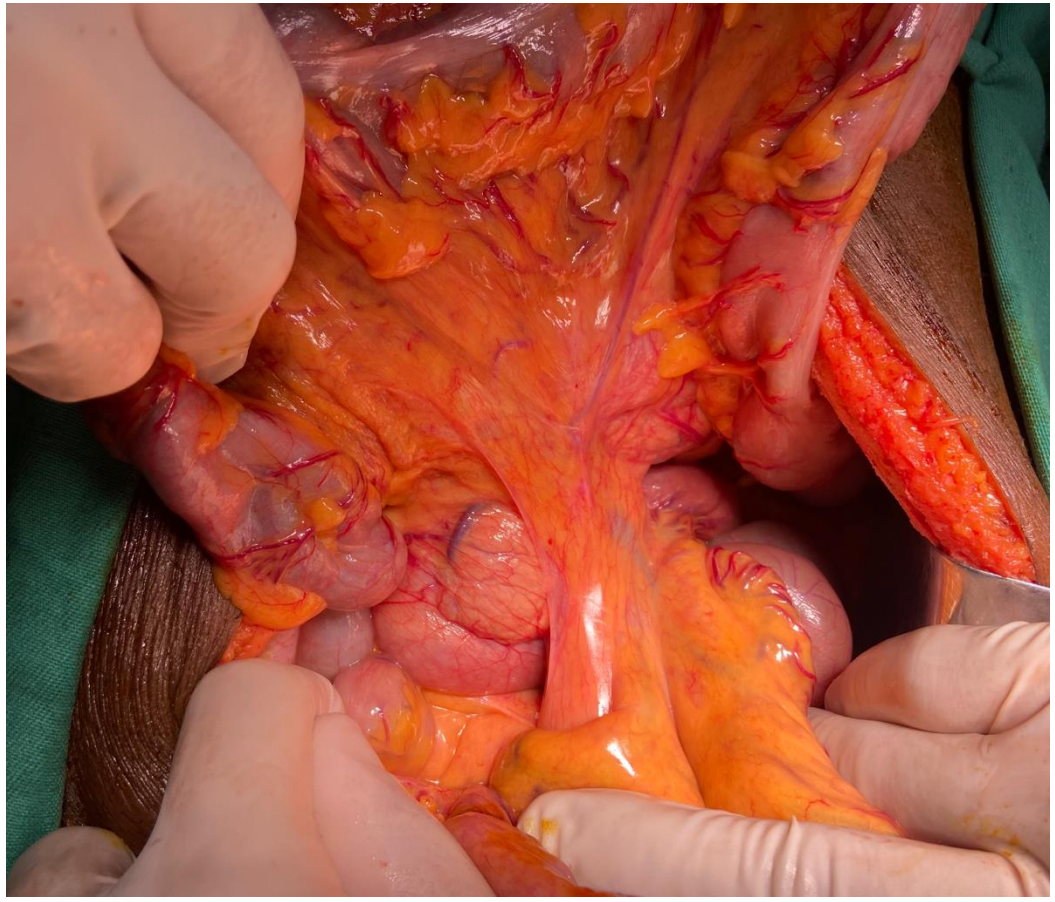
MESENTERIC APPROACH

Eduardo de Souza M. Fernandes[1,2,3], Felipe Pedreira T. de Mello[1,2], Eduardo Pinho Braga[1], Gabrielle Oliveira de Souza[1], Ronaldo Andrade[1,2], Leandro Savattone Pimentel[1,2], Camila Liberato Girão[1,2], Munique Siqueira[1,2], José Maria A. Moraes-Junior[6,7], Romulo Varella de Oliveira[4], Nicolas Goldaracena[5], Orlando Jorge M. Torres[6,7]

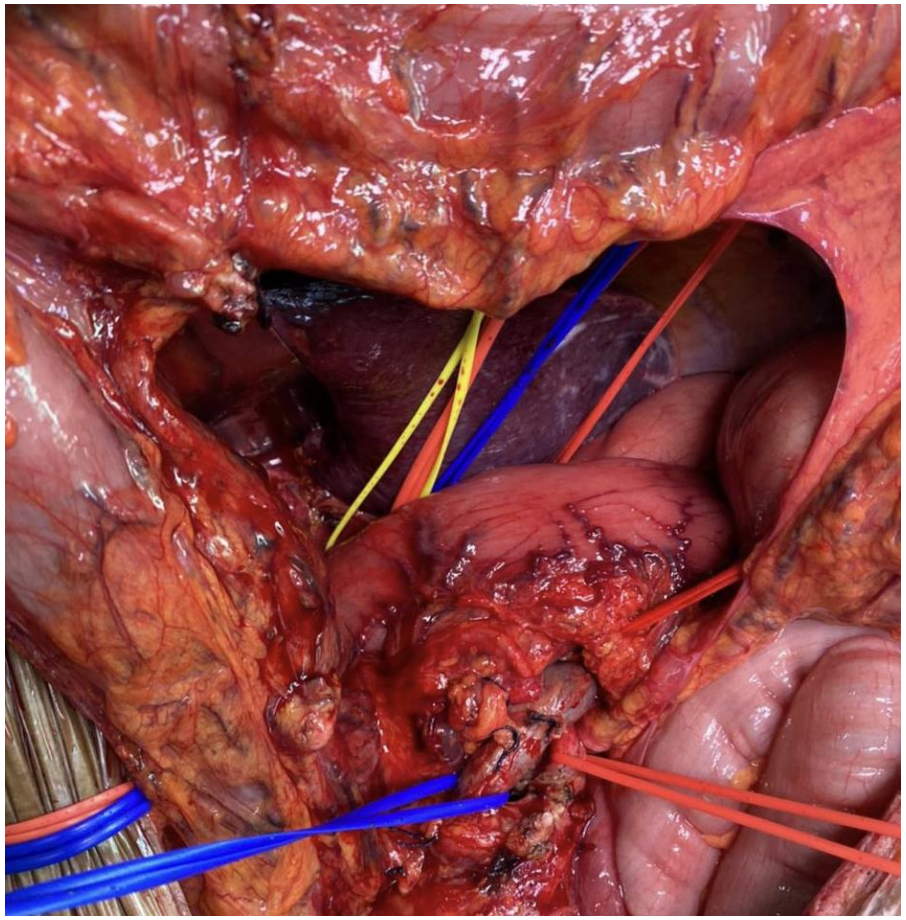
Inferior pancreatoduodenal artery (IPDA)



Fernandes ESM, et al. J Gastrointest Oncol 2023

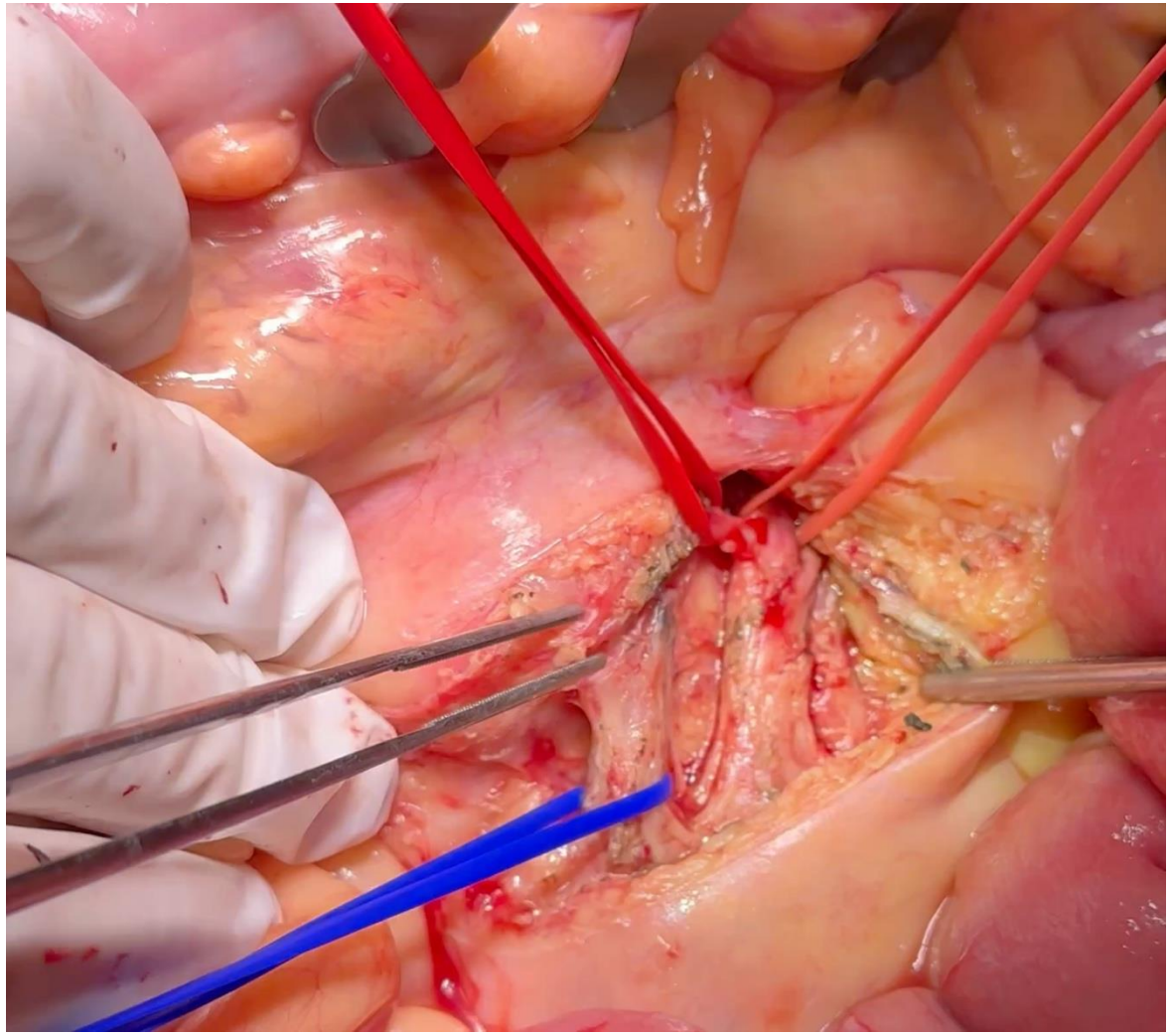


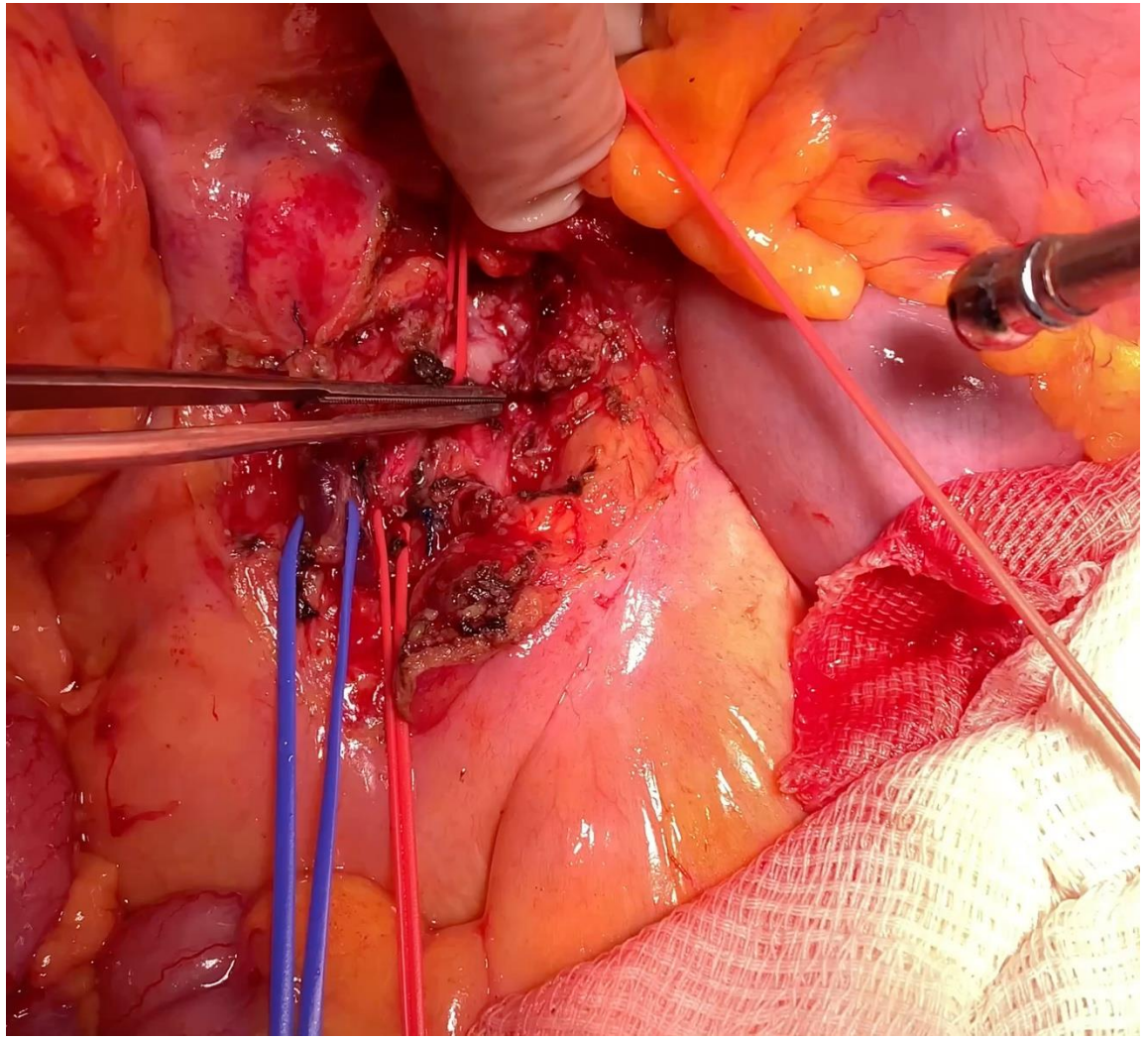
Infracolic approach



MESENTERIC APPROACH

MESENTERIC APPROACH





Infracolic approach

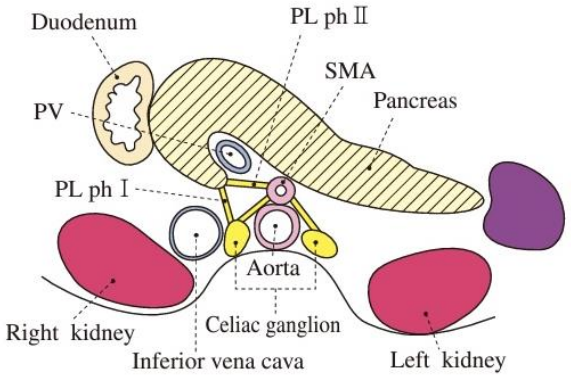


Fig. 3a Pancreatic nerve plexuses (cross-sectional diagram)

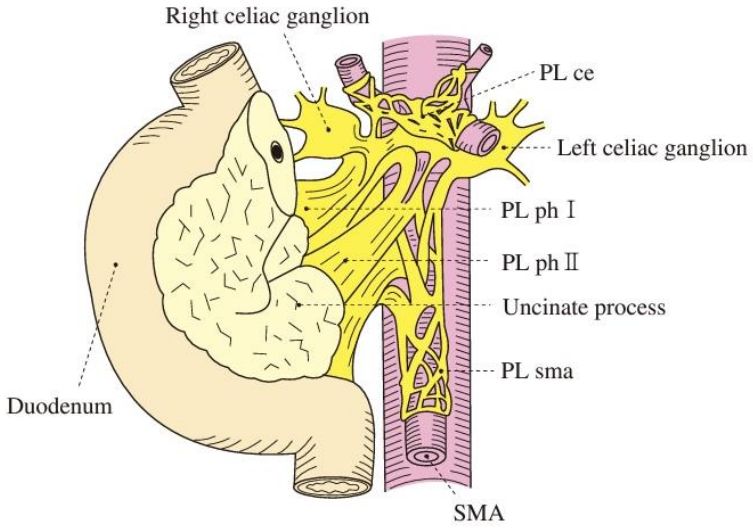
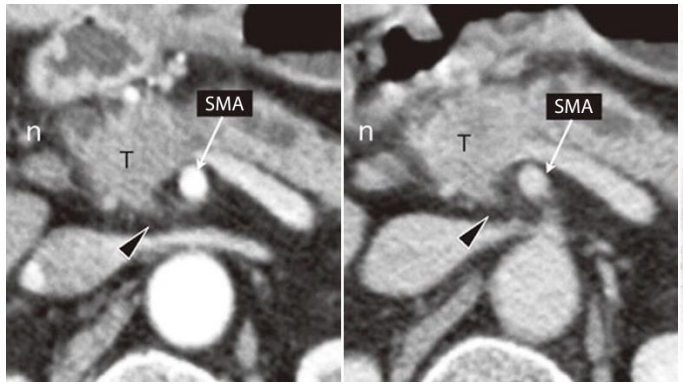
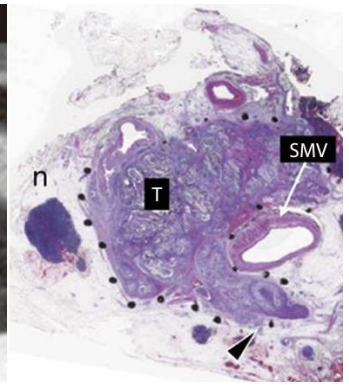


Fig. 3b Extrapancreatic nerve plexuses

PLph I: pancreatic head nerve plexus I
PLsma: superior mesenteric nerve plexus
PLhdl: hepatoduodenal ligament nerve plexus
PLce: celiac plexus

PLph II: pancreatic head nerve plexus II
PLcha: common hepatic artery nerve plexus
PLspa: splenic artery nerve plexus





膵癌取扱い規約（英語版 第4版）
［膵癌取扱い規約 第7版 準拠］

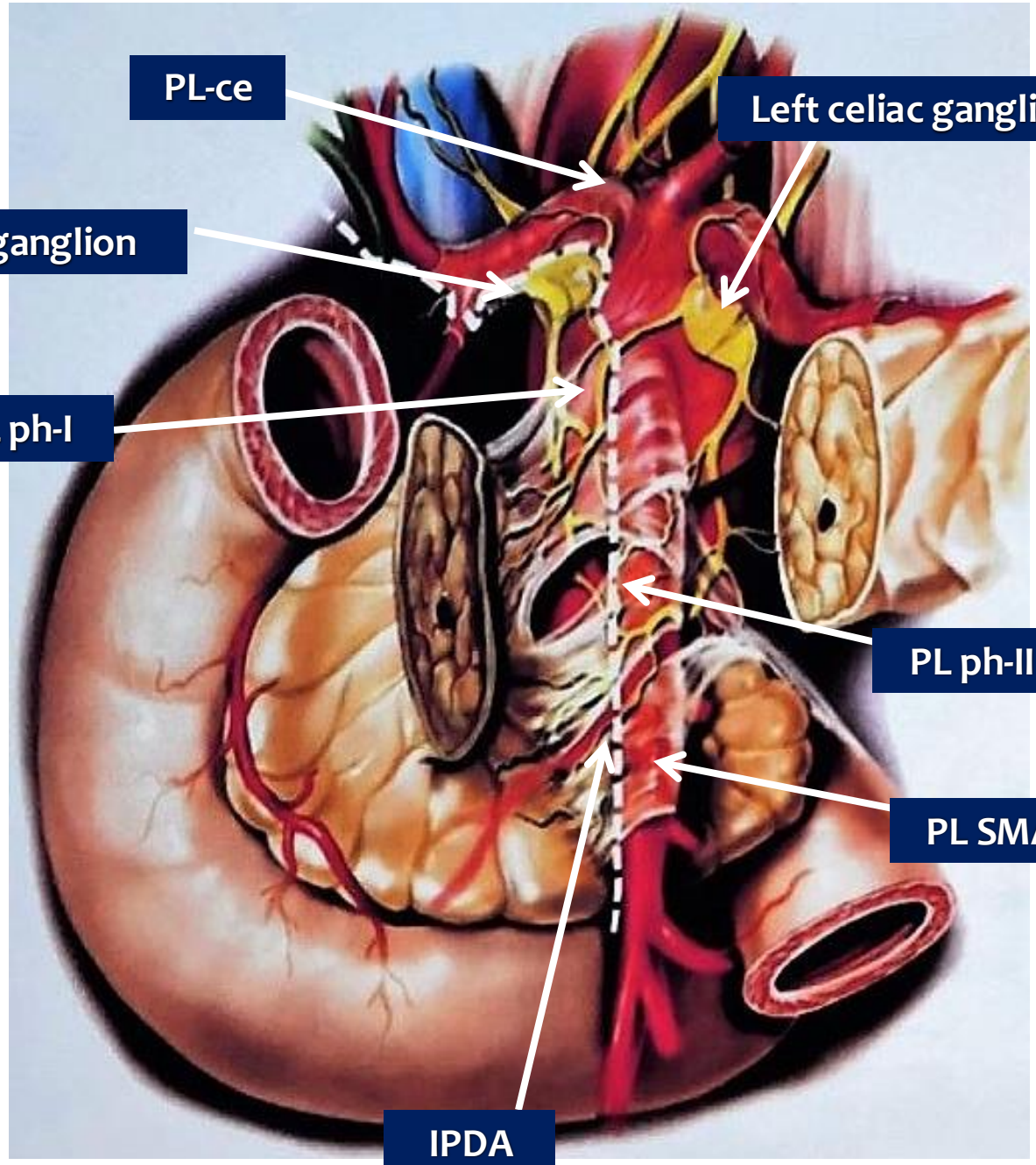
Classification of Pancreatic Carcinoma

Japan Pancreas Society
Fourth English Edition

Kanehara & Co., Ltd.

Japan Pancreas Society – Fourth English Edition, 2017

TOTAL MESOPANCREAS EXCISION



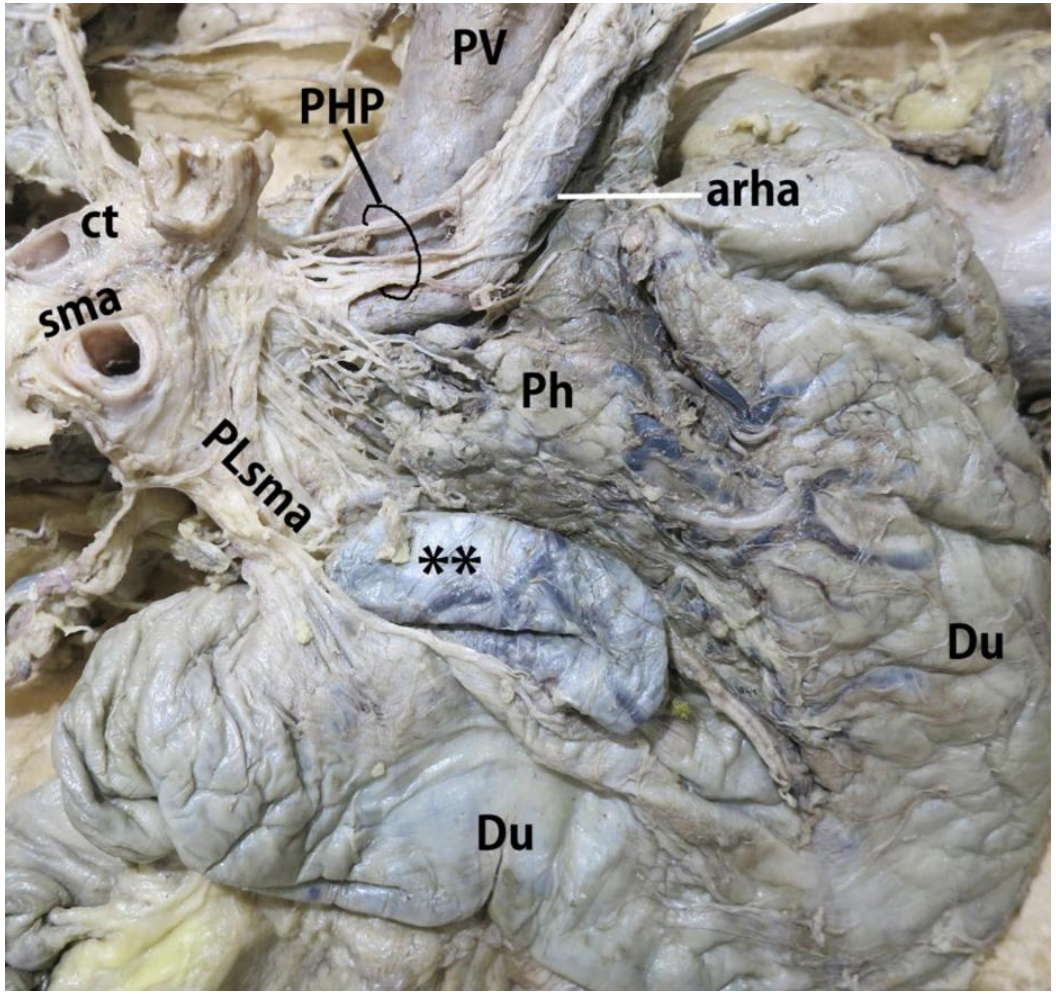
MESOPANCREAS

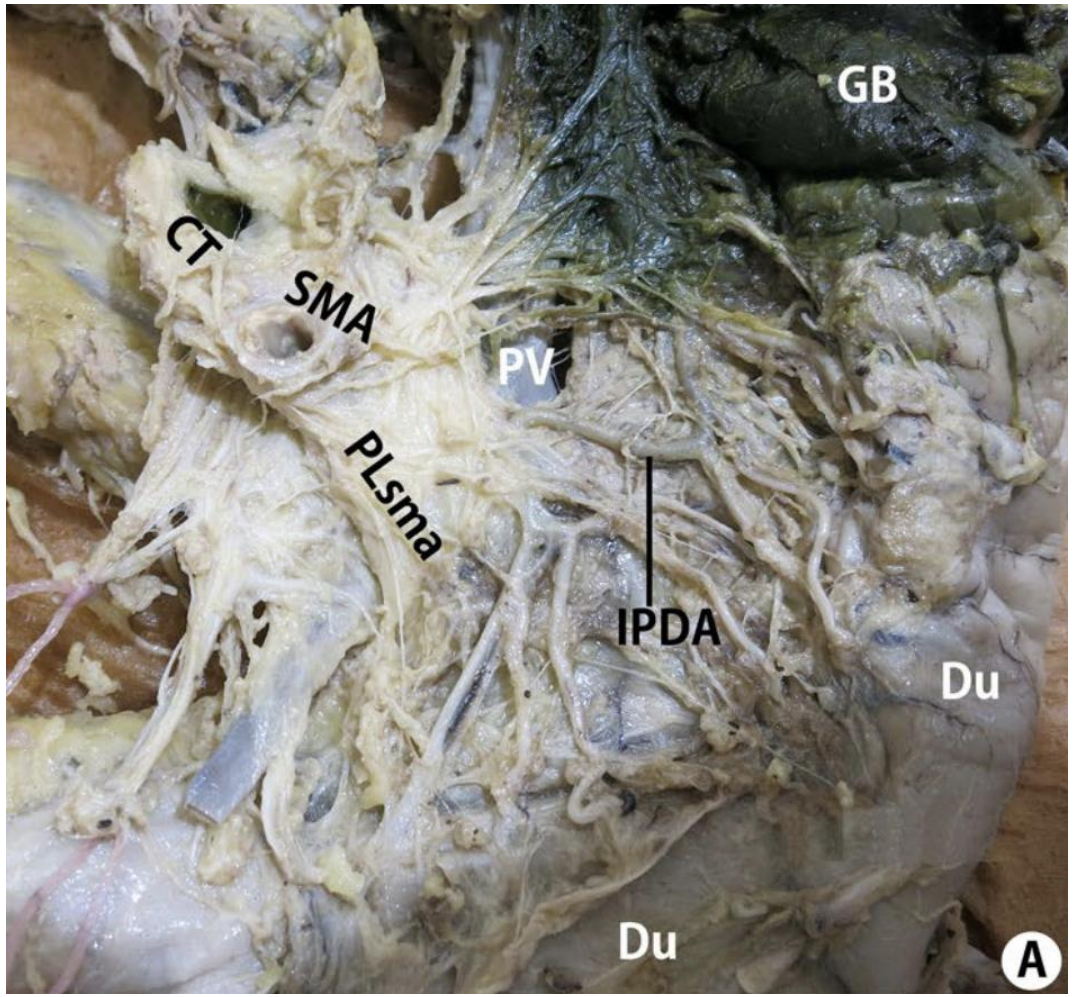
- ❑ plPh-I
- ❑ plPh-II
- ❑ IPDA
- ❑ Jejunal arteries
- ❑ Jejunal veins
- ❑ Lymph nodes

Surgical and Radiologic Anatomy (2020) 42:1501–1508
https://doi.org/10.1007/s00276-020-02547-y

ORIGINAL ARTICLE

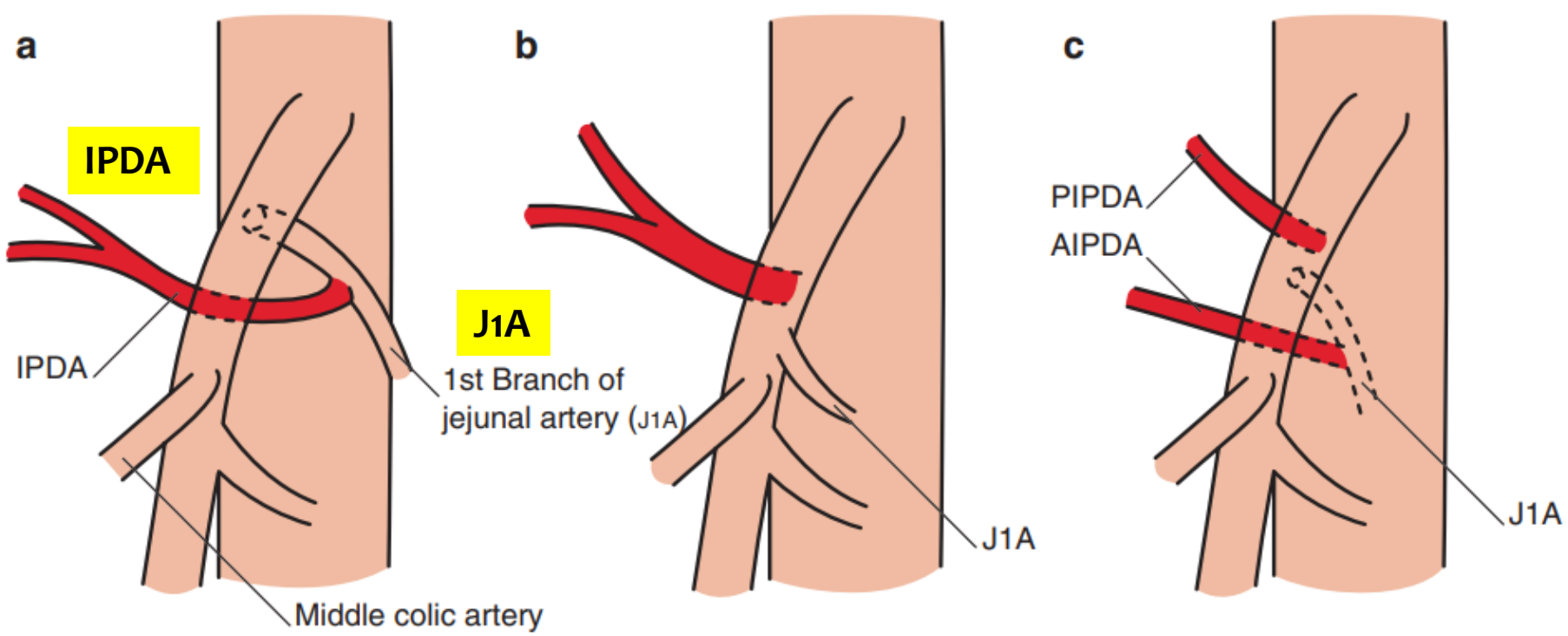
The mesopancreas and pancreatic head plexus: morphological, developmental, and clinical perspectives

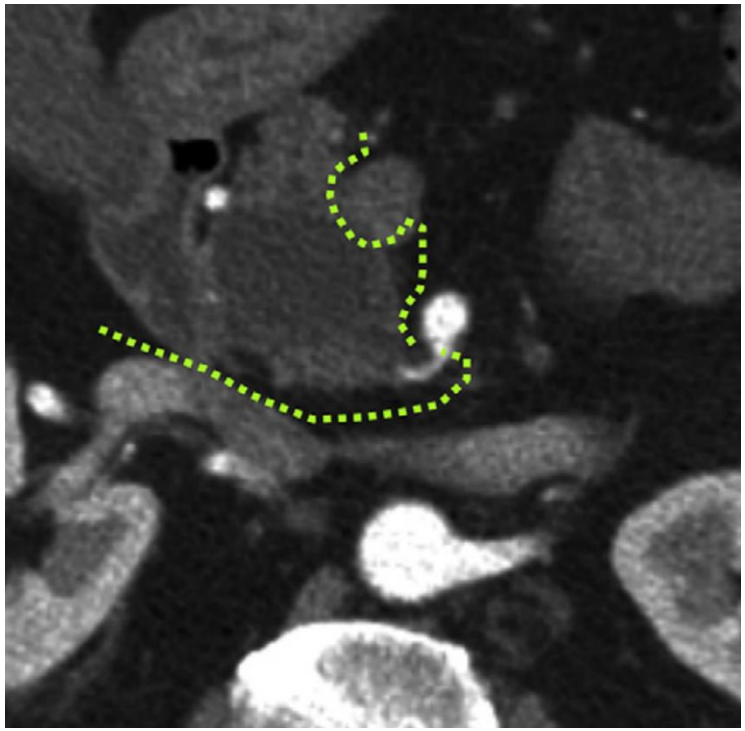




ARTERIES

INFERIOR PANCREATODUODENAL ARTERY (IPDA)

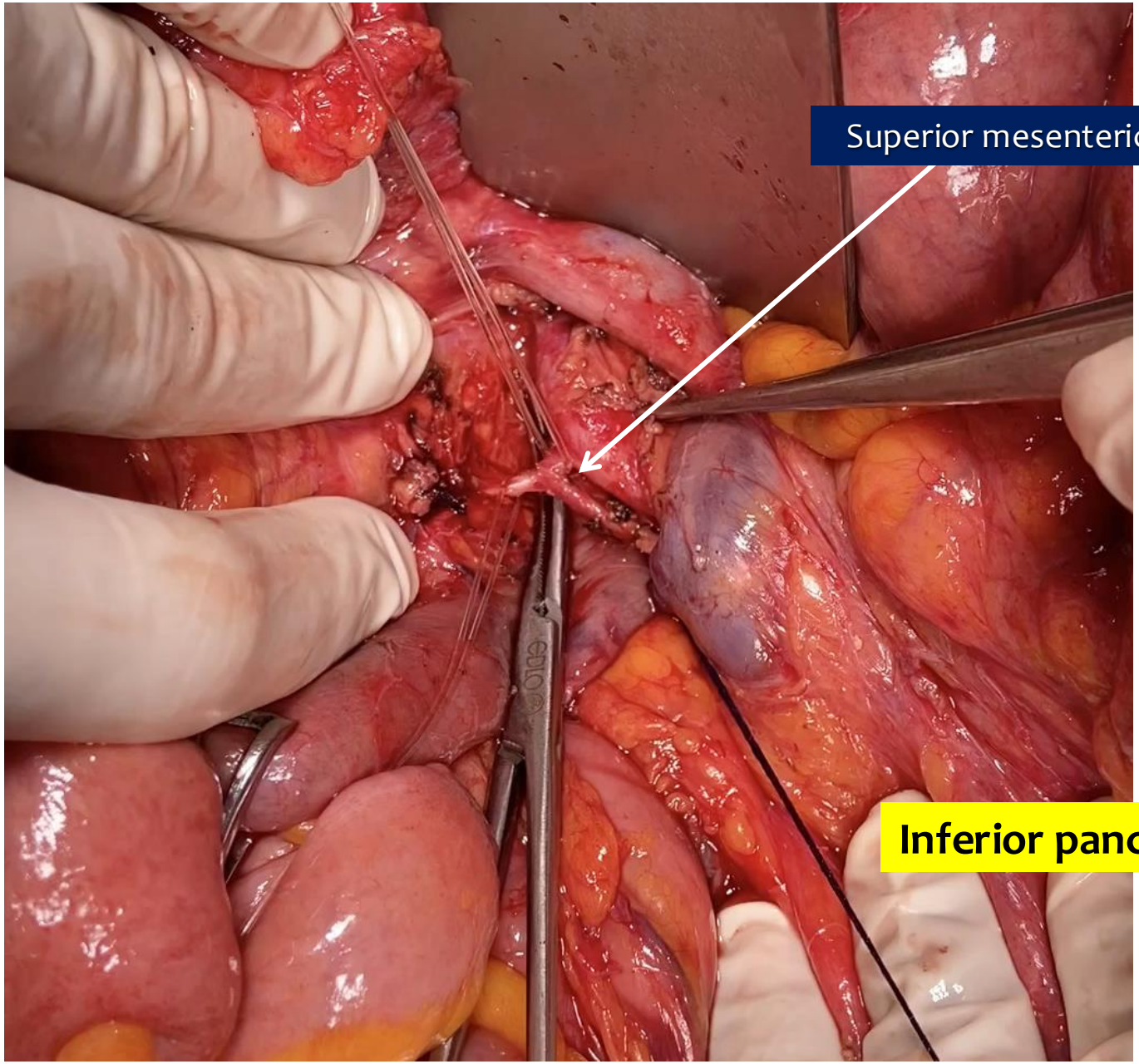




Common trunk

EPICENTRO DA DUODENOPANCREATECTOMIA

IPDA



UNCINATE FIRST

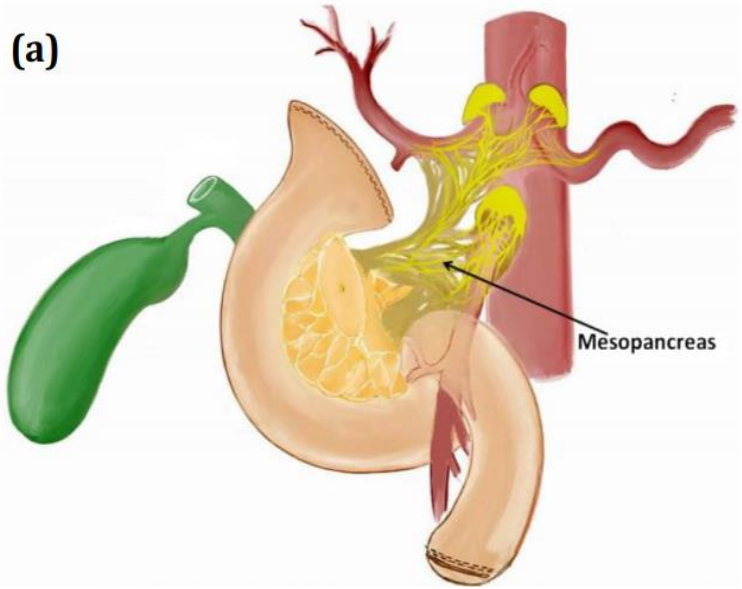
Inferior pancreatoduodenal artery

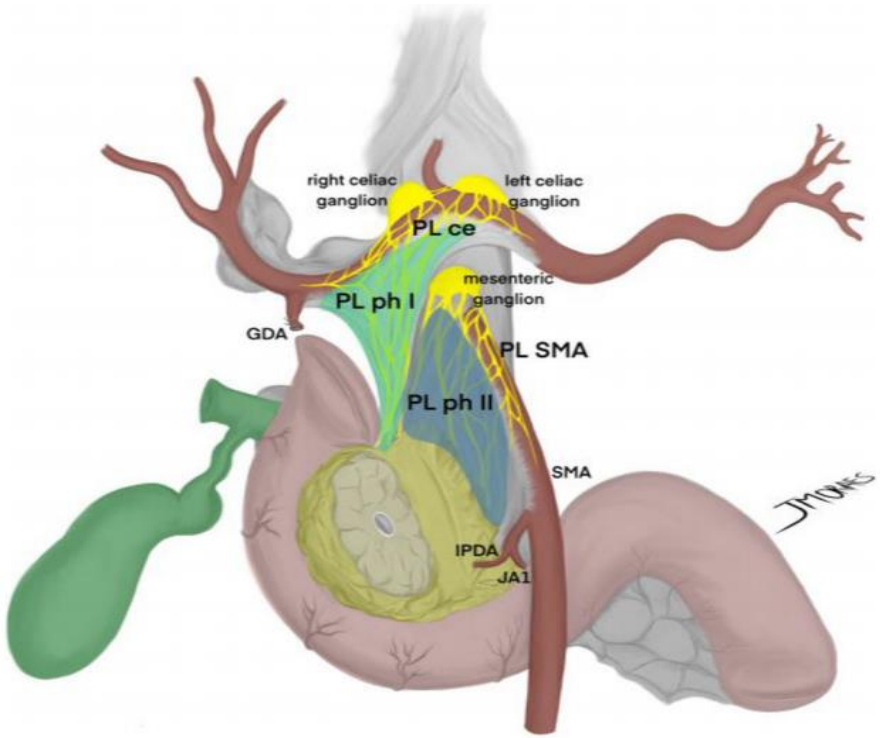
Langenbeck's Archives of Surgery
https://doi.org/10.1007/s00423-021-02211-y

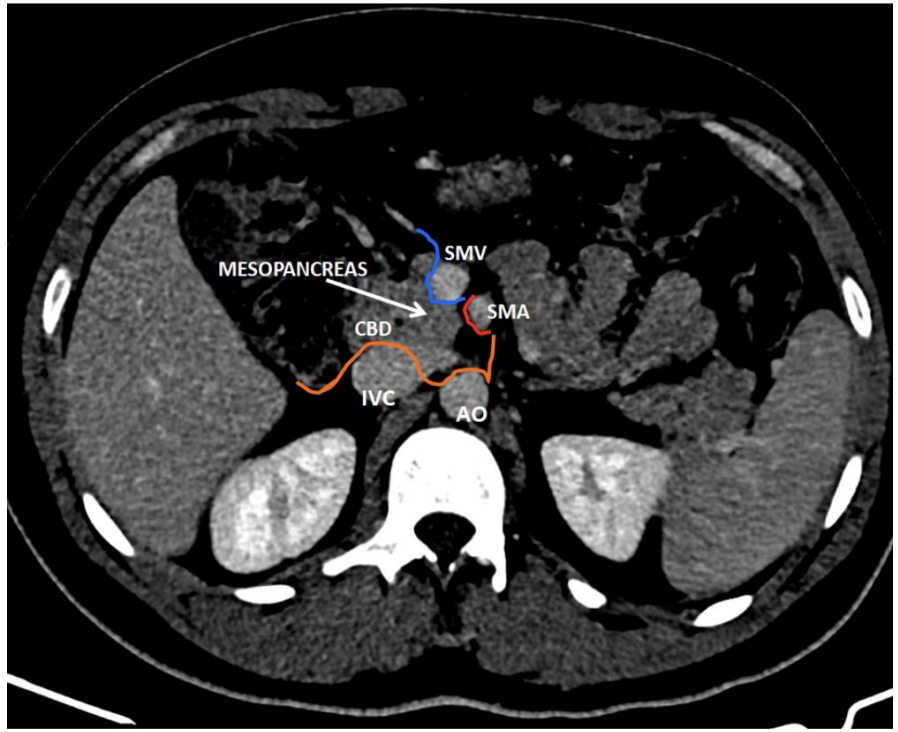
REVIEW ARTICLE

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)

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

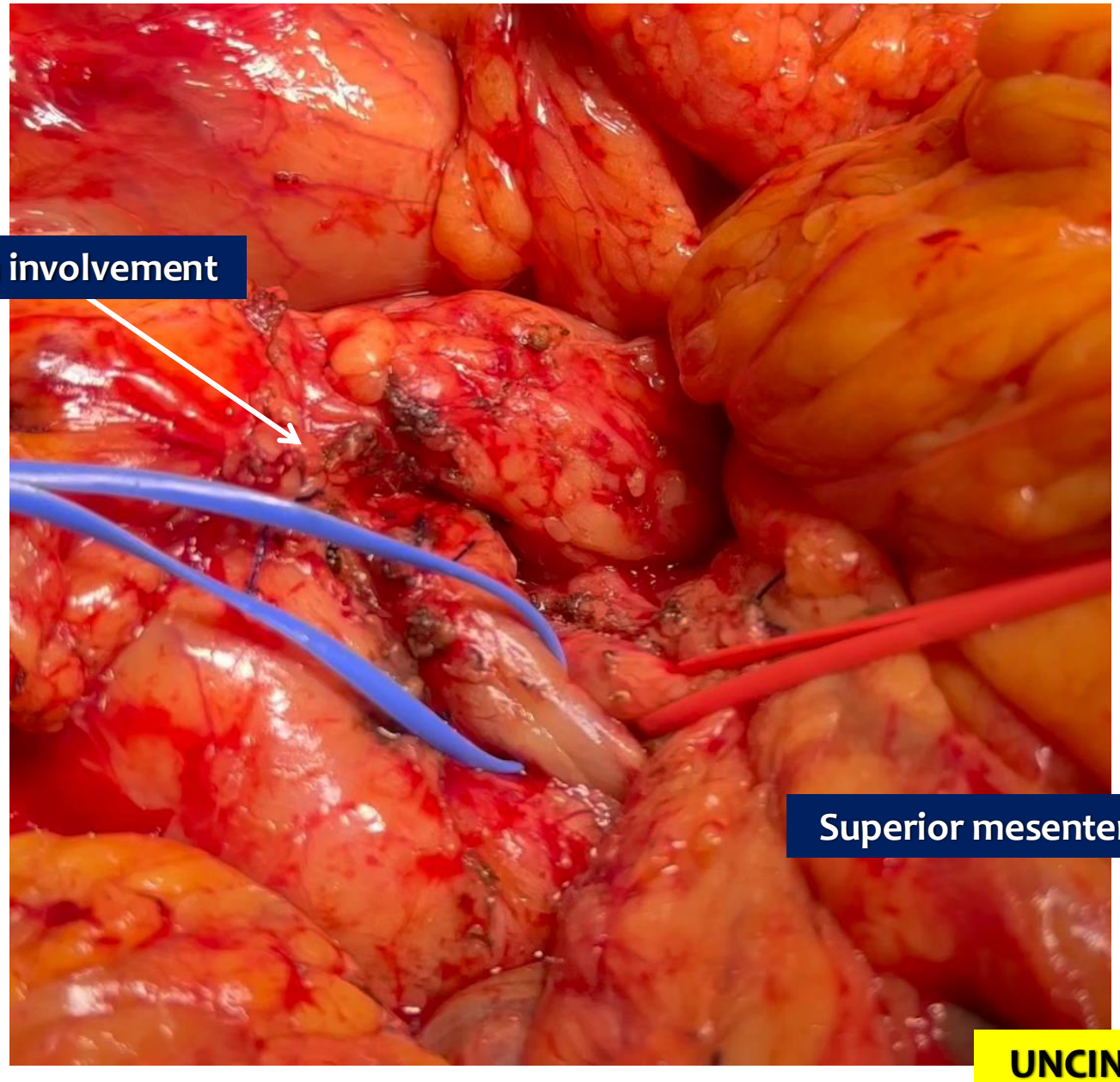
ADVANTAGES OF ARTERY FIRST APPROACH

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)

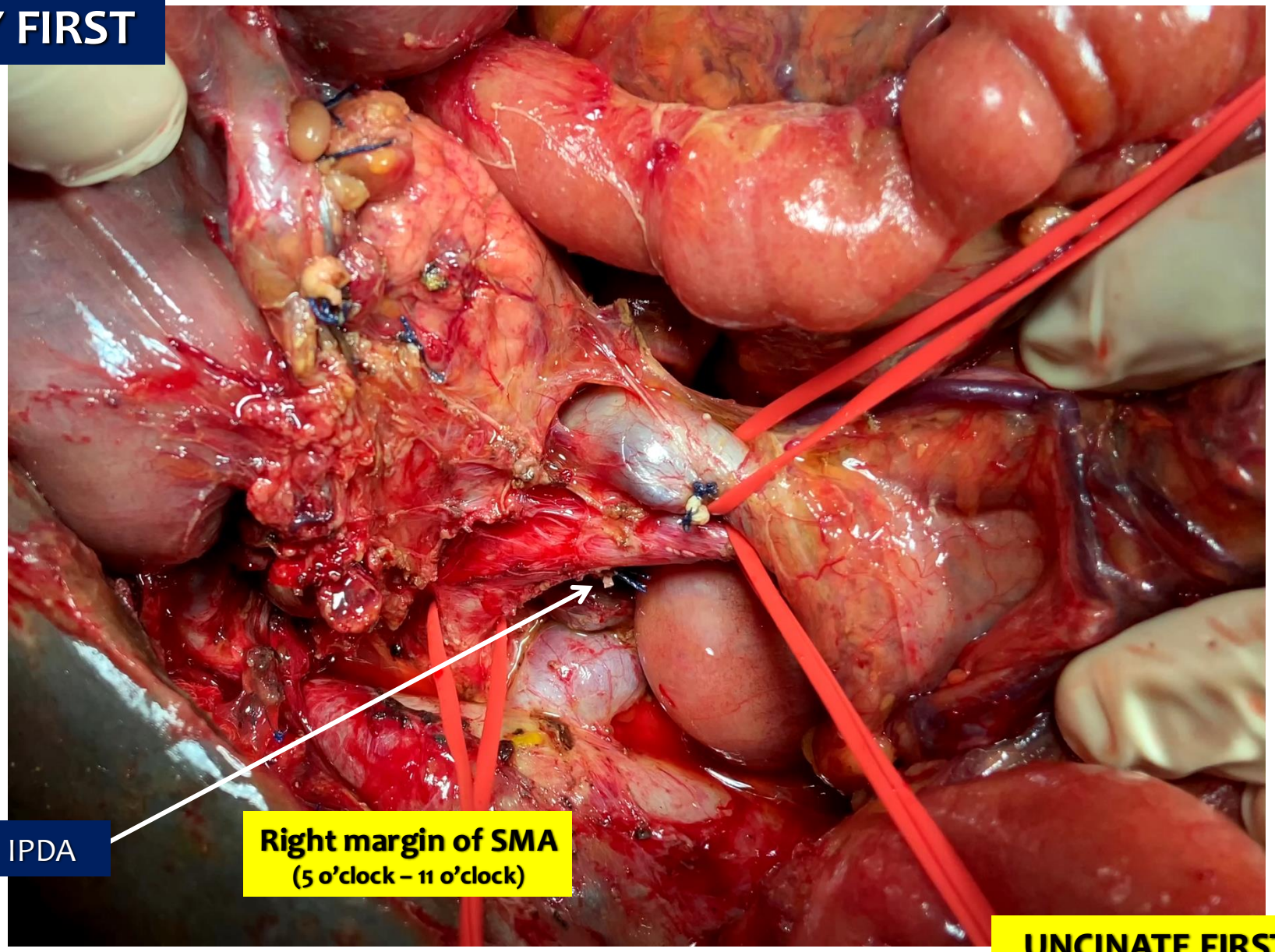
Superior mesenteric artery

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



UNCINATE FIRST

ARTERY FIRST



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ARTERY FIRST

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

ARTERY FIRST

International Journal of Surgery 73 (2020) 14–24

Contents lists available at ScienceDirect

International Journal of Surgery

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

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

Jiang X, et al. Int J Surg 2020;73:14-24

ARTERY FIRST

.1007/s00268-020-05856-w

World Journal of Surgery

ORIGINAL SCIENTIFIC REPORT

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

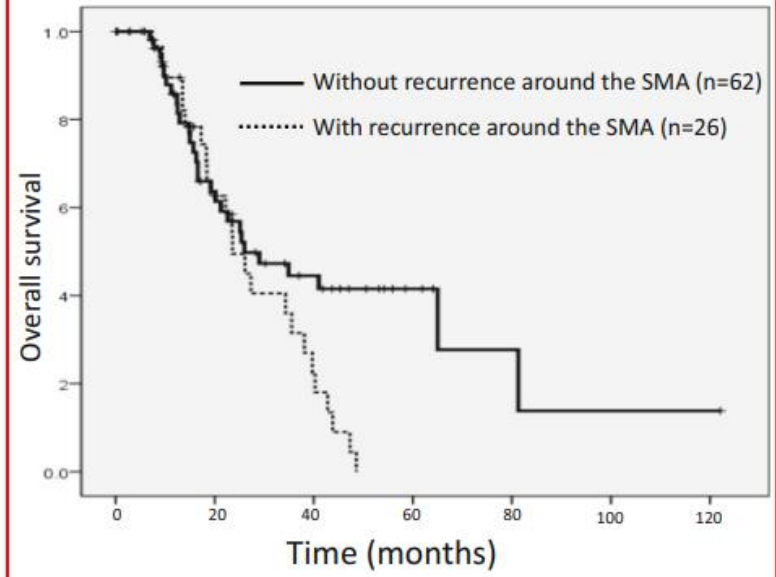

Fig. 1 Overall survival according to recurrence around the SMA. The median survival was 23.6 months in patients with recurrence around the SMA and 26 months in patients without recurrence around the SMA (p = 0.0367) SMA: superior mesenteric artery

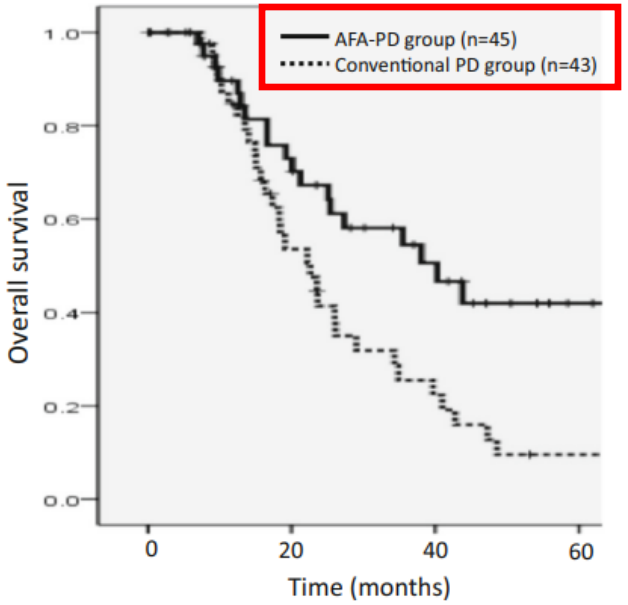

Fig. 2 Overall survival according to the type of the surgery. The median survival was 40.3 months in the AFA-PD group and 22.6 months in the conventional PD group (p = 0.005) AFA-PD: artery-first approach pancreatoduodenectomy

40.3 months vs 22.6 months (p= 0.005)

OVERALL SURVIVAL

Kobayashi S, et al. World J Surg 2020

ADVANTAGES OF ARTERY FIRST APPROACH

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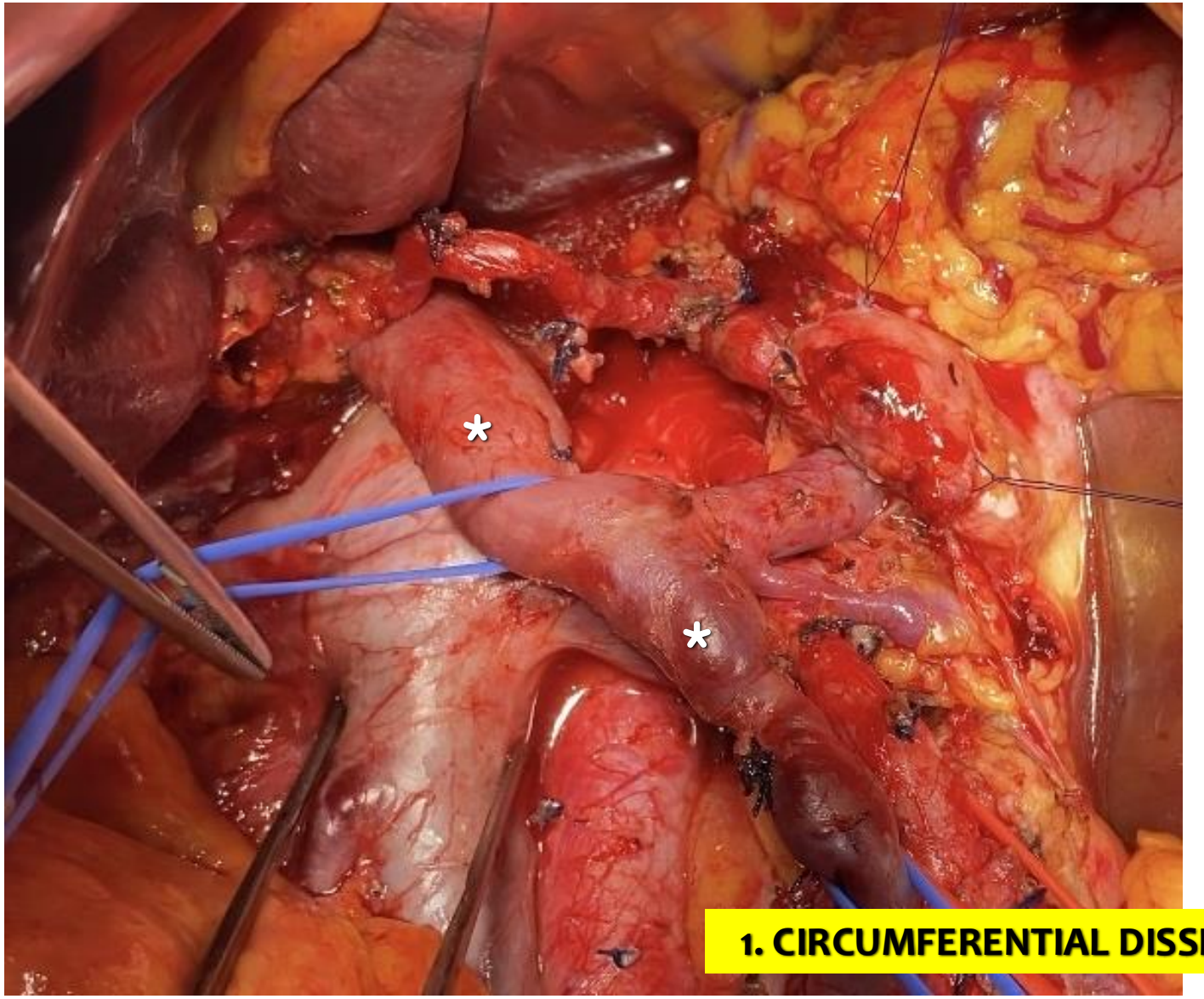
PANCREATIC HEAD PLEXUS (PL ph)

ARTERY FIRST

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

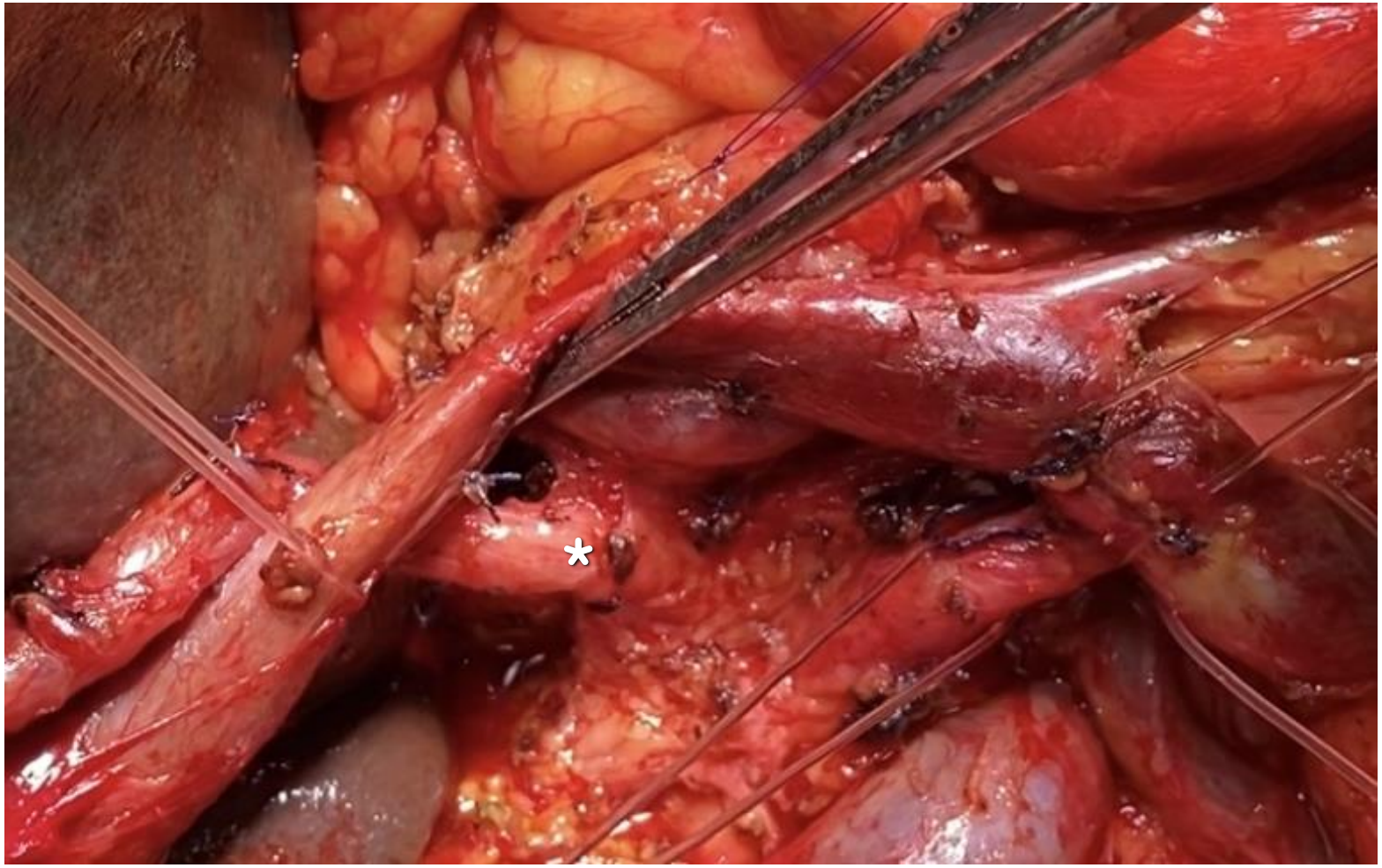
TOTAL MESOPANCREAS EXCISION



1. CIRCUMFERENTIAL DISSECTION OF SMV/PV

TOTAL MESOPANCREAS EXCISION

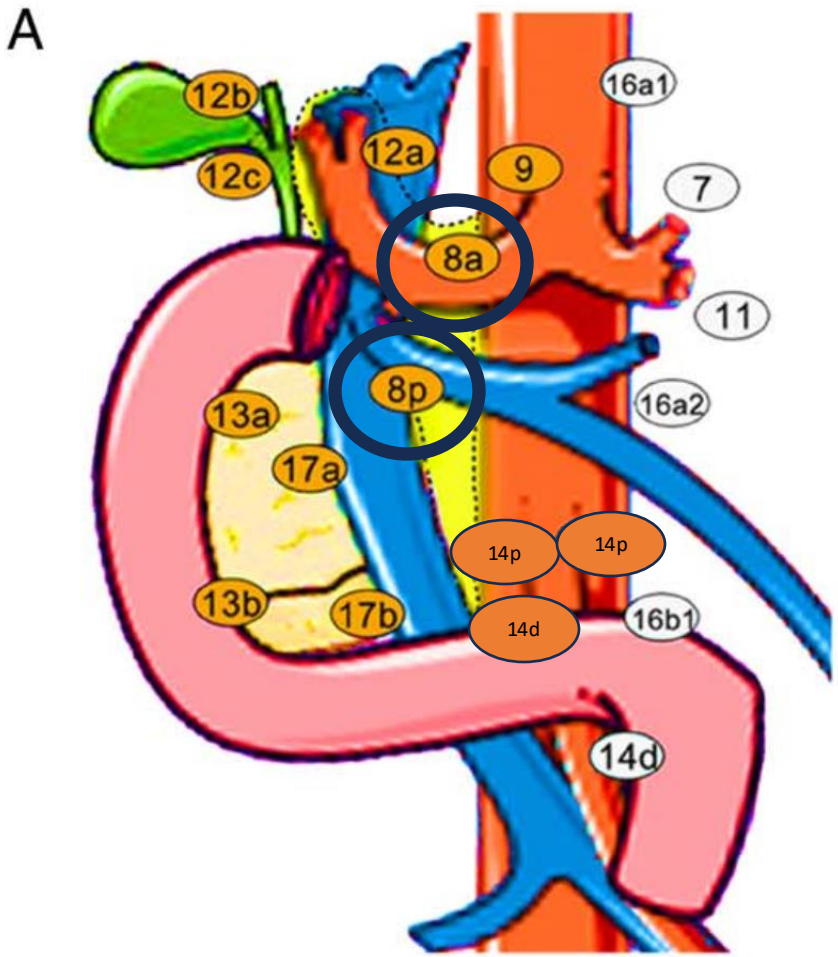
❑Common hepatic artery lymph nodes 8a, 8p

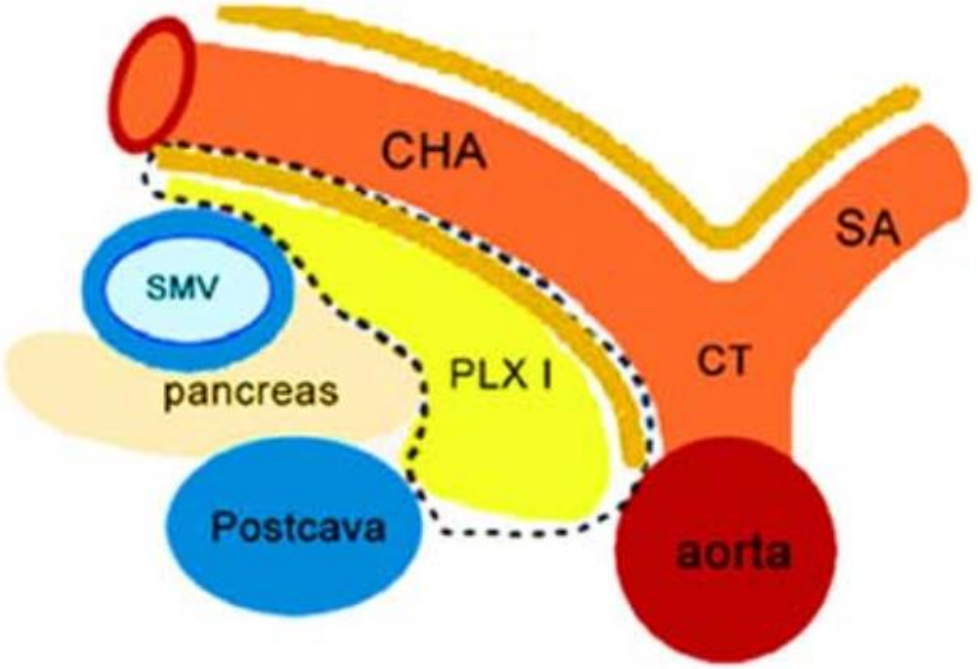


2. HEMICIRCUMFERENTIAL DISSECTION OF CHA

COMMON HEPATIC ARTERY LYMPH NODES

❑8a ❑8p

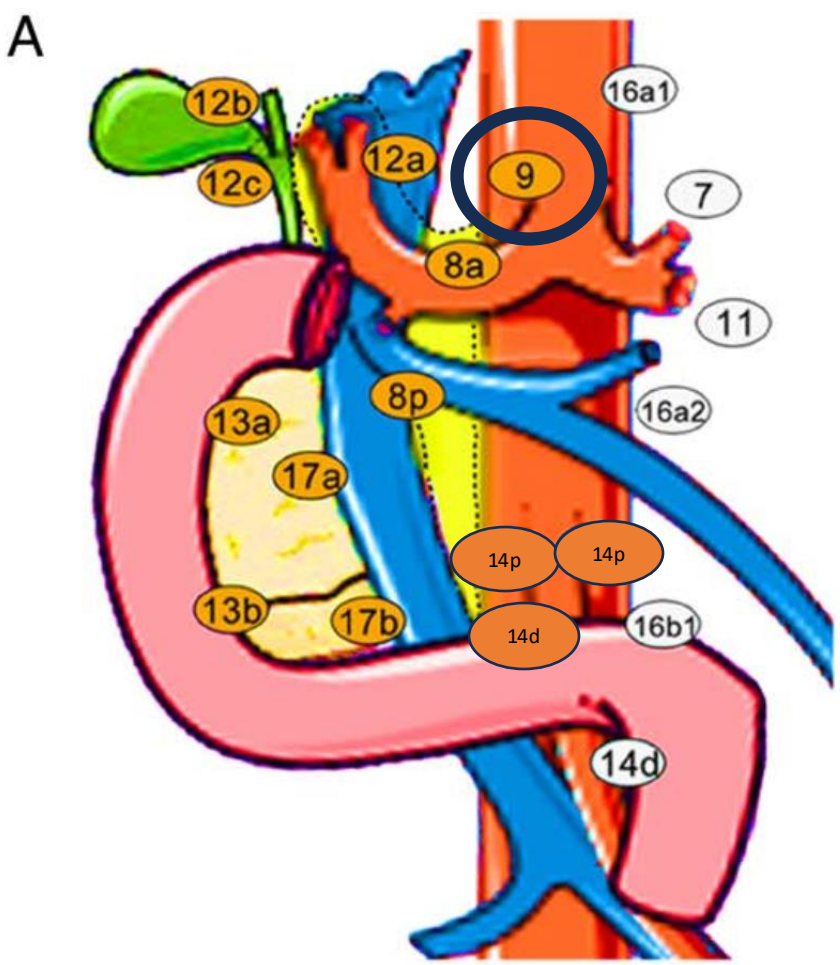




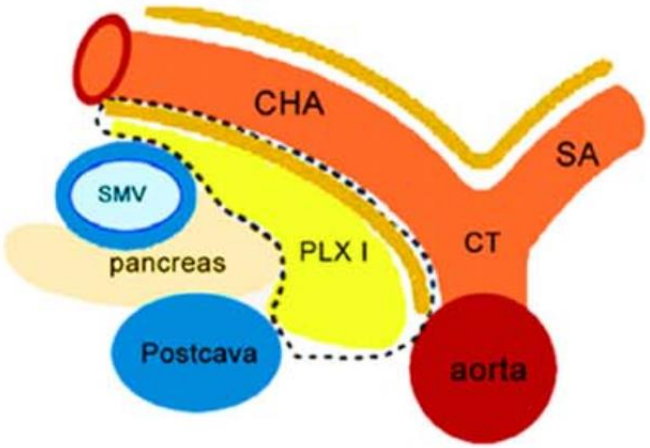
Guo X, et al. Int J Surg 2023.

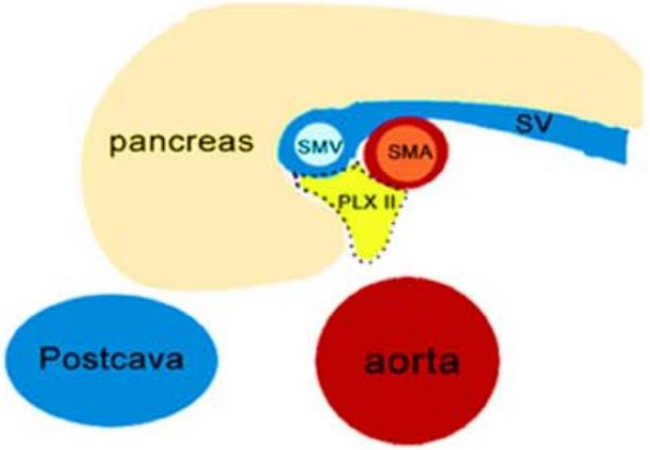
CELIAC TRUNK LYMPH NODES

❑ Celiac trunk lymph nodes 9



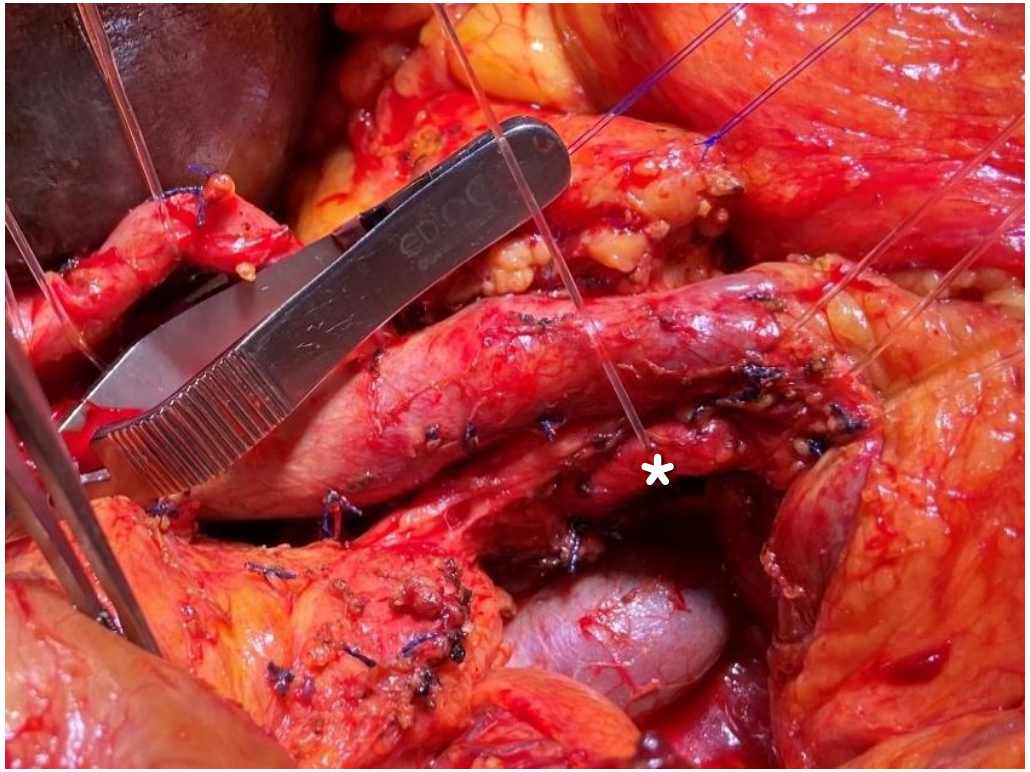
❑9

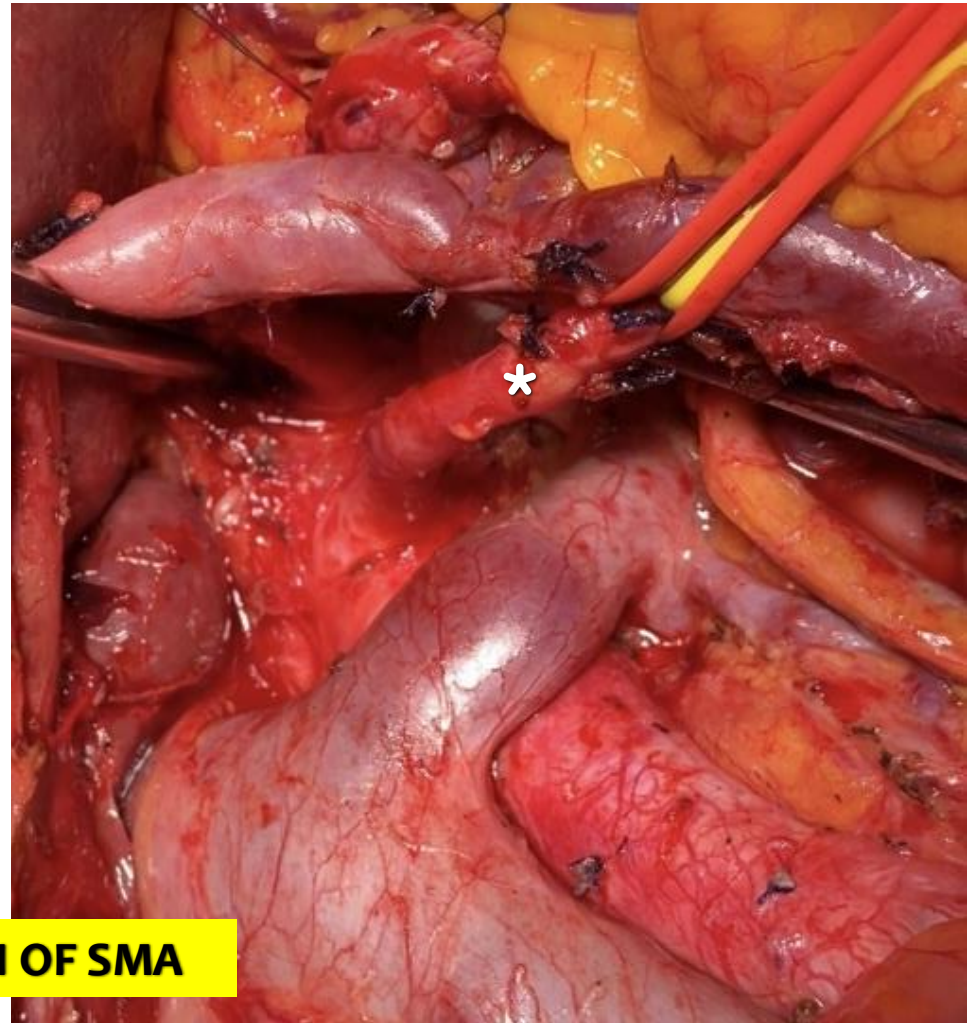




Guo X, et al. Int J Surg 2023.

TOTAL MESOPANCREAS EXCISION

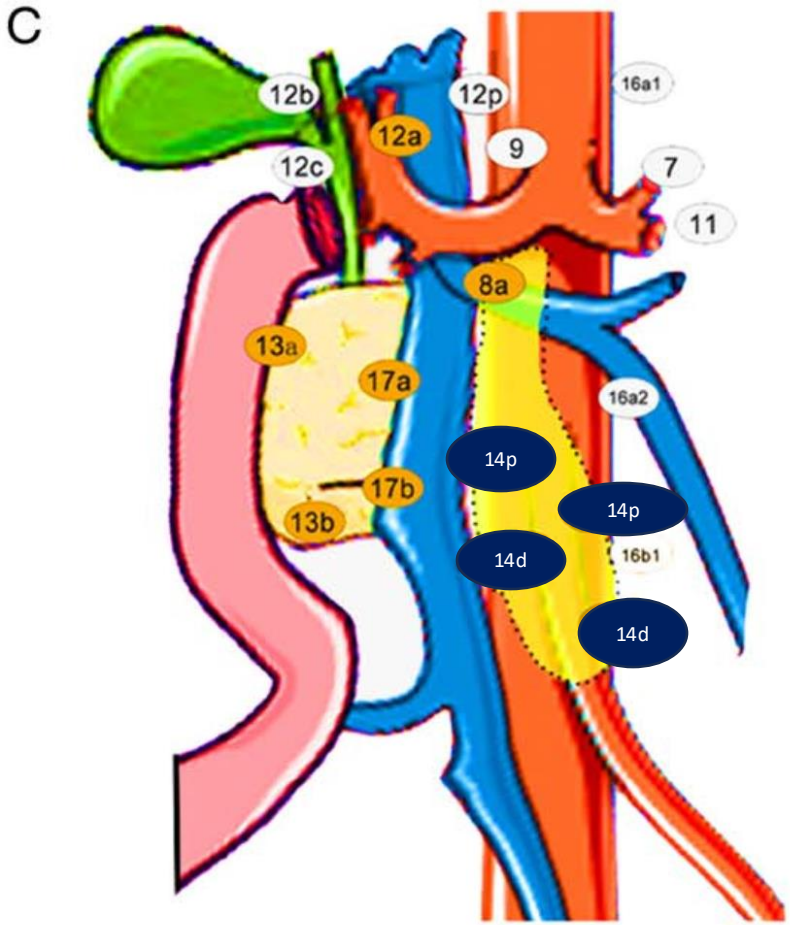


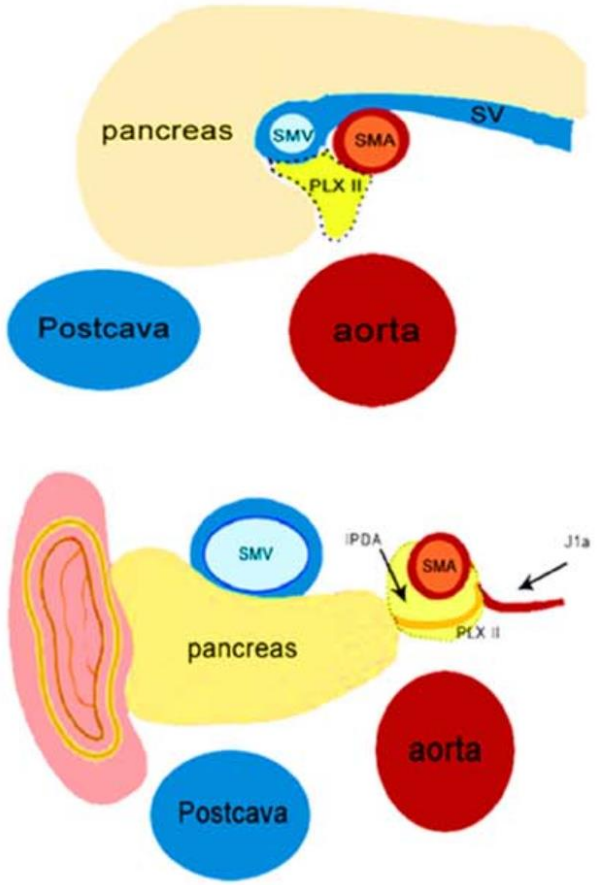


3. HEMICIRCUMFERENTIAL DISSECTION OF SMA

SUPERIOR MESENTERIC ARTERY LYMPH NODES

❑14p ❑14d



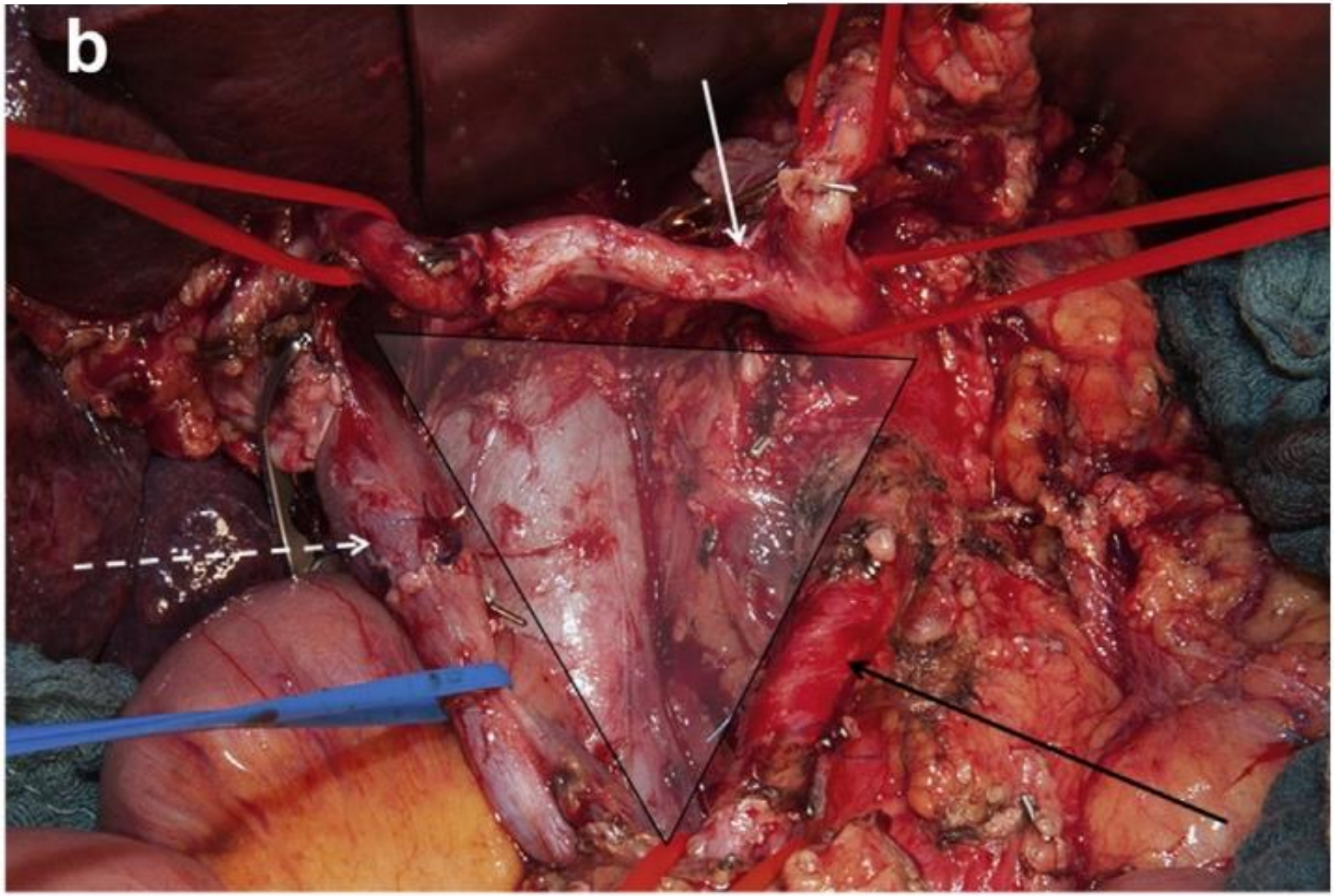


Guo X, et al. Int J Surg 2023.

http://dx.doi.org/10.1016/j.hpb.2017.07.007 HPB

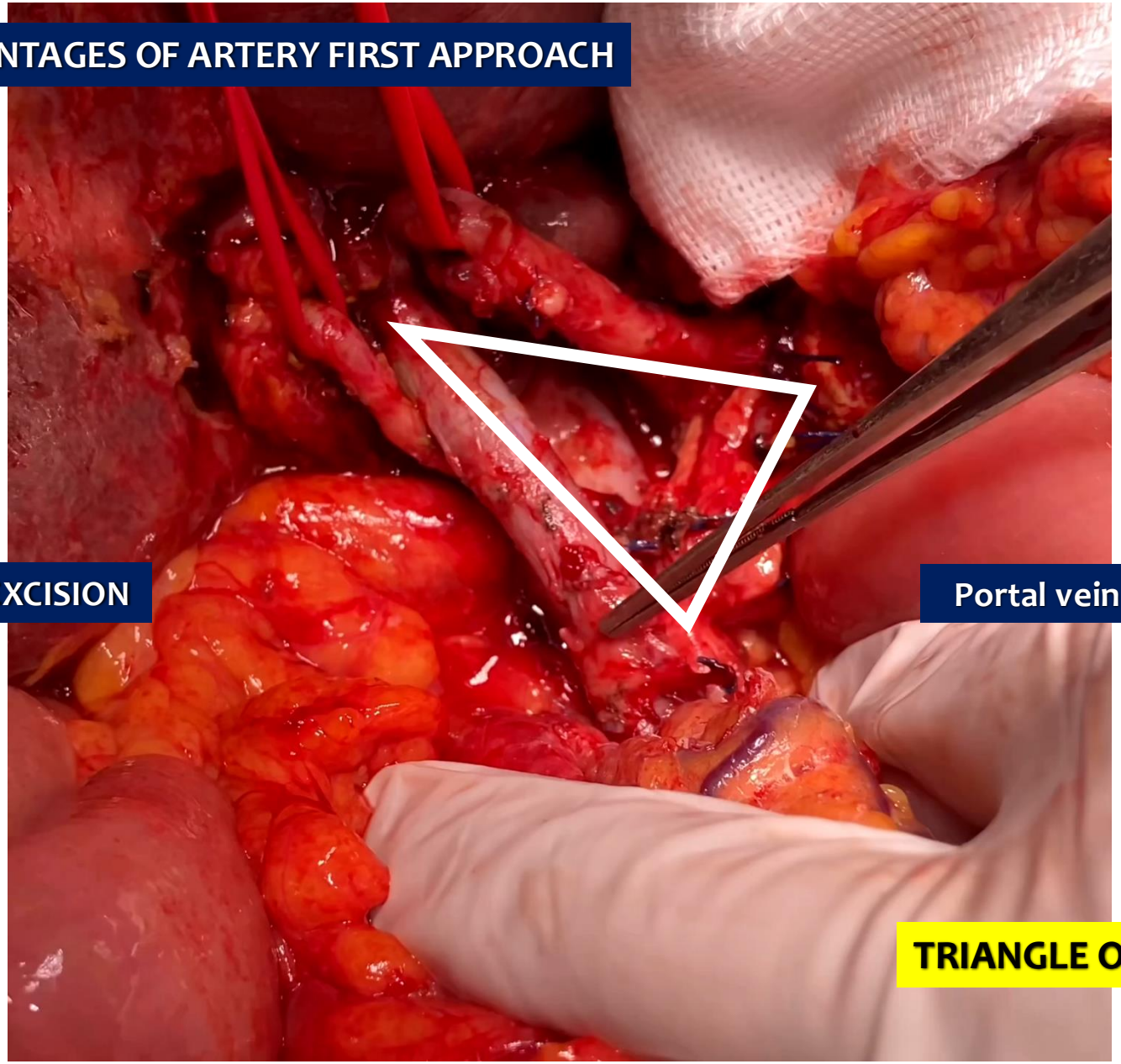
ORIGINAL ARTICLE

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



Hackert T, et al. HPB 2017

ADVANTAGES OF ARTERY FIRST APPROACH

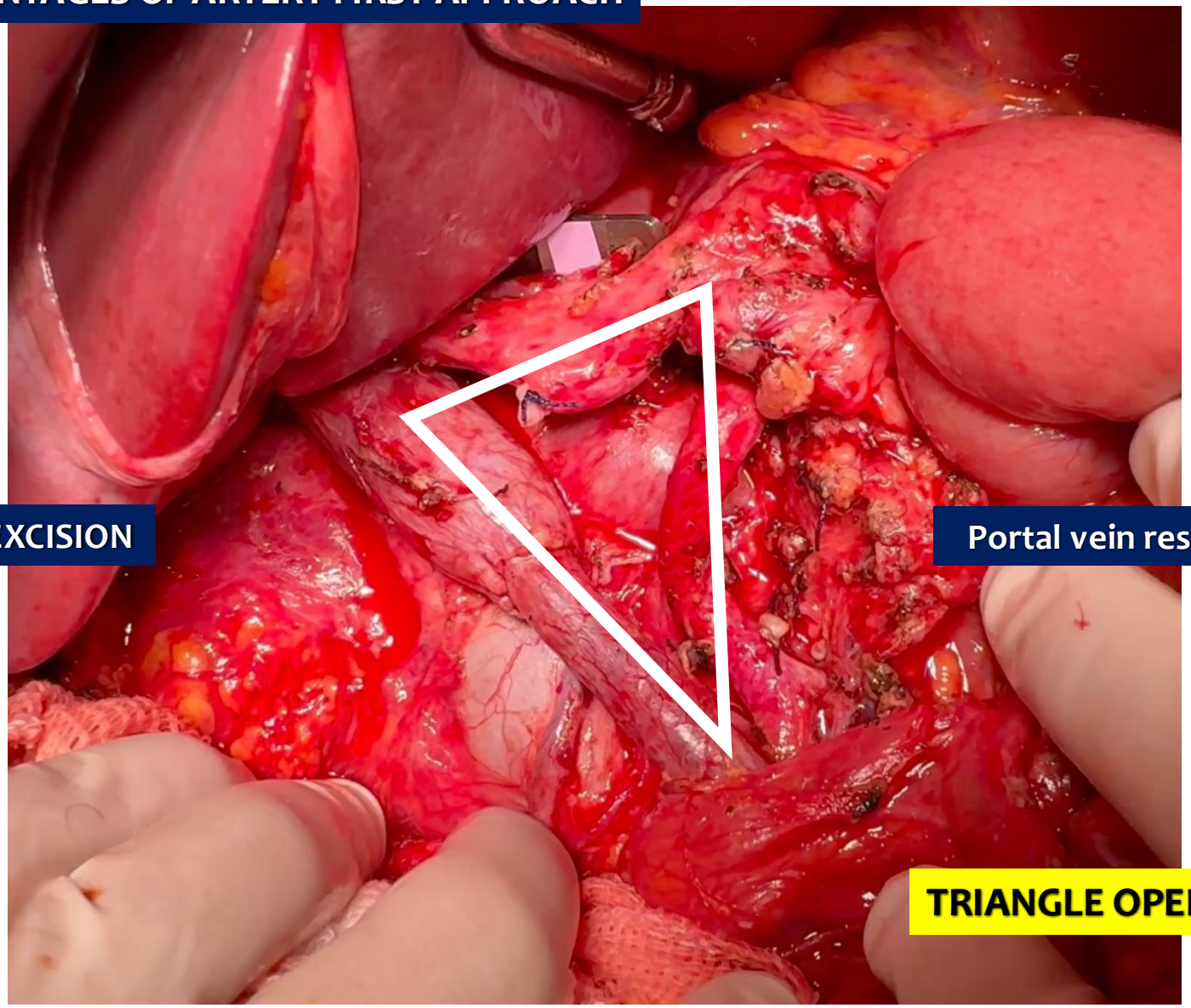


TOTAL MESOPANCREAS EXCISION

Portal vein resection

TRIANGLE OPERATION

ADVANTAGES OF ARTERY FIRST APPROACH



TOTAL MESOPANCREAS EXCISION

Portal vein resection

TRIANGLE OPERATION

http://dx.doi.org/10.1016/j.hpb.2015.11.009 HPB

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. Butler[1], Syed A. Ahmad[2], Matthew H. Katz[3], Jessica L. Cioffi[1] & Nicholas J. Zyromski[1]

[1]Indiana University School of Medicine, Department of Surgery, Indianapolis IN, [2]The University of Cincinnati Cancer Institute, Cincinnati OH, and [3]Department 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.

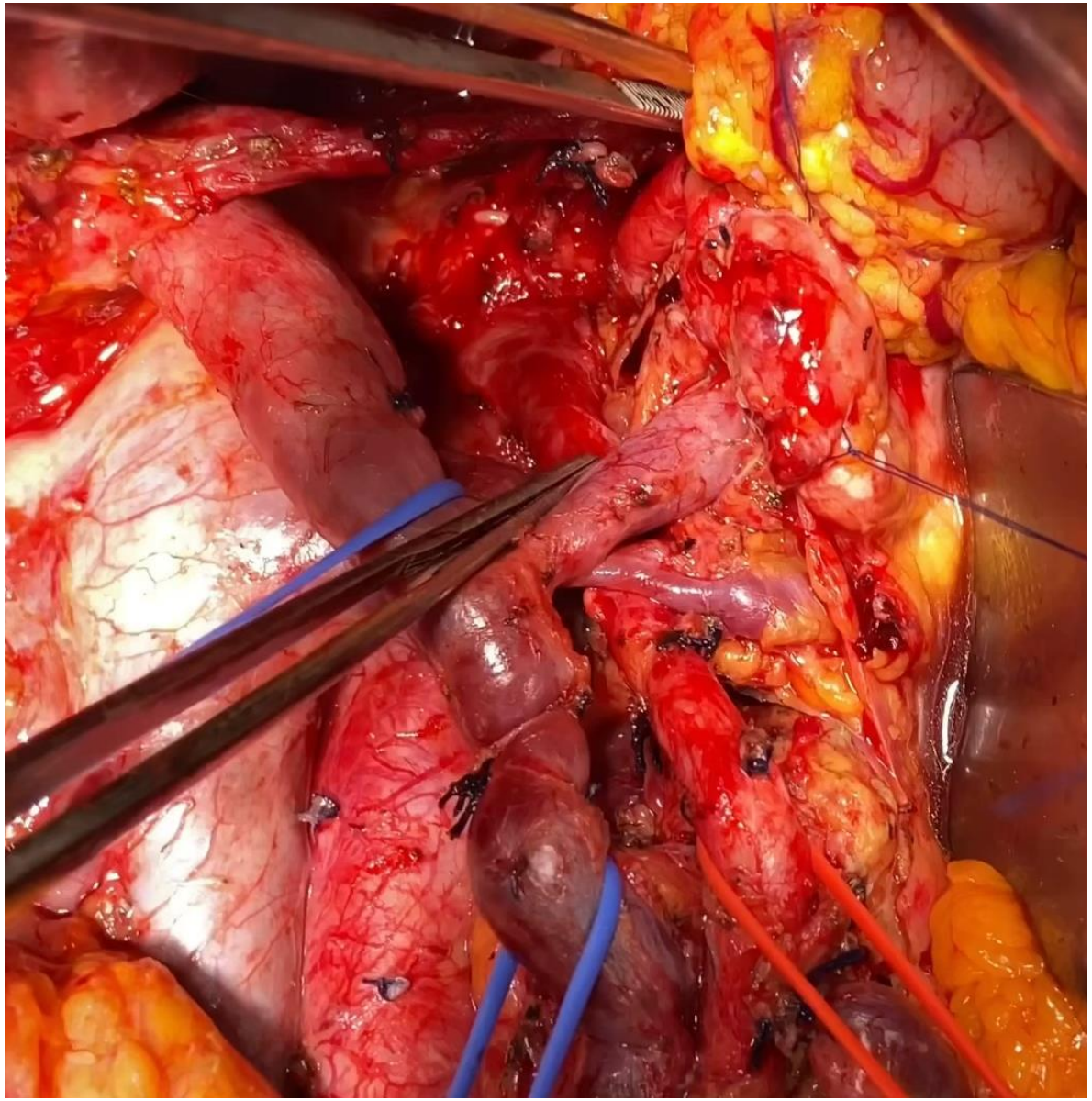
Conclusions: Margin positivity in resectable pancreatic adenocarcinoma is associated with poor survival. Inability to clear the SMA margin is the most common cause of incomplete resection.

Butler JR, et al. HPB 2015

STATE OF THE ART

Pancreatoduodenectomy

- Total mesopancreas excision[1]
- "Artery first"[2]
- Level 3 dissection[3]
- "Triangle operation"[4]
- Extended resection[5]
  - +/- 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

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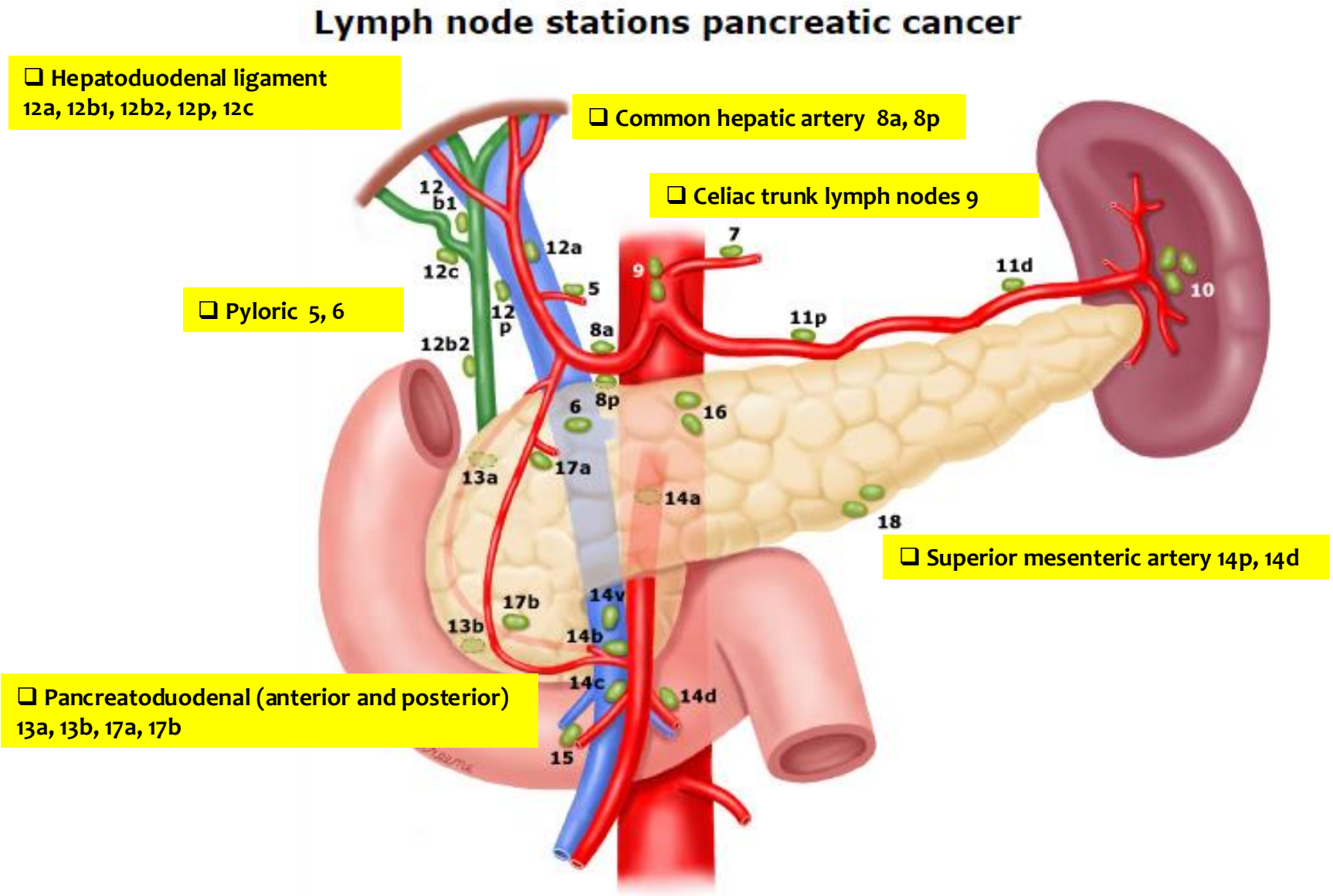
ARTERY FIRST

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

LYMPHATICS



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

❑ Common hepatic artery 8a, 8p

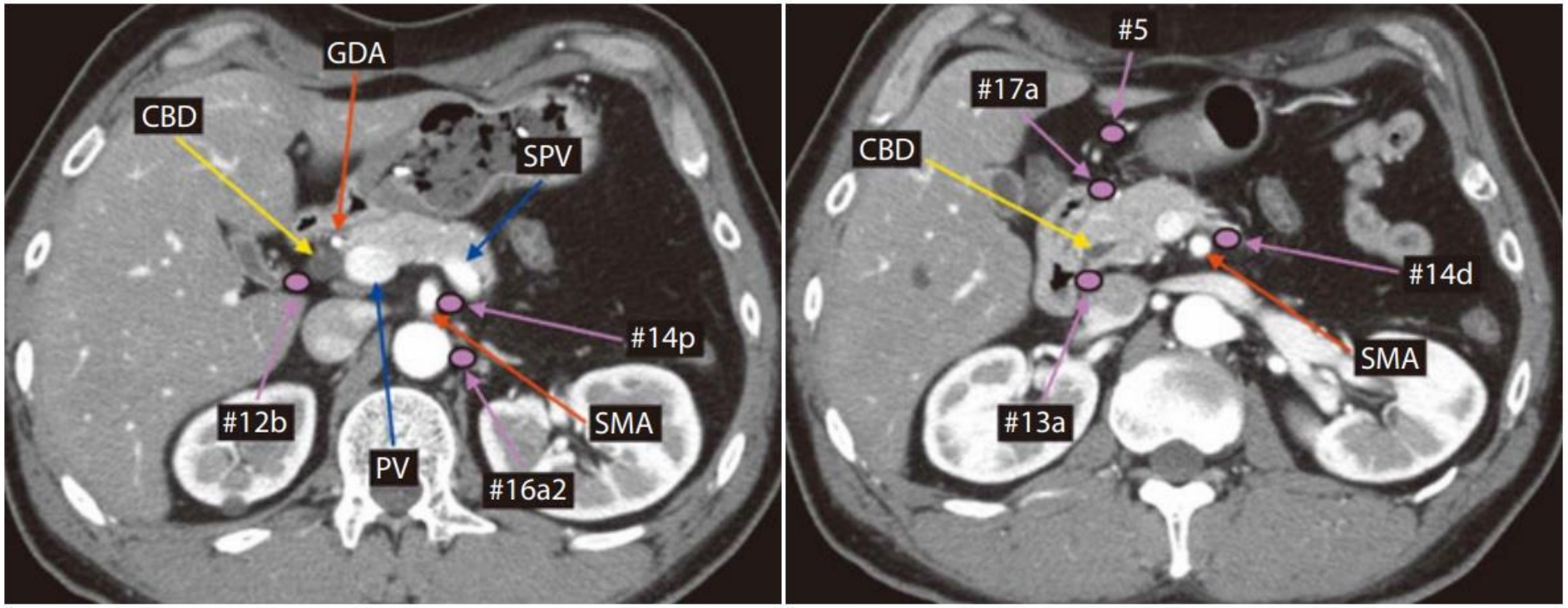
❑ Celiac trunk lymph nodes 9

❑ Pyloric 5, 6

❑ Superior mesenteric artery 14p, 14d

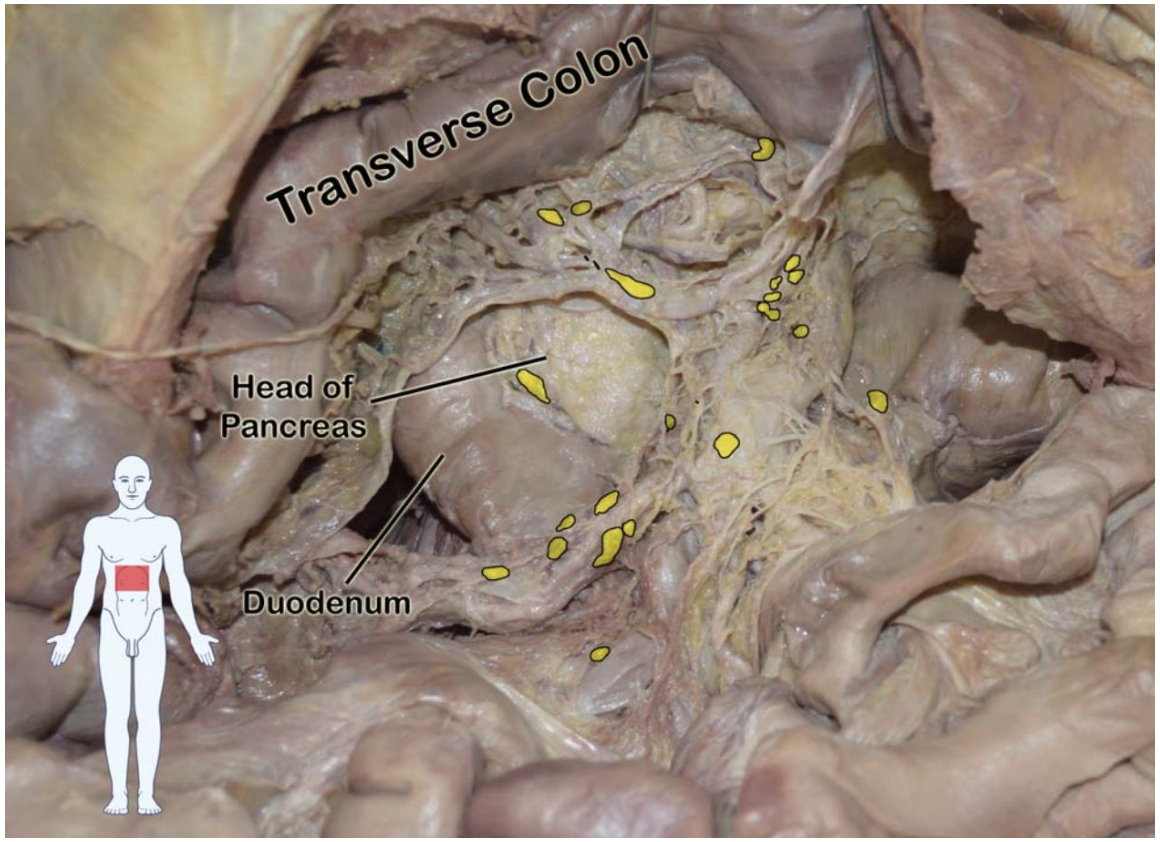
❑ Pancreatoduodenal (anterior and posterior)
13a, 13b, 17a, 17b

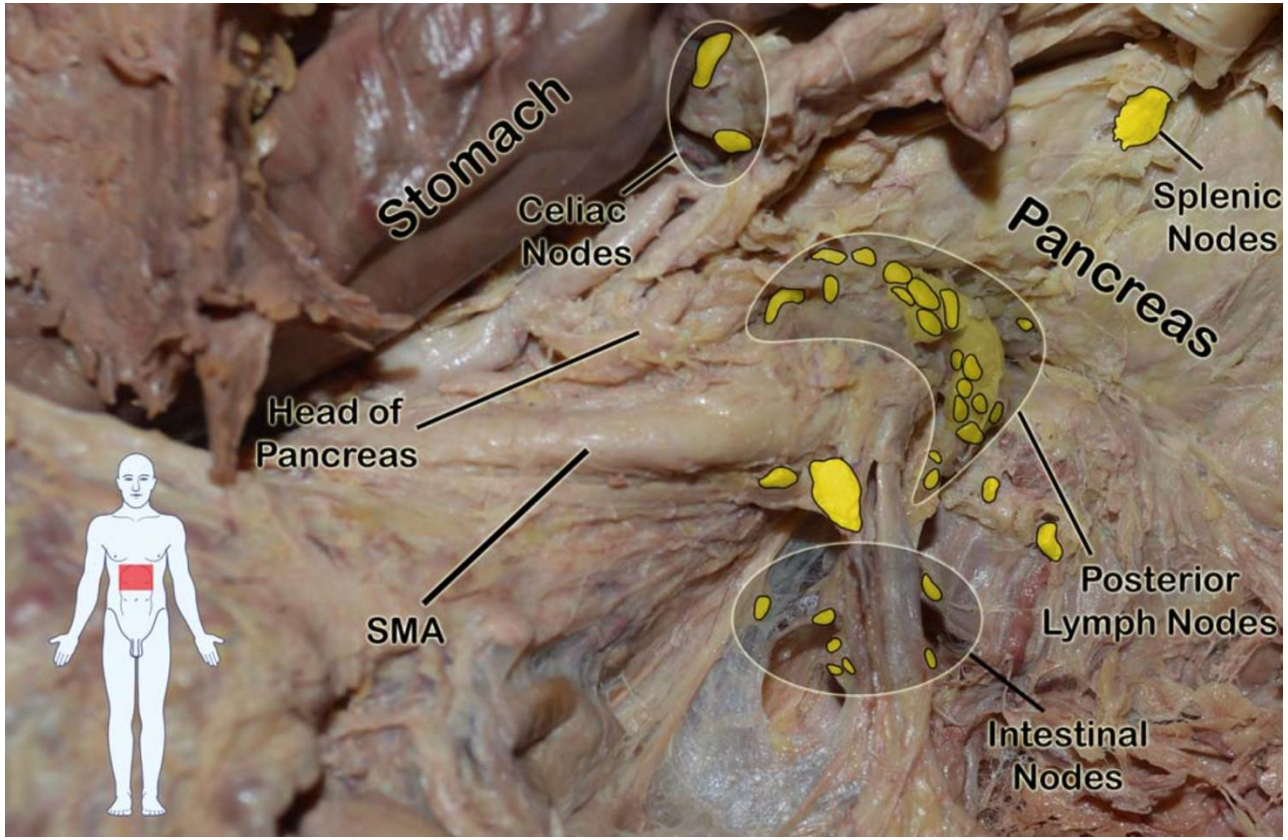
LYMPHADENECTOMY



14p, 14d

LYMPHADENECTOMY





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

ARTERY FIRST

.1007/s00268-020-05856-w

World Journal of Surgery

ORIGINAL SCIENTIFIC REPORT

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	*P*
	n = 45	*n* = 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, n (%)	19 (42.2)	22 (51.2)	0.5178
Portal vein resection, n (%)	12 (26.7)	13 (30.2)	0.8147
Postoperative complications, ≥ grade IIIa, n (%)	3 (6.7)	5 (11.6)	0.4794
Curative resection R0, n (%)	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, n (%)	27 (60)	30 (69.8)	0.3376

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

AFA-PD - Artery first approach pancreatoduodenectomy

Kobayashi S, et al. World J Surg 2020

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
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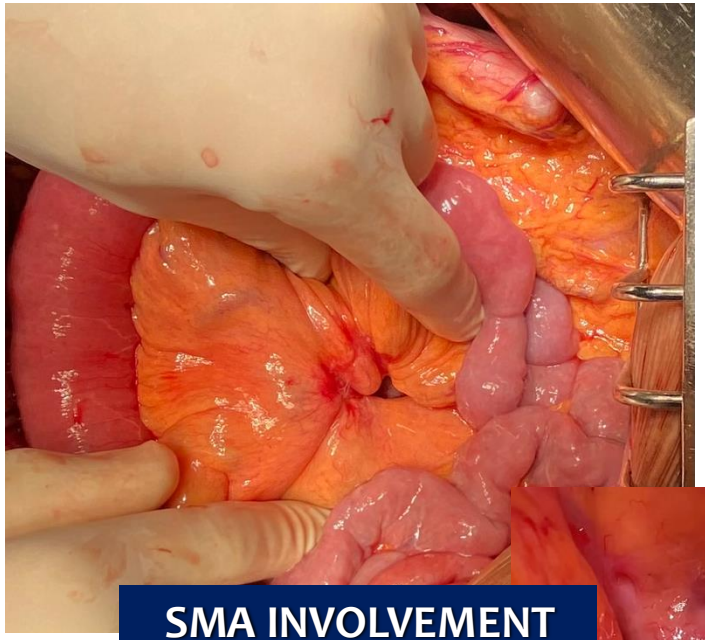
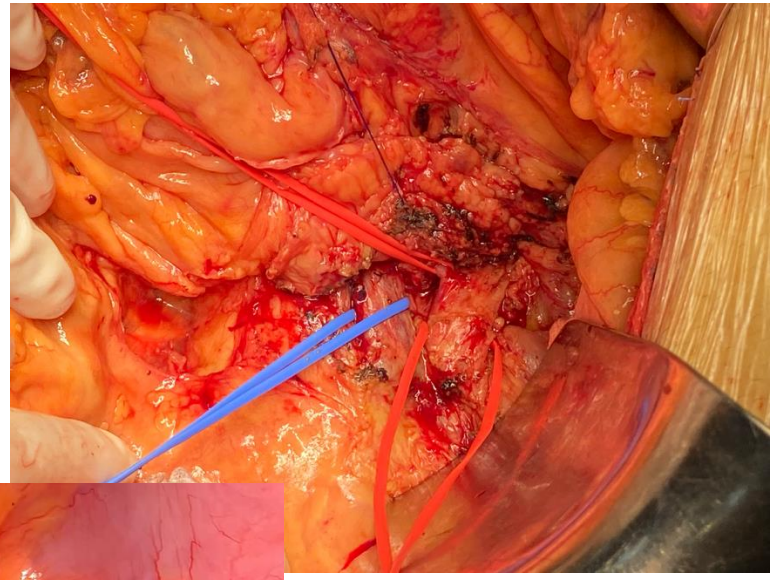
8. Reduced need for graft substitutions
9. Reduced operative time and blood loss (early ligation of IPDA/JA1)

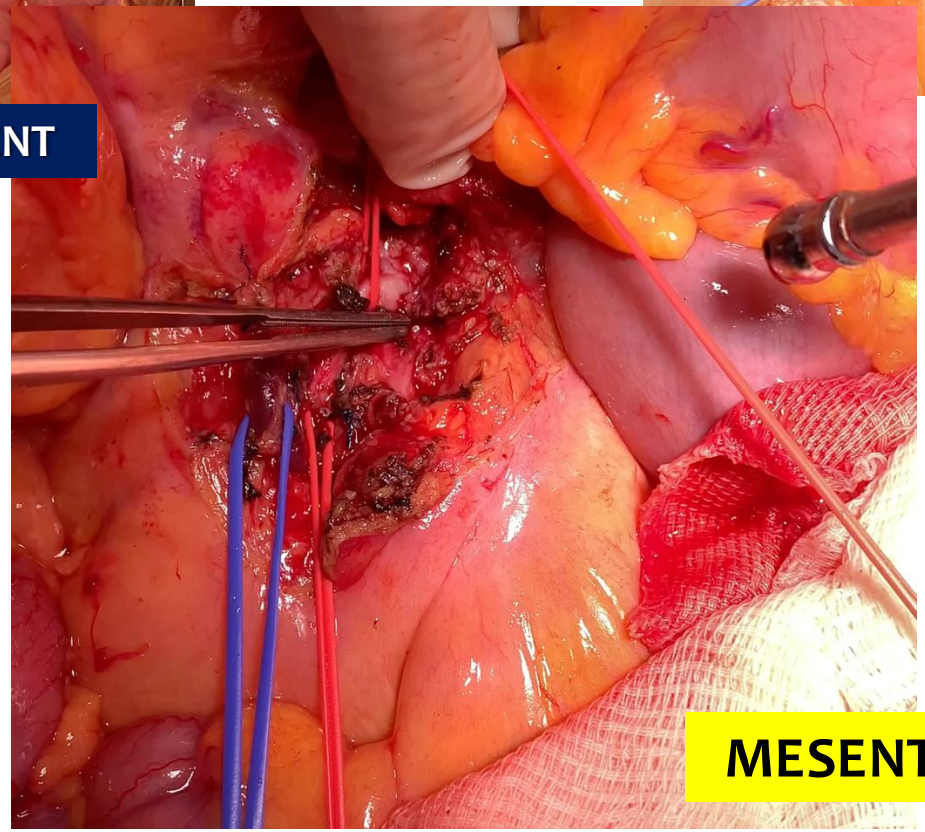
ARTERY FIRST

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





SMA INVOLVEMENT



MESENTERIC APPROACH

ADVANTAGES OF ARTERY FIRST APPROACH

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

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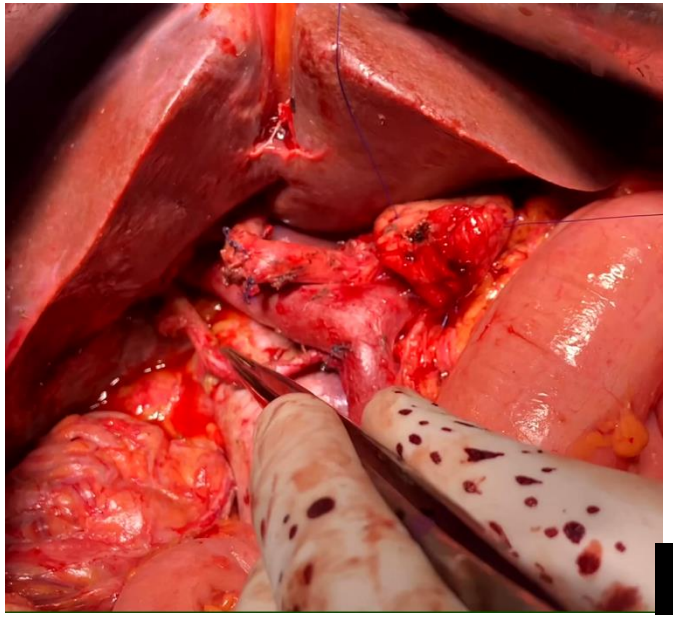
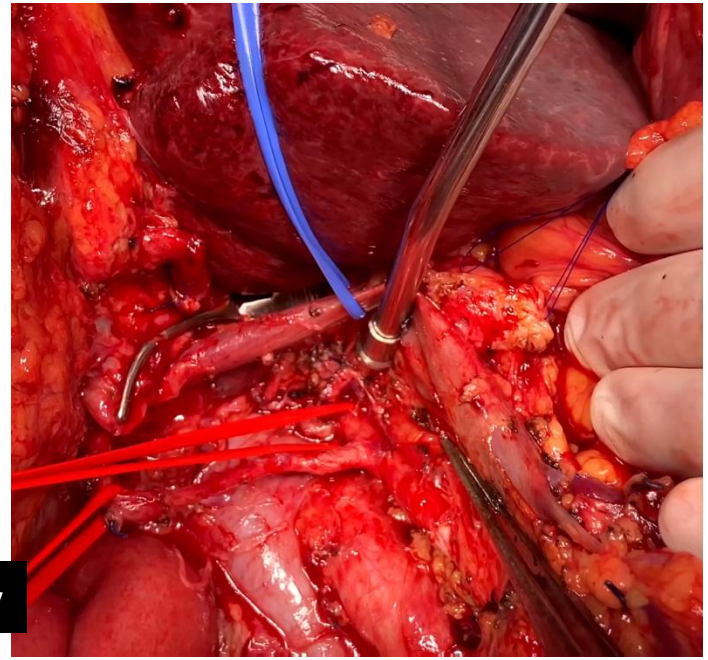
ARTERY FIRST

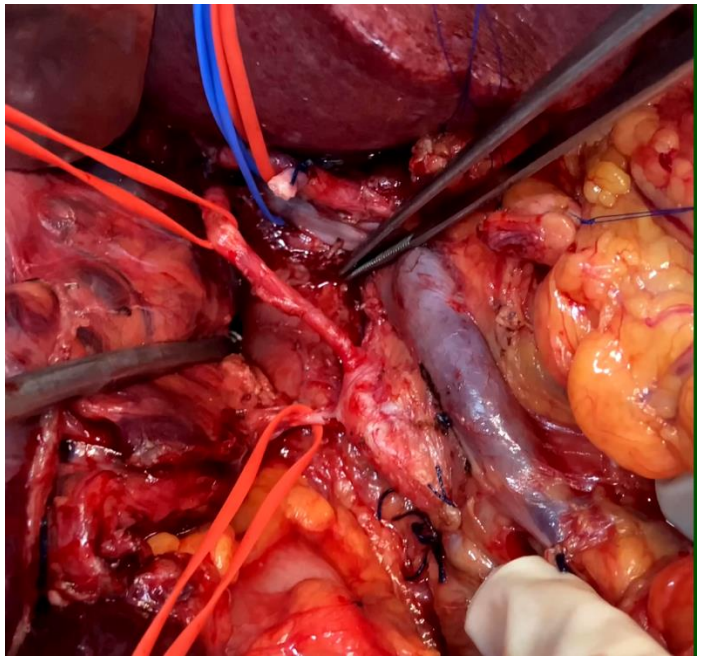
Fernandes ESM, et al. Langenbeck's Arch Surg 2021



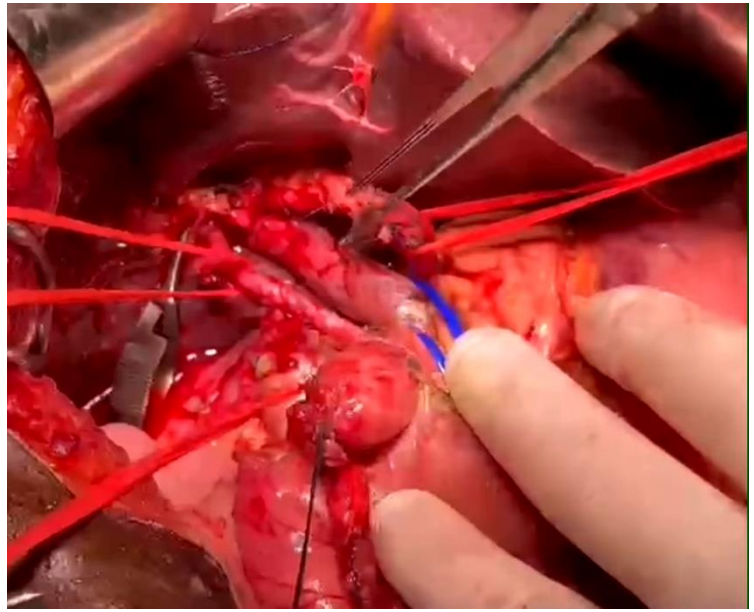
Right hepatic artery



Superior mesenteric artery



ARTERY FIRST



VASCULAR RESECTION

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

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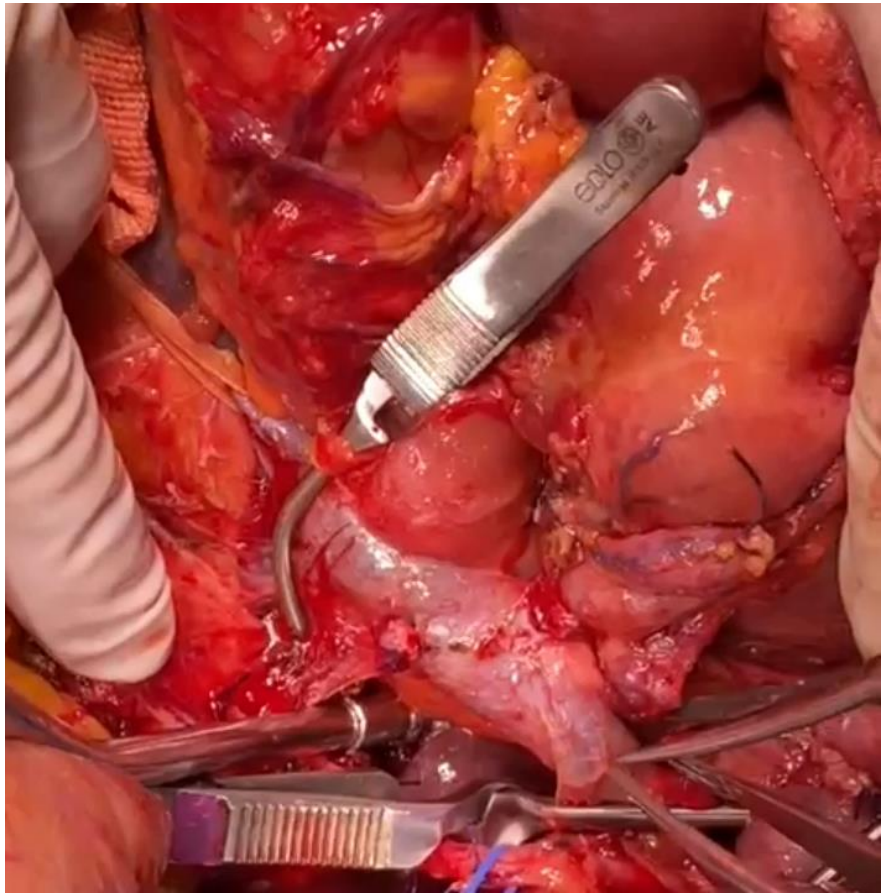
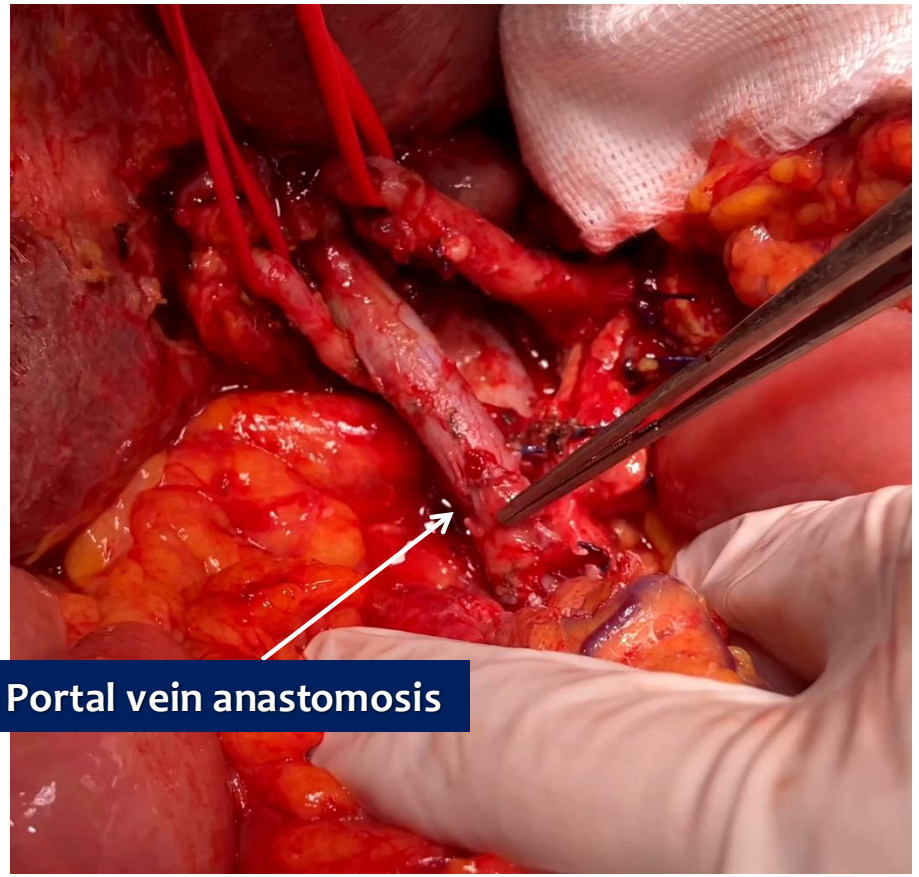
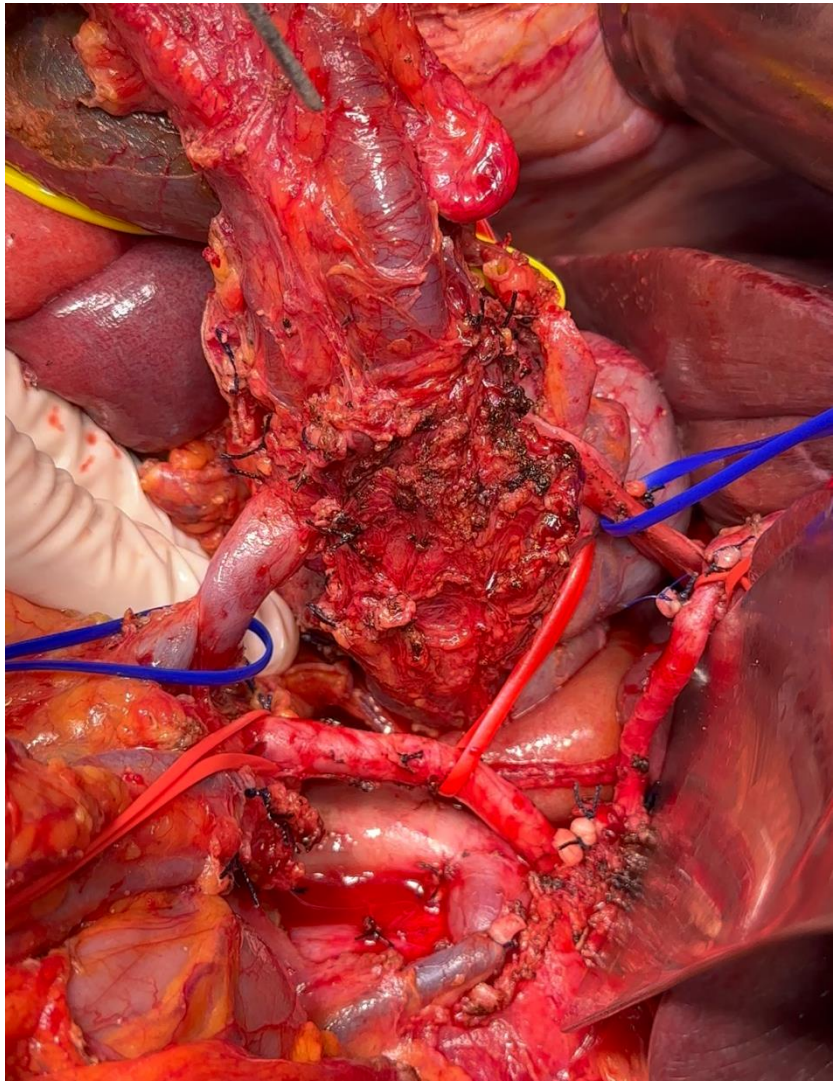
VEIA PORTA/VEIA MESENTÉRICA SUPERIOR

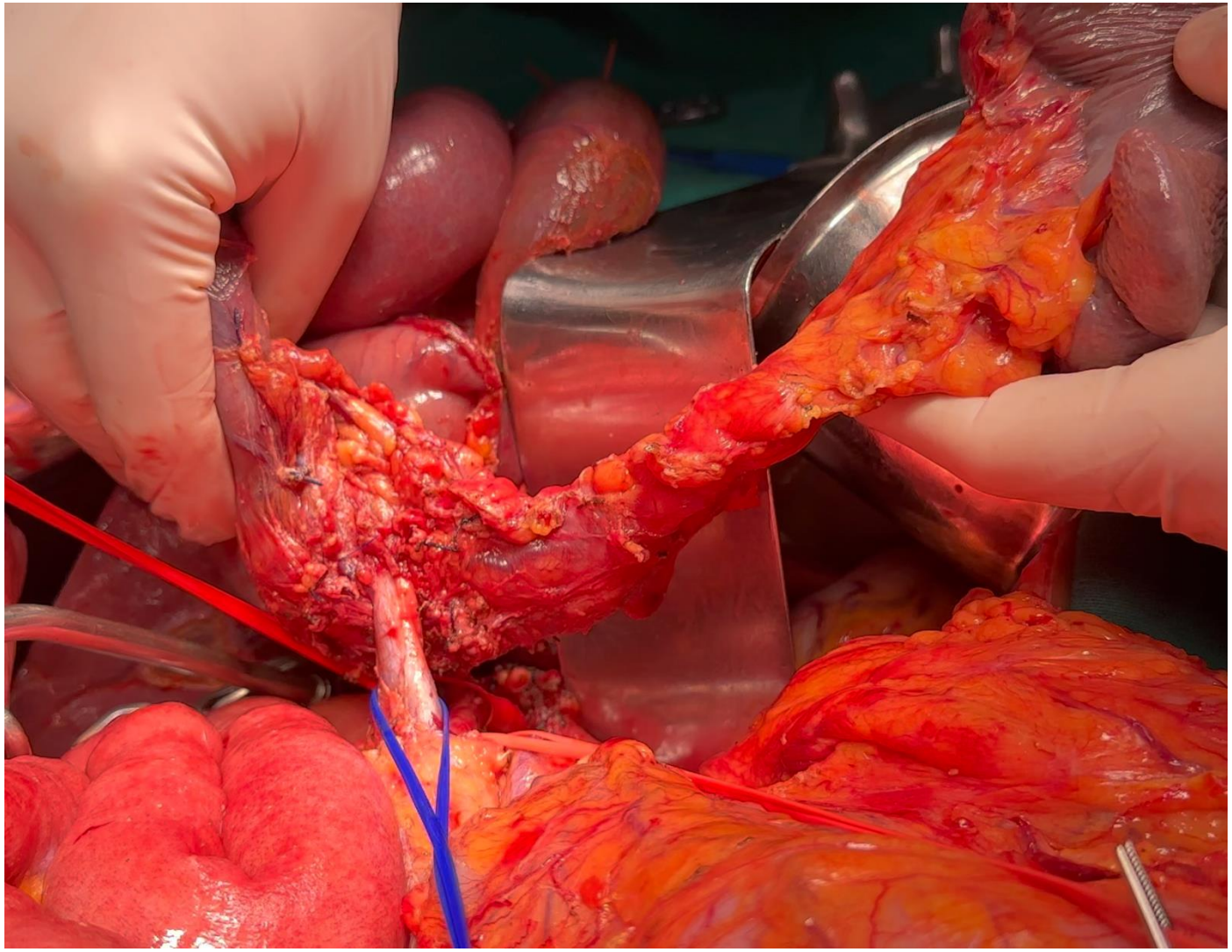
Fernandes ESM, et al. Langenbeck's Arch Surg 2021



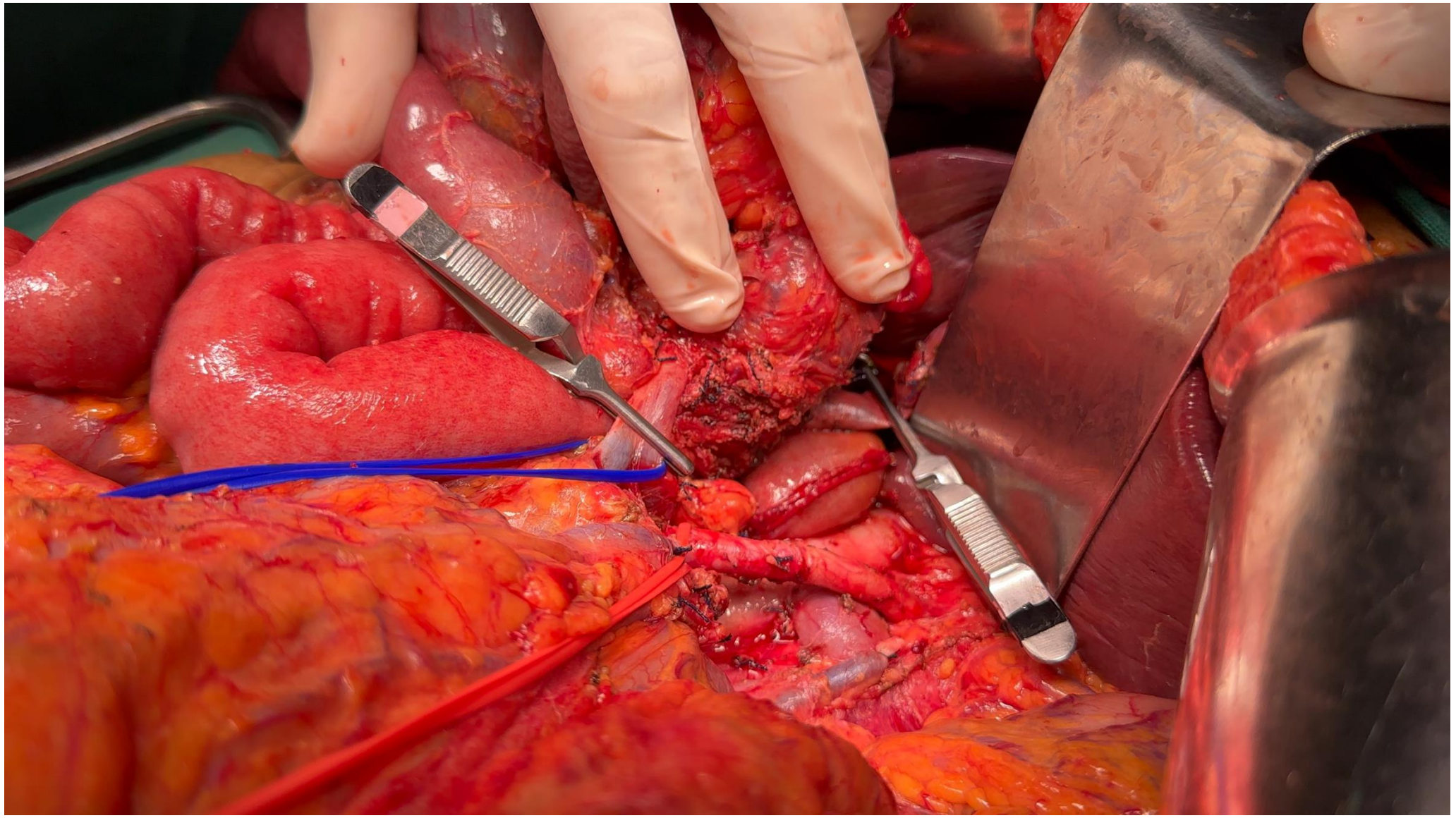


Portal vein/superior mesenteric vein resection/reconstruction





Portal vein/superior mesenteric vein resection/reconstruction



Portal vein/superior mesenteric vein resection/reconstruction

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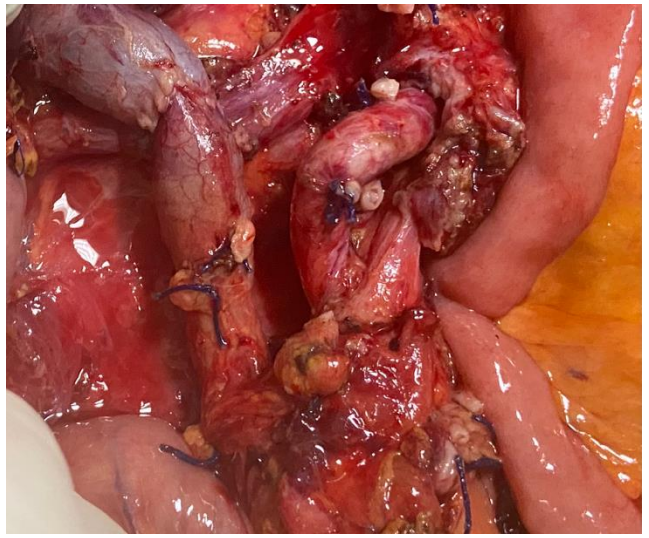
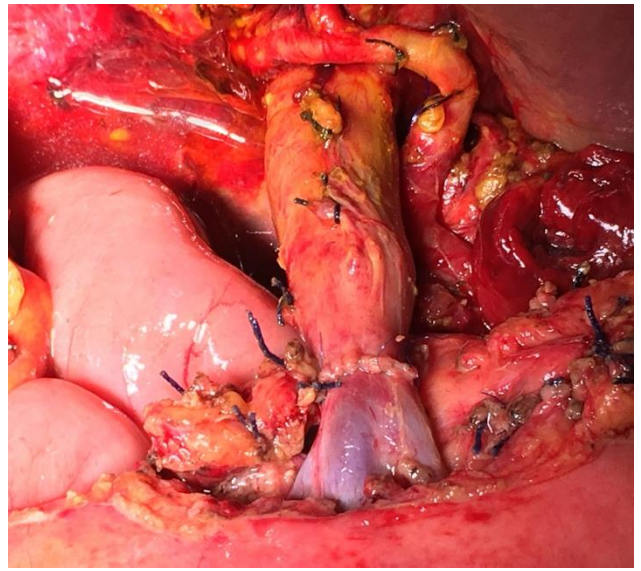


NO GRAFT



ARTERY FIRST

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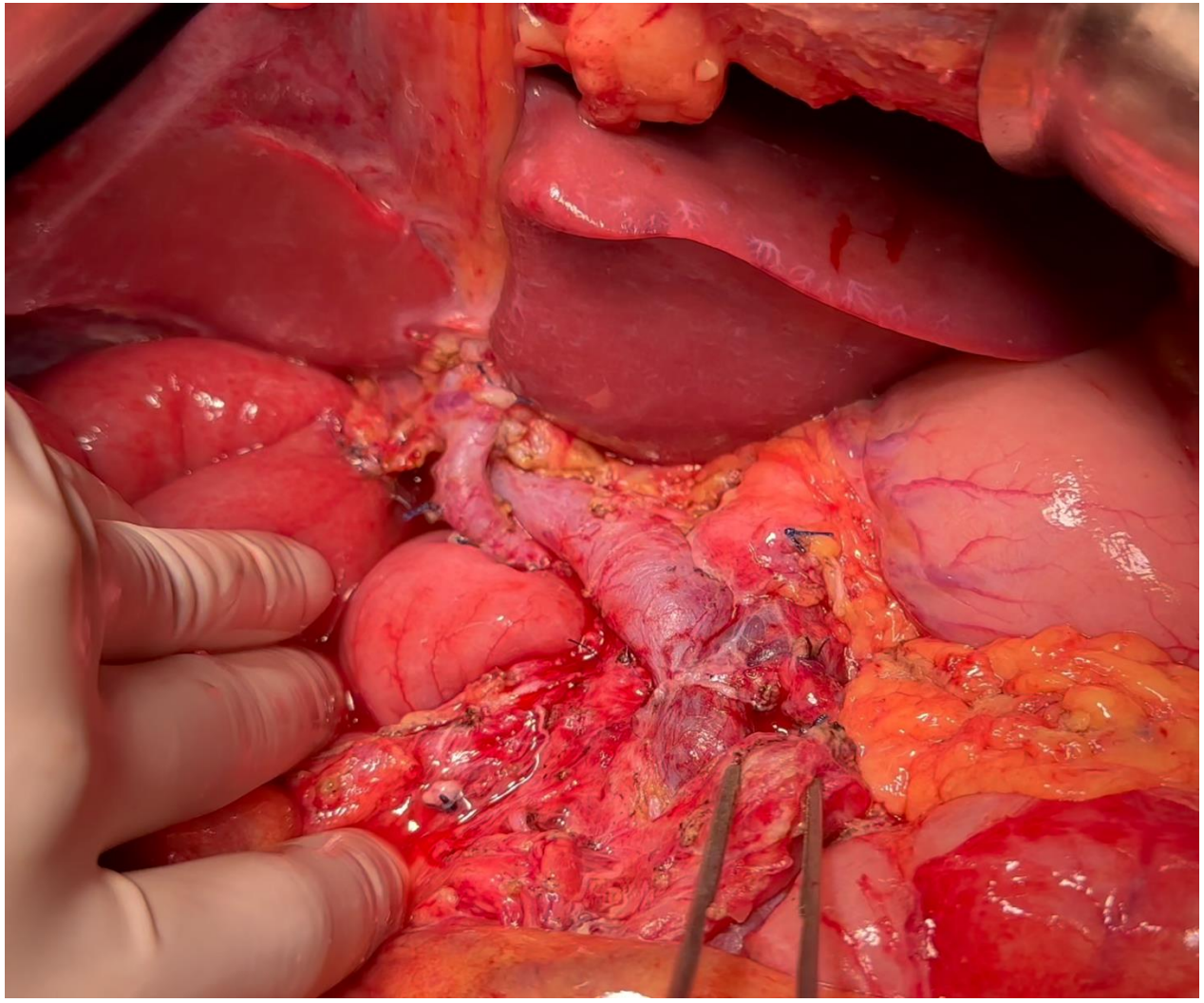

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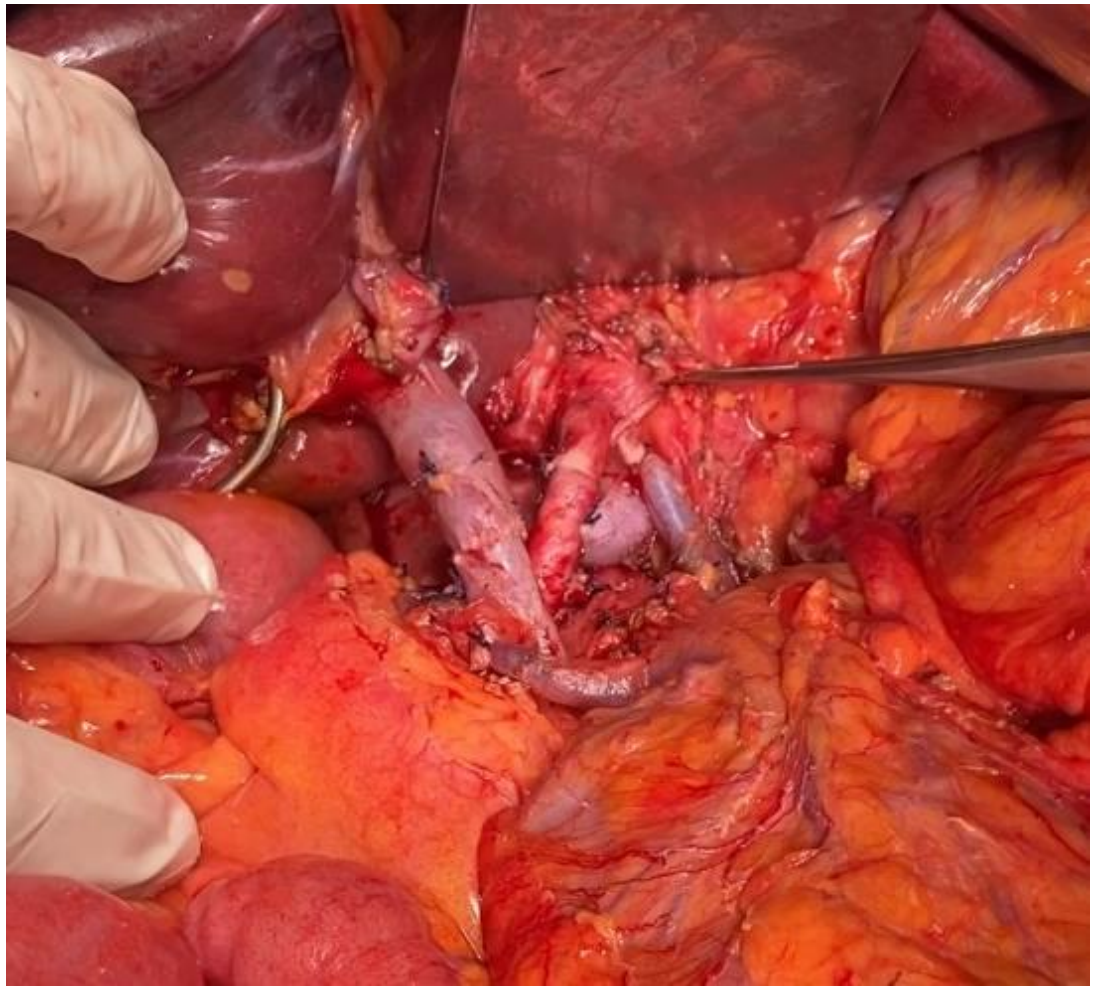

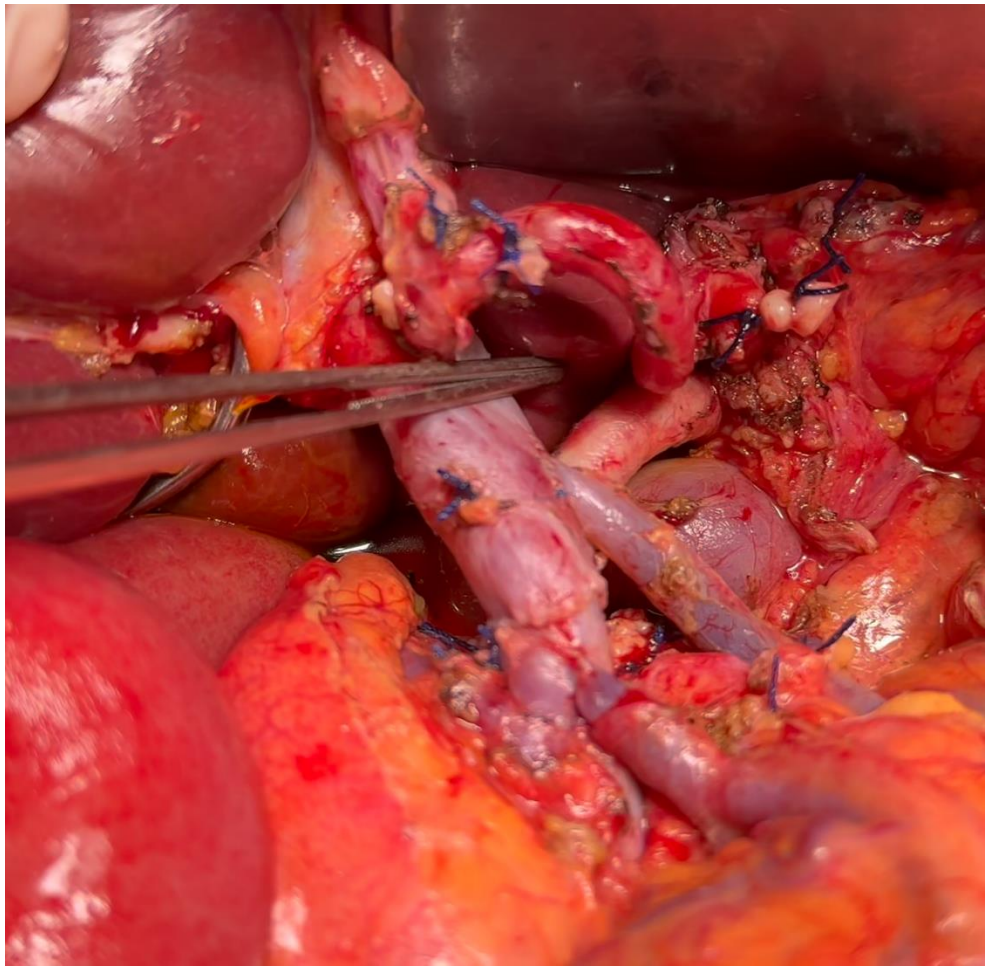

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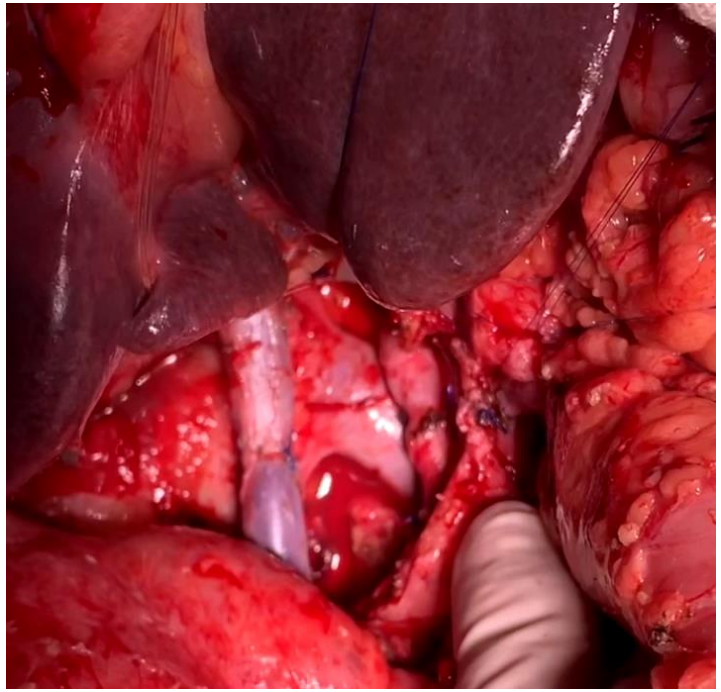

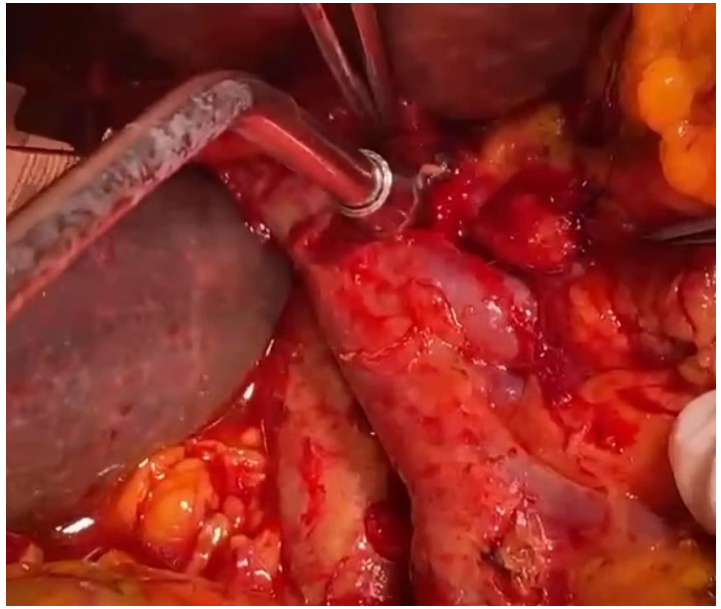

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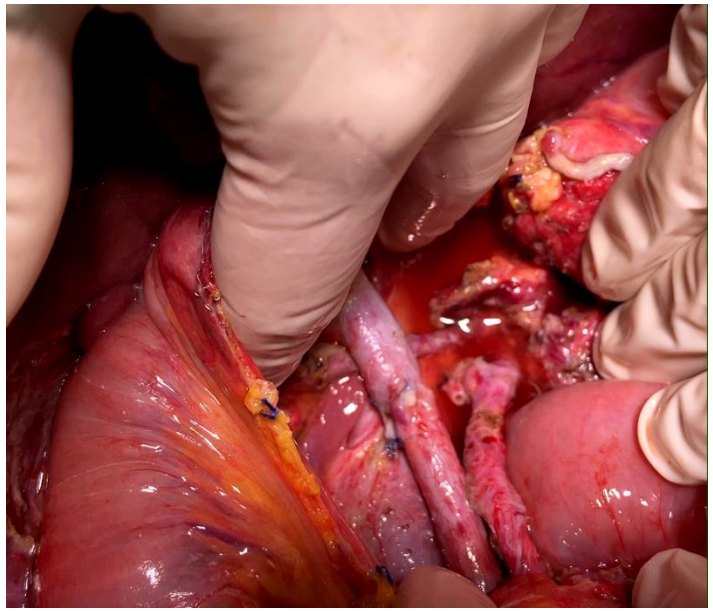

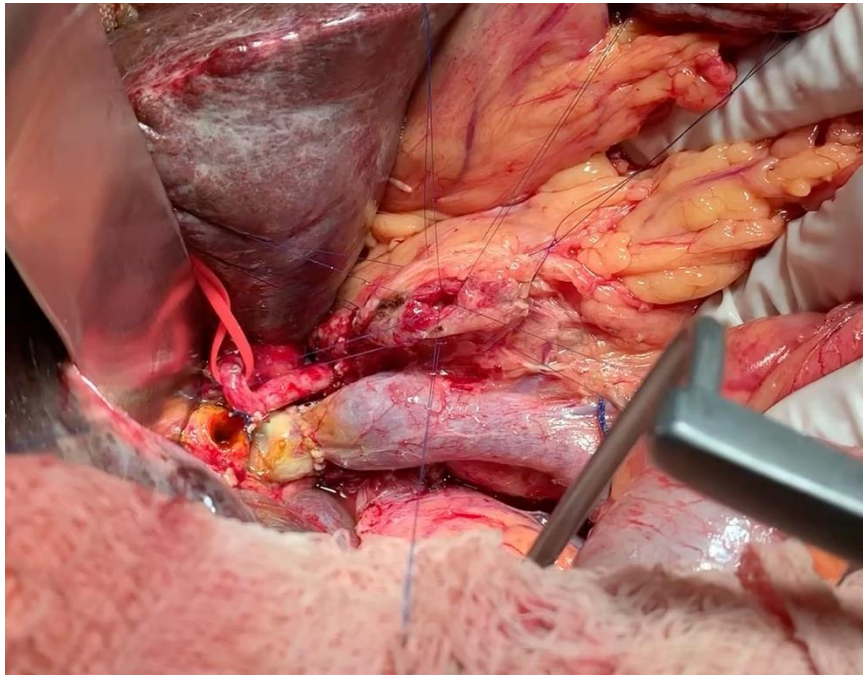

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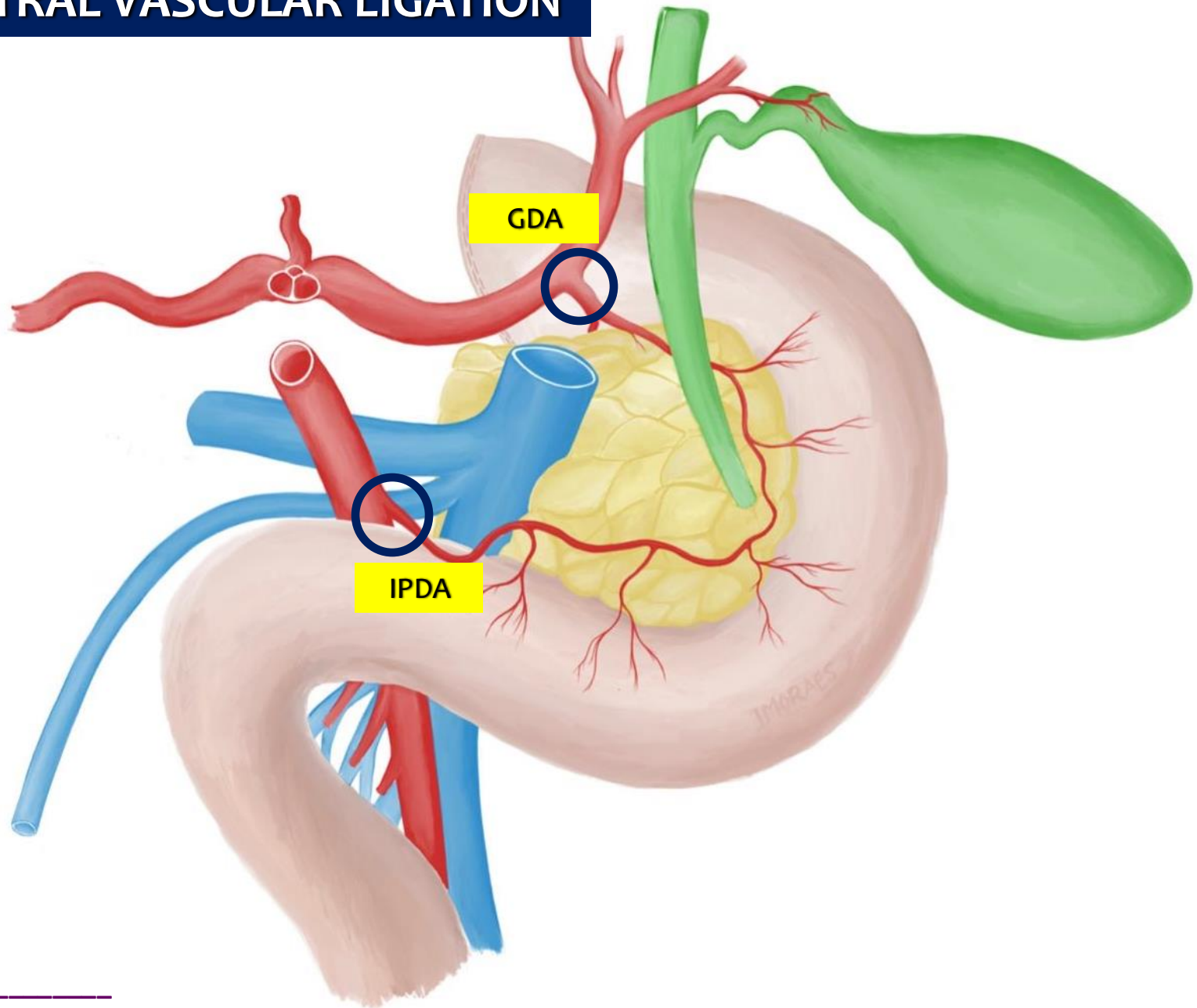
MENOR TEMPO OPERATÓRIO

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

CENTRAL VASCULAR LIGATION



- ❑ **Bleeding**
- ❑ Pancreatic fistula
- ❑ Delayed gastric emptying
- ❑ Oncology

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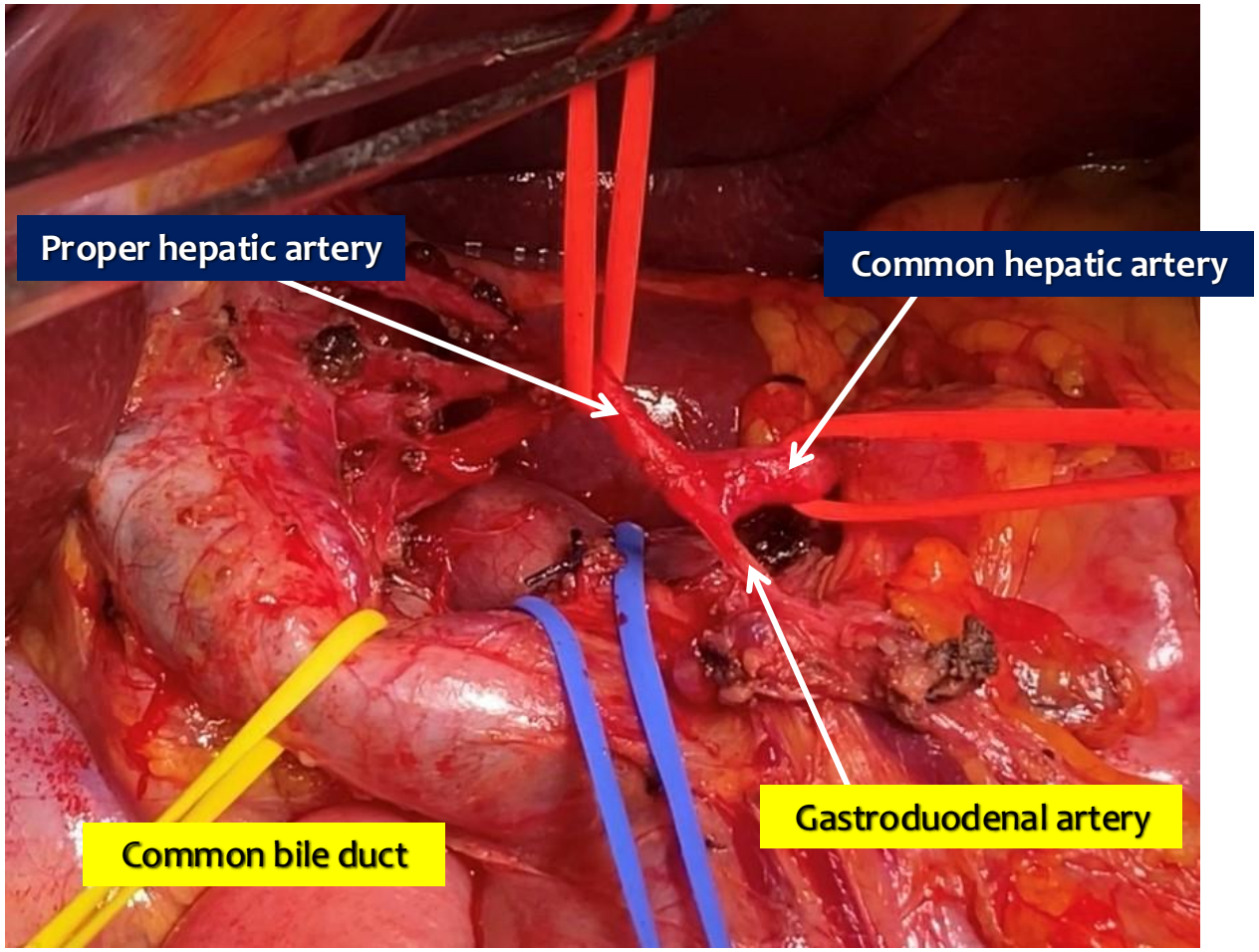
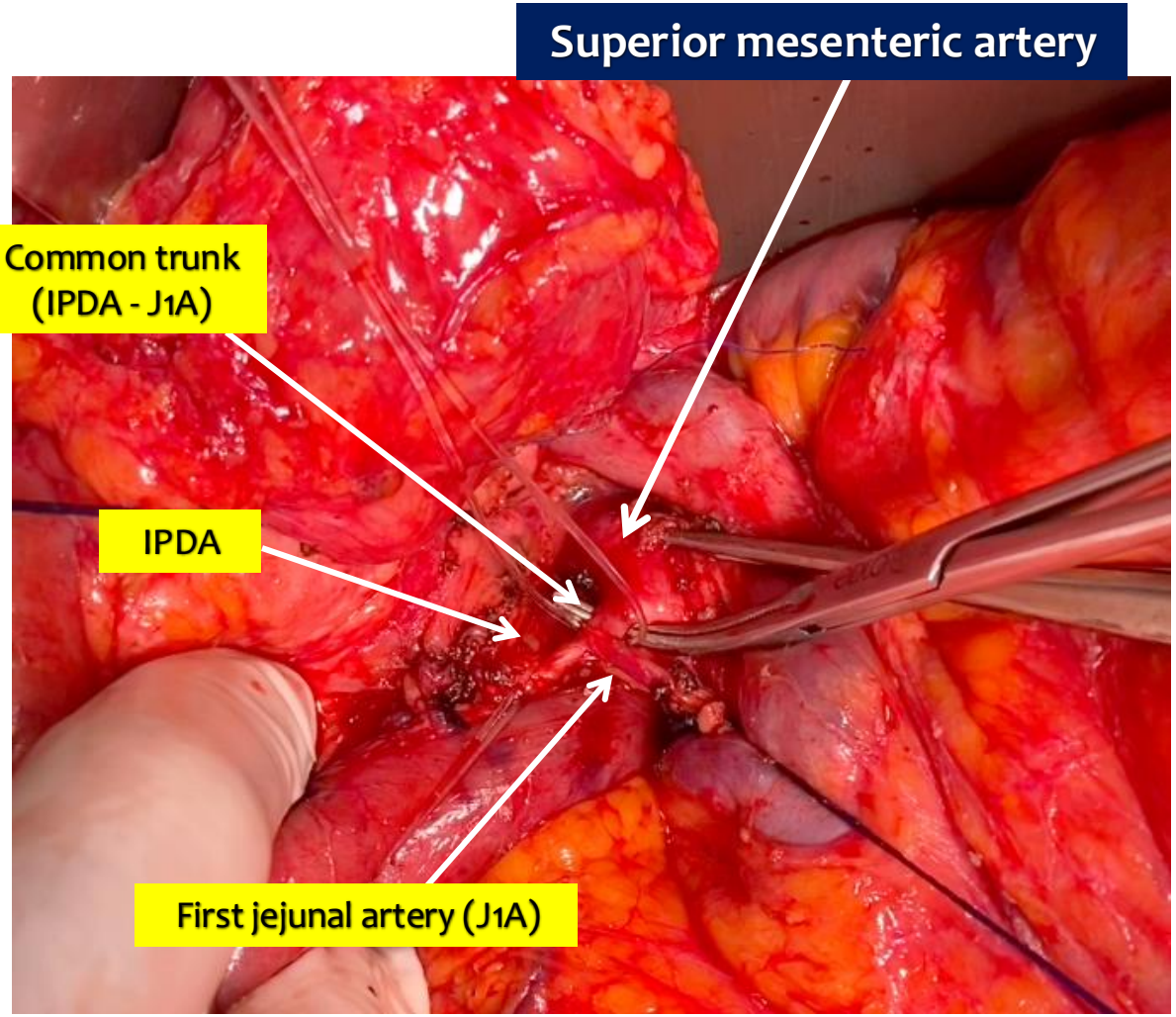
ARTERY FIRST

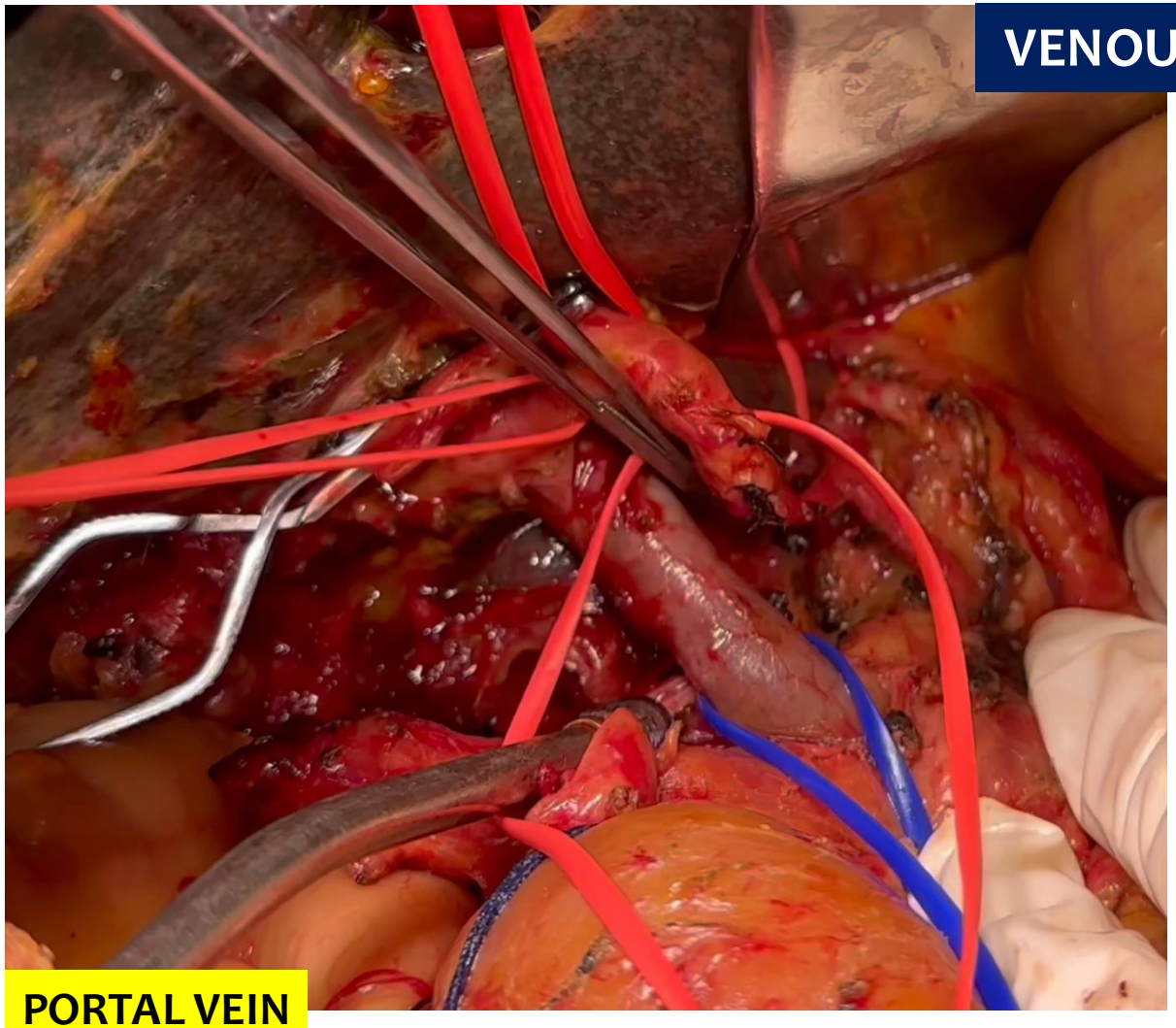
ARTERIAL CONTROL



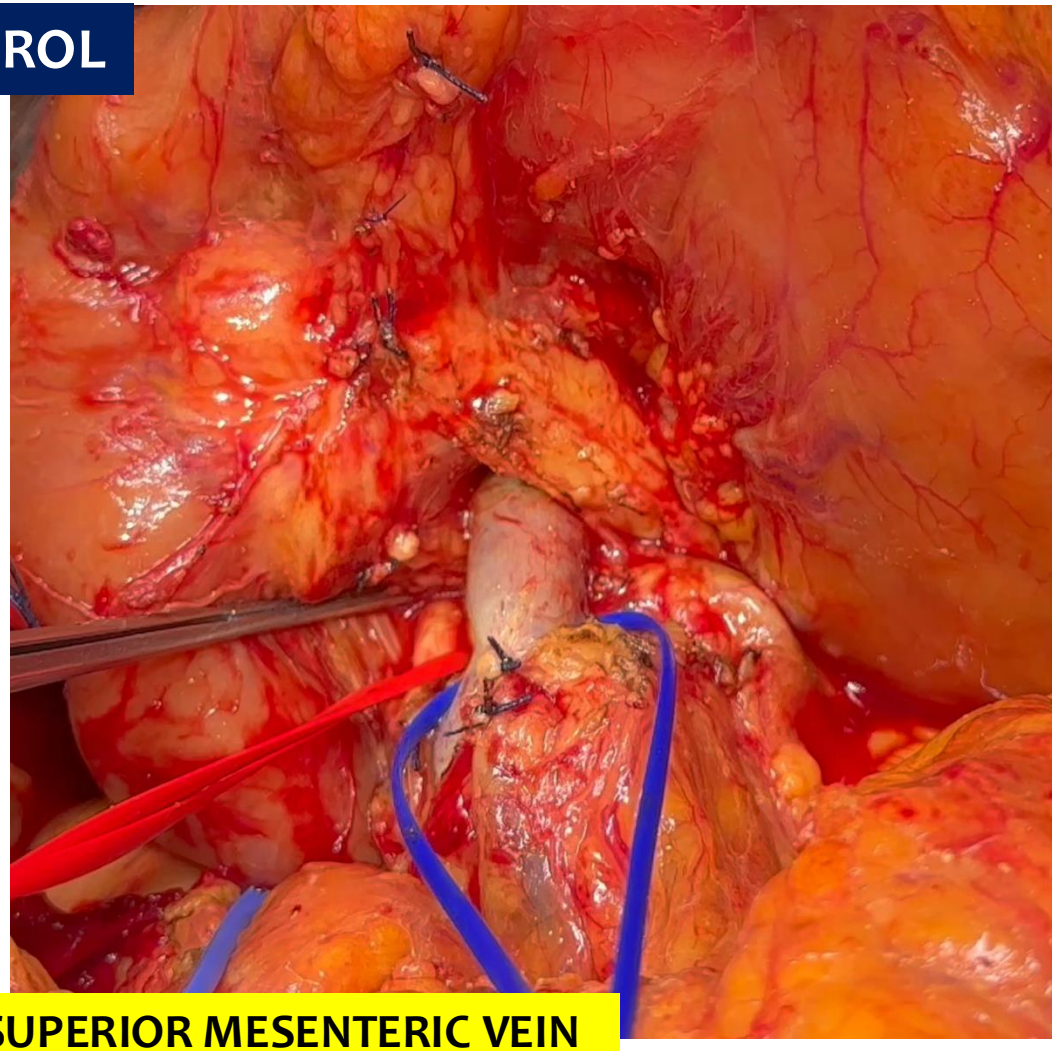


UNCINATE FIRST

VENOUS CONTROL



PORTAL VEIN



SUPERIOR MESENTERIC VEIN

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Surgery

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

DIVESTMENT

Periarterial divestment in pancreatic cancer surgery

Markus K. Diener, MD[a], André L. Mihaljevic, MD[a], Oliver Strobel, MD[a], Martin Loos, MD[a], Thomas Schmidt, MD[a], Martin Schneider, MD[a], Christoph Berchtold, MD[a], Arianeb Mehrabi, MD[a], Beat P. Müller-Stich, MD[a], Kuirong Jiang, MD[b], John P. Neoptolemos, MD[a], Thilo Hackert, MD[a], Yi Miao, MD[b], Markus W. Büchler, MD[a,*]

Resultados promissores LAPC após quimioterapia neoadjuvante[2]
Ressecção arterial com resultados animadores[3]
Difícil interpretação radiológica (>180) de tumor e fibrose após QTNeo[4]
Critérios radiológicos de invasão vascular superestimam envolvimento após QTNeo[5]
Envolvimento radiológico arterial >180° e ≤ 270°, não estava invadida em 89,3% das vezes[6]
Duodenopancreatectomia + ressecção arterial é superior ao tratamento paliativo[7]

1. Diener MK, et al. Surgery 2020
2. Hackert T, et al. Ann. Surg. 2016;264: 457–63
3. Loos M et al, Ann Surg 2022;275:759-68
4. Sasson AR, et al. Cancer 2003;34:121–8
5. Clanton J, et al. HPB 2018;20:925–31
6. Mayer P, et al. Eur J Radiol 2021;137
7. Del Chiaro M, et al. HPB 2019; 21:219–25

ENVOLVIMENTO ARTERIAL

DIVESTMENT

A) Grade 0 (No tumor)

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

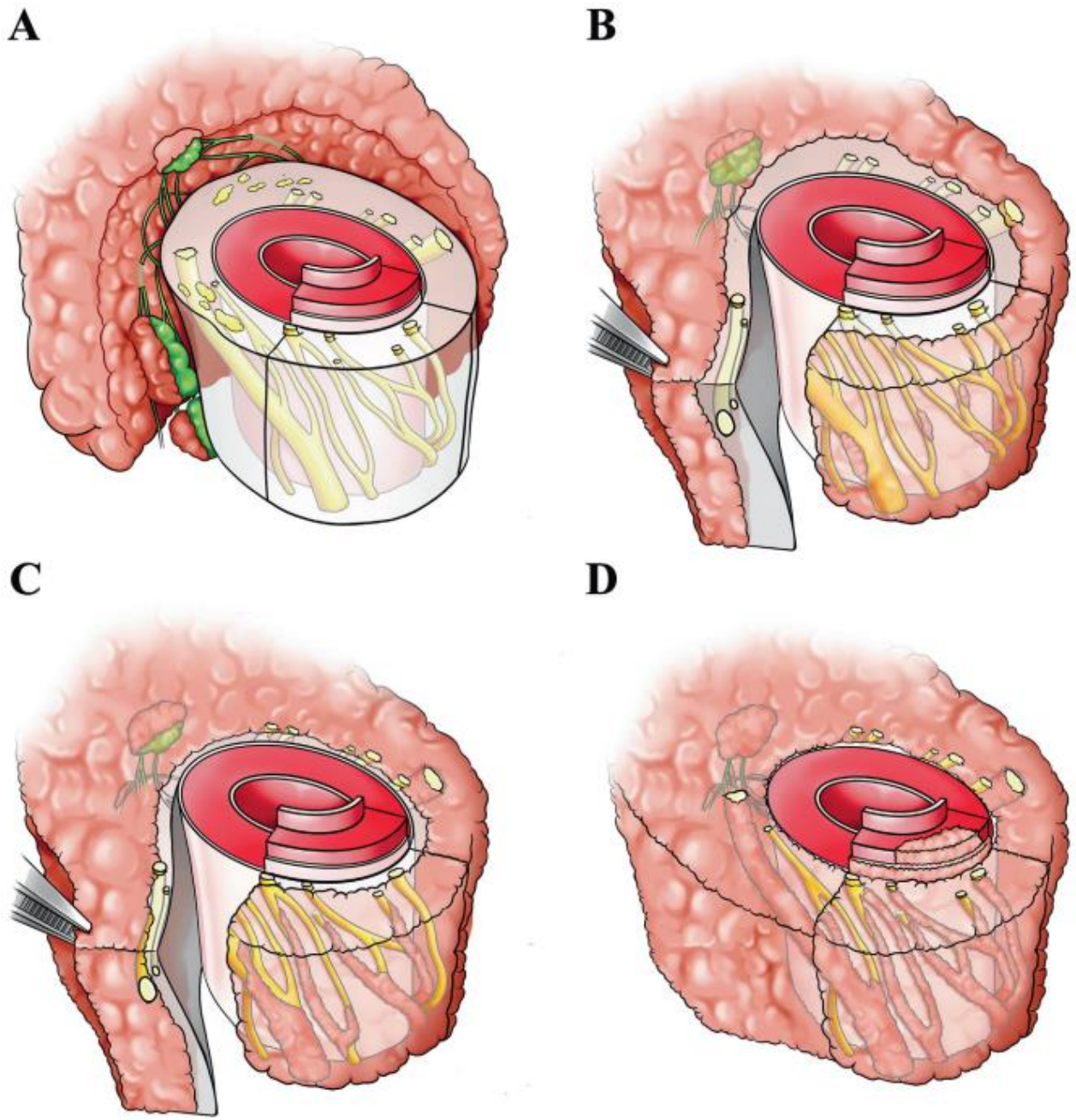
R0 – Periarterial divestment

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

R1 – Sub-adventitial divestment
Or
Arterial resection

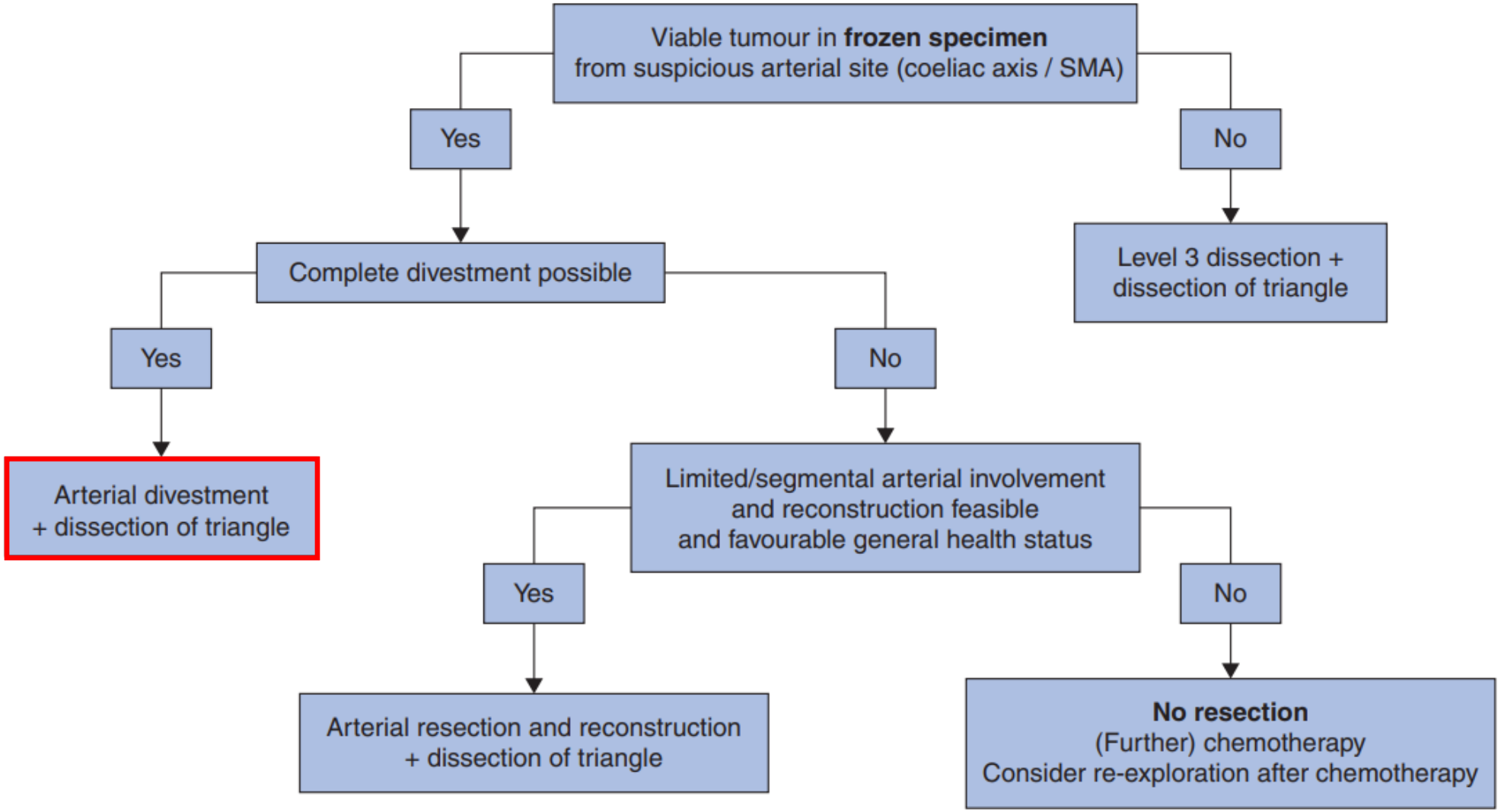
D) Grade III (Tumor invasion of the external elastic lamina).

Arterial resection
Or
Case unresectable



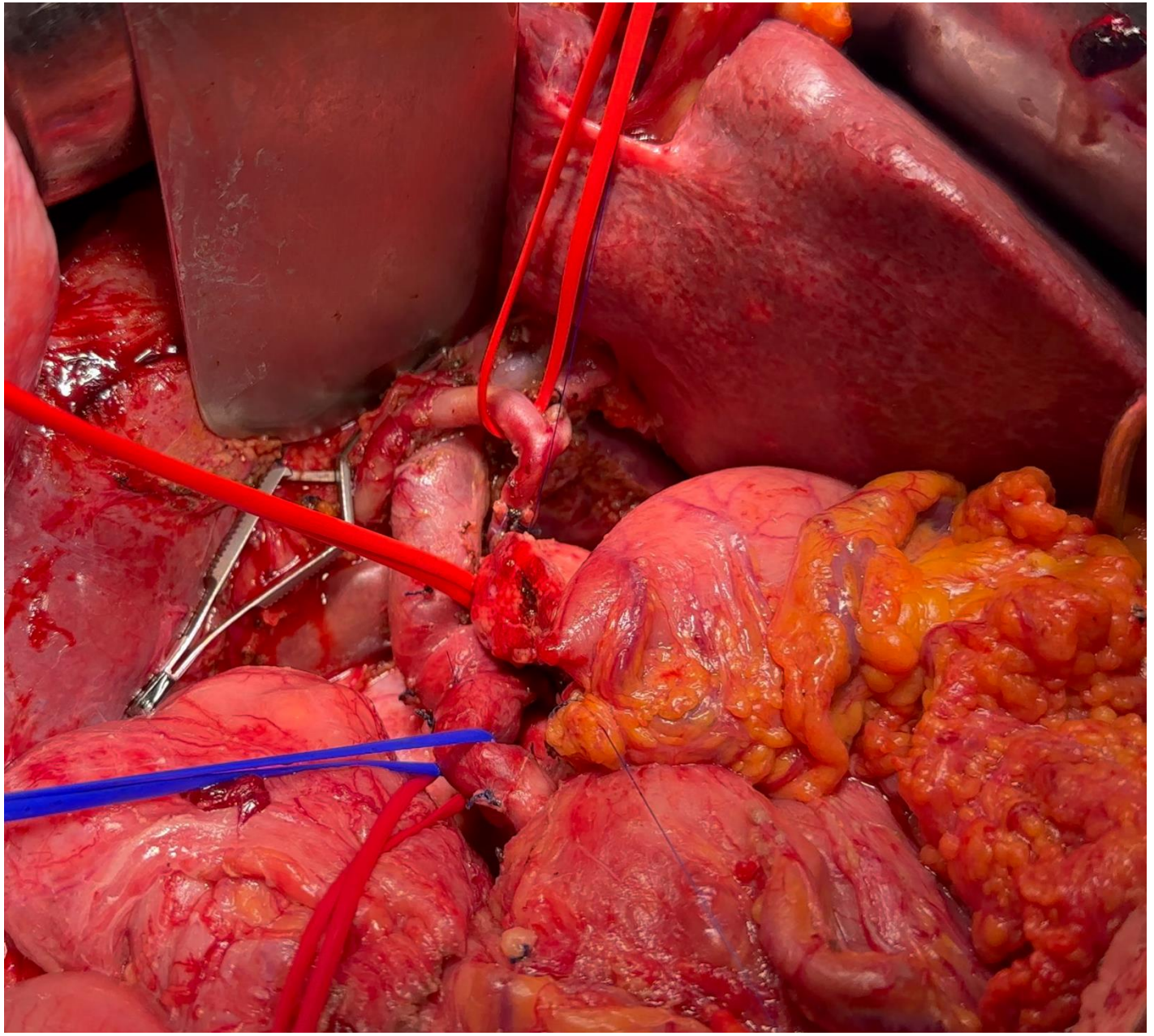
Miao Y, et al. Surg Open Sci 2023

DIVESTMENT



Schneider M, et al. BJS 2021; 108: 777–85

DIVESTMENT

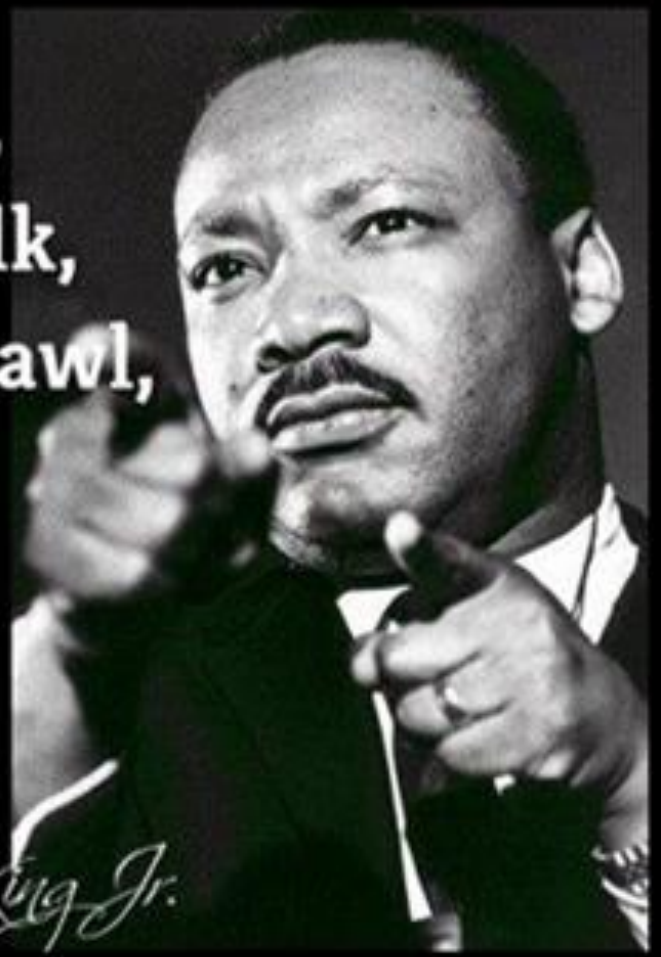


Os resultados alcançados com a utilização da quimioterapia (neoadjuvante-adjuvante) associado ao melhor entendimento da anatomia da recidiva e uma melhor técnica operatória (artery first, excisão total do mesopancreas, triangle operation, ressecção vascular e manuseio da metástase hepática), tem contribuído para uma maior sobrevida.

A discussão caso a caso através de reunião multidisciplinar (tumor board), é fundamental para uma tomada de decisão mais racionalizada.

Todo paciente tem o direito de conhecer essas opções terapêuticas (incluindo a opinião de um cirurgião de pâncreas), e discutir o que temos de melhor para um resultado satisfatório.

If you can't fly then run,
if you can't run then walk,
if you can't walk then crawl,
but whatever you do
you have to
keep moving forward.



~ Martin Luther King Jr.

Lençóis Maranhenses

Obrigado!