



"Prevention and management of pancreatic fistula"



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No disclosure



Two Thousand Consecutive Pancreaticoduodenectomies



John L Cameron, MD, FACS, Jin He, MD, PhD

BACKGROUND: The first successful local resection of a periampullary tumor was performed by Halsted in 1898. Kausch performed the first regional resection in 1909, and the operation was popularized by Whipple in 1935. The operation was infrequently performed until the 1980s and 1990s.

STUDY DESIGN: Two thousand consecutive pancreaticoduodenectomies performed by 1 surgeon (JLC) from the 1960s to the 2000s were retrospectively reviewed from a prospectively maintained database. The first 1,000 were performed over a period of 34 years, the second 1,000 over a period of 9 years.

RESULTS: The most common indication throughout was adenocarcinoma of the head of the pancreas (PDAC, 46%). Benign intraductal papillary mucinous neoplasm (IPMN) increased from

Pancreatic Cancer

Table 4. Morbidity

Complication	n	%
Delayed gastric emptying	410	21
Postoperative pancreatic fistula	295	15
Wound infection	222	11
Cardiac event	69	3
Pneumonia	38	2
Delayed bleeding	32	2
Chyle leak	28	1
Any complication	894	45

Mortality 1,55%

PANCREATIC FISTULA

- A frustrating complication
 - 3-45%
- Major cause of morbidity and mortality
 - 1% general mortality
 - 25% C grade
- Technical aspects of the anastomosis .
- Various procedures have been described.

THE IDEAL PANCREATOENTERIC ANASTOMOSIS

- Good blood supply to the pancreatic stump
- Pancreatic juice flow into the intestinal or gastric lumen,
- Suitable for all pancreatic stumps and all pancreatic ducts,
- Easy to perform and easy to learn

PANCREAS

Pancreatic texture

Duct size

Blood supply to the stump

Pancreatic duct output

Pathologic features

Patient

Age, Sex

Bilirubin level

Comorbid illness

Operation

Operating time

Blood loss

Type of anastomosis

Stent use

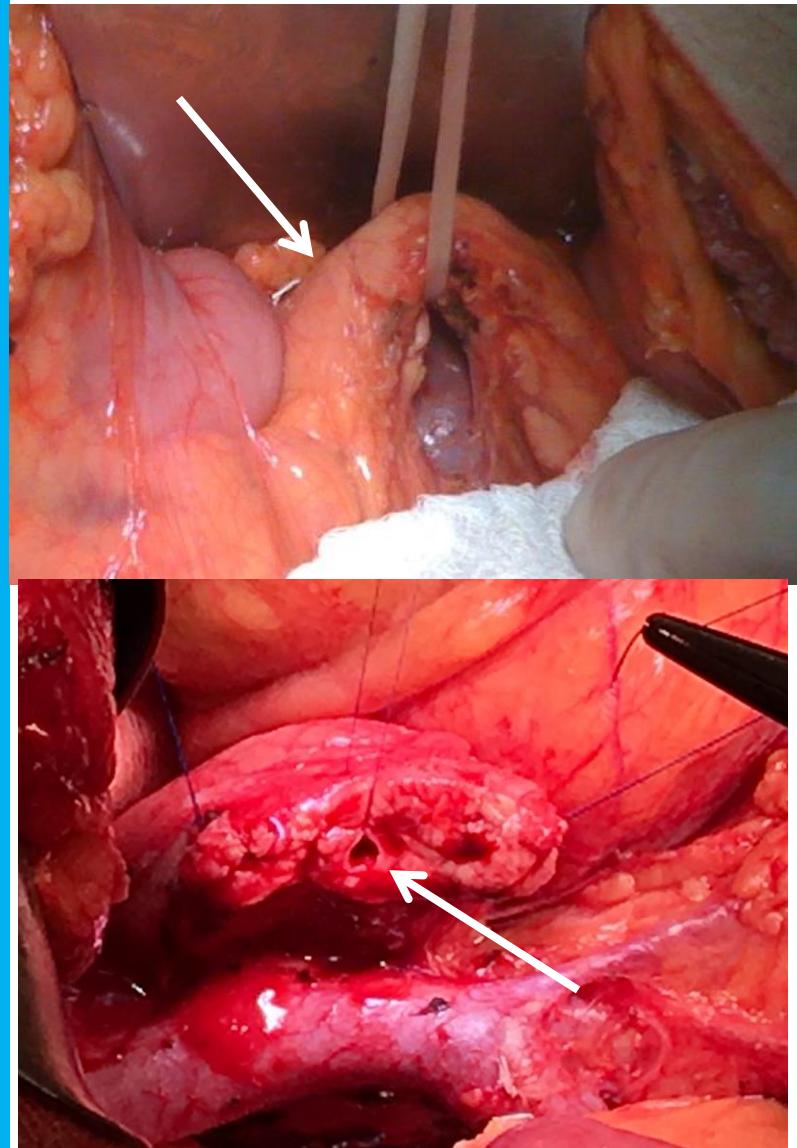
Others

BMI

Nutritional status

Fluids

RISK FACTORS



**7
P
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S**

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

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	≥5	0
	4	1
	3	2
	2	3
	≤1	4
Intraoperative blood loss, mL	≤400	0
	401–700	1
	701–1,000	2
	>1,000	3

*Total 0 to 10 points.

Anastomosis

Risk factors

□ Pancreatic texture and fistula (%)

Hard 0%

Soft 25%

□ Factors (soft pancreas):

1. Normal exocrin function

High volume of pancreatic juice output

2. Associated with pancreatic duct size (thin)

3. Damage of the pancreas during anastomosis

Quality of anastomosis



PANCREATODUODENECTOMY: BRAZILIAN PRACTICE PATTERNS*

*Duodenopancreatectomia: prática padrão do Brasil**

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Paulo Cezar G. AMARAL⁴, Marcelo Bruno de REZENDE⁵, Roland Montenegro COSTA⁶, André Luís MONTAGNINI⁷

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ABSTRACT - Background: Pancreatoduodenectomy is a technically challenging surgical procedure with an incidence of postoperative complications ranging from 30% to 61%. The procedure requires a high level of experience, and to minimize surgery-related complications and mortality, a high-quality standard surgery is imperative. **Aim:** To understand the Brazilian practice patterns for pancreatectomy. **Method:** A questionnaire was designed to obtain an overview of the surgical practice in pancreatic cancer, specific training, and experience in pancreatectomy. The survey was sent to members who declared an

Surgical strategies

- Occlusion of the pancreatic duct

- Pancreatogastrostomy

- Classic

- Montenegro technique

- Pancreatojejunostomy

- Ducto-to-mucosa

- Invagination

- Peng technique

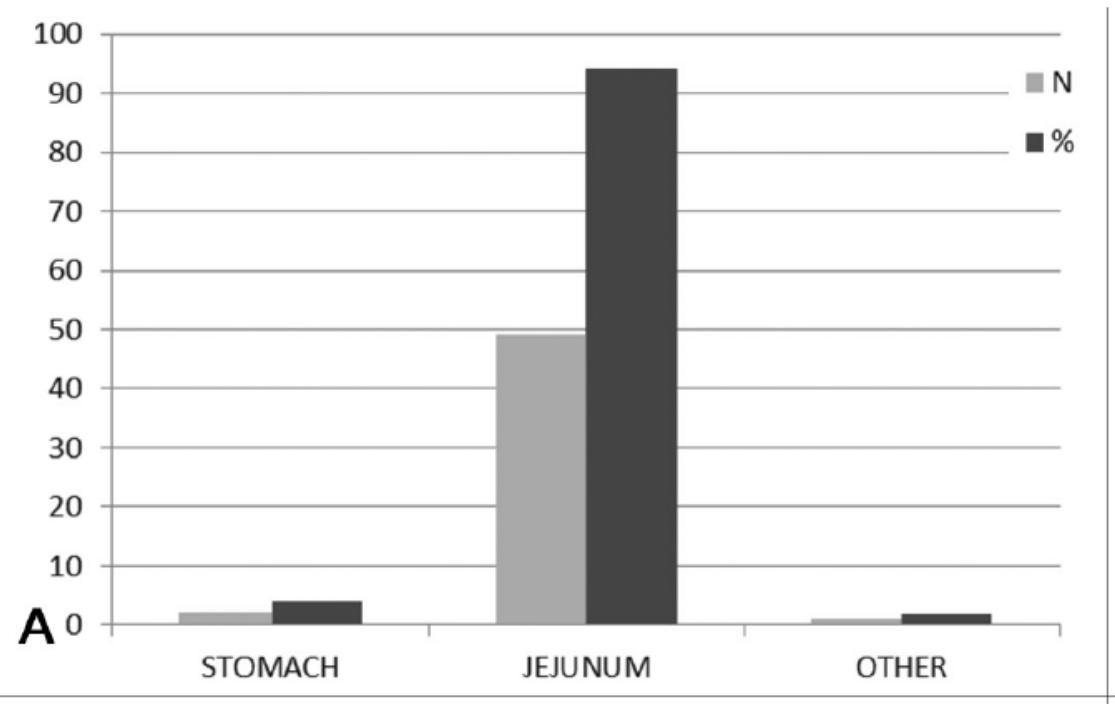
- Heidelberg technique

- Octreotide

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Surgical strategies

- Stent into the pancreatic duct

- Internal

- External

- Pancreatojejunostomy

- Classic

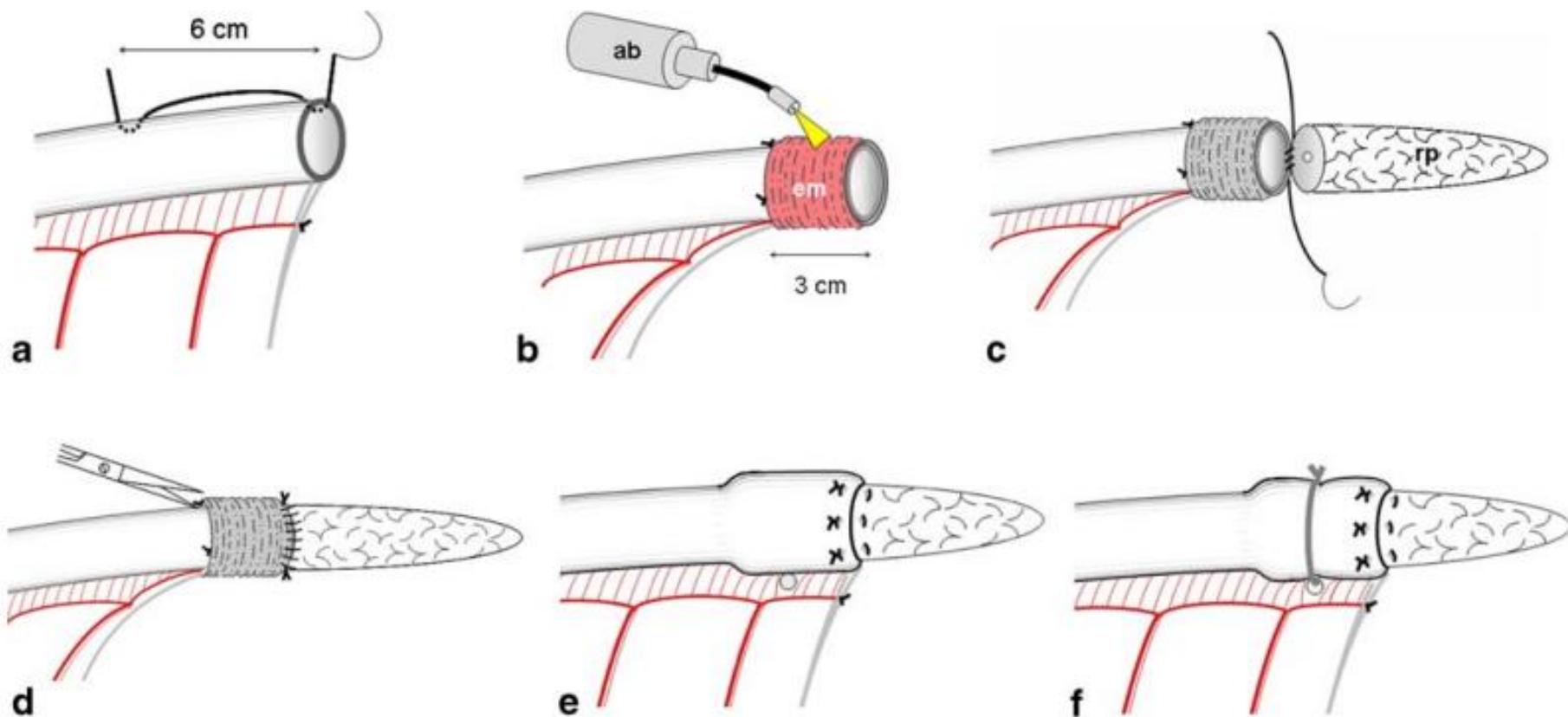
- Y loop

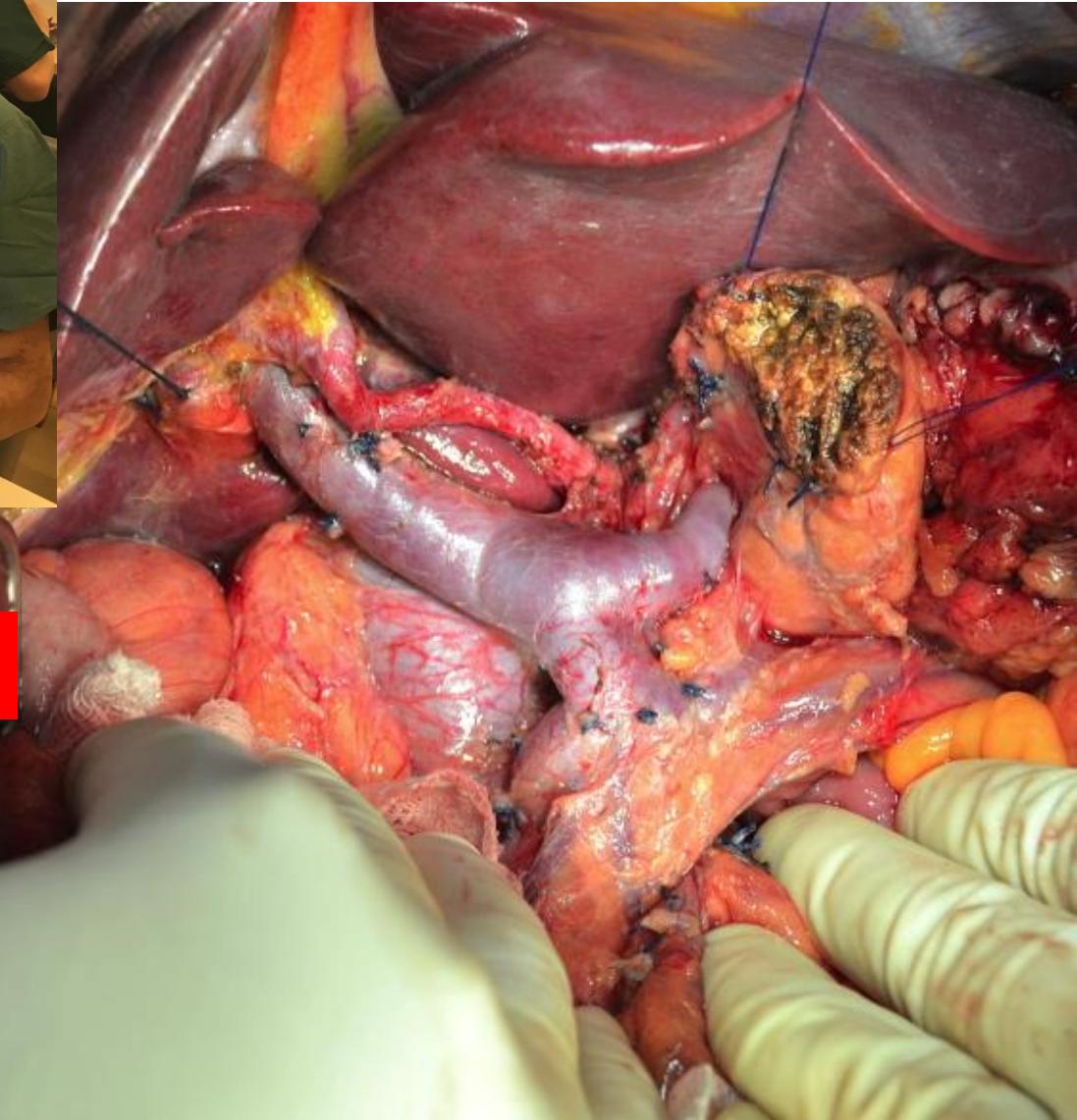
- Braun

- Biological glue

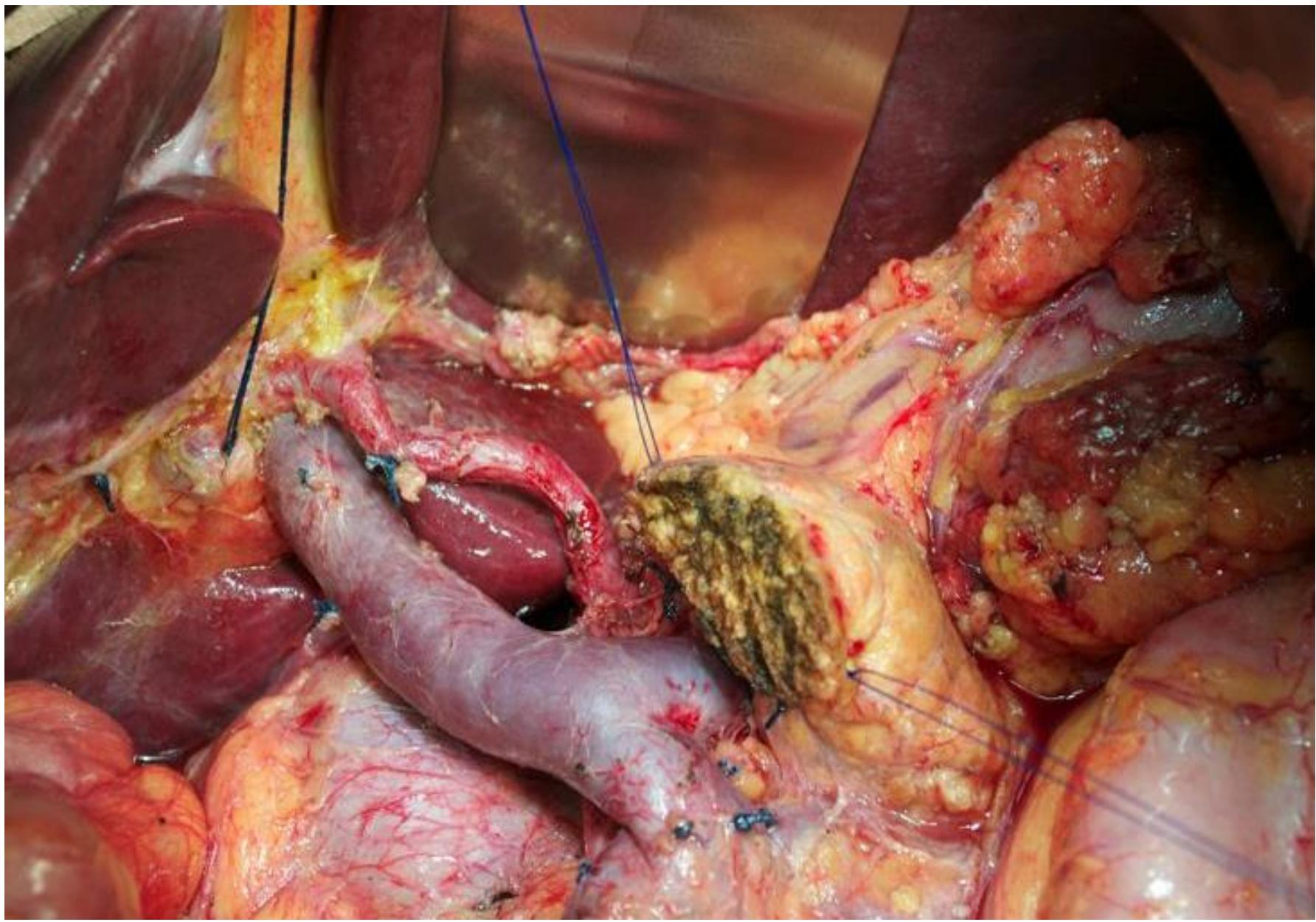
- Total Pancreatectomy

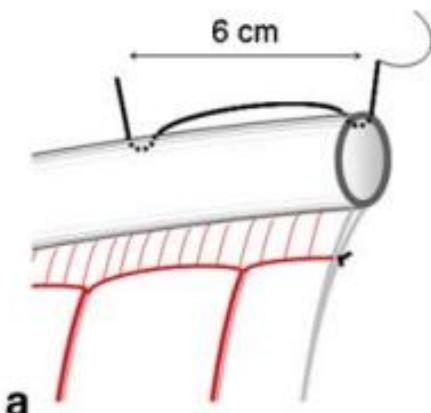
Peng Technique



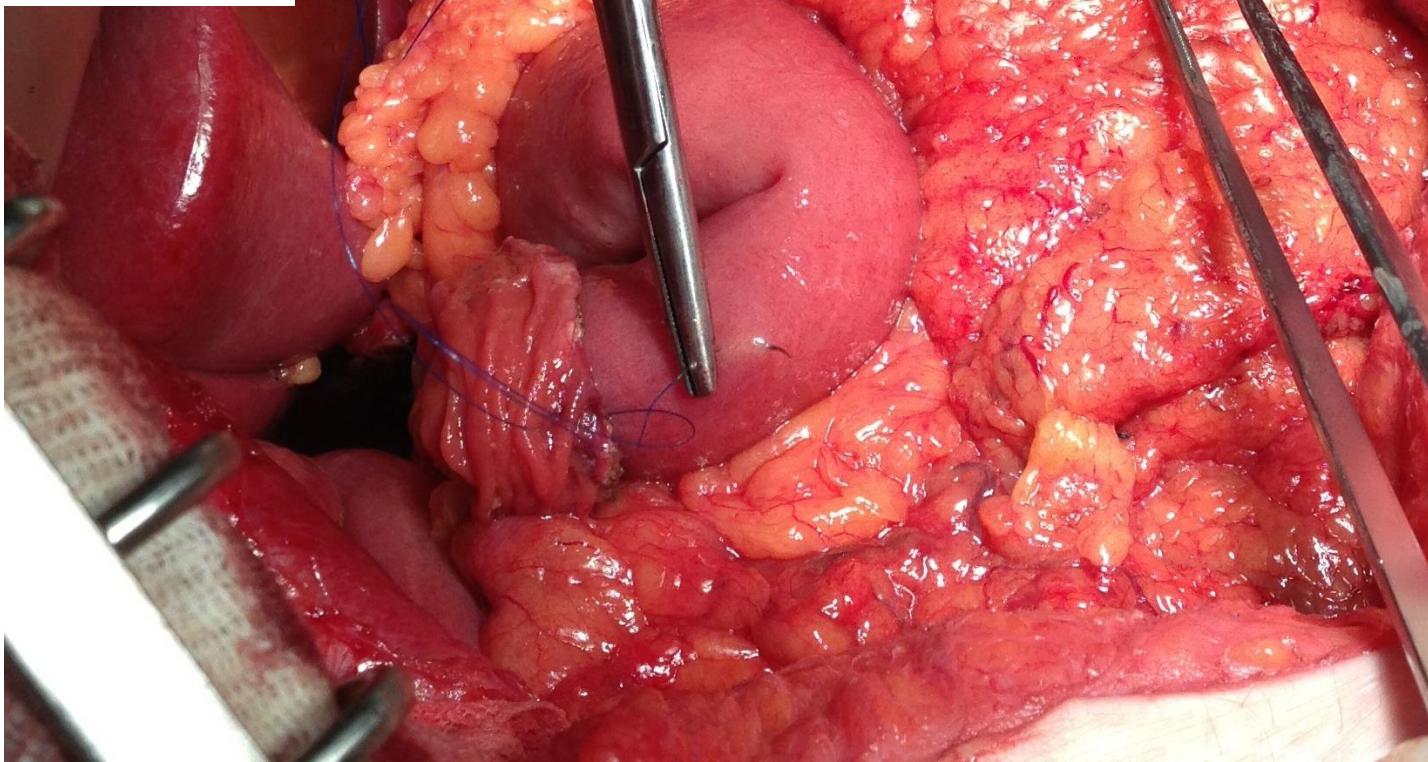


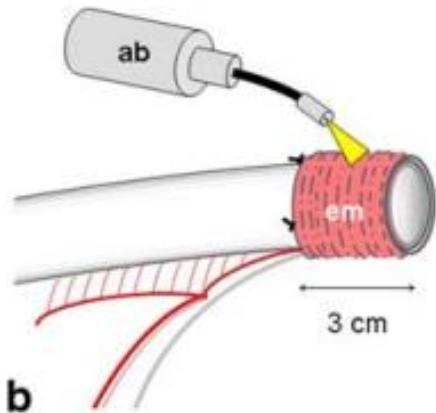
Hangzhou – China



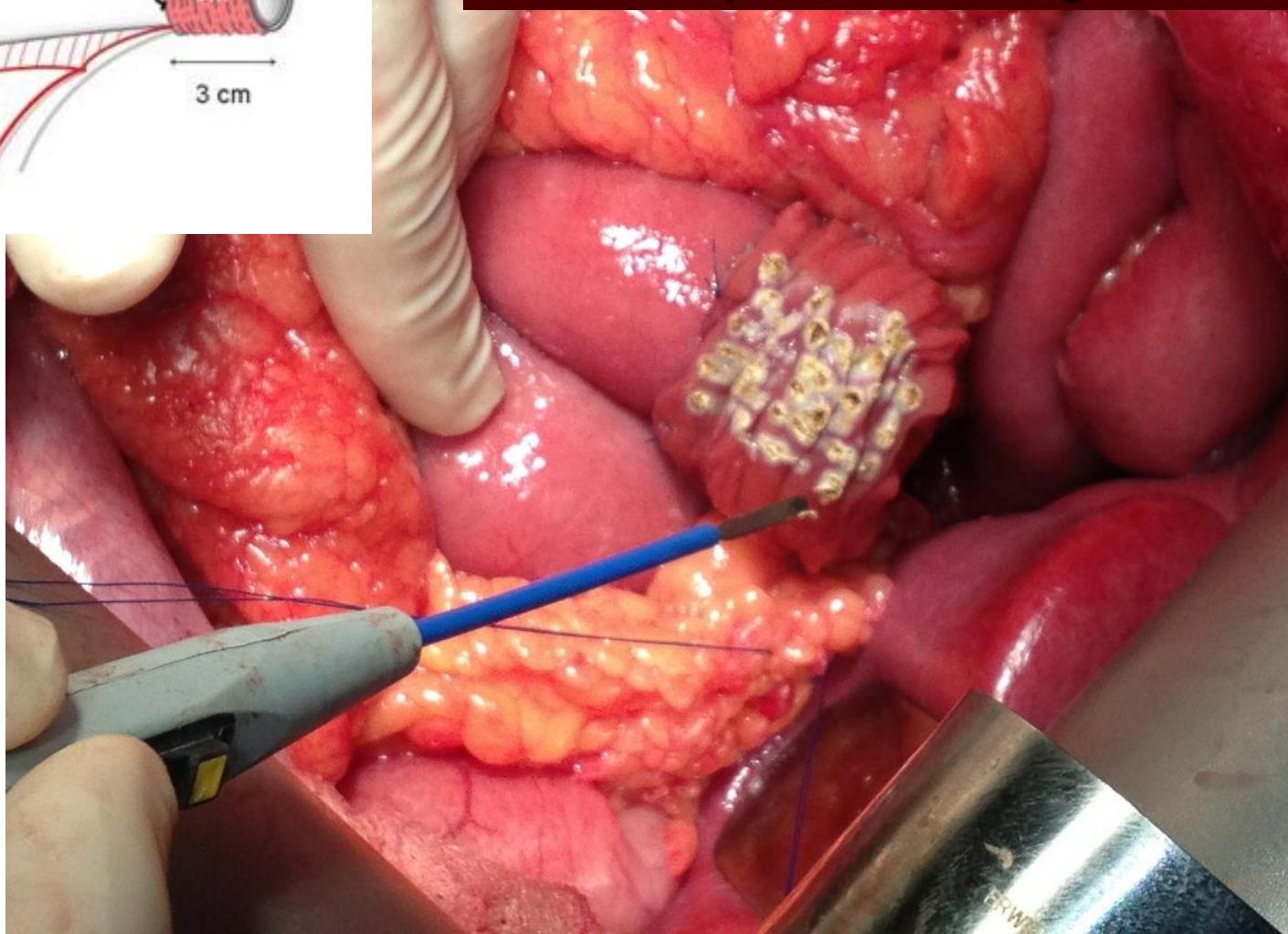


The stump of the jejunum is everted

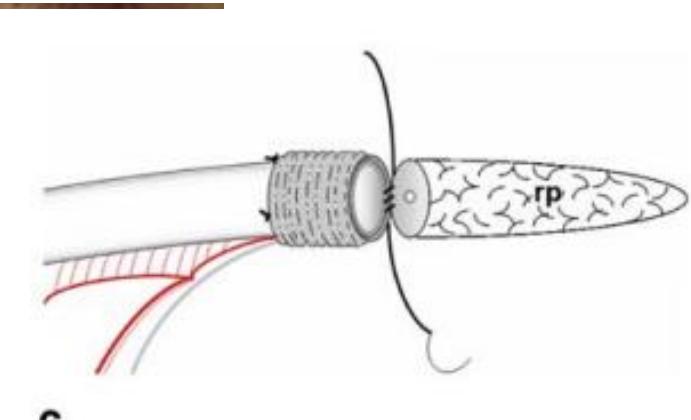
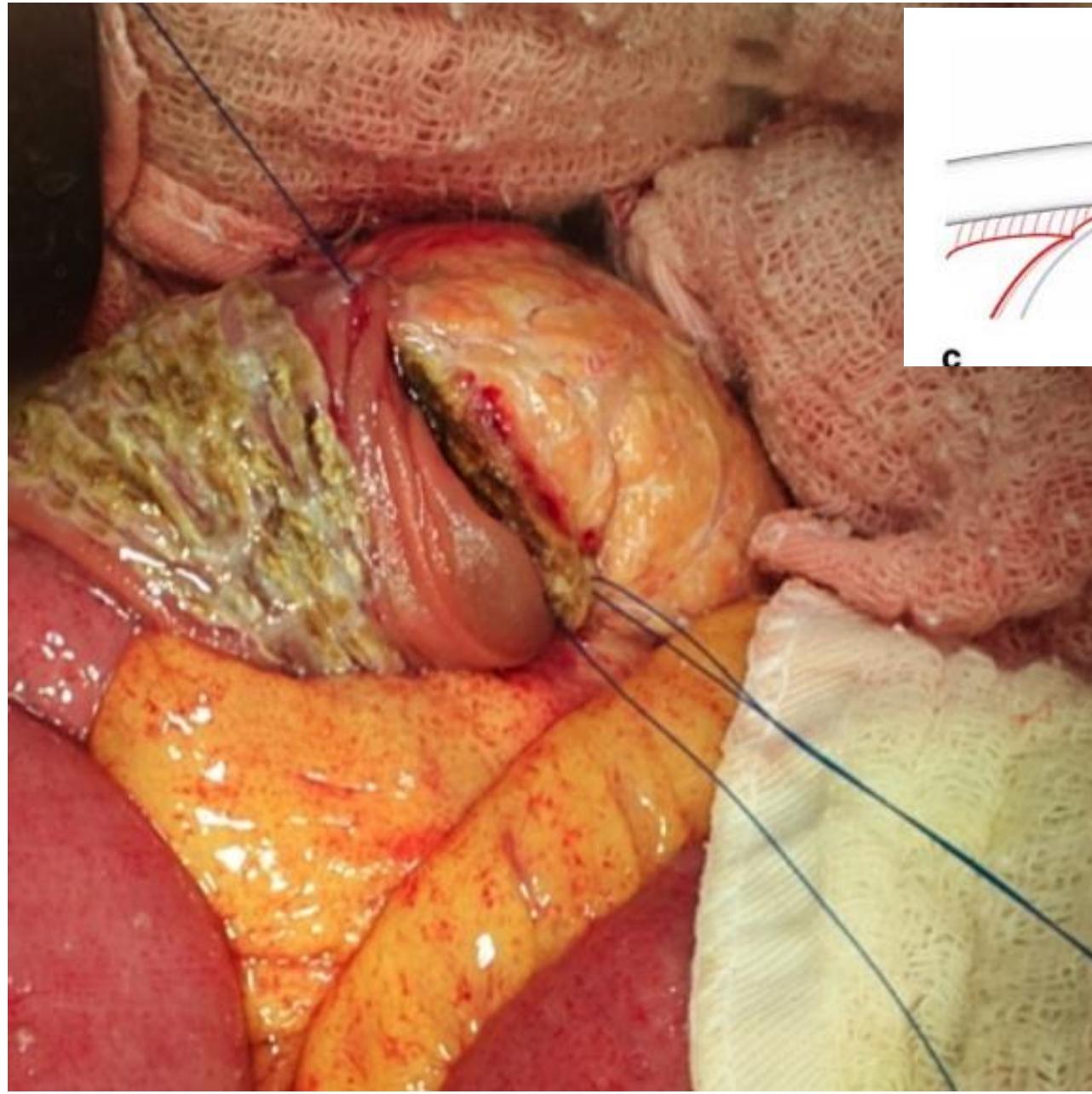


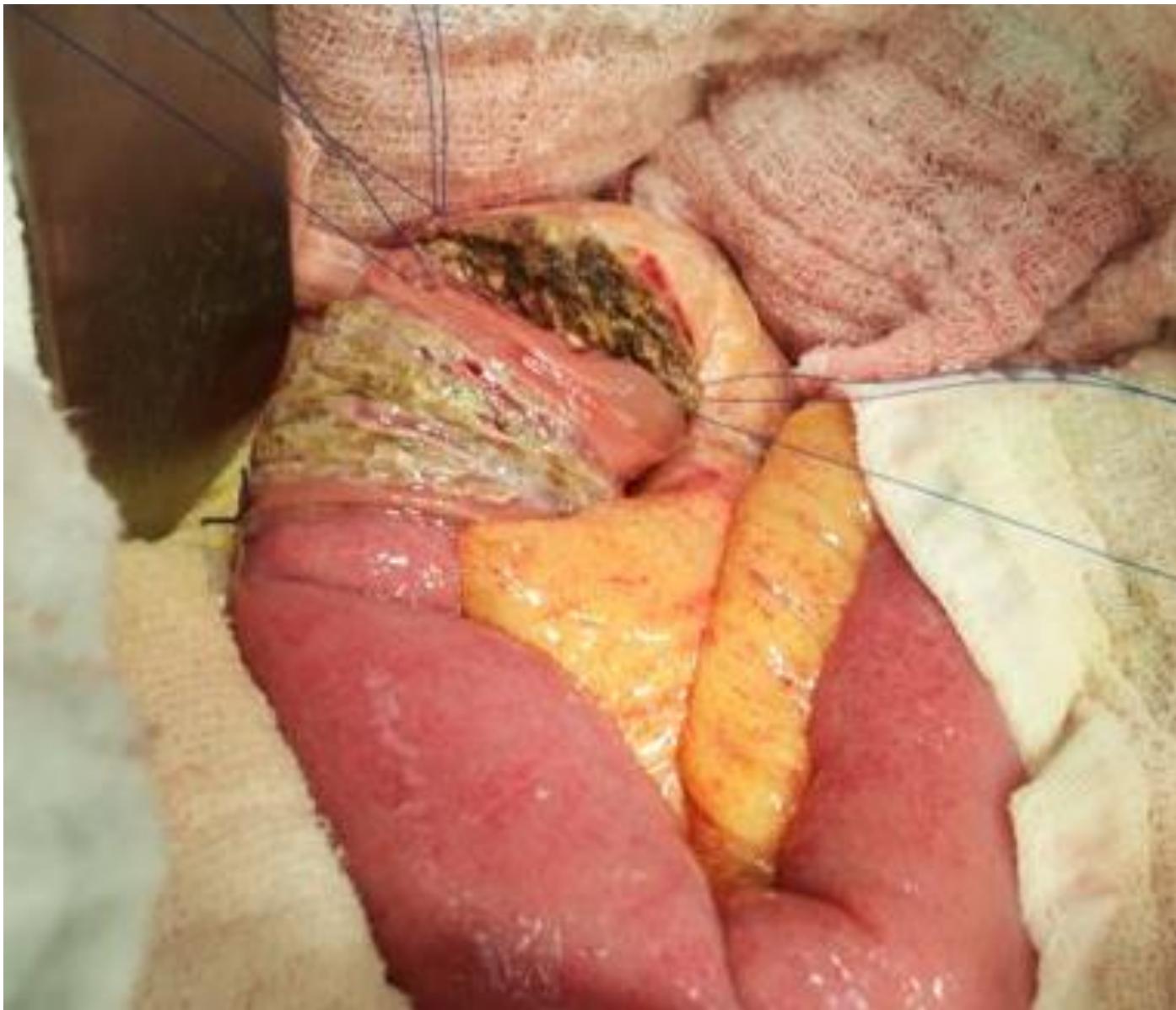


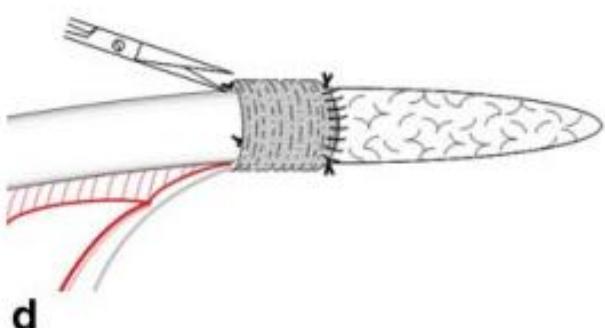
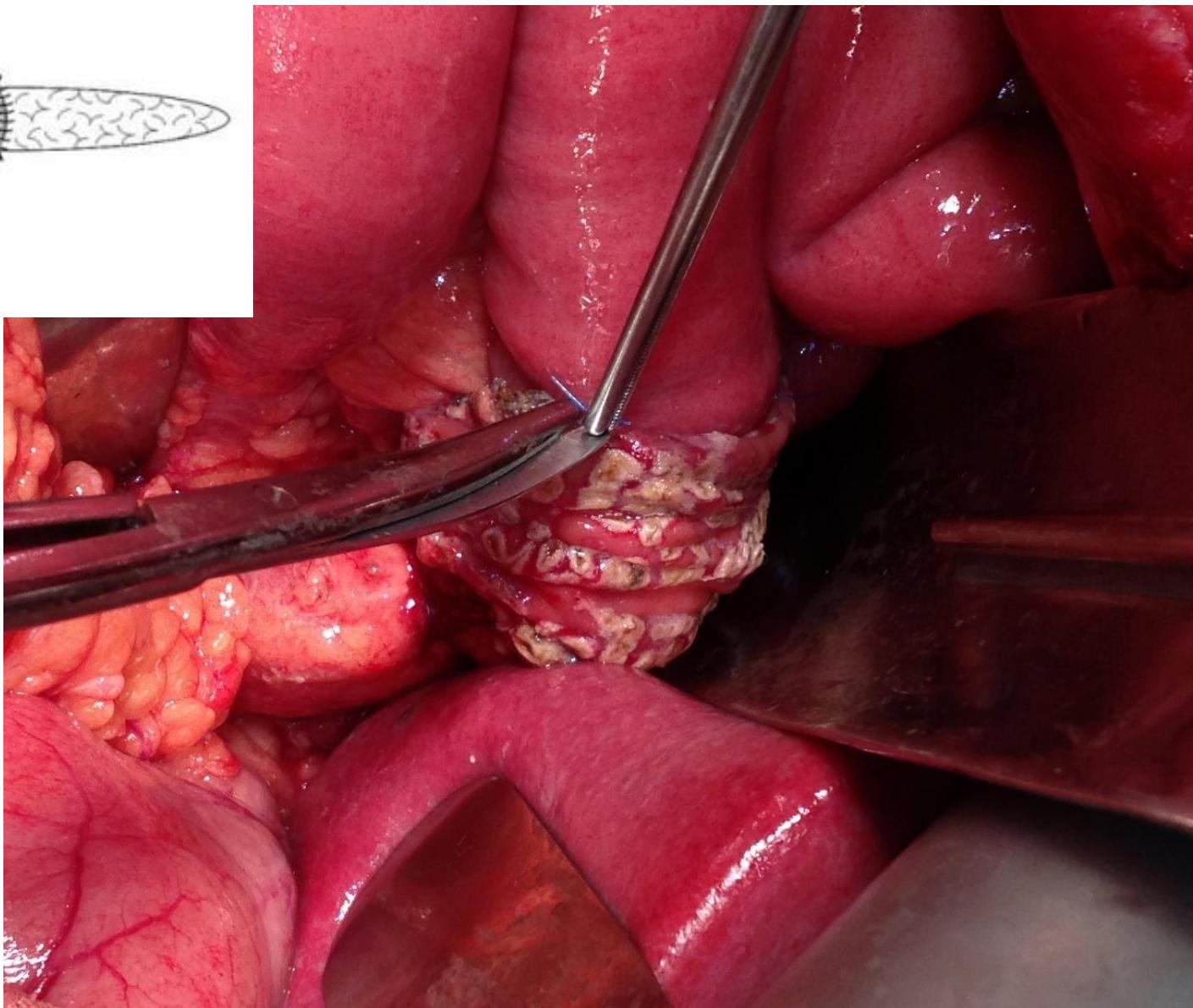
The mucosa is destroyed by electric coagulation

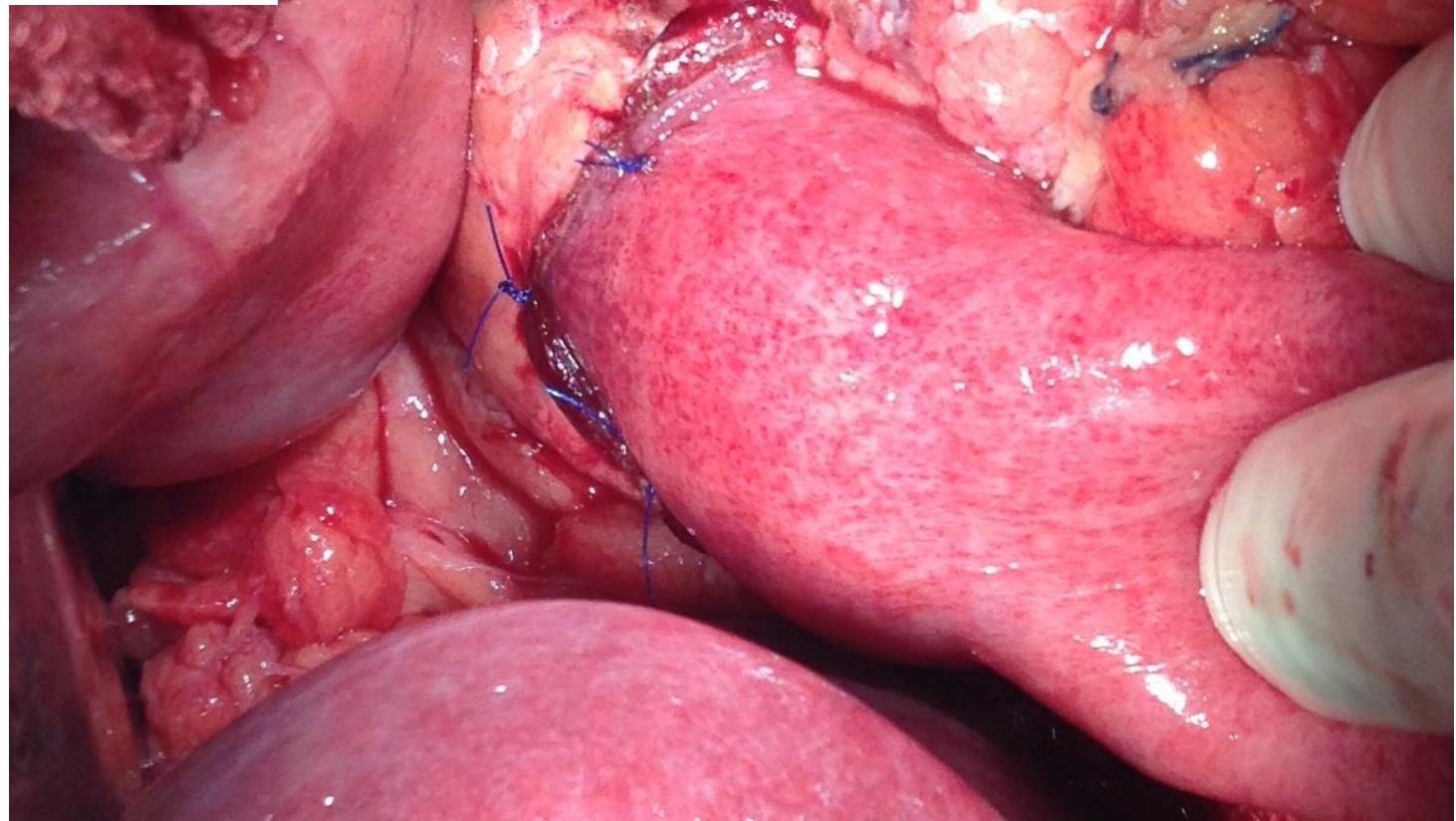
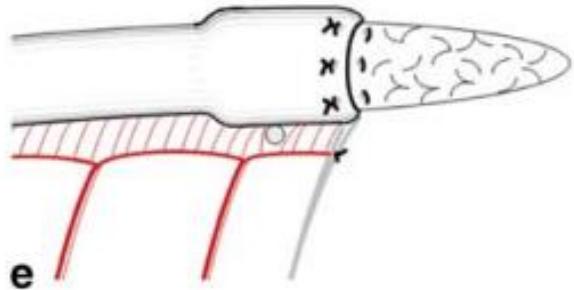


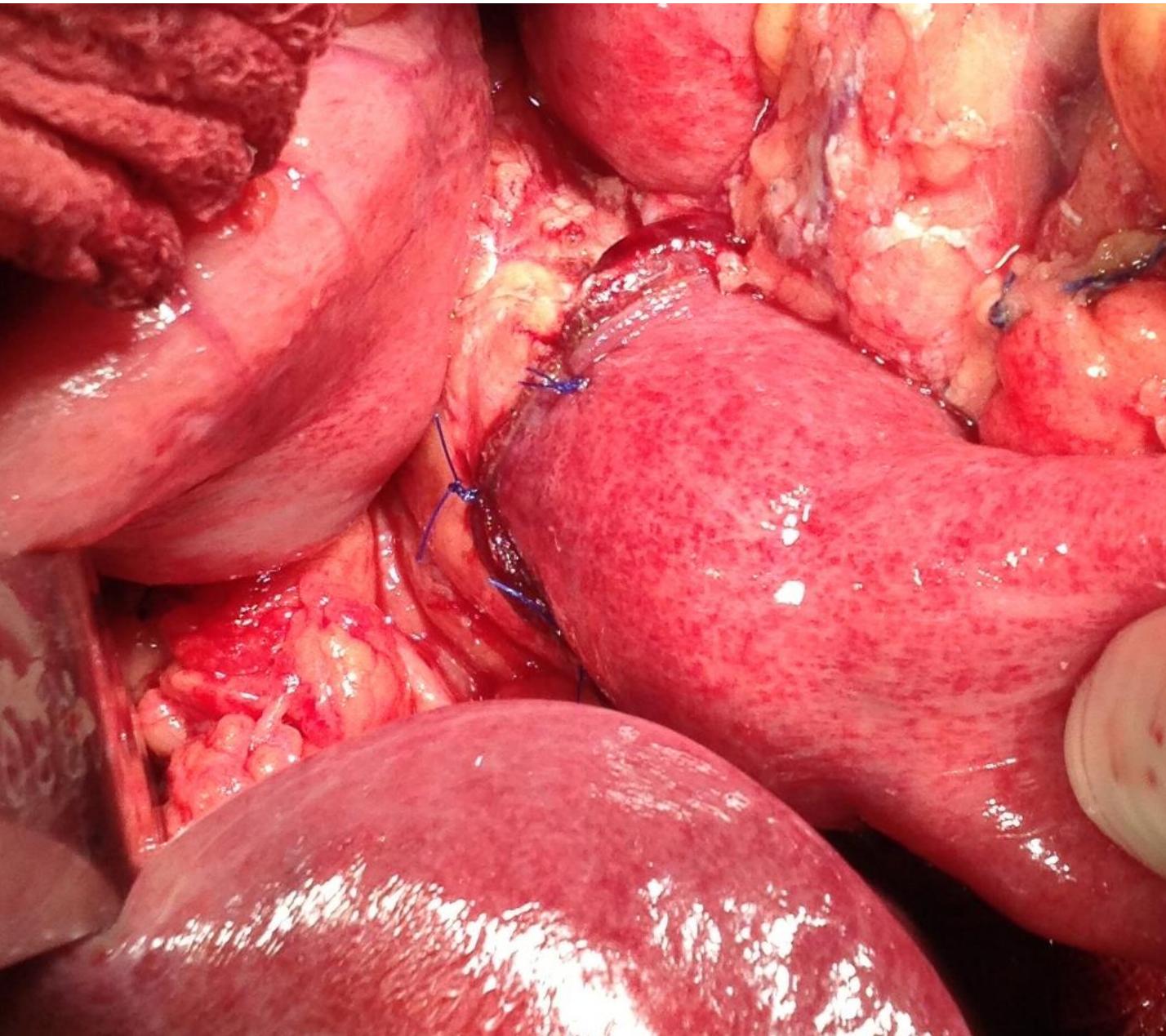


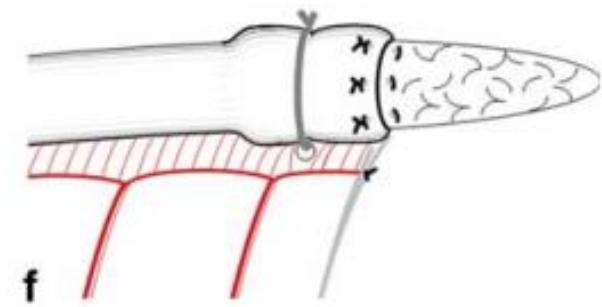




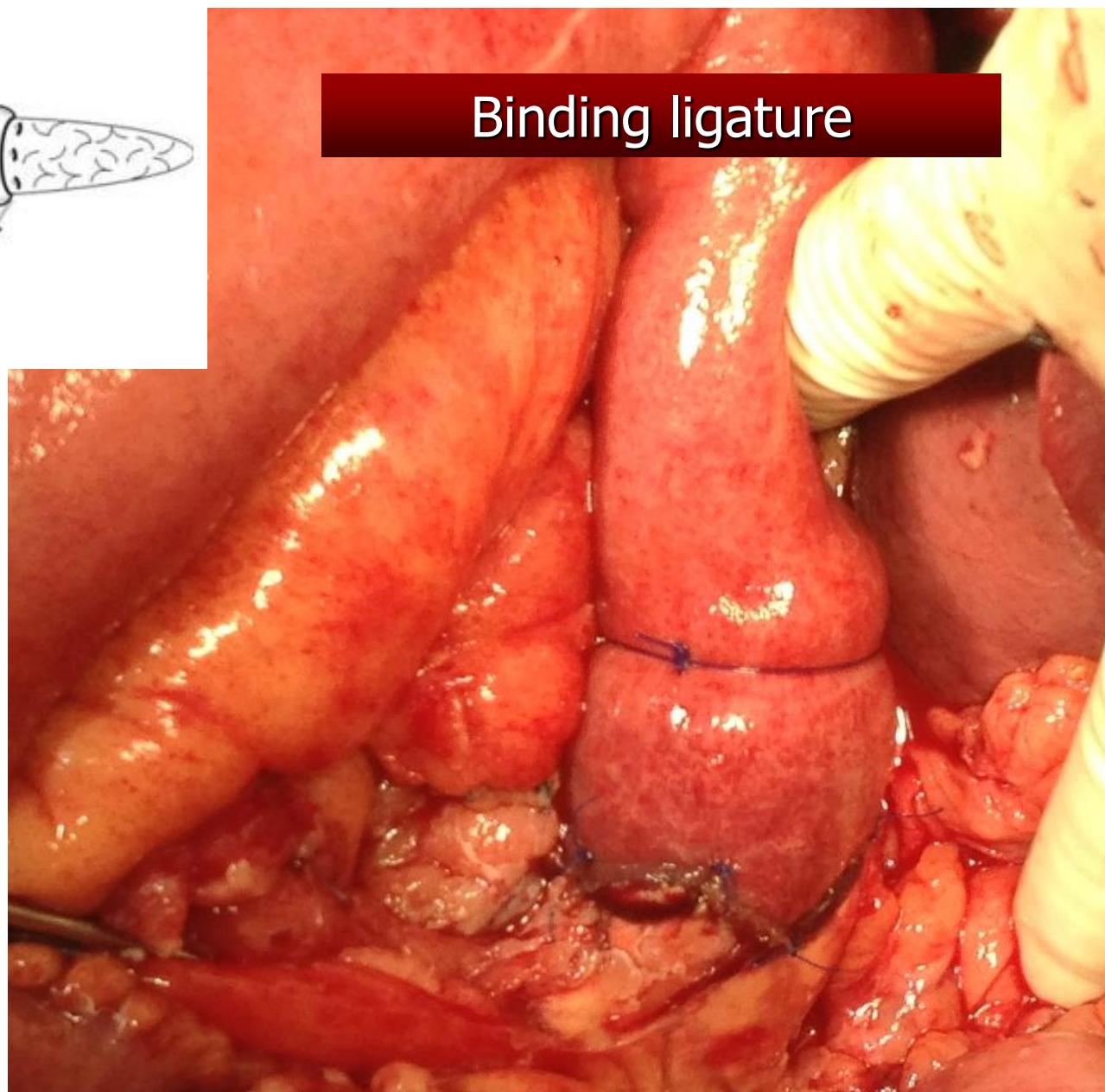




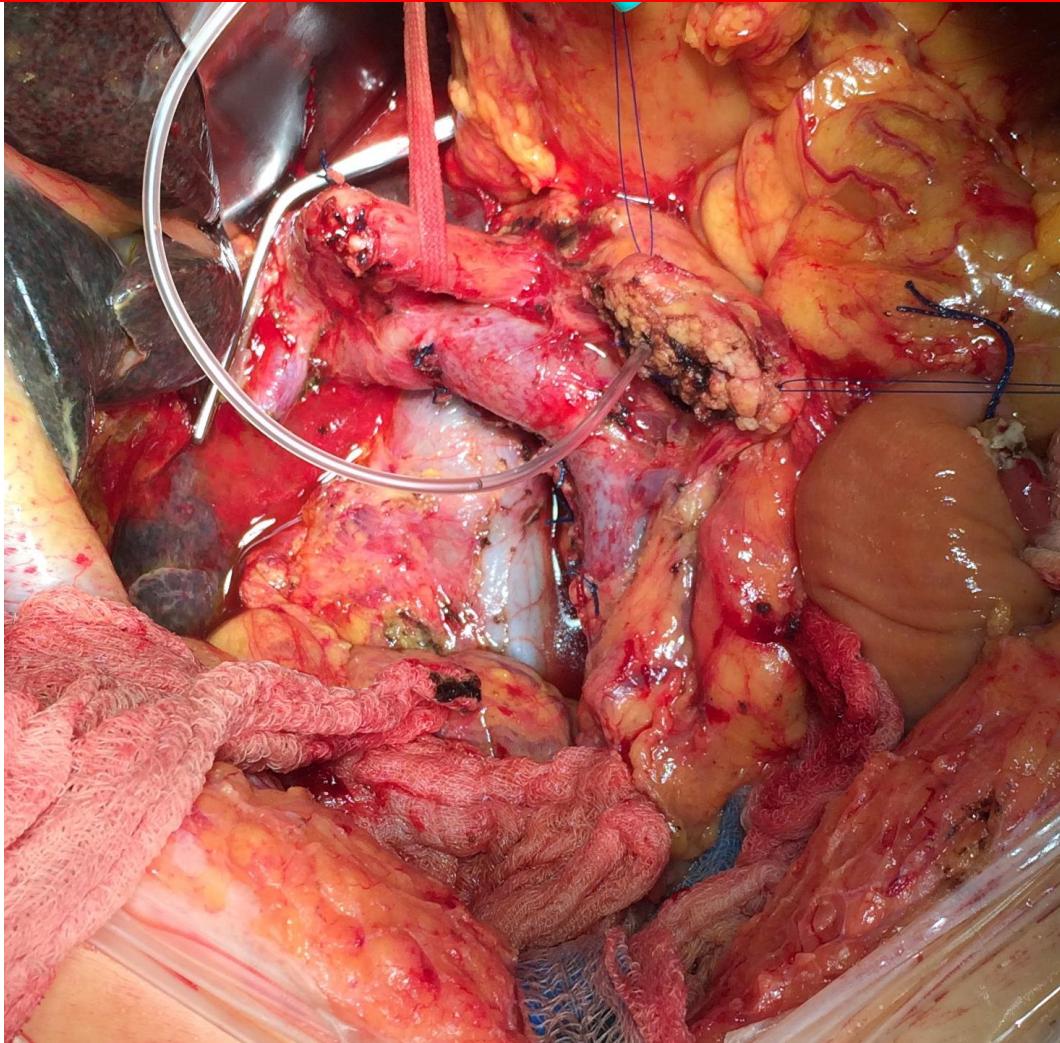


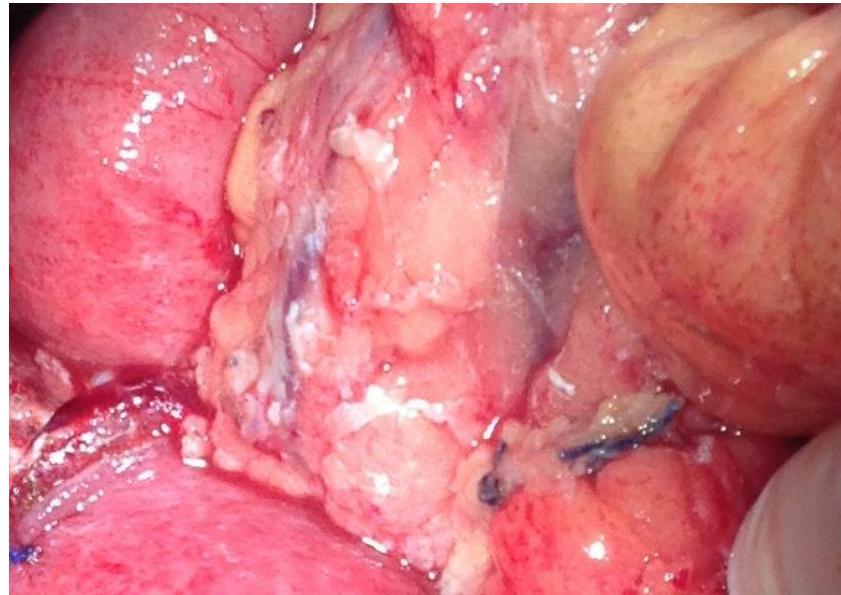
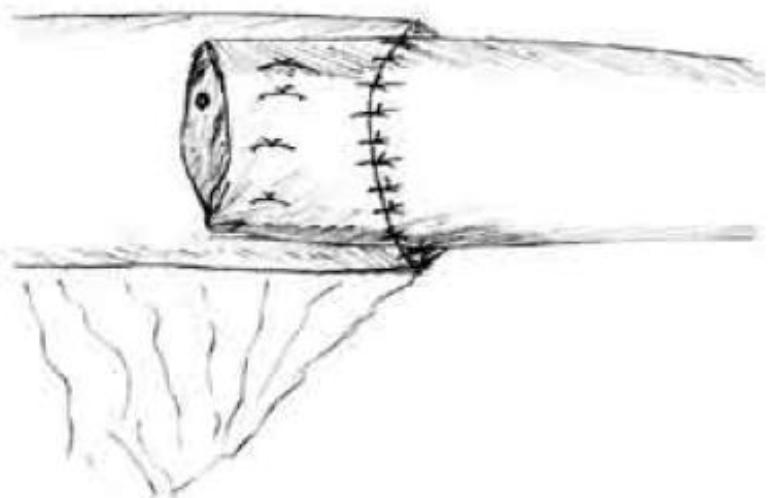


Binding ligature

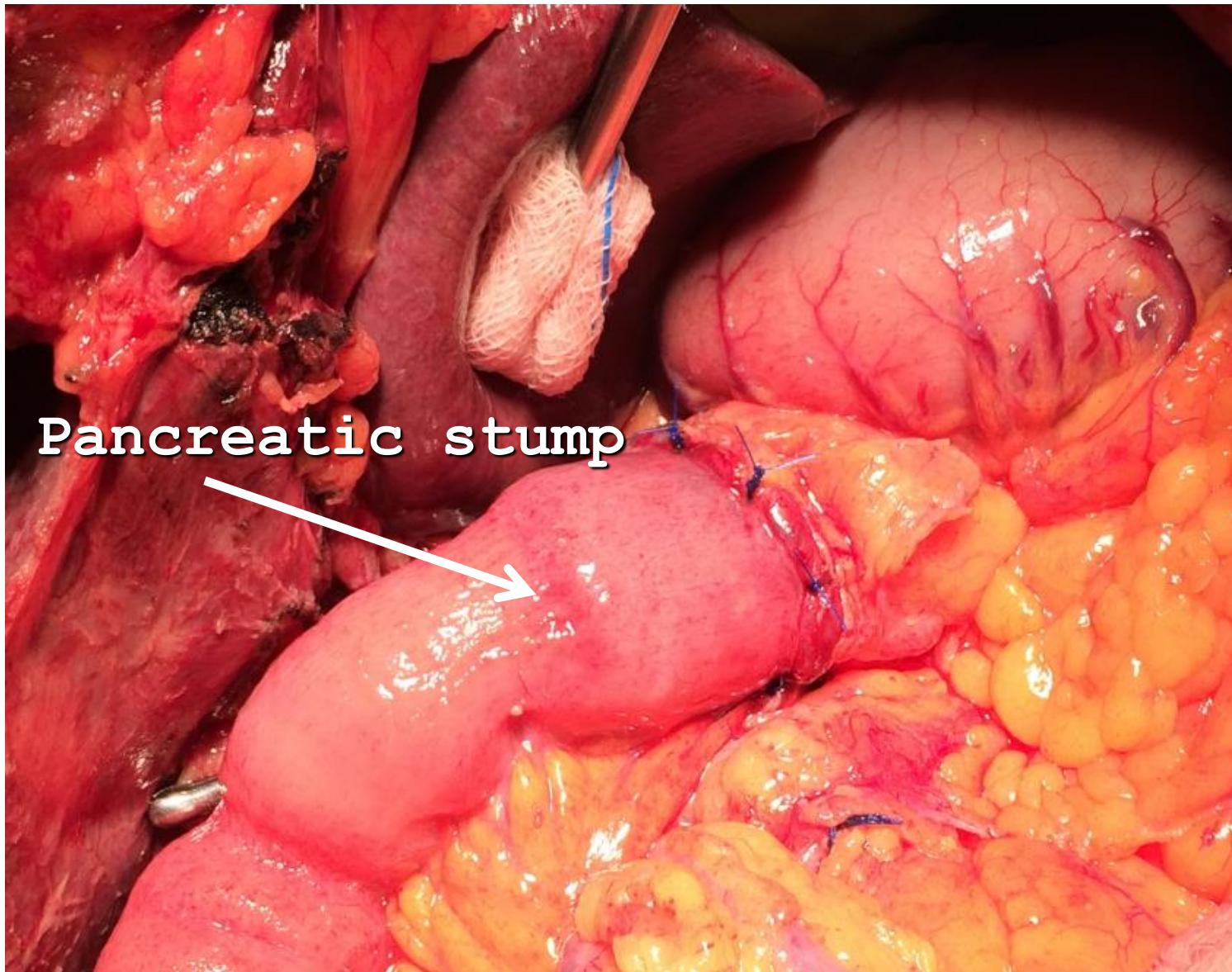


Invaginating Technique

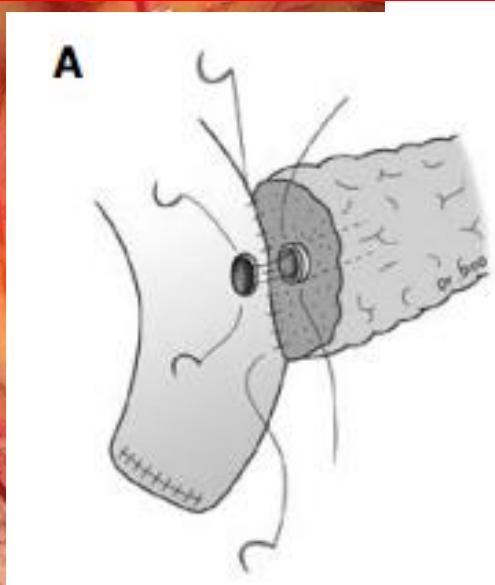
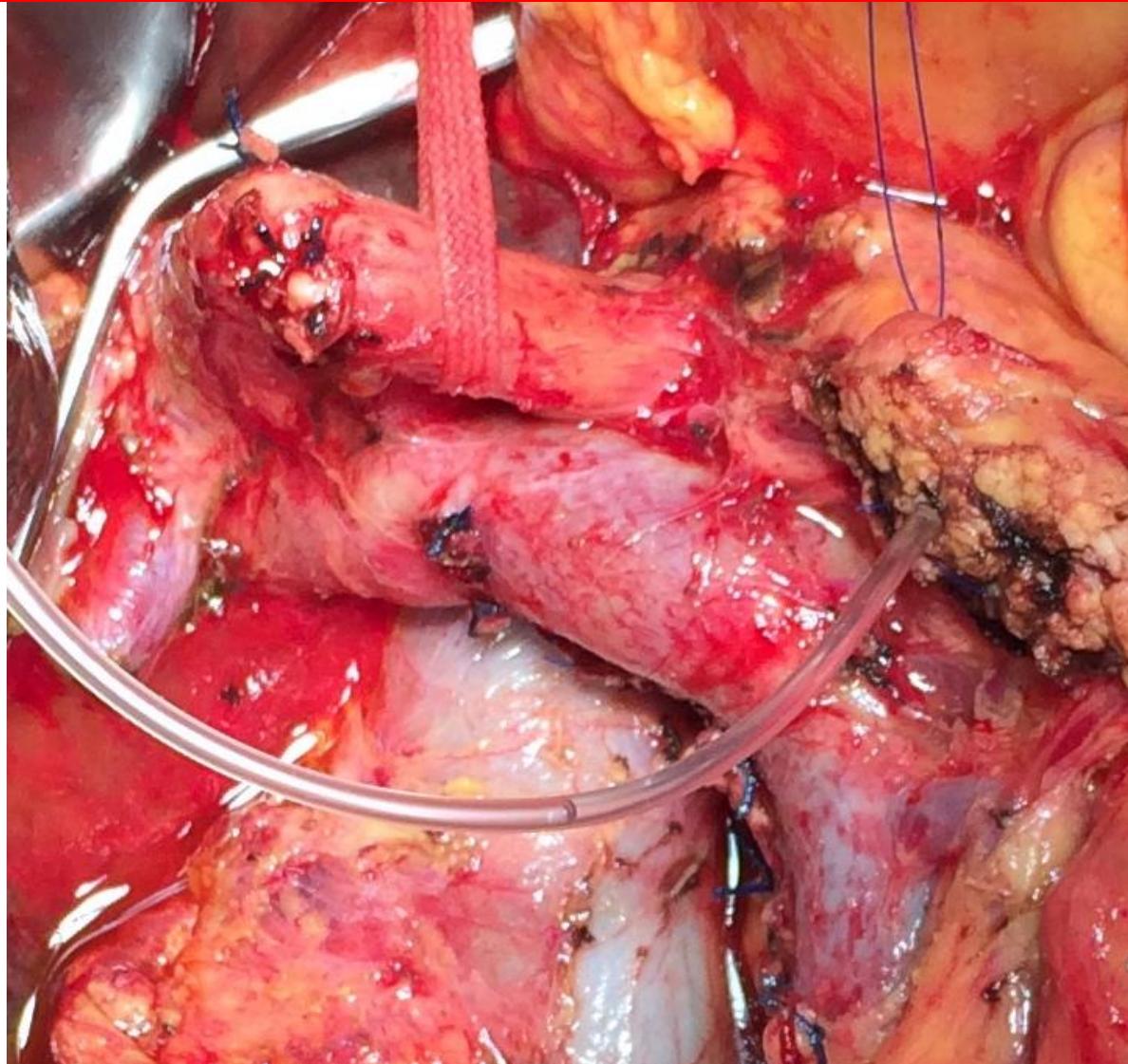


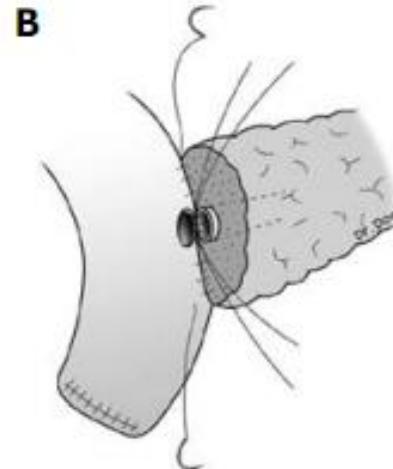
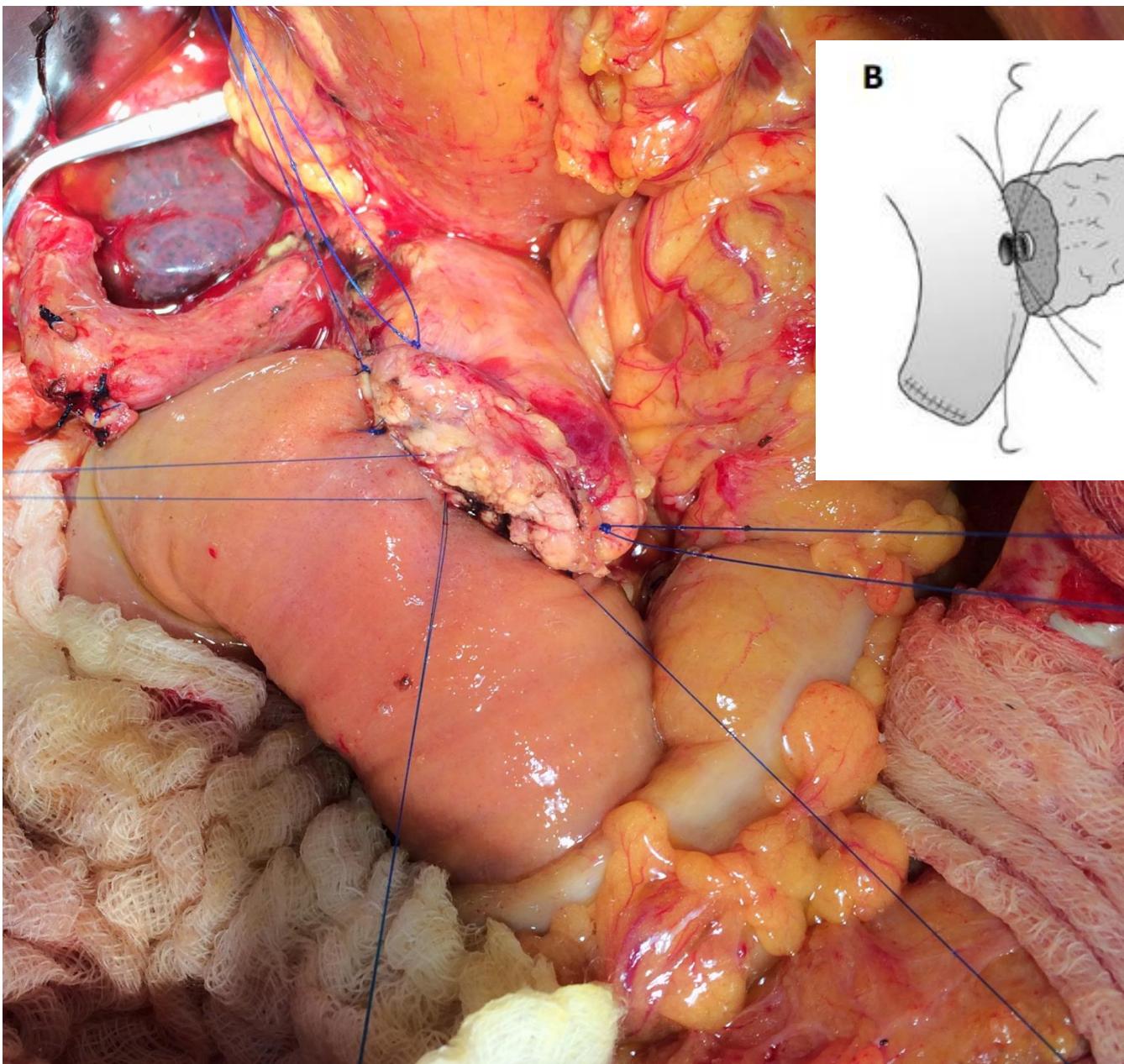


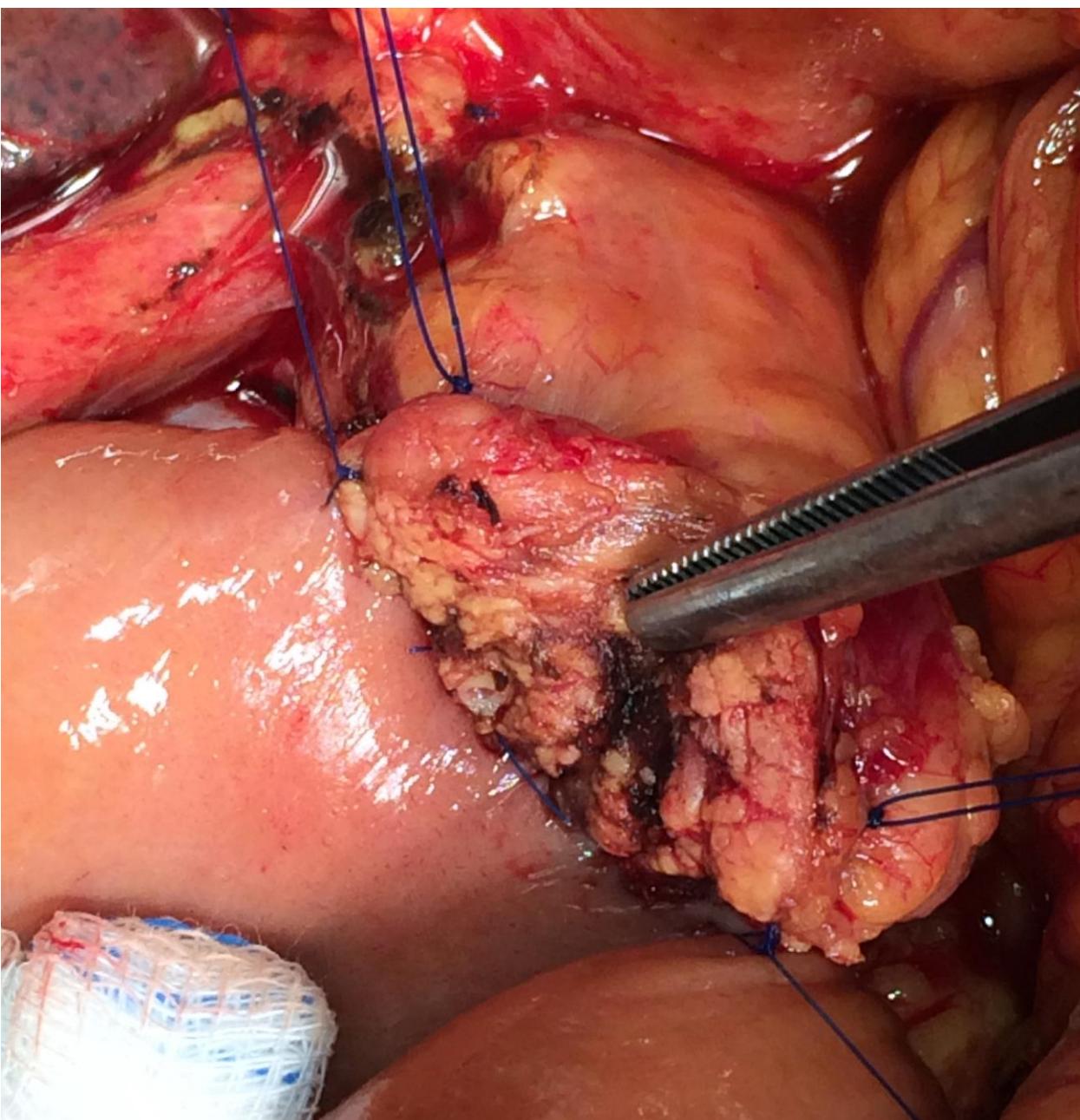
Invaginating technique

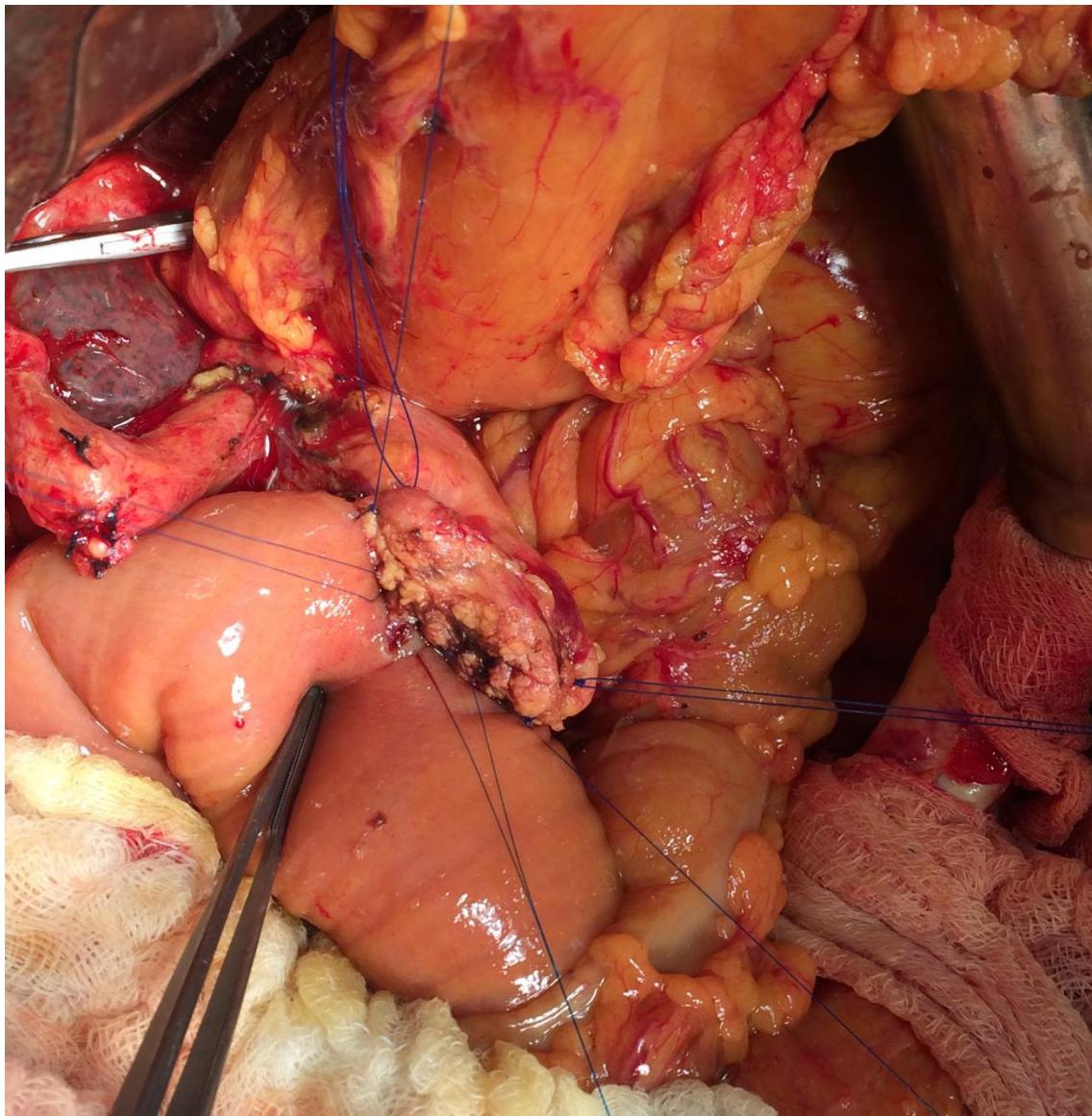


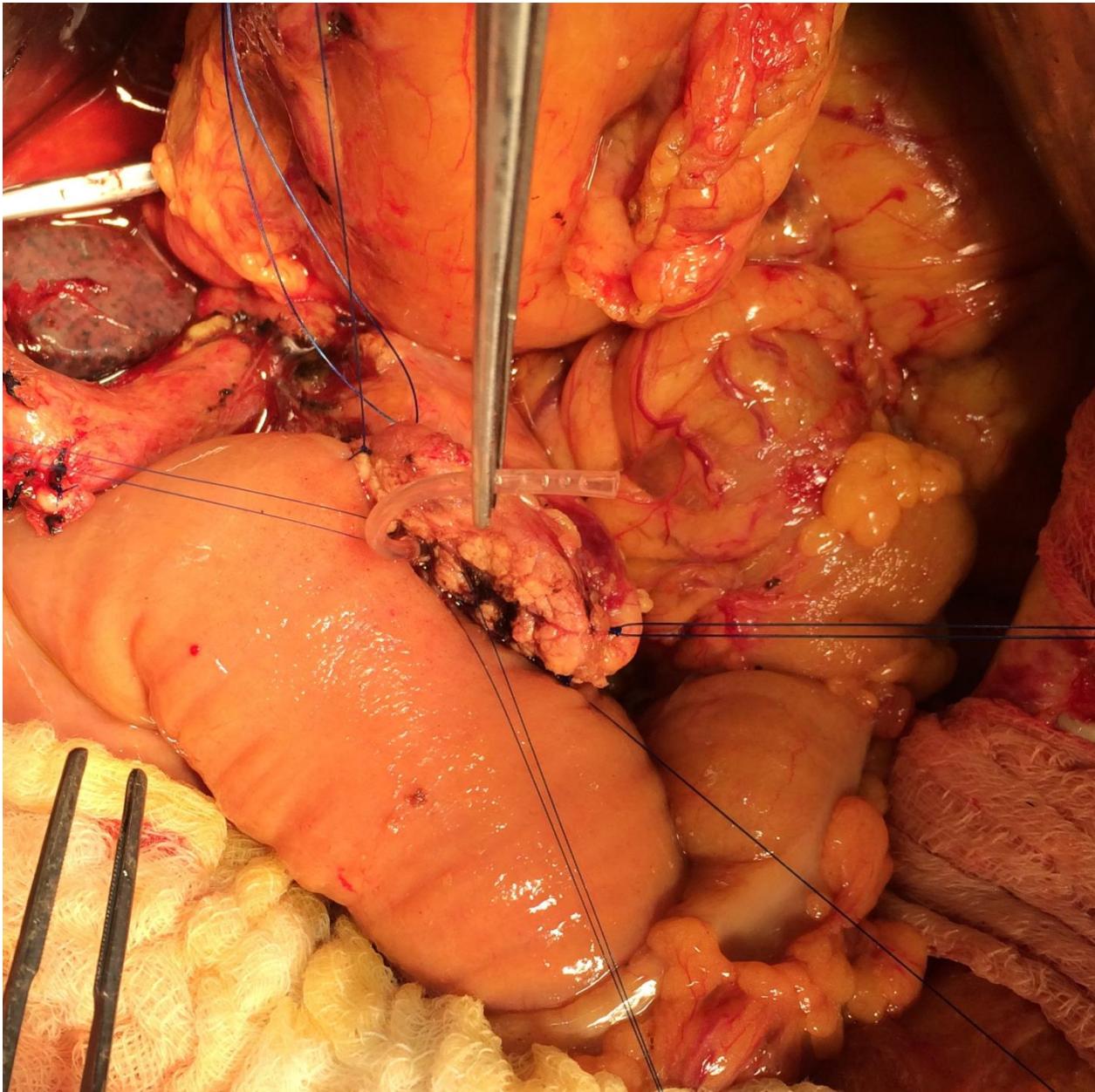
Duct-to-mucosa Technique

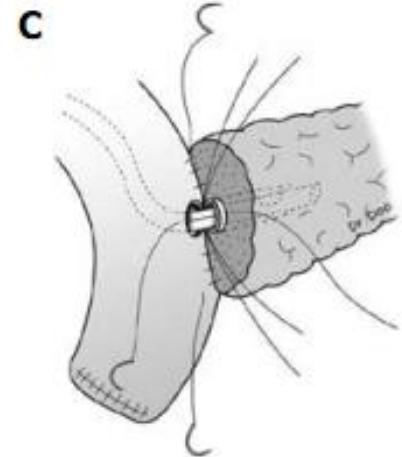
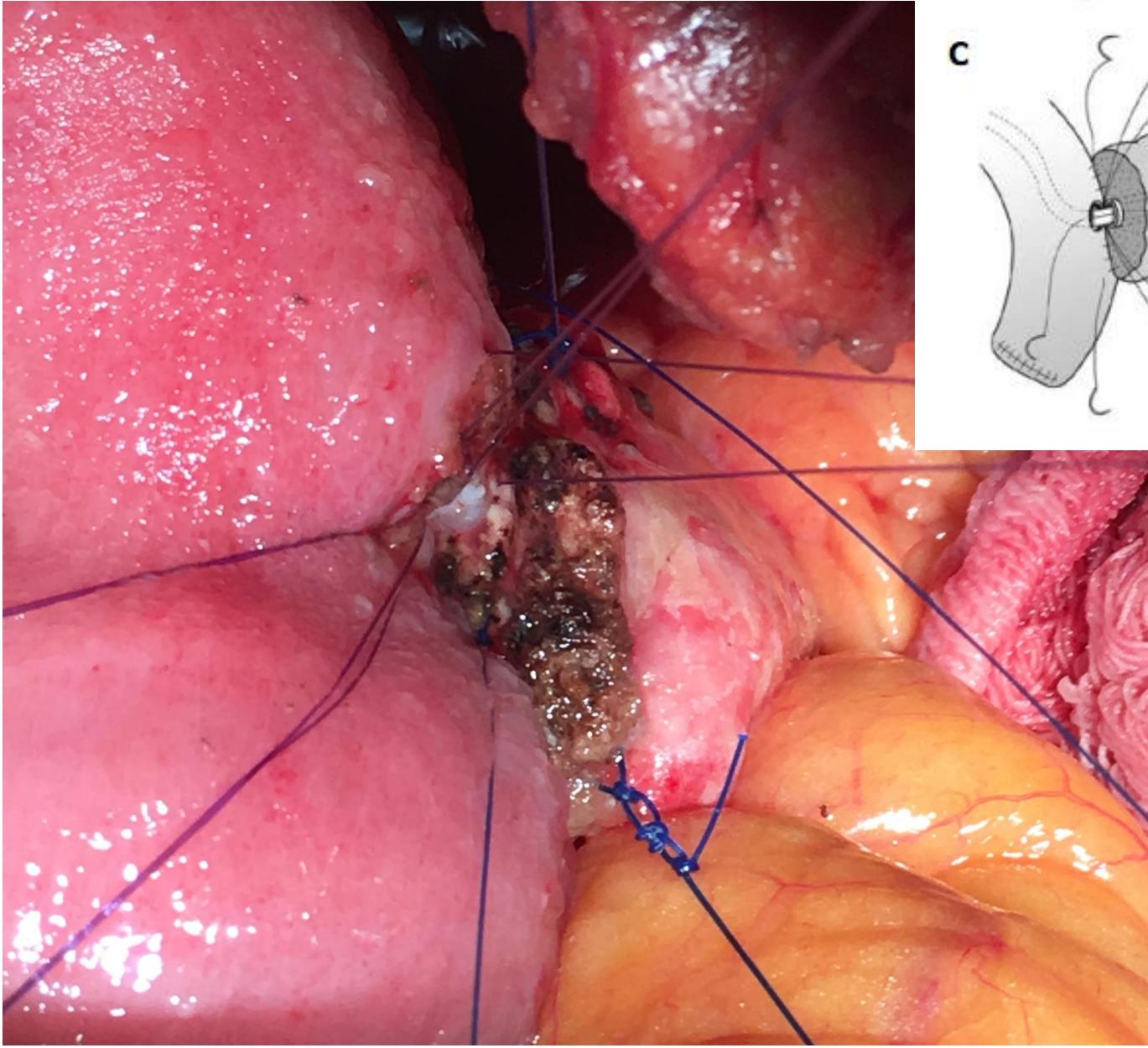


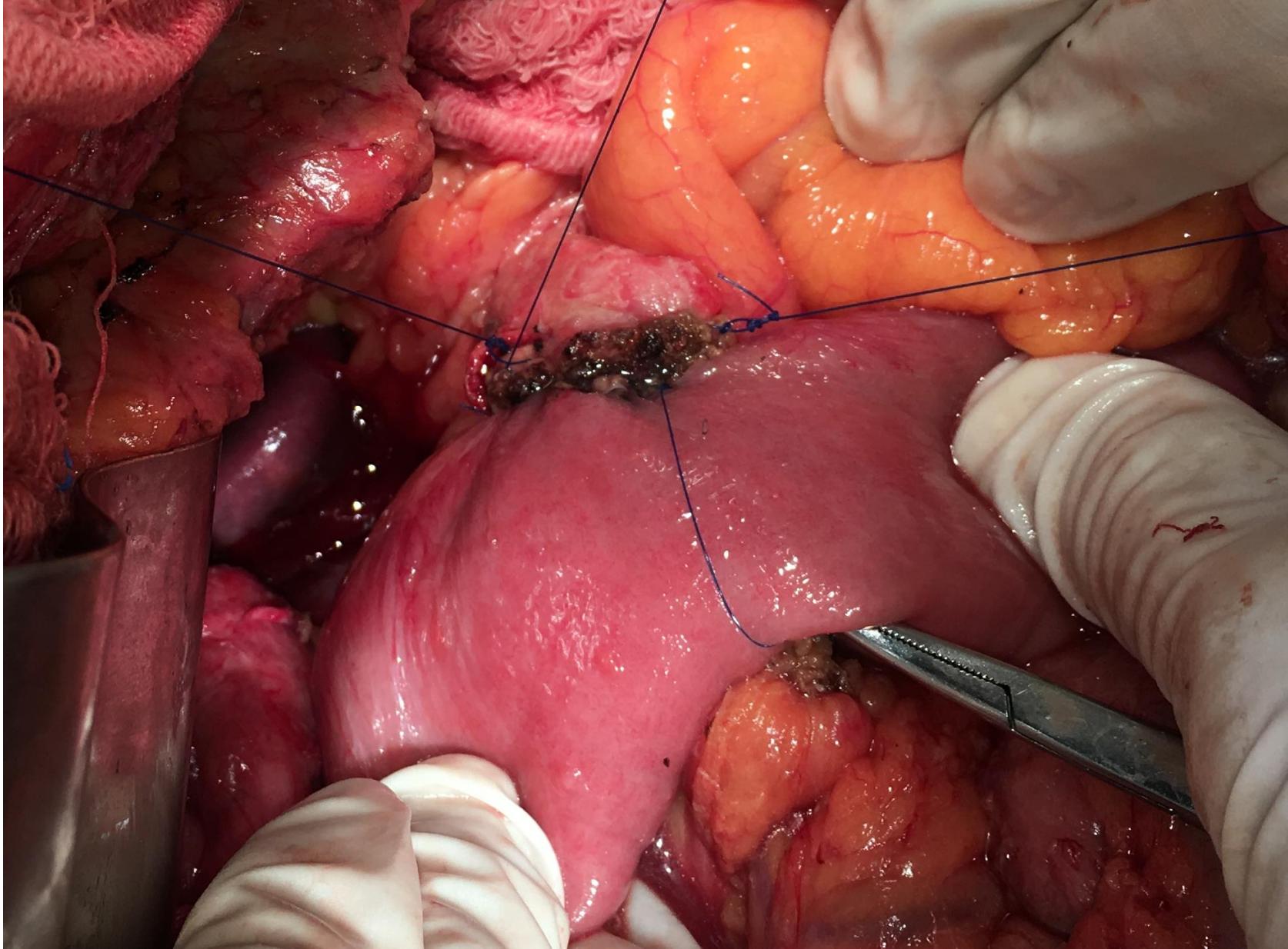


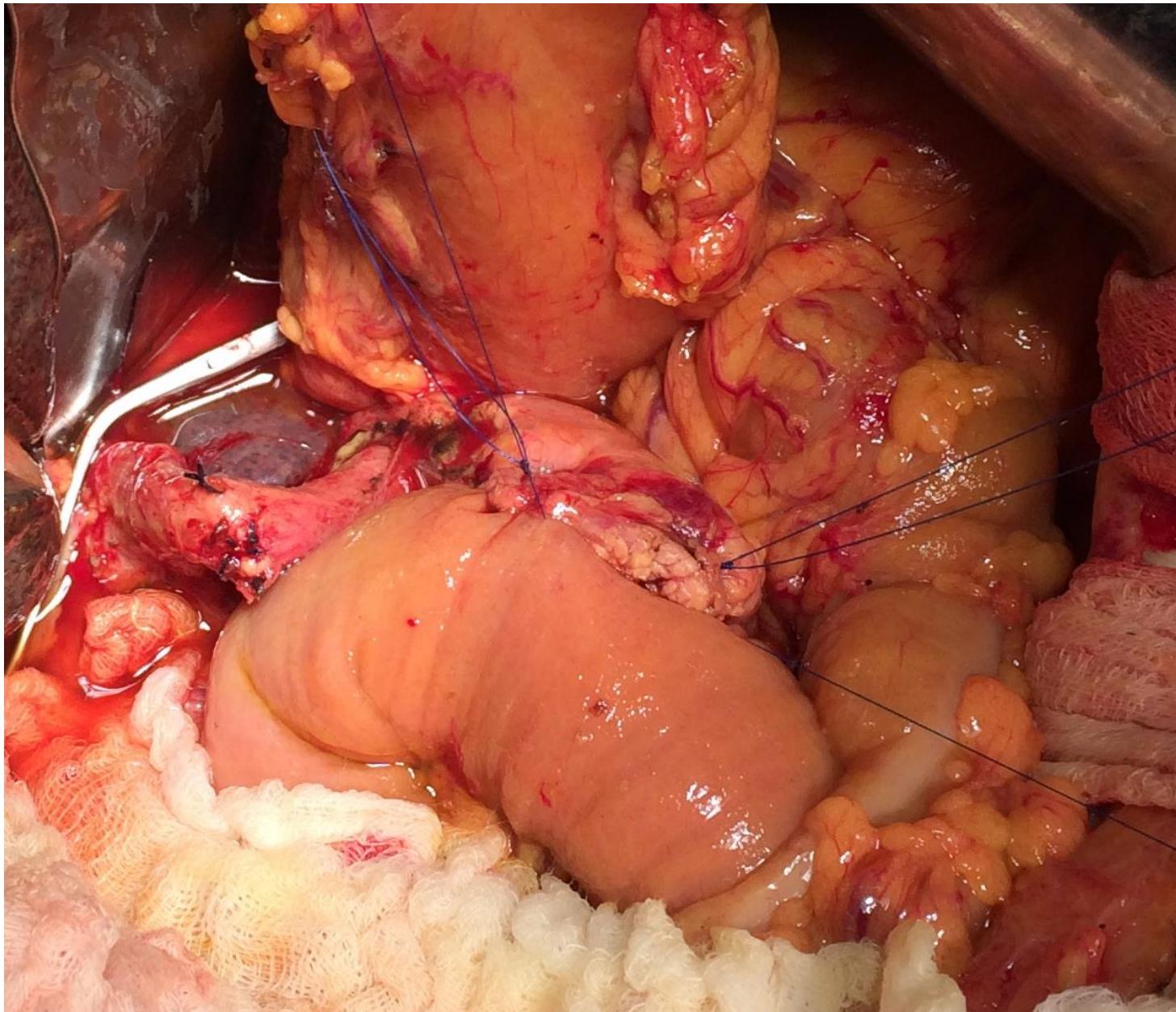


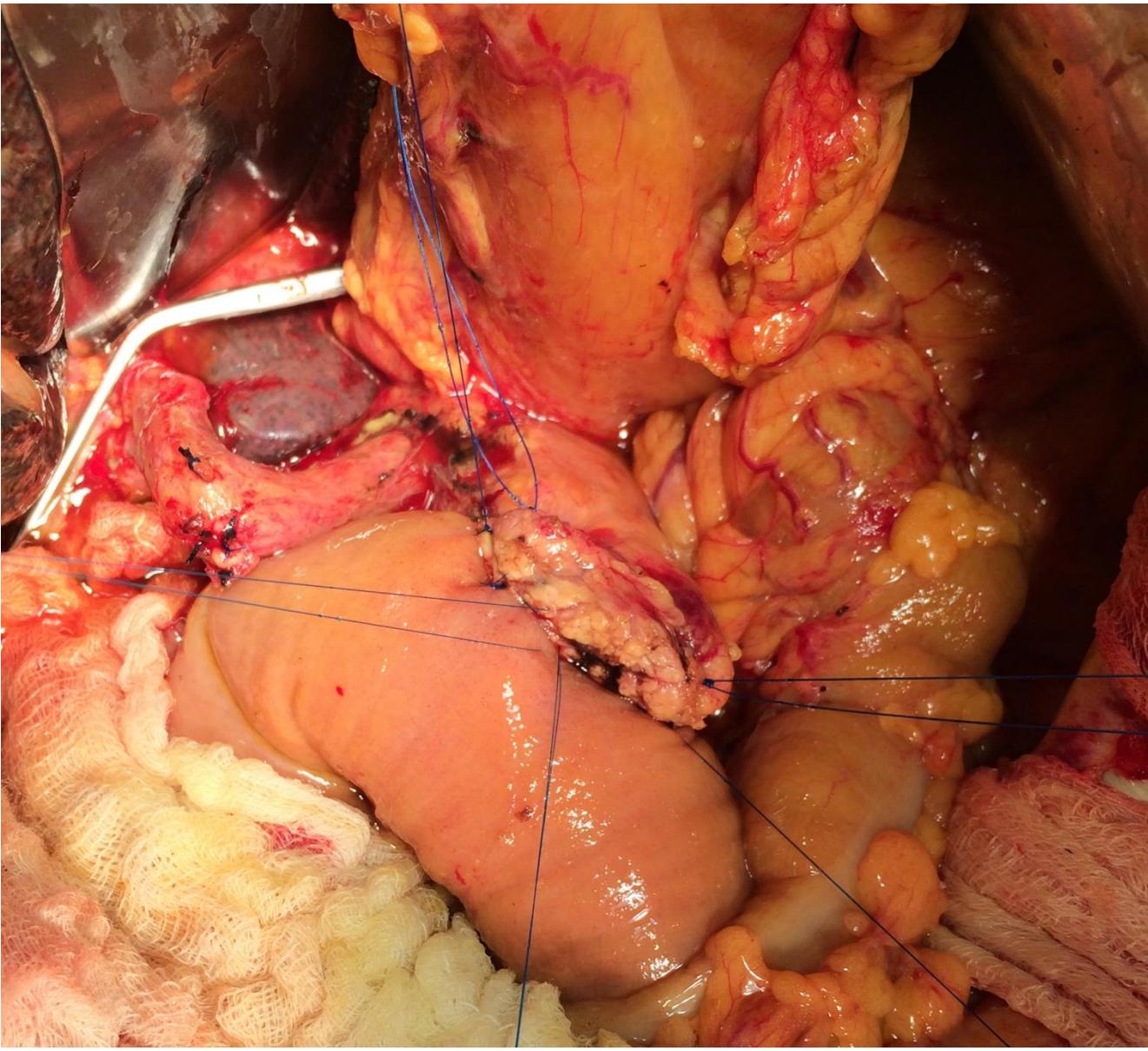


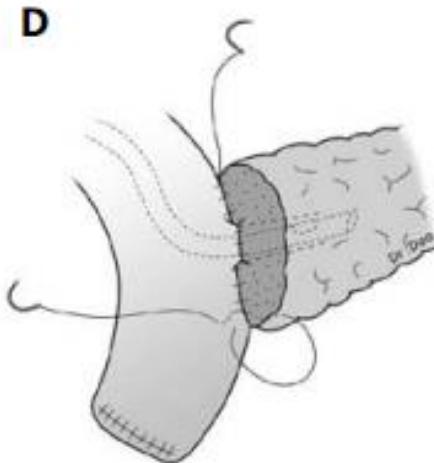
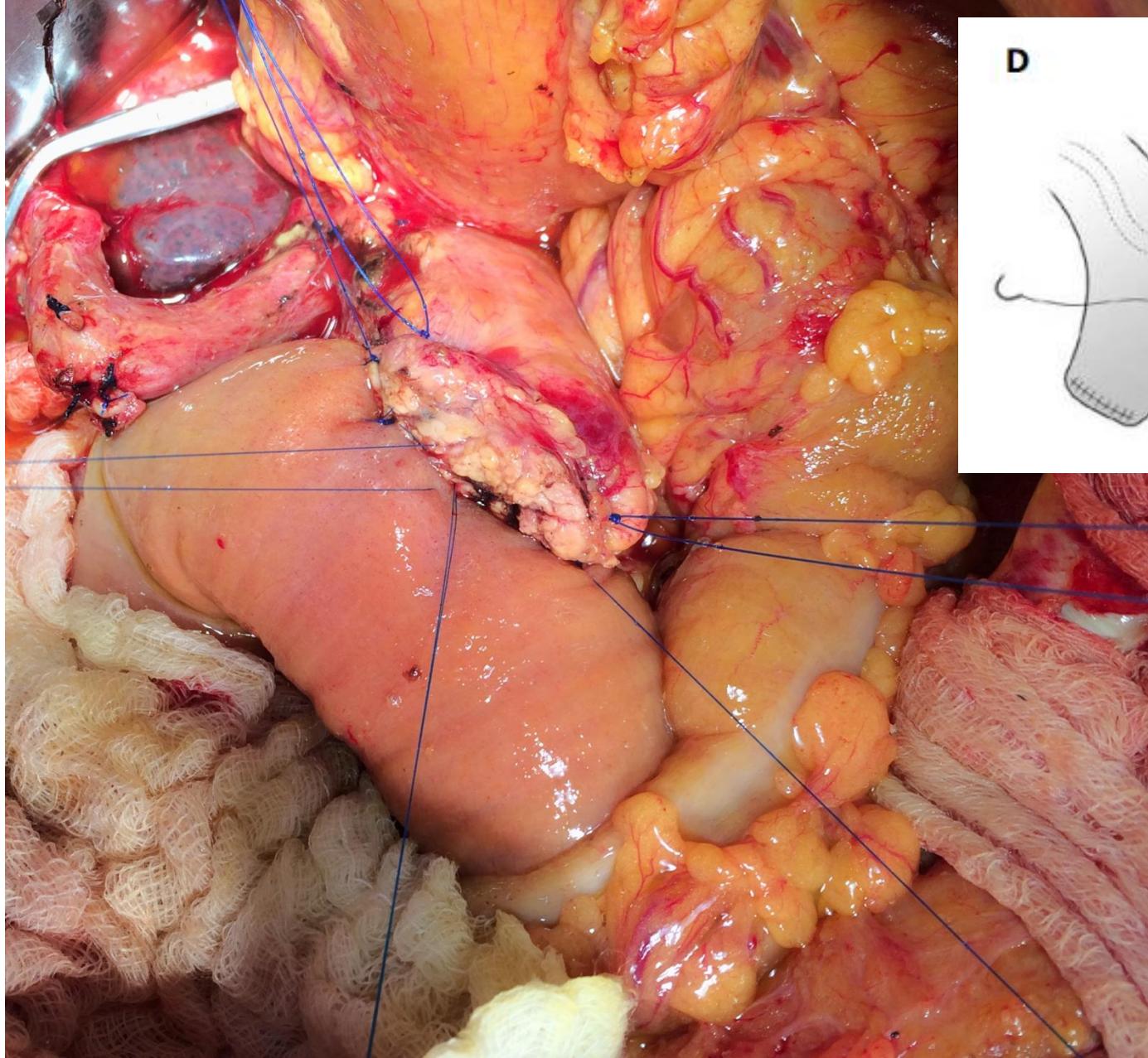


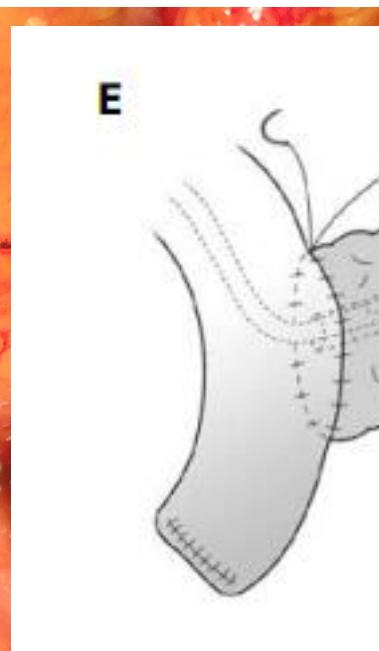
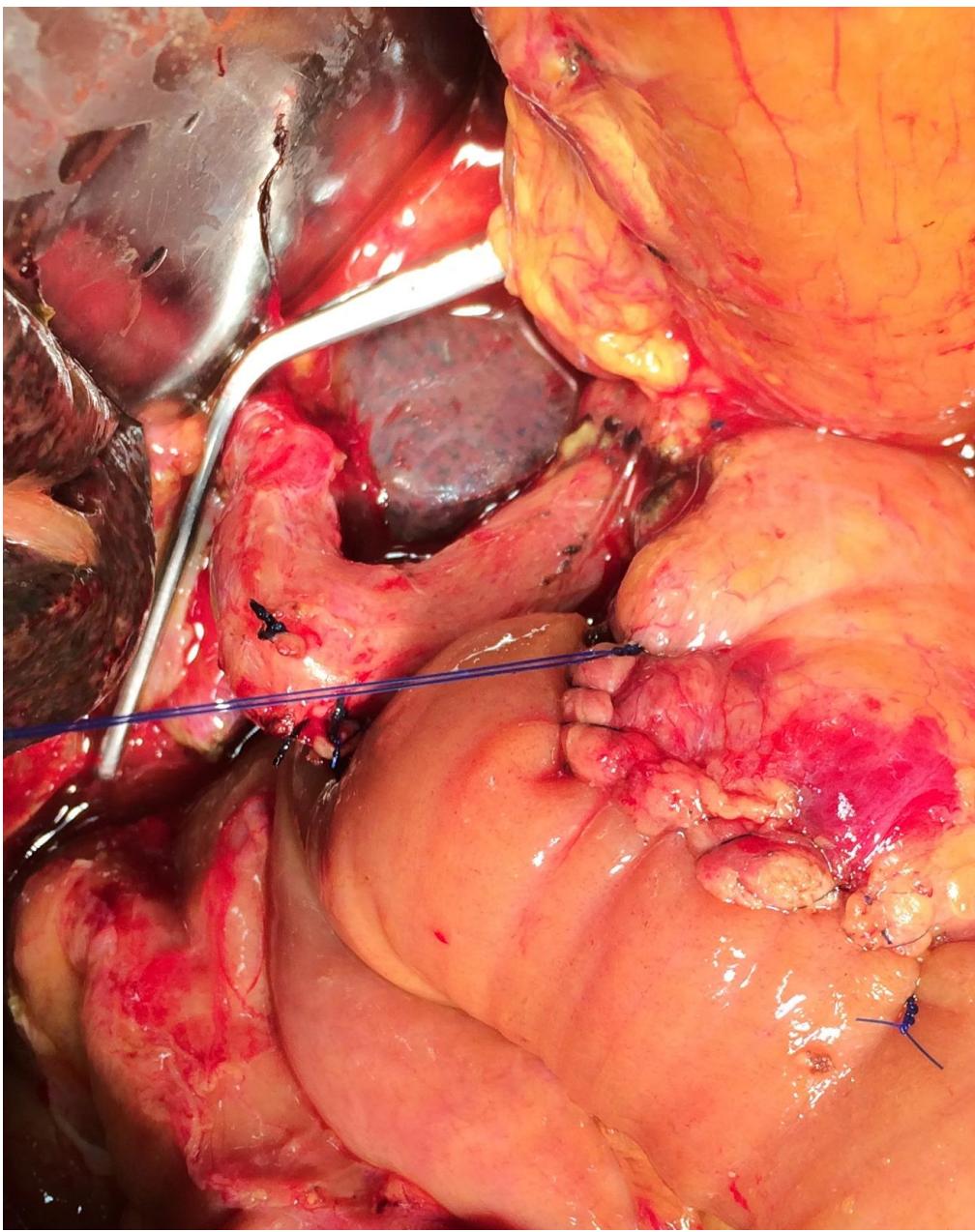


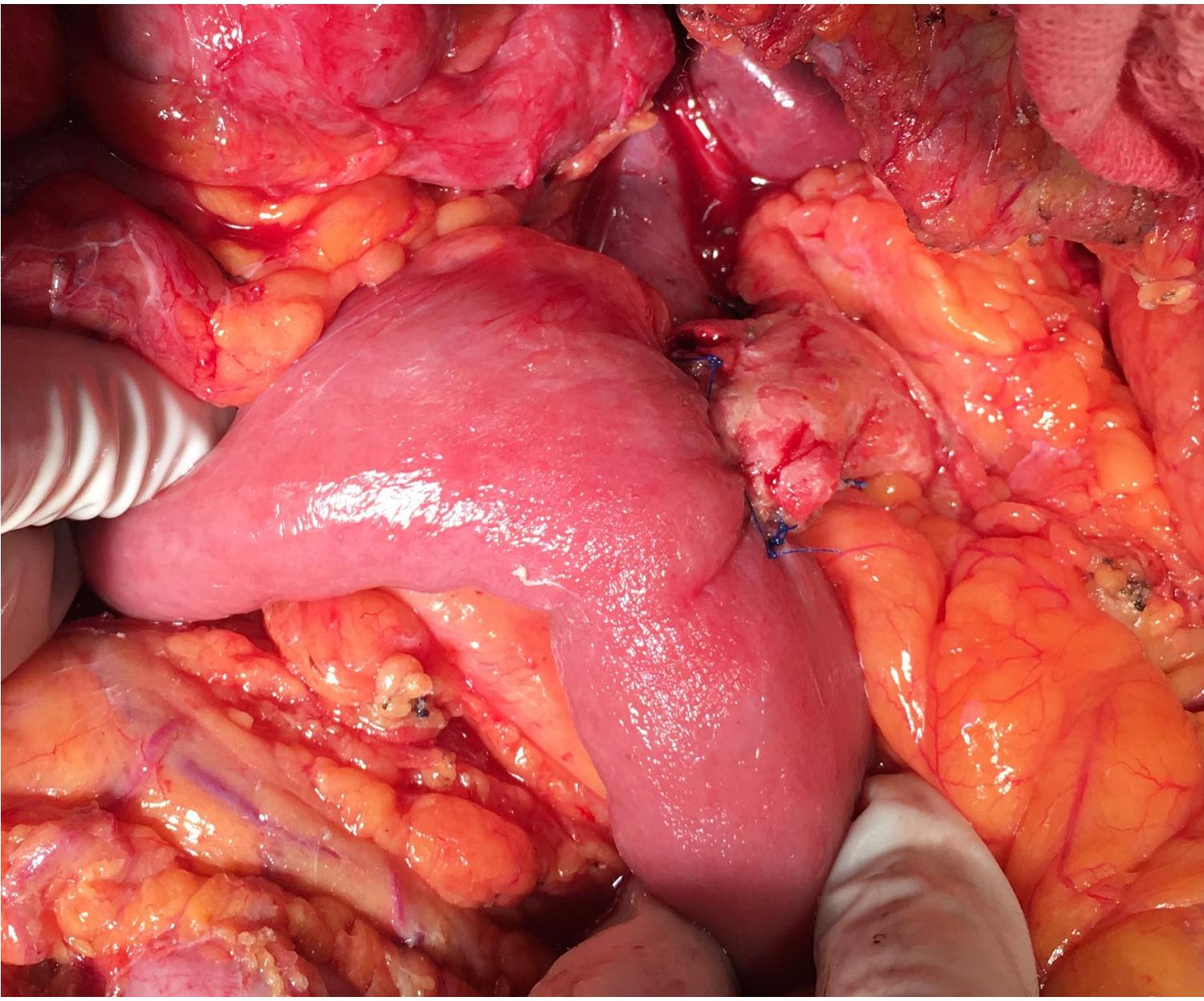




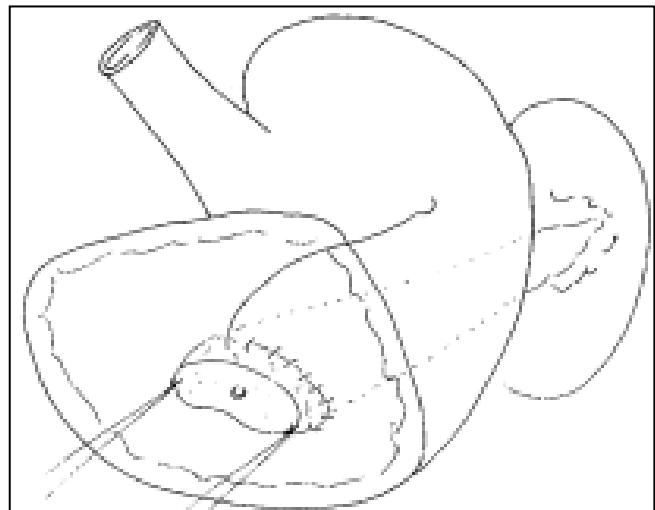
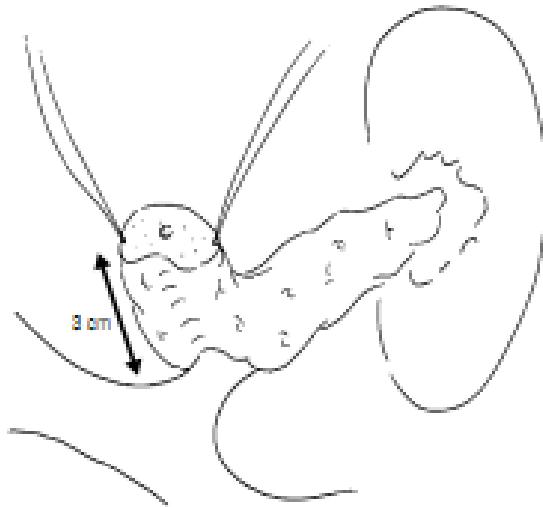








Pancreato-gastrostomy



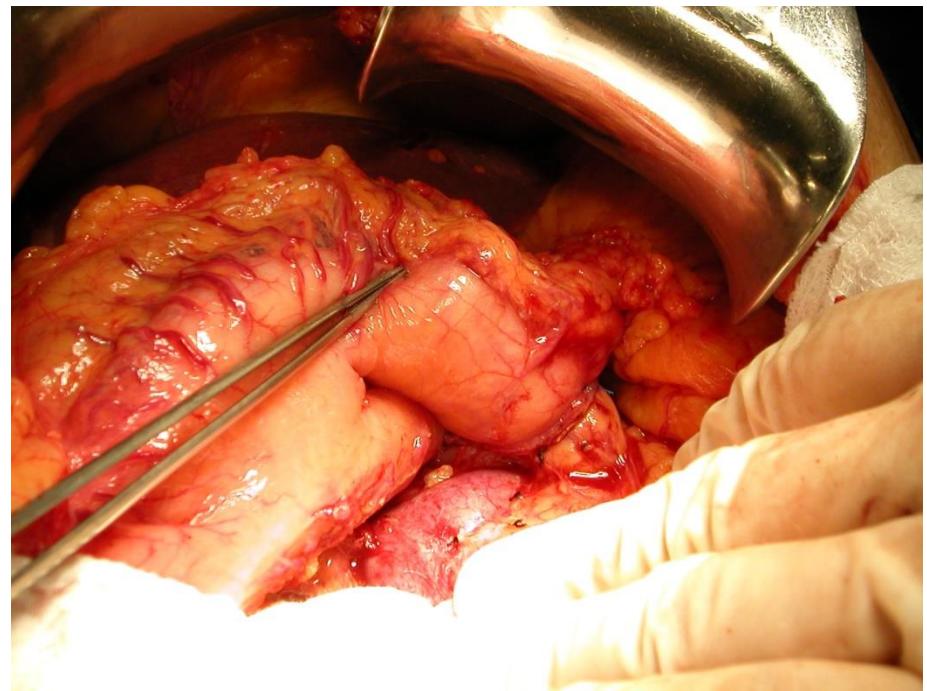
Oussoultzoglou E, et al. Arch Surg 2004; 139:327-35

Montenegro Technique



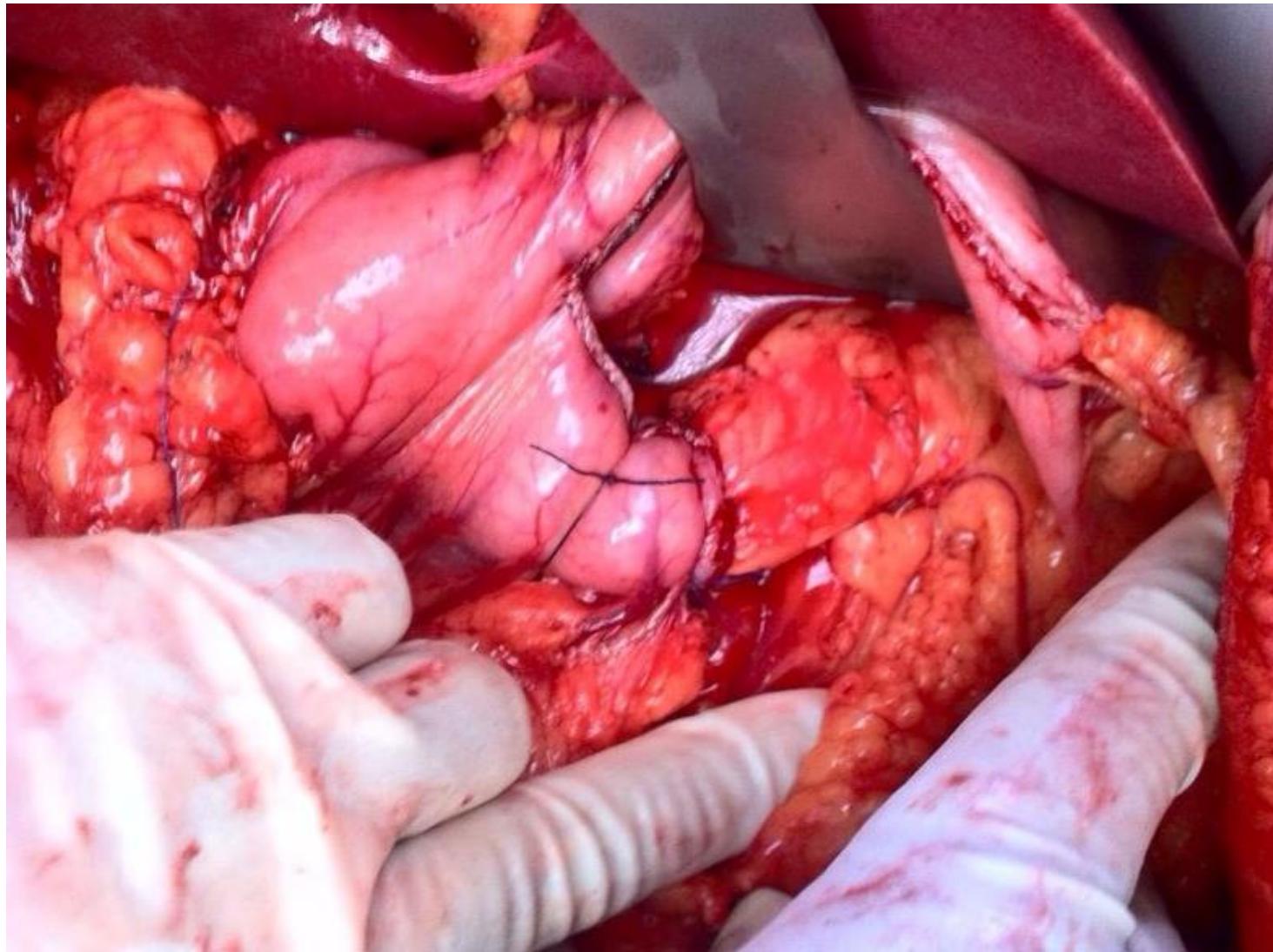
Courtesy from Roland Montenegro Costa

Montenegro Technique



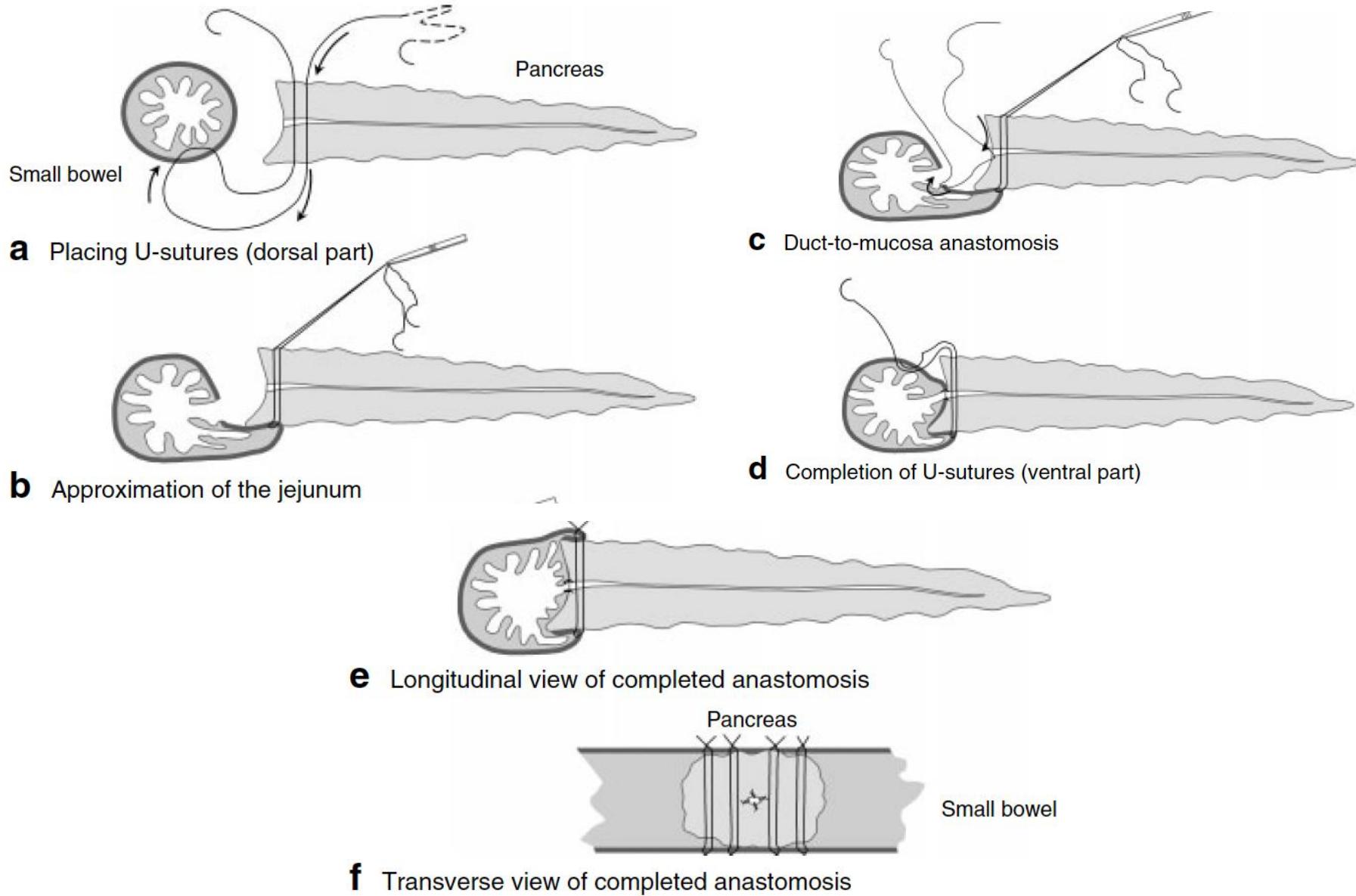
Courtesy from Roland Montenegro Costa

Pancreatogastrostomy Montenegro Technique



Courtesy from Roland Montenegro Costa

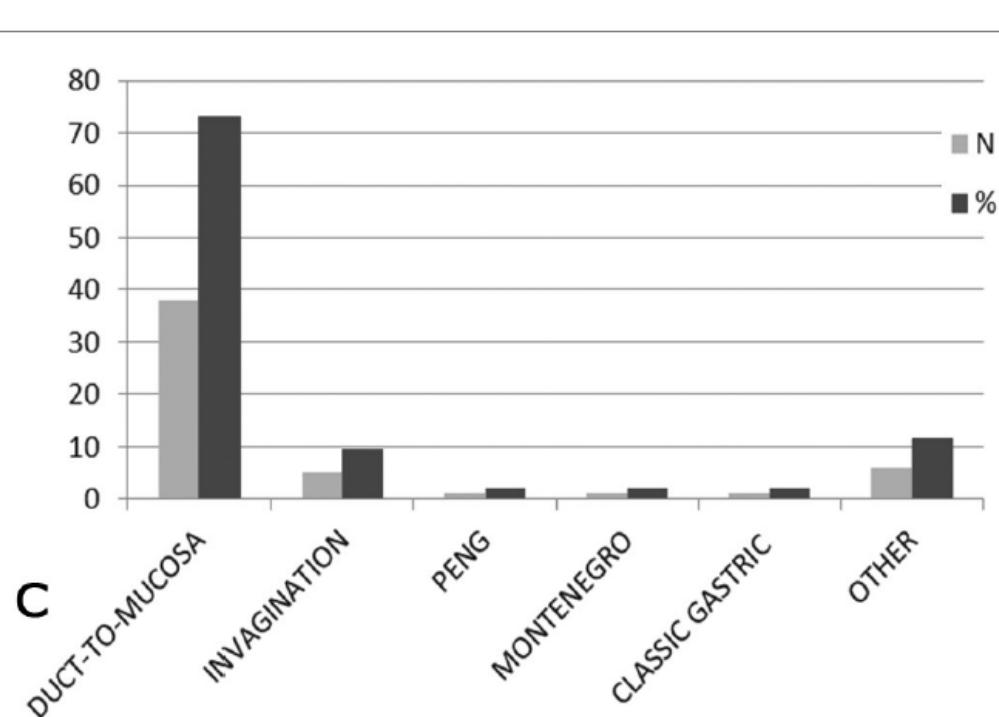
Blumgart Technique



PANCREATODUODENECTOMY: BRAZILIAN PRACTICE PATTERNS*

*Duodenopancreatectomia: prática padrão do Brasil**

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Pancreatic anastomosis after pancreateoduodenectomy: A position statement by the International Study Group of Pancreatic Surgery (ISGPS)

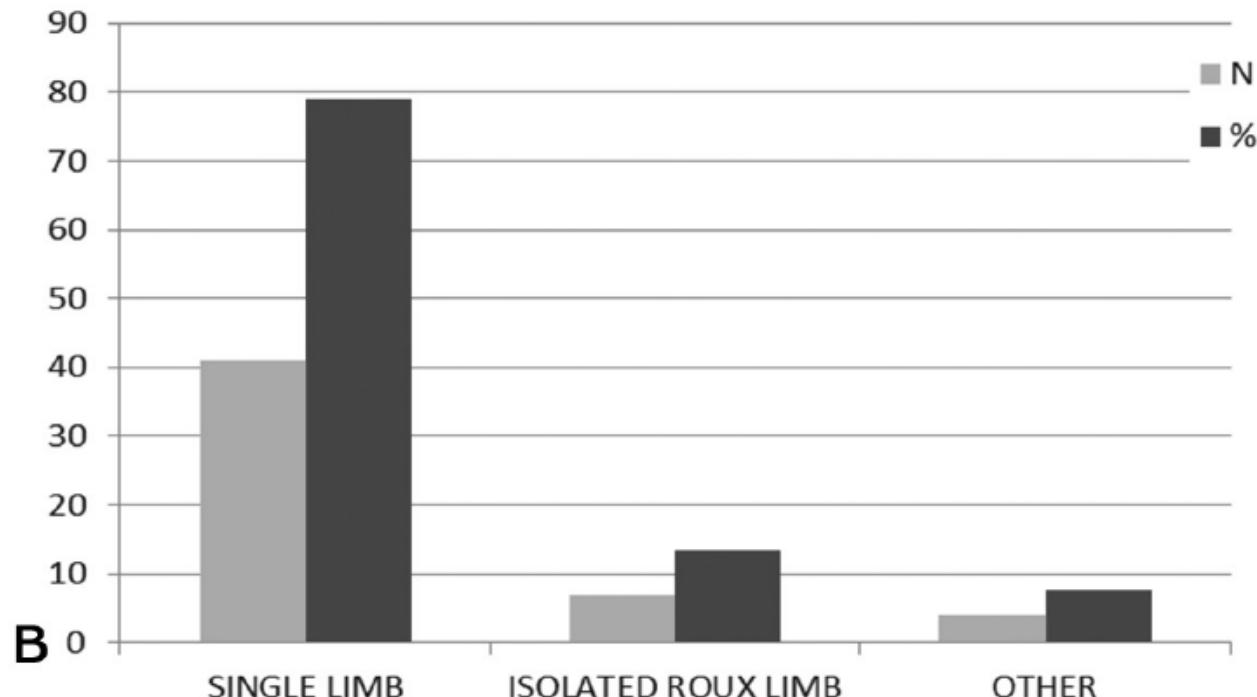
Shailesh V. Shrikhande, MD,^a Masillamany Sivasanker, MD,^a Charles M. Vollmer, MD,^b Helmut Friess, MD,^c Marc G. Besselink, MD,^d Abe Fingerhut, MD,^e Charles J. Yeo, MD,^f Carlos Fernandez-delCastillo, MD,^g Christos Dervenis, MD,^h Christopher Halloran, MD,ⁱ Dirk J. Gouma, MD,^j Dejan Radenkovic, MD,^j Horacio J. Asbun, MD,^k John P. Neoptolemos, MD,ⁱ Jakob R. Izbicki, MD,^l Keith D. Lillemoe, MD,^g Kevin C. Conlon, MD,^m Laureano Fernandez-Cruz, MD,ⁿ Marco Montorsi, MD,^o Max Bockhorn, MD,^l Mustapha Adham, MD,^p Richard Charnley, MD,^q Ross Carter, MD,^r Thilo Hackert, MD,^s Werner Hartwig, MD,^t Yi Miao, MD,^u Michael Sarr, MD,^v Claudio Bassi, MD,^w and Markus W. Büchler, MD,^s for the International Study Group of Pancreatic Surgery (ISGPS) Mumbai, India, Philadelphia, PA, Munich, Hamburg, and Heidelberg Germany Amsterdam The Netherlands Graz Austria Boston MA Athens Greece Liverpool

Single Limb x Roux in Y
Stomach X Jejunum
Tachosil
Octreotide

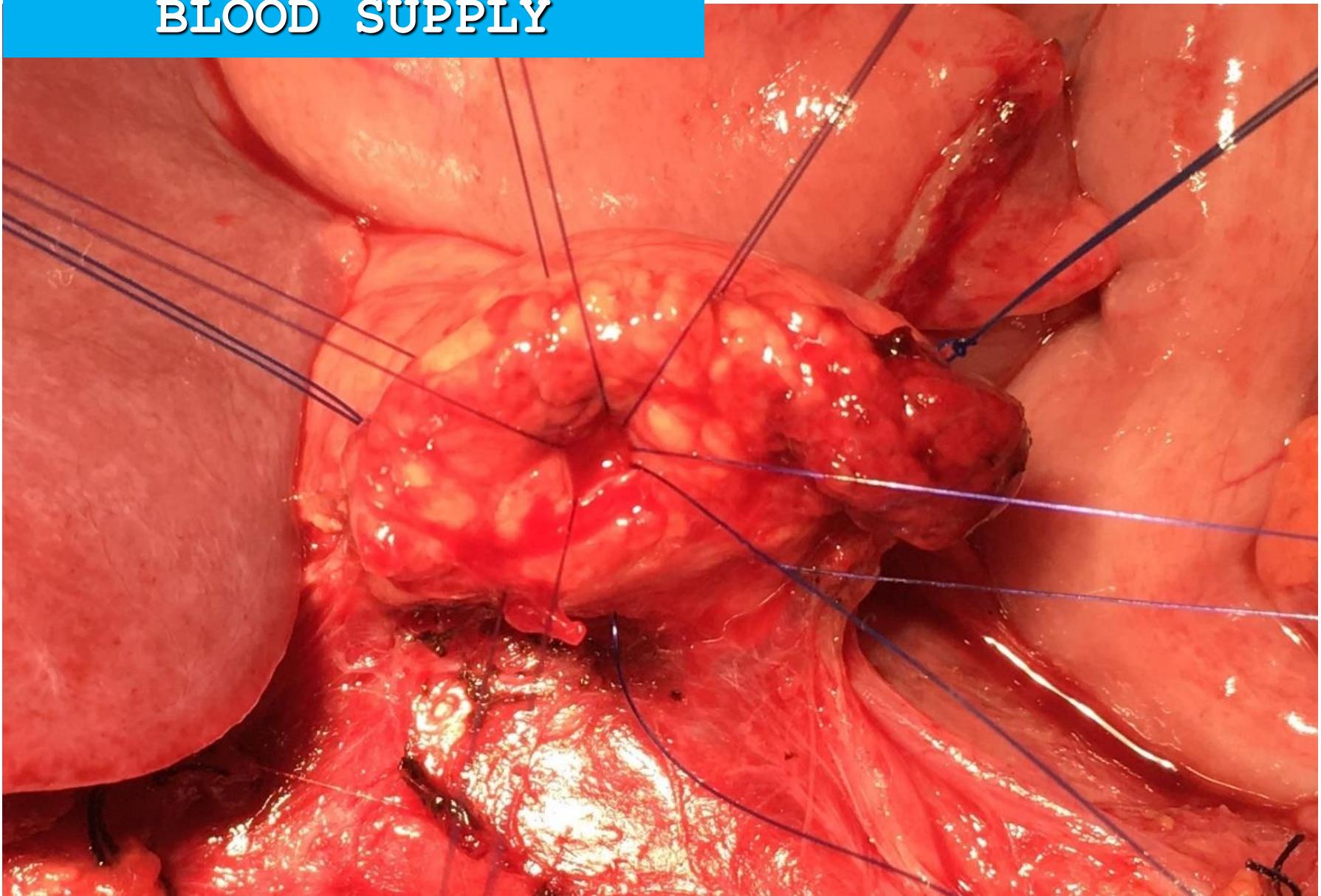
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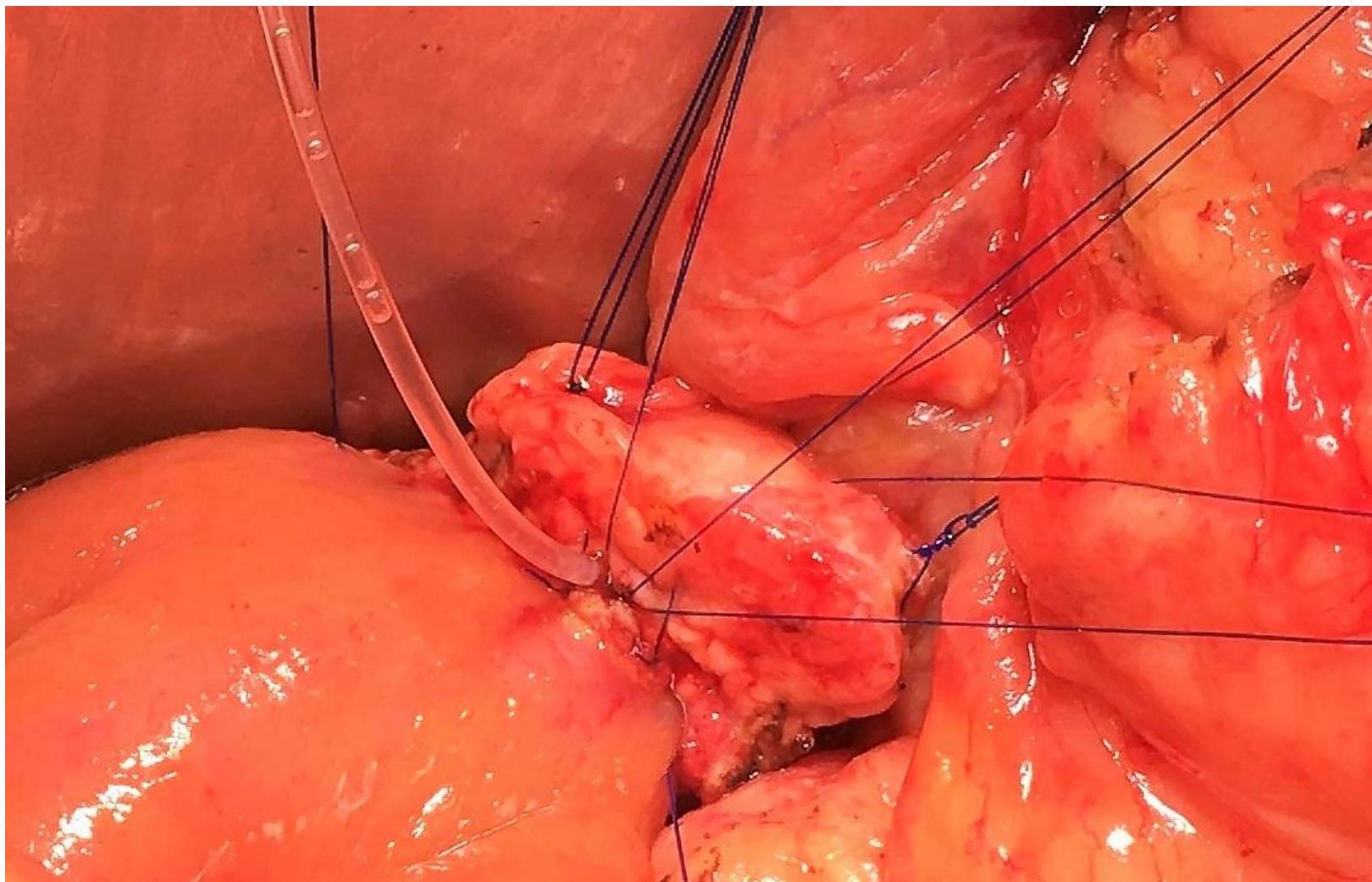
Orlando Jorge M **TORRES¹**, Eduardo de Souza M **FERNANDES²**, Rodrigo Rodrigues **VASQUES¹**, Fabio Luís **WAECHTER³**,
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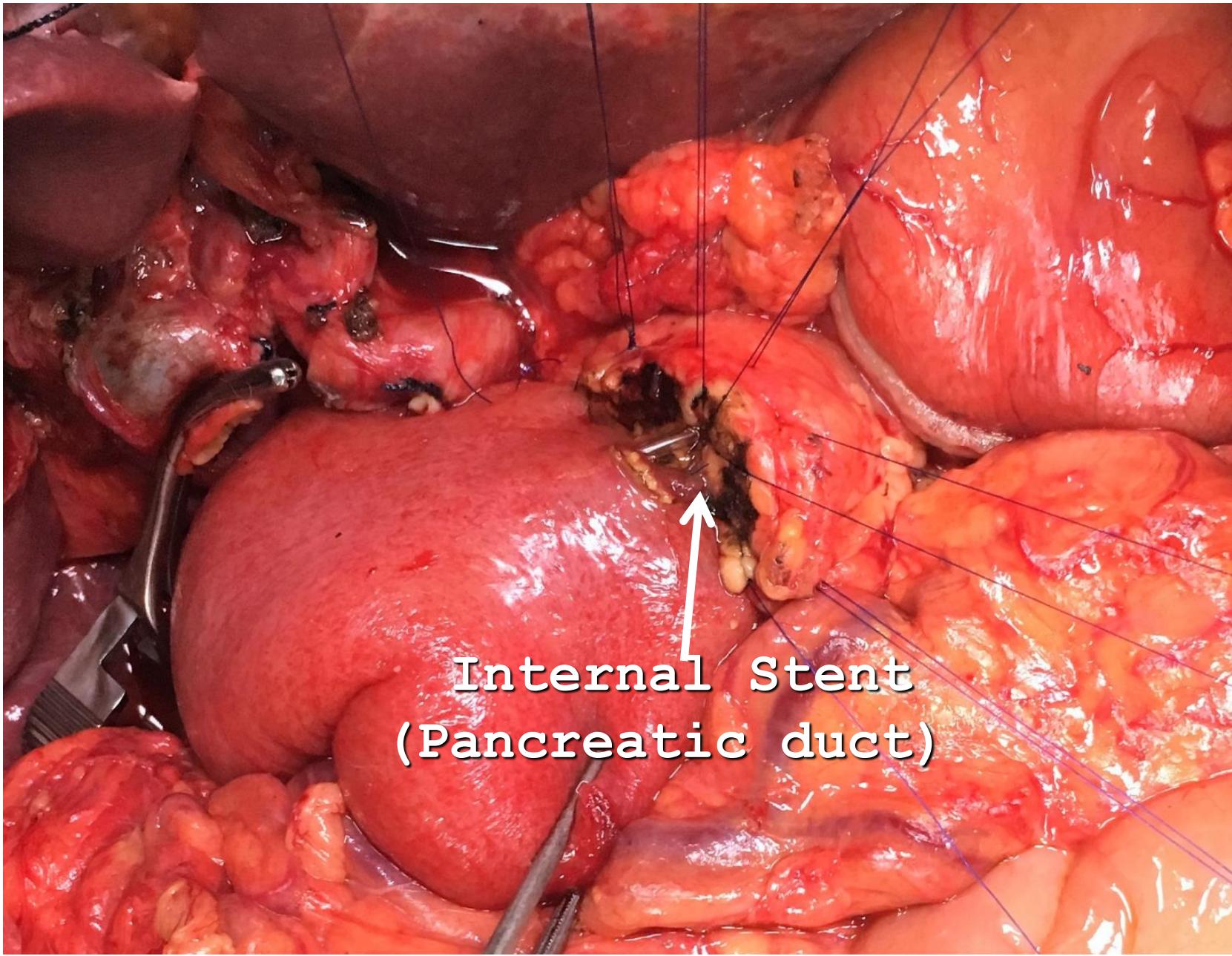


BLOOD SUPPLY



STENT





Internal Stent
(Pancreatic duct)



Suggestion



Mumbai (India)
January 2016



MODIFIED HEIDELBERG TECHNIQUE FOR PANCREATIC ANASTOMOSIS

Anastomose pancreática pela técnica de Heidelberg modificada

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

DUCT 1



DUCT 2



DUCT 3



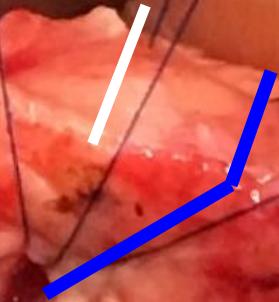
Stay suture

Cut surface

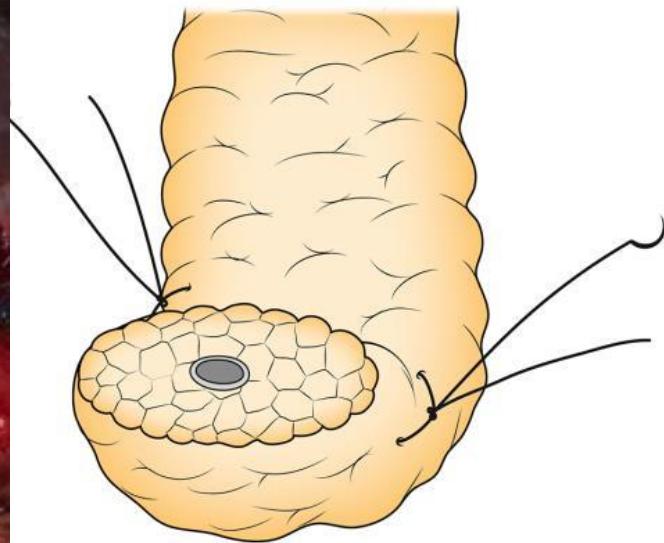
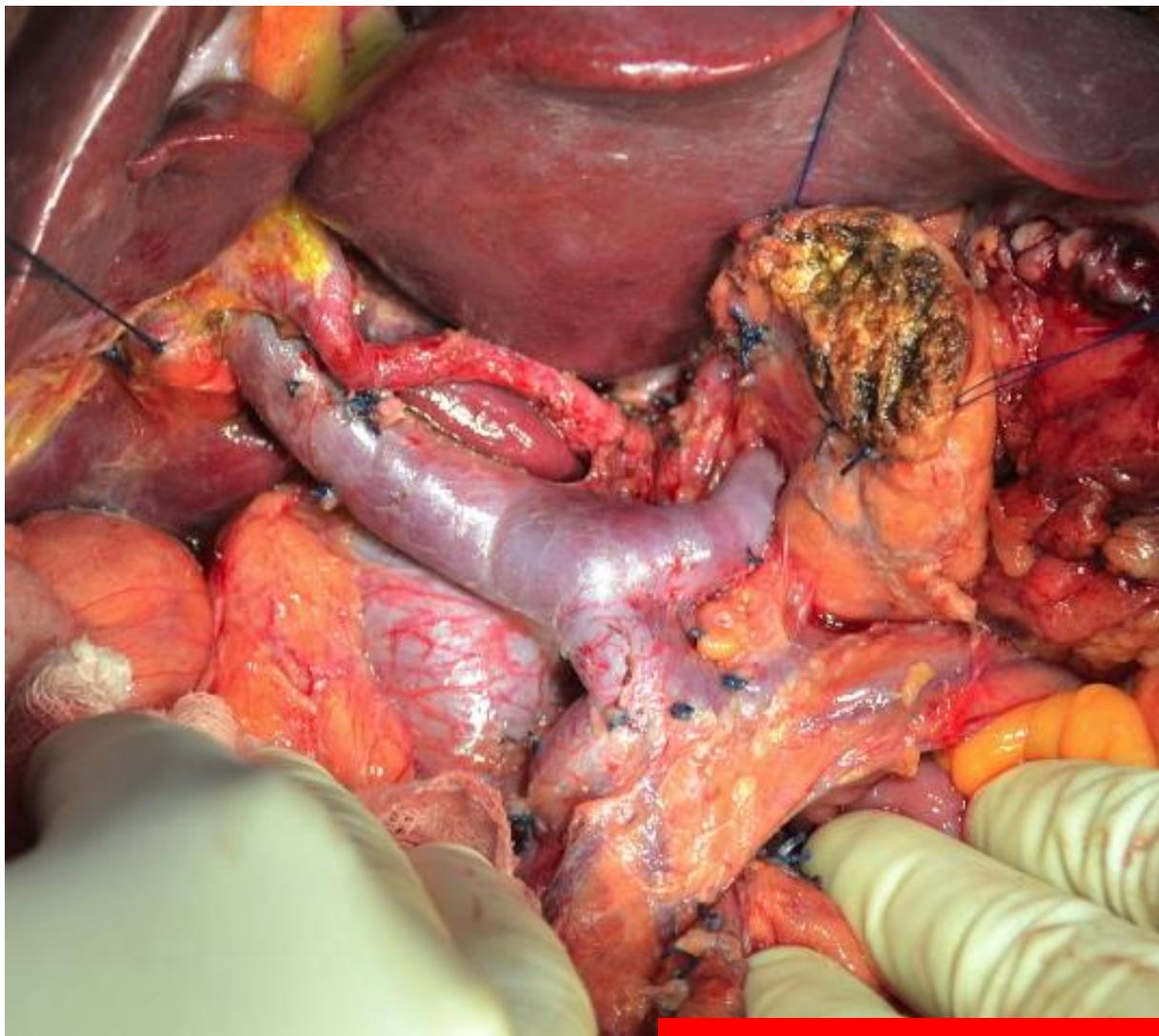
Duct ✓

Pancreas ✓

1 cm



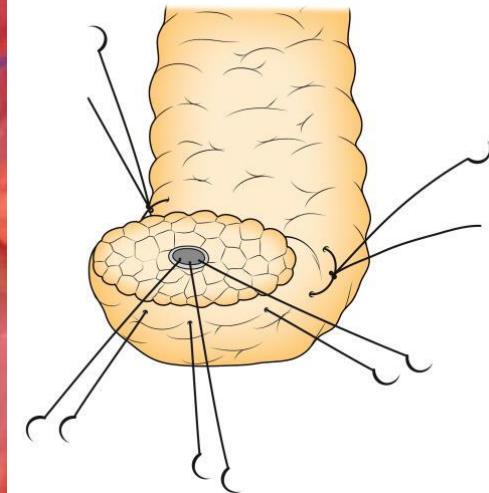
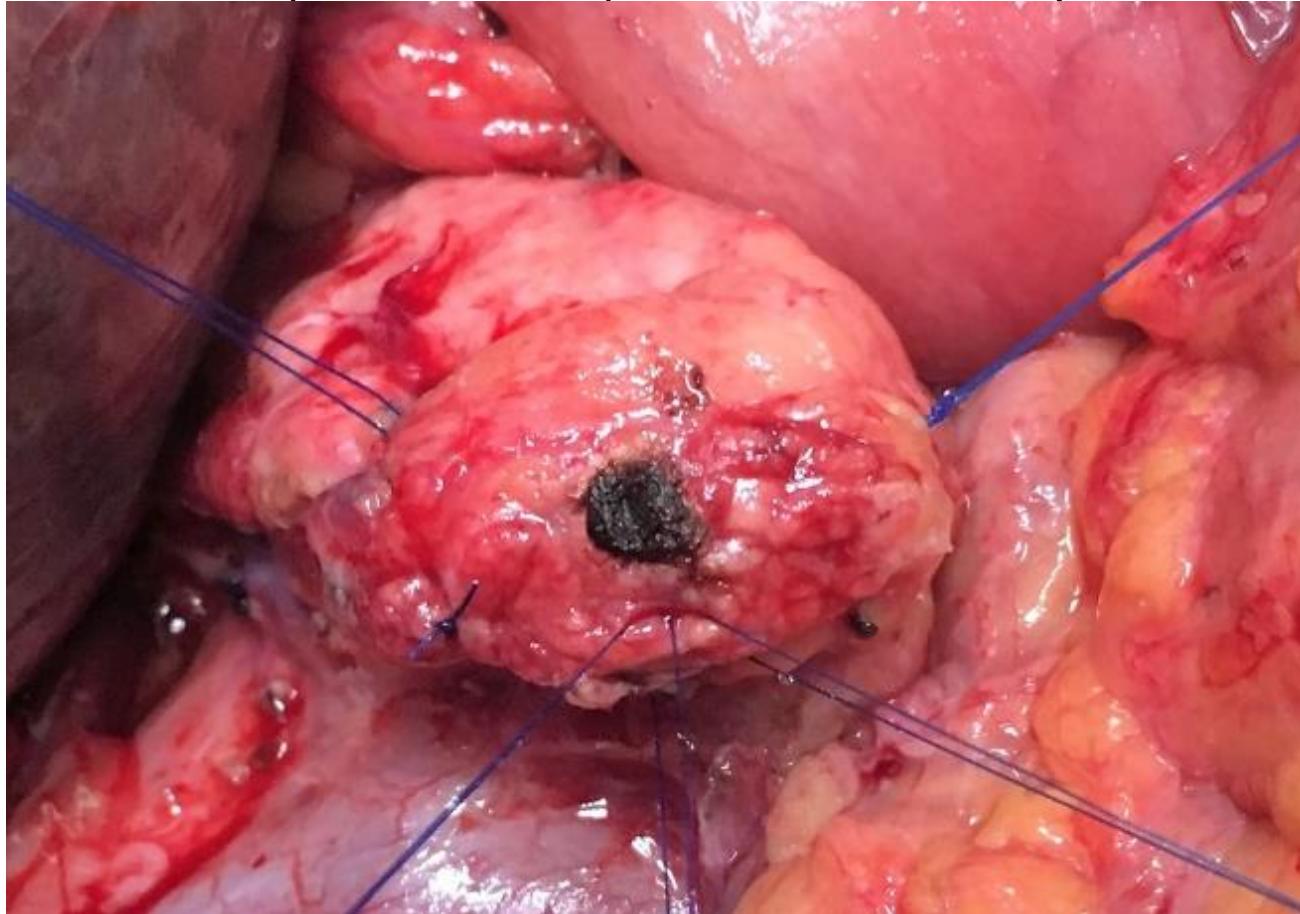
Stay suture



Protect the anastomosis

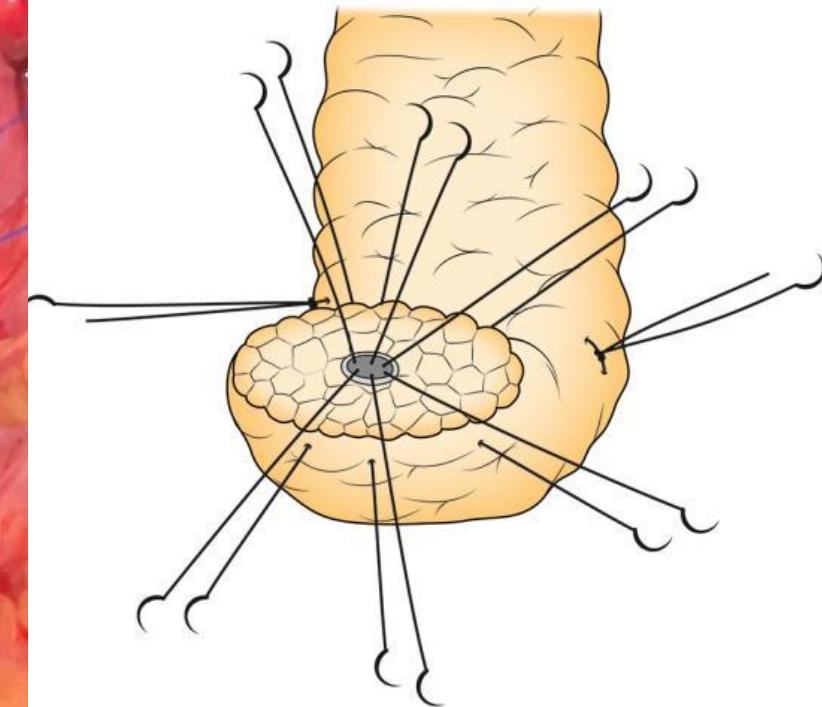
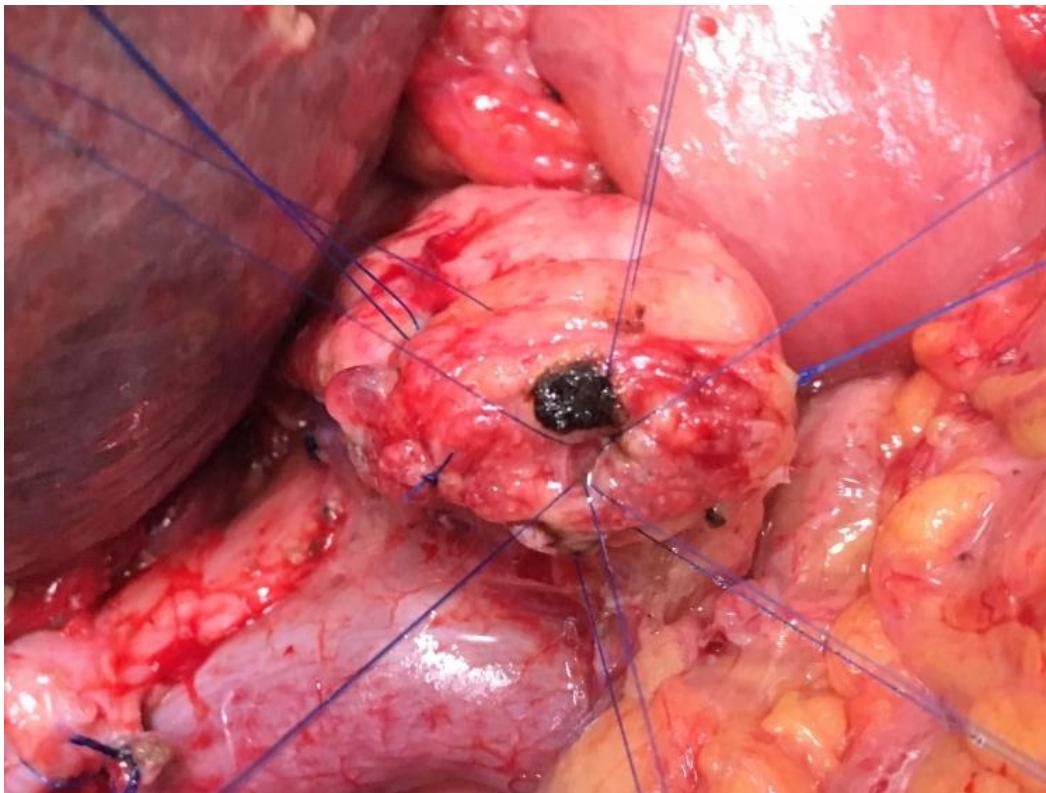
Posterior duct-pancreatic suture

Three sutures are placed on the posterior wall of the pancreatic duct to the posterior pancreatic parenchyma. The stitches are performed with 5-0 double needle prolene at the 4 o'clock, 6 o'clock, and 8 o'clock positions.

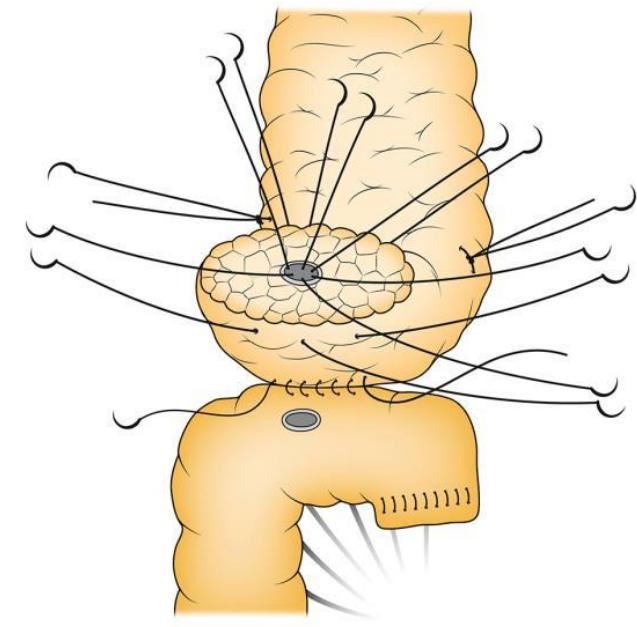
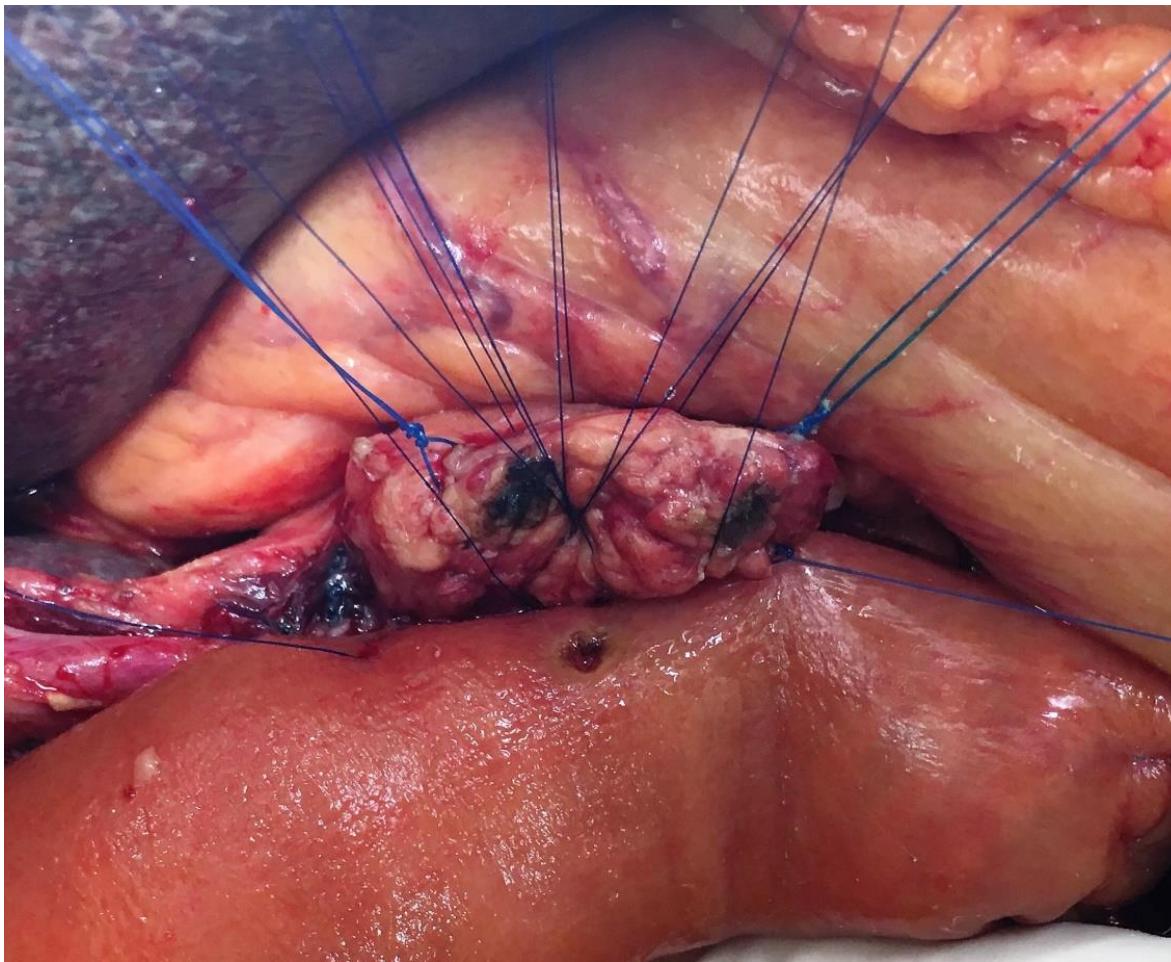


Anterior duct-pancreatic suture

Three sutures are placed on the anterior wall of the pancreatic duct to the anterior pancreatic parenchyma. The stitches are performed with 5-0 double needle prolene at the 10 o'clock, 12 o'clock, and 2 o'clock positions.

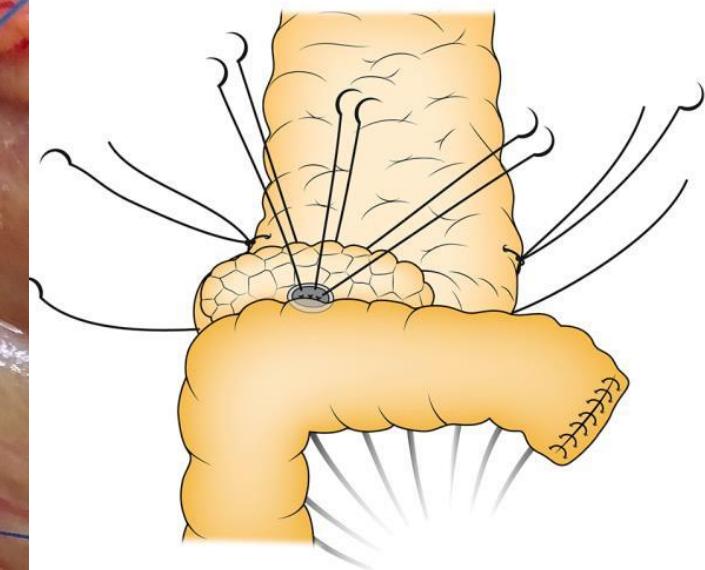
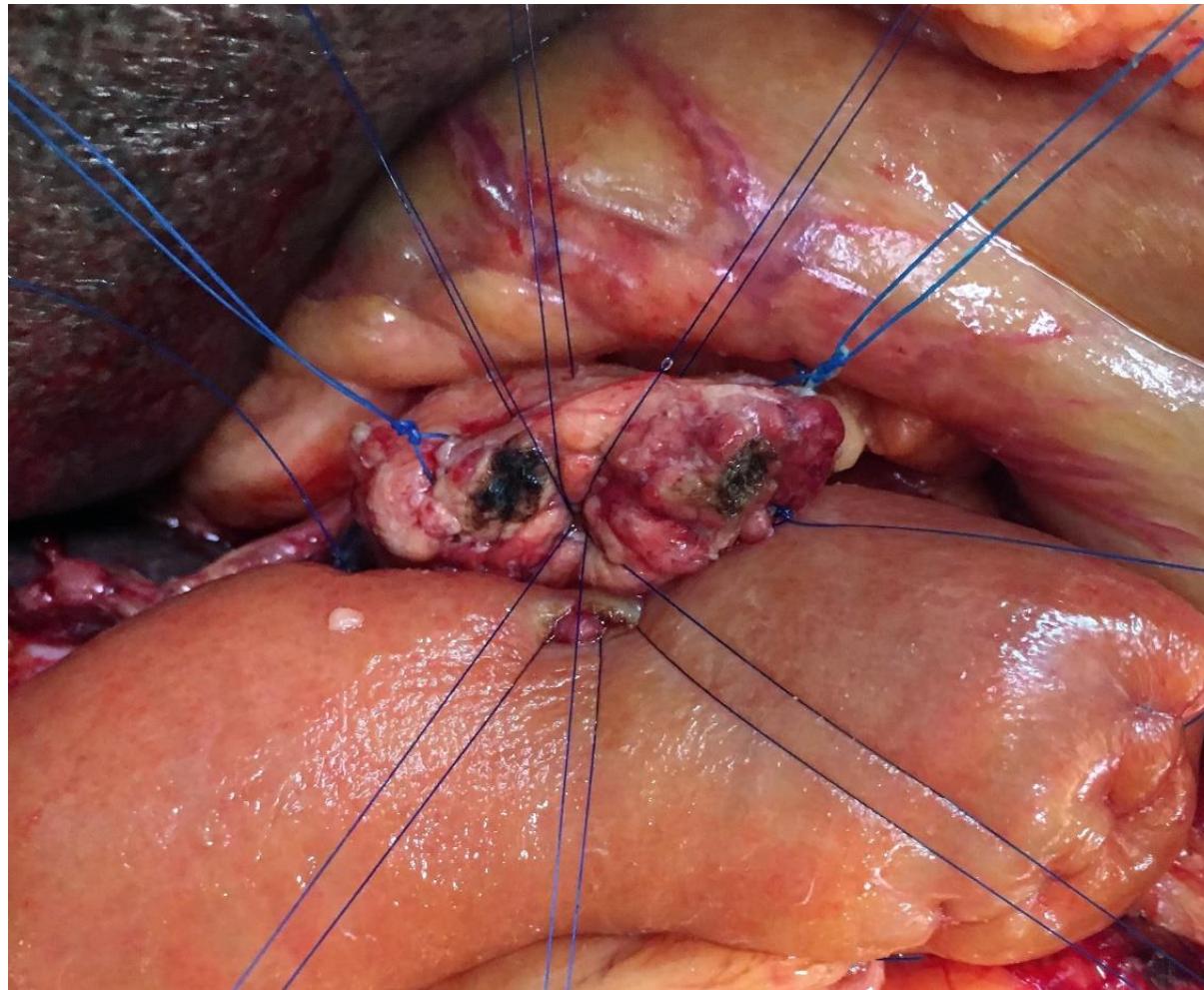


Posterior outer layer



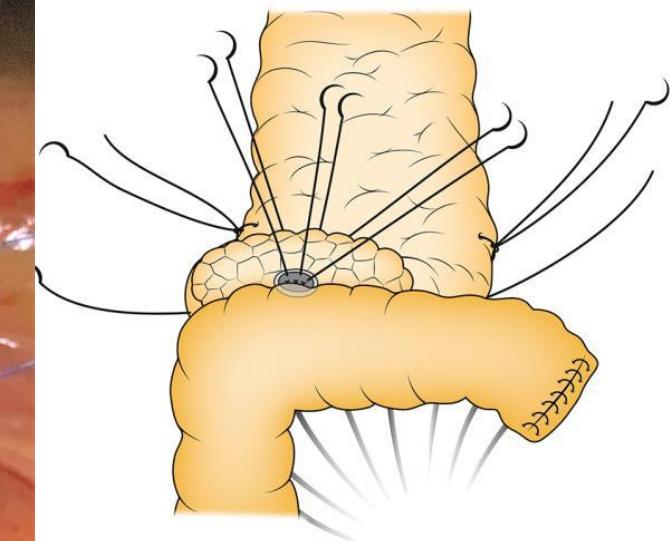
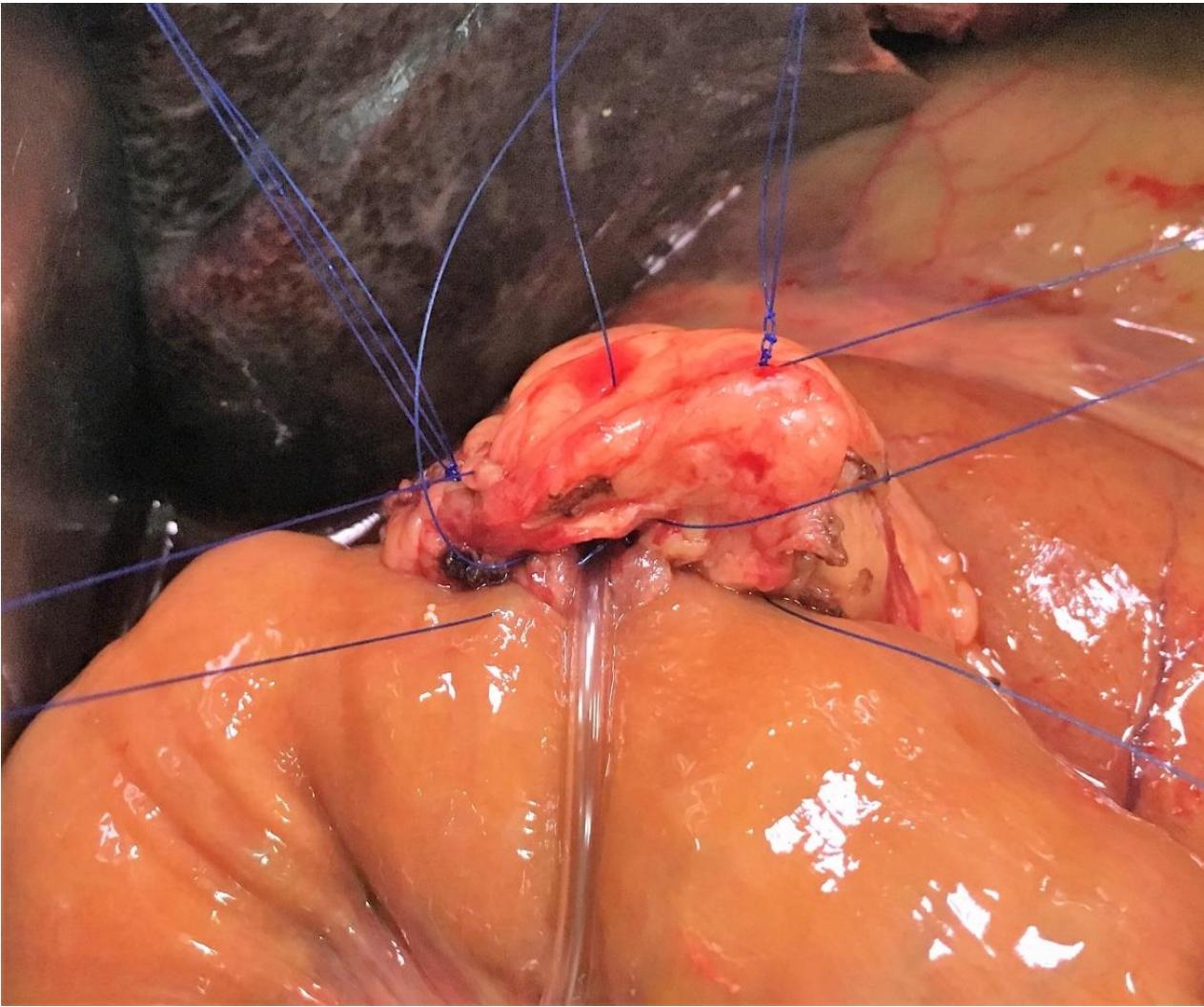
Running suture with 4-0 single needle prolene on the posterior aspect the pancreatic parenchyma with the jejunal seromuscular layer.

Posterior inner layer



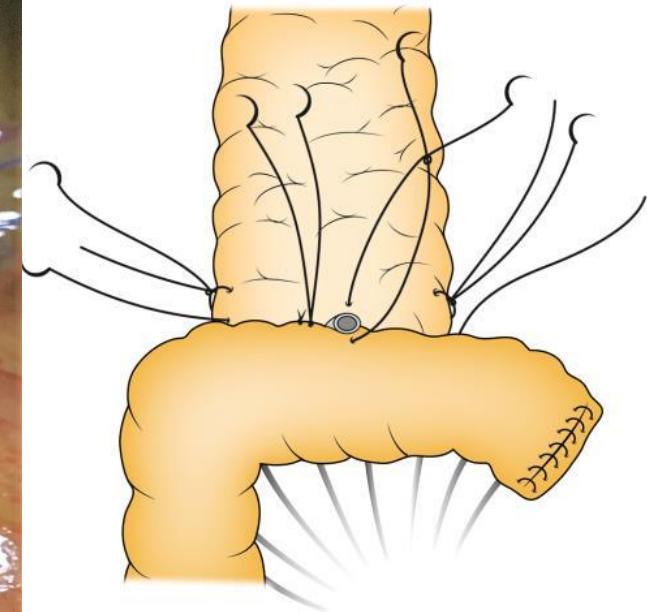
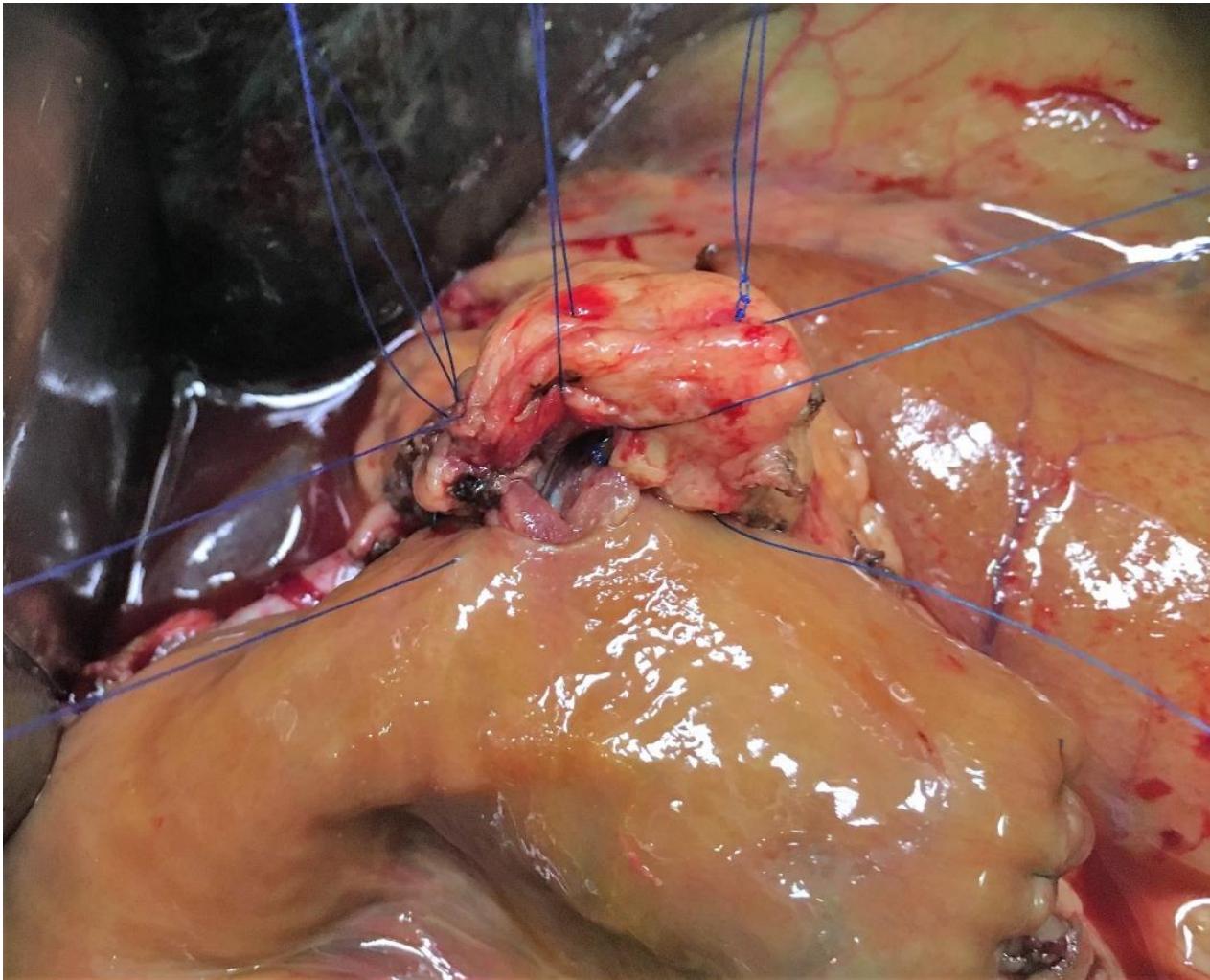
The sutures in the 4 o'clock, 6 o'clock, and 8 o'clock positions are passed from outside to inside in the inferior edge of the jejunum at the same positions.

Posterior inner layer



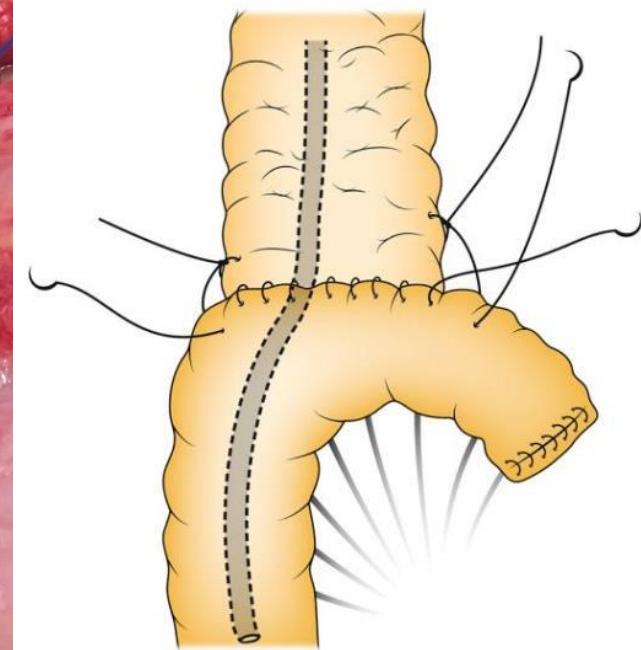
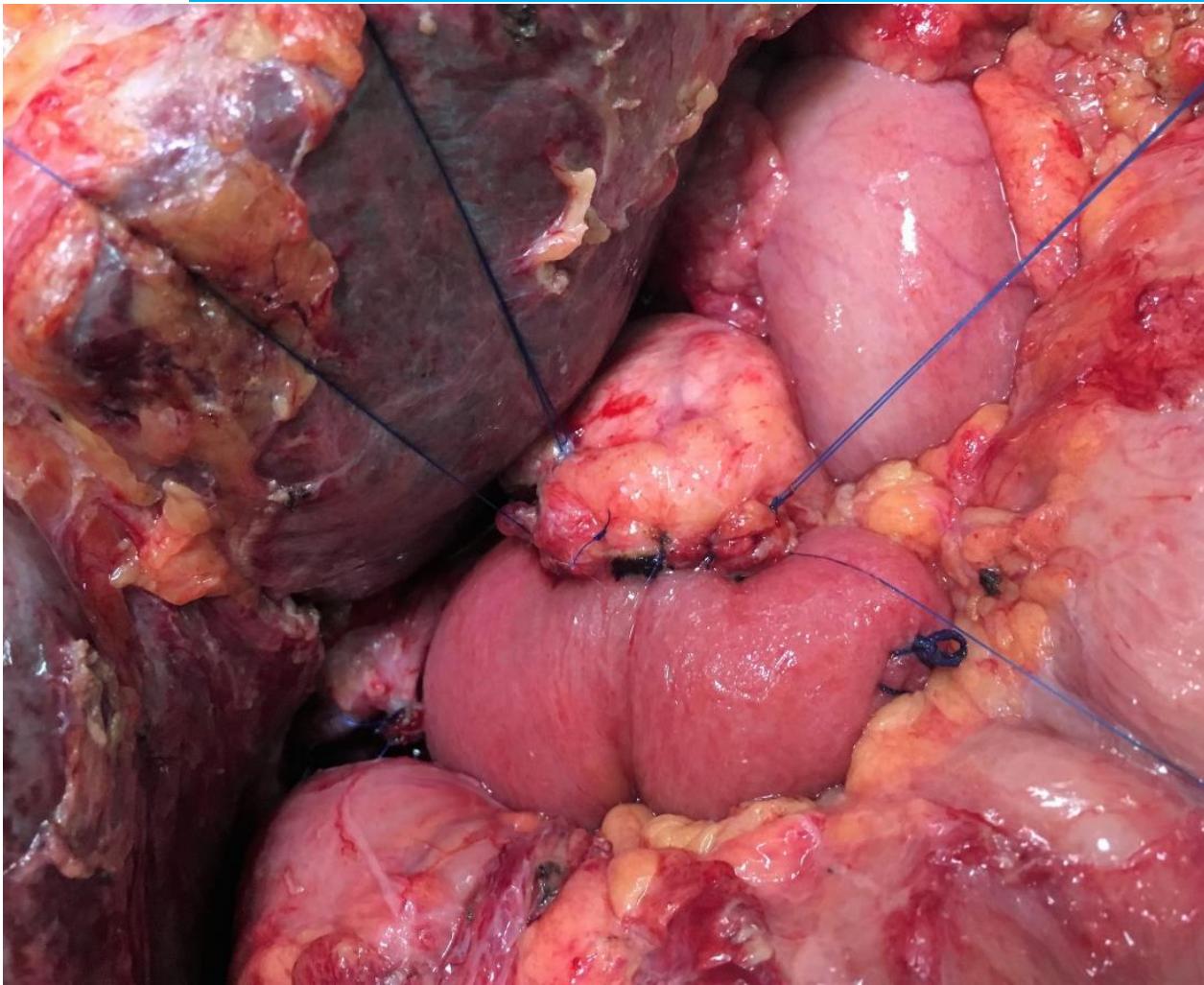
The sutures in the 4 o'clock, 6 o'clock, and 8 o'clock positions are passed from outside to inside in the inferior edge of the jejunum at the same positions.

Anterior inner layer



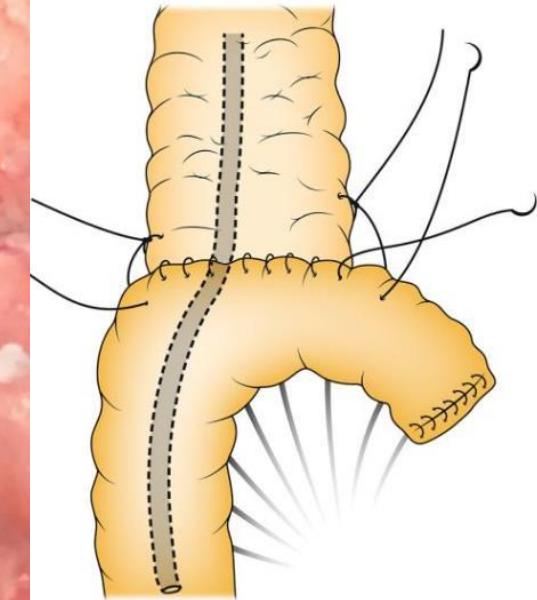
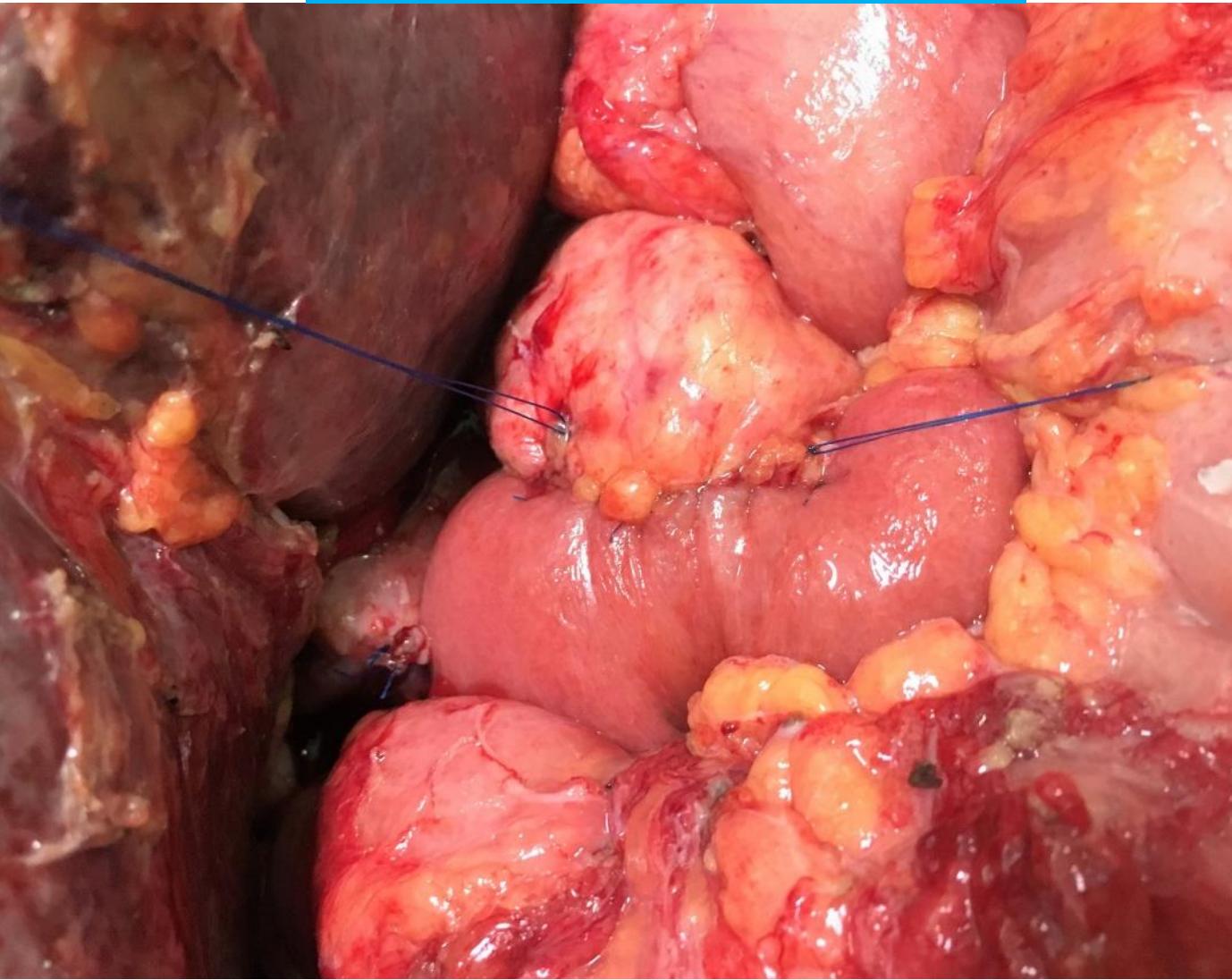
The sutures in the 10 o'clock, 12 o'clock, and 2 o'clock positions are passed from inside to outside in the superior edge of the jejunum and are knotted with the plastic stent into the jejunal lumen.

Anterior outer layer

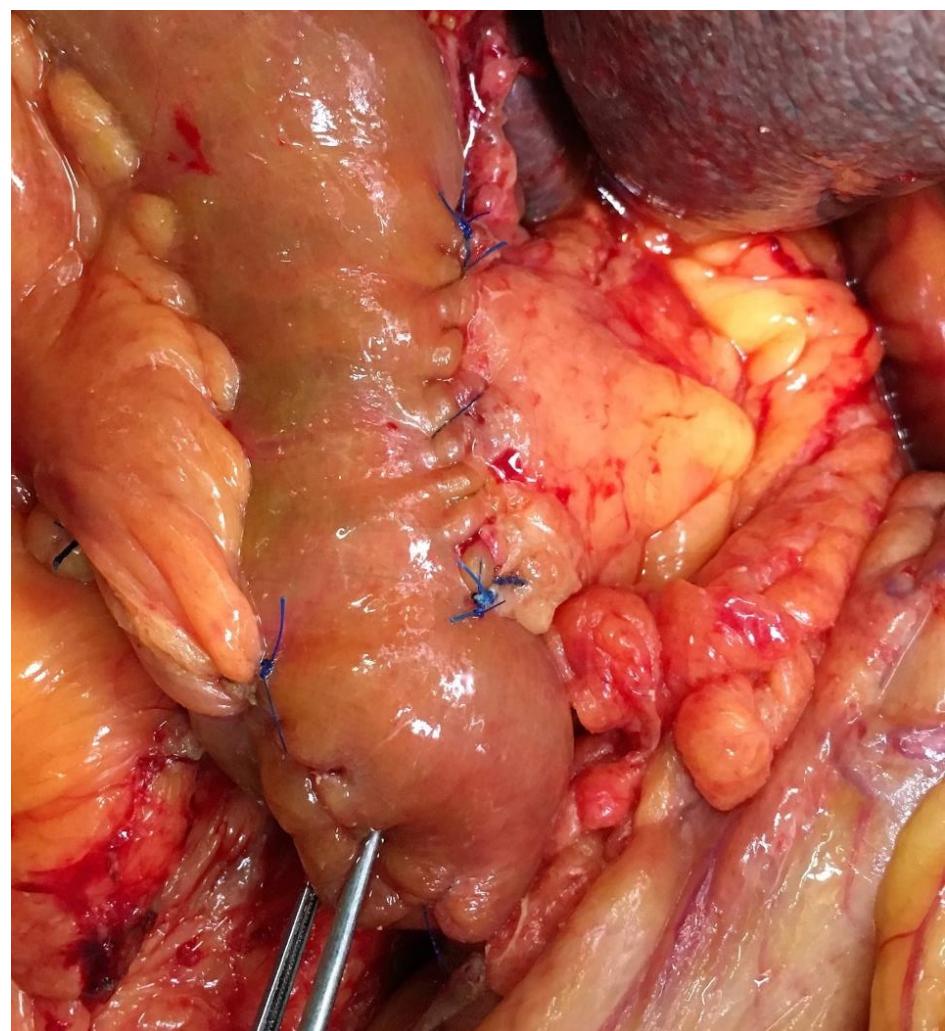
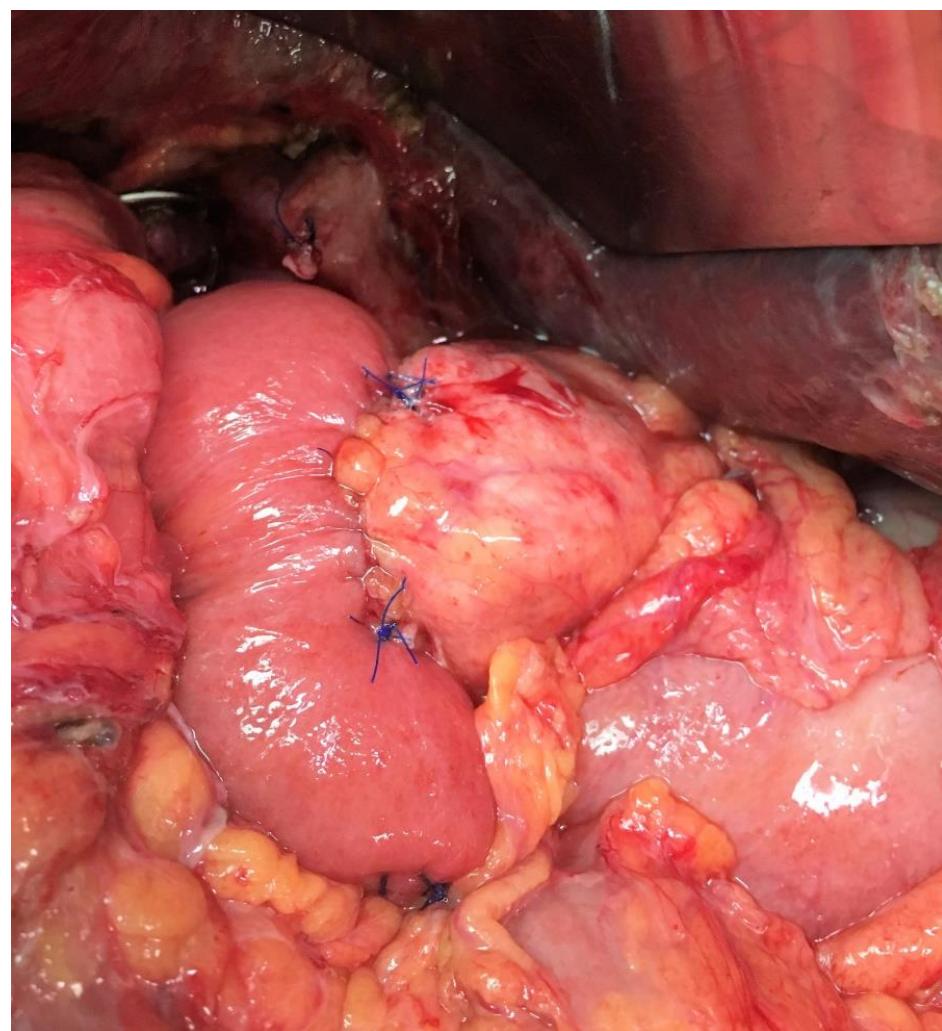


A running suture is performed with 4-0 single needle prolene, on the anterior aspect of the pancreatic parenchyma with jejunal seromuscular layer.

Stay suture

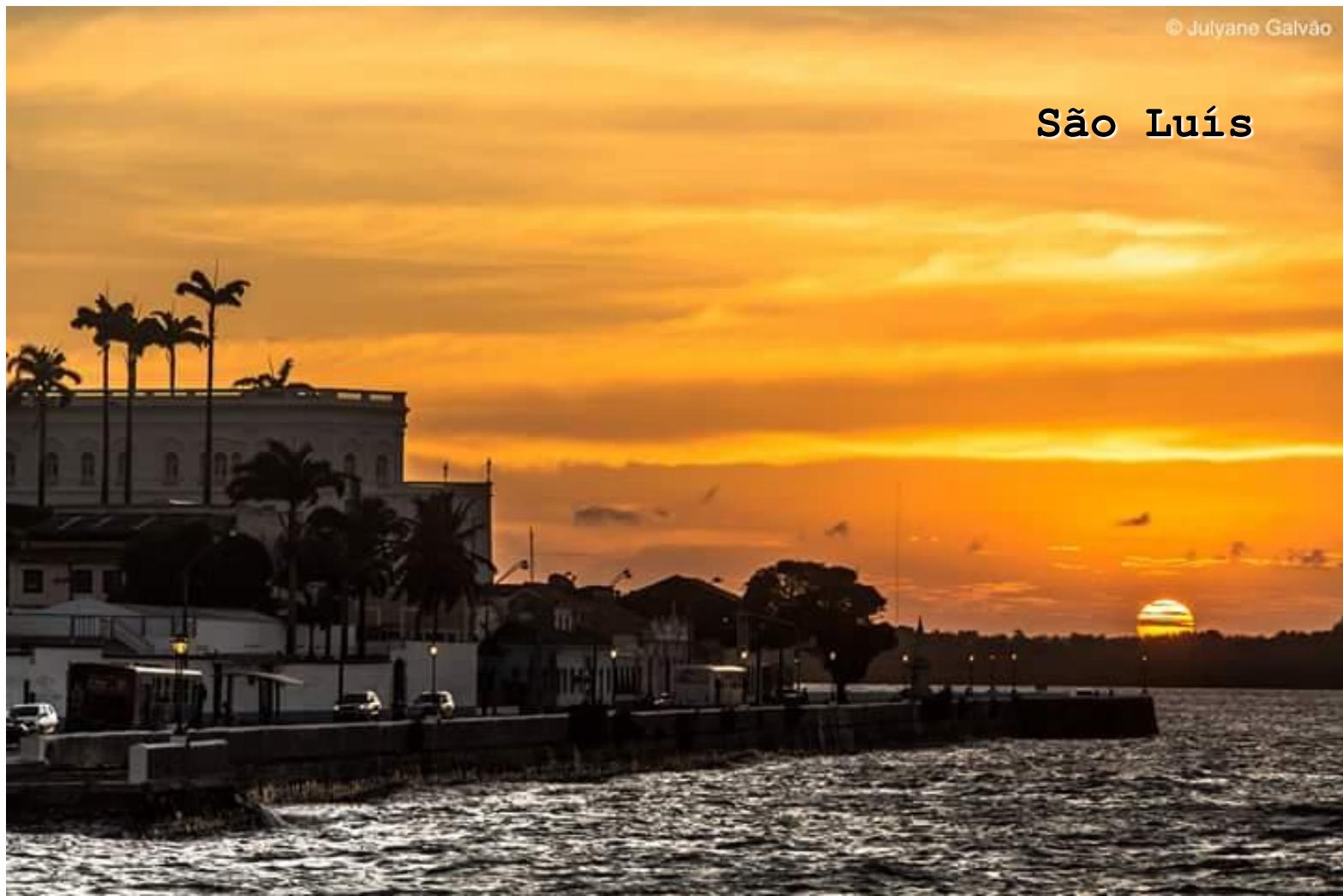


Final aspect



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São Luís



Thanks !