

SÃO PAULO, 24 A 26 DE NOVEMBRO



16º CONGRESSO BRASILEIRO DE VIDEOCIRURGIA

5º CONGRESSO BRASILEIRO E LATINO-AMERICANO DE CIRURGIA ROBÓTICA

## ANASTOMOSE PANCREATOJEJUNAL



**Orlando Jorge M. Torres**

Professor Titular

Serviço de Cirurgia do Aparelho Digestivo

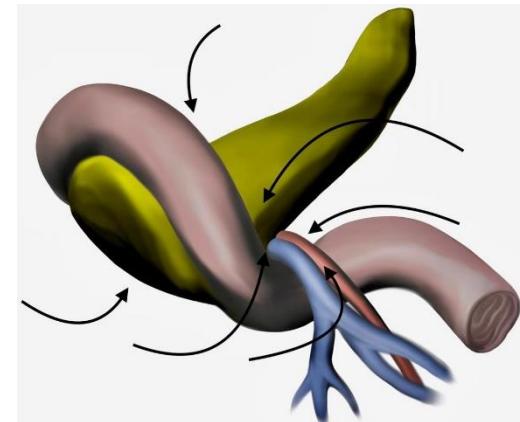
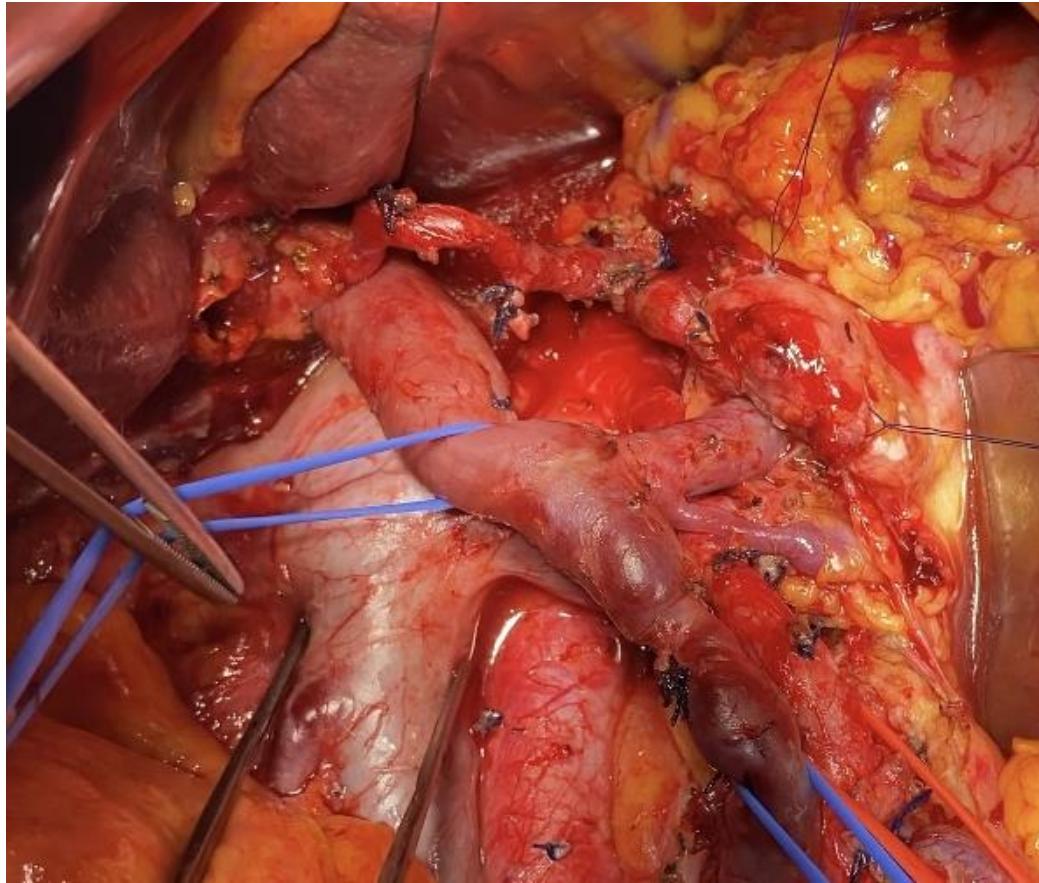
Unidade Hepatopancreatobiliar

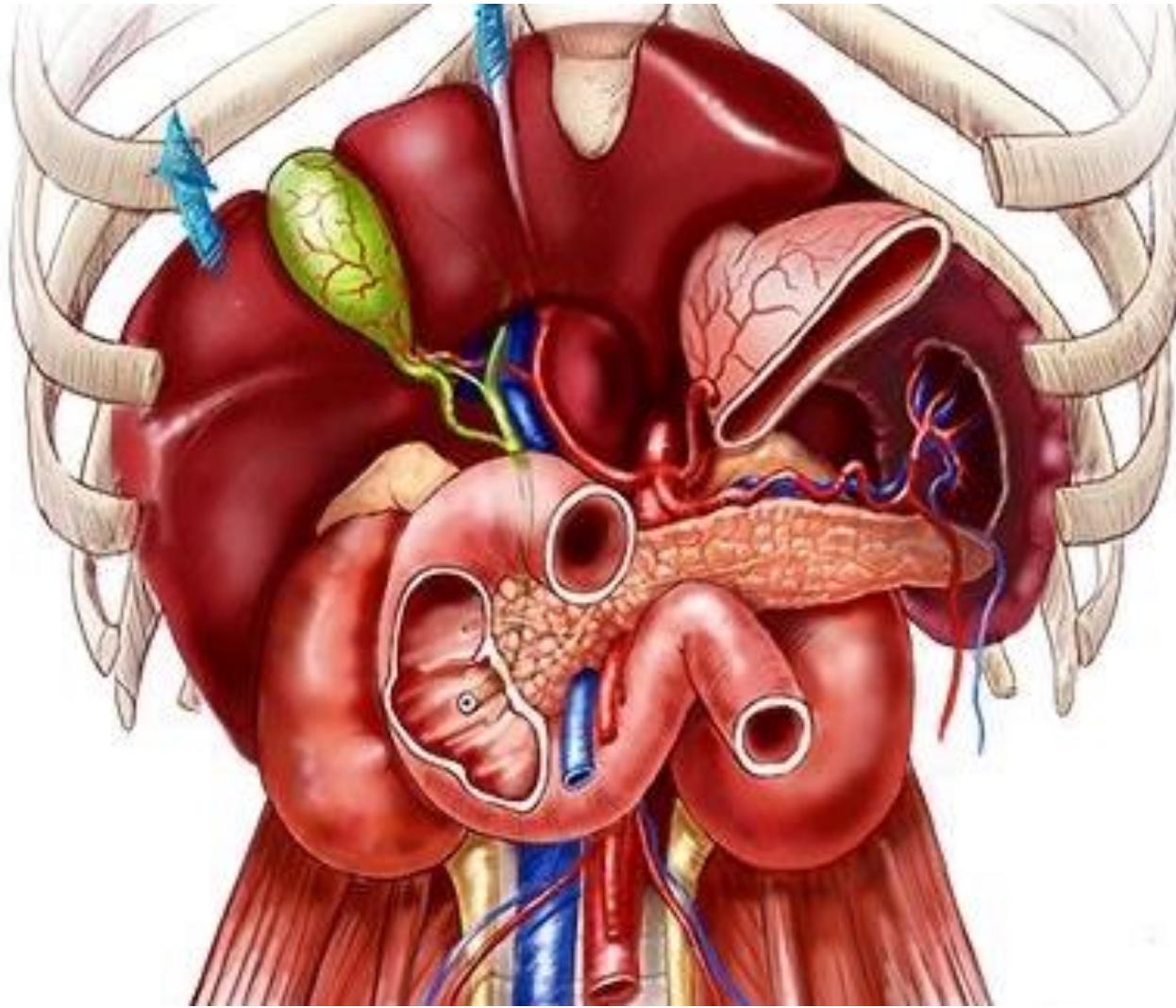
Universidade Federal do Maranhão - Brasil



## What do surgeons need to know about the mesopancreas

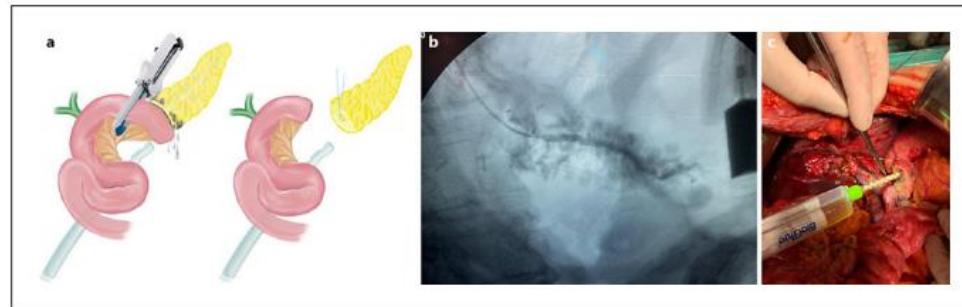
Eduardo de Souza M. Fernandes<sup>1,2</sup> · Oliver Strobel<sup>3,4</sup> · Camila Girão<sup>1,2</sup> · Jose Maria A. Moraes-Junior<sup>5,6</sup> ·  
Orlando Jorge M. Torres<sup>5,6</sup>





## Surgical Management of Postoperative Grade C Pancreatic Fistula following Pancreatoduodenectomy

Orlando Jorge Martins Torres<sup>a</sup> José Maria Assunção Moraes-Junior<sup>a</sup>  
Eduardo de Souza Martins Fernandes<sup>b</sup> Thilo Hackert<sup>c</sup>



**Fig. 2.** **a** Main pancreatic duct occlusion. **b** Wirsungography. **c** Pancreatic duct occlusion with cyanoacrylate.



**Fig. 6.** Completion pancreatectomy.



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**Table 2.** Fistula Risk Score for Prediction of Clinically Relevant Pancreatic Fistula after Pancreatoduodenectomy (Model III)

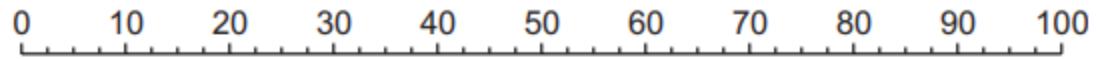
Risk factor	Parameter	Points*
Gland texture	Firm	0
	Soft	2
Pathology	Pancreatic adenocarcinoma or pancreatitis	0
	Ampullary, duodenal, cystic, islet cell	1
Pancreatic duct diameter, mm	$\geq 5$	0
	4	1
	3	2
	2	3
	$\leq 1$	4
Intraoperative blood loss, mL	$\leq 400$	0
	401–700	1
	701–1,000	2
	$>1,000$	3

\*Total 0 to 10 points.

- Negligible** 0
- Low** 1-3
- Moderate** 4-6
- High** 7-10

# Risk for POPE - Nomogram

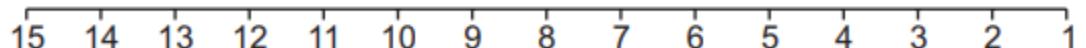
Points



Portal vein invasion



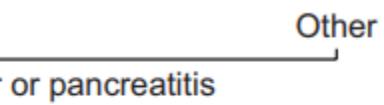
Duct diameter in mm



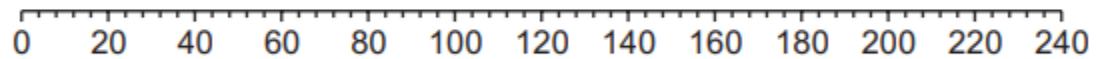
Texture of pancreas



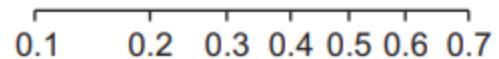
Pathology



Total points



Probability



# Risk for POPF – Nomogram

**Table 3.** Risk groups based on the predictive nomogram for all patients

Group	Total points	Predicted risk	Predicted mean risk	Observed rate
Low risk	<133.5	<10%	7.7%	2% (2/101)
Intermediate risk	133.5–178.25	10%–30%	17.0%	19.6% (21/107)
High risk	>178.25	>30%	46.7%	43.3% (39/90)

**Table 4.** Outcomes related to POPF by risk group for all patients

Adverse events	Low risk (n = 101)	Intermediate risk (n = 107)	High risk (n = 90)	P-value
Readmission (%)	0	3 (2.8)	3 (3.3)	0.201
Secondary infections (%)	0	15 (14.0)	26 (28.9)	<0.001*
Prolongation of drainage (>21 days) (%)	2 (2.0)	15 (14.0)	27 (30.0)	<0.001*
Percutaneous drainage (%)	0	6 (5.6)	10 (11.1)	0.003*
Postpancreatectomy hemorrhage (%)	0	2 (1.9)	7 (7.8)	0.005*
Reoperation (%)	0	1 (0.9)	7 (7.8)	0.002*
Mortality (%)	0	2 (1.9)	3 (3.3)	0.198

Secondary infections, infections occurring owing to the postoperative pancreatic fistula (POPF) itself, regardless of the severity of infection to some extent.

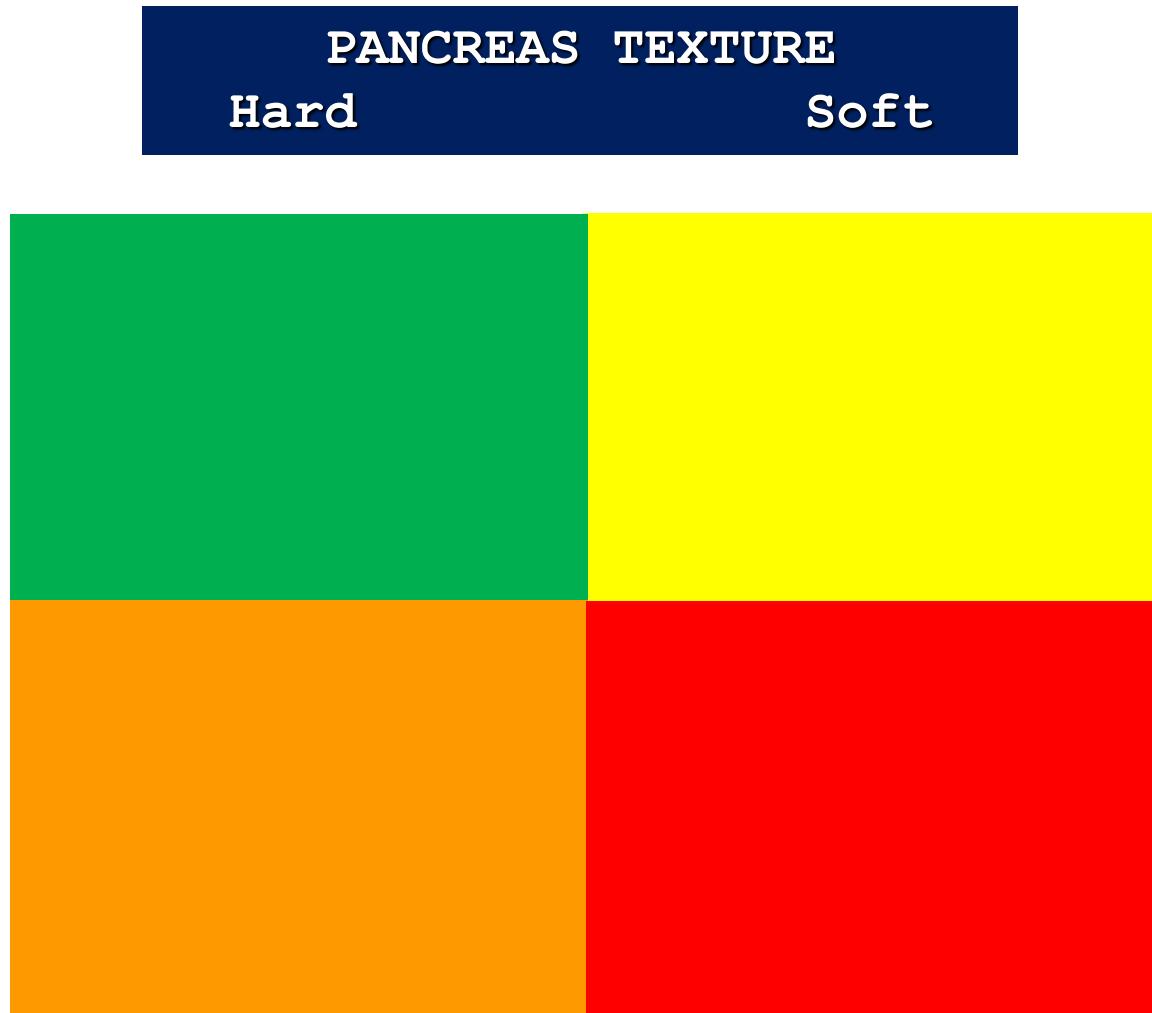
\*P < 0.05, statistically significant difference.

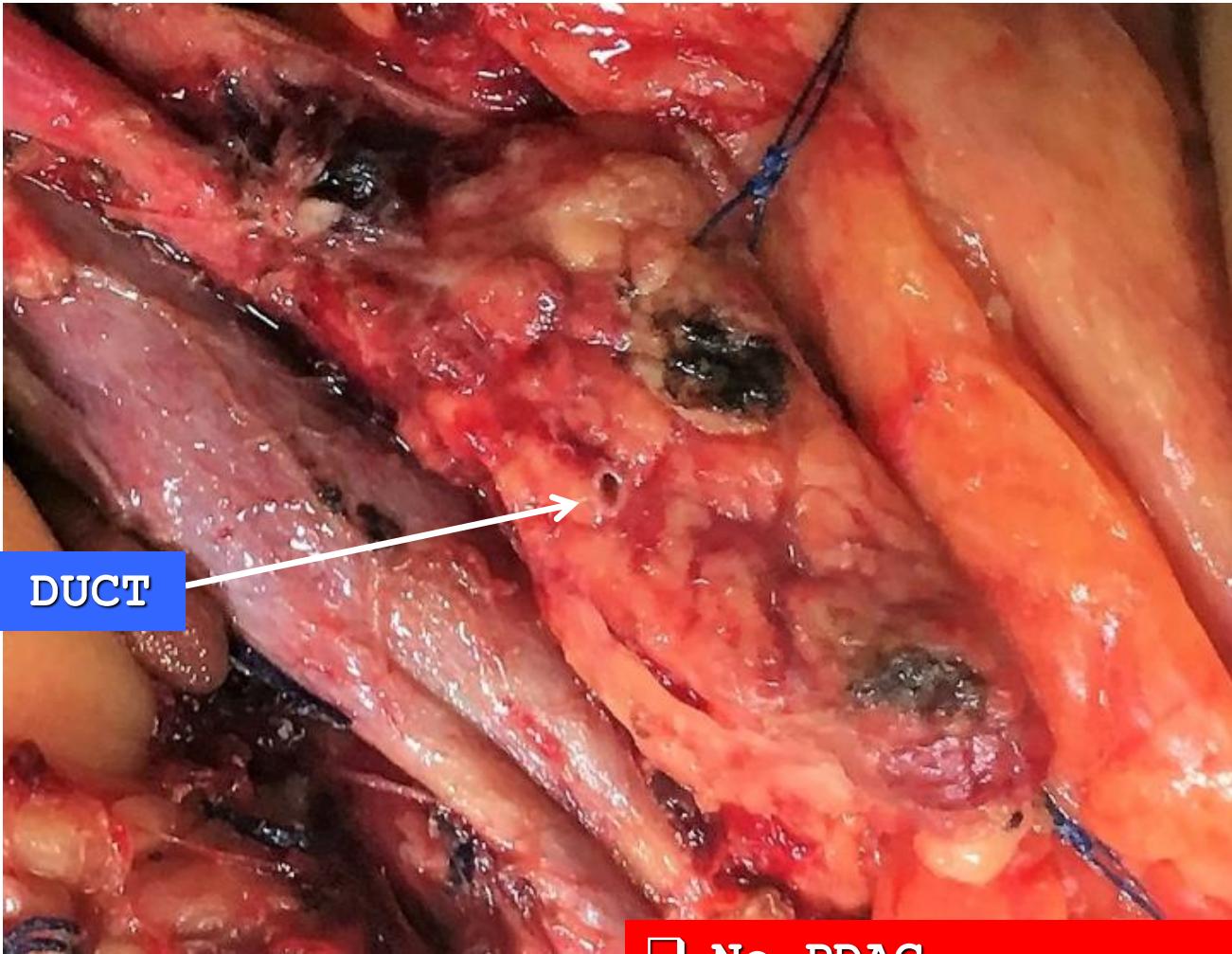
# PANCREATIC FISTULA

D  
U  
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> 3mm

$\leq$  3mm





- No PDAC
- < 3mm pancreatic duct
- Soft pancreatic parenchyma

OPEN

### Pancreatogastrostomy Versus Pancreatojejunostomy for RECOstruction After PANCreatoduodenectomy (RECOPANC, DRKS 00000767)

*Perioperative and Long-term Results of a Multicenter Randomized Controlled Trial*

Tobias Keck, MD, MBA, FACS, \*† U. F. Wellner, MD,\*† M. Bahra, MD,‡ F. Klein, MD,‡ O. Sick, MSc, †  
M. Niedergethmann, MD,§ T. J. Wilhelm, MD,§ S. A. Farkas, MD,¶ T. Börner, MD,¶ C. Bruns, MD,||  
A. Kleespies, MD,|| J. Kleeff, MD,\*\* A. L. Mihaljevic, MD,\*\* W. Uhl, MD,†† A. Chromik, MD,††  
V. Fendrich, MD,†† K. Heeger, MD,†† W. Padberg, MD,§§ A. Hecker, MD,§§ U. P. Neumann, MD,¶¶  
K. Junge, MD,¶¶ J. C. Kalff, MD,||| T. R. Glowka, MD,||| J. Werner, MD,\*\*\* P. Knebel, MD,\*\*\*  
P. Piso, MD,††† M. Mayr, MD,††† J. Izbicki, MD,††† Y. Vashist, MD,††† P. Bronsert, MD,§§§¶¶¶  
T. Bruckner, PhD,||||| R. Limprecht, MSc,||||| M. K. Diener, MD,\*\*\*\*\* I. Rossion, MD,\*\*\*\*  
I. Wegener, MD,\*\*\*\* and U. T. Hopt, MD†

**RECOPANC**

# PG versus PJ

RECOPANC

TABLE 2. Primary Endpoint Analysis

Parameter	Total n	Univariate Analysis			P
		No/POPF A n (%)	POPF B/C n (%)		
All patients	320	253 (79%)	67 (21%)	—	
PJ	149	116 (78%)	33 (22%)		0.617
PG	171	137 (80%)	34 (20%)		

NO DIFFERENCE

PG – more postoperative bleeding

JAMA Surgery | Original Investigation

# Pancreaticojejunostomy With Externalized Stent vs Pancreaticogastrostomy With Externalized Stent for Patients With High-Risk Pancreatic Anastomosis A Single-Center, Phase 3, Randomized Clinical Trial

Stefano Andrianello, MD; Giovanni Marchegiani, MD, PhD; Giuseppe Malleo, MD, PhD; Gaia Masini, MD; Alberto Balduzzi, MD; Salvatore Paiella, MD, PhD;  
Alessandro Esposito, MD; Luca Landoni, MD; Luca Casetti, MD, PhD; Massimiliano Tuveri, MD; Roberto Salvia, MD, PhD; Claudio Bassi, MD

## High risk for POPF

- PJ vs PG – Similar rates of POPF
- Clavien-Dindo  $\geq 3$  – PG
- PJ + externalized stent + octreotide omission  
**Most appropriate technical strategy**

# PJ versus PG

**Table I.** Characteristics of selected meta-analyses comparing PG vs PJ (2006–2015)

#	Author and year	Number of RCTs included	Number of observational studies included	Extent of heterogeneity $I^2$ statistic	Conclusion of meta-analysis
1.	McKay 2006 <sup>35</sup>	1 RCT	10 OCS	NA	PG better than PJ
2.	Wente, 2007 <sup>36</sup>	3 RCTs	13 OCS	35.6%	OCS->PG superior over PJ; RCTS->PG and PJ have equal results.
3.	Clerveus M 2014 <sup>37</sup>	7 RCTs	—	NA	PG cannot be considered superior to PJ due to heterogeneity of trials and absence of difference in morbidity, reoperation rates, and mortality
4.	Hallet J 2015 <sup>38</sup>	4 RCTs	—	0%	PG decreases POPF rate
5.	WeiTaoQue MM 2015 <sup>39</sup>	8 RCTs	—	51.9%	PG preferred over PJ
6.	Benjamin Menahem 2015 <sup>40</sup>	7 RCTs	—	17%	PG-> lower POPF rates and biliary fistula rates

ISGAPS

**Table II.** Suggested recommendations in diverse intraoperative situations

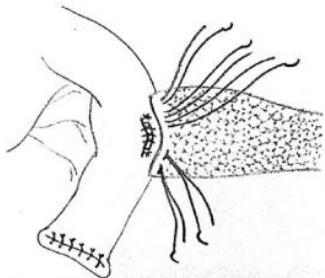
No	Scenario	Recommended strategy	ISGPS concurrence
1	Preferred method of PA following PD (PPPD/cW)	PJ with duct-mucosa advised as anastomotic technique	Moderate
2	Preferred method of PA in the presence of high risk features for POPF – soft gland, small duct (<3 mm), fatty pancreas and posteriorly located duct etc.	PJ with duct-mucosa advised as anastomotic technique	Moderate

**Table III.** Levels of evidence and ISGPS recommendation

Variables	Literature review summary data	Level of evidence (1 to 5) and evidence-based recommendation (A to D)	ISGPS recommendation (Strong, Moderate, Weak)	Justification
PG vs PJ	PG apparently seems advantageous over PJ although varied heterogeneity seen in existing RCTs	Level 1B Grade B	Moderate	High level of heterogeneity observed in evidence.

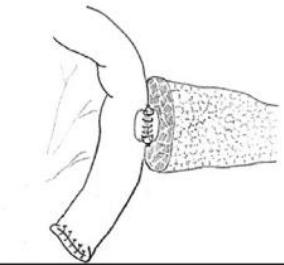
**Duct-mucosa pancreateojejunostomy**

# PANCREATOJEJUNOSTOMY

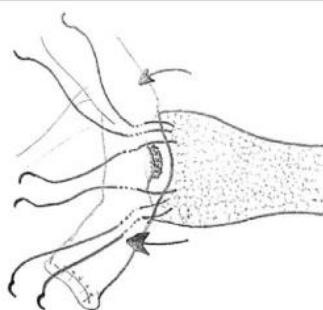


E

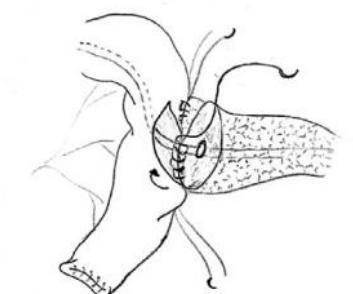
- Blumgart
- Modified Blumgart
- Heidelberg
- Modified Heidelberg
- Peng Technique
- Pair watch
- Invagination
- Cattel Warren



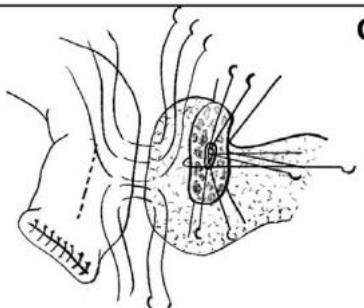
I



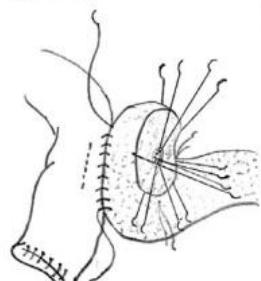
K



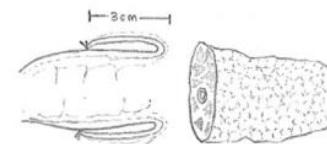
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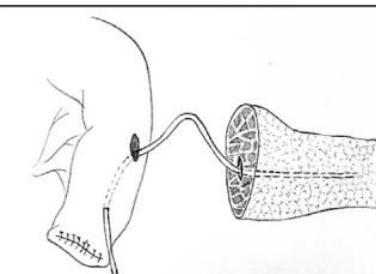
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A



E

# PANCREATOJEJUNOSTOMY

Studies comparing various PJ techniques.

Study Arms	Author	Type of study	Year	Results	p value
Duct to mucosa v/s Invagination	Berger et al [17]	RCT	2009	Higher PF rate with duct-to-mucosa technique	0.04
	Bai et al [18]	RCT	2016	Similar overall POPF but higher rate of clinically relevant POPF in invagination group	0.004
	Zhang et al [19]	Meta-analysis	2017	No significant difference	0.13
Cattell-Warren v/s Blumgart Binding versus Invagination	Lee et al [20]	Before-after	2018	No significant difference in POPF rates	0.11
	Peng et al [21]	RCT	2007	POPF rate lower with binding technique	0.014
	Maggiori et al [22]	Case-Control	2010	No significant difference	0.33

PJ- Pancreatico-jejunostomy, POPF- Postoperative pancreatic fistula, RCT- Randomised control trial.

**"The pancreatic surgeon should be wise enough and aware of the various surgical techniques which can be appropriately applied in cases where high-risk anastomoses is anticipated."**



## Review

The optimal choice for pancreatic anastomosis after  
pancreaticoduodenectomy: A network meta-analysis of randomized control  
trials

**Table 2**

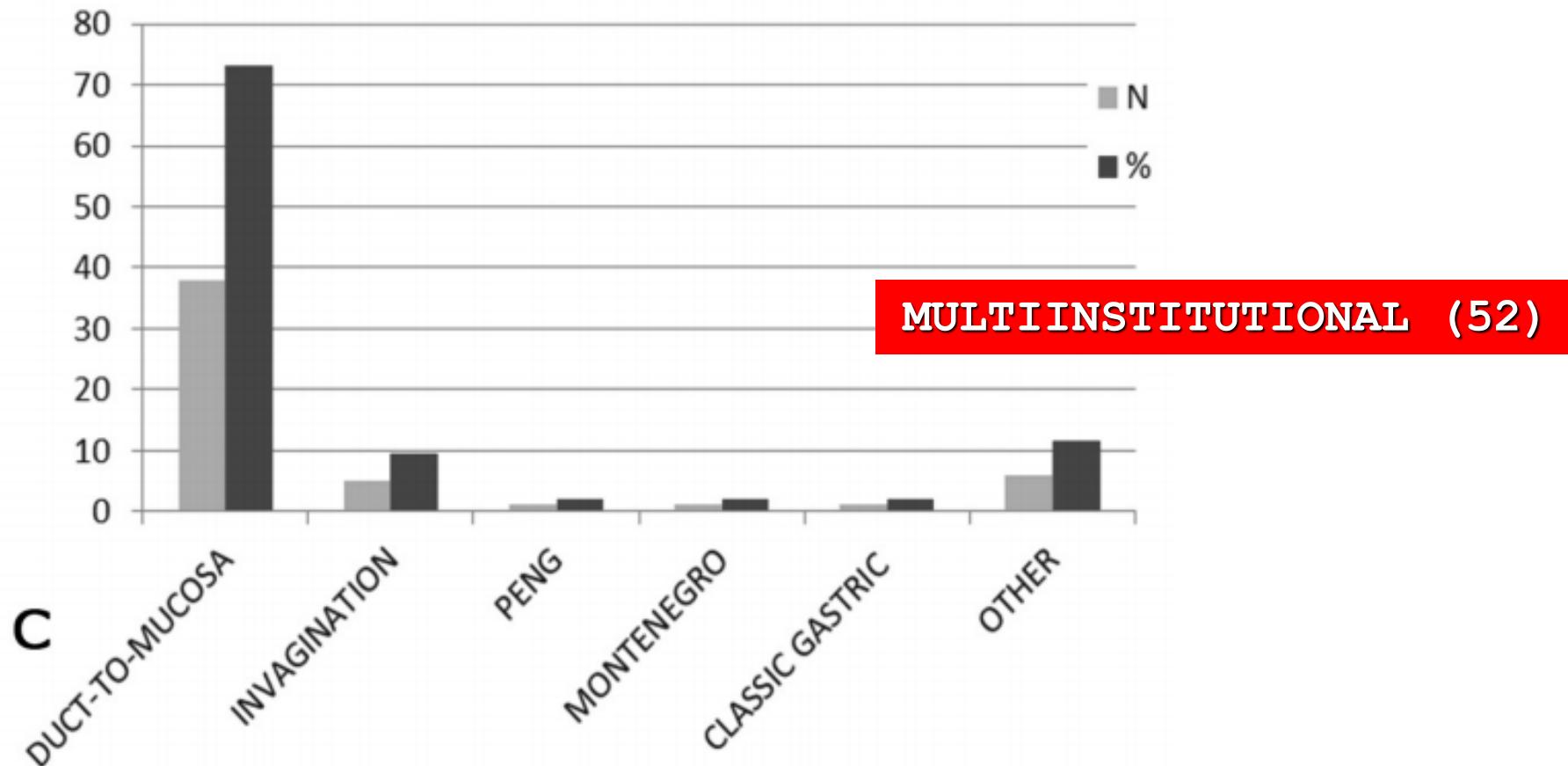
Outcome	Name	Direct effect	Indirect effect	Overall	P-value
PF	PJ-DtoM, PJ-Inv	0.09 (-0.52, 0.79)	-0.42 (-1.61, 0.62)	-0.05 (-0.56, 0.50)	0.42
	PG-Inv, PJ-DtoM	0.62 (-0.13, 1.43)	0.10 (-1.02, 1.09)	0.42 (-0.17, 1.00)	0.4
	PG-Inv, PJ-Inv	0.19 (-0.65, 0.95)	0.70 (-0.27, 1.85)	0.37 (-0.20, 0.97)	0.38
PF(ISGPS definition)	PG-Inv, PJ-DtoM	0.61 (-0.17, 1.51)	0.38 (-0.95, 1.59)	0.55 (-0.10, 1.20)	0.74
	PG-Inv, PJ-Inv	0.28 (-0.70, 1.15)	0.47 (-0.61, 1.74)	0.35 (-0.33, 1.04)	0.78
	PJ-DtoM, PJ-Inv	-0.13 (-0.92, 0.76)	-0.35 (-1.70, 0.82)	-0.19 (-0.85, 0.46)	0.75
PF( soft pancreatic texture)	PG-Inv, PJ-DtoM	0.51 (-0.50, 1.63)	1.02 (-0.78, 2.63)	0.67 (-0.19, 1.59)	0.58
	PG-Inv, PJ-Inv	1.06 (-0.44, 2.63)	0.54 (-0.75, 2.00)	0.78 (-0.13, 1.83)	0.56
	PJ-DtoM, PJ-Inv	0.08 (-0.76, 0.90)	0.65 (-1.34, 2.28)	0.12 (-0.61, 0.87)	0.5
Overall morbidity	PG-Inv, PJ-DtoM	0.51 (-0.18, 1.25)	-0.31 (-0.92, 0.25)	0.02 (-0.46, 0.48)	0.07
	PG-Inv, PJ-Inv	-0.24 (-0.71, 0.16)	0.56 (-0.19, 1.39)	-0.05 (-0.45, 0.36)	0.08
	PJ-DtoM, PJ-Inv	0.08 (-0.29, 0.44)	-0.75 (-1.58, 0.10)	-0.07 (-0.41, 0.28)	0.07
Overall mortality	PG-Inv, PJ-DtoM	-0.03 (-1.17, 1.13)	0.07 (-1.56, 1.63)	-0.02 (-0.86, 0.89)	0.93
	PG-Inv, PJ-Inv	0.09 (-1.12, 1.24)	-0.02 (-1.60, 1.53)	0.04 (-0.85, 0.94)	0.96
	PJ-DtoM, PJ-Inv	0.00 (-1.13, 1.06)	0.08 (-1.65, 1.70)	0.07 (-0.88, 0.94)	0.96
Delayed gastric emptying	PG-Inv, PJ-DtoM	0.09 (-0.65, 0.90)	-0.39 (-1.71, 0.84)	-0.02 (-0.62, 0.57)	0.43
	PG-Inv, PJ-Inv	-0.50 (-1.48, 0.31)	-0.08 (-1.14, 1.16)	-0.37 (-0.99, 0.30)	0.53
	PJ-DtoM, PJ-Inv	-0.18 (-1.01, 0.78)	-0.60 (-1.86, 0.47)	-0.35 (-0.97, 0.36)	0.51

**"No significant differences."**

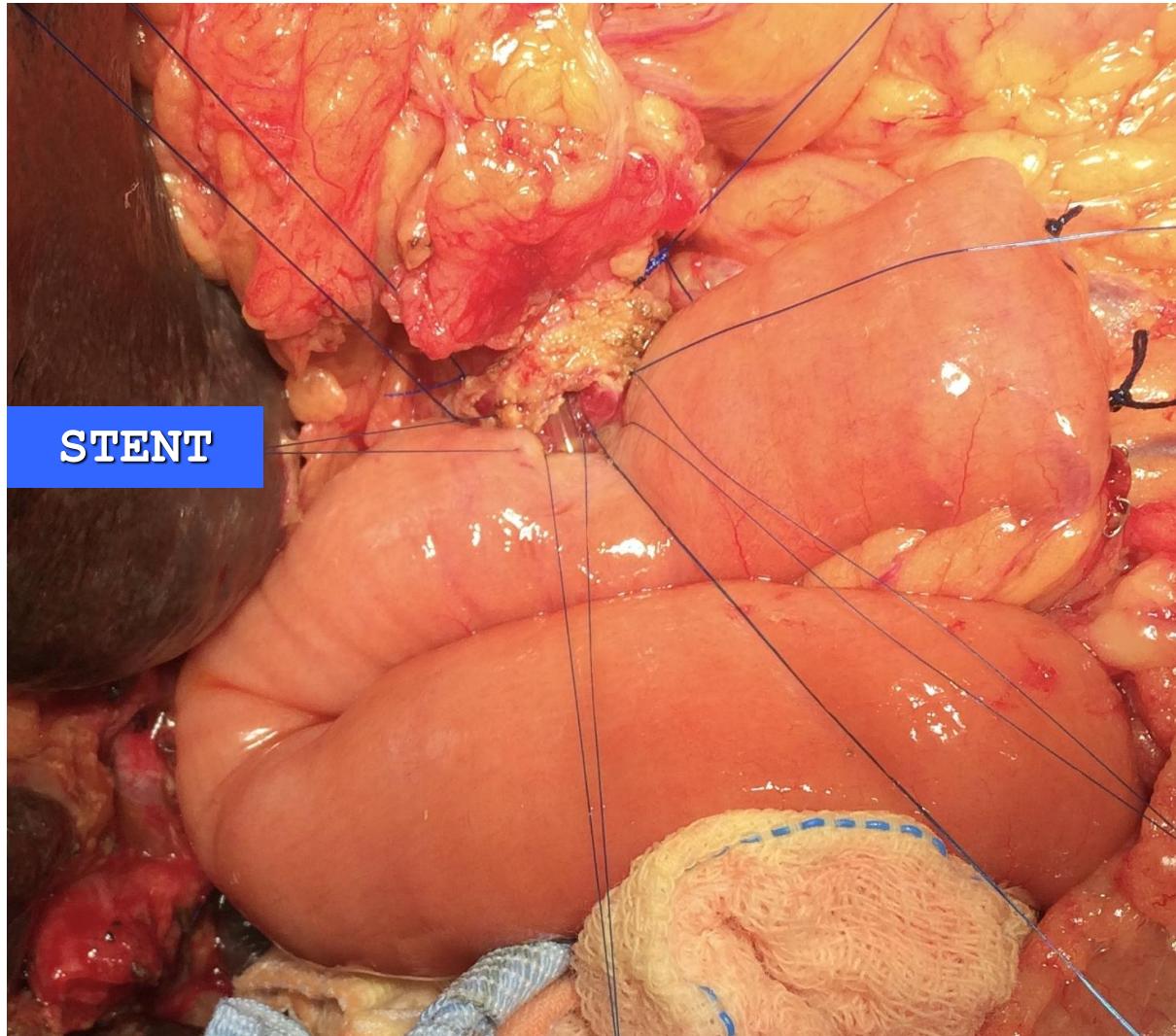
## PANCREATODUODENECTOMY: BRAZILIAN PRACTICE PATTERNS\*

*Duodenopancreatectomia: prática padrão do Brasil\**

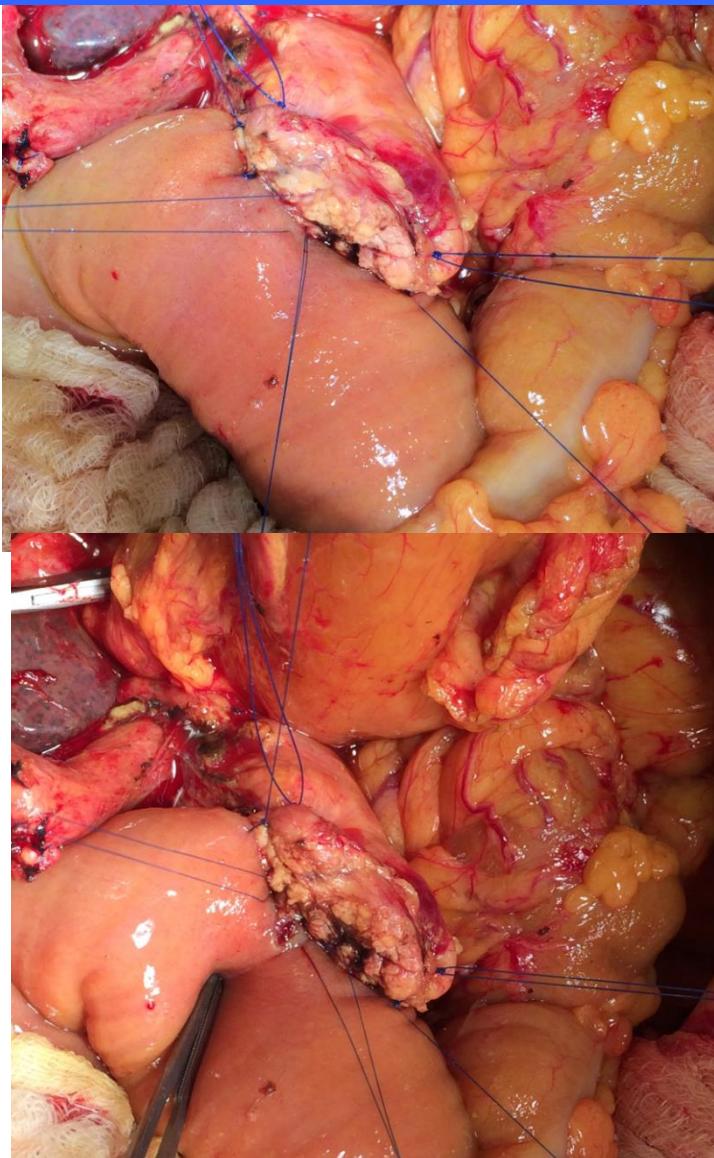
Orlando Jorge M **TORRES**<sup>1</sup>, Eduardo de Souza M **FERNANDES**<sup>2</sup>, Rodrigo Rodrigues **VASQUES**<sup>1</sup>, Fabio Luís **WAECHTER**<sup>3</sup>,  
Paulo Cezar G. **AMARAL**<sup>4</sup>, Marcelo Bruno de **REZENDE**<sup>5</sup>, Roland Montenegro **COSTA**<sup>6</sup>, André Luís **MONTAGNINI**<sup>7</sup>



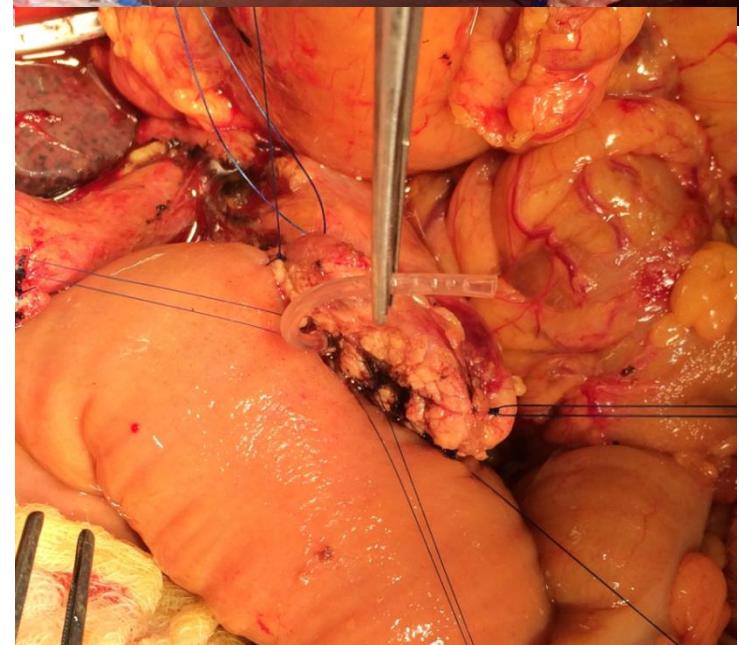
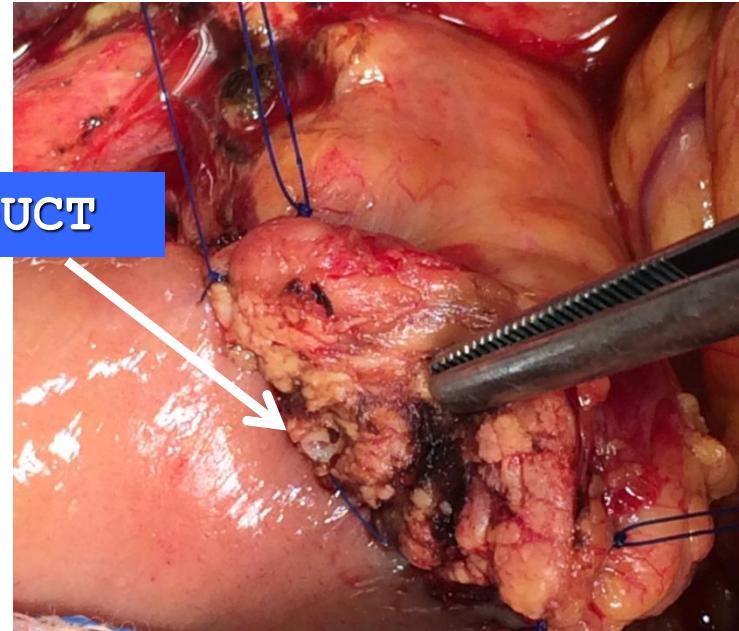
# DUCT-TO-MUCOSA



# DUCT-TO-MUCOSA



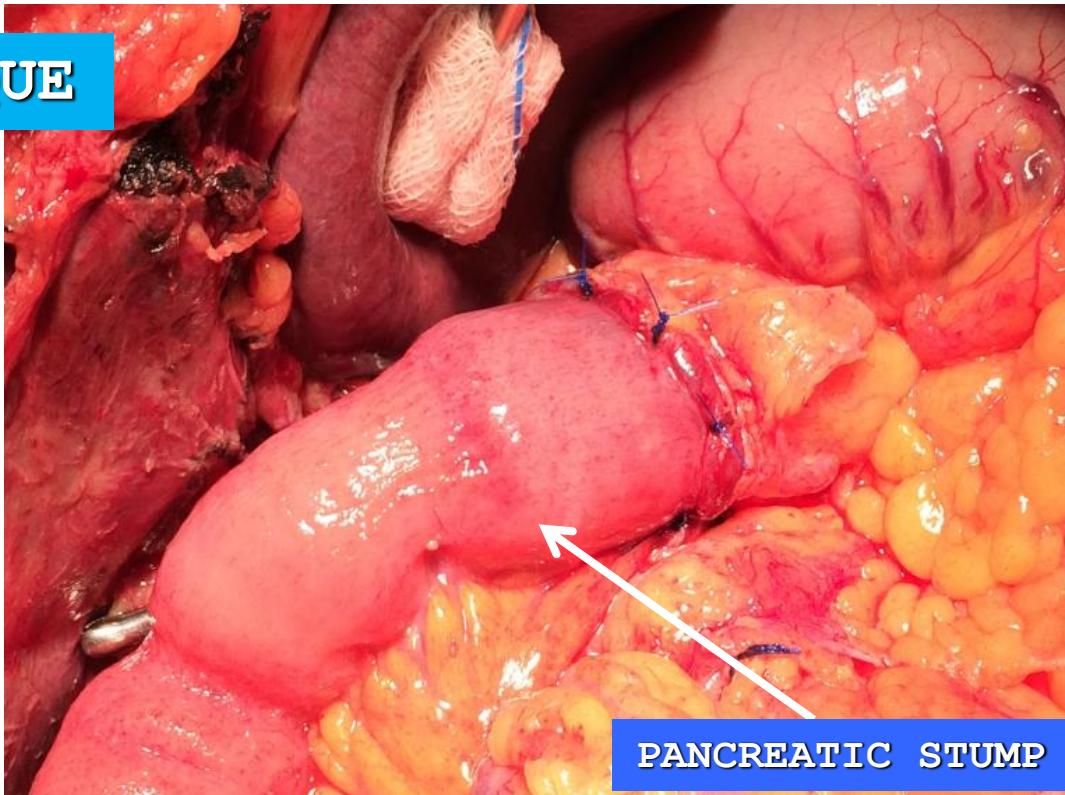
DUCT



# INVAGINATION TECHNIQUE

ISGPS

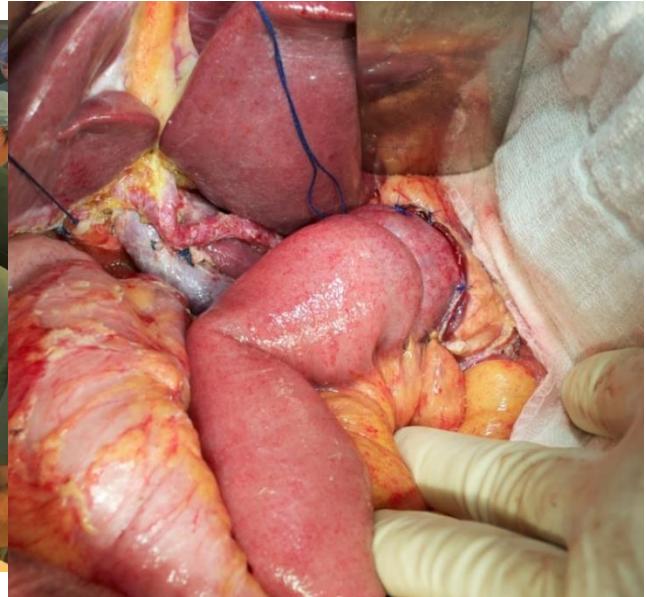
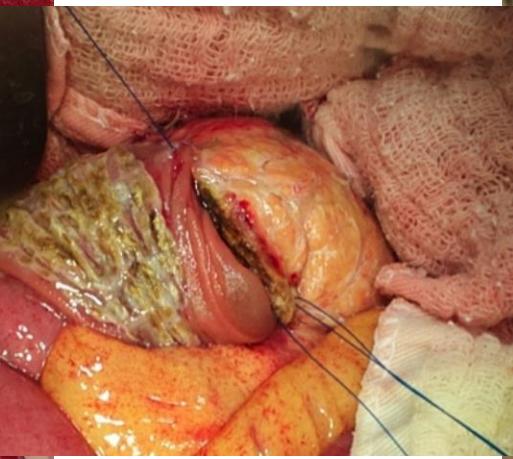
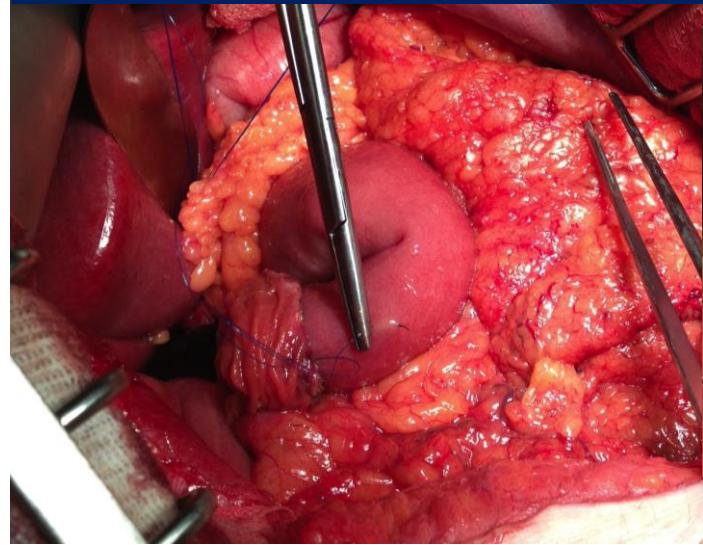
- Soft pancreas
- Duct ≤ 3mm



**Table III.** Levels of evidence and ISGPS recommendation

Variables	Literature review summary data	Level of evidence (1 to 5) and evidence-based recommendation (A to D)	ISGPS recommendation (Strong, Moderate, Weak)	Justification
Invagination technique	Safe technique and can be preferred in soft glands with narrow duct	Level 1B Grade B	Moderate	Adequate evidence observed.

# Peng's binding technique



# Peng's binding technique

**Table III.** Levels of evidence and ISGPS recommendation

Variables	Literature review summary data	Level of evidence (1 to 5) and evidence-based recommendation recommendation (A to D)	ISGPS recommendation (Strong, Moderate, Weak)	Justification
Duct to mucosa technique	Safe and common technique of PJ	Level 1B Grade A	Strong	Adequate evidence observed.
Binding PJ	Safe but not associated with lower frequency of CR-POPF, morbidity, and mortality.	Level 1B Grade B	Weak	Consistent evidence is lacking.

Not associated with:

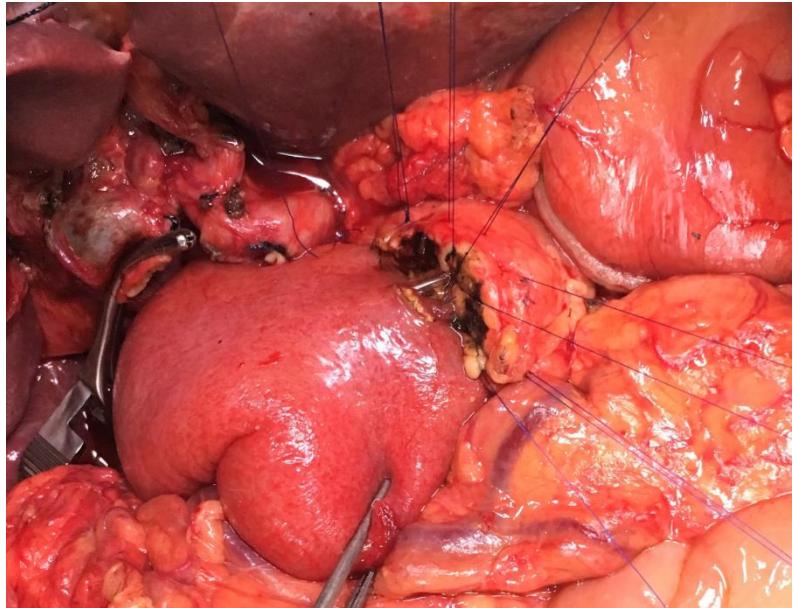
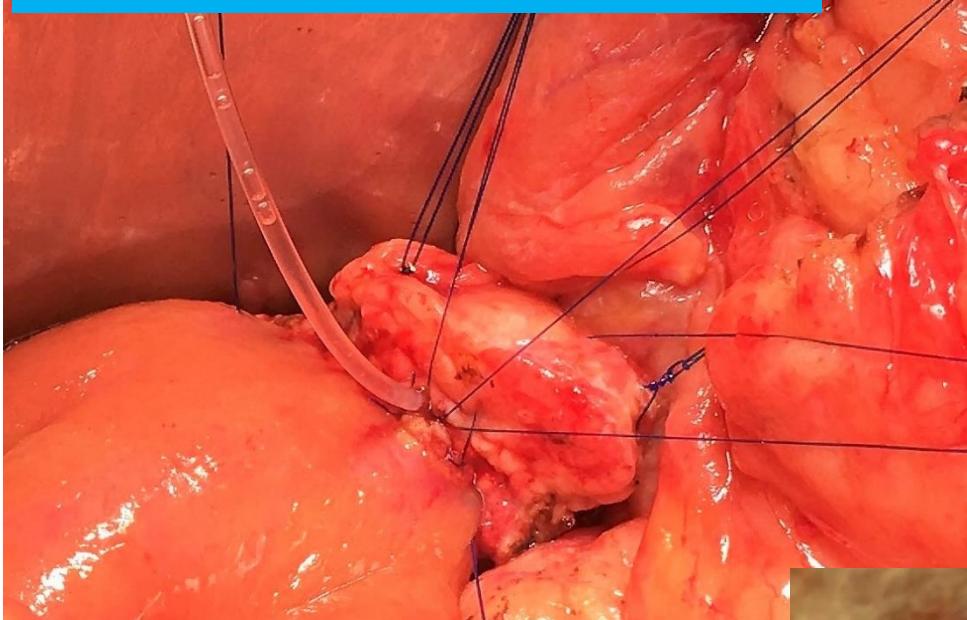
**Lower rate of POPF B and C**

**Lower morbidity**

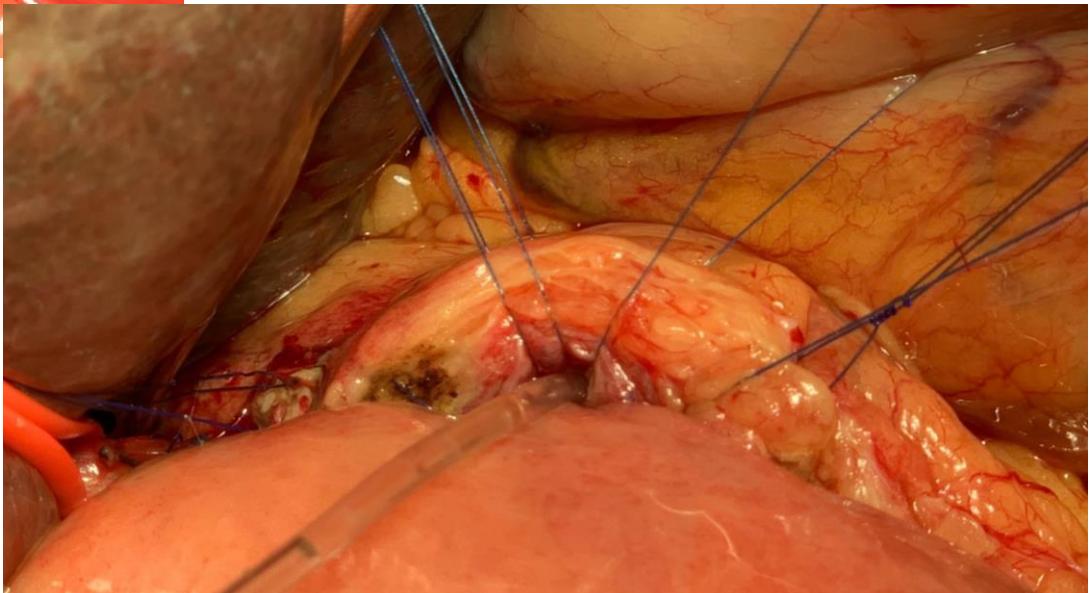
**Lower mortality**

**ISGPS**

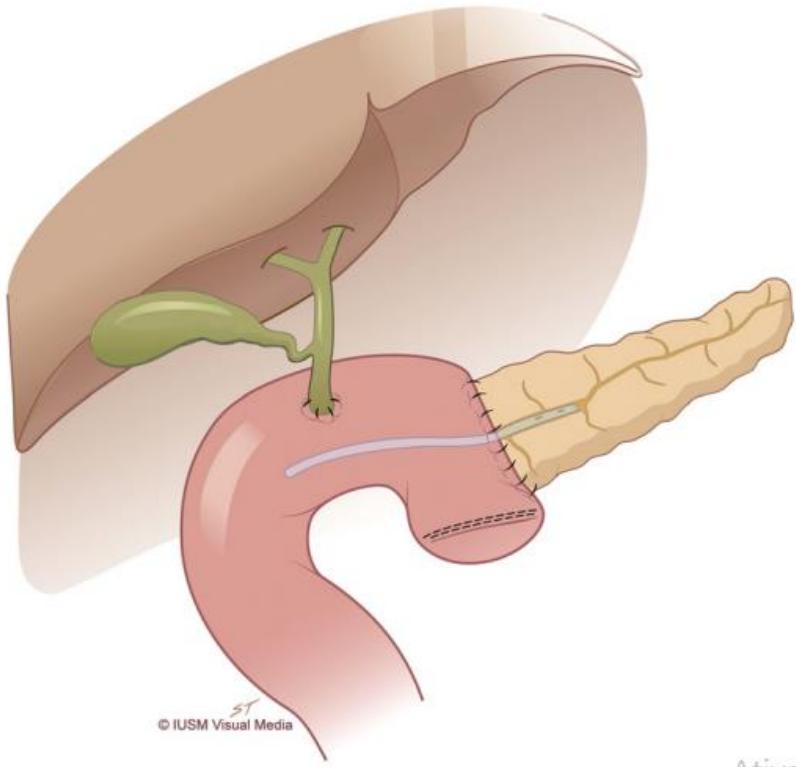
# ANASTOMOTIC STENTING



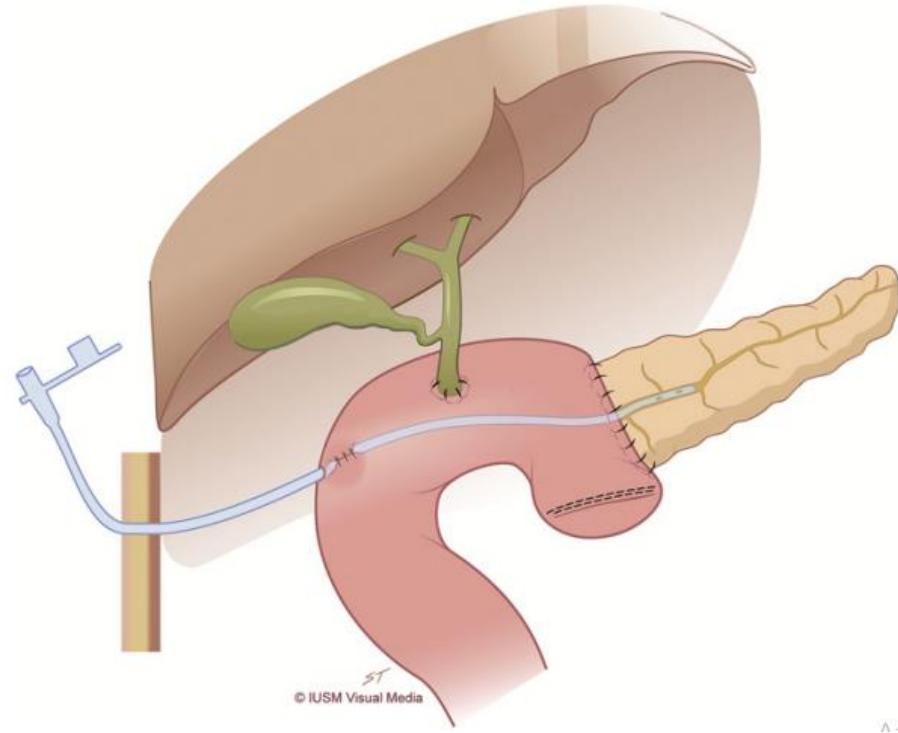
- Internal
- External



# ANASTOMOTIC STENTING



Internal



External

# ANASTOMOTIC STENTING

ISGPS

**Table II.** Suggested recommendations in diverse intraoperative situations

No	Scenario	Recommended strategy	ISGPS concurrence
	Preferential practice of anastomotic stenting	Stent (external/internal) based on high risk features for POPF	Weak

**Table III.** Levels of evidence and ISGPS recommendation

Variables	Literature review summary data	Level of evidence (1 to 5) and evidence-based recommendation (A to D)	ISGPS recommendation (Strong, Moderate, Weak)	Justification
PA stenting	Benefit of stenting PA is not well supported by evidence. No advantage of external over internal stenting	Level 1A Grade B	Moderate	Moderate level evidence observed.

**NO STENT**



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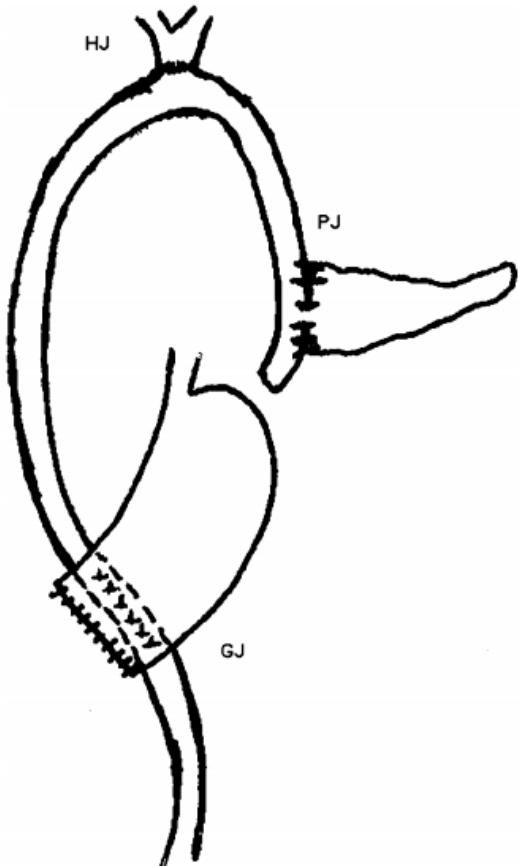
## Internal Versus External Drainage With a Pancreatic Duct Stent For Pancreaticojejunostomy During Pancreaticoduodenectomy for Patients at High Risk for Pancreatic Fistula: A Comparative Study

**Table 2 – Postoperative complications of PD in the internal drainage and external drainage groups.**

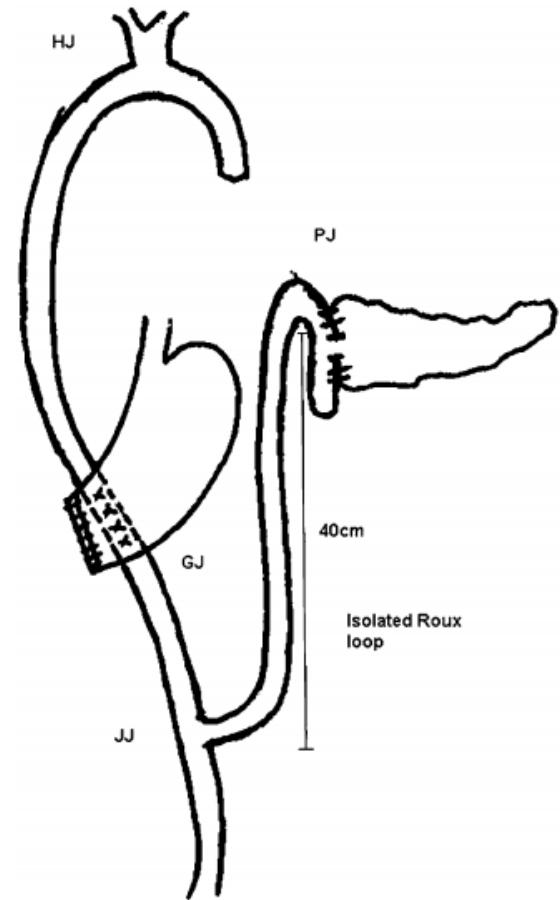
Postoperative complications	Internal drainage (n = 314)	External drainage (n = 181)	P
Complication, n (%)	184 (58.6)	110 (60.8)	0.961
PF, n (%)	73 (23.2)	44 (24.3)	0.505
Grade B	53 (16.9)	36 (19.9)	
Grade C	20 (6.3)	8 (4.4)	
Reoperation, n (%)	16 (5.1)	9 (5.0)	0.952
Perioperative death, n (%)	12 (3.8)	7 (3.9)	0.980
Postoperative hospital stay (d)	17.4 ± 10.2	18.3 ± 7.9	0.272

### INTERNAL STENTING

# Single Loop X Roux in Y



X



**Table II.** Suggested recommendations in diverse intraoperative situations

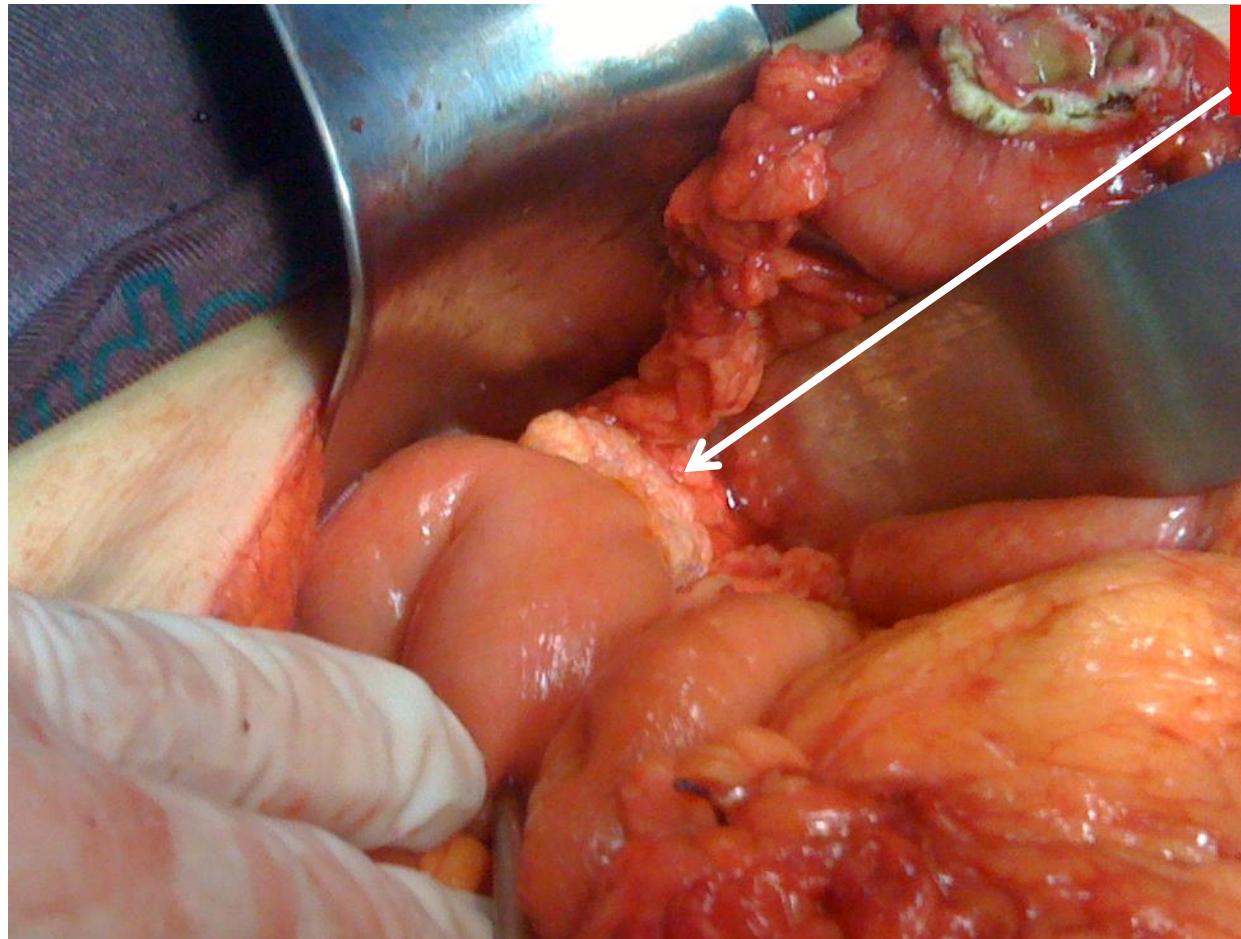
No	Scenario	Recommended strategy	ISGPS concurrence
	Role of isolated Roux-en Y PJ following PD to decrease CR-POPF	Not indicated as a strategy	Strong

**Table III.** Levels of evidence and ISGPS recommendation

Variables	Literature review summary data	Level of evidence (1 to 5) and evidence-based recommendation	ISGPS recommendation (Strong, Moderate, Weak)	Justification
		(A to D)		
Dual loop with isolated PJ	Dual loop with isolated PJ is not superior to single loop	Level 1A Grade A	Strong	Consistent evidence observed.

No dual loop

# TISSUE SEALANT



TachoSil®



ORIGINAL SCIENTIFIC REPORT

## The Effect of Fibrinogen/Thrombin-Coated Collagen Patch (TachoSil®) Application in Pancreaticojejunostomy for Prevention of Pancreatic Fistula After Pancreaticoduodenectomy: A Randomized Clinical Trial

**Table 2** Rates of POPF

Variables	Intervention (N = 62)	Control (N = 62)	p value
POPF+, n (%)	16 (25.8%)	23 (37.1)	0.246
POPF grade, n (%)			
Biochemical leakage	12 (19.4)	19 (30.6)	0.323
B	4 (6.5)	3 (4.8)	
C	0 (0.0)	1 (1.6)	
Clinically relevant POPF, n (%)	4 (6.5)	4 (6.5)	1.000
Alternative fistula risk score* (Negative/biochemical leakage/clinically relevant POPF), n			
Low	18/1/0	19/0/0	0.317
Intermediate	25/11/1	18/18/2	0.088
High	3/0/3	2/1/2	0.771

# IDEAL PANCREATIC ANASTOMOSIS

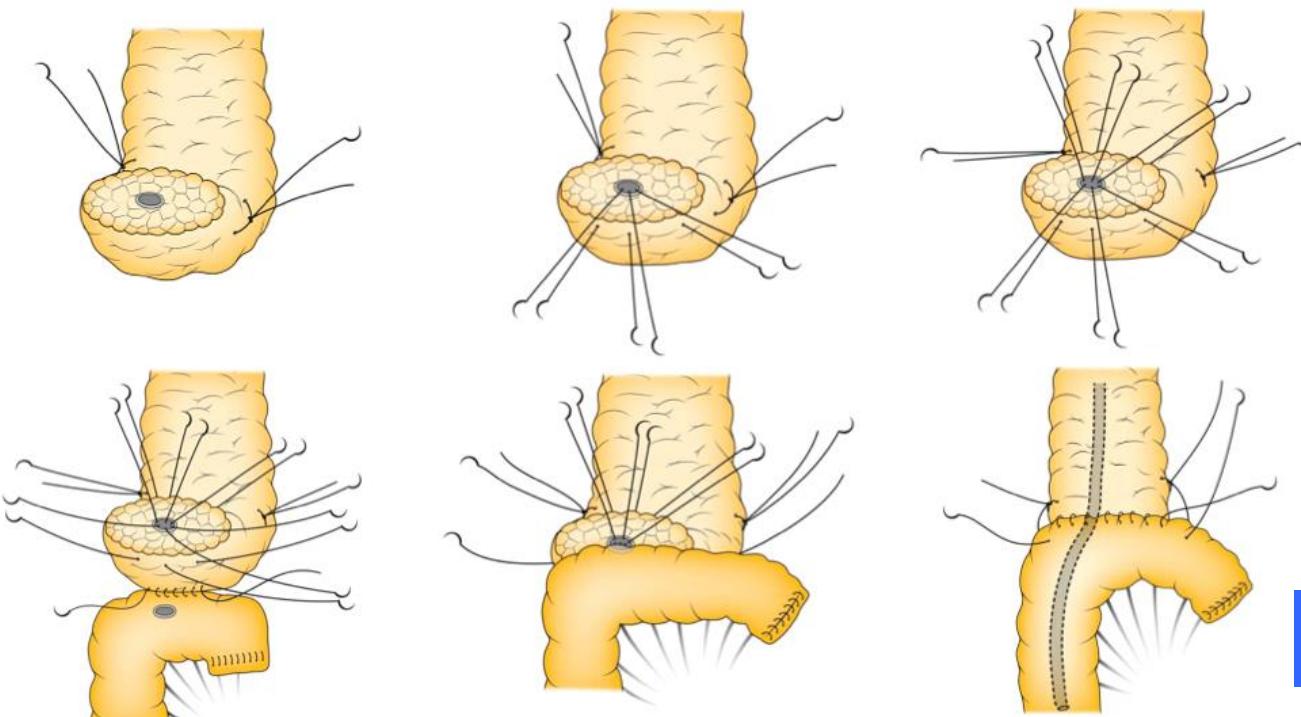
- Good blood supply to the pancreatic stump
- Pancreatic juice flow into the intestinal or gastric lumen
- Suitable for:
  - all pancreatic parenchyma
  - all pancreatic ducts
- Easy to perform
- Easy to learn
- Low rate of pancreatic fistula



## MODIFIED HEIDELBERG TECHNIQUE FOR PANCREATIC ANASTOMOSIS

*Anastomose pancreática pela técnica de Heidelberg modificada*

Orlando Jorge M **TORRES**<sup>1</sup>, Roberto C N da Cunha **COSTA**<sup>1</sup>, Felipe F Macatrão **COSTA**<sup>1</sup>, Romerito Fonseca **NEIVA**<sup>1</sup>,  
Tarik Soares **SULEIMAN**<sup>1</sup>, Yglésio L Moyses S **SOUZA**<sup>1</sup>, Shailesh V **SHRIKHANDE**<sup>2</sup>



**SUGGESTION**

**Table 2** Suture material, needle type, and advantages and disadvantages of the modified pancreaticojejunostomy techniques

Types of PJ	Author	Suture material and needle type	Advantages	Disadvantages
Single-layer DTM interrupted PJ	<sup>24</sup> Zeng et al	Transverse full-thickness sutures: 4–0 double-needles absorbable monofilament suture	Simplified procedure, uniformly distributed shear force, reduced damage of the tissues, alleviated tension in the anastomotic stoma, and enables the pancreatic juice to be drained out from the anastomotic stoma immediately	Not suitable for soft pancreas and thin MPD. Besides, if the MPD is not present at central area of the pancreatic stump, these methods are not applicable
	<sup>13</sup> Wei et al	Transverse full-thickness sutures: 4–0 poly-lactin 910 22 mm 1/2c (Vicryl) suture		
	<sup>25</sup> Torres et al	Transverse full-thickness sutures: 5–0 double-needles polypropylene 17 mm 1/2c (Prolene) suture; circular running suture: 4–0 polypropylene 17 mm 1/2c (Prolene) suture	With the advantages mentioned above, the “clock-face” suturing is integrated to make the anastomosis more concise. Further, a circular running suture of the pancreatic capsule layer and the jejunal seromuscular layer is placed to reinforce the fixation	
Single-layer DTM continuous PJ	<sup>26</sup> Hong et al	Single-stitch transpancreatic suture and the purse-string suture: 4–0 polydioxanone 17 mm 1/2c (PDS) suture; figure-of-eight continuous suture: 3–0 polydioxanone 17 mm 1/2c (PDS) suture	Simplified DTM anastomosis minimizes damage to the tissues, thus protecting its blood supply; insertion of the tube ensures a patent outflow of the pancreatic juice; and the procedure is greatly simplified, suitable for MIPD	Fixation of the drainage tube should be proper in case of displacement and the pancreatic juice may leak from the needle tract left by the transpancreatic suture on the MPD

Torres et al. reported the modified Heidelberg technique in 2017.<sup>25</sup> Compared with SPJ, this technique integrates the concept of “clock-face” anastomosis, which regards the MPD as a clock and inserts 6 transpancreatic sutures at the 2, 4, 6, 8, 10, and 12 o’clock positions. Additionally, circular running sutures between the pancreatic parenchyma and the jejunum seromuscular layer are added for further fixation.



## Pancreaticojejunostomy—a review of modern techniques

### Invagination techniques

- [10] Yang et al., 2017
- [13] Peng et al., 2003
- [14] Casadei et al., 2013
- [15] Buc et al., 2010
- [16] Kim et al., 2014
- [17] Kim et al., 2016
- [18] Li et al., 2015
- [19] Kelemen et al., 2016
- [20] Li et al., 2018
- [21] Hashimoto et al., 2013
- [22] Kuśnierz et al., 2015

### Duct-to-mucosa techniques

- [35] Torres et al., 2017
- [36] Palampros et al., 2016
- [37] Su et al., 2014
- [38] Zhang et al., 2015
- [41] Kim et al., 2017
- [42] Chen et al., 2014
- [43] Ji et al., 2015
- [44] Grobmyer et al., 2010
- [51] Kojima et al., 2018
- [52] Wang et al., 2017

**“No surgical technique gives any advantage in eliminating the risk of pancreatic fistula.”**



## Review Article

## Pancreaticojejunostomy for Pancreatico-enteric Anastomosis after Pancreaticoduodenectomy: one procedure with multiple techniques.



Rajesh S Shinde <sup>a,\*</sup>, Rajgopal Acharya <sup>b</sup>, Vikram A Chaudhari <sup>c</sup>, Manish S Bhandare <sup>c</sup>, Shailesh V Shrikhande <sup>c</sup>

**Table 1**  
Studies describing PJ techniques.

PJ technique	Study	POPF grade B or C (%)	Overall mortality (%)
Blumgart	Kleespies et al [12]	4	3.26
	Grobmyer et al [13]	6.9	1.6
	Mishra et al [14]	7.1	3.06
Modified Blumgart	Fuji et al [4]	2.5	0
Heidelberg	Buchler et al [15]	-	0
Modified Heidelberg	Torres et al [6]	0	0
Peng's binding technique	Peng et al [7]	-	2.2
Pair-watch technique	Yoshinori et al [8]	0	0
Invagination technique	Lampe et al [11]		1.9
Cattell Warren	Warren et al [10]		
	Bassi C et al [16]	-	2

PJ- Pancreatico-jejunostomy, POPF- Postoperative pancrea

## PANCREATECTOMIES PER YEAR

900

APPROXIMATELY

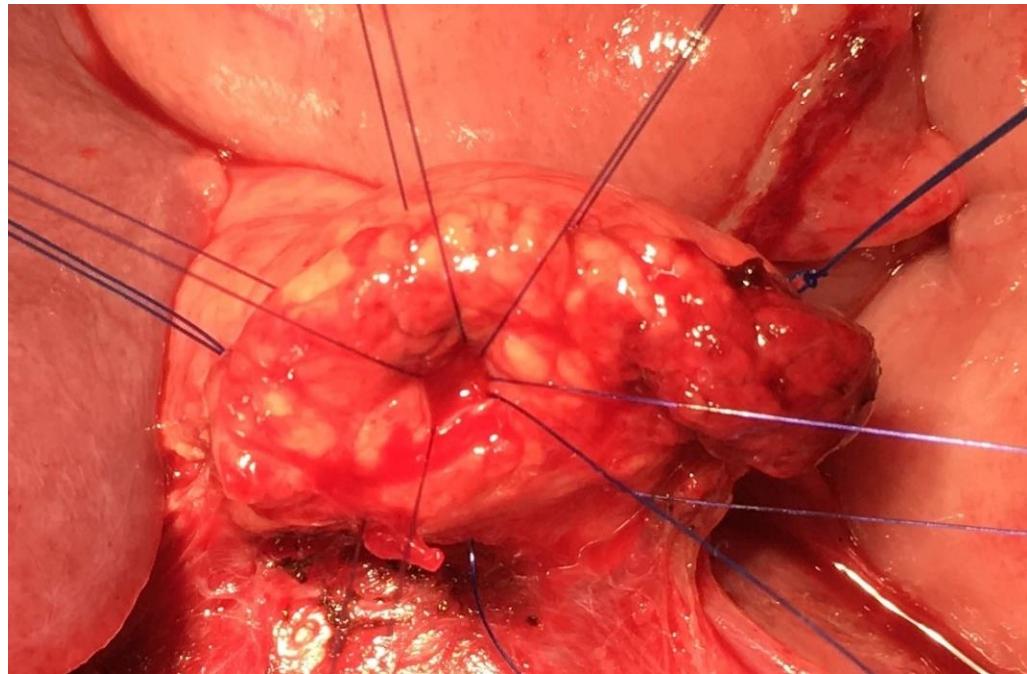
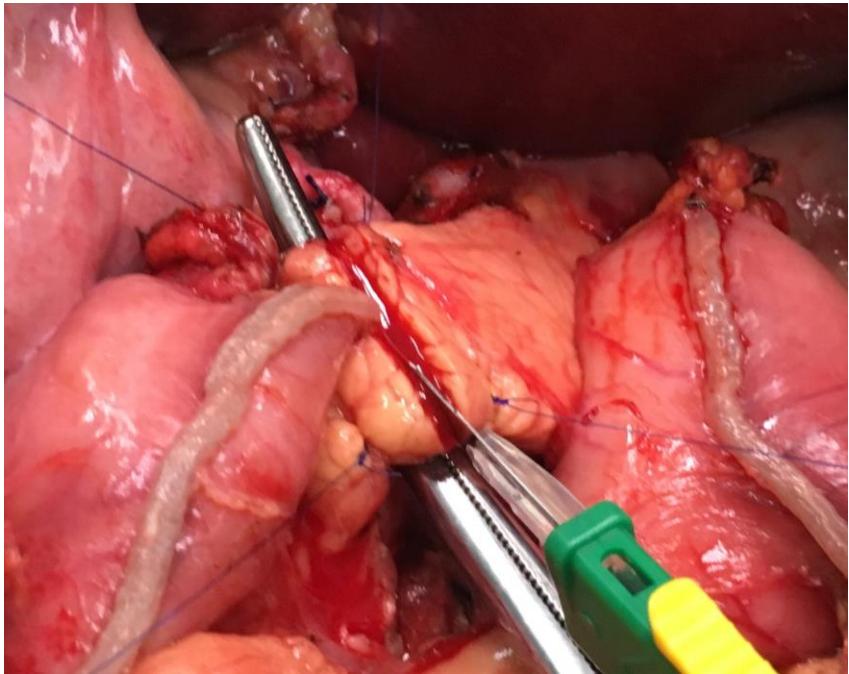
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Markus Buchler

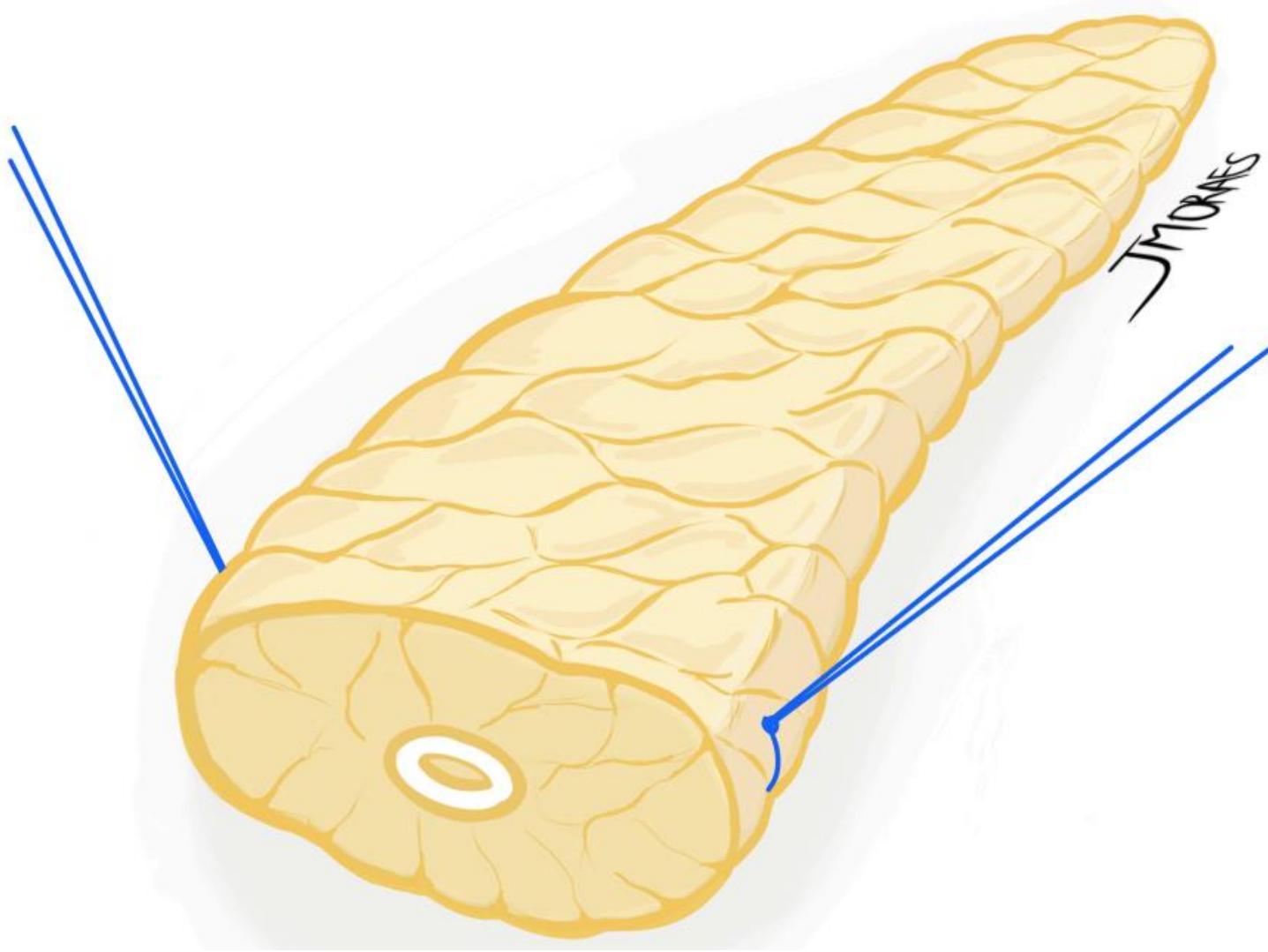


Shailesh Shrikhande

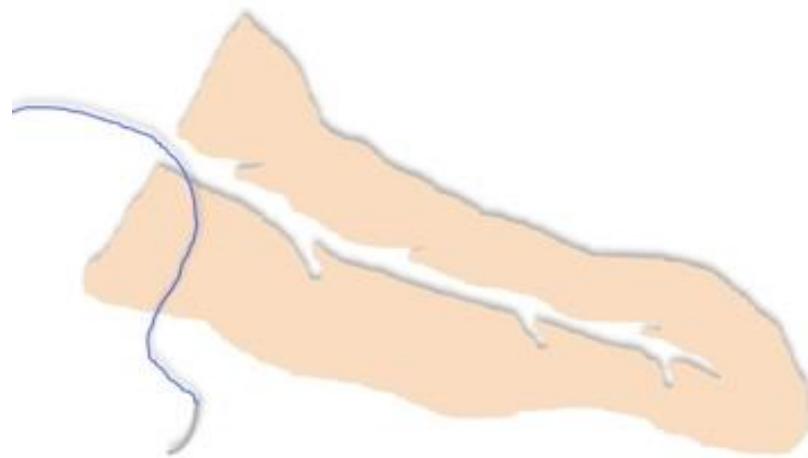
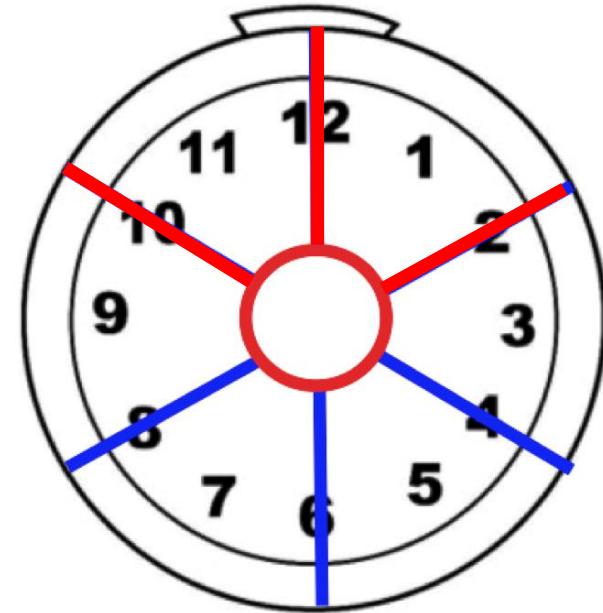
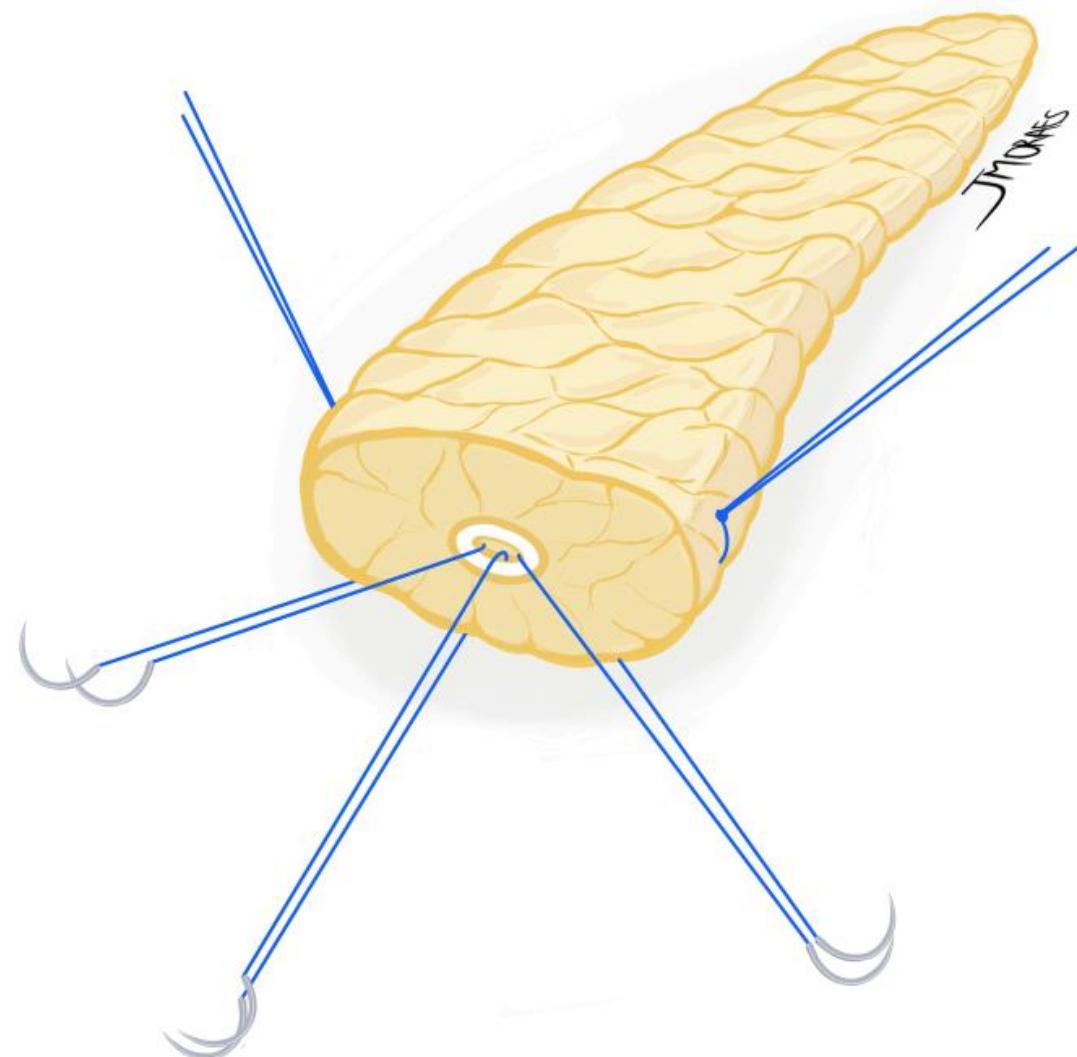


- The pancreatic parenchyma is transected with sharp knife.
- Hemostasis is performed with electrocautery.

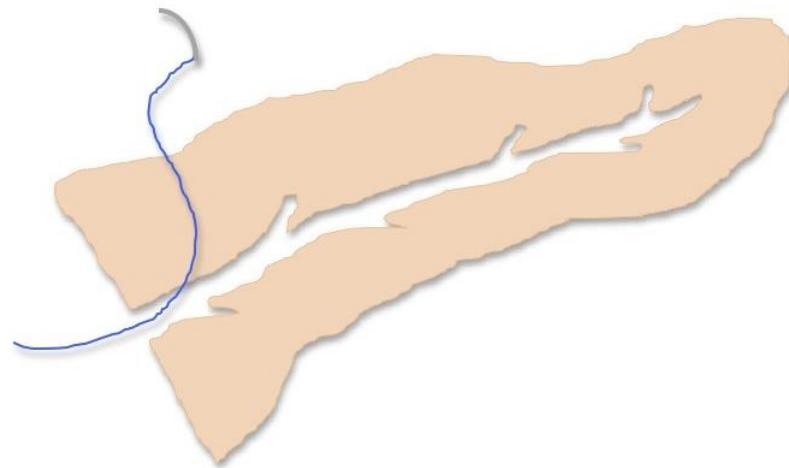
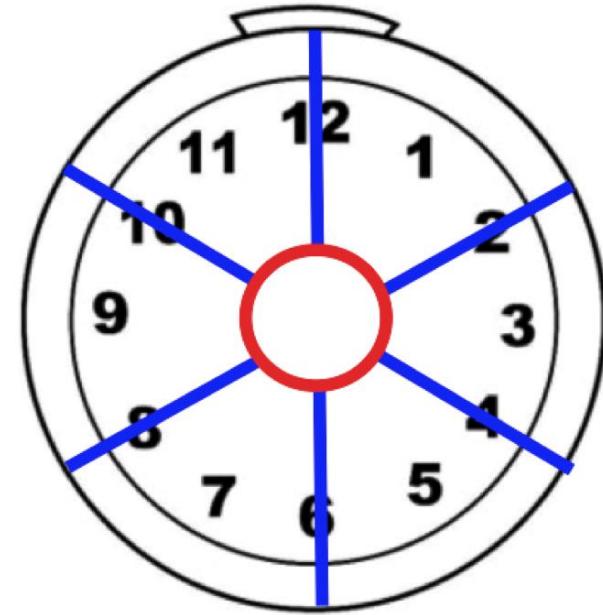
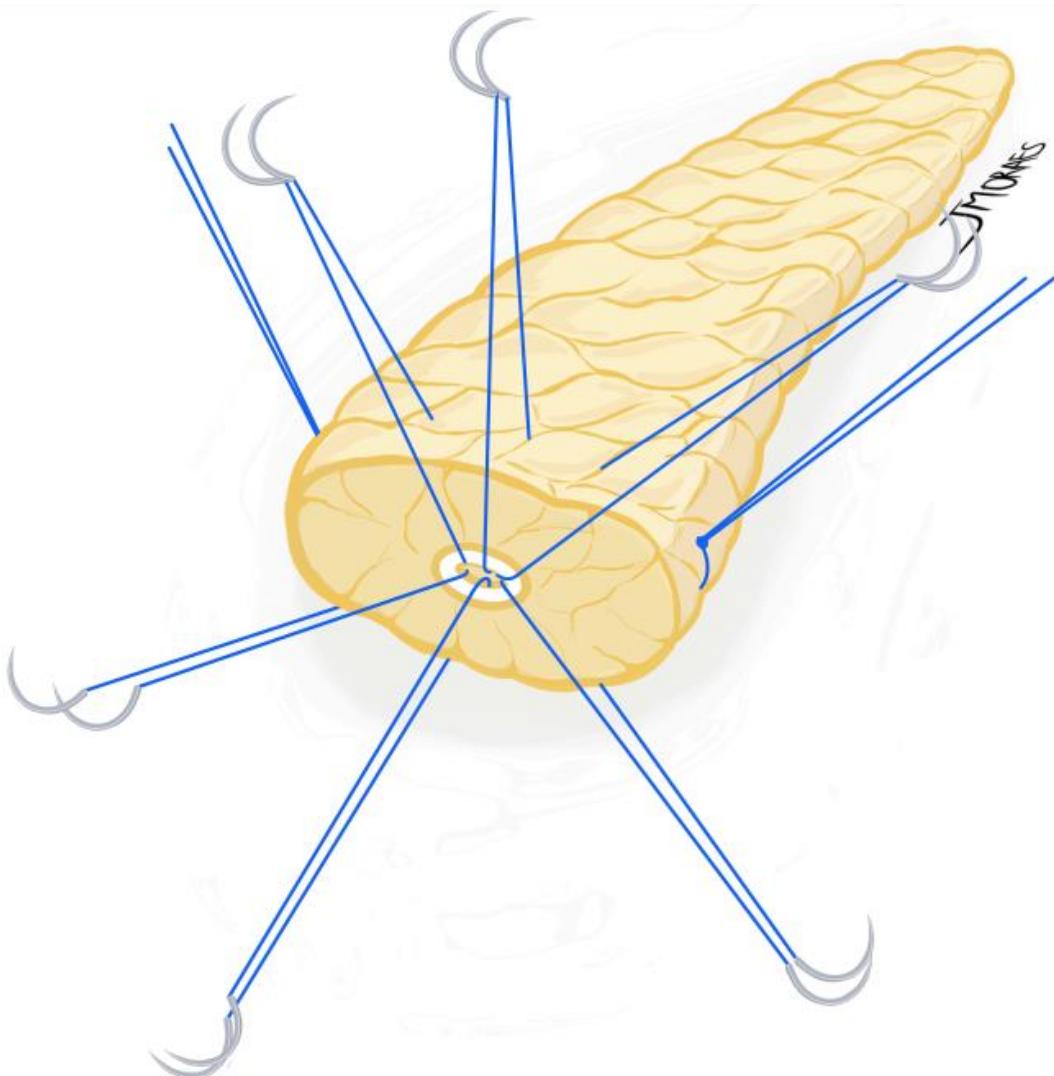
# STAY SUTURE



# POSTERIOR INNER

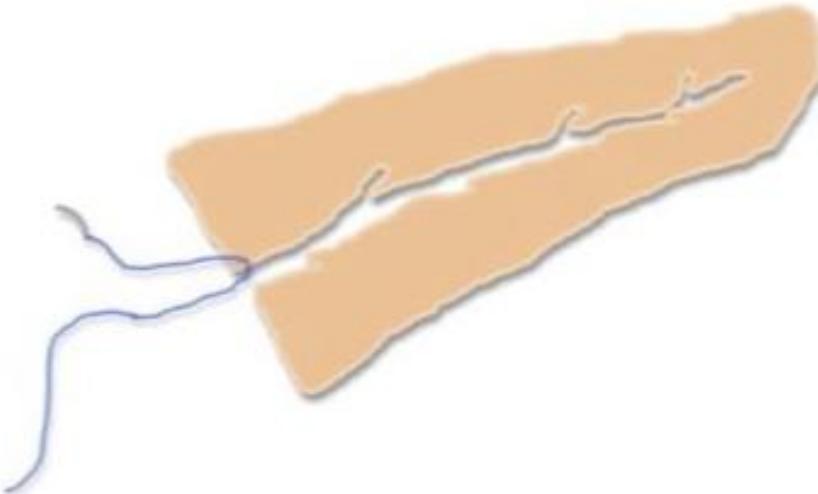


# ANTERIOR INNER

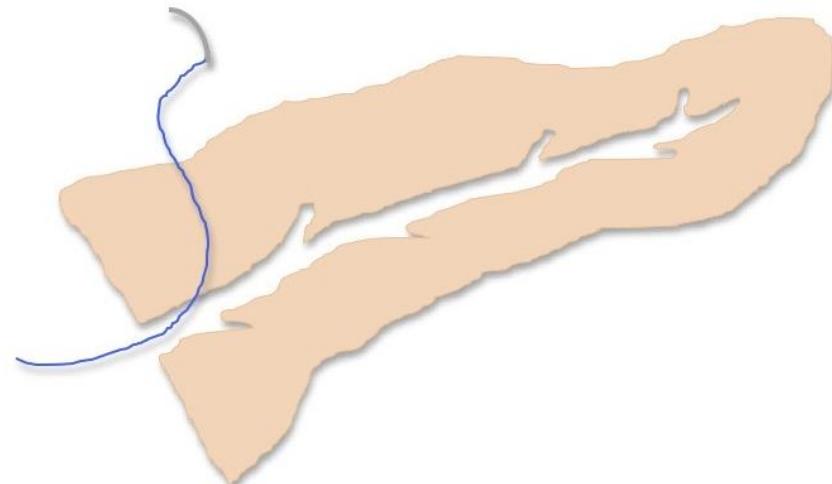


# DUCT-TO-MUCOSA VS MODIFIED HEIDELBERG

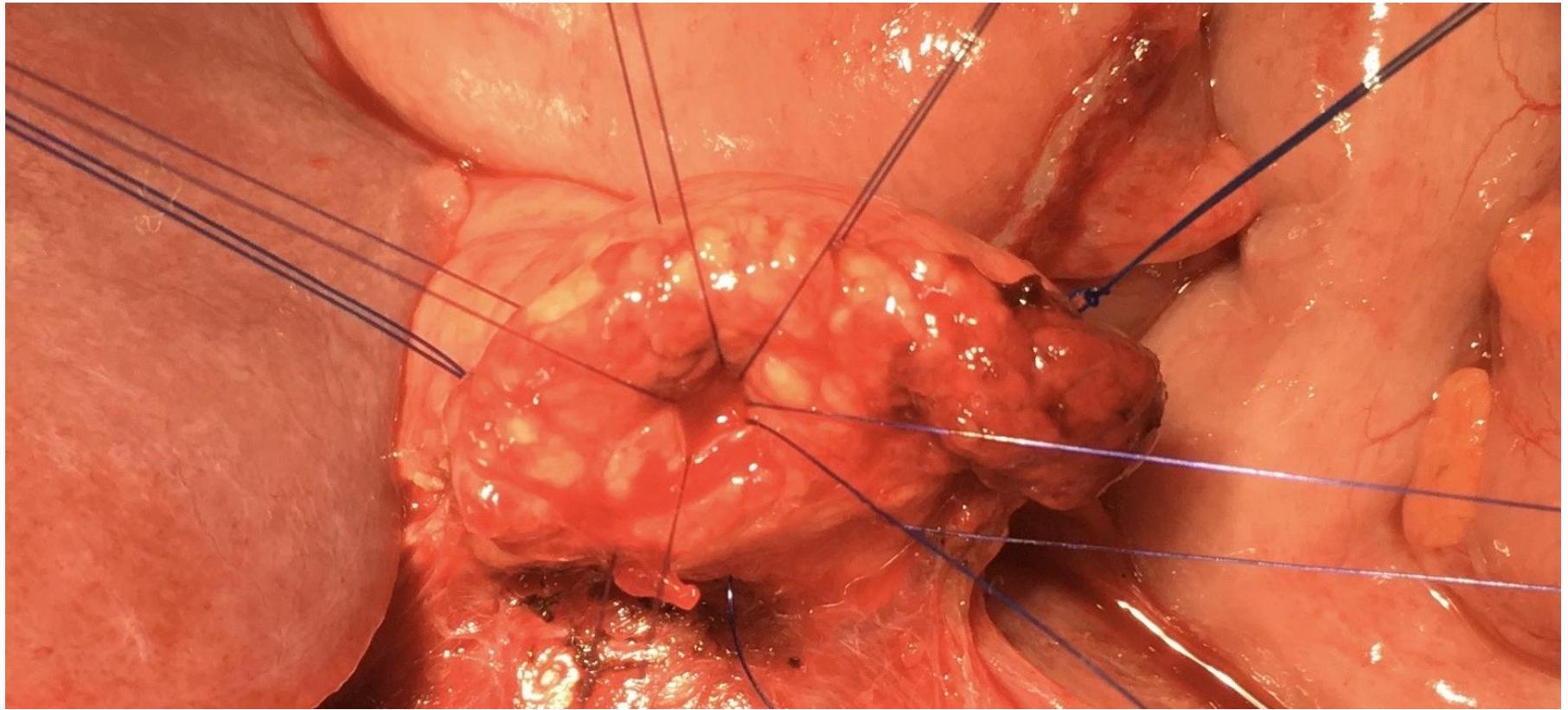
- LESS DUCT
- NO PAREMCHYMA
- SMALL BITE
- LESS THAN 3MM DEEP



- MORE DUCT
- PAREMCHYMA
- FULL THICKNESS
- 1 CM DEEP



# Anterior duct-pancreatic suture



**STAY SUTURE**

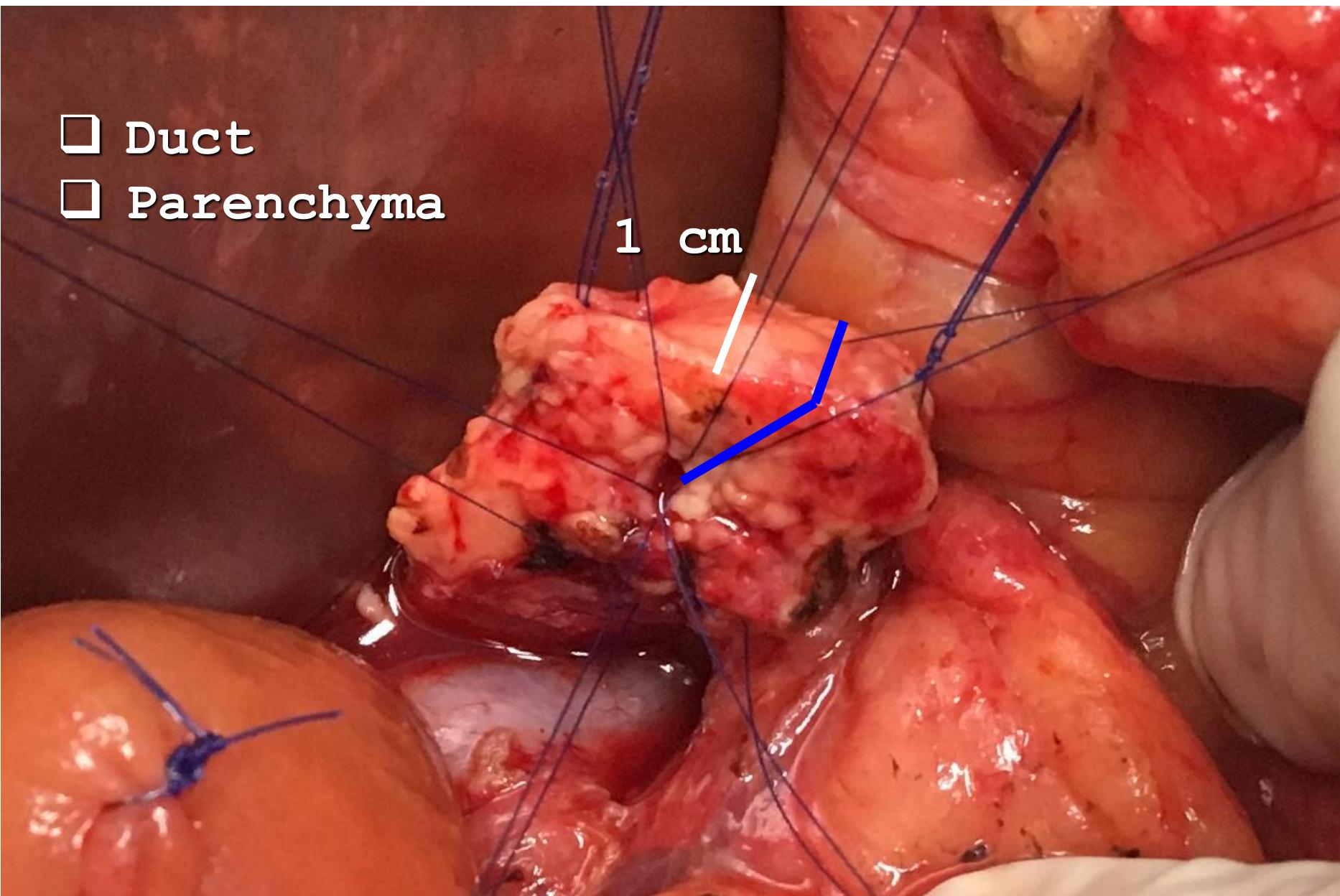


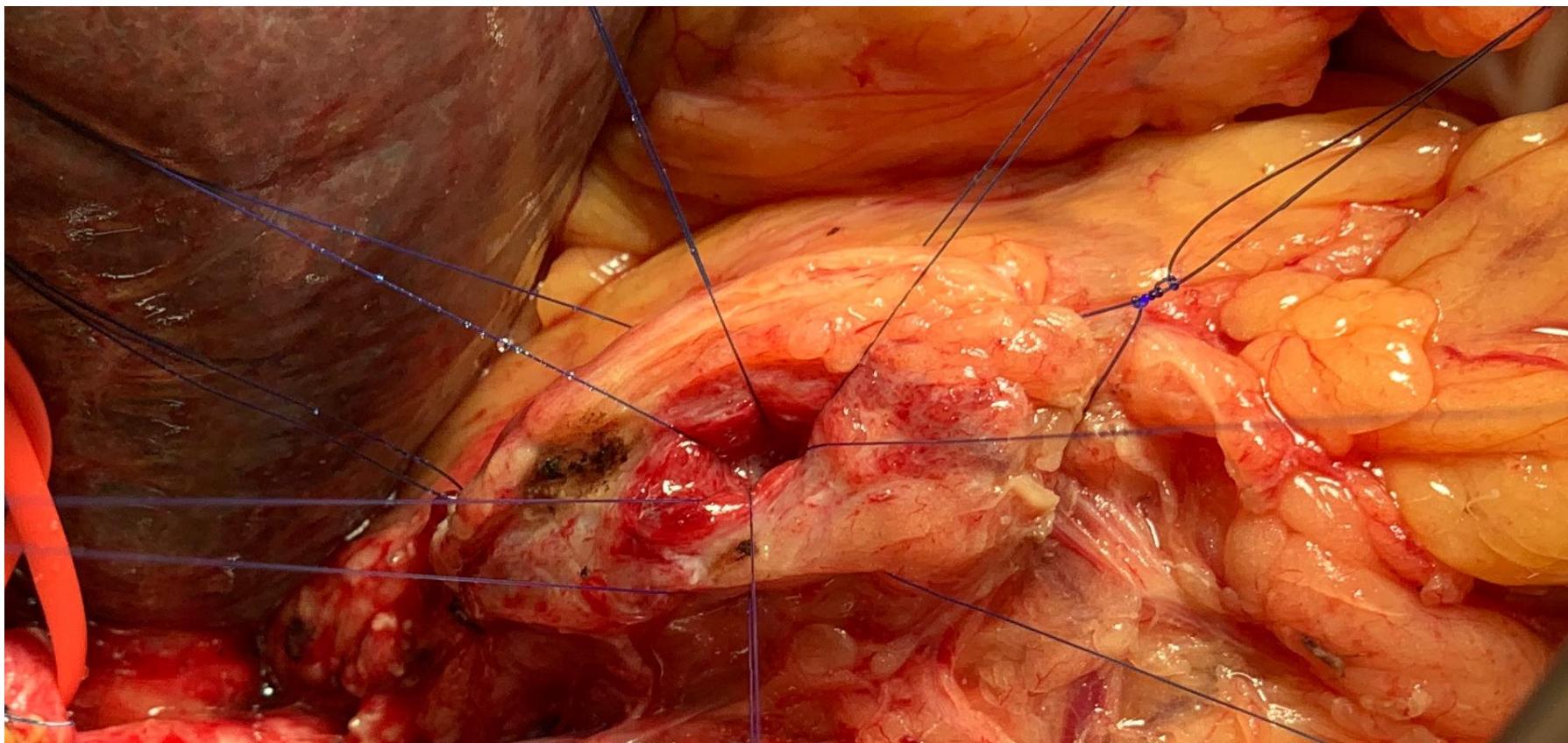
**Cut surface**

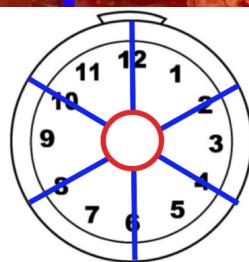
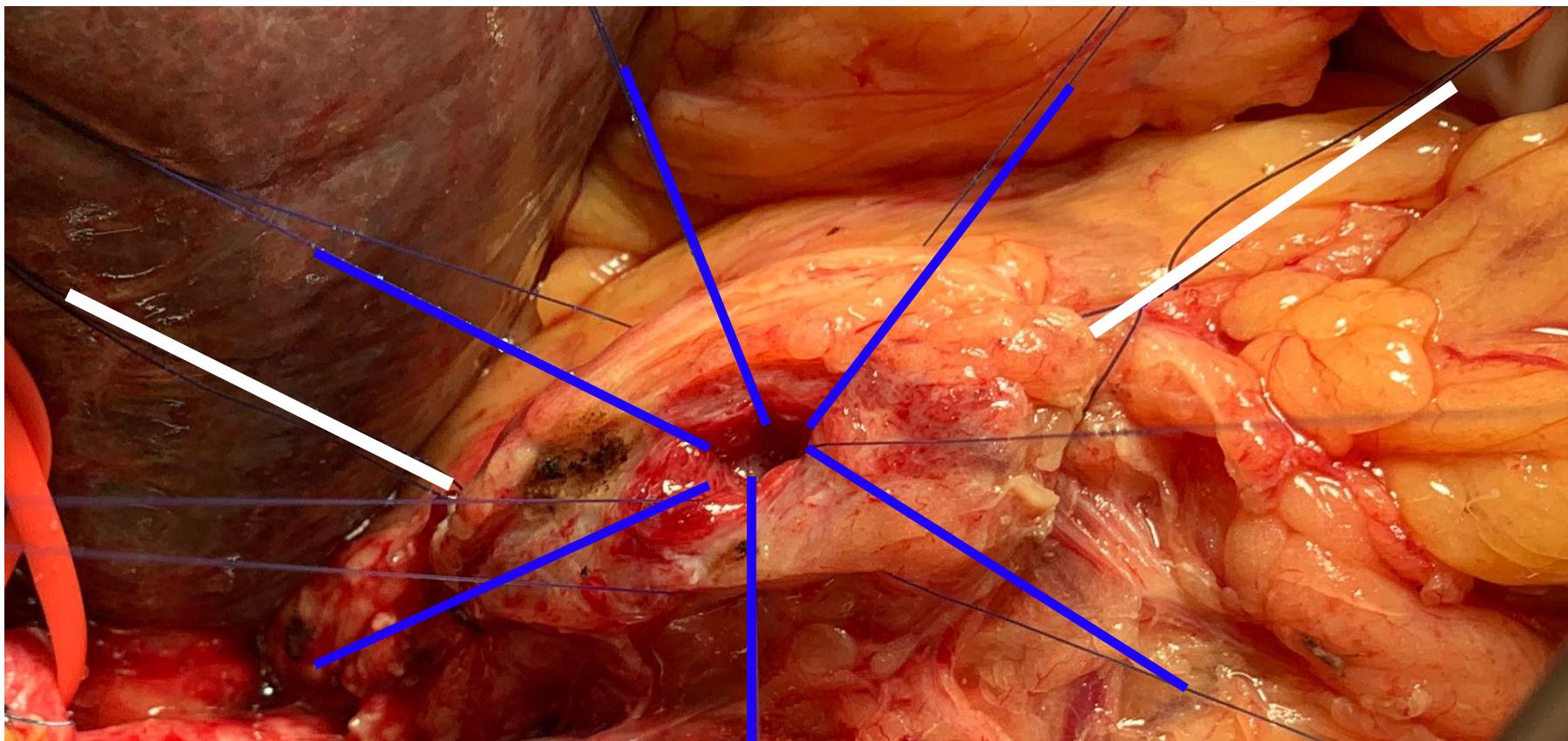


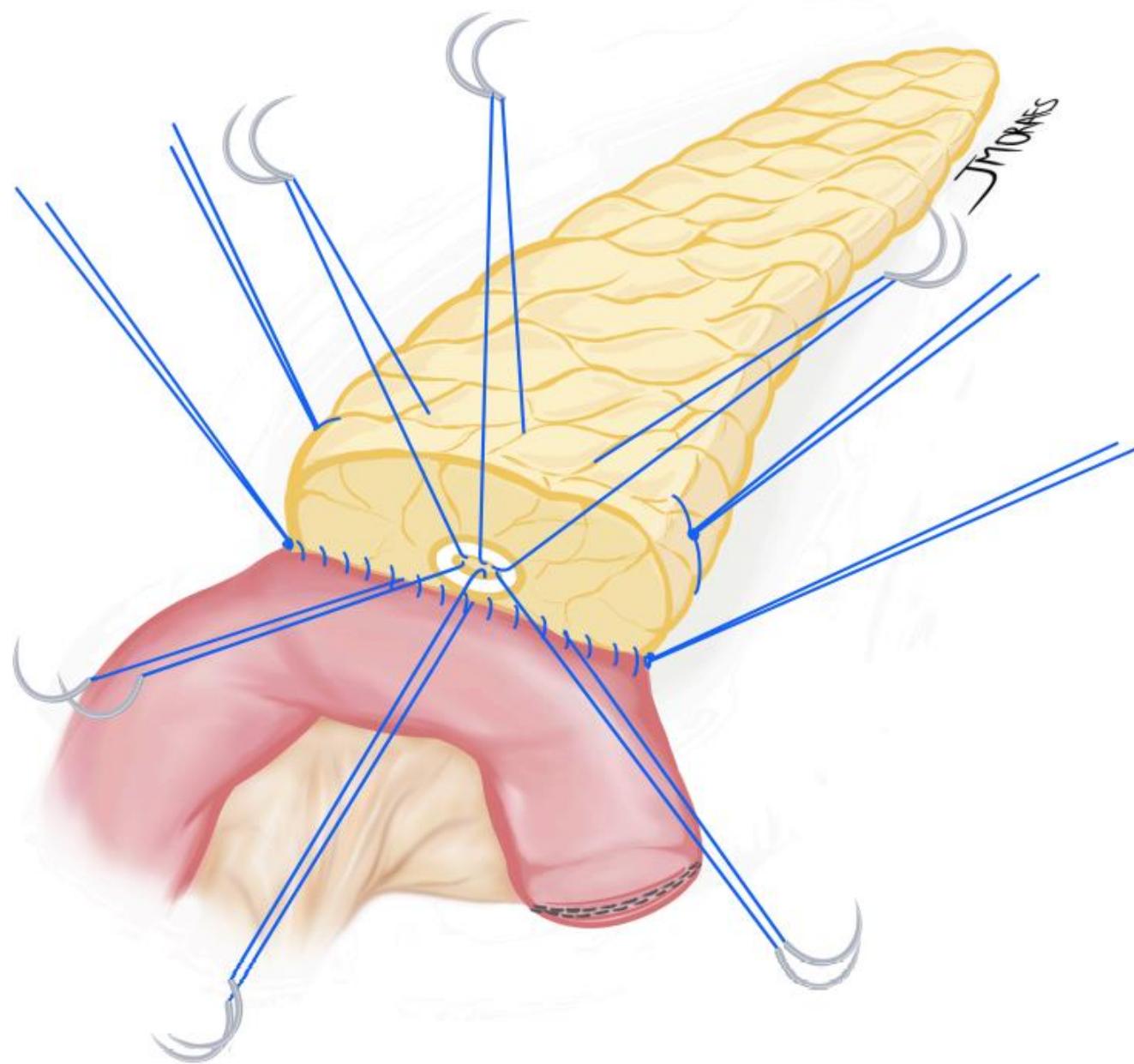
- Duct
- Parenchyma

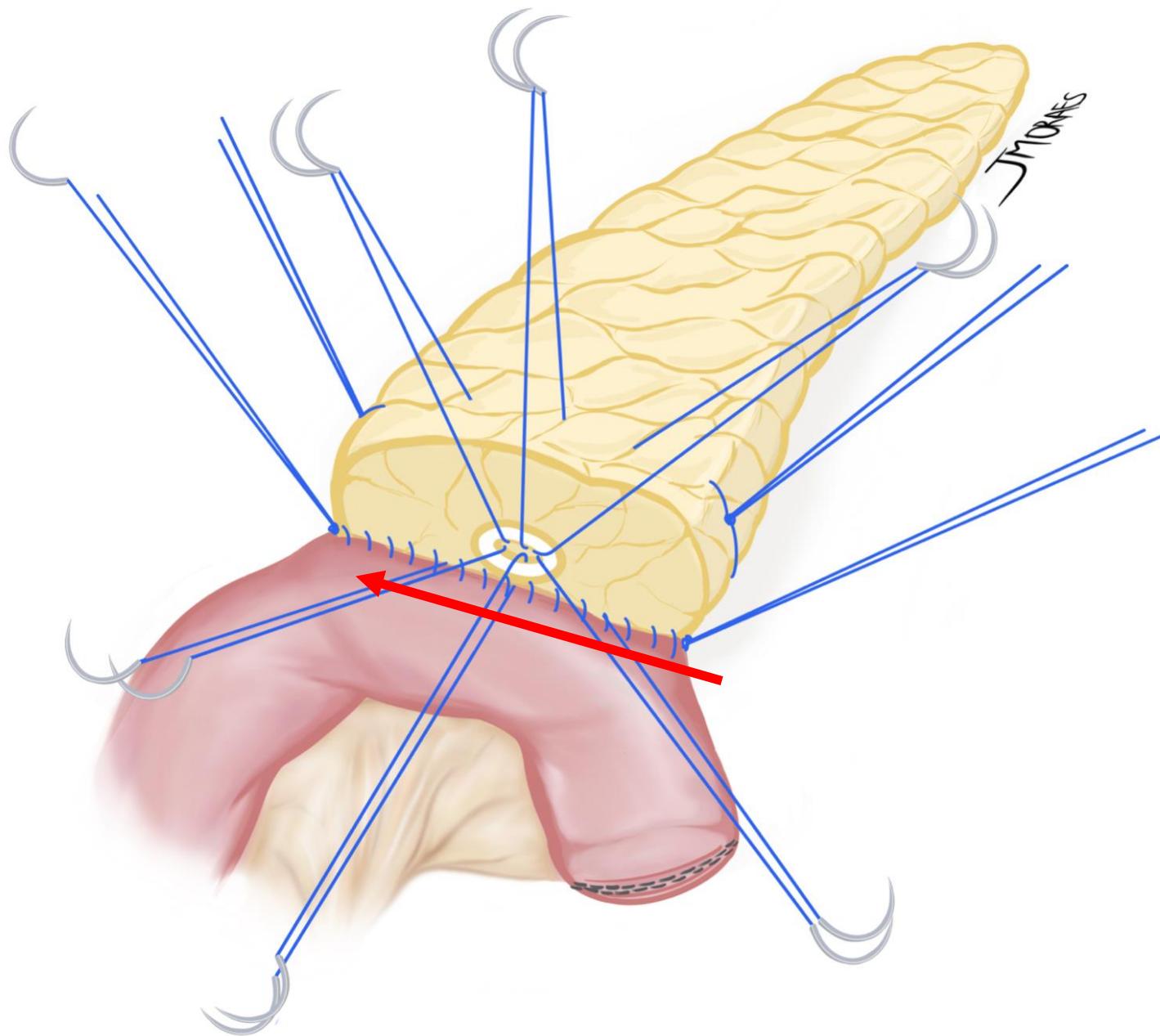
1 cm

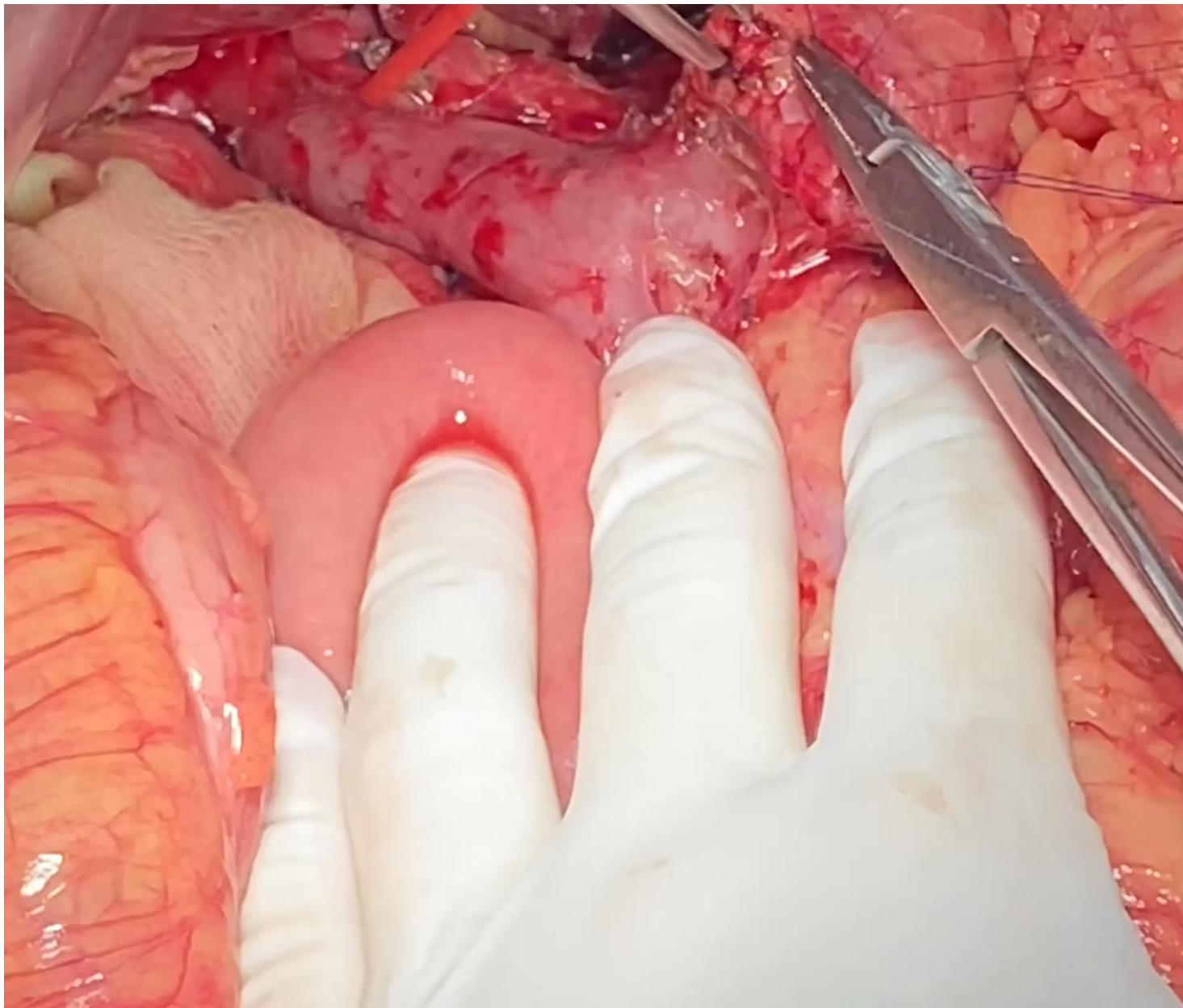


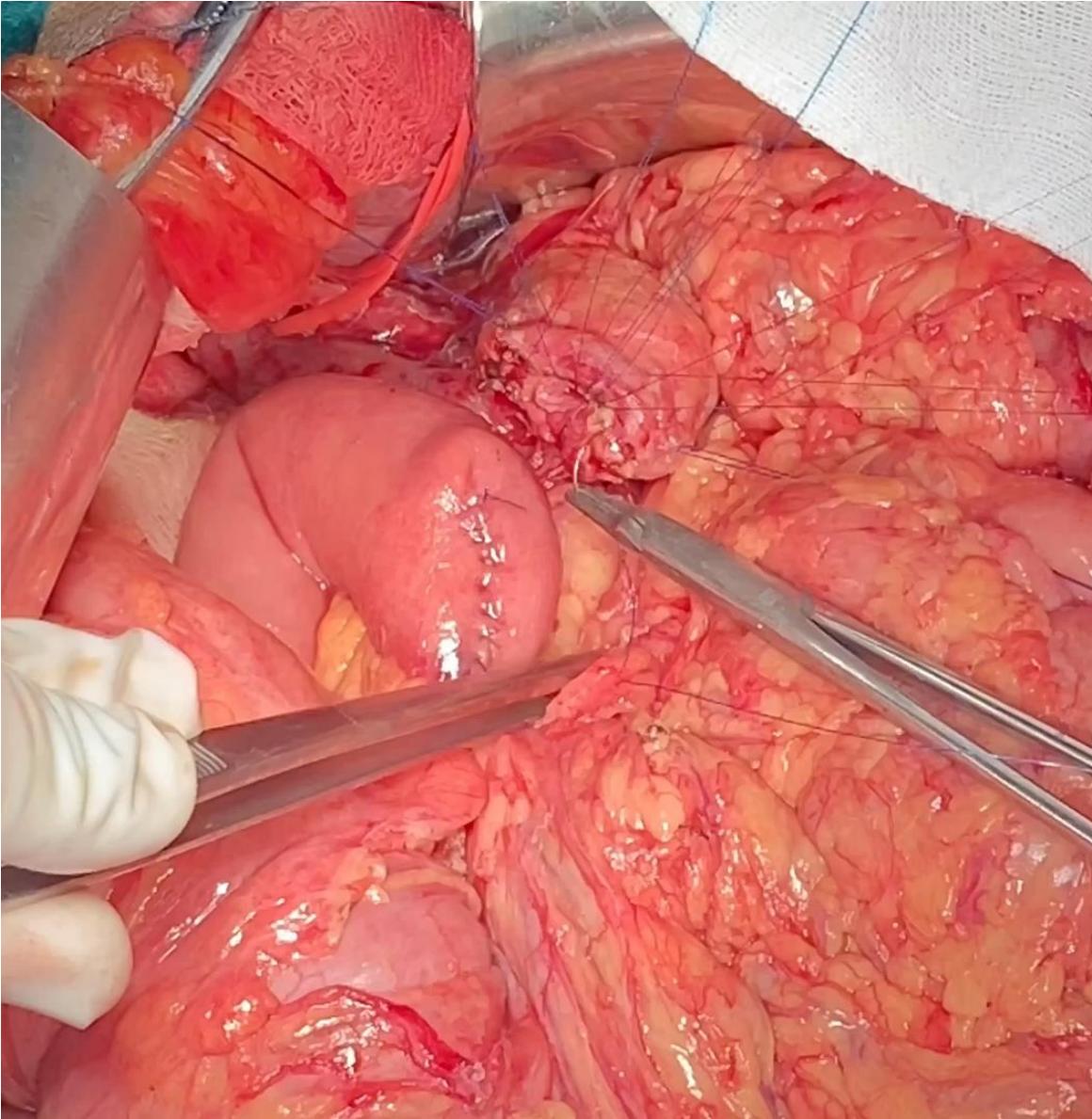


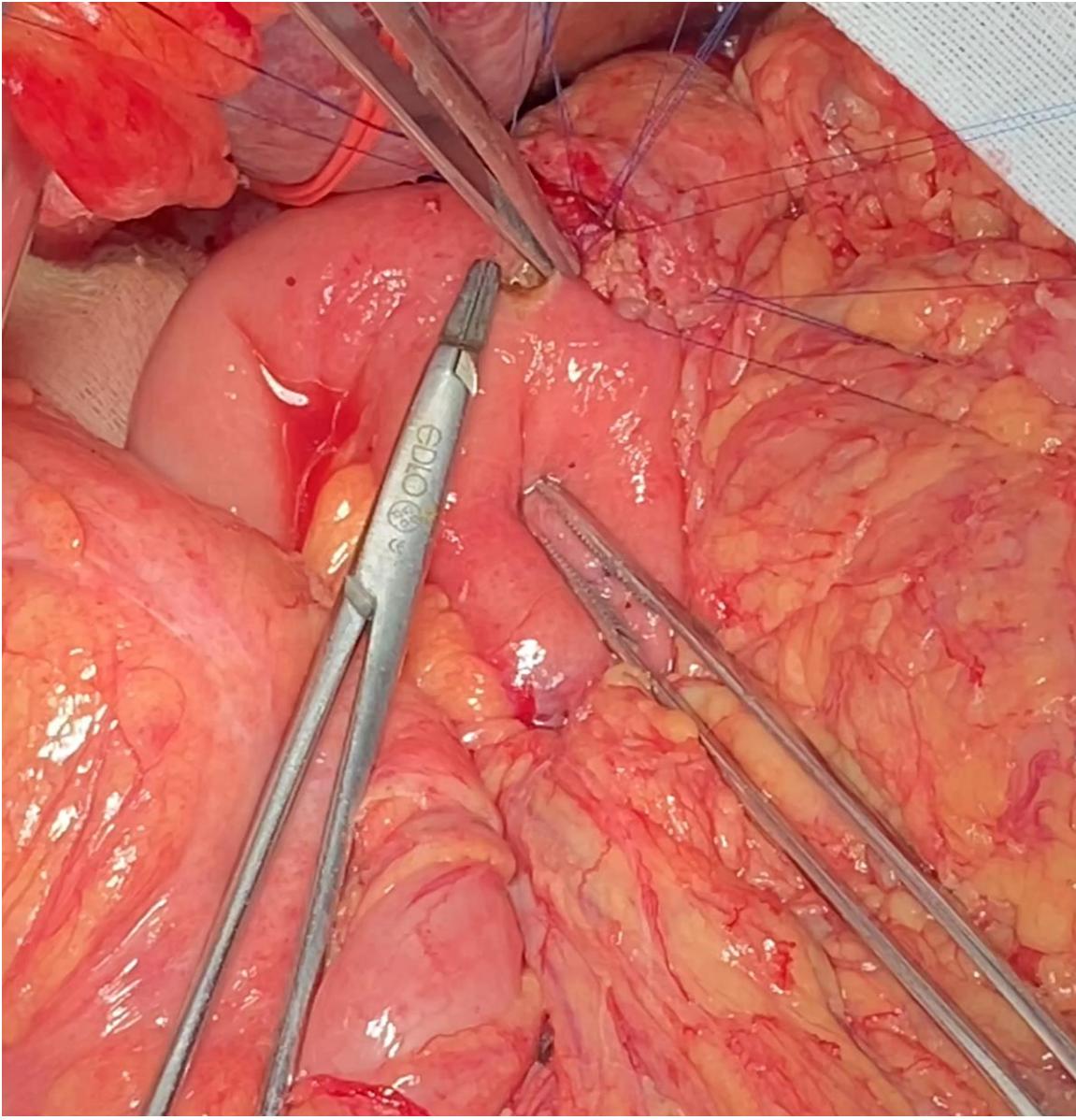


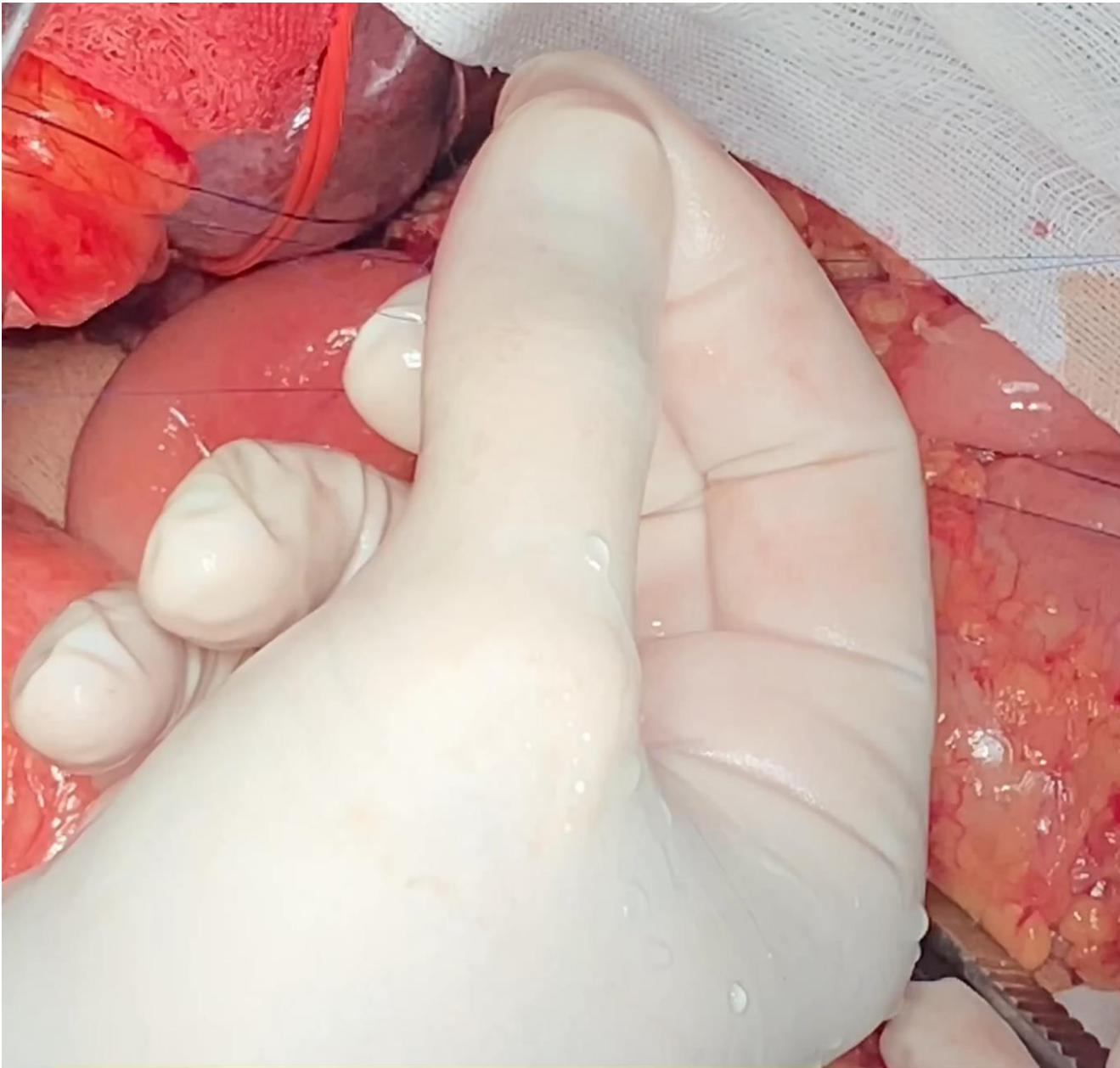




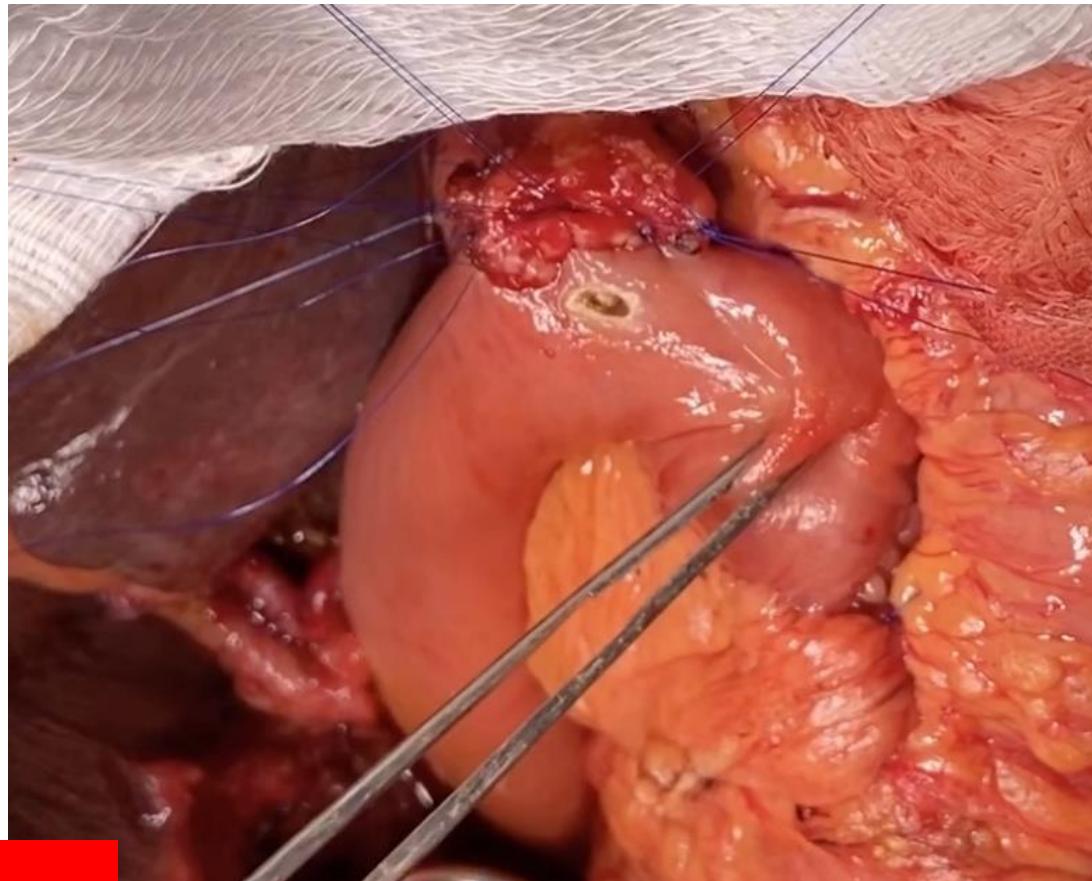
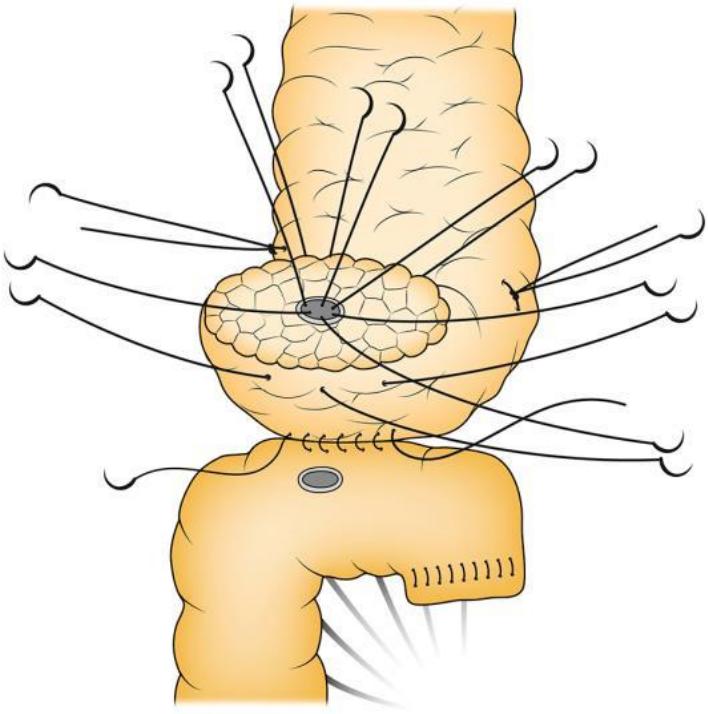




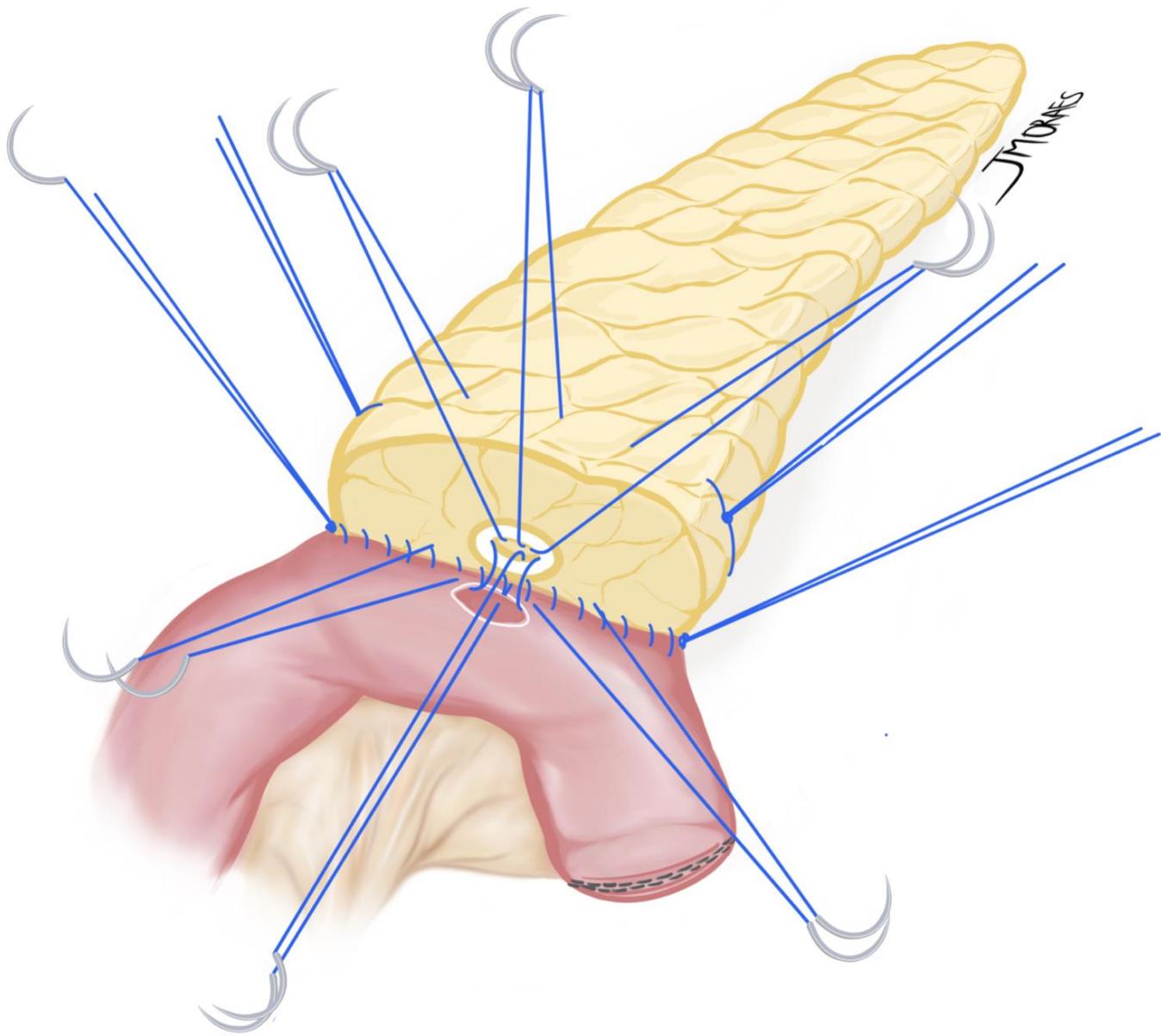


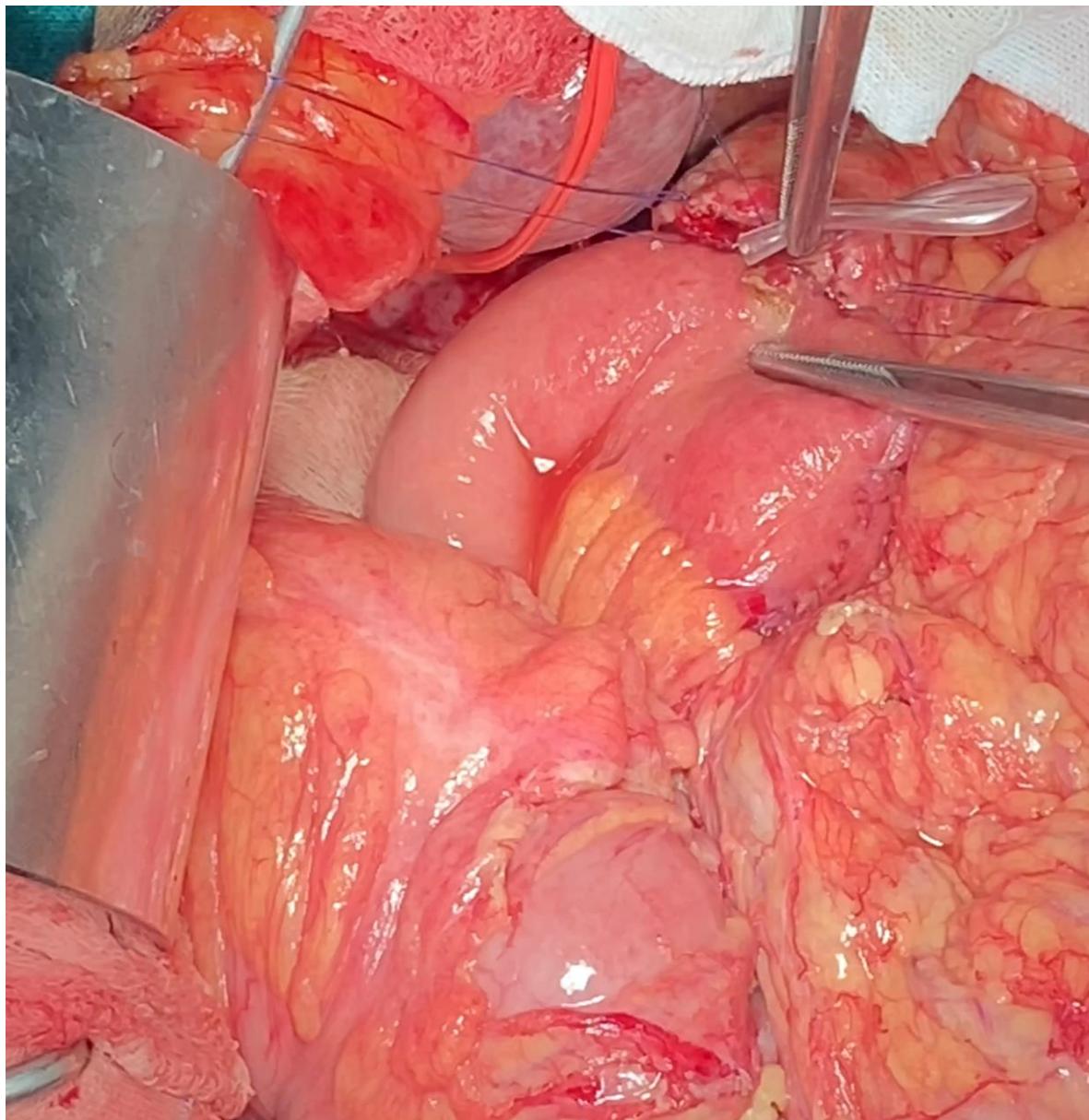


## THE JEJUNUM IS OPENED



- Anti-mesenteric side
- 0.5 cm long
- Near the pancreatic duct

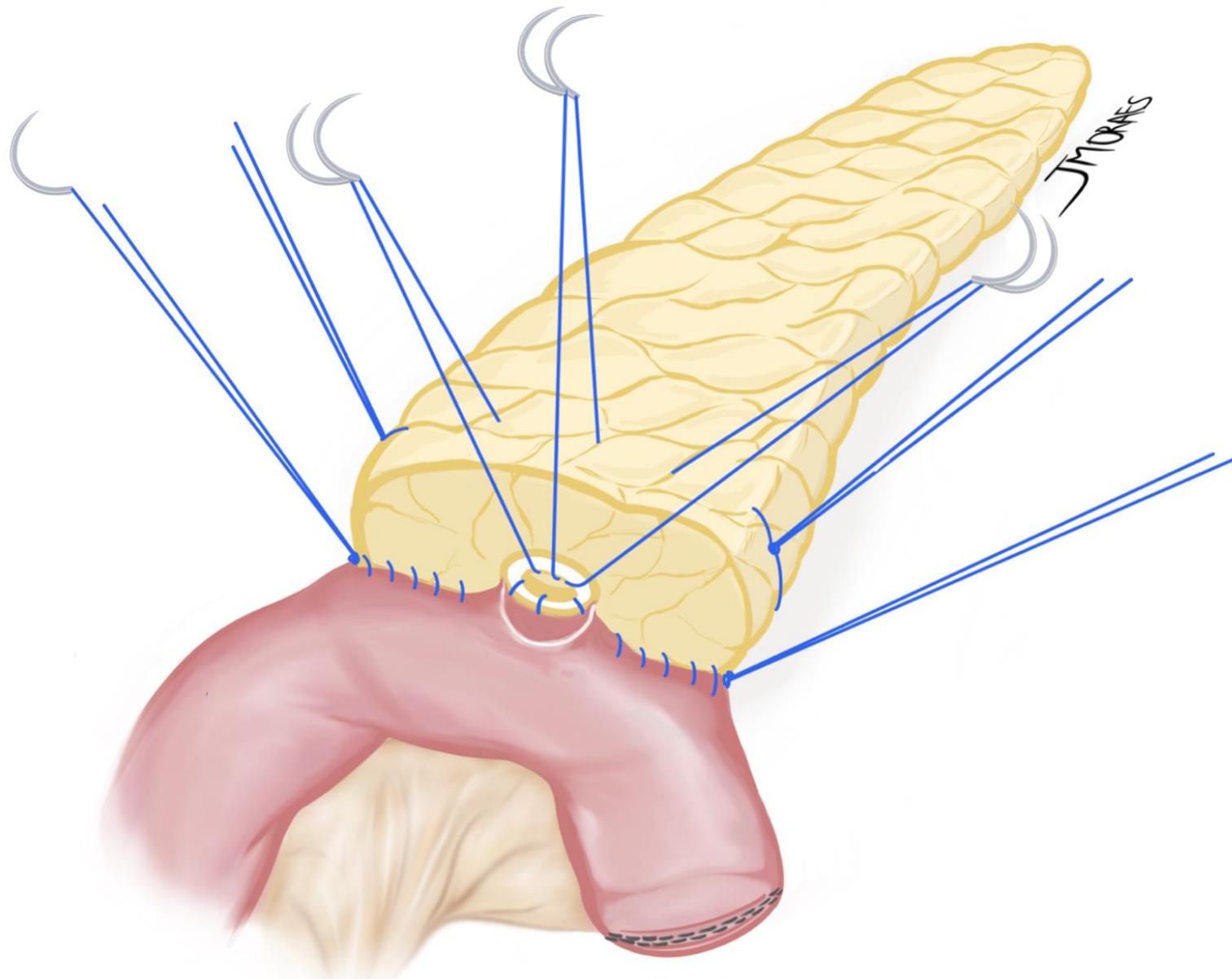


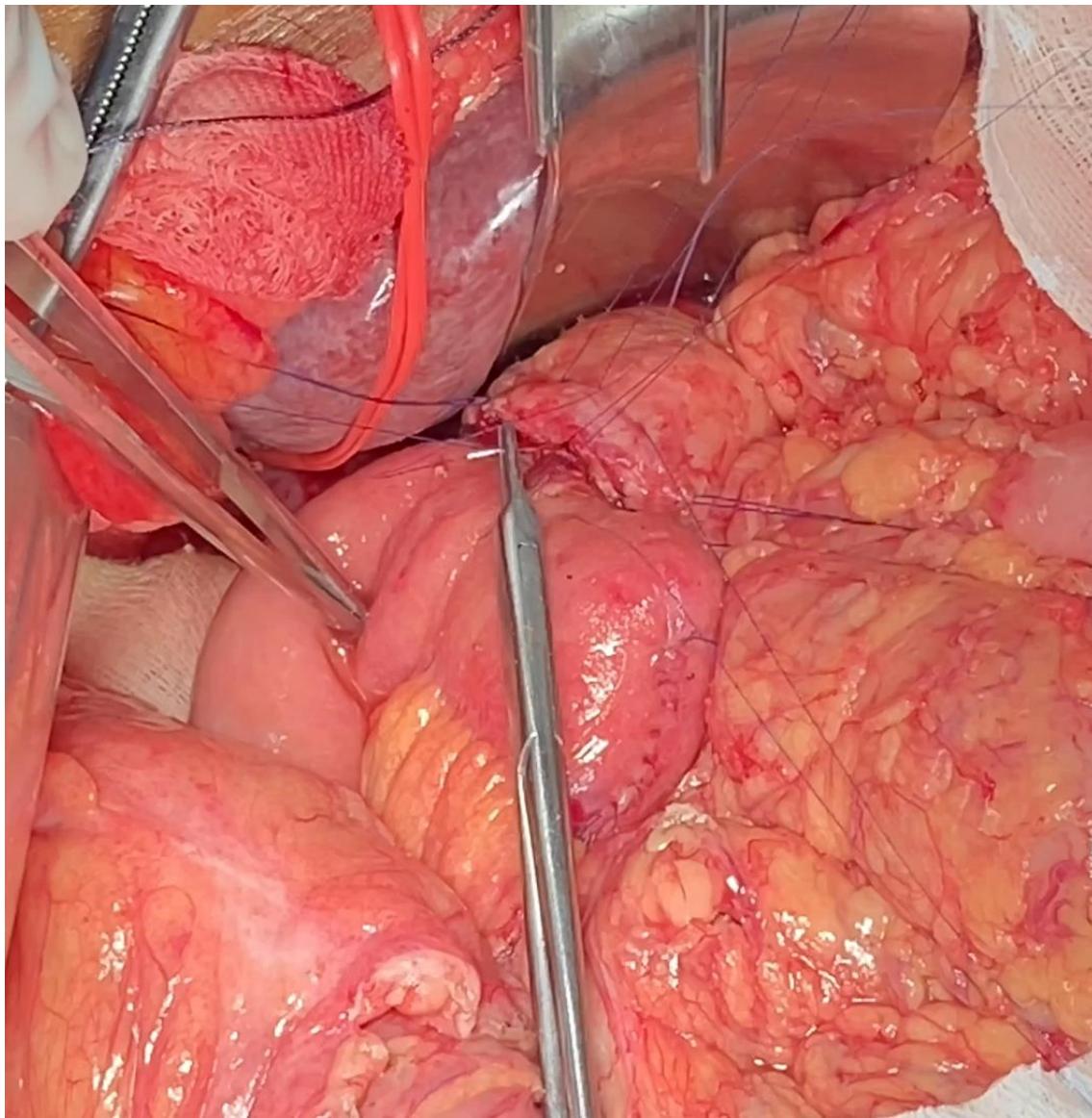


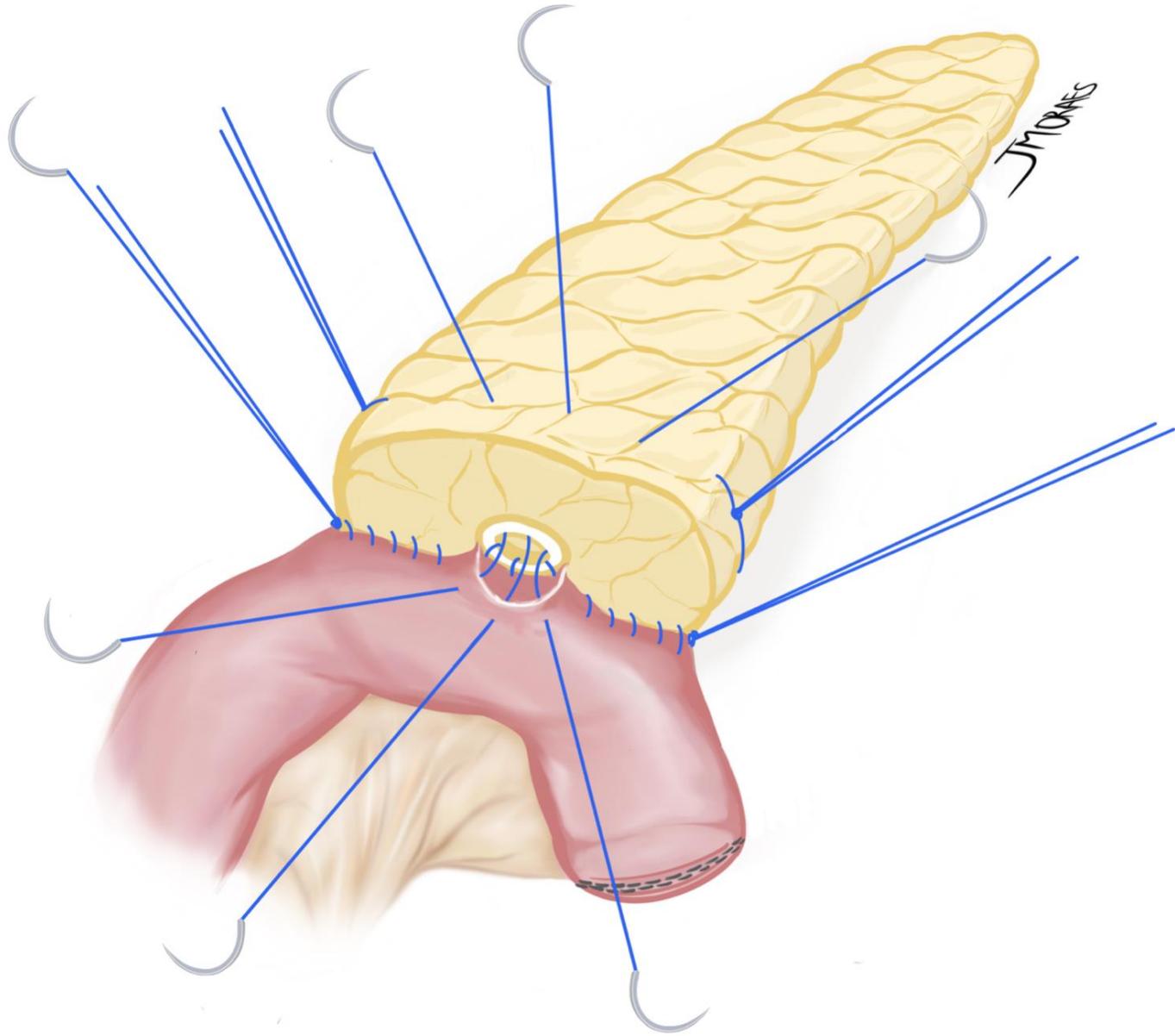
# ANASTOMOTIC STENTING

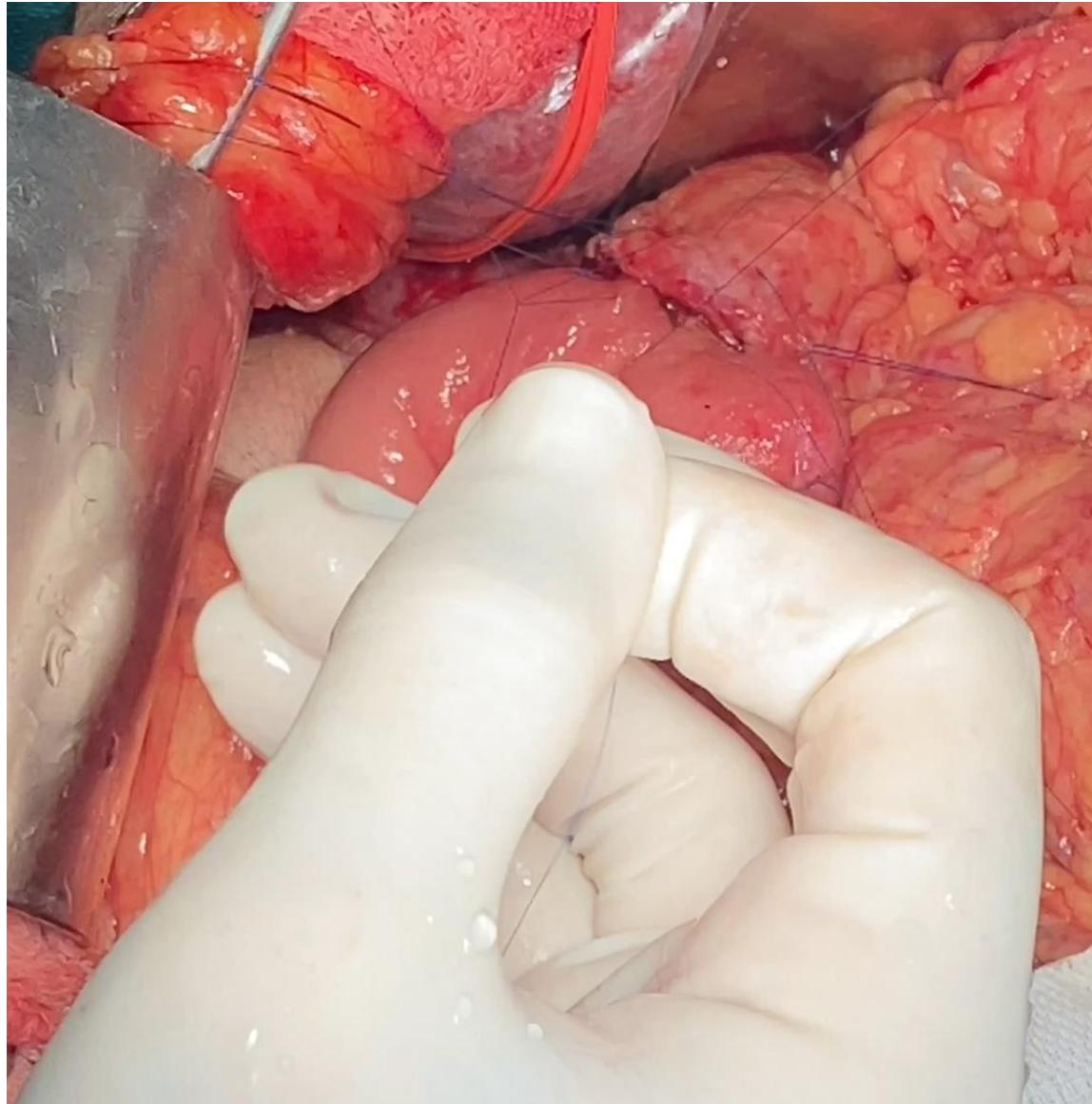
WHY NOT?

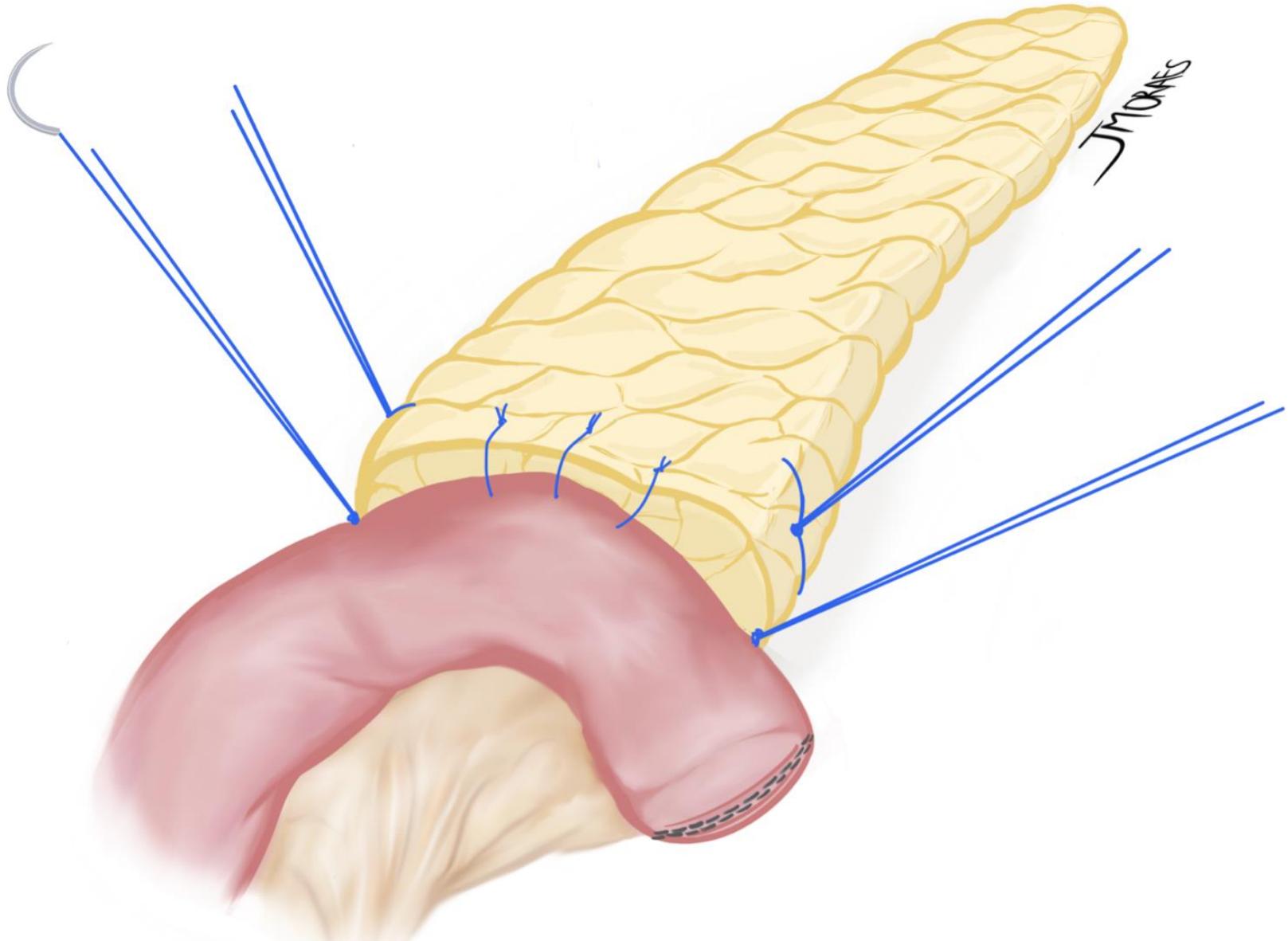
- Keep pancreatin away from the anastomosis
- Easy placement of sutures on the anterior wall of the duct
- Avoid occlusion of the small pancreatic duct
- Sufficient drainage prevent postoperative pancreatitis
- Helpful for duct-to-mucosa anastomosis on small ducts

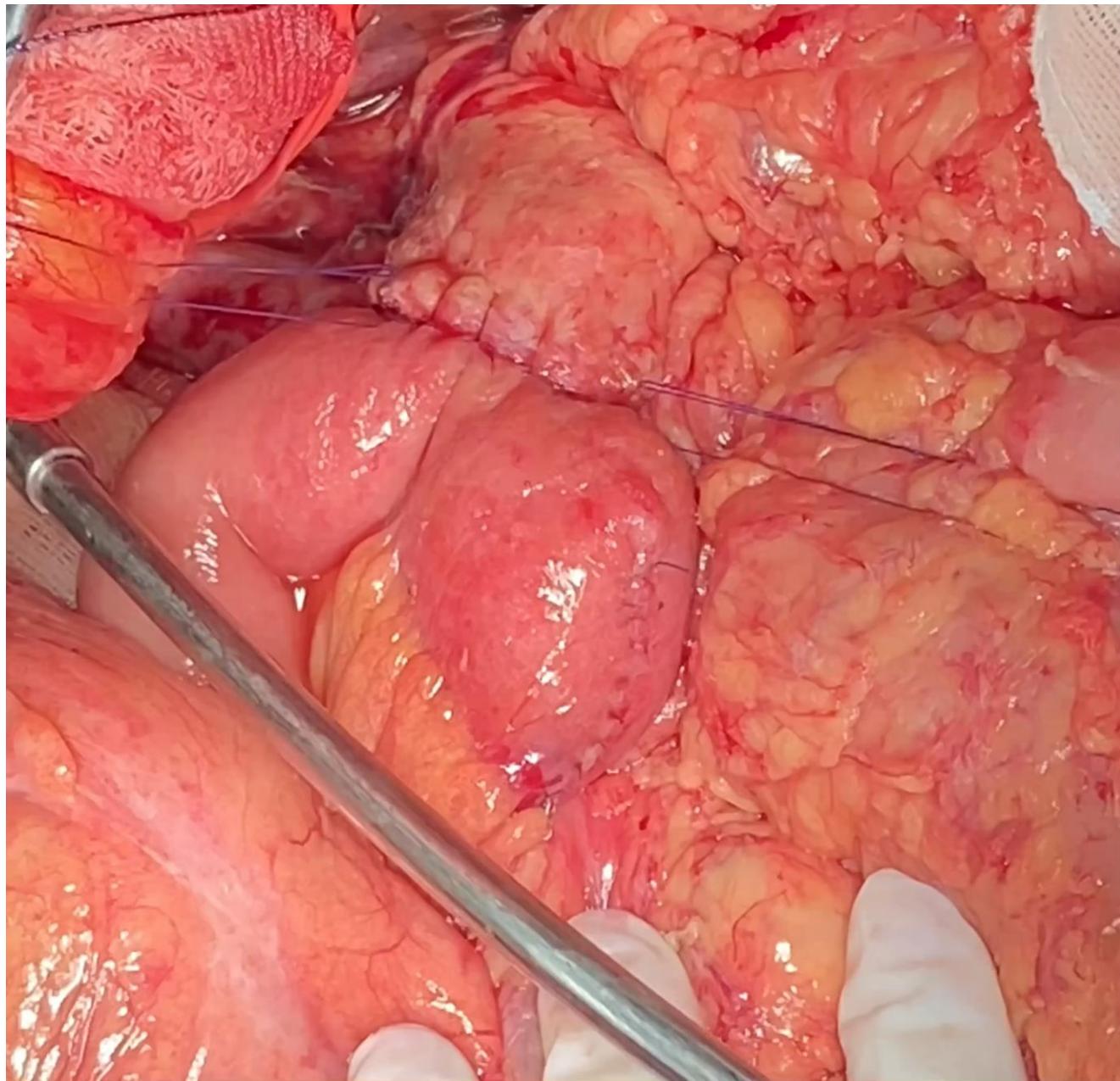


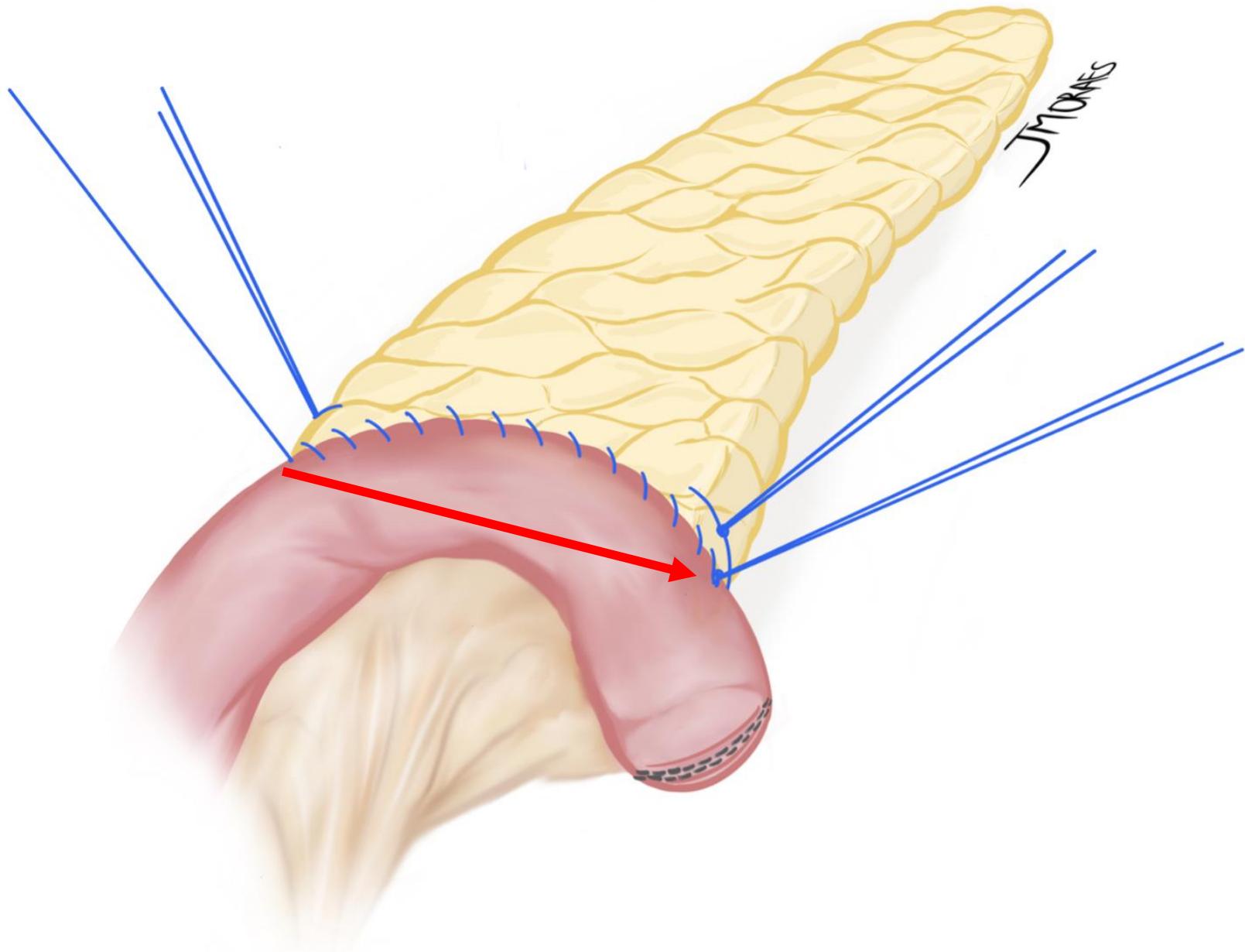


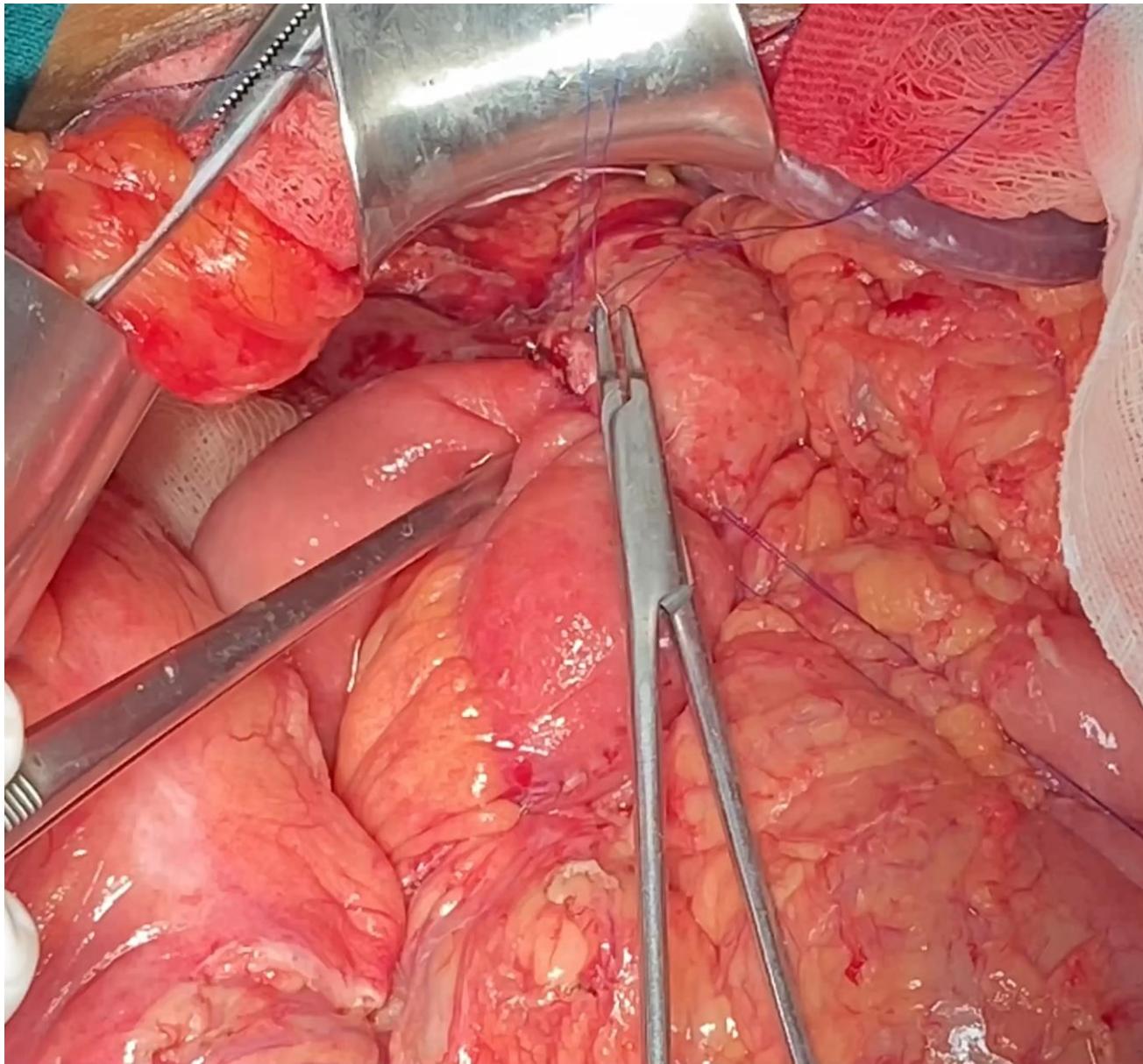




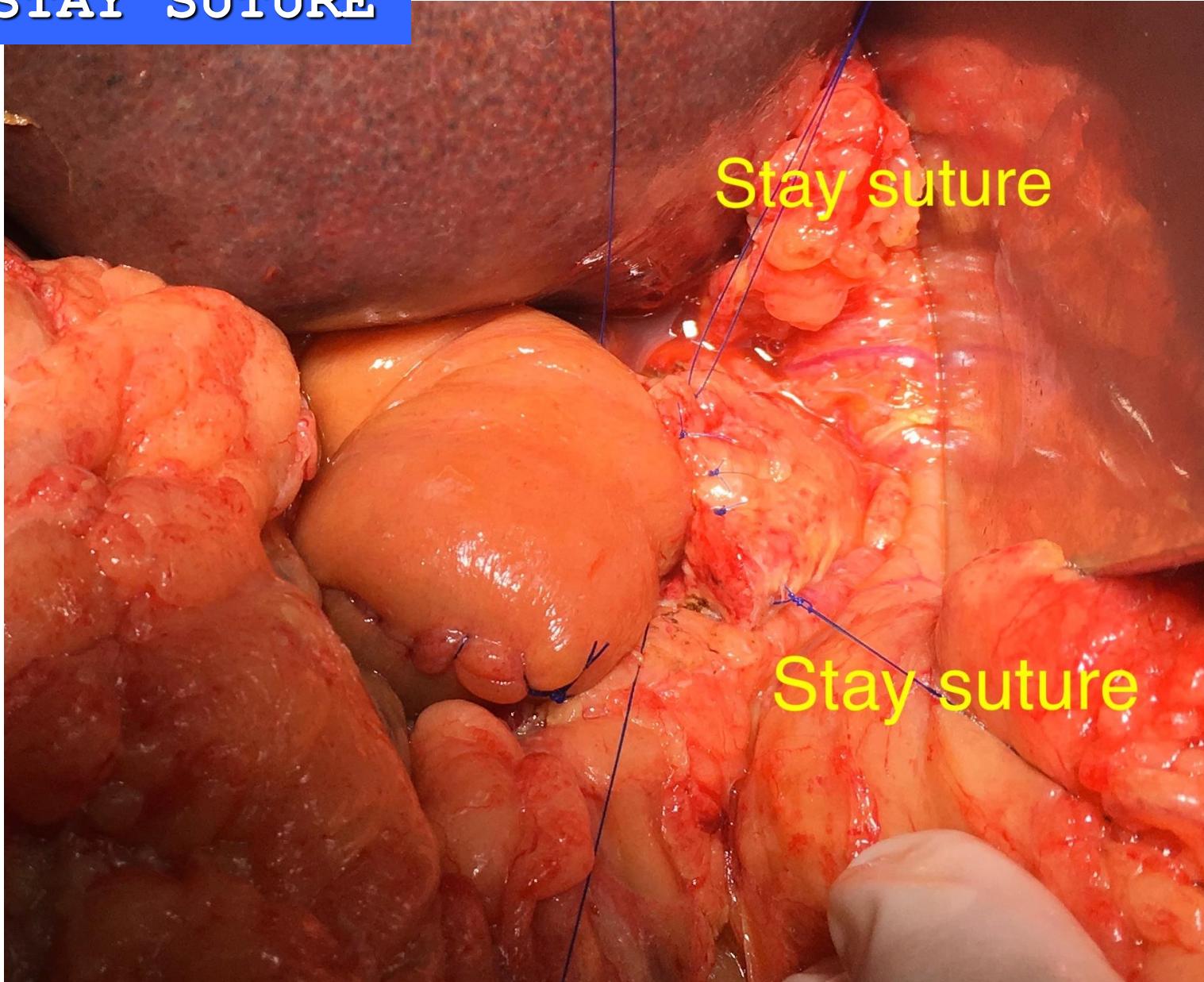




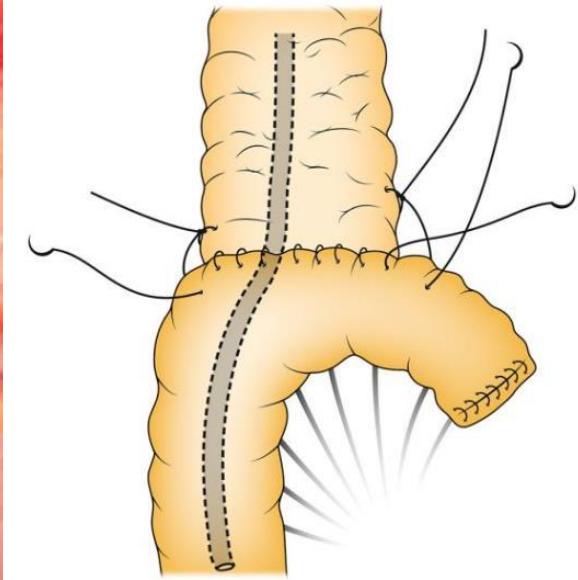
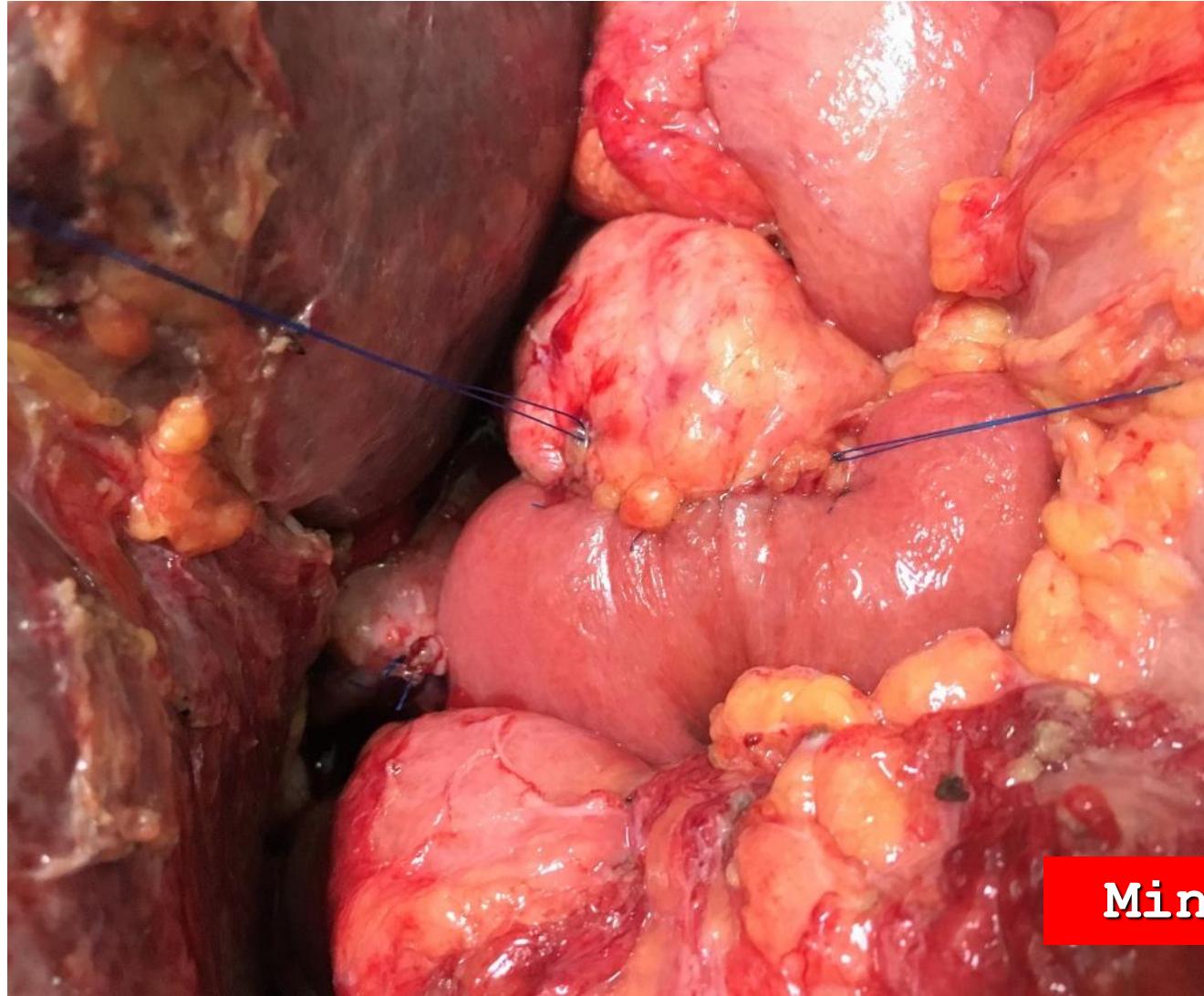




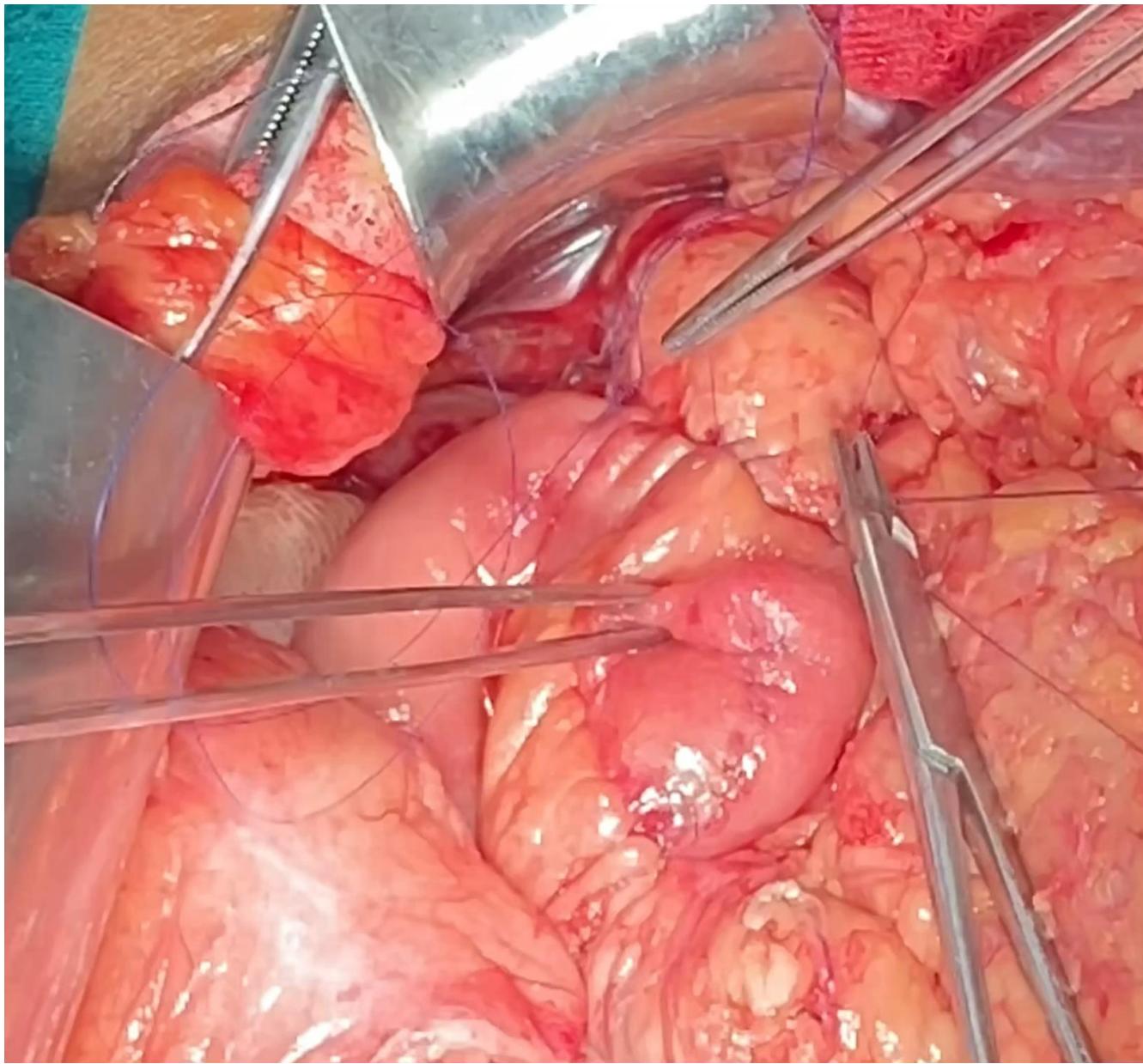
# STAY SUTURE

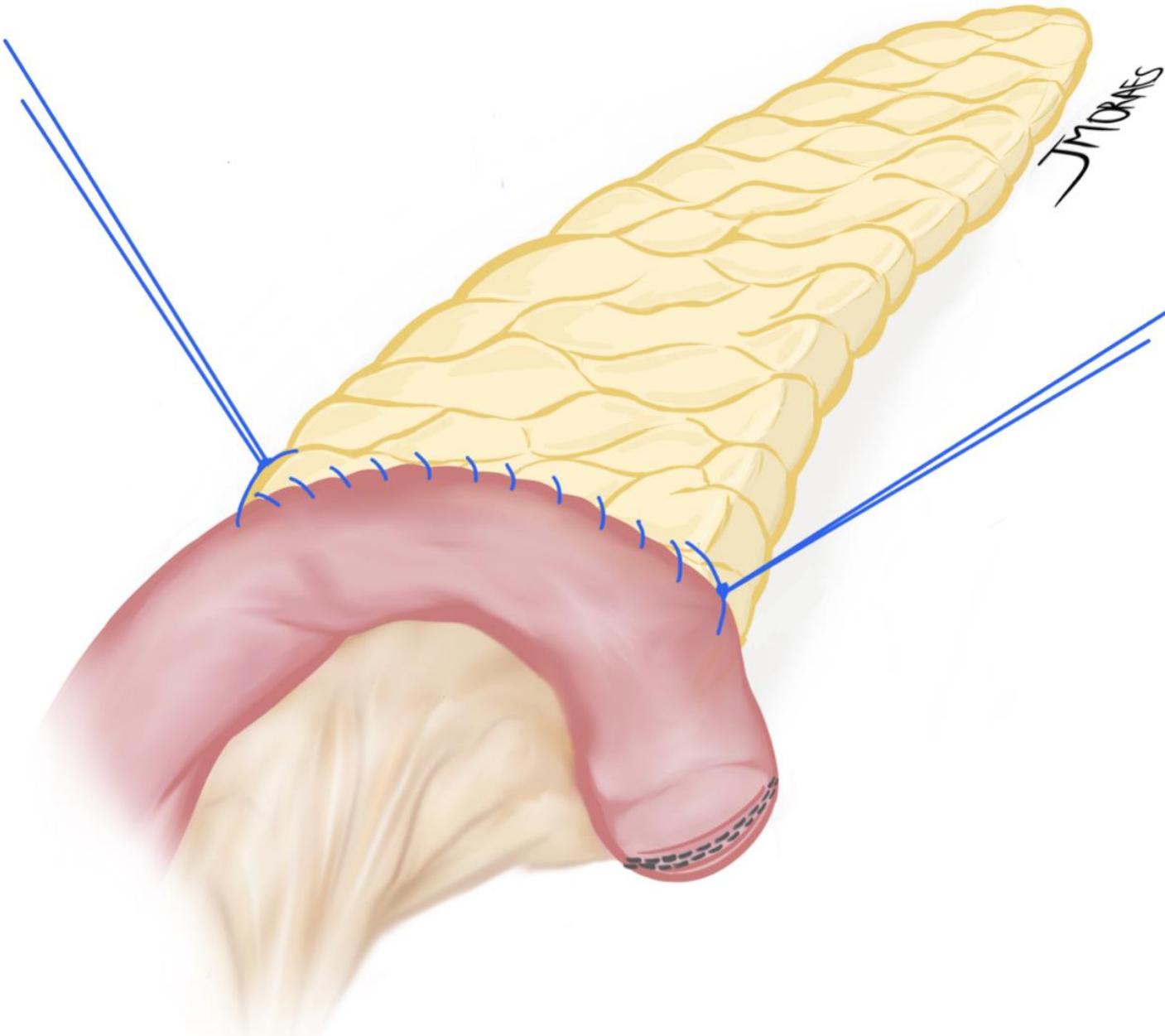


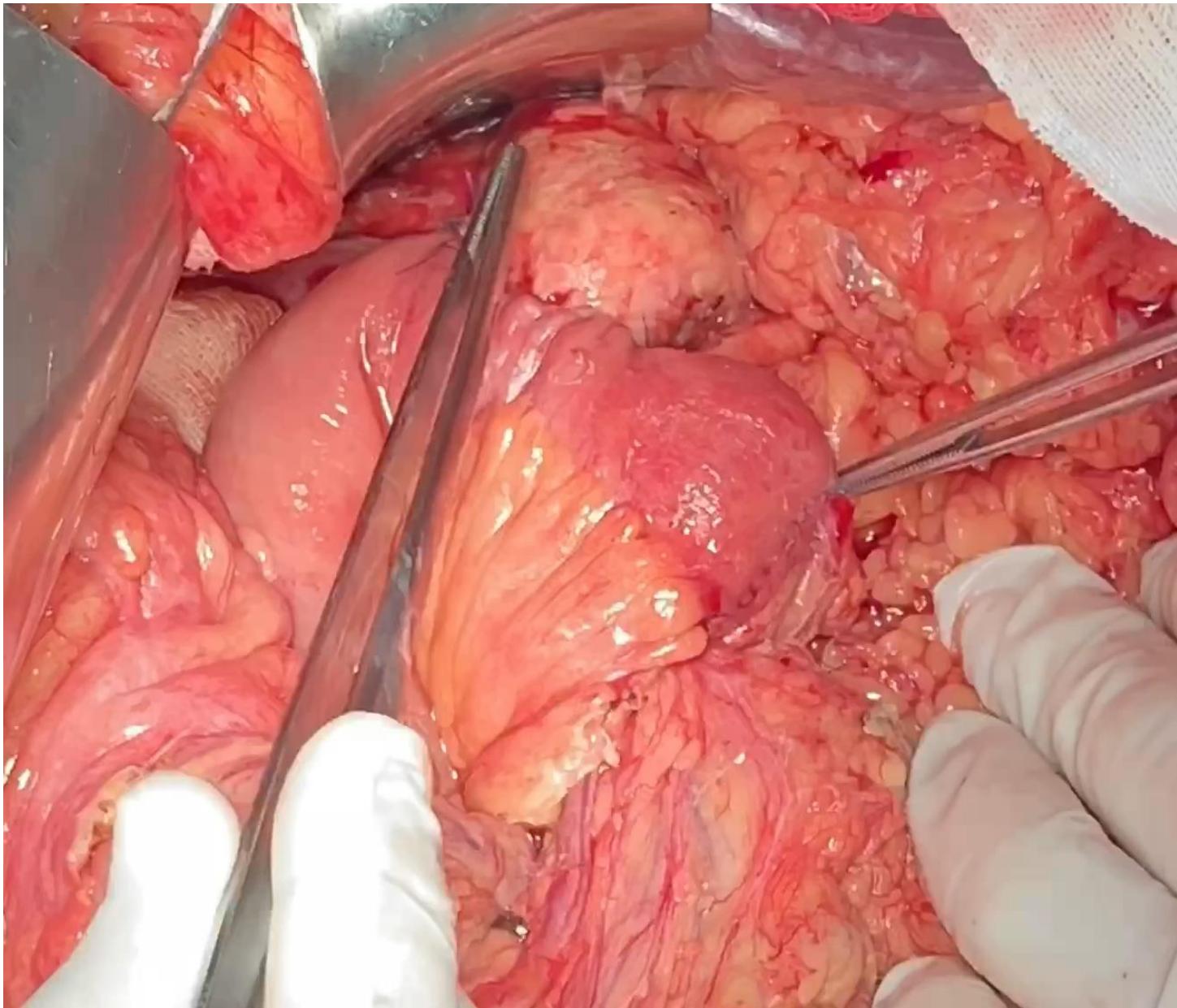
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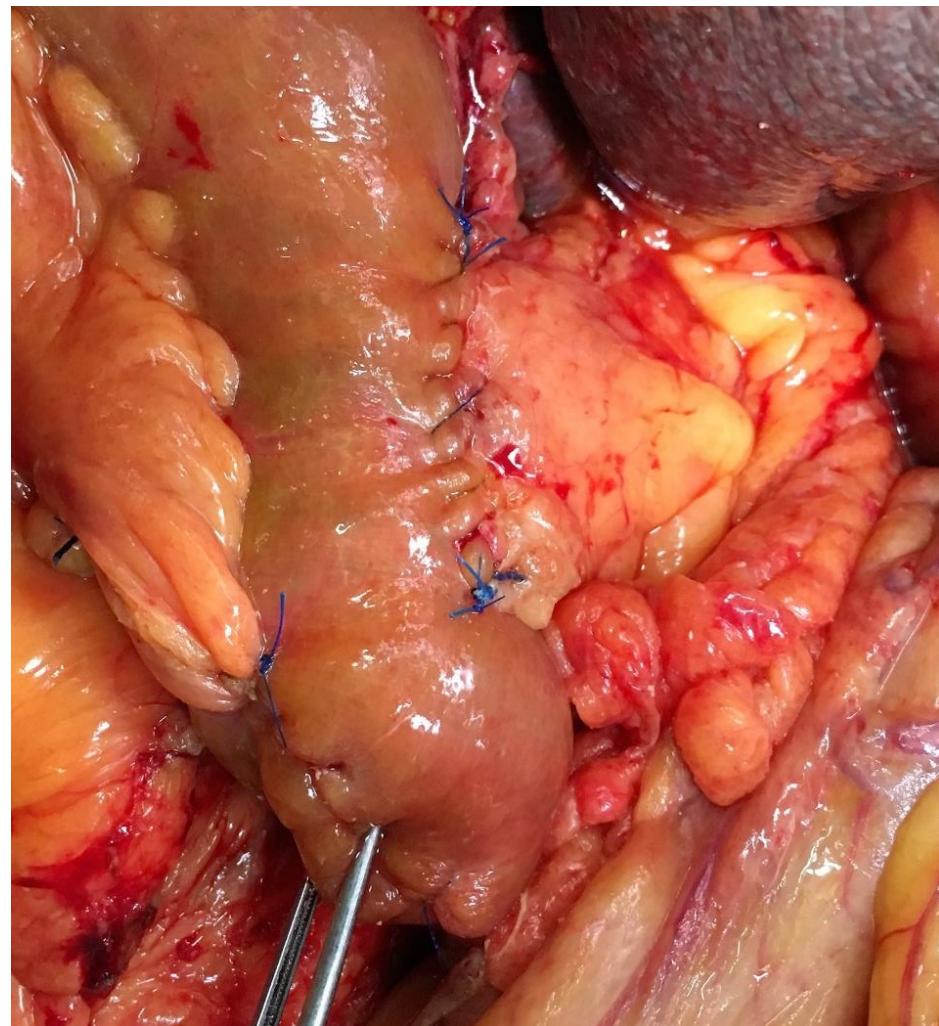
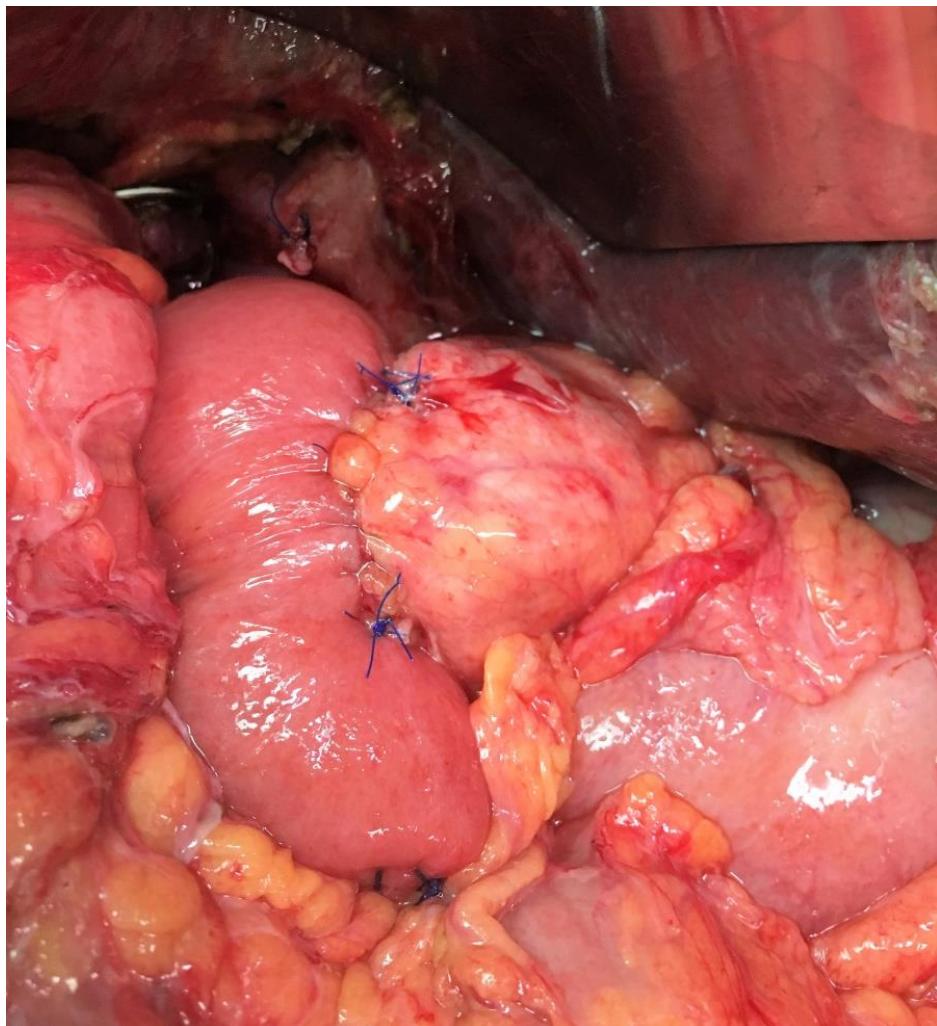
Minimize tension







# FINAL ASPECT





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Obrigado!

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