XVII CONGRESSO BRASILEIRO DE CIRURGIA ONCOLÓGICA

05 A 08 DE NOVEMBRO DE 2025

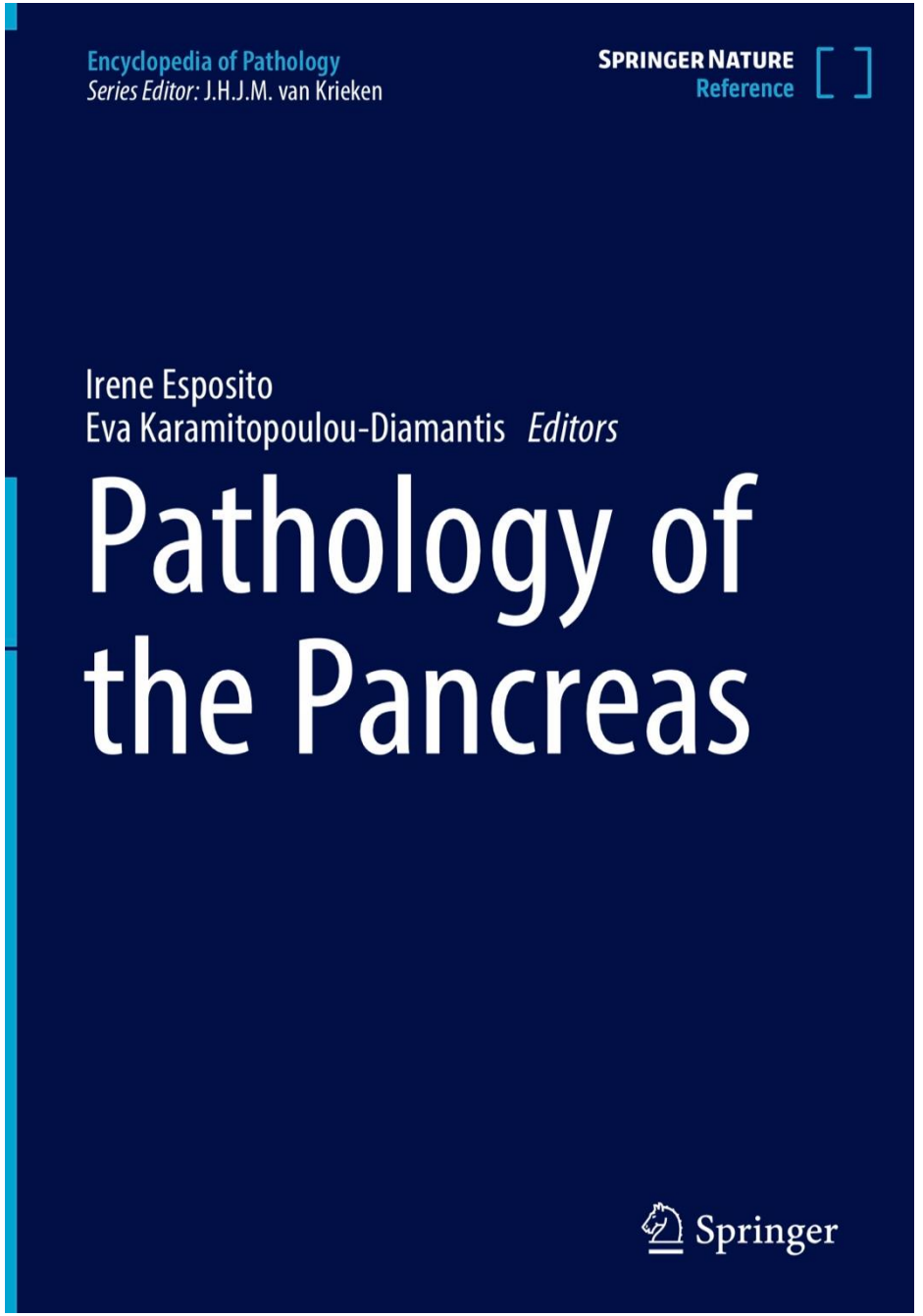
RIO DE JANEIRO

Excisão total do mesopâncreas: SEMPRE

Orlando Jorge M. Torres
Department of Gastrointestinal Surgery
Hepatopancreatobiliary Unit
Maranhão Federal University - Brazil

Prof. Irene Esposito (Heidelberg – Germany)
Pathologist - Düsseldorf, Germany

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



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]

76%

SUPERIOR MESENTERIC ARTERY

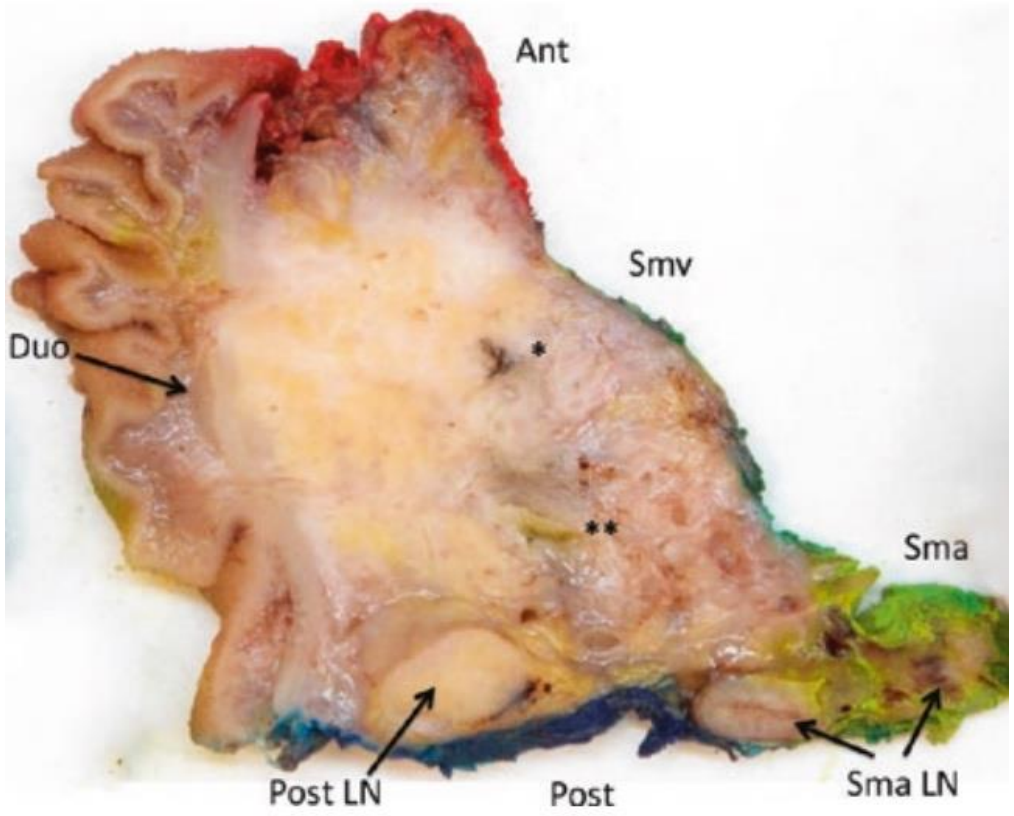


TABLE 3. *Tumor margin characteristics of 111 consecutive macroscopic complete resections for pancreatic ductal adenocarcinoma (2005–2006)*

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.

MESOPANCREAS 68%

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

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

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]
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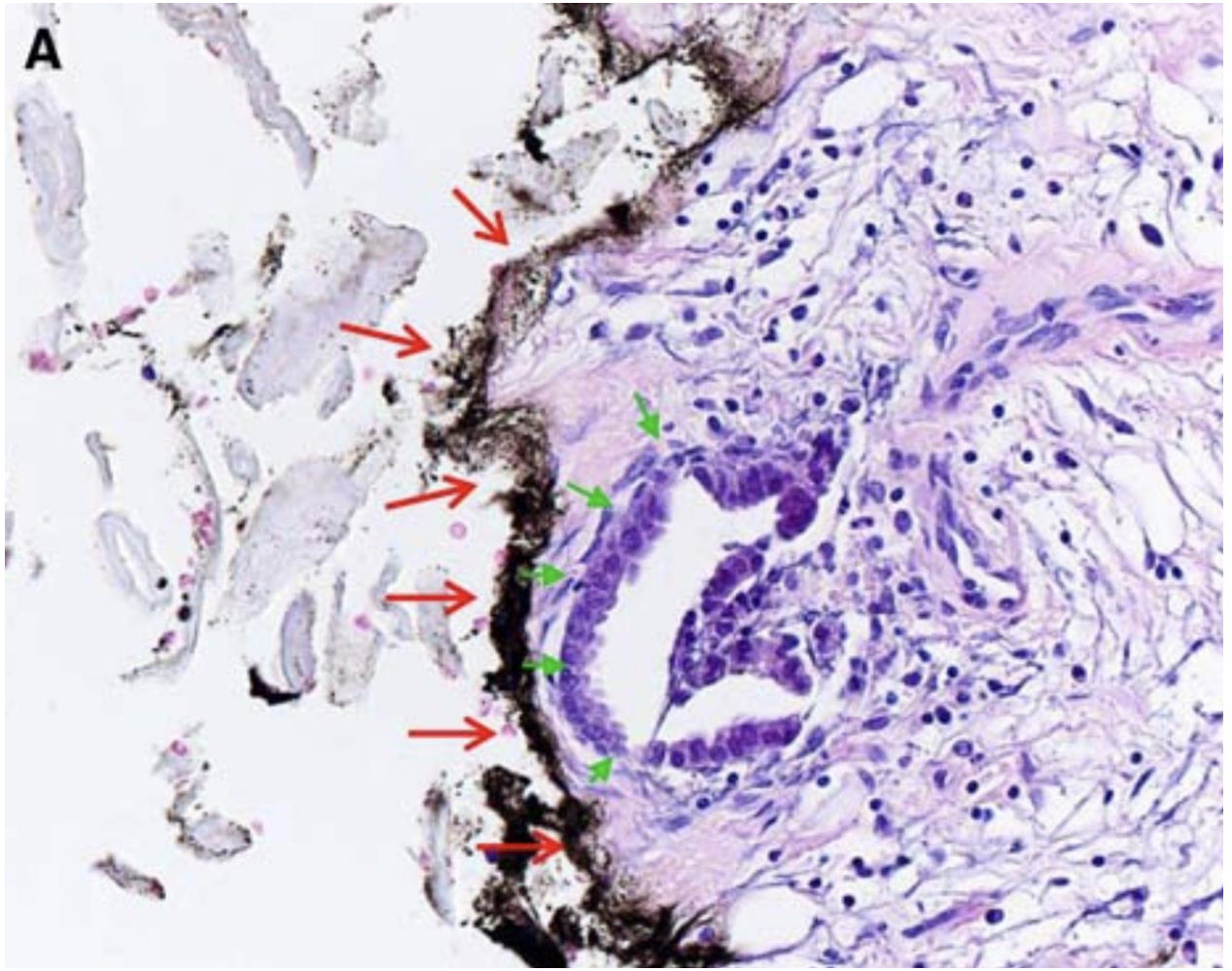


R1 – Margem ≤ 1 mm
Seta verde – Neoplasia
Seta vermelha - margem

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

Email para Prof. Irene Esposito
Pathologist - Dusseldorf, Germany

Dear Prof Esposito
Thanks a lot for your response
As a surgeon I strongly believe that the medial part of the specimen is where the smv, sma and the PLph are located and that's where we can provide a more accurate surgery in the modern concept - total mesopancreas excision
Many papers are investigating the nerves sheaths and their role in tumor dissemination.
Are you also looking into this issue?
We would love to visit you in Germany and also invite you for our meetings here in Brazil if you allow us
Your work is very much appreciated here
Warm regards
Eduardo Fernandes
Enviado do meu iPhone

Eduardo Fernandes

Resposta da Prof. Irene Esposito
Pathologist - Dusseldorf, Germany

Dear Dr. Fernandes,
thank you for your email and congratulations for your publications on this topic.

The 1-mm rule should be applied to the dorsal, medial (SMV/SMA), neck and bile-duct margins.
The ventral, peritonealized surface is to be classified as R1 only when tumor cells are detected on the ink surface, so it is not affected by the 1 mm rule. You may refer to the explanatory notes of the ICCR dataset (attached) for a clarification of these topics. Please note that in some countries the presence of tumor cells within 1-mm from e.g. the medial margin is not called R1 but R0-narrow. Whatever you call it, we know that this is a prognostic unfavourable situation, which correlates with high recurrence rates.
That said, pathologists can only assess what they receive from the OR; so it is the surgeon who is required to perform an oncologic resection including the so-called “mesopancreas”.
In any case, the best way for assessment is to follow a standardized protocol and to embed enough tissue for correct assessment of all margins.
We advocate for the axial slicing method, which you also describe in your paper.

Have I answered your questions?

Best regards
Irene Esposito

1-mm rule

Univ.-Prof. Dr. Irene Esposito

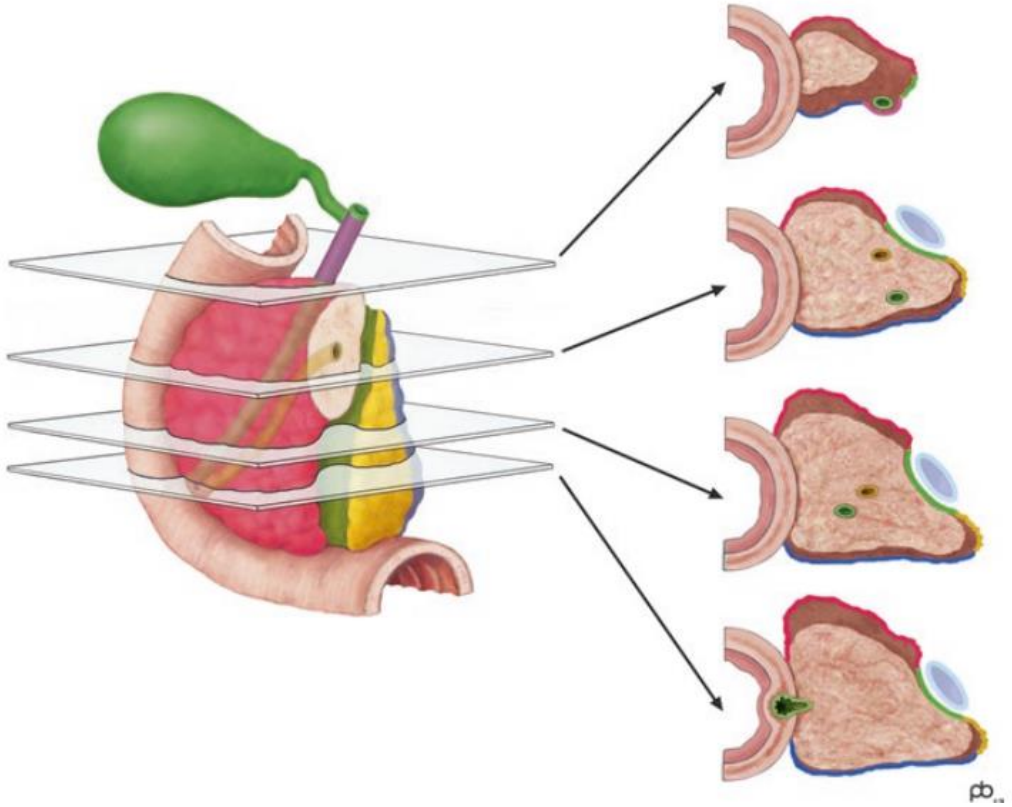
Director

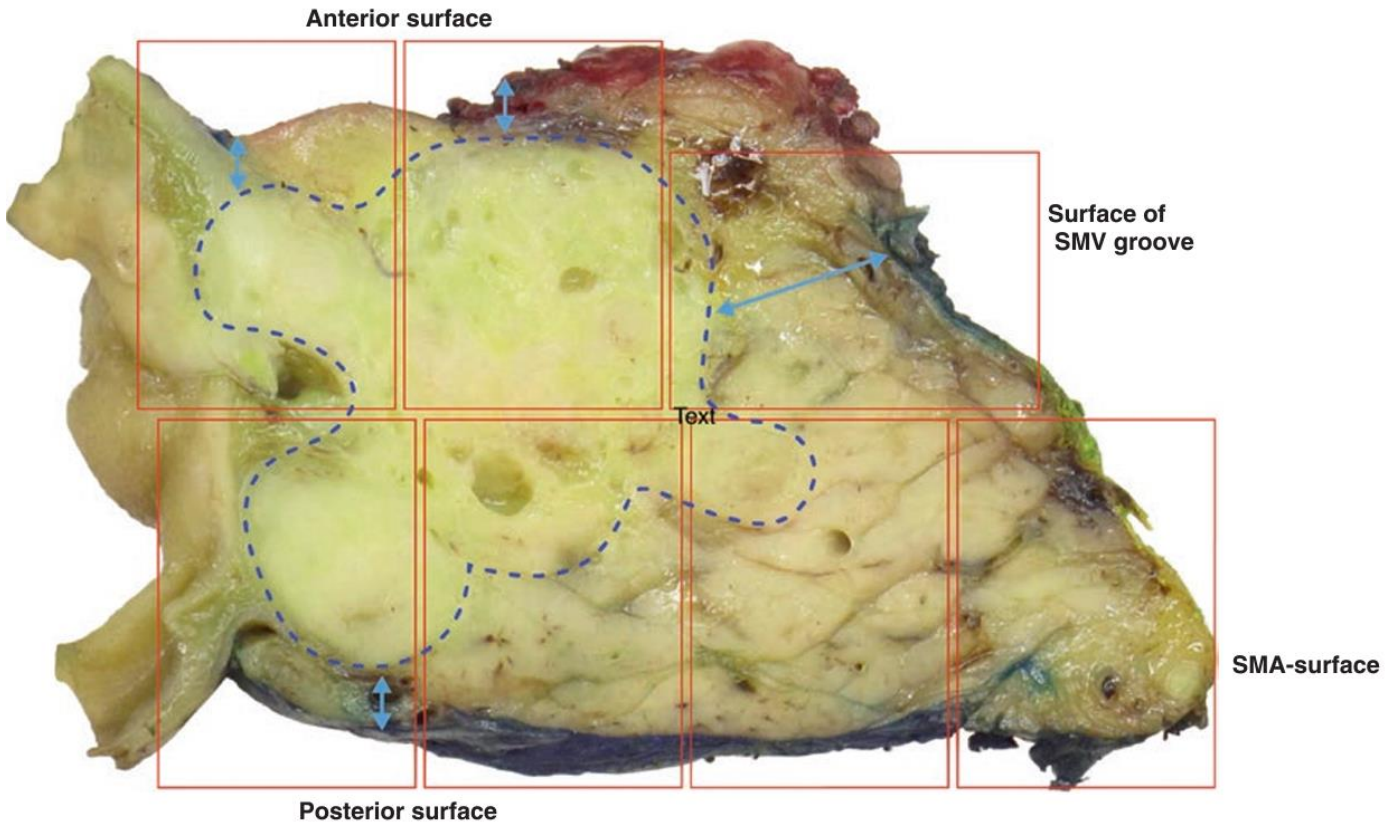
Institute of Pathology

University Hospital of Duesseldorf
Building 14.79
Moorenstr. 5
40225 Duesseldorf
Germany

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

Mesopancreas





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

Campbell F and Verbeke C. Pathology of the pâncreas. Springer 2021

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

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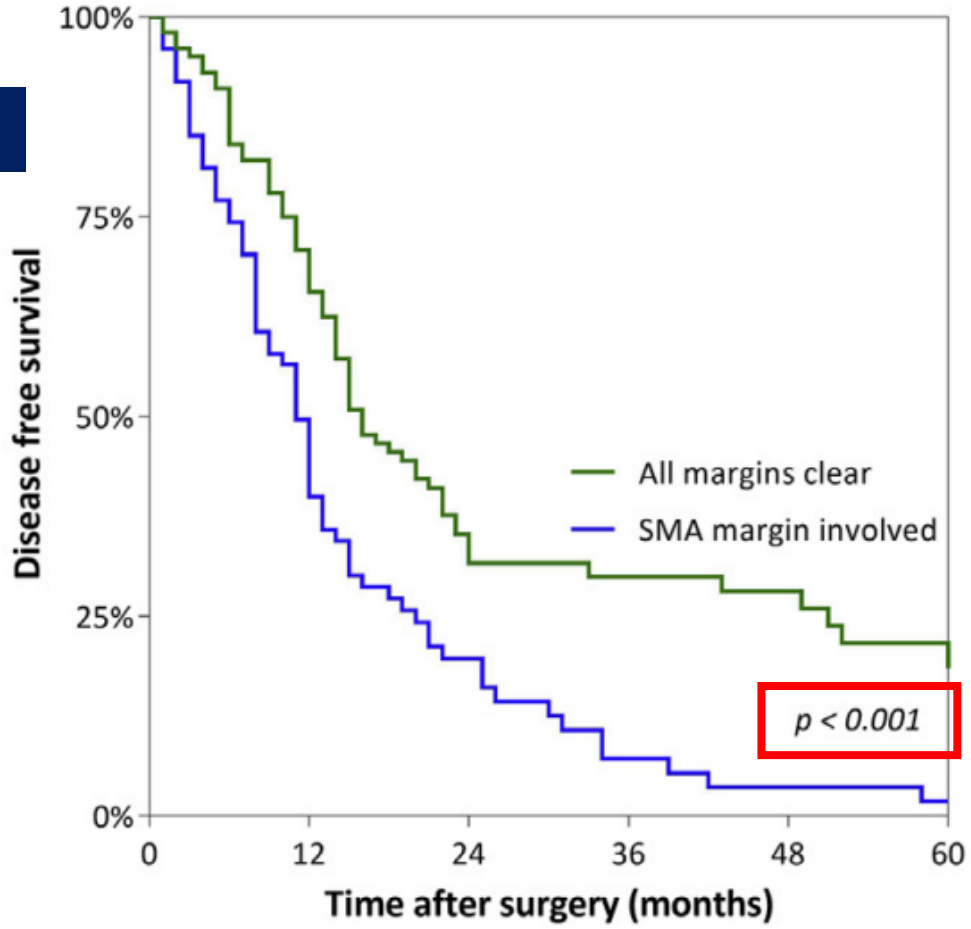
SUPERIOR MESENTERIC ARTERY

d - SMA margin clearance & disease free survival



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

SUPERIOR MESENTERIC ARTERY

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Kalisvaart M, et al. HPB 2020

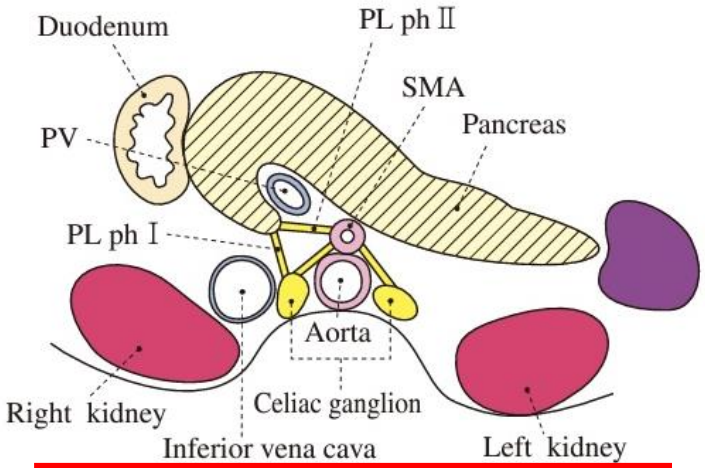


Fig. 3a Pancreatic nerve plexuses (cross-sectional diagram)

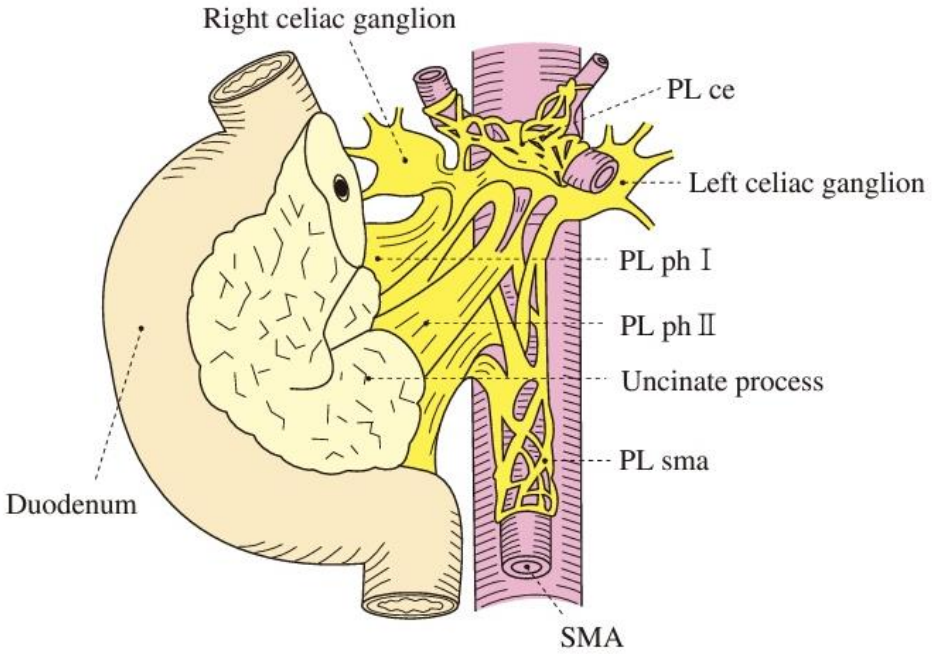
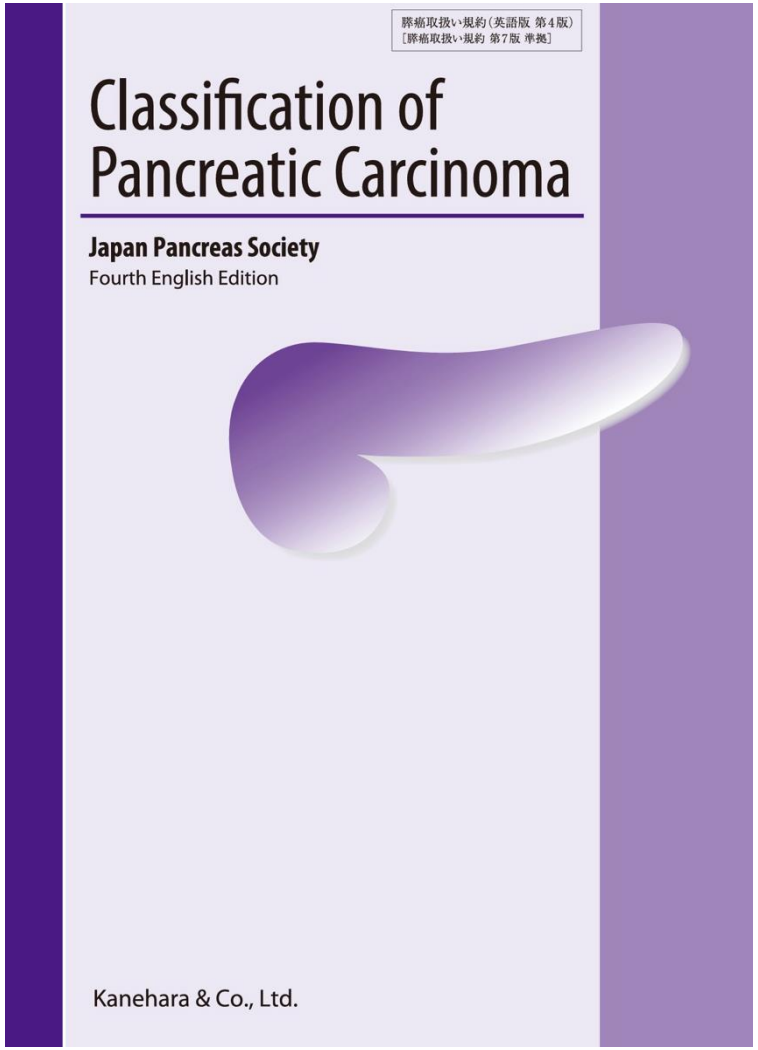


Fig. 3b Extrapancreatic nerve plexuses

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

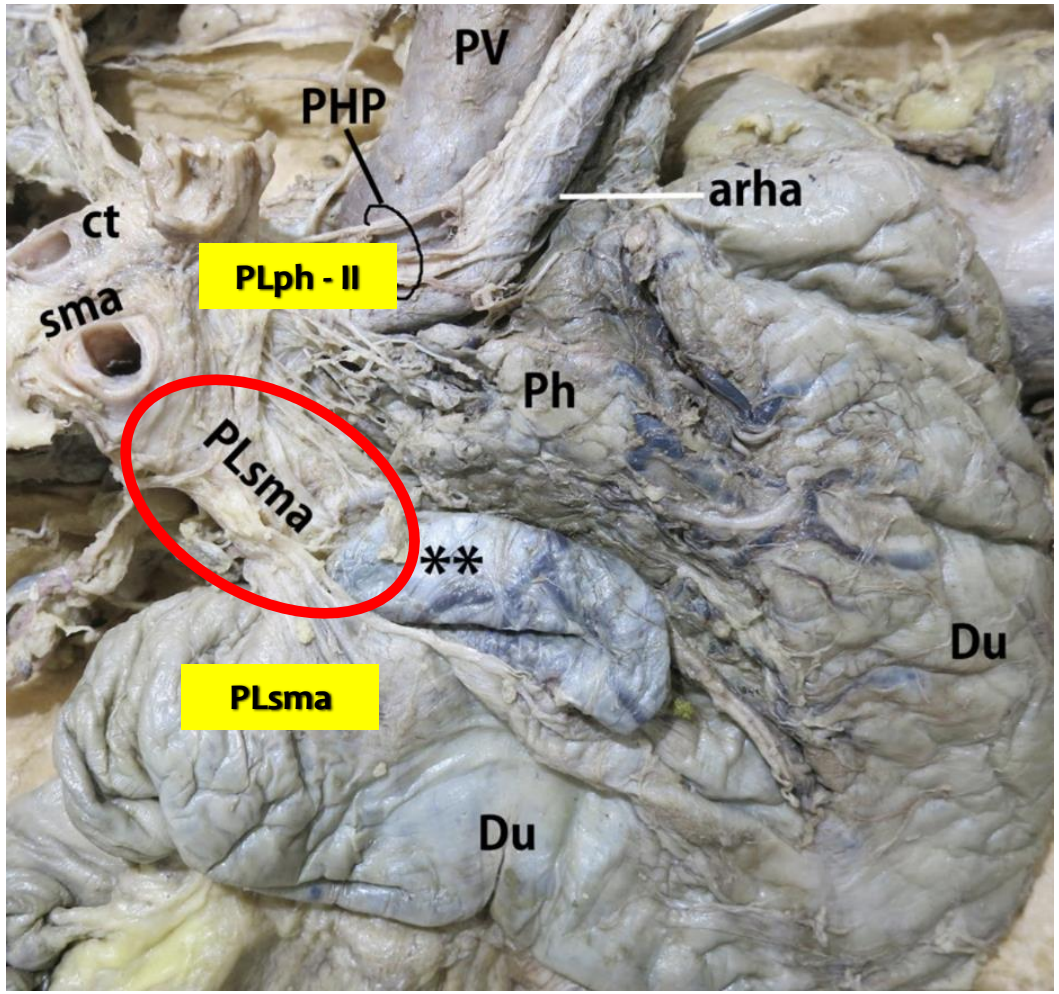


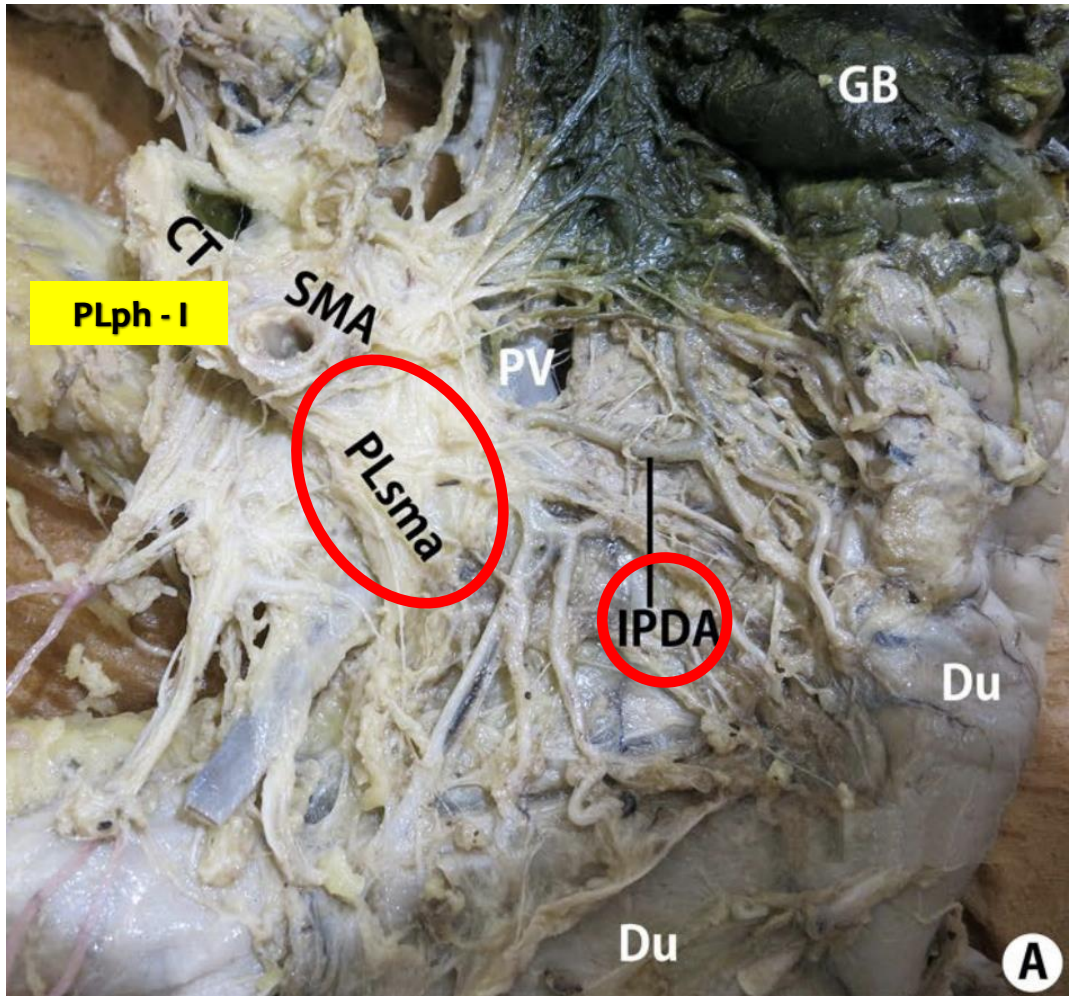
Japan Pancreas Society – Fourth English Edition, 2017

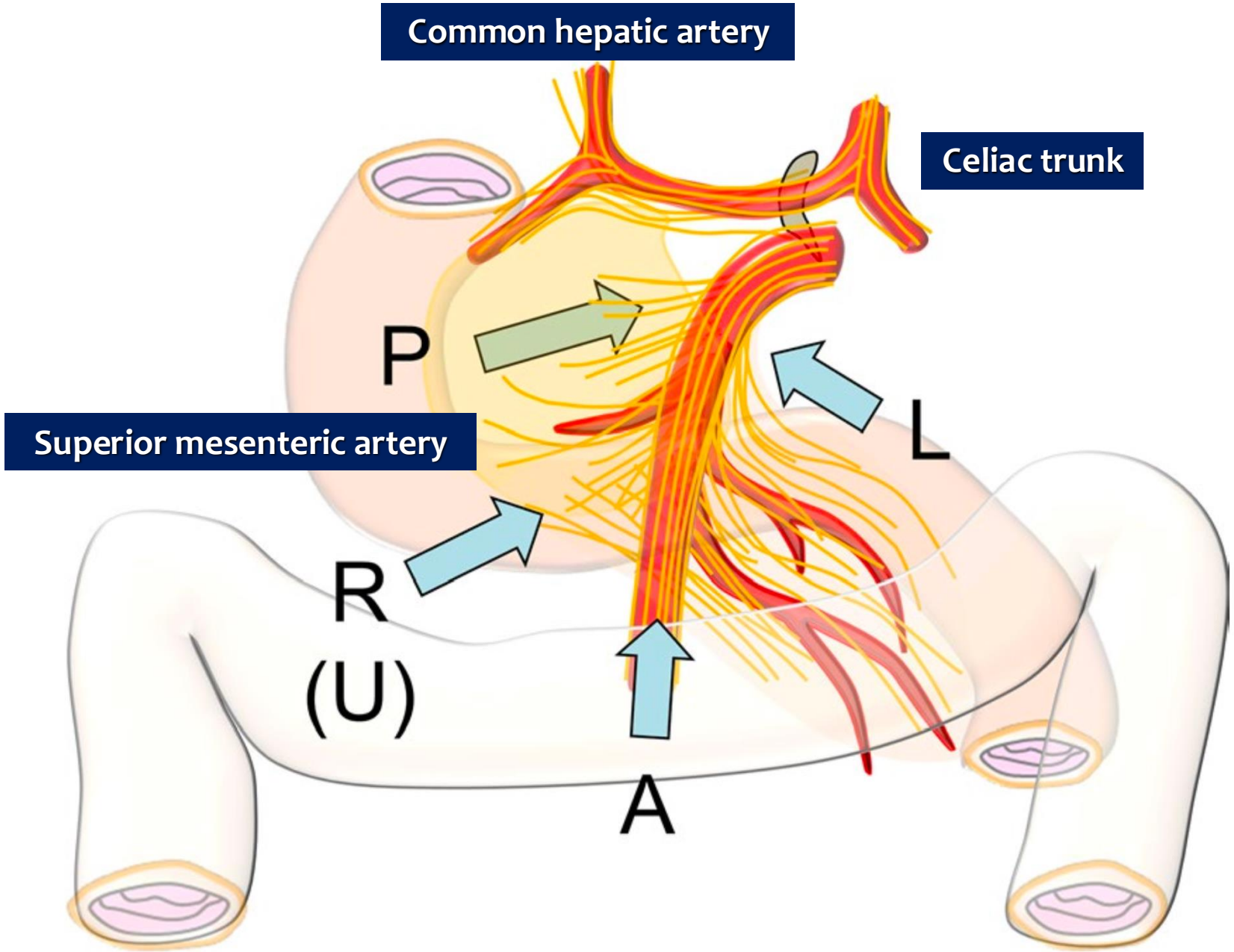
Surgical and Radiologic Anatomy (2020) 42:1501–1508
https://doi.org/10.1007/s00276-020-02547-y

ORIGINAL ARTICLE

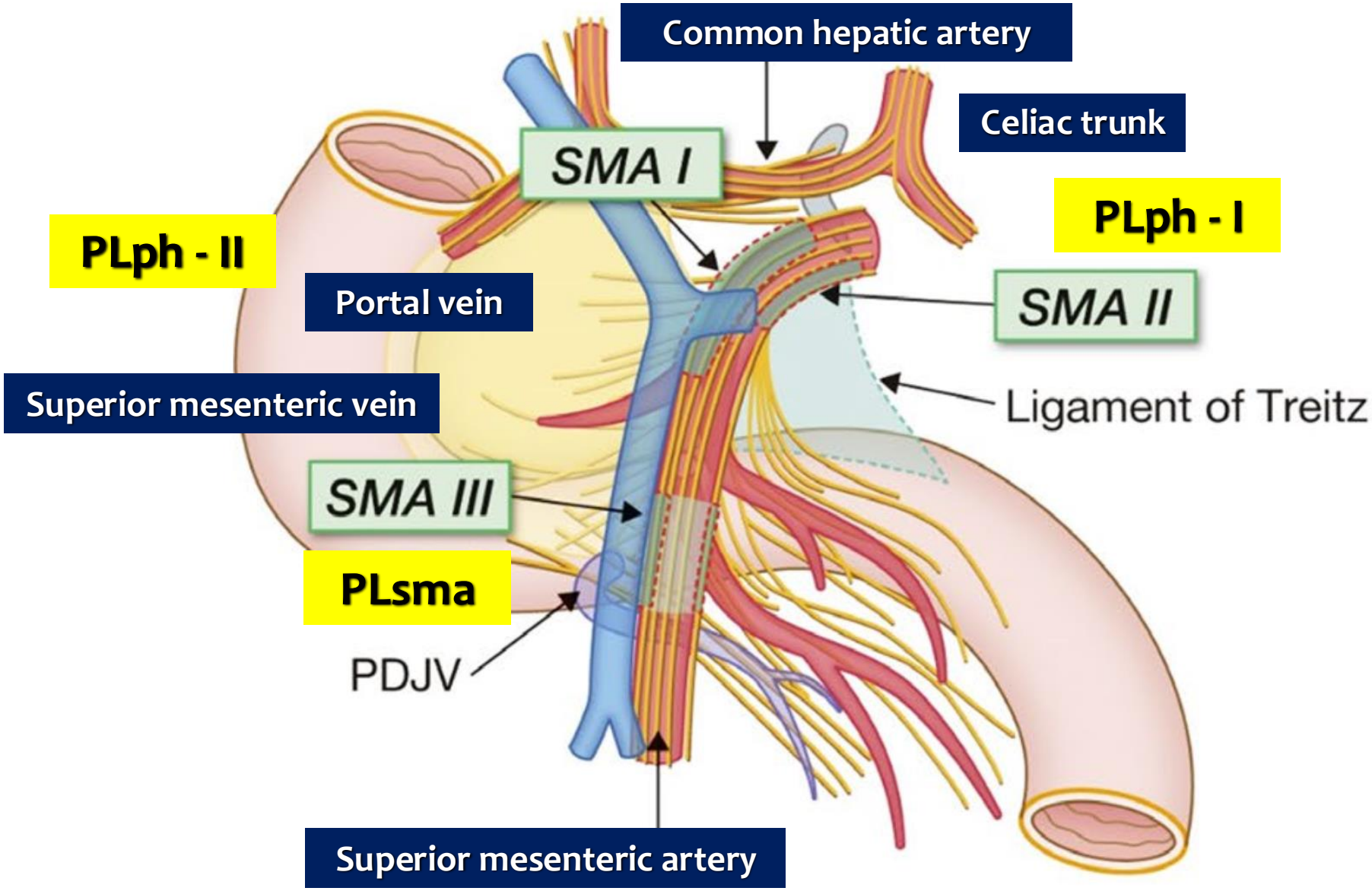
The mesopancreas and pancreatic head plexus: morphological, developmental, and clinical perspectives



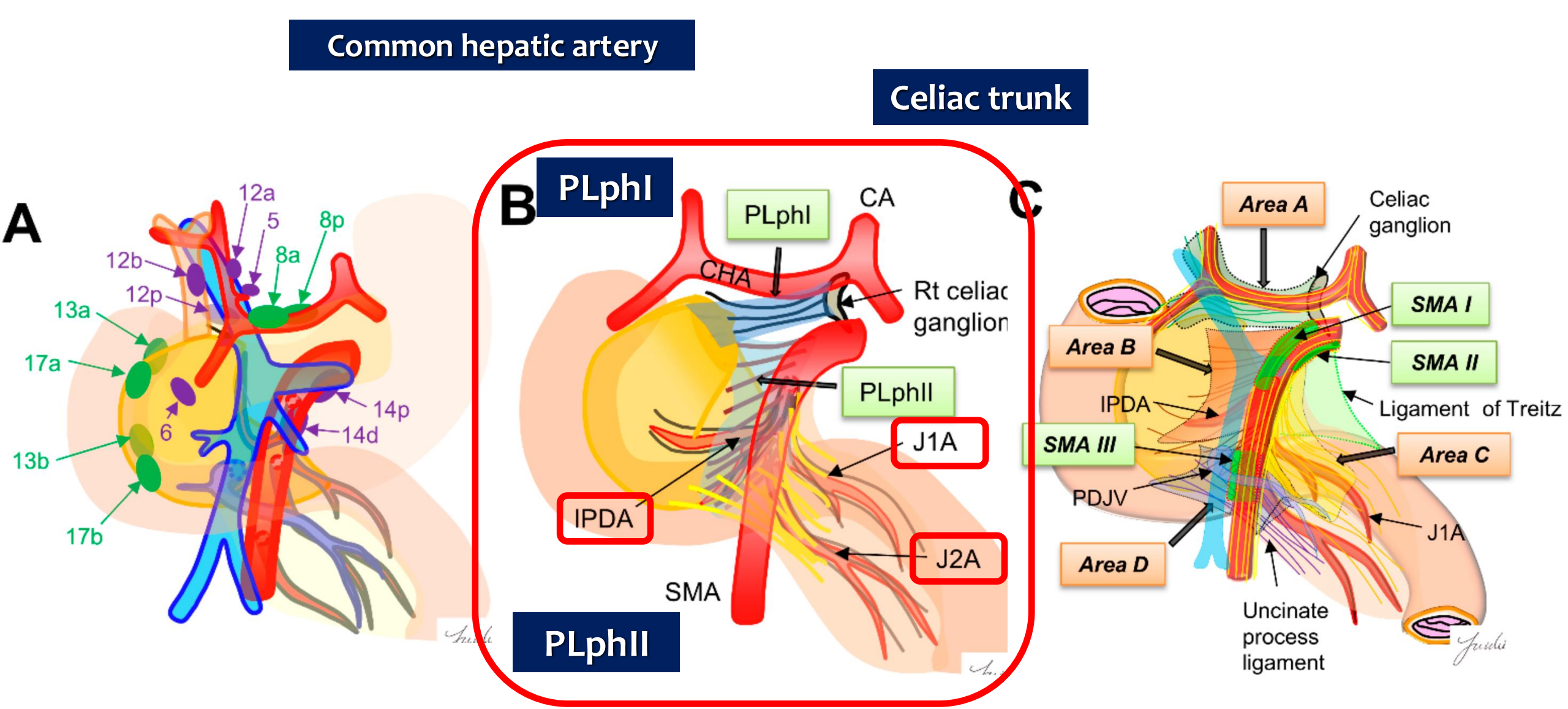




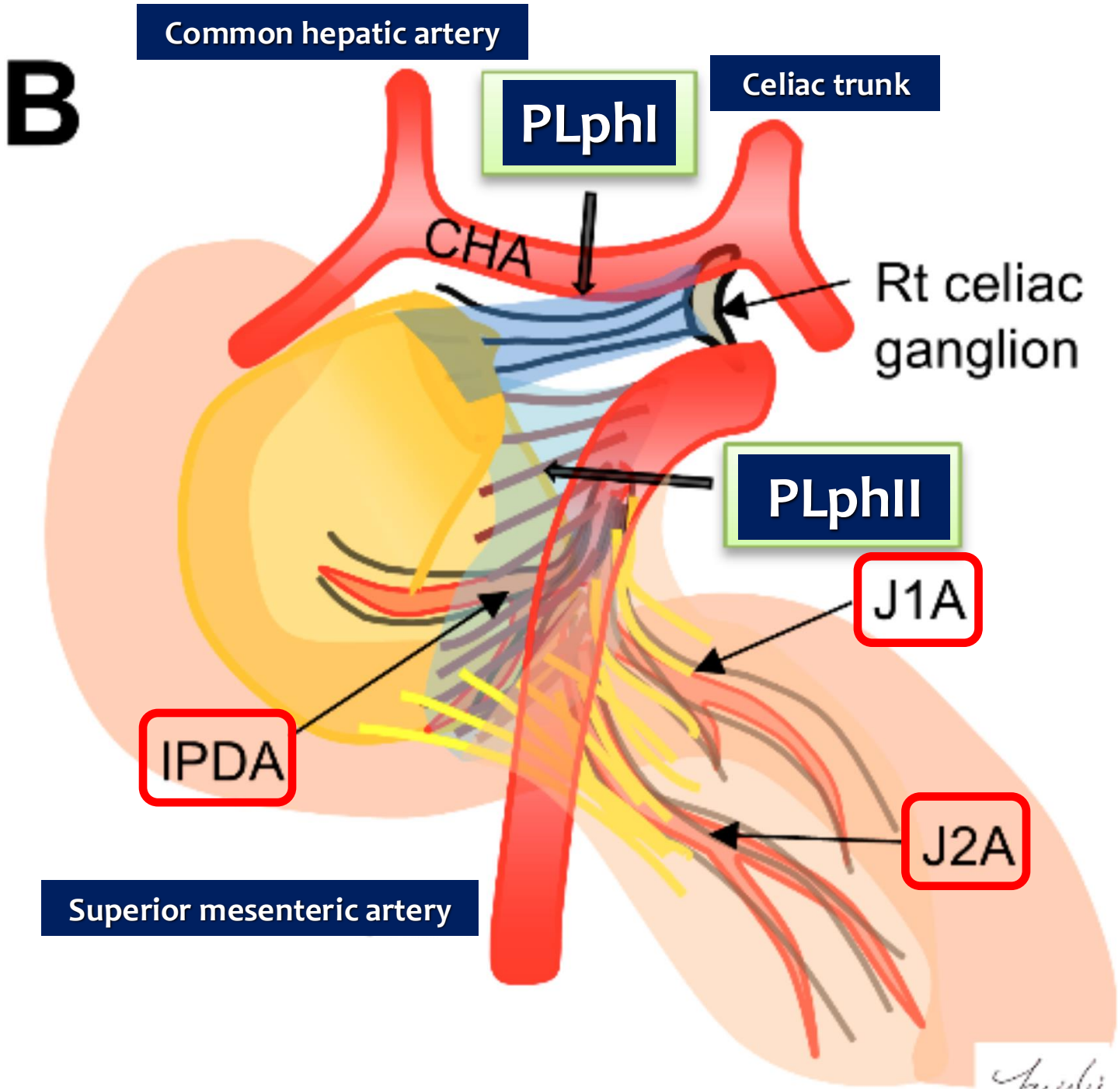
Nagakawa Y, et al. J Hepatobiliary Pancreat Sci 2021;00:1–10



Nagakawa Y, et al. J Hepatobiliary Pancreat Sci. 2020;27:342–51

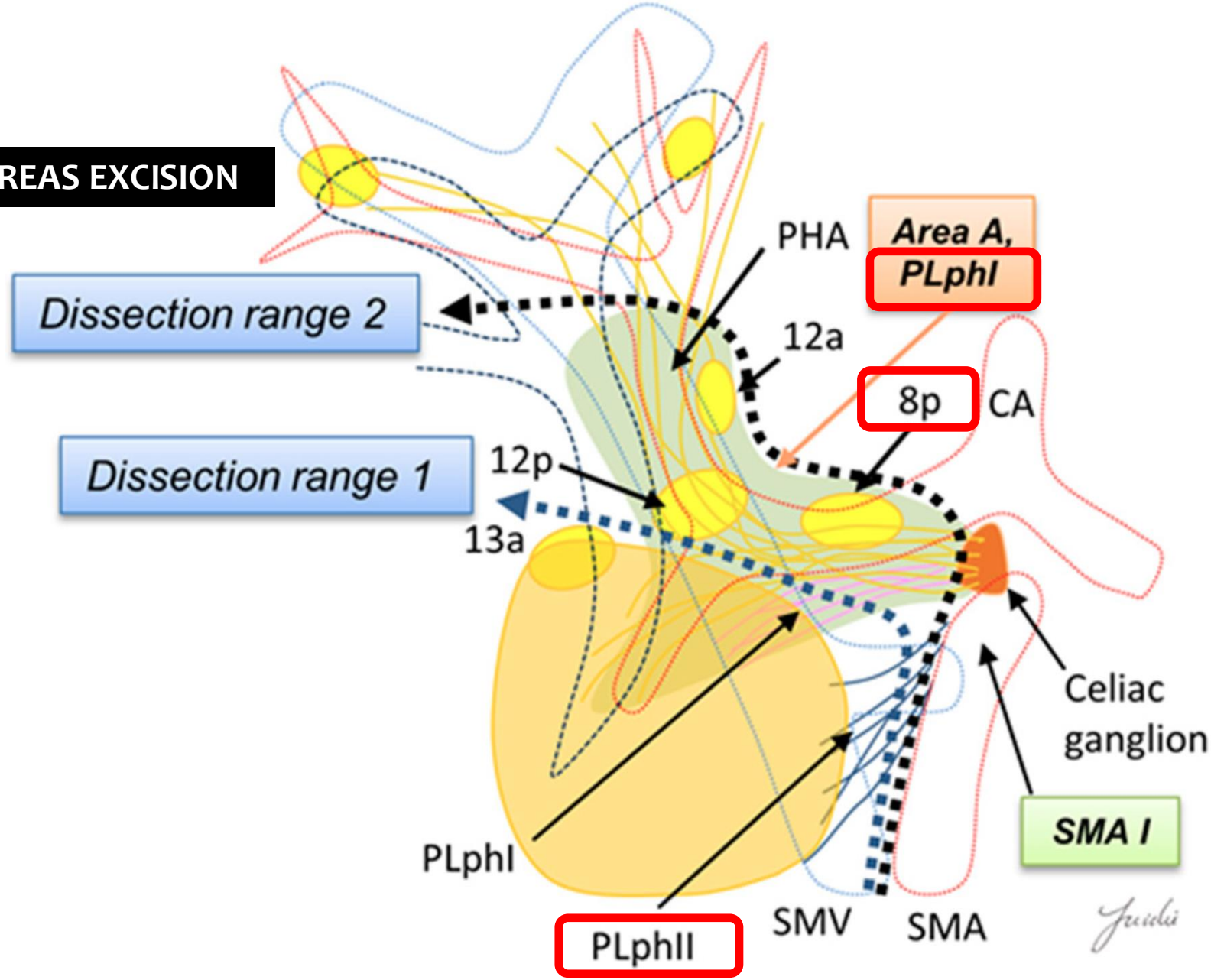


Nagakawa Y, et al. Cancers 2021; 13, 3605



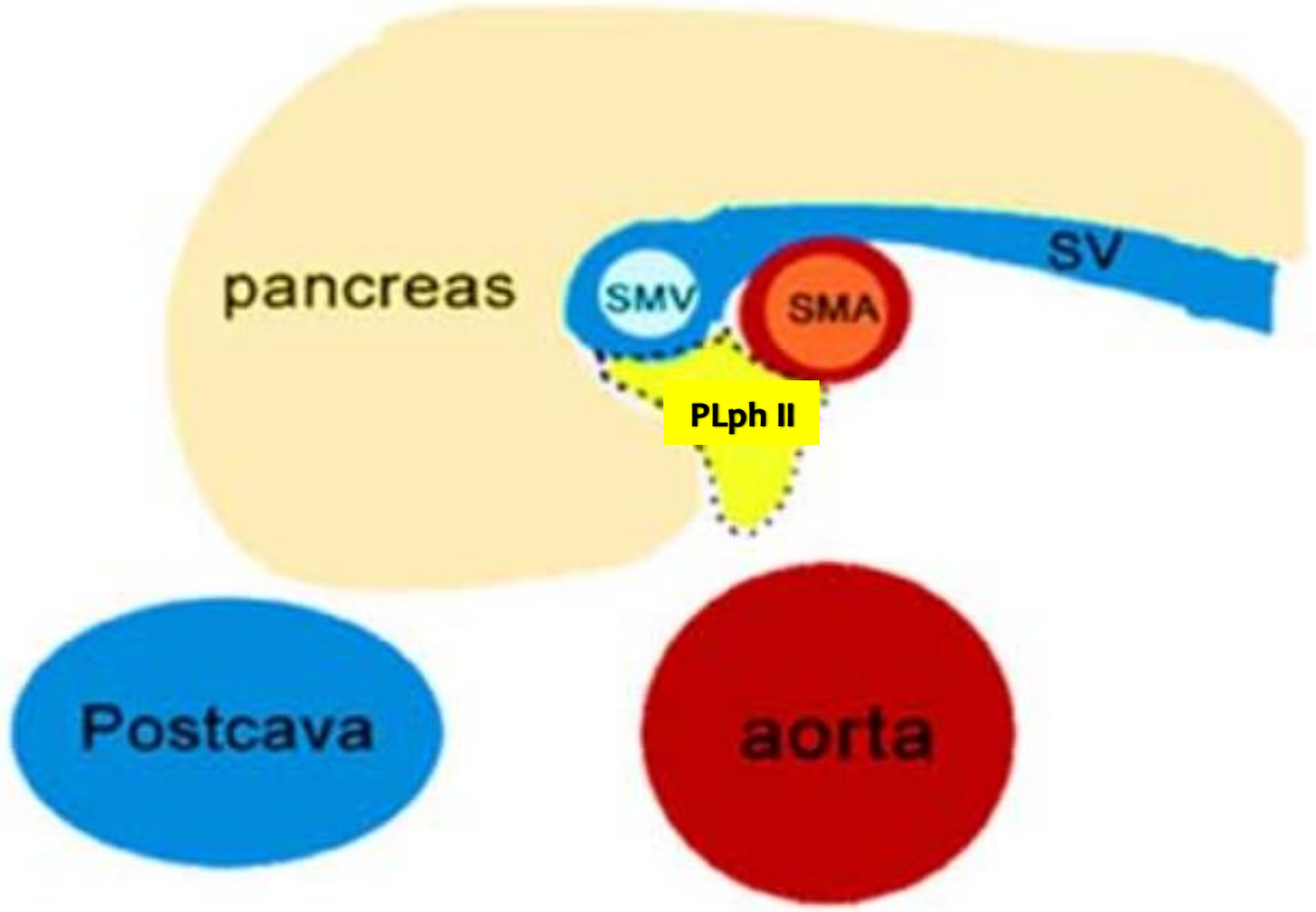
Nagakawa Y, et al. Cancers 2021; 13, 3605

TOTAL MESOPANCREAS EXCISION



Nagakawa Y, et al. Cancers 2021; 13, 3605

PLph II



Guo X, et al. Int J Surg 2023.

Mesopancreas

CELIAC TRUNK

PANCREATIC HEAD AND UNCINATE

SUPERIOR MESENTERIC ARTERY

LEFT RENAL VEIN

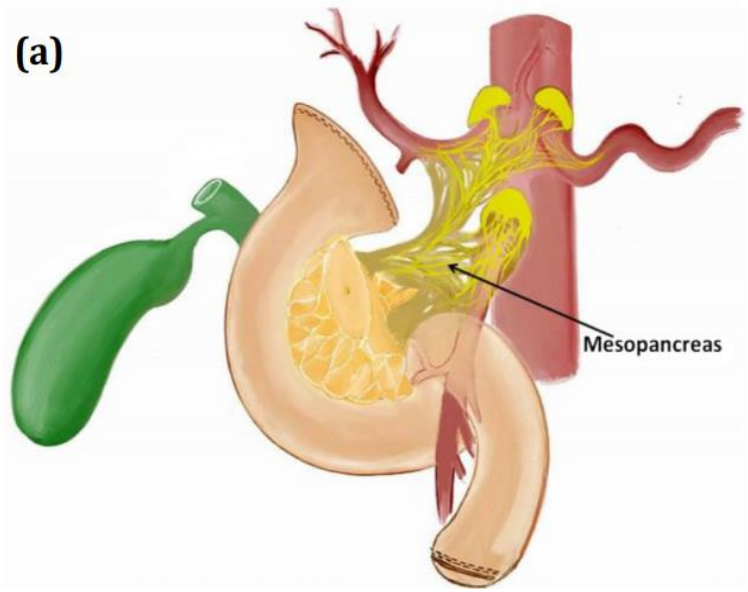
MESENTERIC ROOT

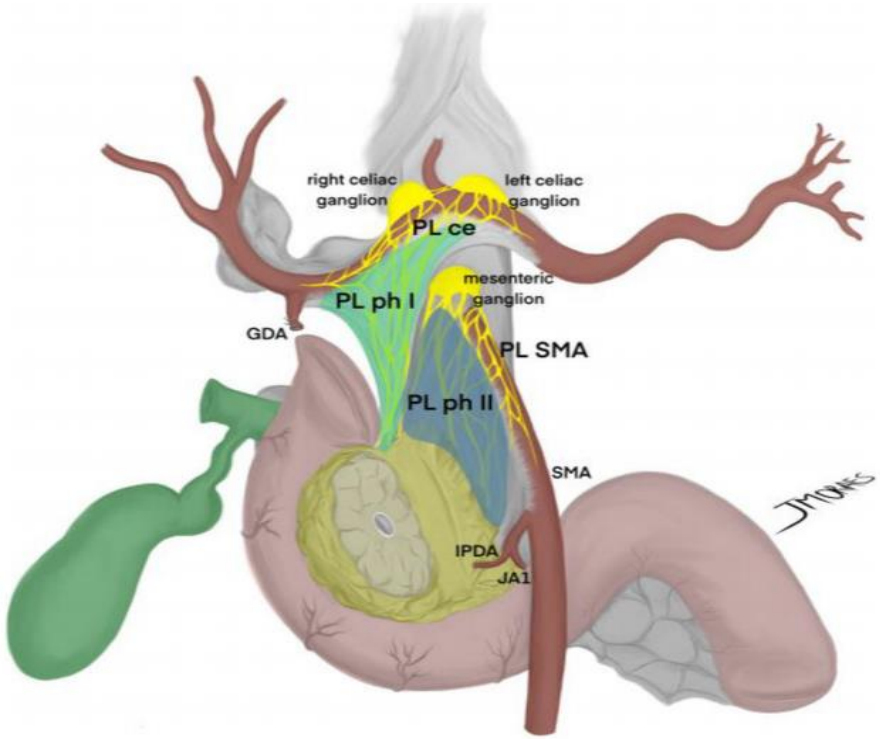
Langenbeck's Archives of Surgery
https://doi.org/10.1007/s00423-021-02211-y

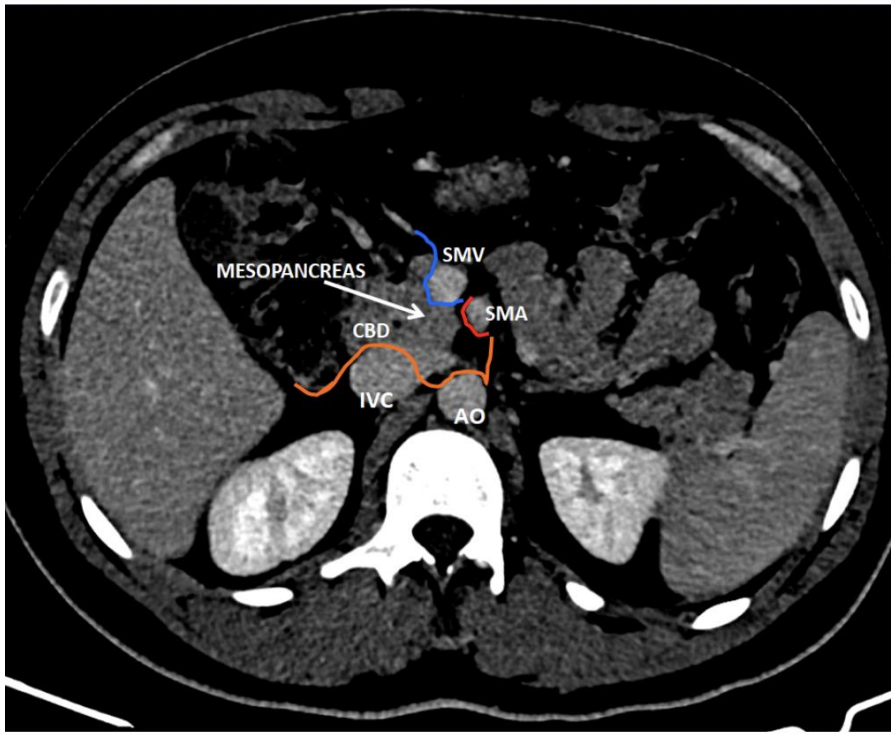
REVIEW ARTICLE

What do surgeons need to know about the mesopancreas

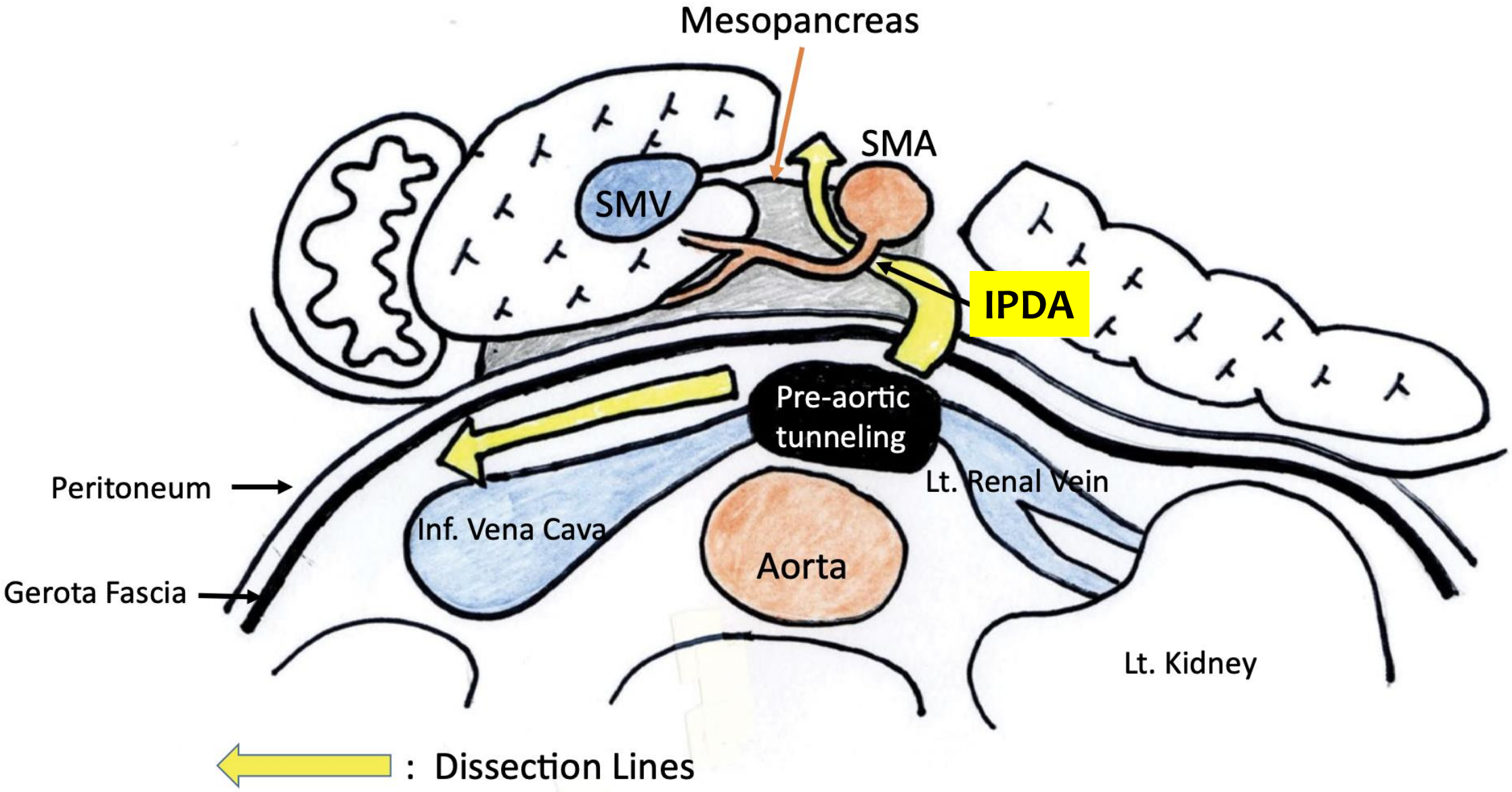
Eduardo de Souza M. Fernandes [1,2] · Oliver Strobel [3,4] · Camila Girão [1,2] · Jose Maria A. Moraes-Junior [5,6] · Orlando Jorge M. Torres [5,6]





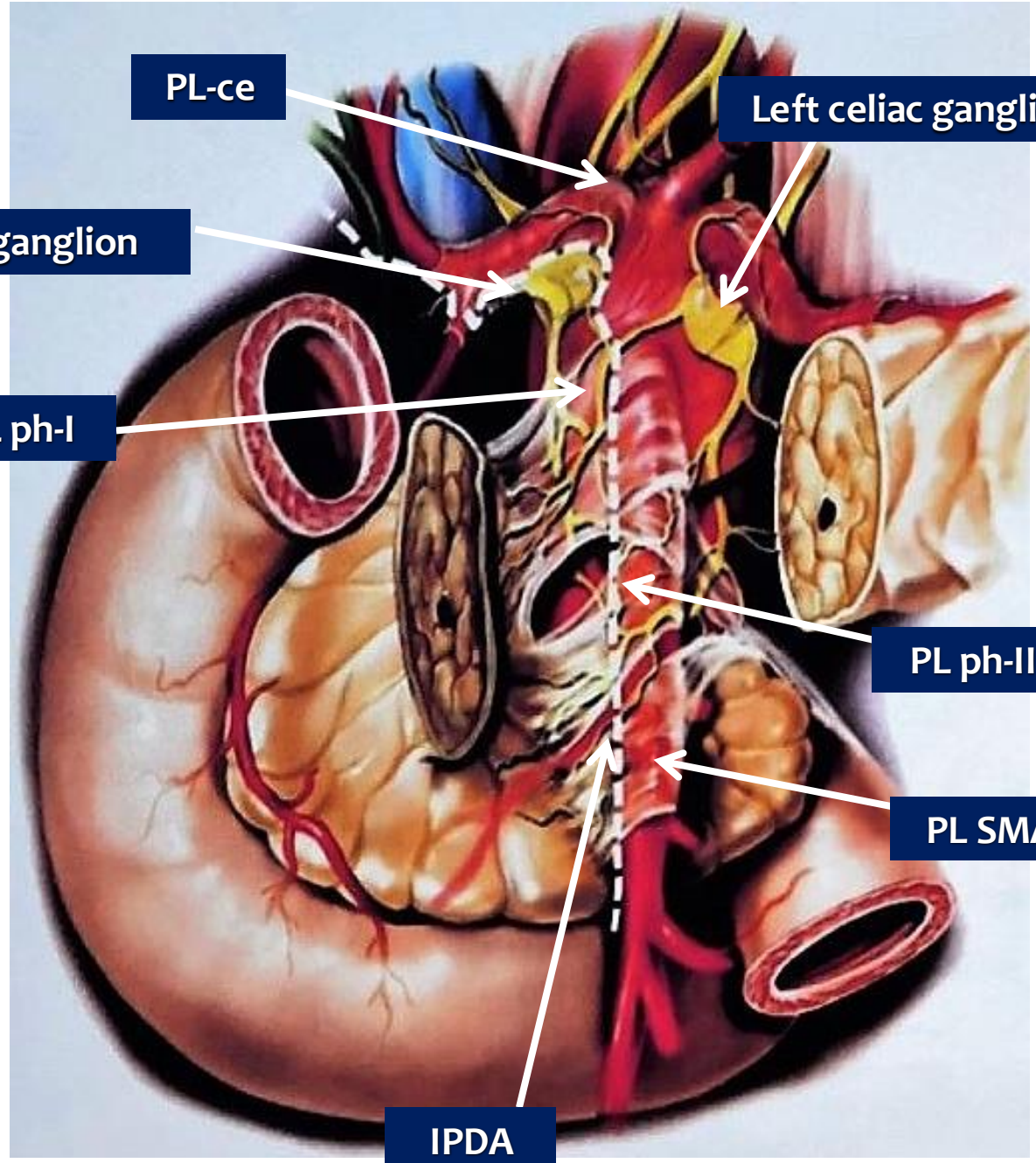


Fernandes ESM, et al. Langenbeck's Arch Surg 2021



Hirota M, et al. J Pancreas 2017; 18:245-5

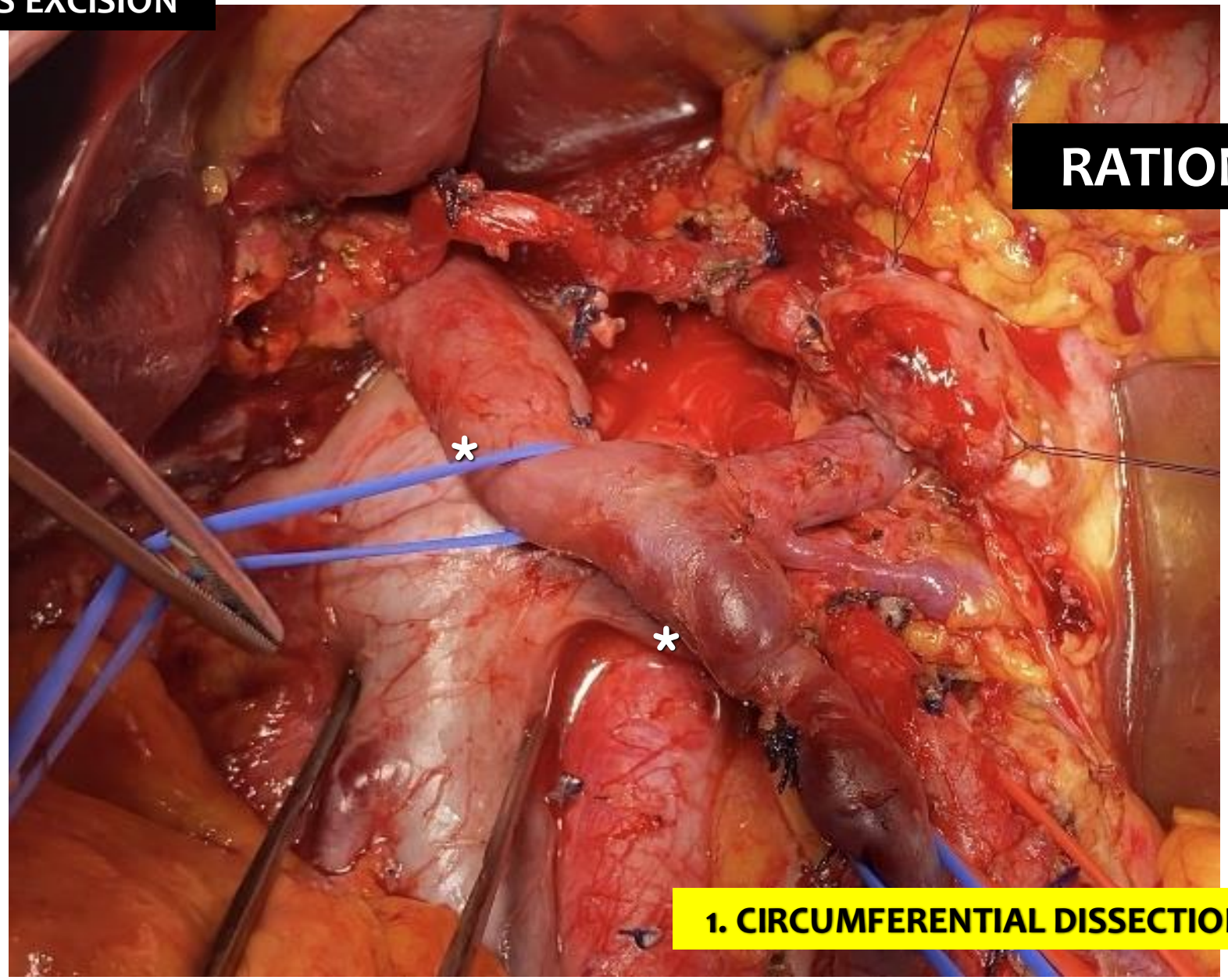
TOTAL MESOPANCREAS EXCISION



MESOPANCREAS

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

TOTAL MESOPANCREAS EXCISION



TOTAL MESOPANCREAS EXCISION

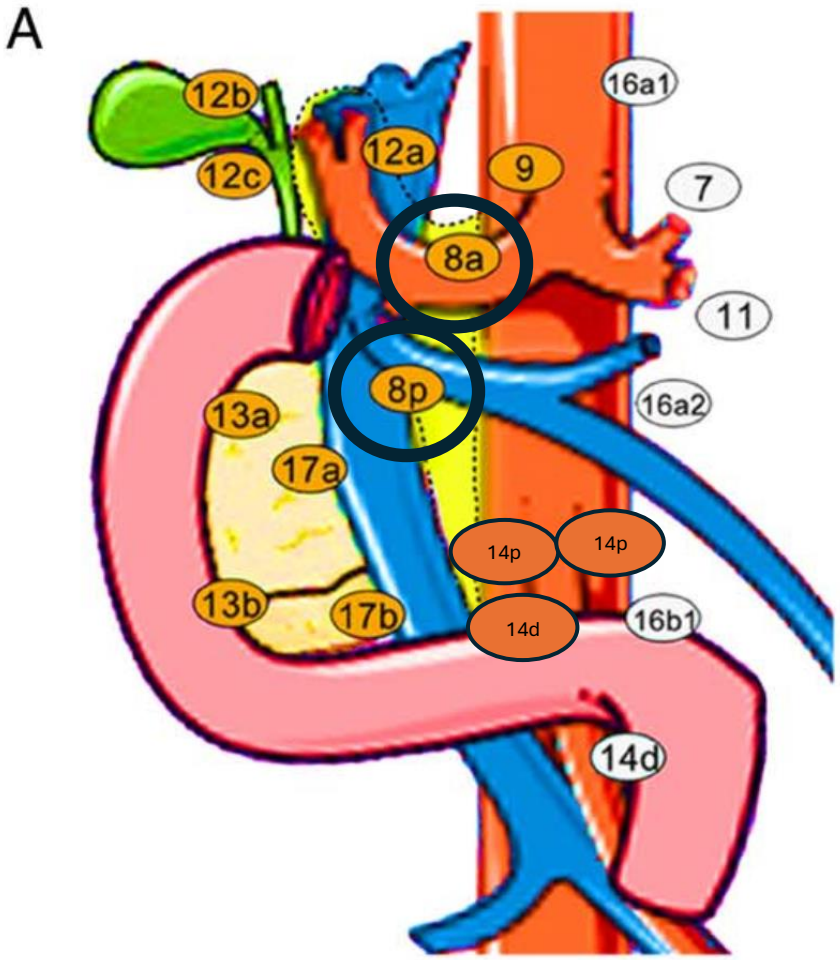
❑Common hepatic artery lymph nodes 8a, 8p

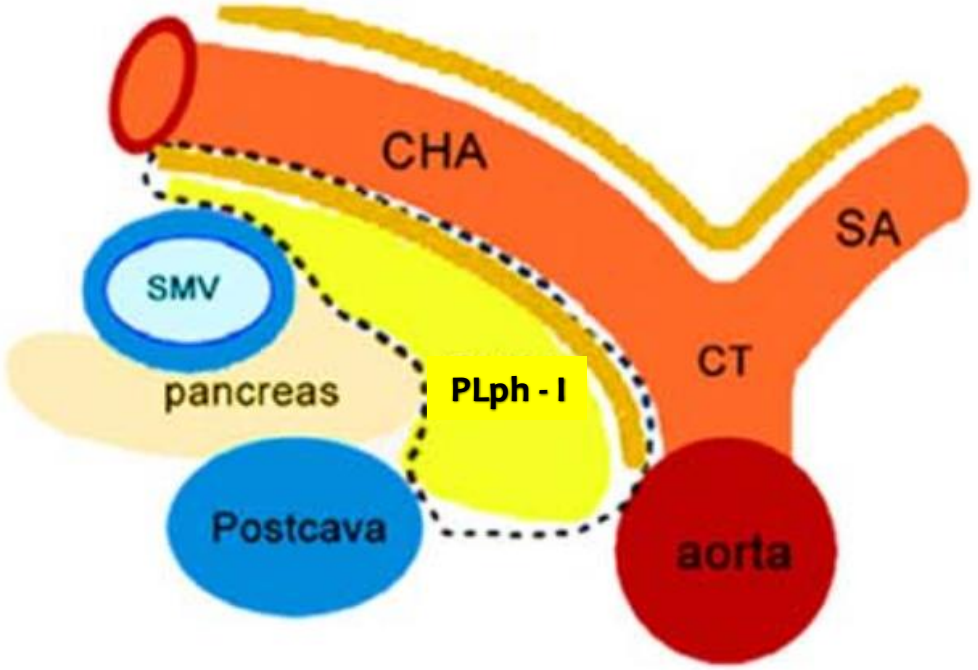
RATIONAL

2. HEMICIRCUMFERENTIAL DISSECTION OF CHA

COMMON HEPATIC ARTERY LYMPH NODES

❑8a ❑8p

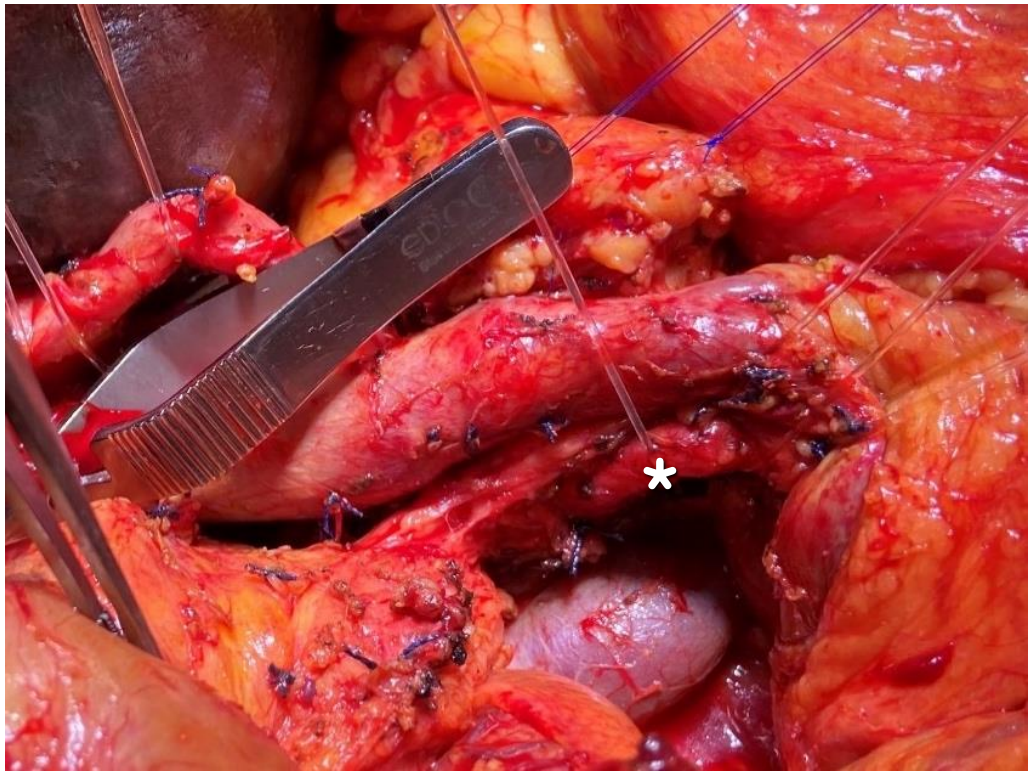




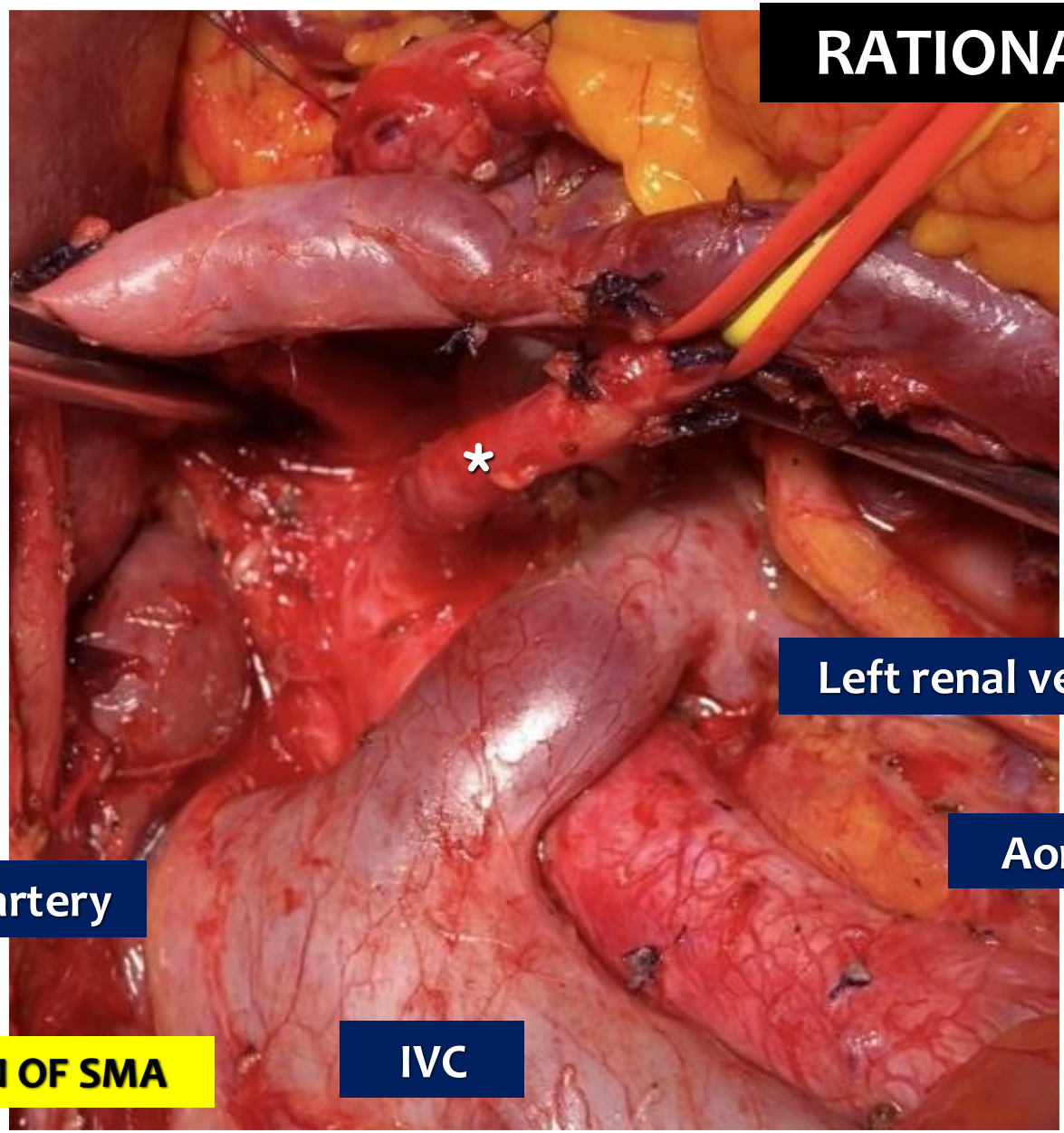
2. HEMICIRCUMFERENTIAL DISSECTION OF CHA

Guo X, et al. Int J Surg 2023.

TOTAL MESOPANCREAS EXCISION

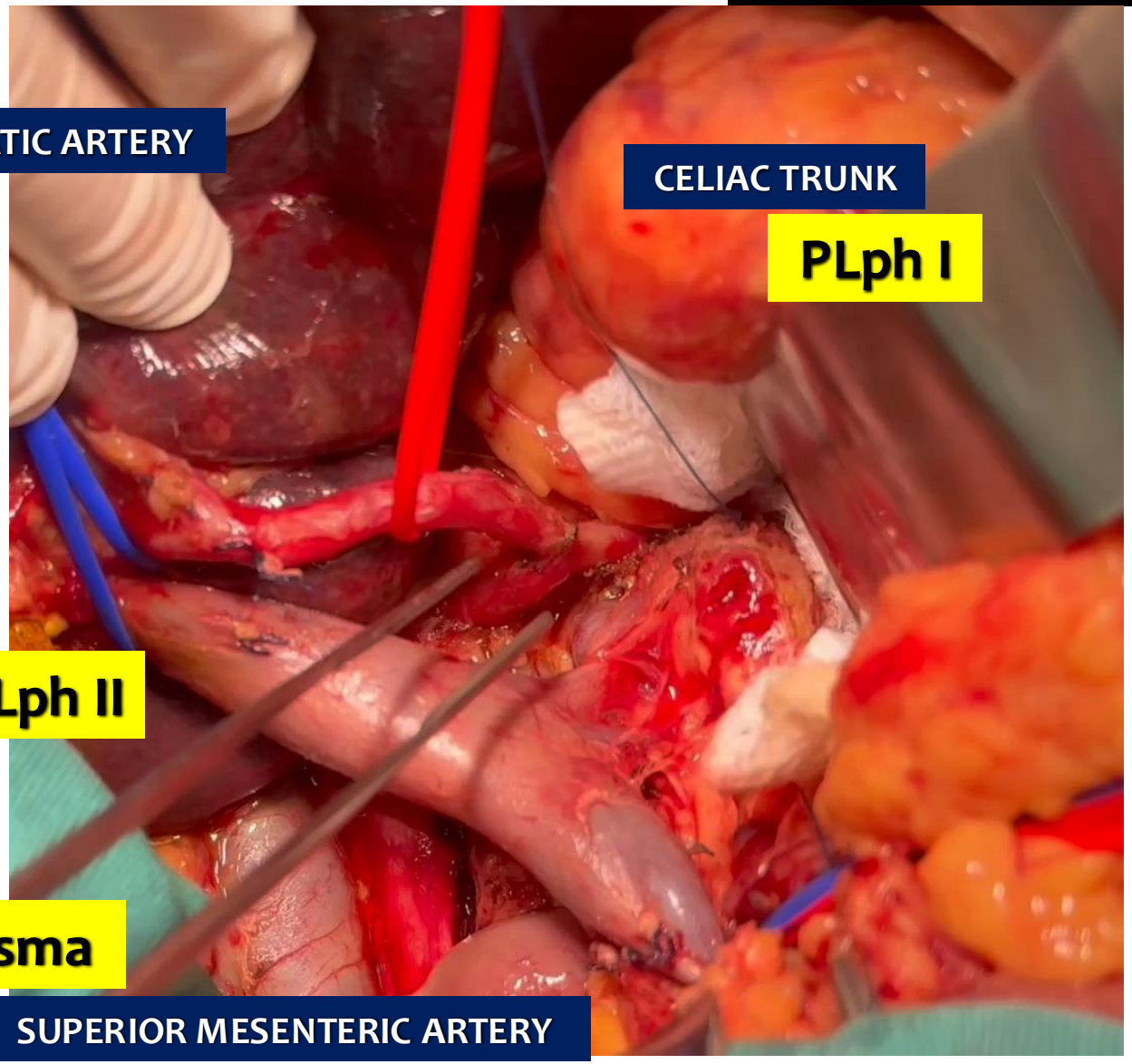


RATIONAL



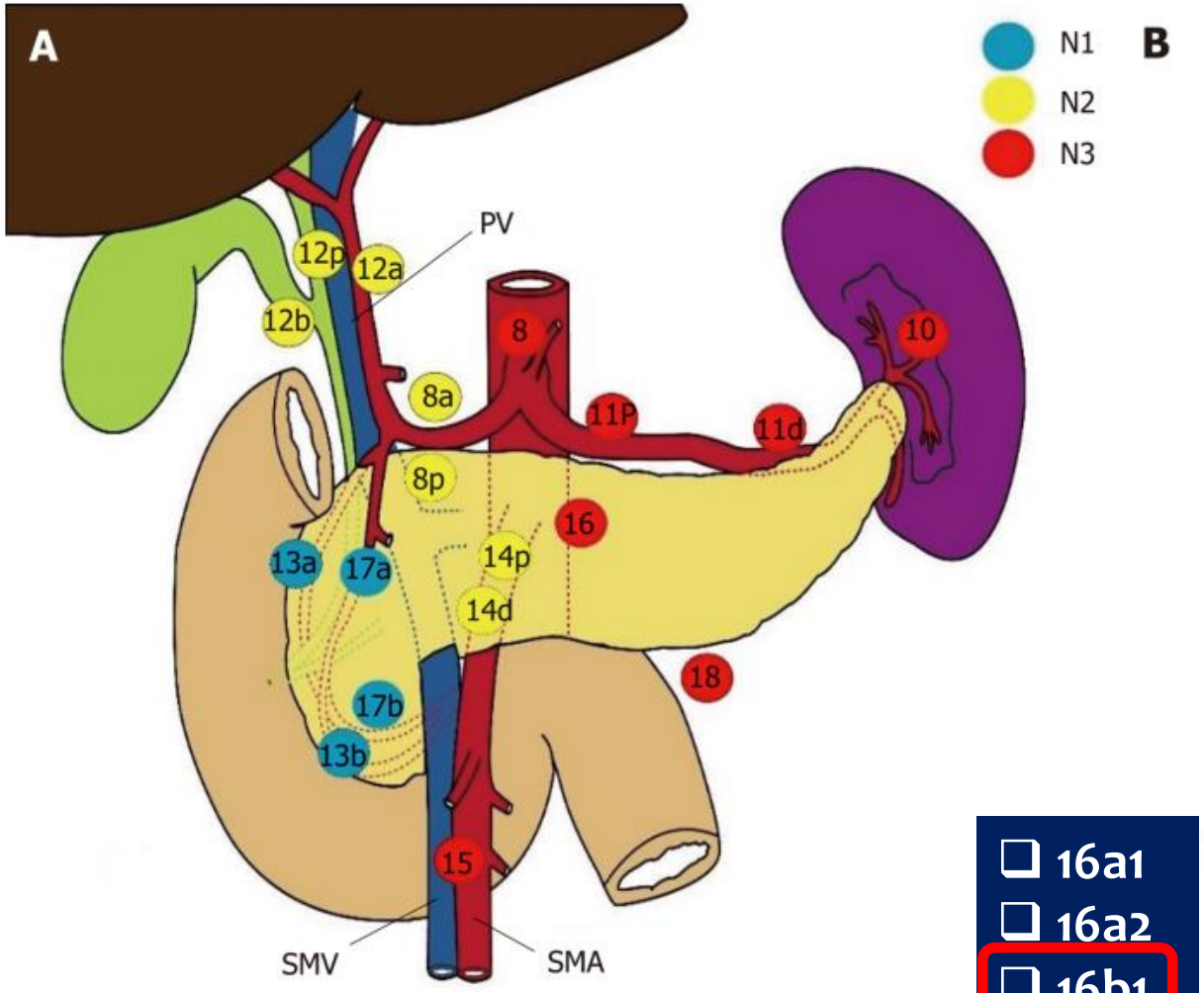
3. HEMICIRCUMFERENTIAL DISSECTION OF SMA

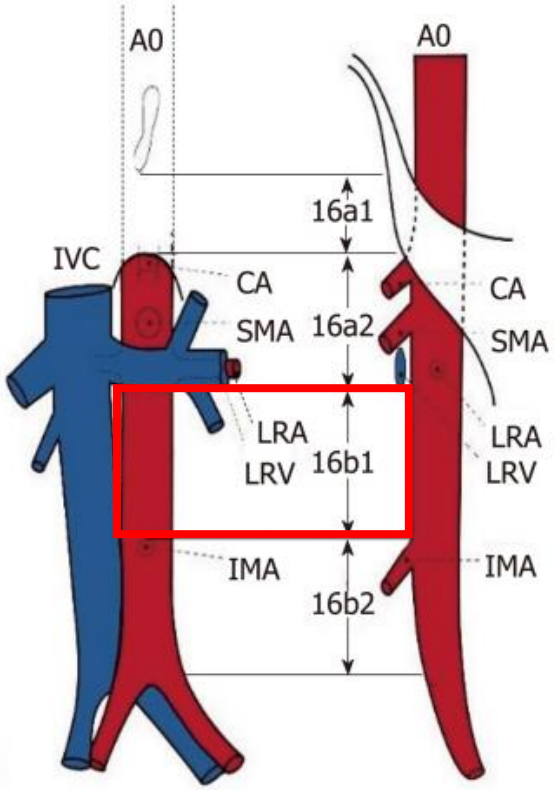
TOTAL MESOPANCREAS EXCISION



LYMPHATICS

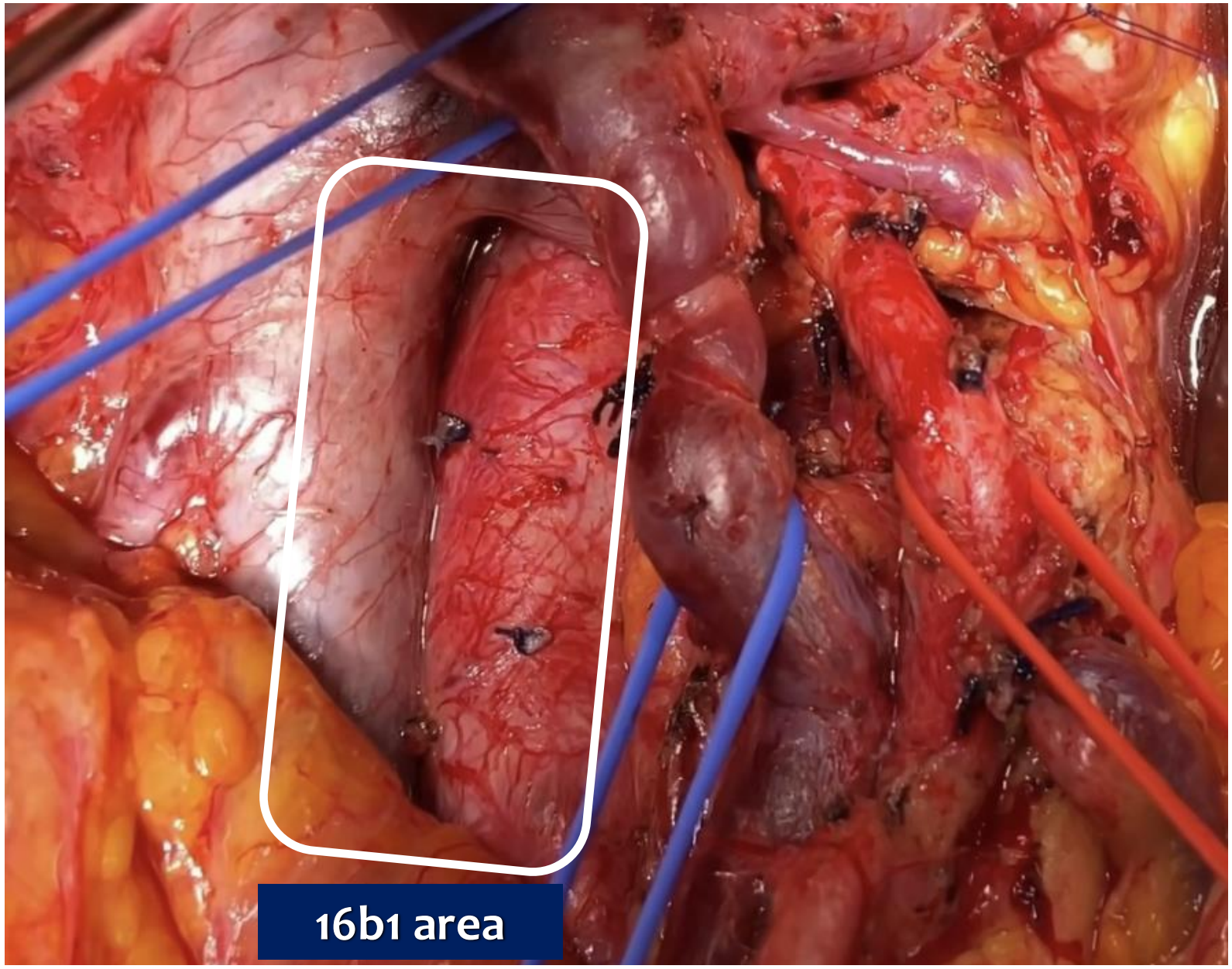
❑16b1 lymph nodes





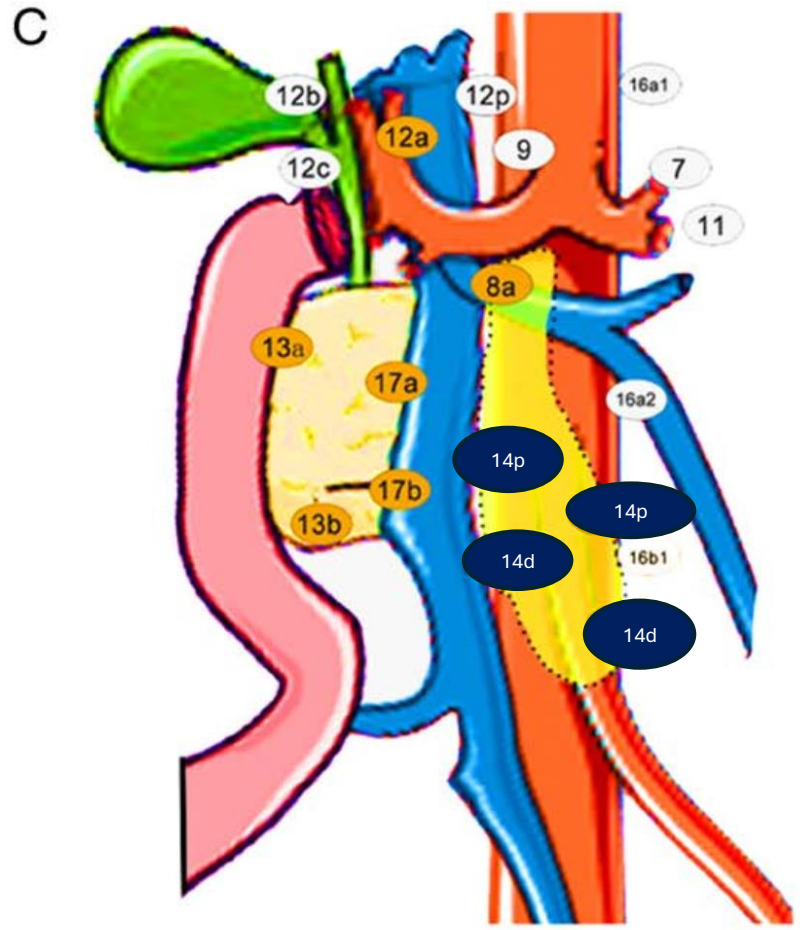
- ❑ 16a1
- ❑ 16a2
- ❑ 16b1
- ❑ 16b2

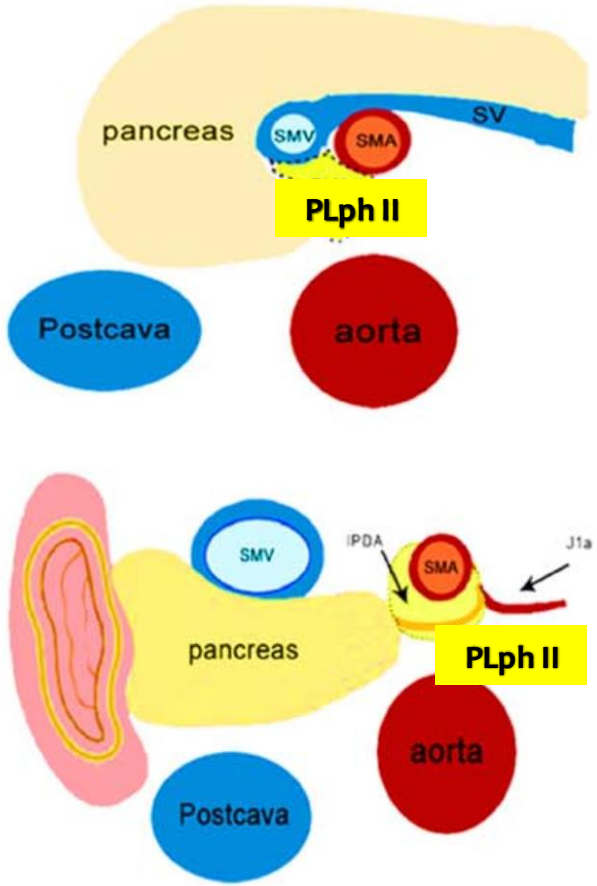
Dolay K, et al. World J Gastrointest Surg 2019


16b1 area

SUPERIOR MESENTERIC ARTERY LYMPH NODES

❑14p ❑14d



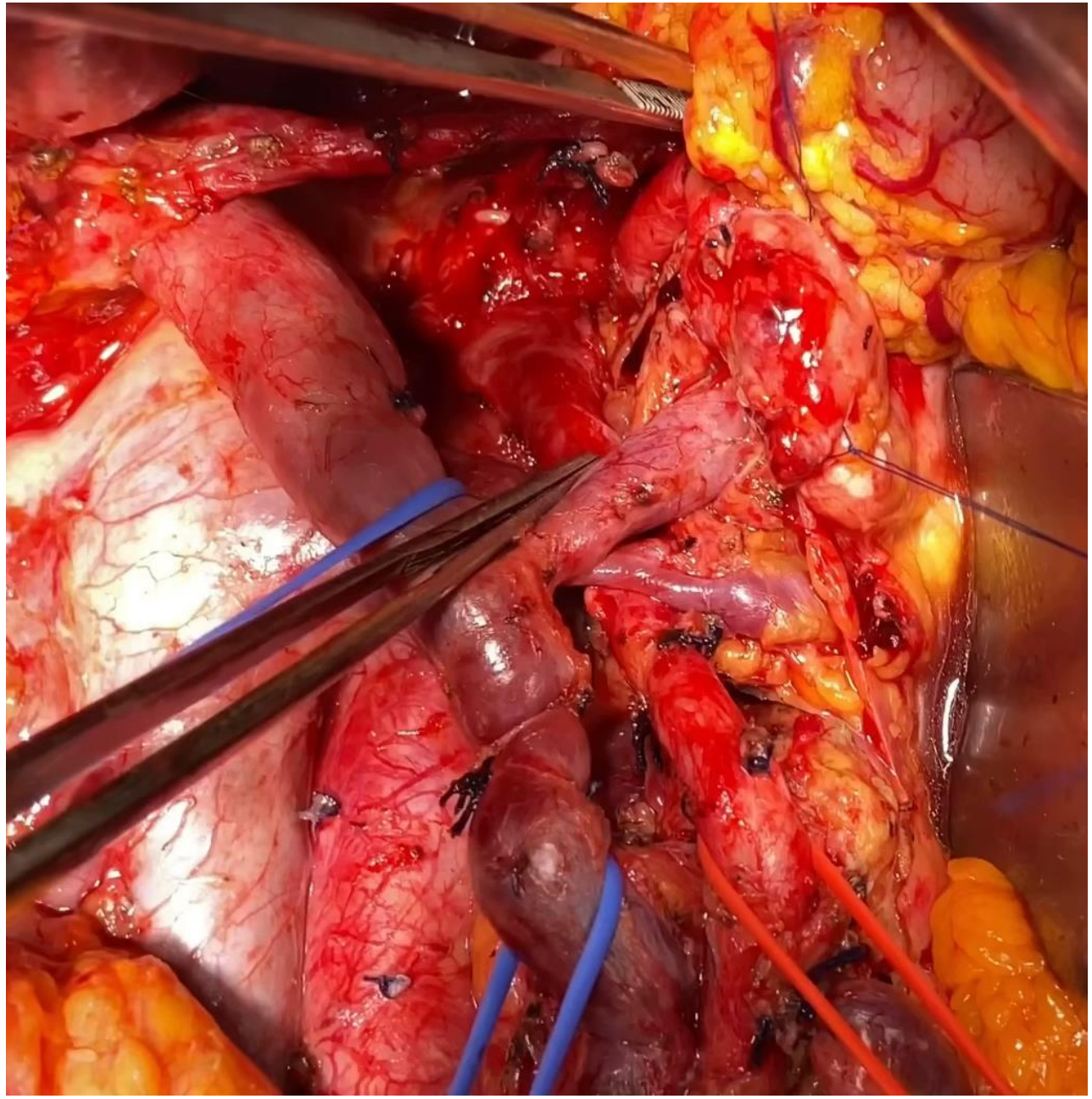


Guo X, et al. Int J Surg 2023.

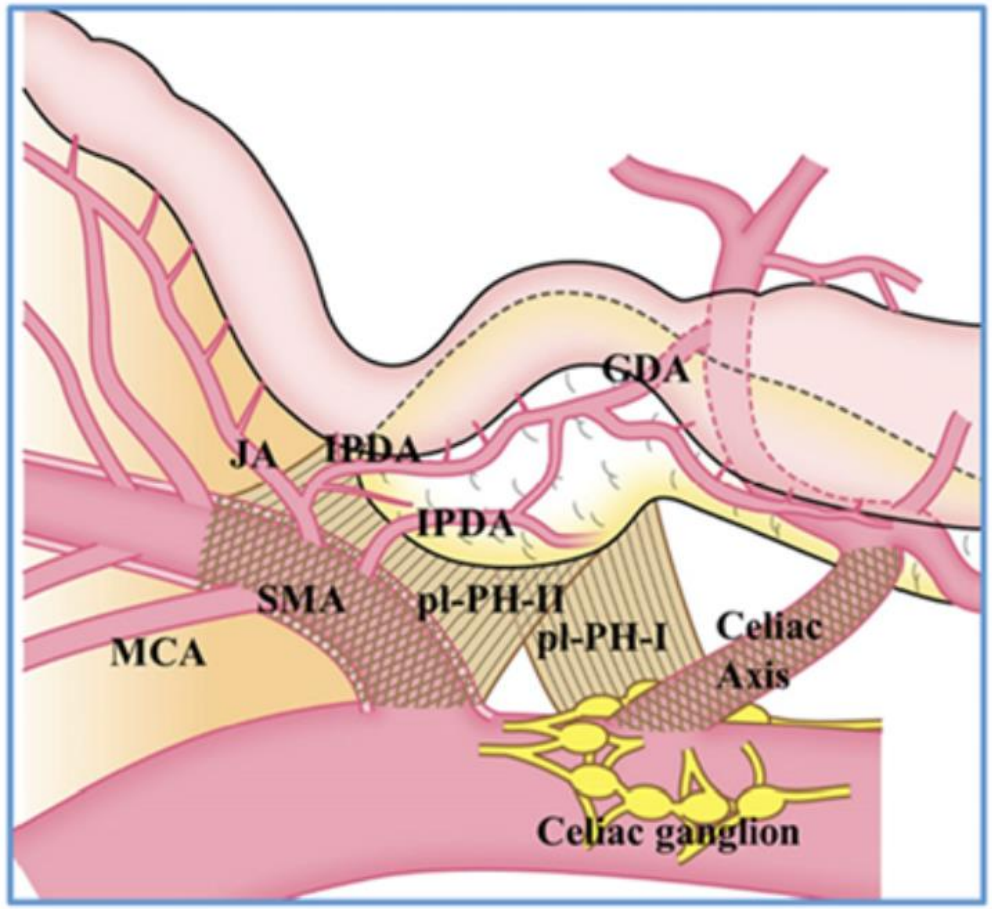
STATE OF THE ART

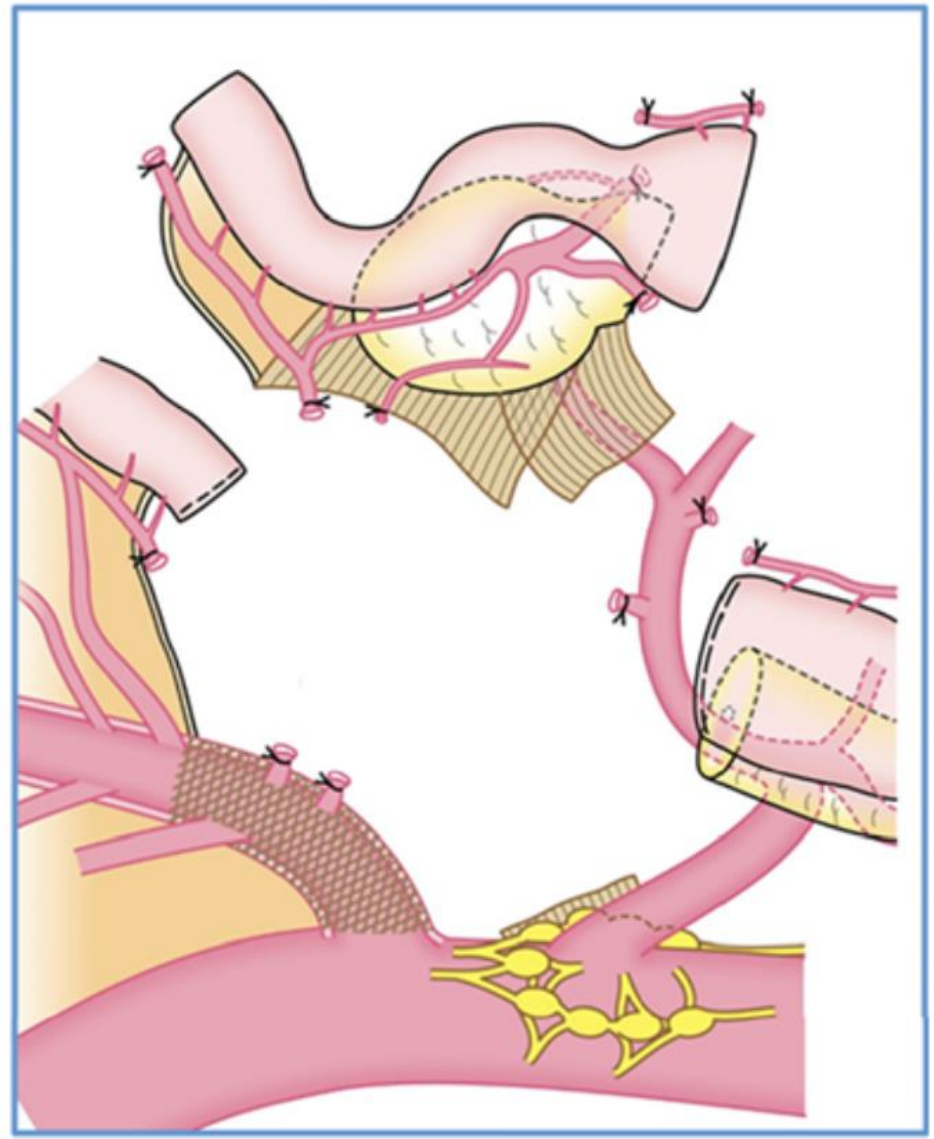
Pancreatoduodenectomy

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



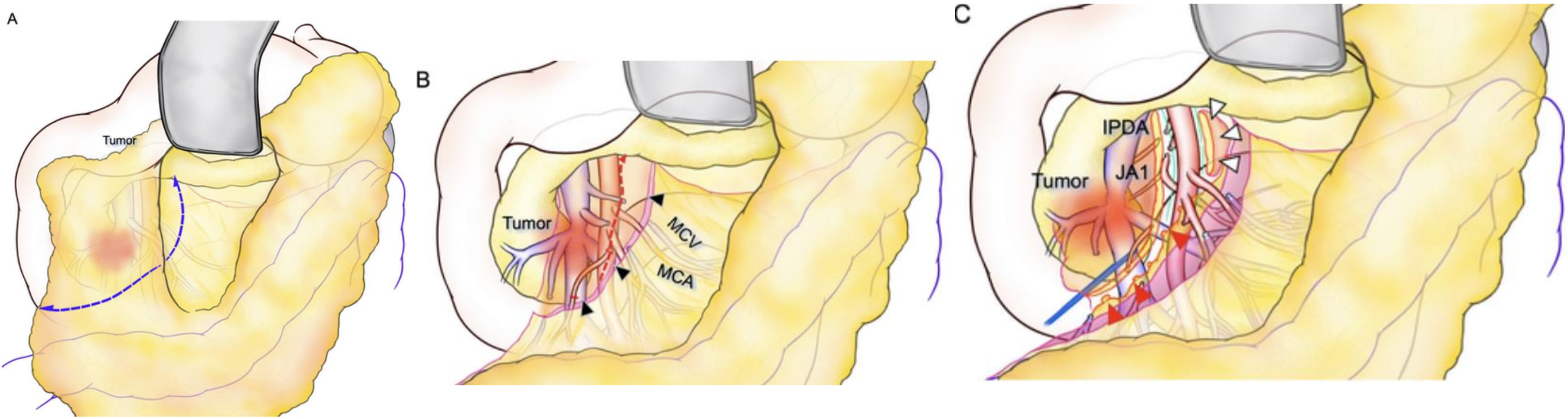
1.Fernandes ES, et al. Langenbecks Arch Surg 2021
2.Inoue Y, et al. J Gastrointest Surg 2018
3.Niesen W, et al. Ann Gastroenterol Surg. 2019
4.Hackert T, et al. HPB 2017
5.Fernandes ES, et al. J Gastrointest Oncol 2023
6. Torres OJ, Zurich and Cape Town





Inoue Y, et al. J Gastrointest Surg 2016

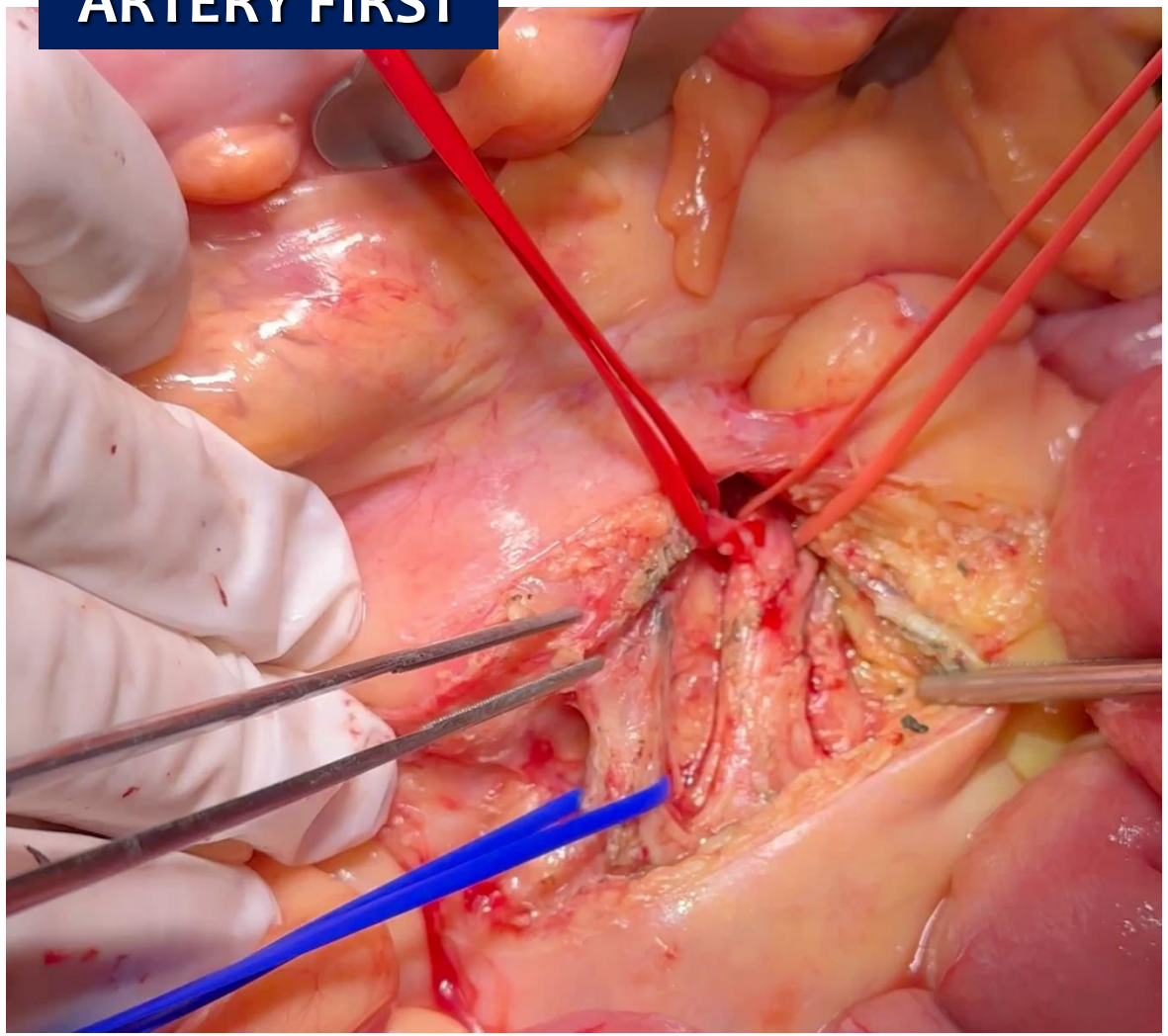
ARTERY FIRST



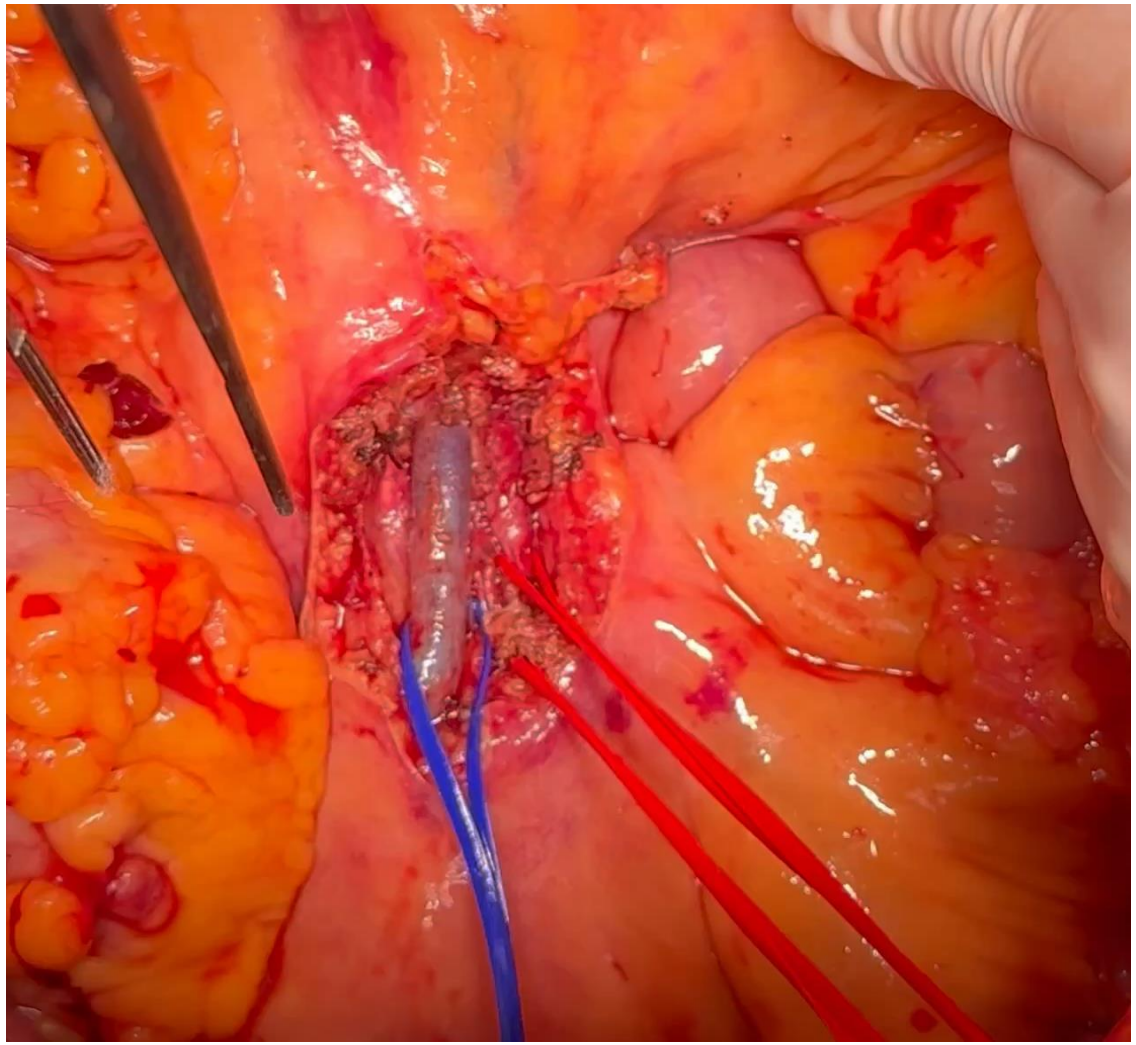
MESENTERIC APPROACH

Ono Y, et al. Langenbecks Arch Surg 2023;408(1):422

ARTERY FIRST

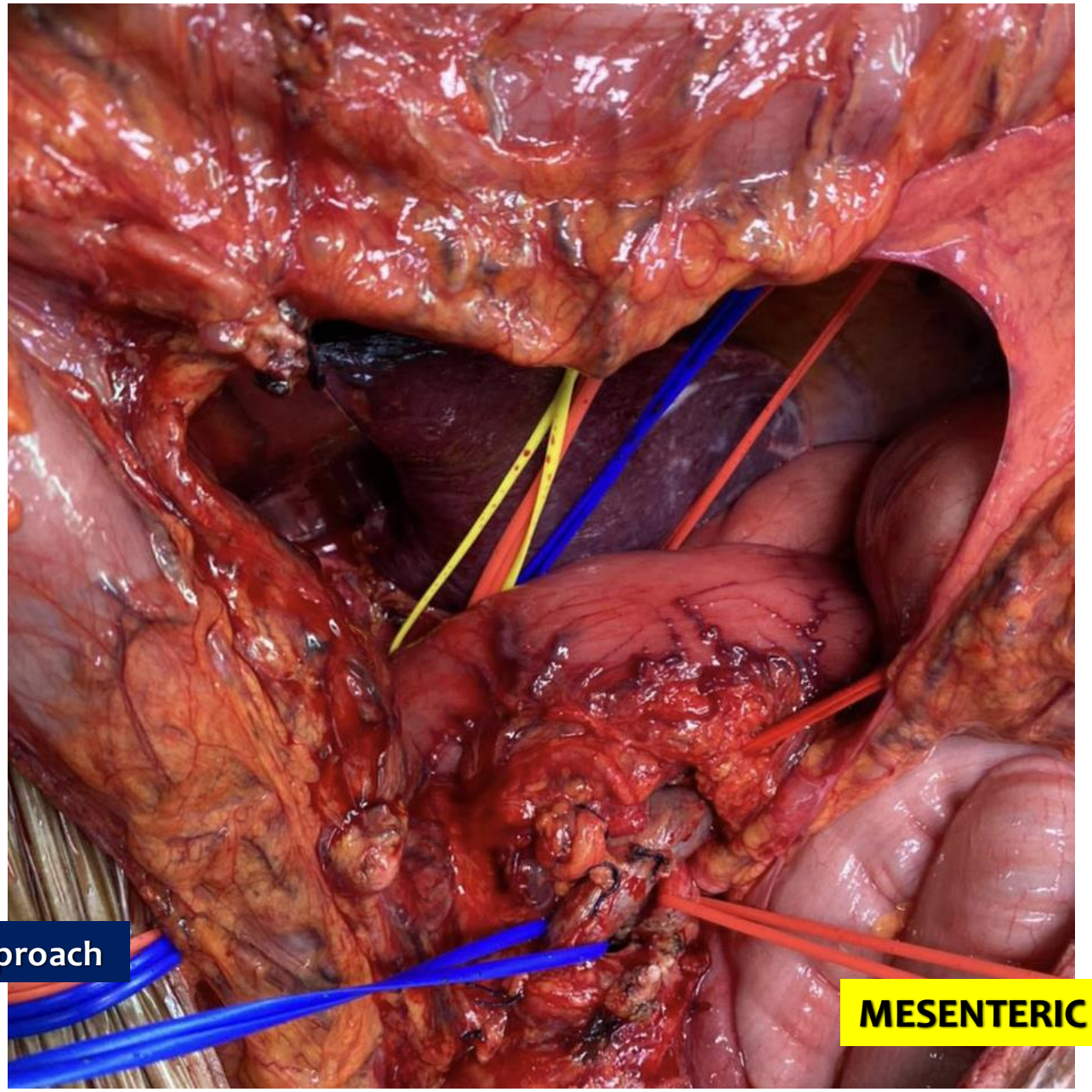


INFRACOLIC APPROACH



MESENTERIC APPROACH

ARTERY FIRST

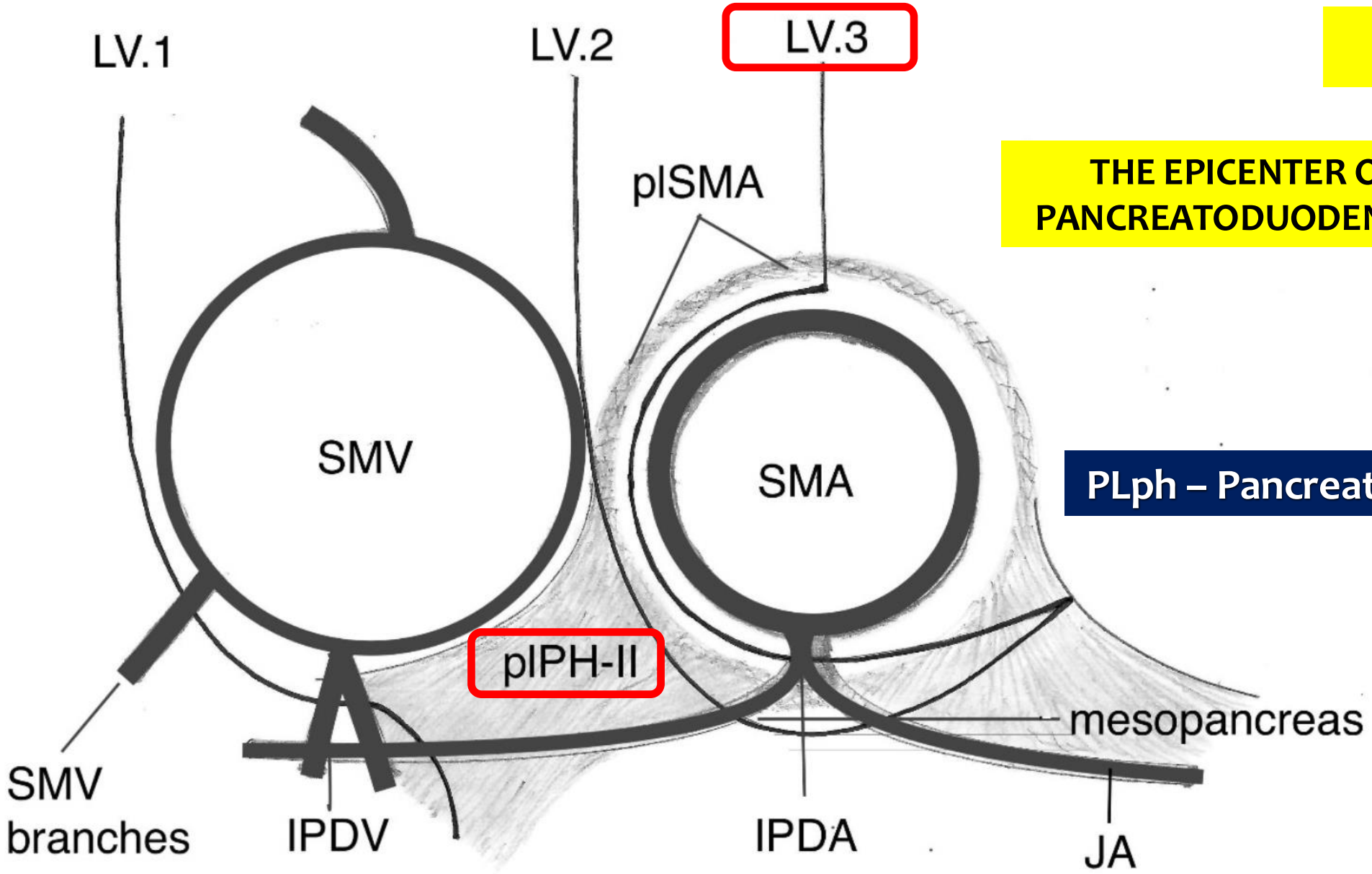


Infracolic approach

MESENTERIC APPROACH

IPDA

THE EPICENTER OF THE PANCREATODUODENECTOMY

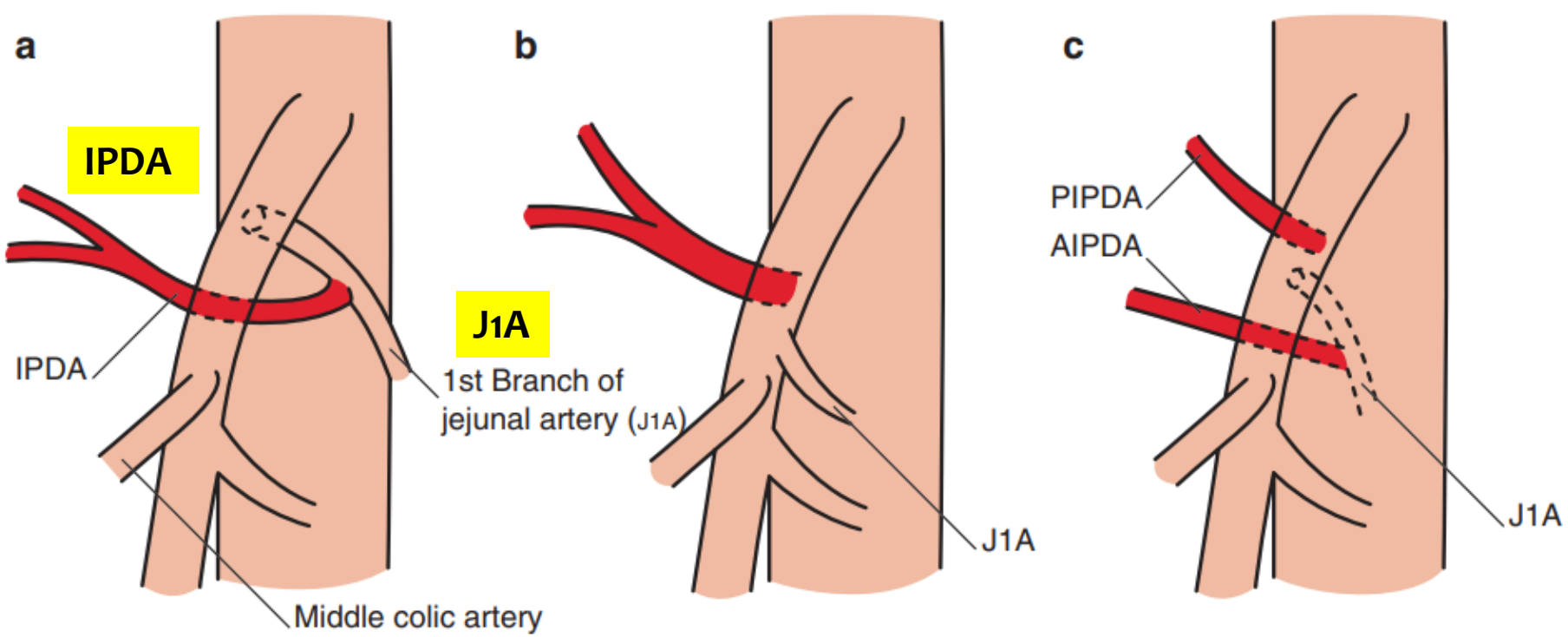


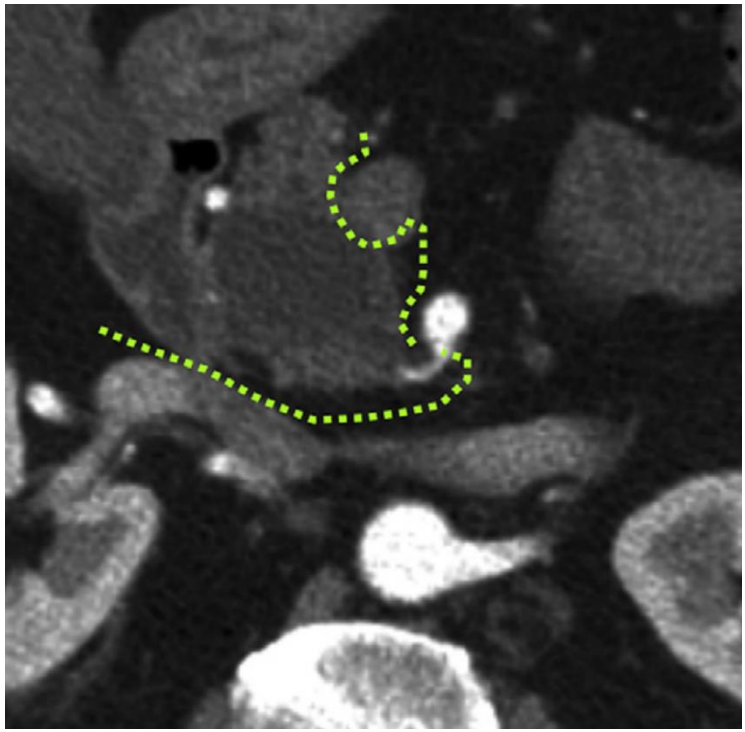
PLph – Pancreatic head plexus

Olakowski M, et al. J Oncol 2021

ARTERIES

INFERIOR PANCREATODUODENAL ARTERY (IPDA)





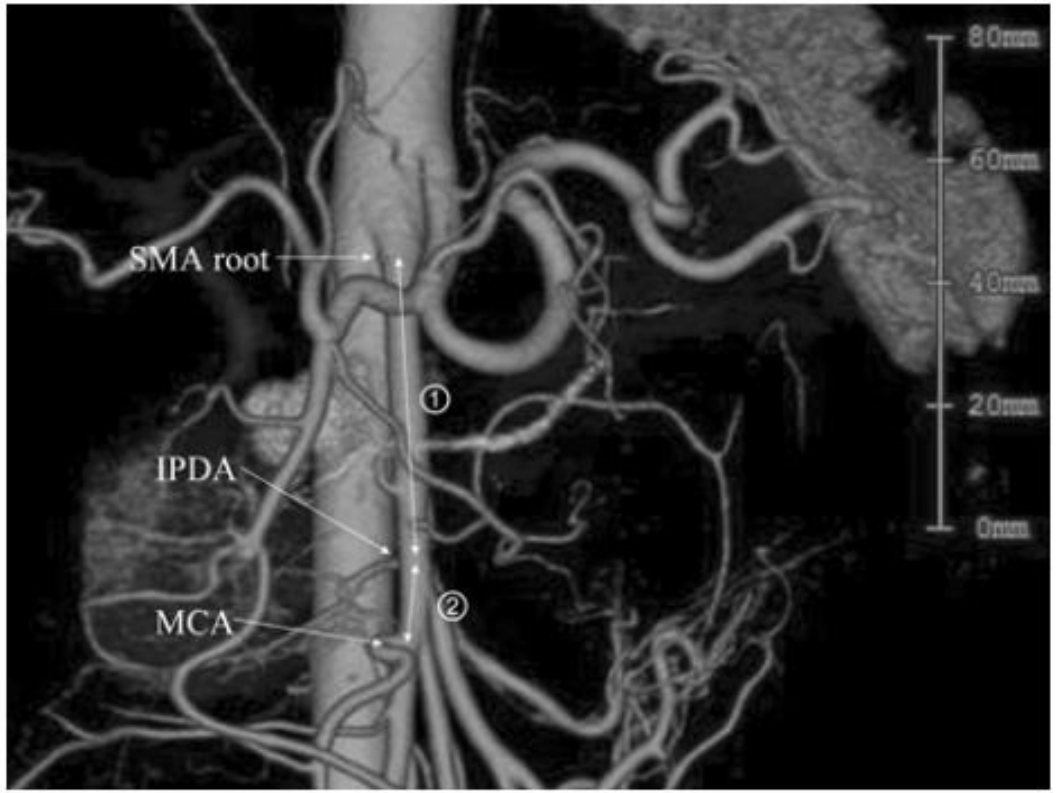
Common trunk

THE EPICENTER OF THE PANCREATODUODENECTOMY

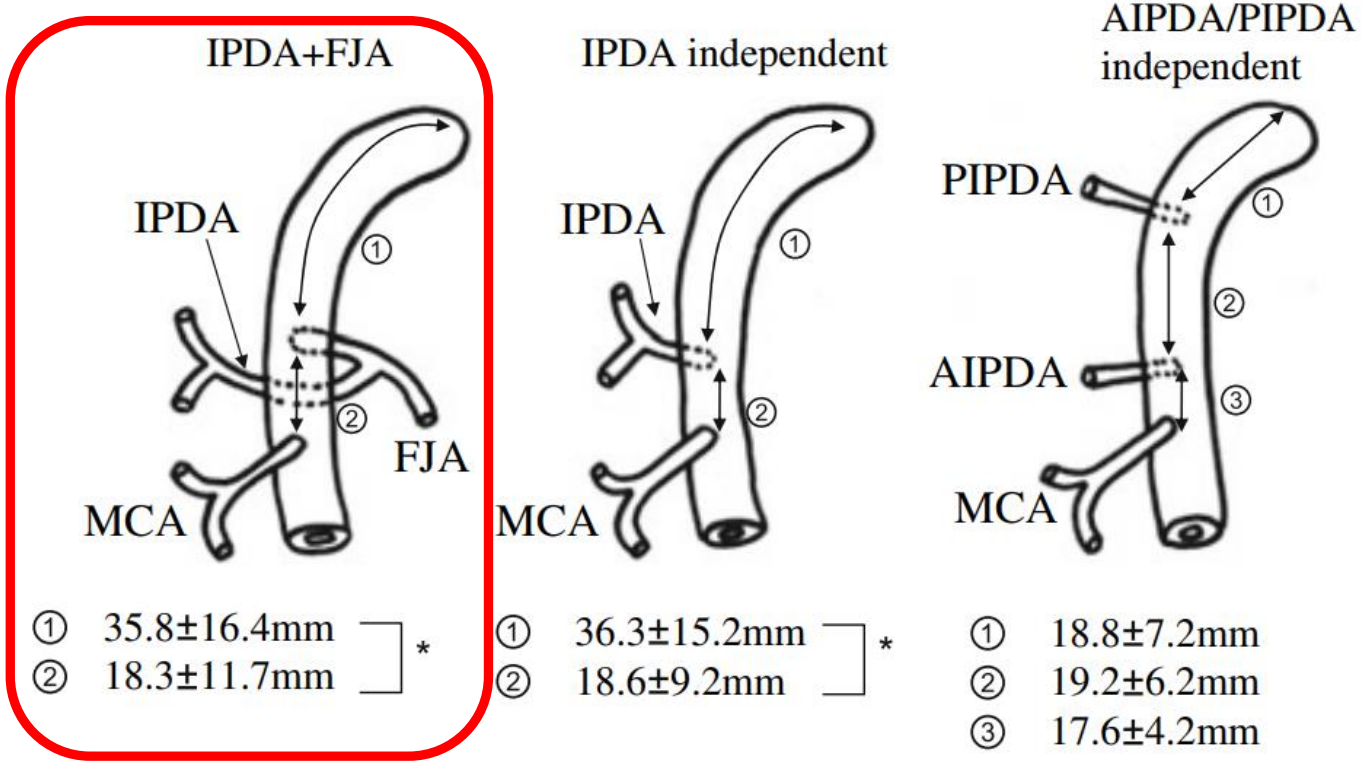
J Hepatobiliary Pancreat Sci (2010) 17:523–526
DOI 10.1007/s00534-009-0261-9

ORIGINAL ARTICLE

Three-dimensional models of arteries constructed using multidetector-row CT images to perform pancreatoduodenectomy safely following dissection of the inferior pancreaticoduodenal artery

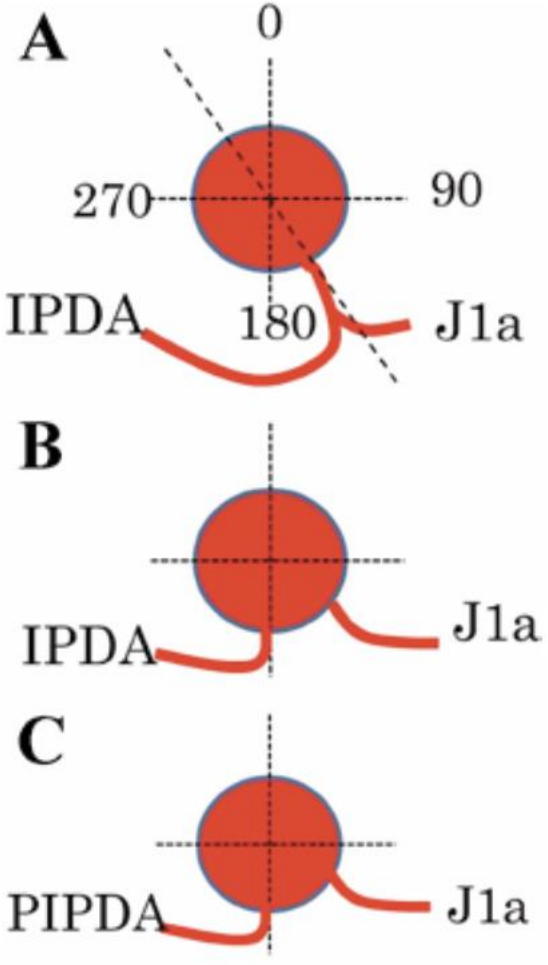


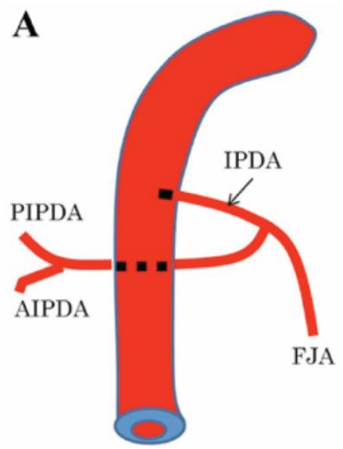
INFERIOR PANCREATODUODENAL ARTERY (IPDA)

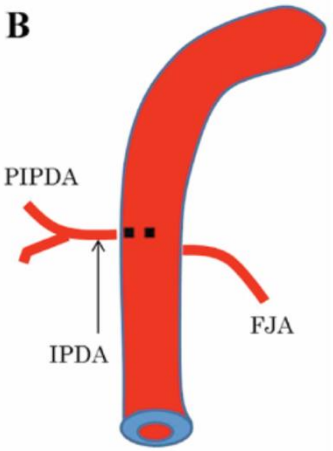


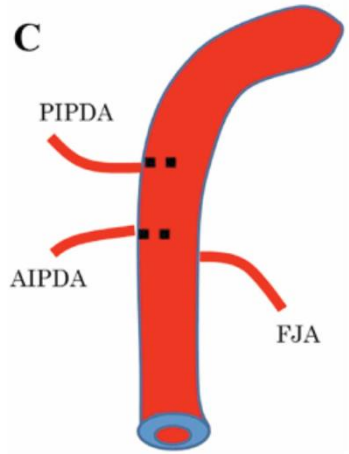
Horiguchi A, et al. J Hepatobiliary Pancreat Sci (2010) 17:523–6

INFERIOR PANCREATODUODENAL ARTERY (IPDA)



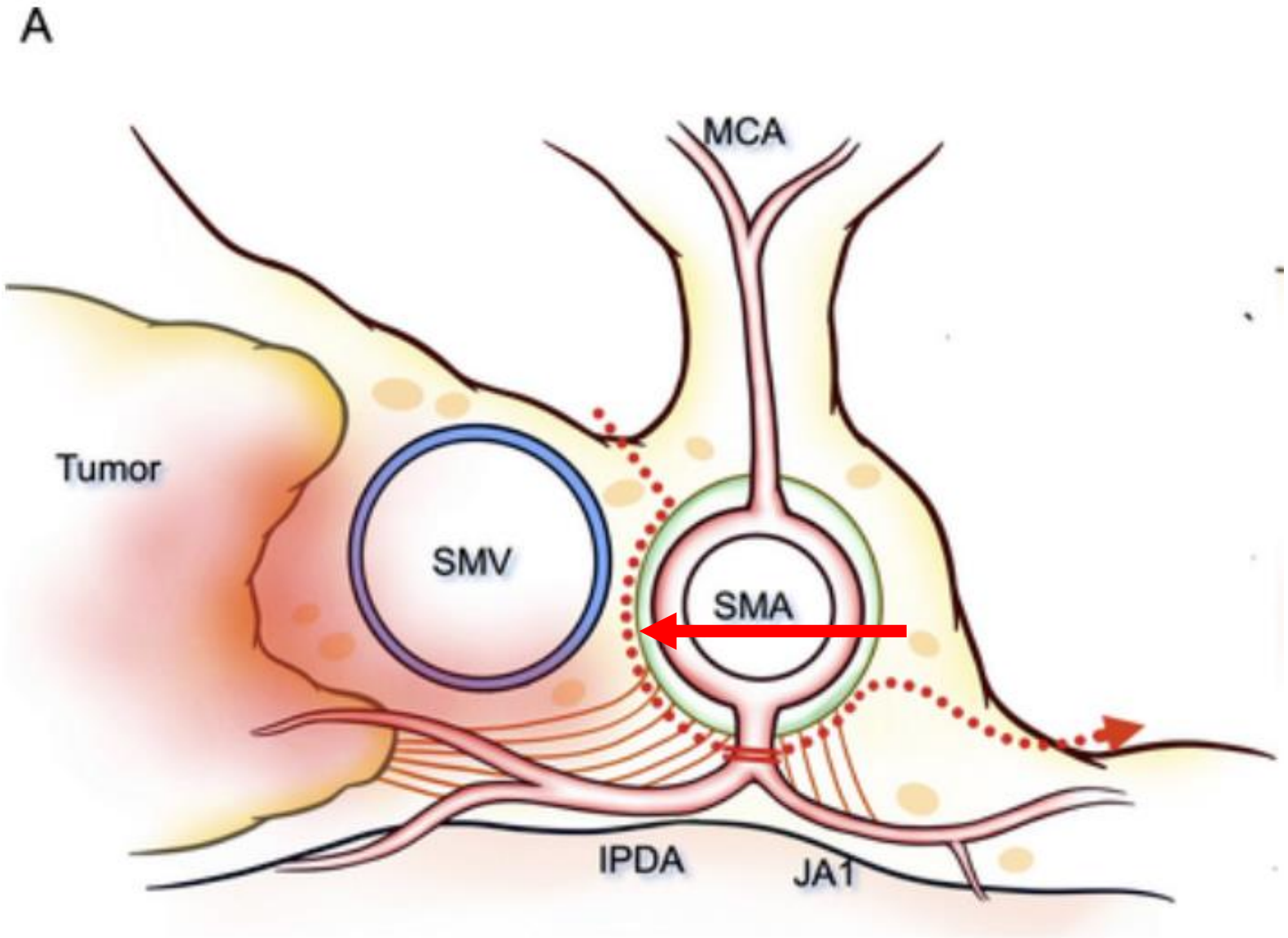






Terakawa H, et al. Oncol Let 2017;14:397-403

IPDA



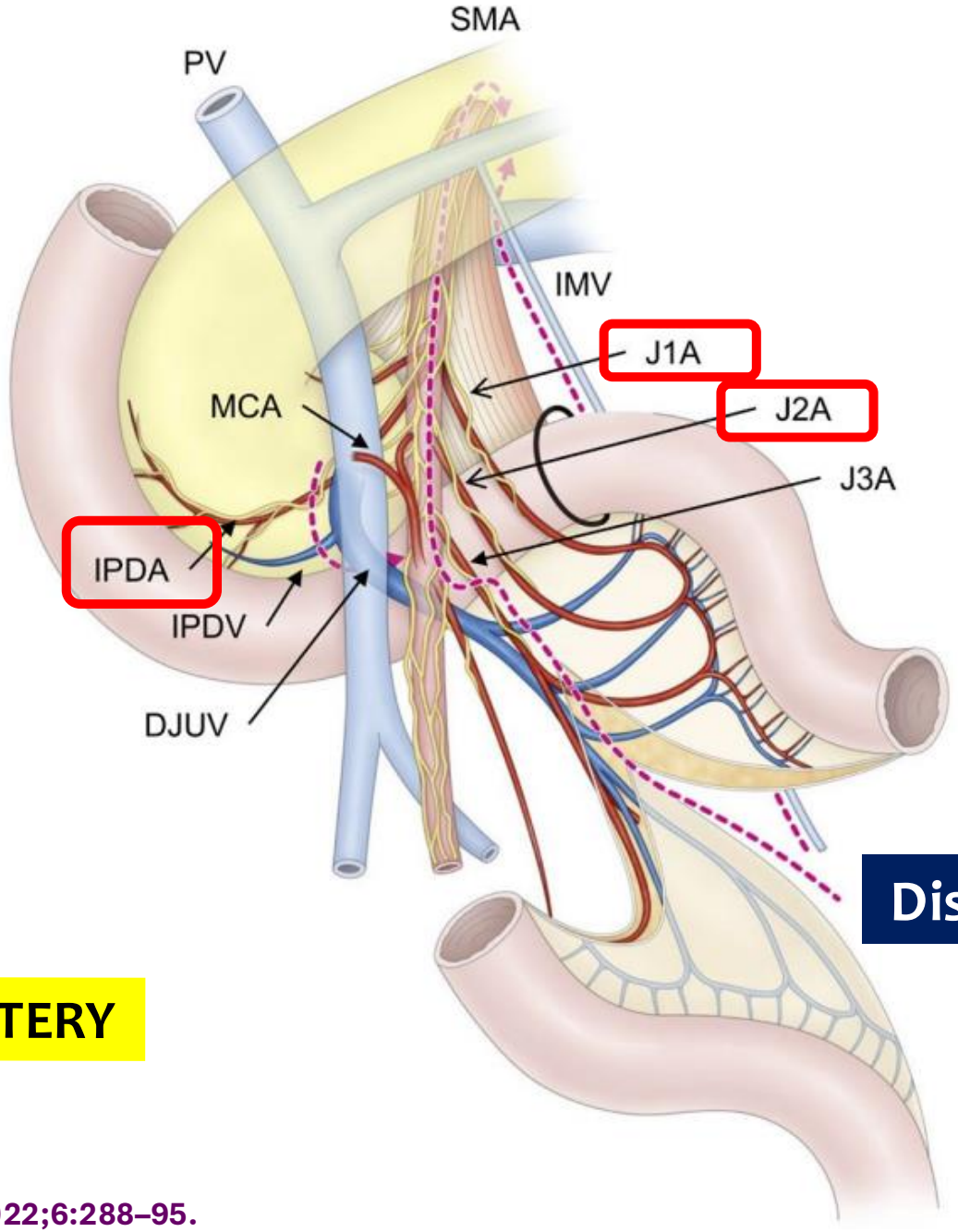
EPICENTRO DA DUODENOPANCREATECTOMIA

Ono Y, et al. Langenbecks Arch Surg 2023;408(1):422

MESOPANCREAS

MESOJEJUNUM

IPDA



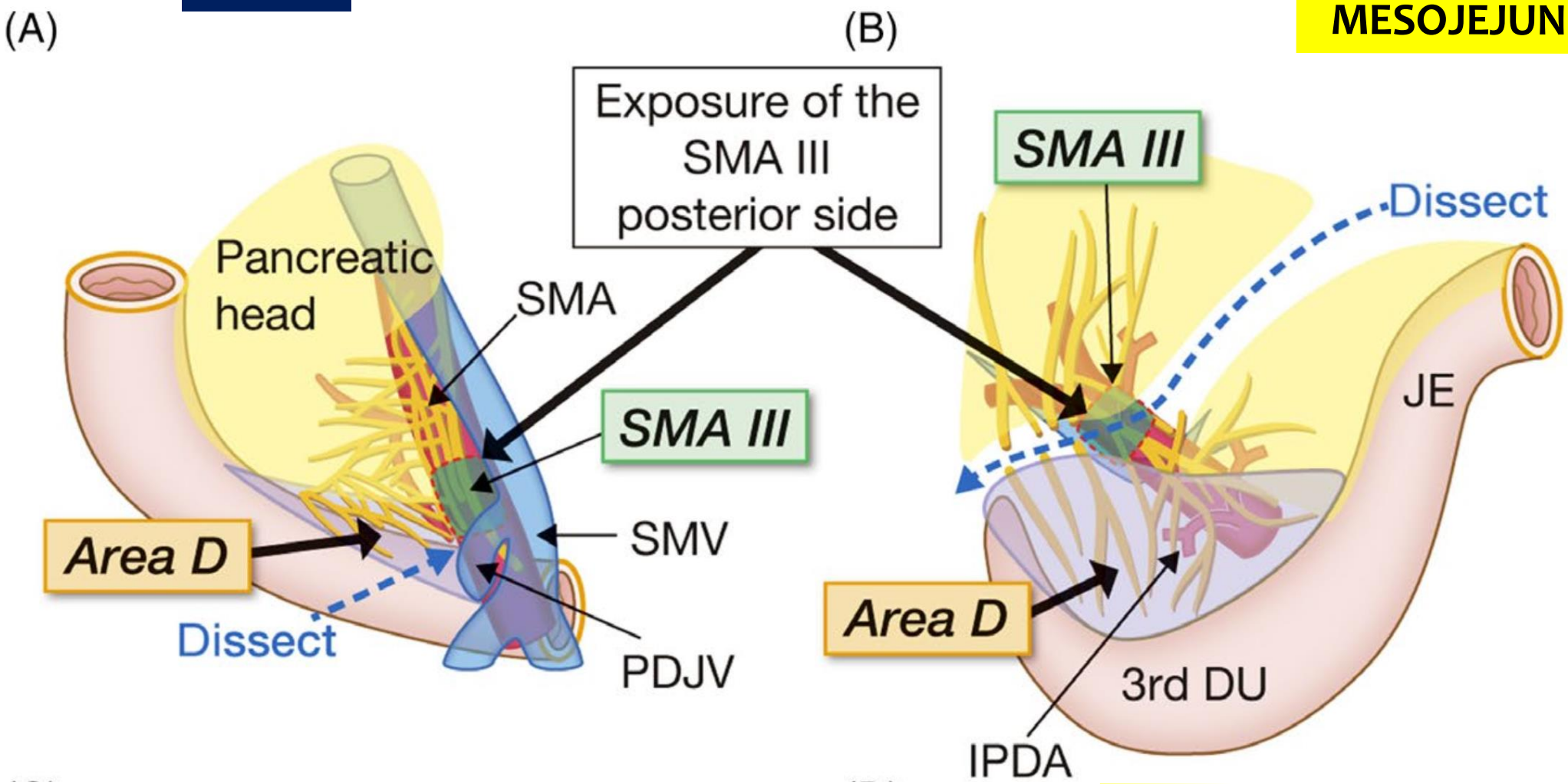
Dissecting line

FIRST JEJUNAL ARTERY

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

IPDA

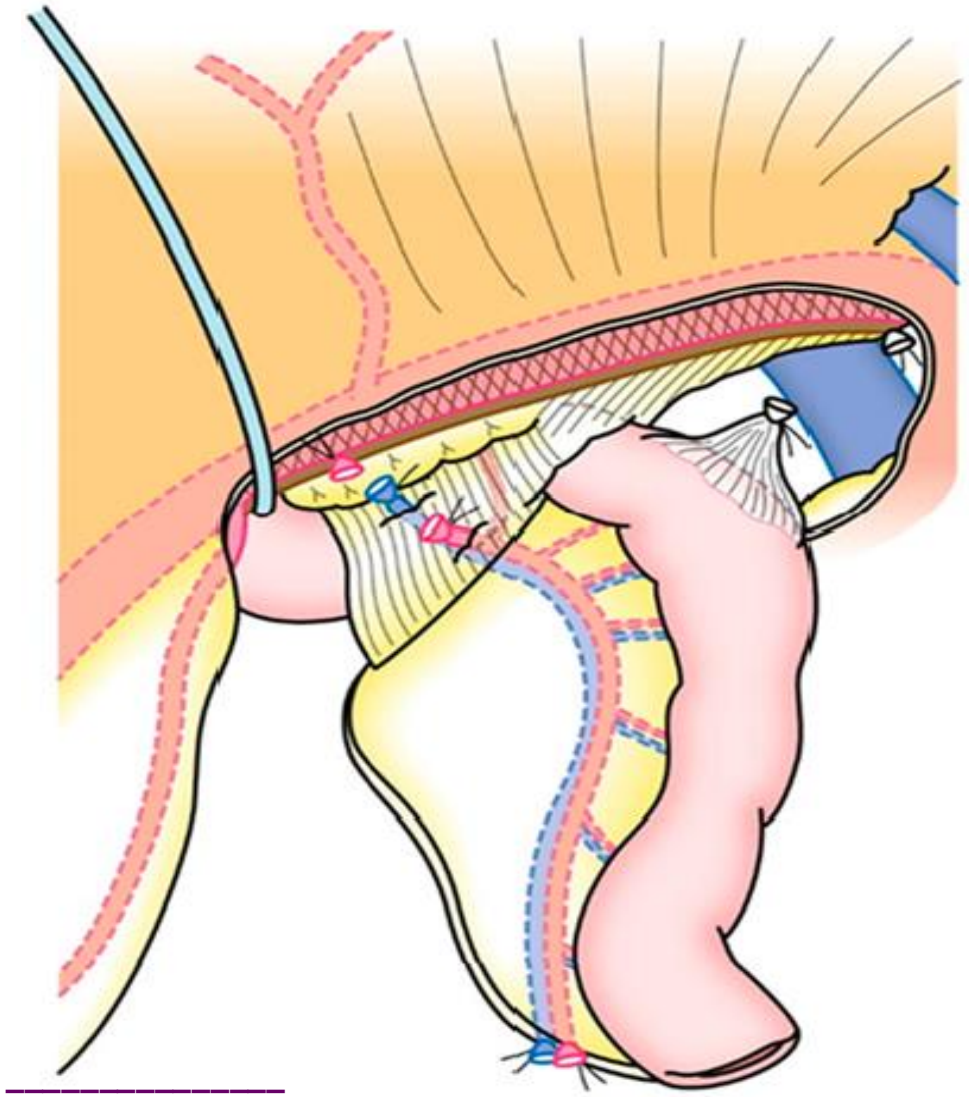
MESOJEJUNUM



FIRST JEJUNAL ARTERY

Nagakawa Y, et al. J Hepatobiliary Pancreat Sci. 2020;27:342–51

FIRST JEJUNAL ARTERY

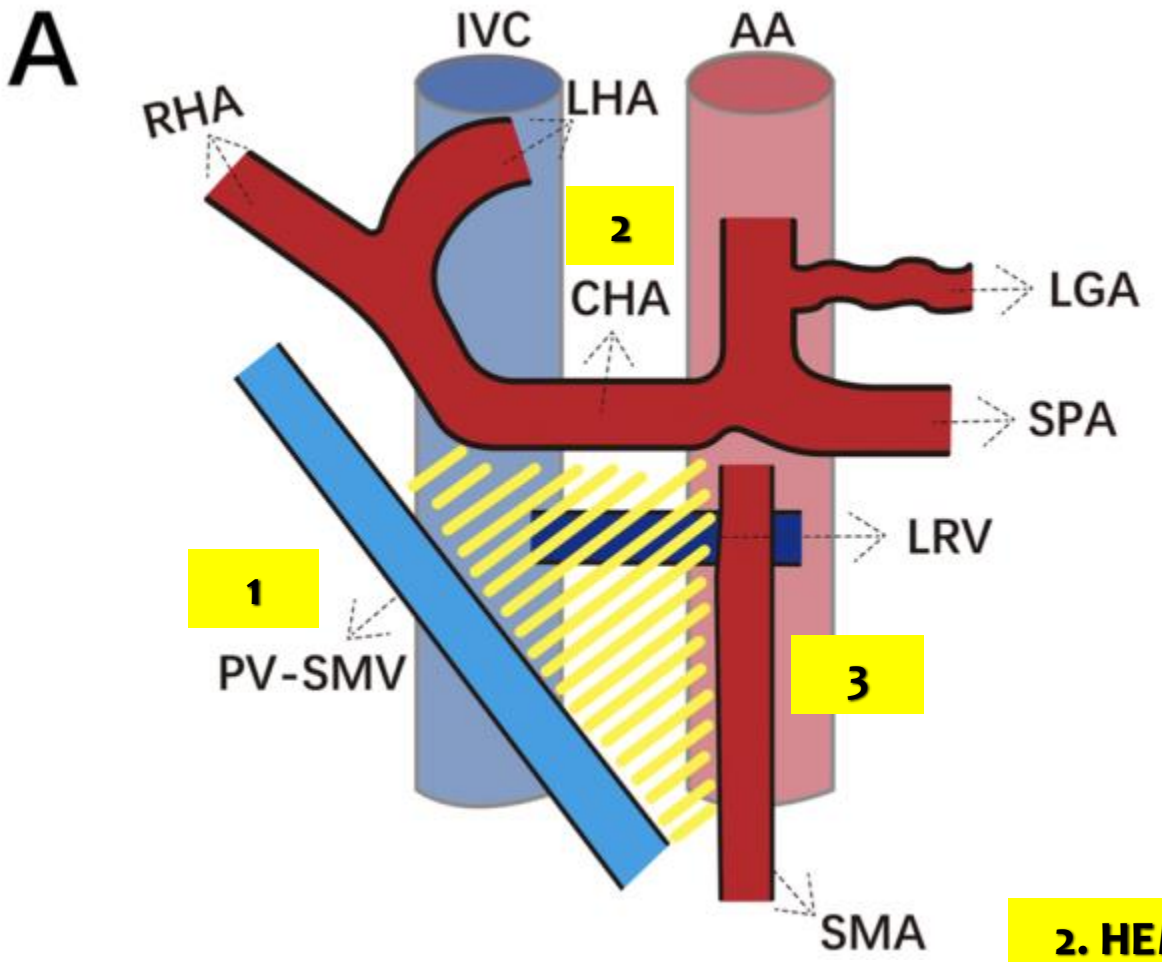


Inoue Y, et al. J Gastrointest Surg 2016

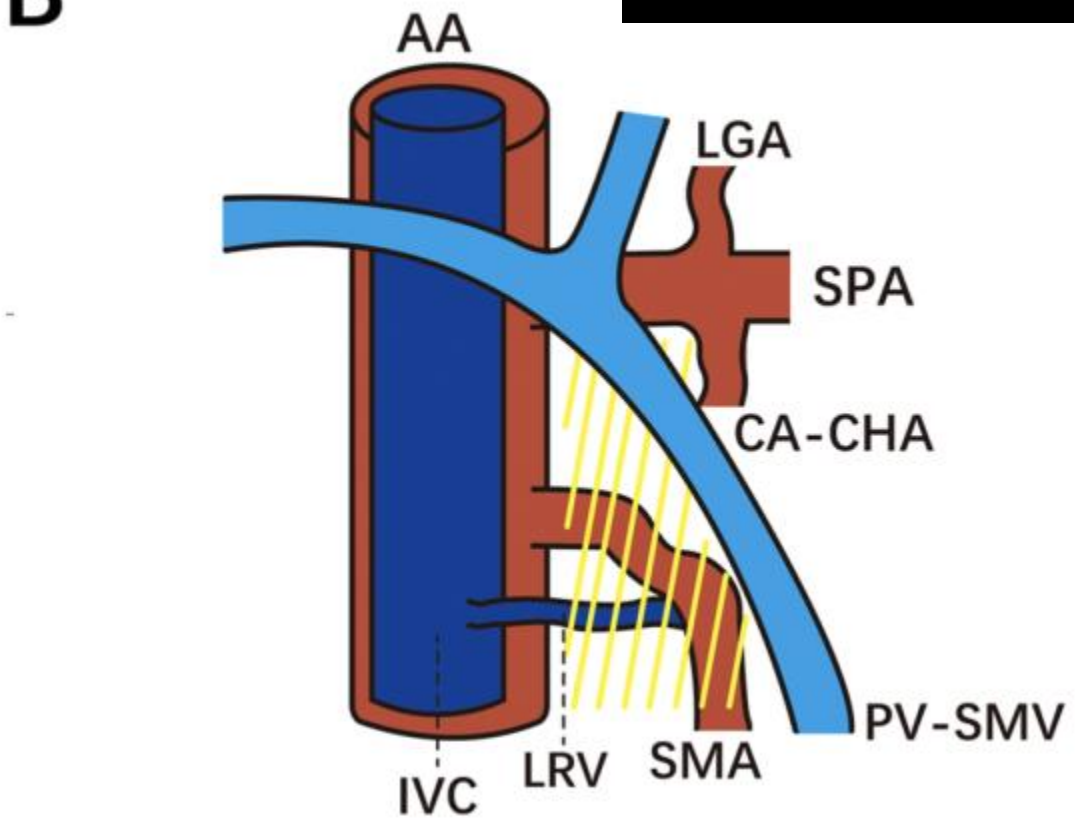
MESOJEJUNUM

TRIANGLE OPERATION

1. CIRCUMFERENTIAL DISSECTION OF SMV/PV



RATIONAL



2. HEMICIRCUMFERENTIAL DISSECTION OF CHA

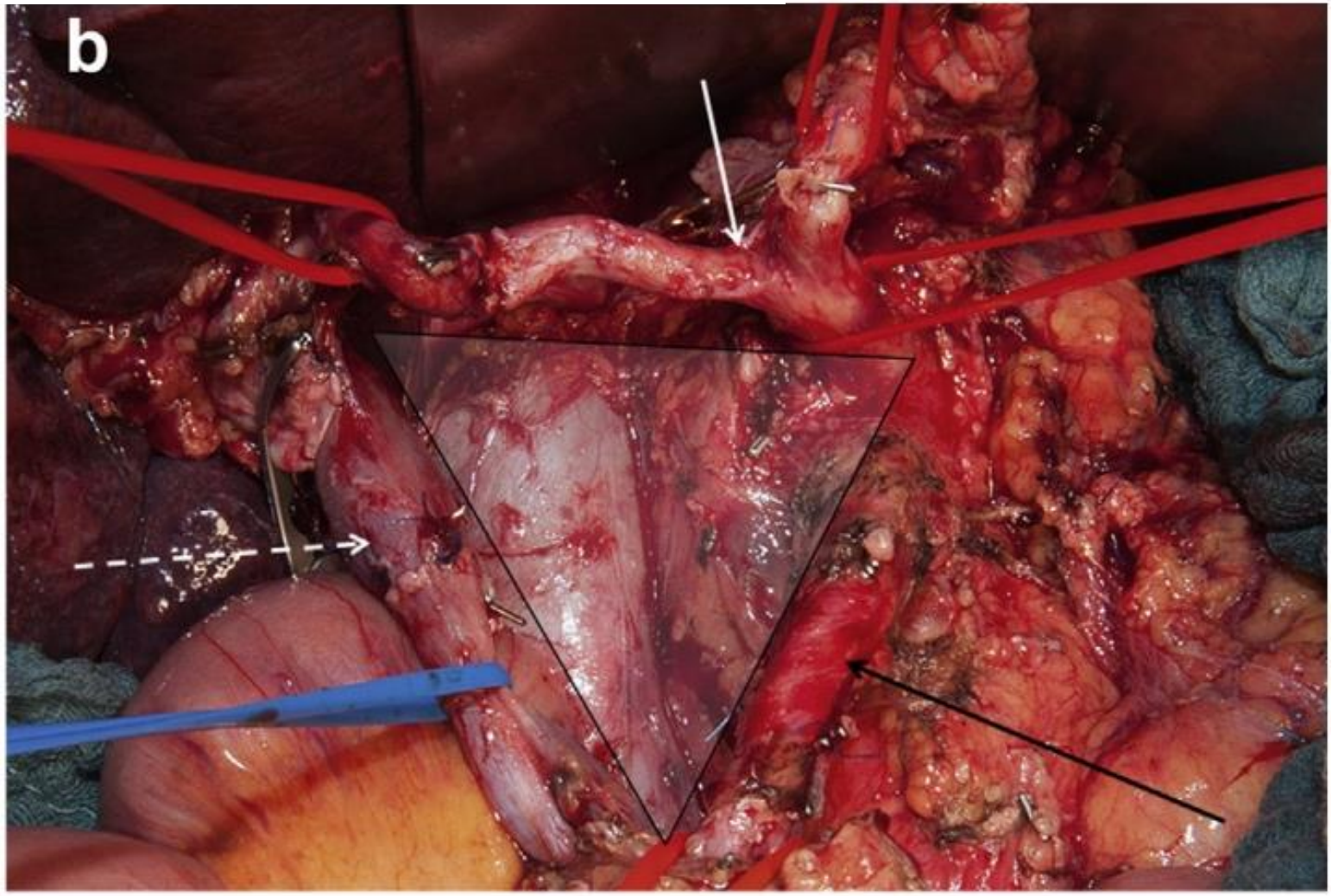
3. HEMICIRCUMFERENTIAL DISSECTION OF SMA

Chen JH, et al. World J Surg Oncol 2024;22:4

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

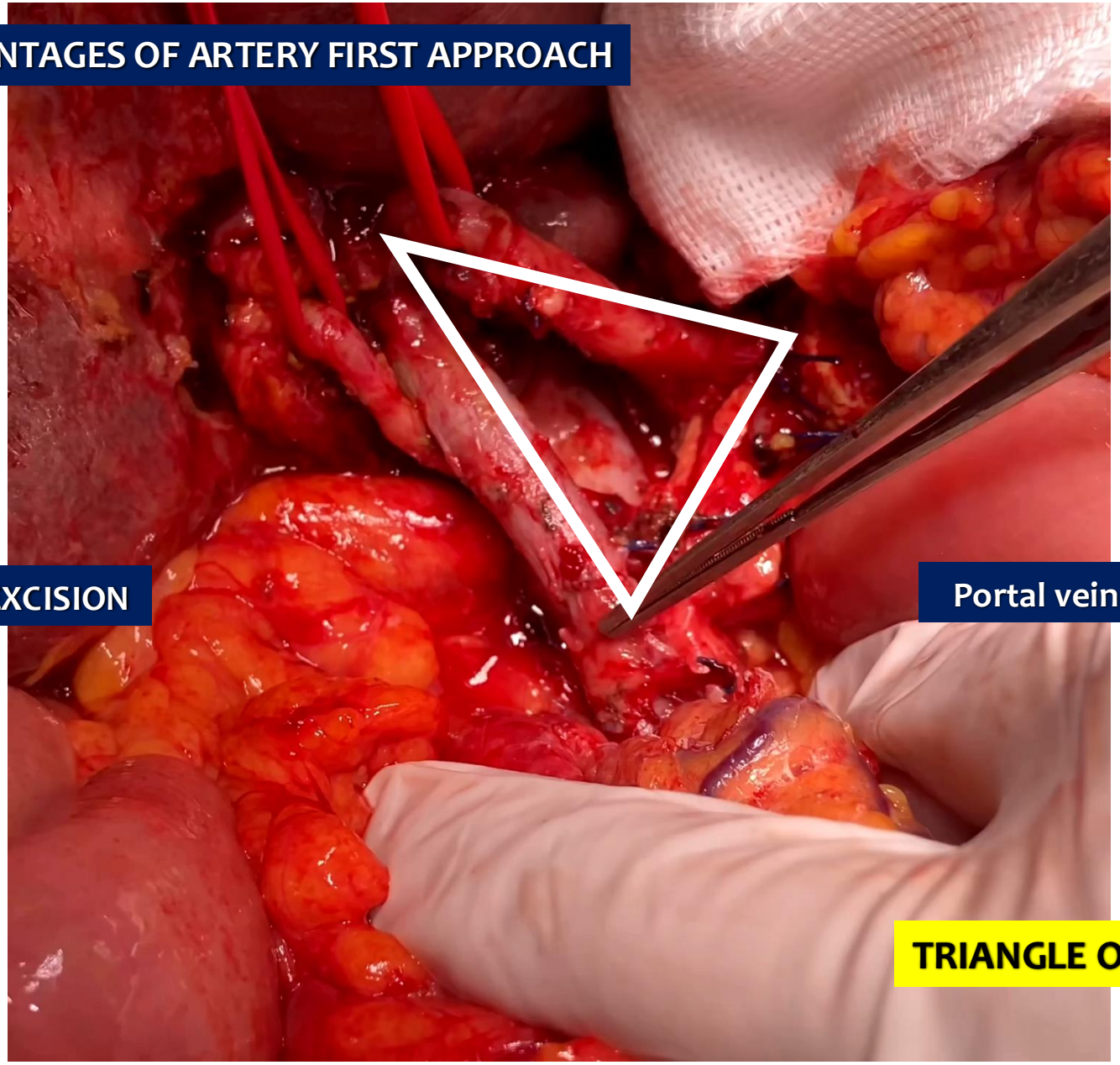
ORIGINAL ARTICLE

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

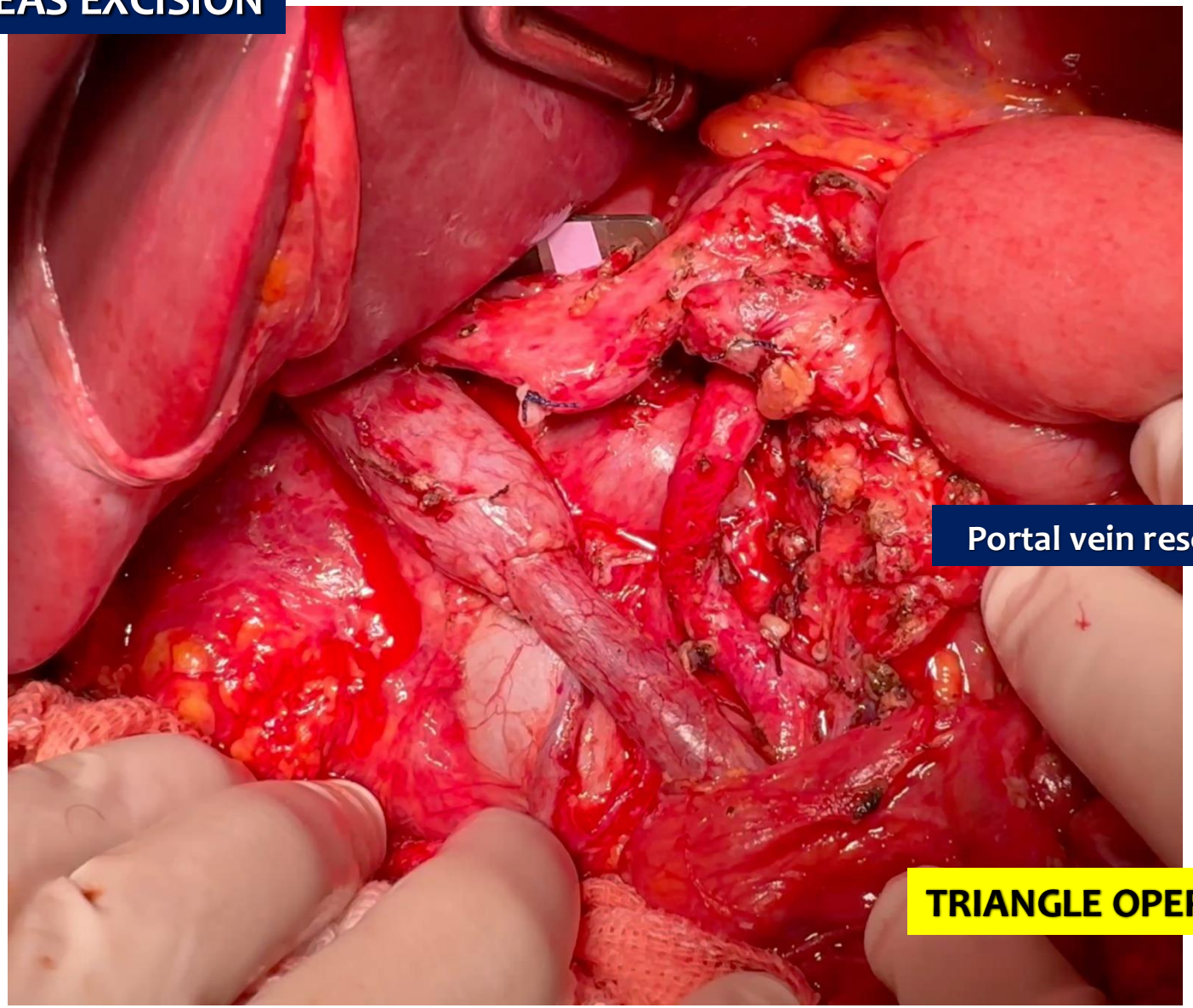


TOTAL MESOPANCREAS EXCISION

Portal vein resection

TRIANGLE OPERATION

TOTAL MESOPANCREAS EXCISION



Portal vein resection

TRIANGLE OPERATION

JAMA Surgery | Original Investigation

Patterns of Recurrence After Resection of Pancreatic Ductal Adenocarcinoma

A Secondary Analysis of the ESPAC-4 Randomized Adjuvant Chemotherapy Trial

ESPAC-4

Recurrence?

Table 2. Sites of First Recurrence and Median Overall Survival From Surgery and Median Survival After Diagnosis of Recurrence by Site

Site of Recurrence	No.	Median (95% CI)		
		Recurrence-Free Survival, mo	Survival After Recurrence, mo	Overall Survival, mo
Local only	238	13.57 (12.61-14.06)	9.36 (8.08-10.48)	24.83 (22.96-27.863)
Local and distant recurrence	48	11.99 (10.28-15.83)	8.11 (5.22-11.79)	23.82 (17.48-28.32)
Distant only	193	11.14 (10.05-12.32)	9.23 (7.82-11.43)	20.61 (18.12-23.80)

Total: 730
Recurrence rate 479 (65.6%)
Local 238 (479): 49.7%
Distant 193 40.3%
Simultaneous 48: 10.0%

RESIDUAL DISEASE

Jones RP, et al. JAMA Surg 2019

Received: 14 April 2019 | Revised: 18 May 2019 | Accepted: 6 June 2019

DOI: 10.1002/ags3.12273

REVIEW ARTICLE

AGSurg Annals of Gastroenterological Surgery WILEY

Local radicality

Local radicality and survival outcome of pancreatic cancer surgery

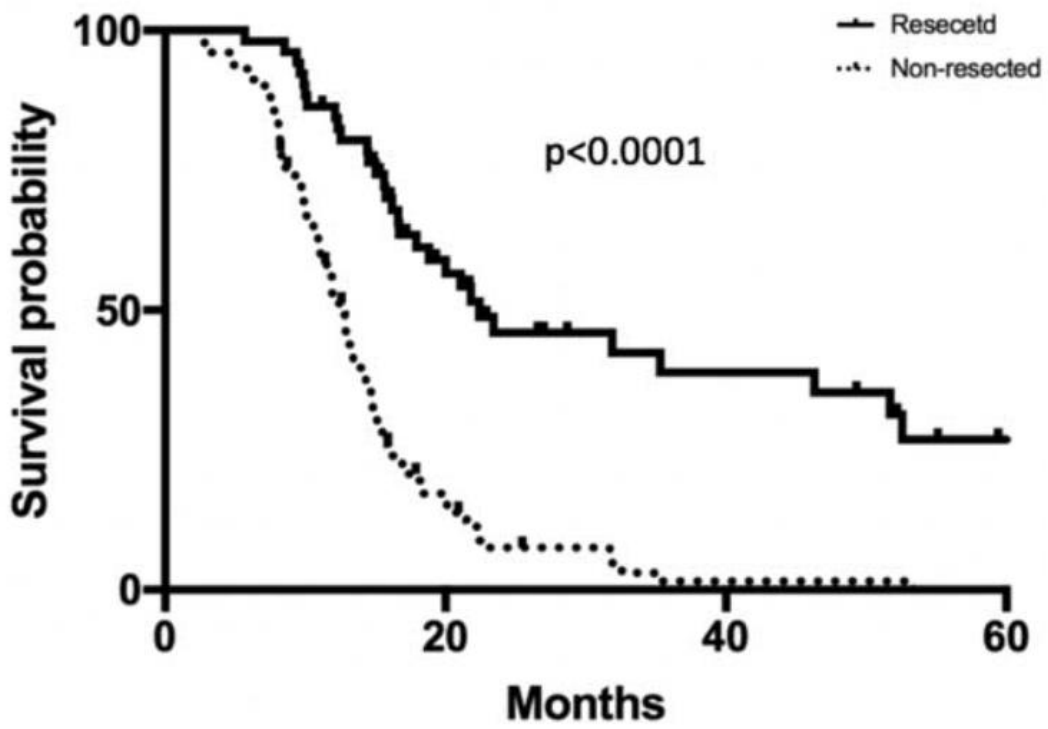
TABLE 2 The effect of positive resection margins on survival in pancreatic cancer

Study	Type of study	Patients included	Type of surgery	R-definition	R0/R1 rate, absolute (%)	Years	Median survival	5-year survival rate	Adjuvant (chemo-) therapy
Uesaka 2016[4] JASPAC 01	RCT	385	257 (68%): PD 116 (13%): DP 4 (19%): TP	0-mm rule	R0 > 0 mm: 49 (13%) R1 0 mm: 328 (87%)	2007-2010			Yes: 98.7%
		190 GEM	136 (72%): PD 50 (26%): DP 4 (2%): TP		R0 > 0 mm: 26 (14%) R1 0 mm: 164 (86%)		25.5 months	24.4%	
		187 S-1	121 (65%): PD 66 (35%): DP 0 (0%): TP		R0 > 0 mm: 23 (12%) R1 0 mm: 164 (88%)		46.5 months	44.1%	

Study	Type of study	Patients included	Type of surgery	R-definition	R0/R1 rate, absolute (%)	Years	Median survival	5-year survival rate	Adjuvant (chemo-) therapy
Strobel 2017[41]	Retrospective single-center	561	561 PD 72 (12.8%): cPD 427 (76.1%): ppPD 62 (11.1%): prPD	1-mm rule	R0 > 1 mm: 112 (20%) R1 0-1 mm: 123 (21.9%) R1 0 mm: 326 (58.1%)	2006-2012	R0 > 1 mm: 41.6 months R1 0-1 mm: 27.5 months R1 0 mm: 23.4 months	37.7% 30.1% 20.3%	Yes: 438 (78.1%) No: 72 (12.8%) NA: 51 (9.1%)
Hank 2018[42]	Retrospective single-center	455	218 DP: (47.9%) 237 TP: (52.1%)	1-mm rule	R0 > 1 mm: 107 (23.5%) R1 0-1 mm: 104 (22.9%) R1 0 mm: 244 (53.6%)	2006-2014	R0 > 1 mm: 62.4 months R1 0-1 mm: 24.6 months R1 0 mm: 17.2 months	52.6% 16.8% 13%	Yes: 81.5% No: 18.5%

Niesen W, et al. Ann Gastroenterol Surg. 2019;3:464–75

Surgery Improves Survival After Neoadjuvant Therapy for Borderline and Locally Advanced Pancreatic Cancer

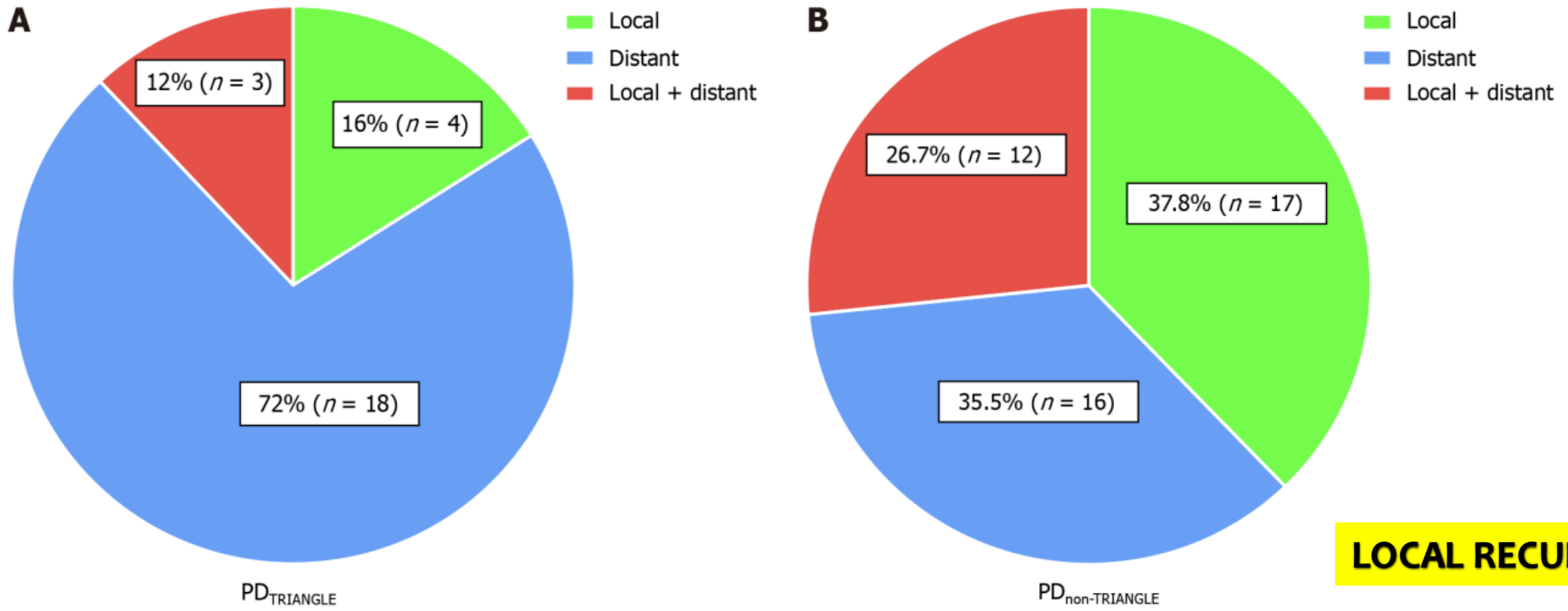


Local radicality

Rangelova E,et al. Ann Surg 2019

TRIANGLE OPERATION

Local radicality

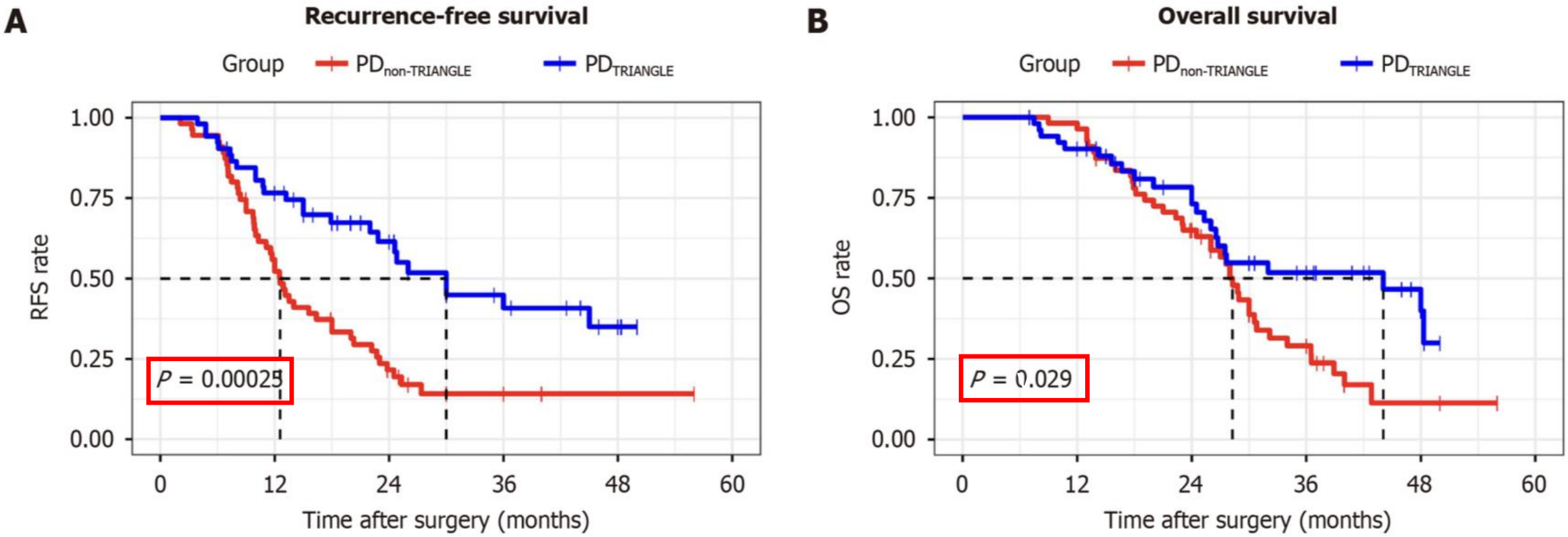


LOCAL RECURRENCE

Chen JH, et al. World J Gastrointest Oncol 2024; 16: 1773-86C

TRIANGLE OPERATION

Local radicality

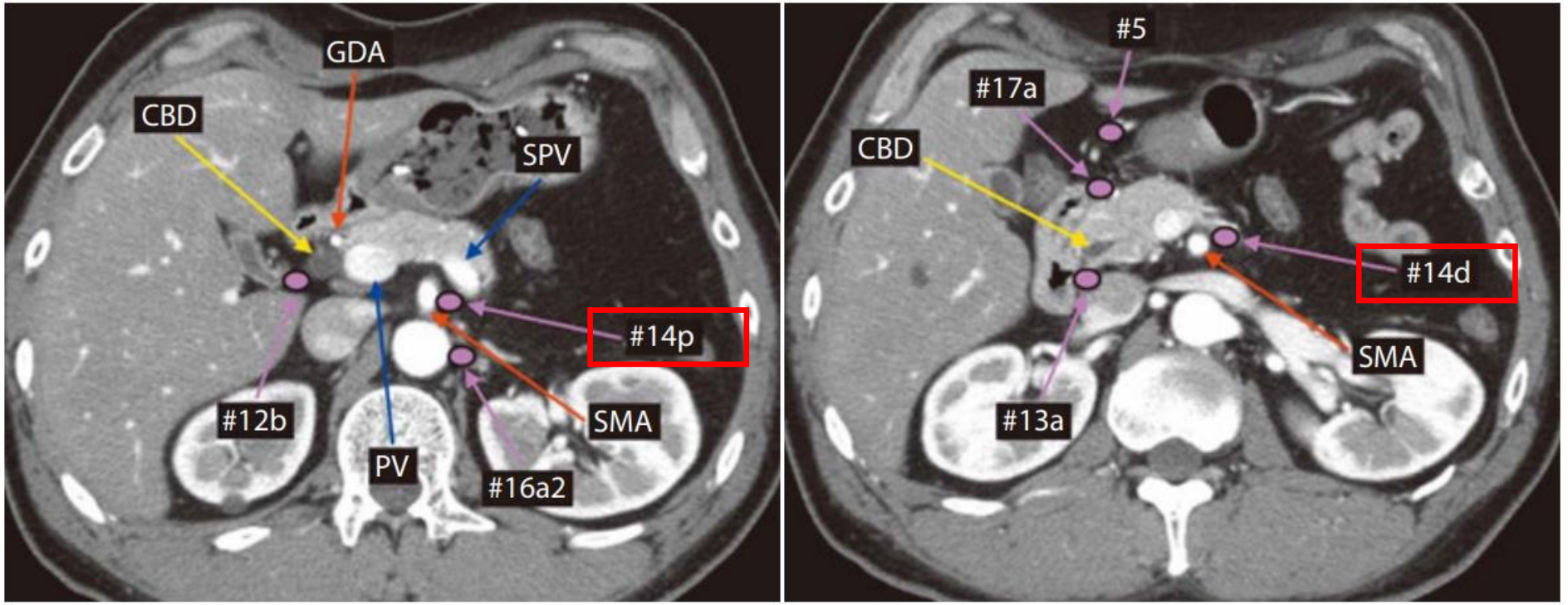


Chen JH, et al. World J Gastrointest Oncol 2024; 16: 1773-86

LYMPHADENECTOMY

Local radicality

RIGHT SIDE OF SMA ?



14p, 14d

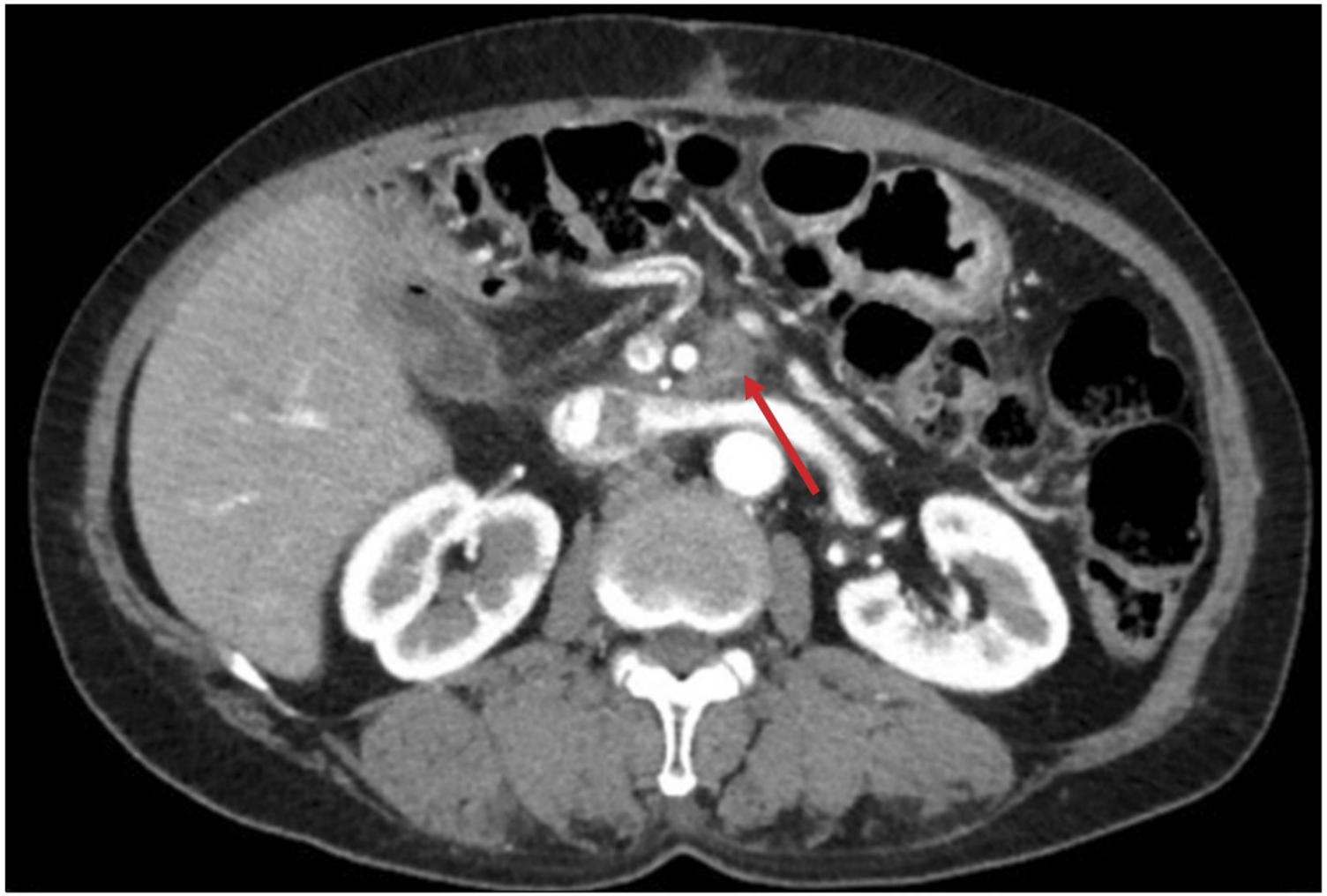
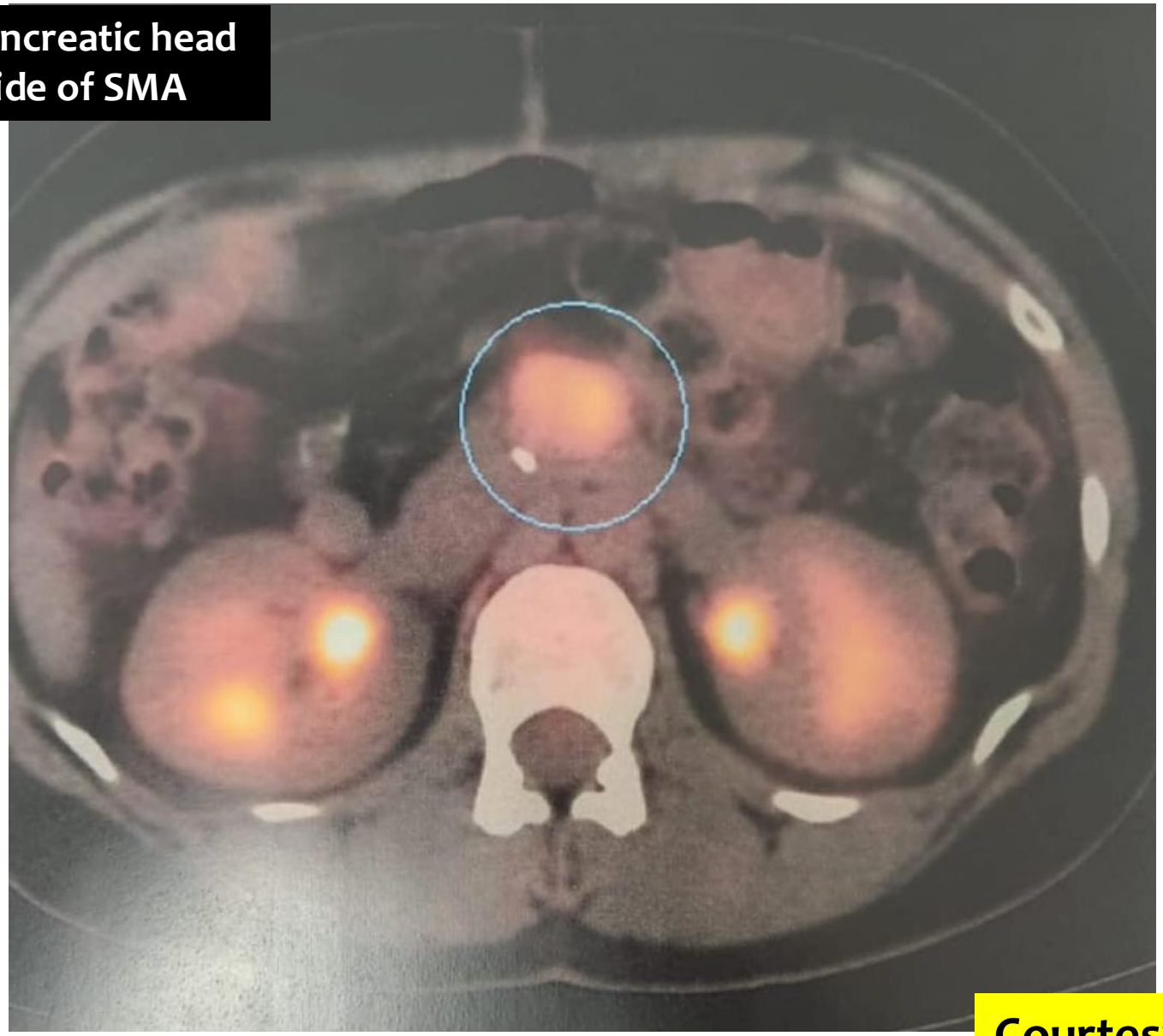


Fig. 1. Nodal type local recurrence of pancreatic head cancer on the left side of SMA.

Kang MJ, et al. Ann Hepatobiliary Pancreat Surg 2020;24:389-95

Local recurrence of pancreatic head cancer on the left side of SMA



Courtesy Dr. Alberto Stein (ES)

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

Local radicality

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

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

Local radicality

- 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

Local radicality

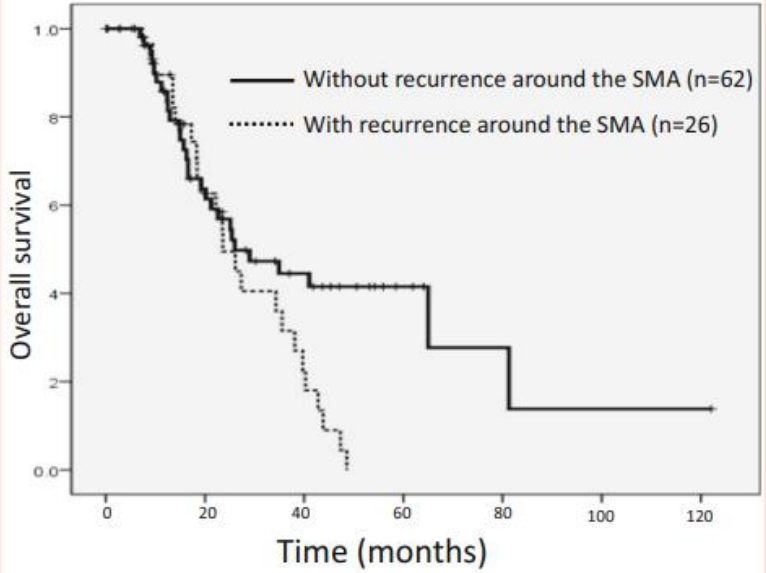


Fig. 1 Overall survival according to recurrence around the SMA. The median survival was 23.6 months in patients with recurrence around the SMA and 26 months in patients without recurrence around the SMA (p = 0.0367) SMA: superior mesenteric artery

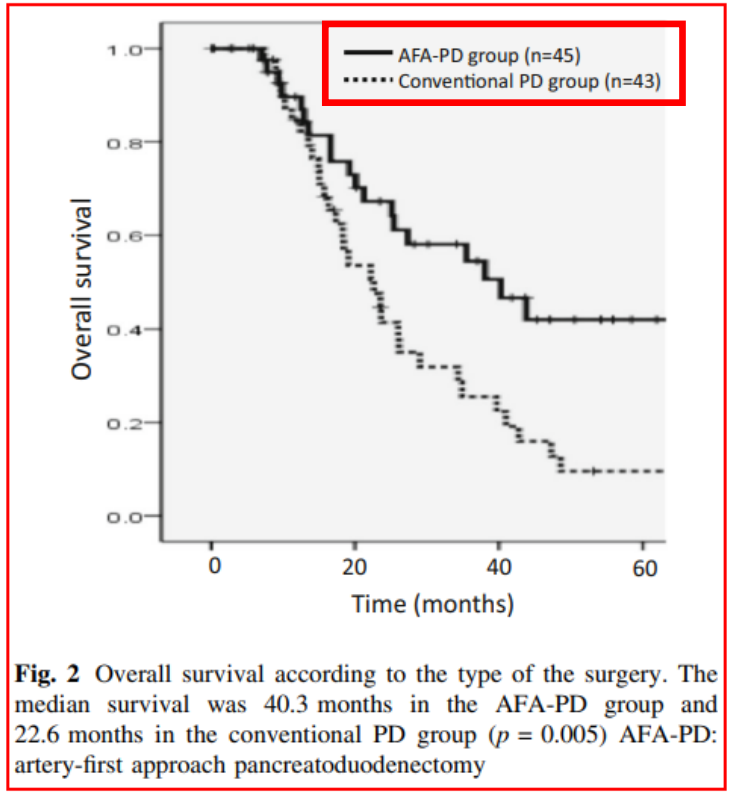


Fig. 2 Overall survival according to the type of the surgery. The median survival was 40.3 months in the AFA-PD group and 22.6 months in the conventional PD group (p = 0.005) AFA-PD: artery-first approach pancreatoduodenectomy

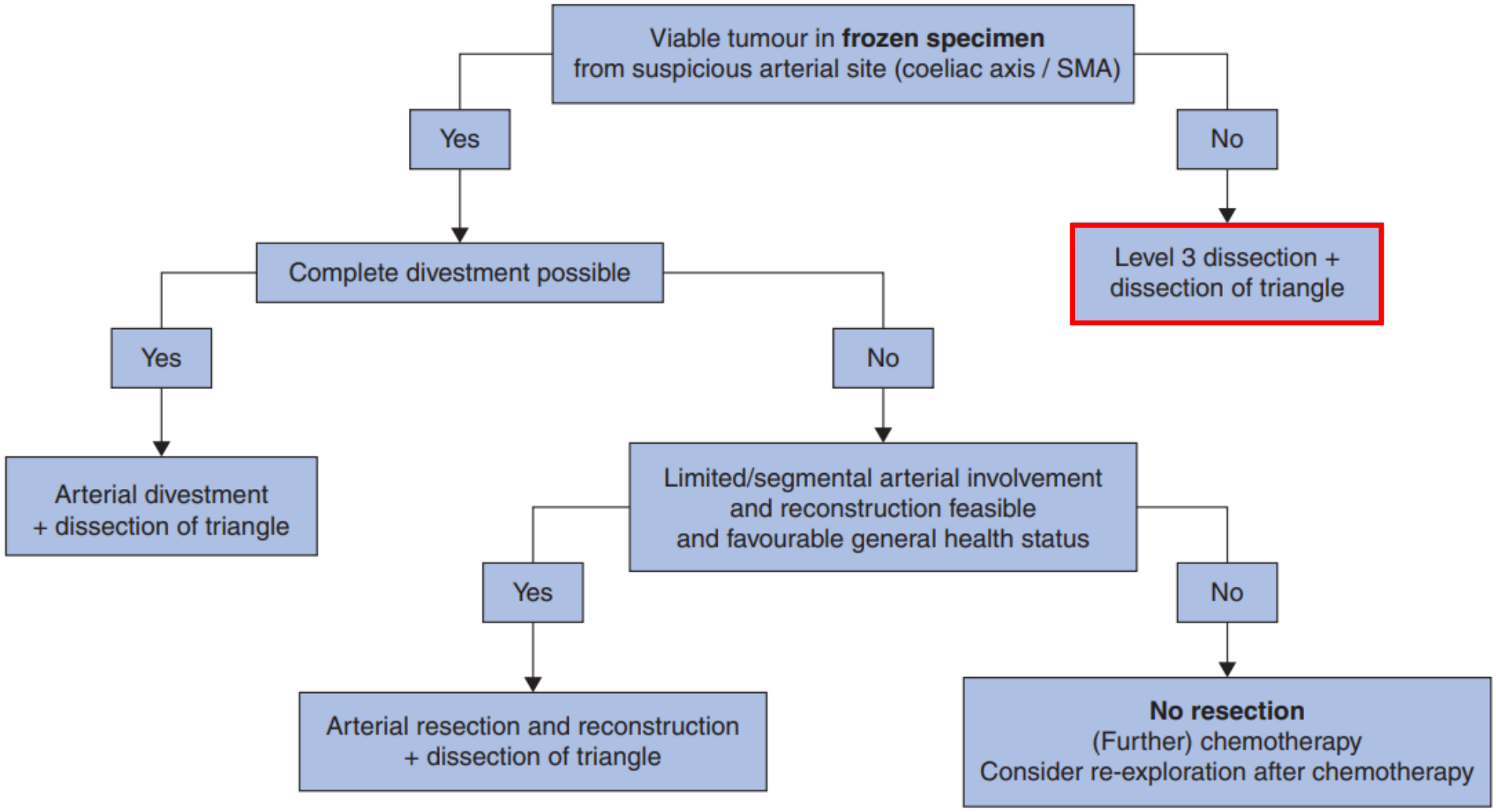
40.3 months vs 22.6 months (p= 0.005)

OVERALL SURVIVAL

Kobayashi S, et al. World J Surg 2020

STATE OF THE ART

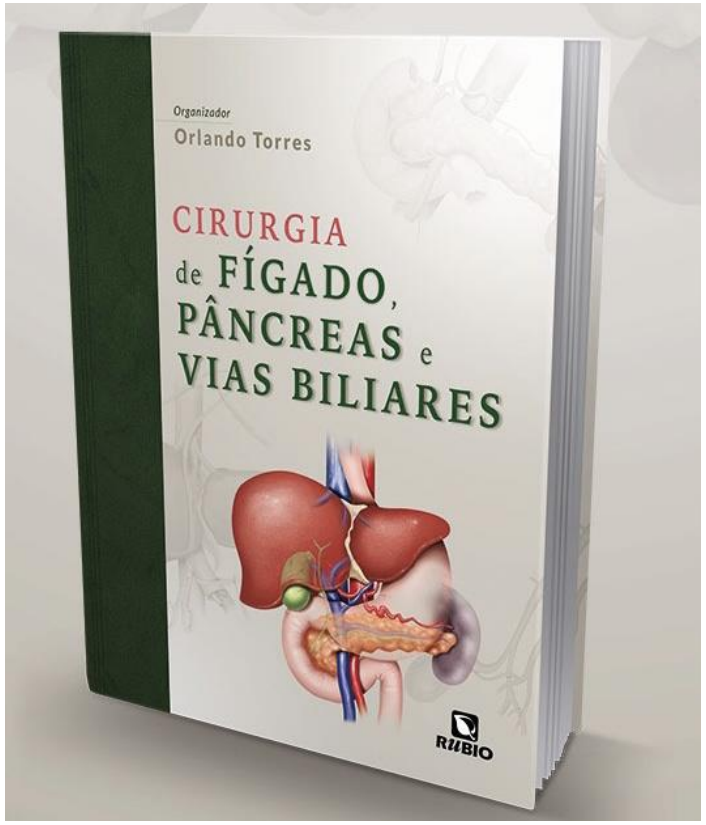
Local radicality



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

CONCLUSIONS

- Radical resection with adequate regional lymphadenectomy and radical resection around the large peri-pancreatic vessels is an important prerequisite for good oncological outcomes.
- High-quality radical surgery and modern adjuvant therapy, defined by lymph node resection and margin status, has a profound impact on survival.
- In modern pancreatic surgery, radical resections can be facilitated and achieved by several techniques, including artery-first approaches, a level-3 dissection around the arteries, the TRIANGLE operation, and extended resections, including vascular resection.



www.drorlandotorres.com.br

Shailesh and Thilo

Lençóis Maranhenses

Thanks!

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