Reconstrução pancreática após duodenopancreatectomia

Orlando Jorge M. Torres
Professor Livre-Docente UFMA

One Thousand Consecutive Pancreaticoduodenectomies

TABLE 5. One Thousand Pancreaticoduodenectomies

	No.	%
Mortality	10	1
Morbidity	41	
Delayed gastric emptying		18
Pancreatic fistula		12
Wound infection		7
Intraabdominal abscess		6
Cardiac event		3
Pancreatitis		2
Bile leak		2
Pneumonia		2
Hemobilia		2
Lymphatic leak		1
Ulcer		1
Reoperation	27	2.7
Bleeding	9	
Abscess	7	
Wound	4	
Negative lap	3	
SBO	2	
Ulcer	1	
PA rupture	1	

Cameron JL, et al. Ann Surg 2006;244:10-15

Fatores de risco

- Pâncreas
  - Textura
  - Diâmetro do ducto
  - Suprimento sanguíneo do coto
  - Débito do suco pancreático
  - Características da doença
- Paciente
  - Idade
  - Sexo
  - Níveis de bilirrubina
  - Co-morbidades
- Operação
  - Tempo operatório
  - Perda sanguínea
  - Tipo de anastomose
  - Uso de Stent

Textura

Diâmetro do ducto

Lai ECH, et al. Arch Surg 2009;144:1074-80

Risco de fístula pancreática

Table 3 Intraoperative Classification of Pancreatic Parenchyma Density in 218 Consecutive Patients Undergoing Partial Duodenopancreatectomy

Parameters	*n*	Percentage
Pancreatic density	218	100
Soft	83	38.0
Intermediate	57	26.2
Hard	78	35.8

Frymerma AS, et al. J Gastrointest Surg 2010;14:711-8

Fatores de risco

- Textura do pâncreas e fístula (%)
  - Consistente 0%
  - Frágil (amolecido) 25%
- Fatores (pâncreas amolecido):
  1. Função exócrina normal
     - Débito elevado do suco pancreático
  2. Associação com ducto fino
  3. Laceração da margem na sutura

Yeo CJ, et al. Ann Surg 2000;232:419-29

Fatores de risco

Table 4 Multivariate logistic regression for pancreatic leakage

Parameters	*P*	Odds ratio	CI
Anastomotic technique			
Duct-to-mucosa	-	1	
Invagination	0.128	9.967	0.514-193.15
Pancreatic size (mm)			
≥3	-	1	
<3	0.007	11.867	1.96-71.86
Pancreatic texture			
Hard	-	1	
Soft	0.017	15.445	1.629-146.46

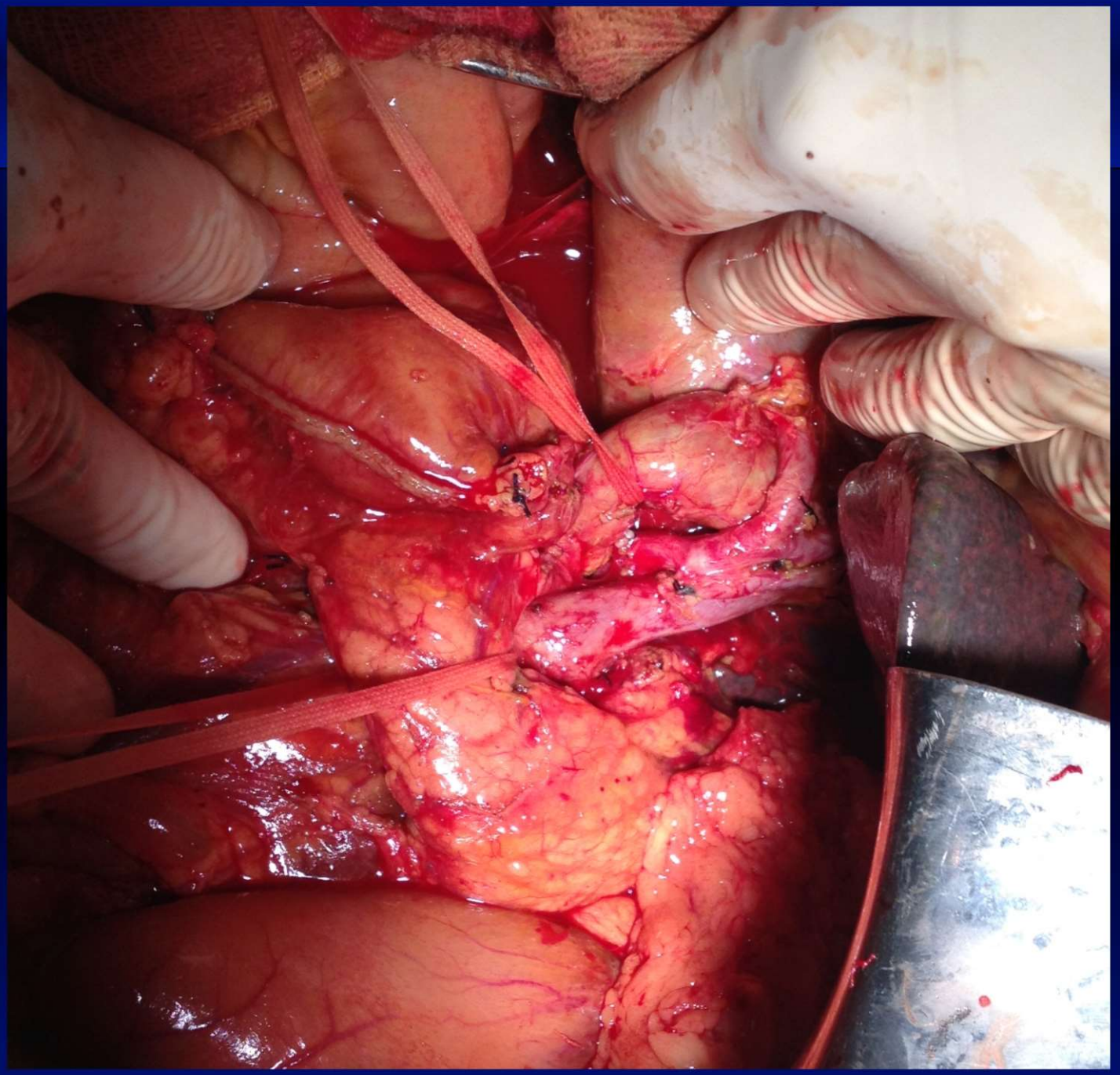
Yang YM, et al. World J Gastroenterol 2005;11:2456-61

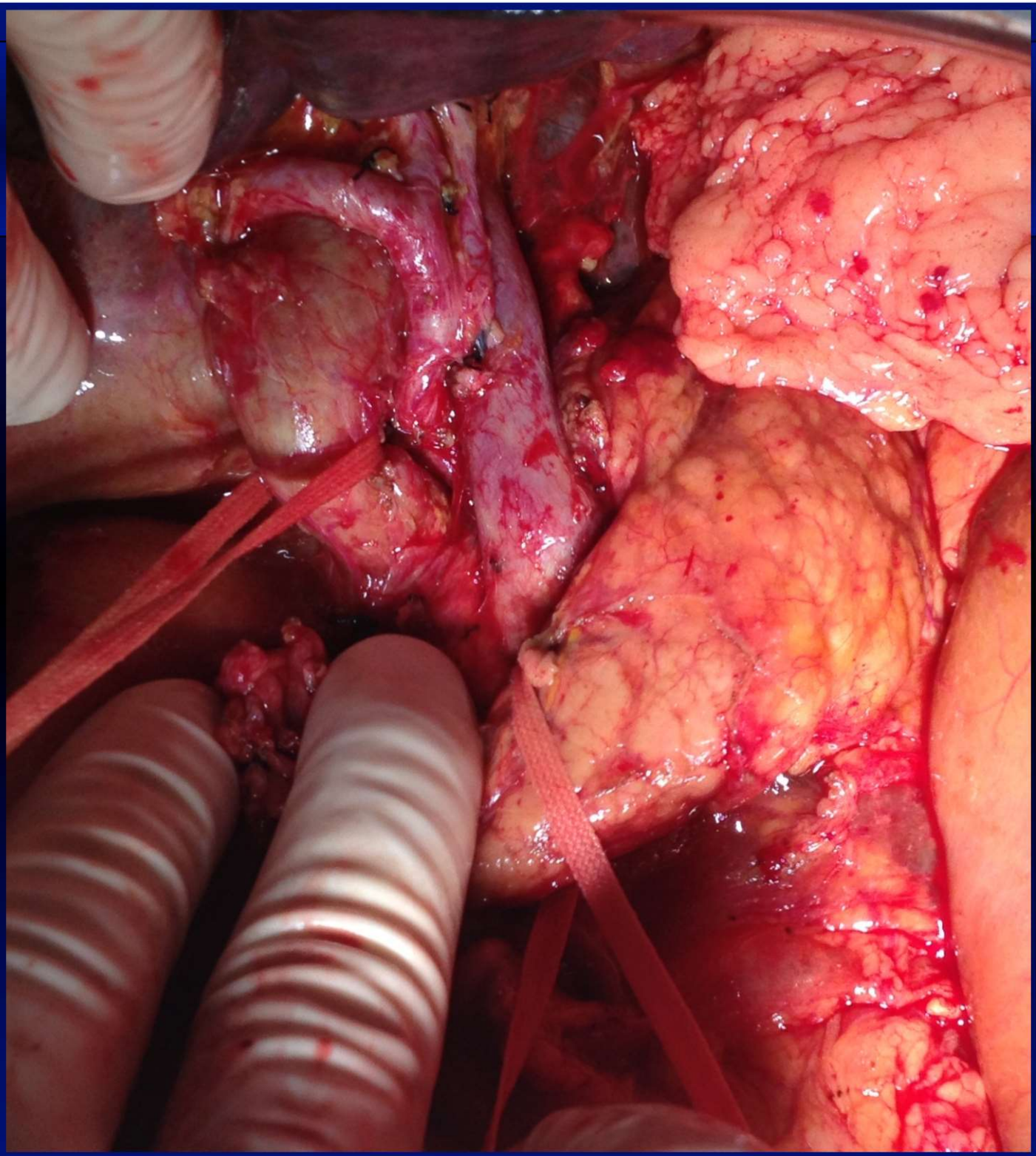
Intervenções técnicas

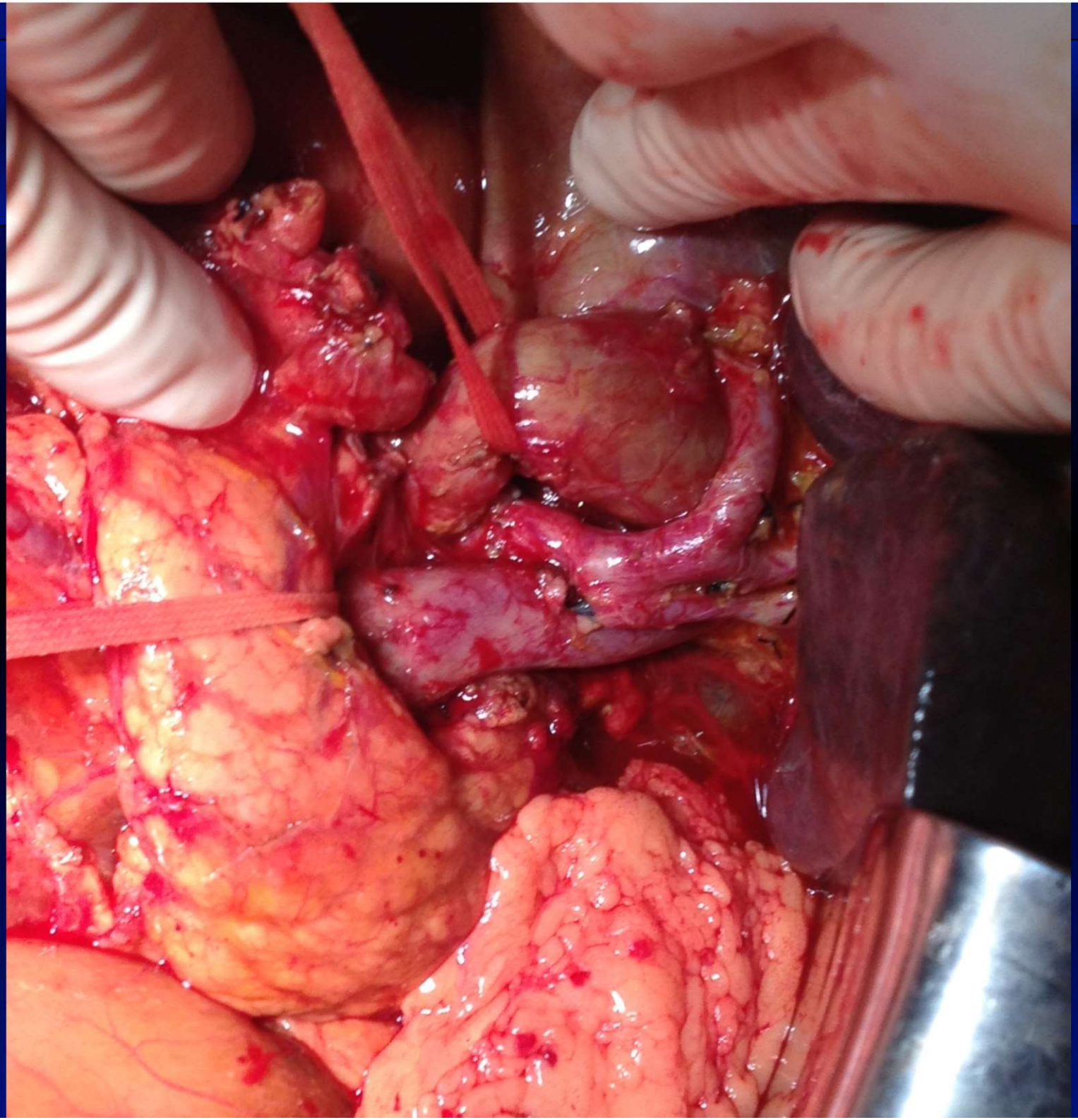
- Oclusão do ducto pancreático
- Pancreatogastrostomia
  - Convencional
  - Técnica de Montenegro
- Pancreatojejunostomia
  - Ducto-mucosa
  - Invaginação
  - Peng
  - Alça isolada em Y de Roux
  - Convencional (Alça única)
- Stent no ducto pancreático
- Pancreatectomia total

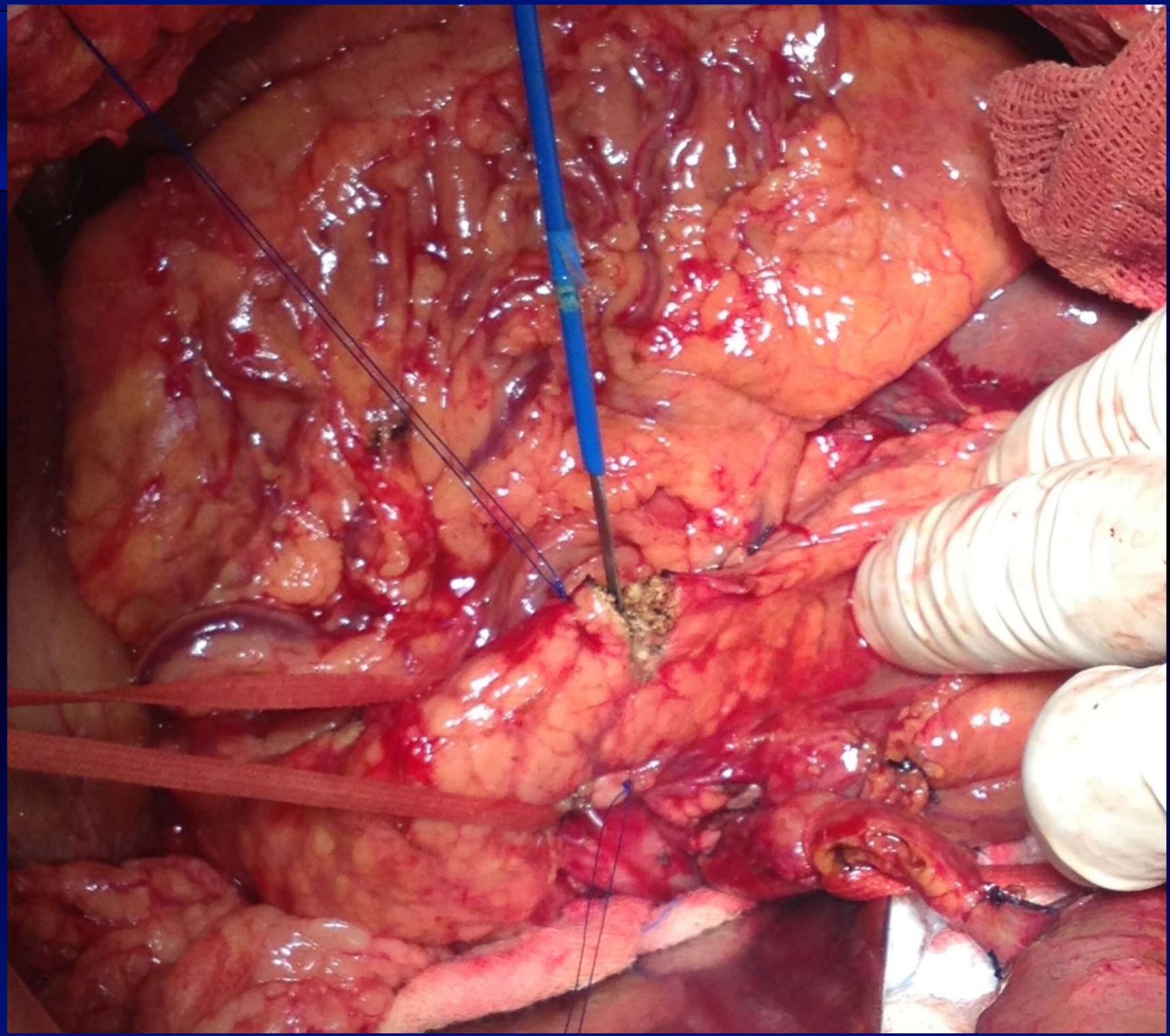
Lai ECH, et al. Arch Surg 2009;144:1074-80

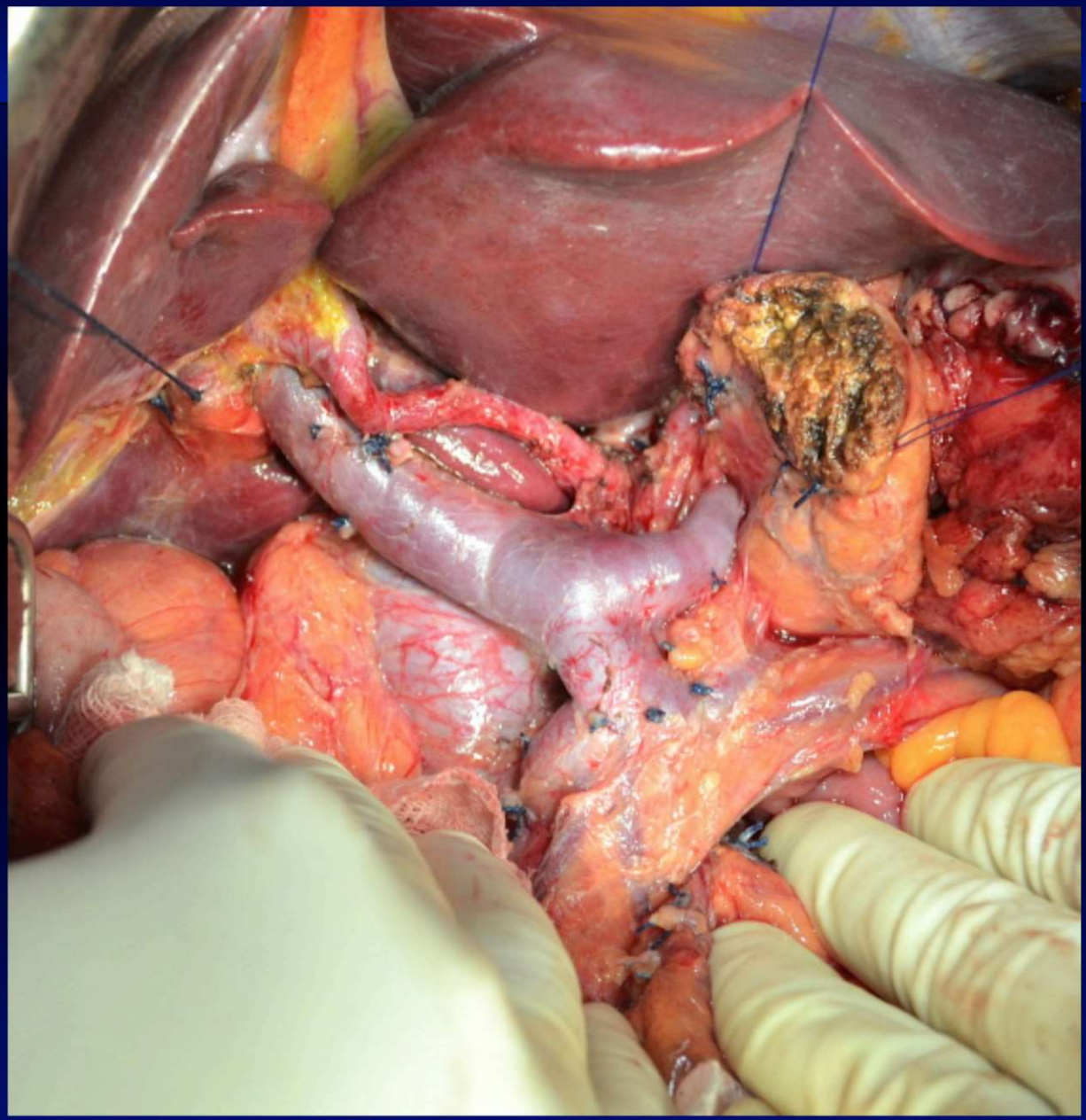
PENG

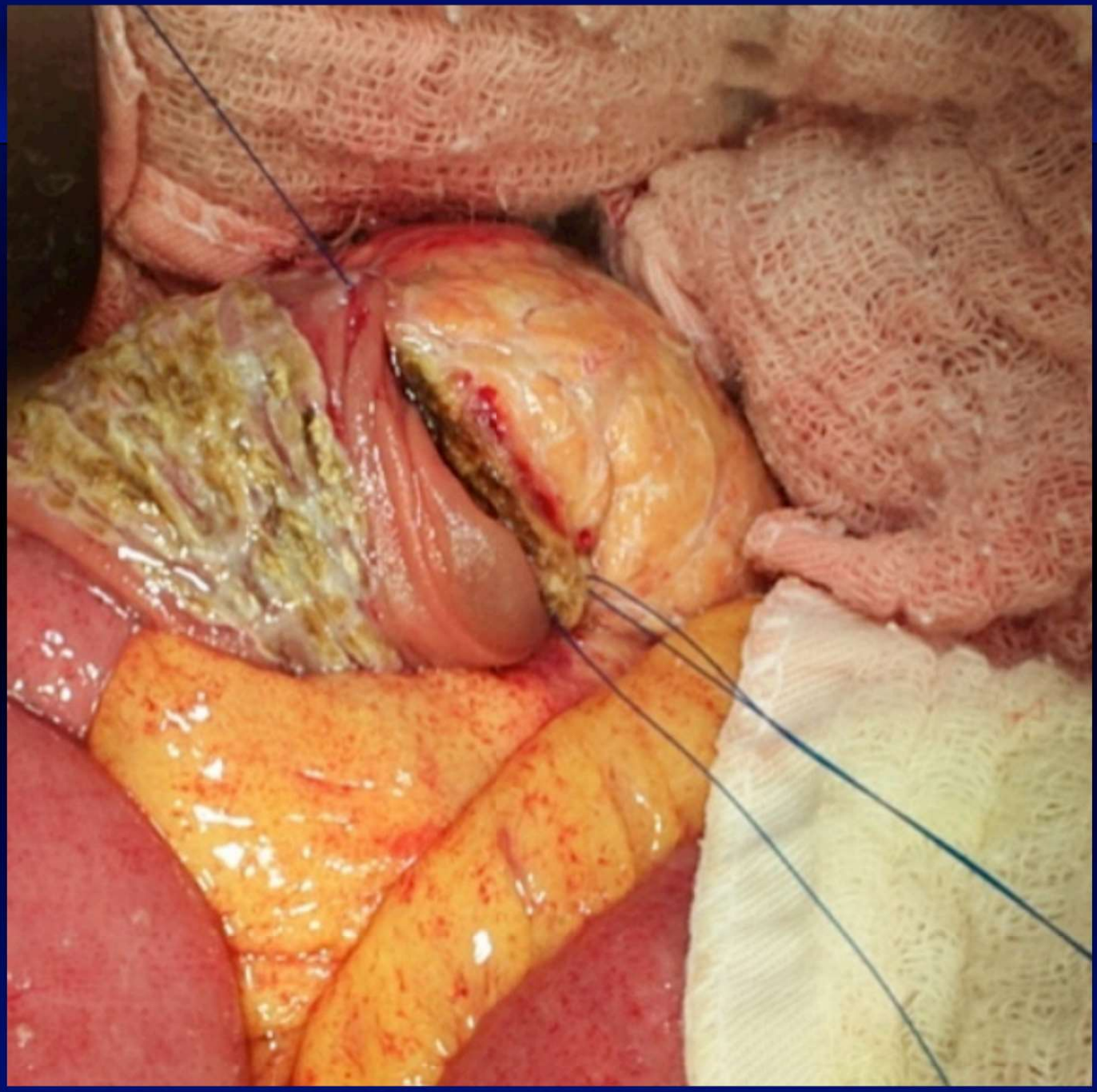


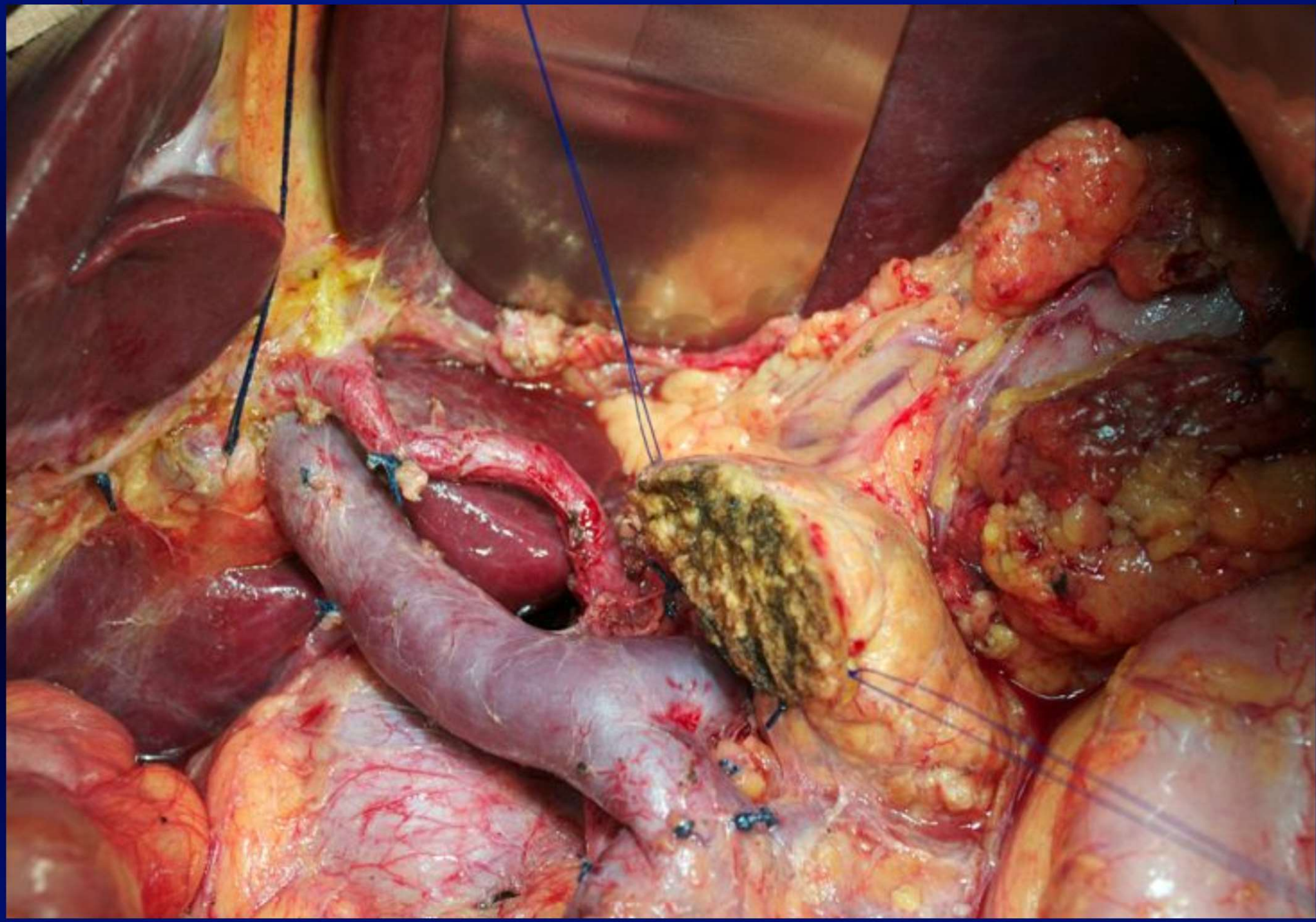


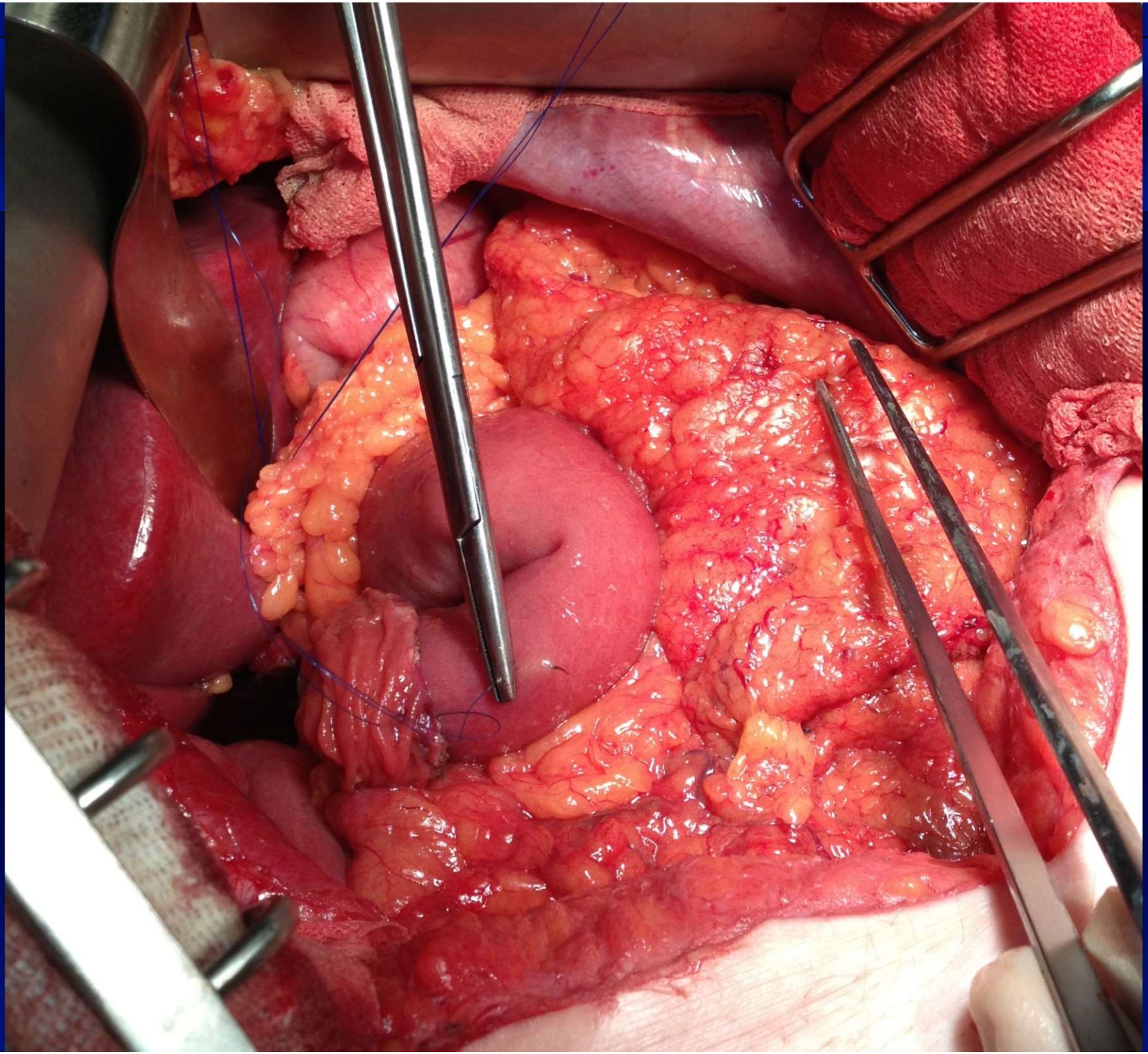


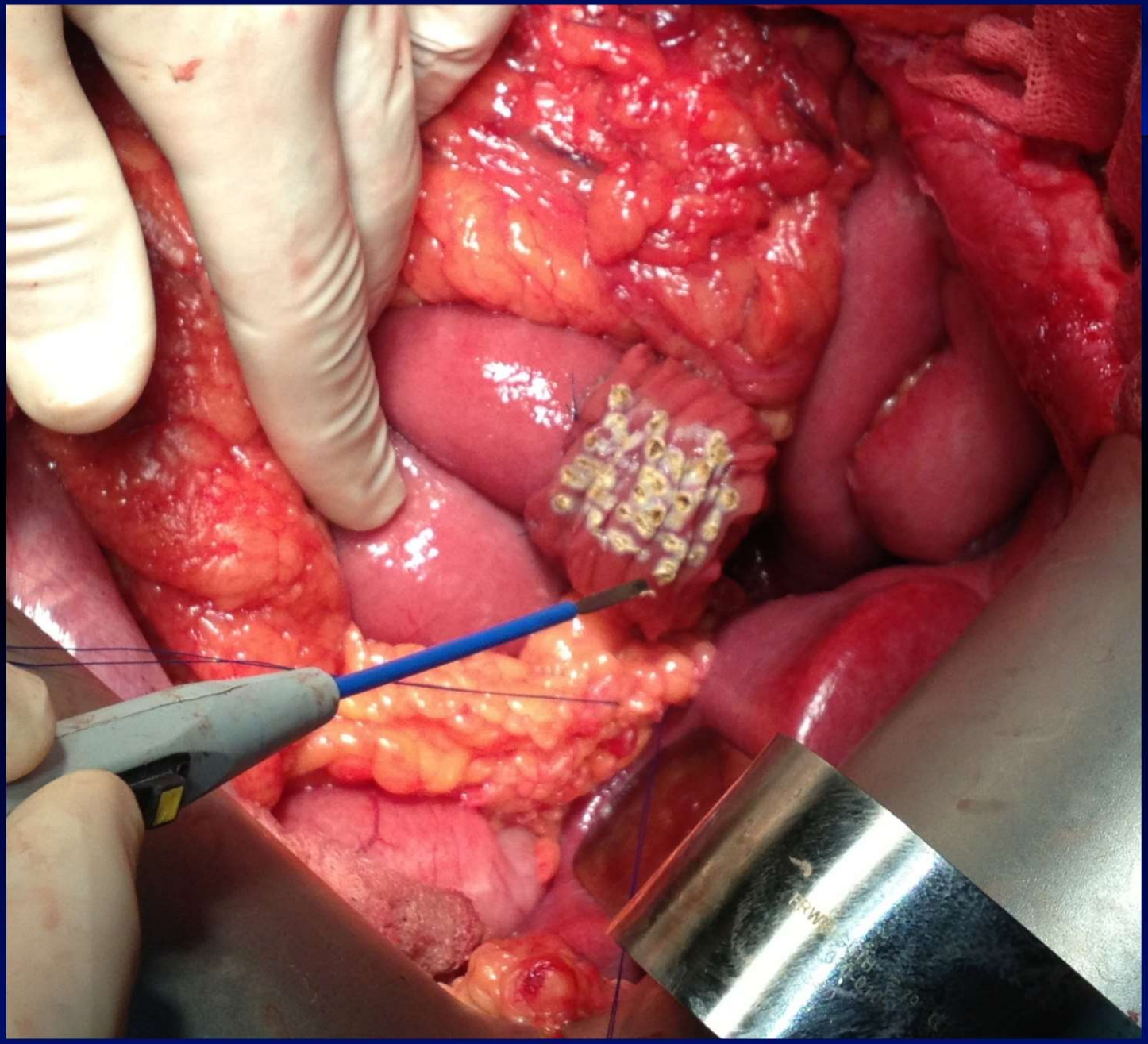


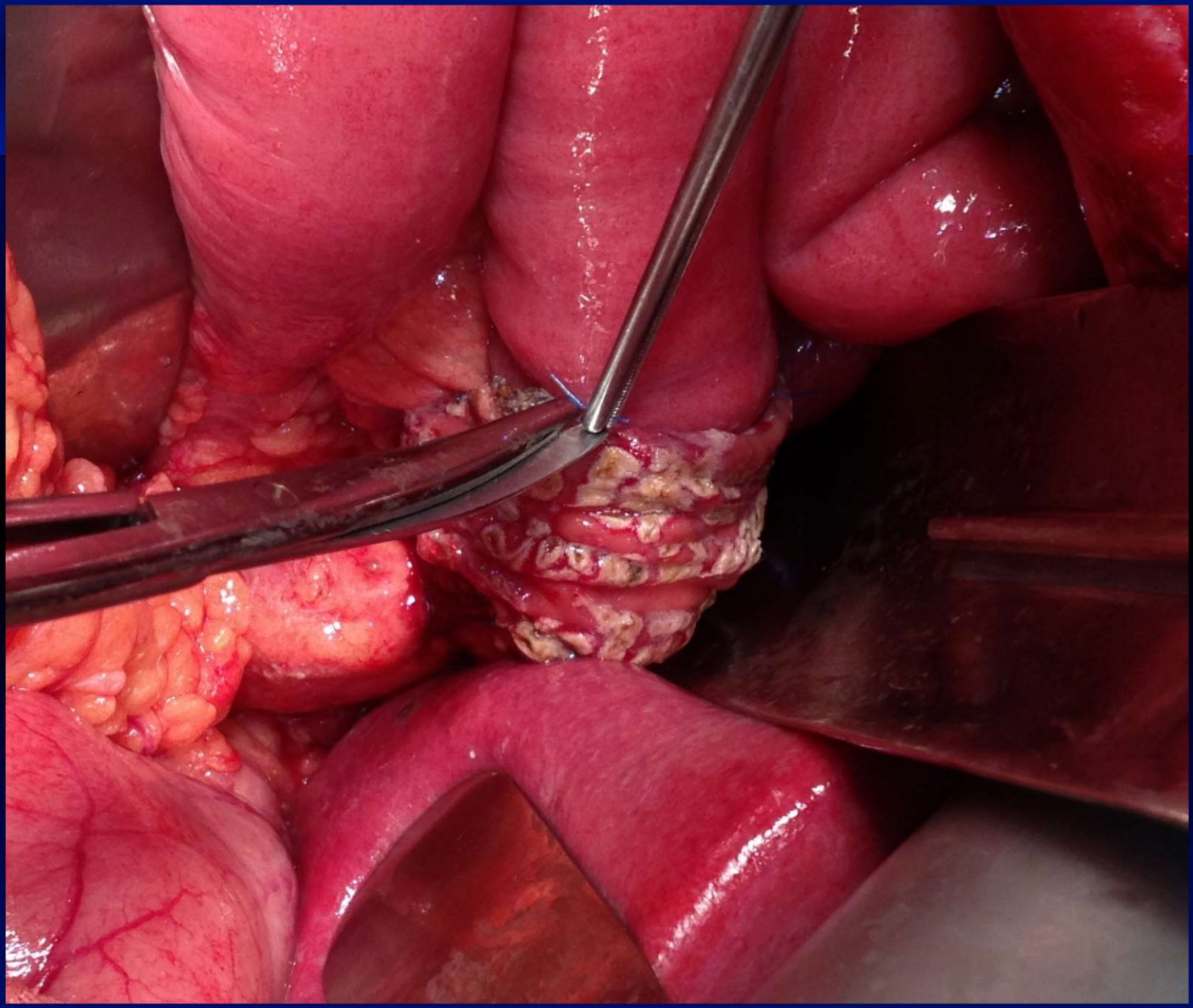


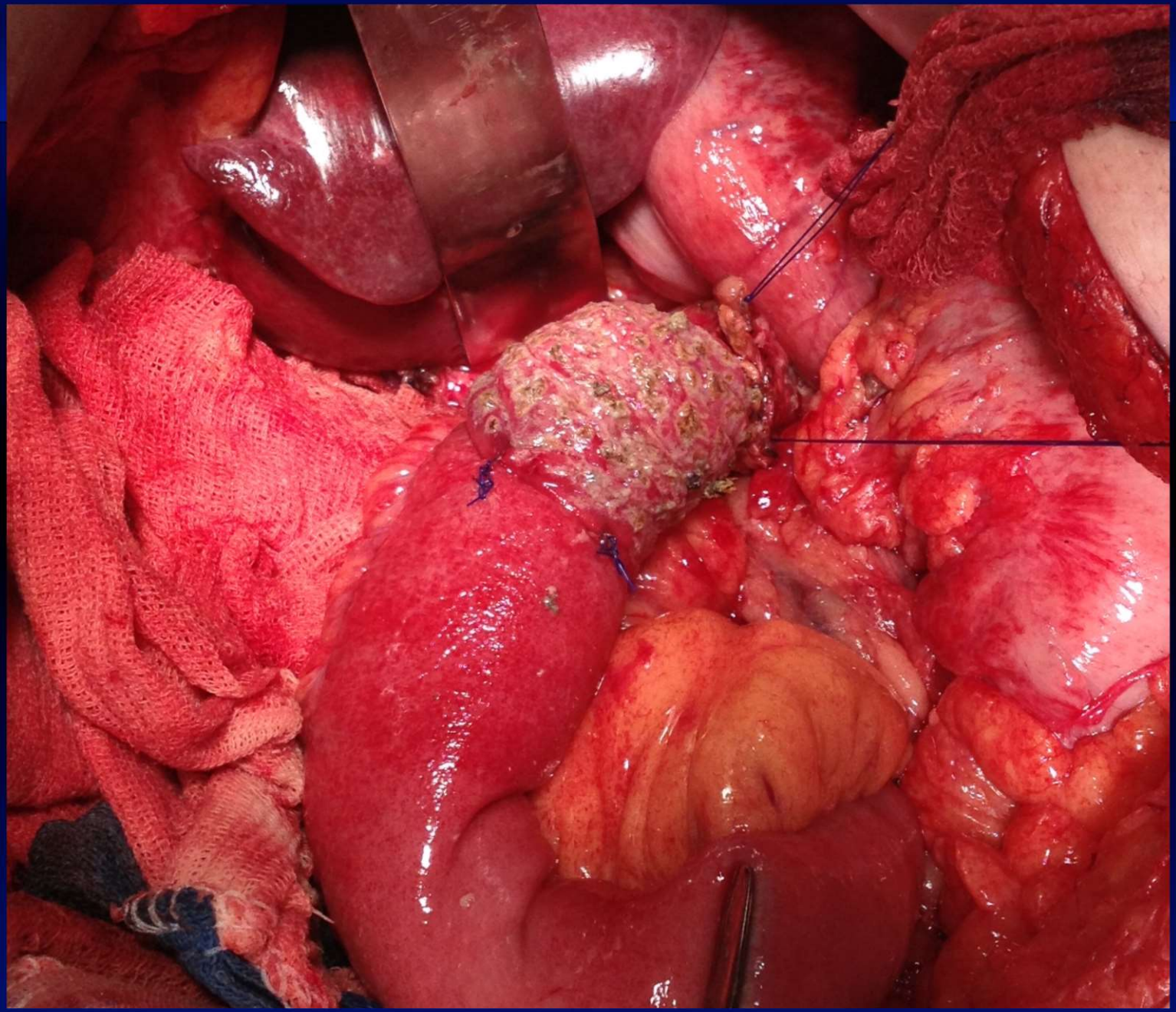


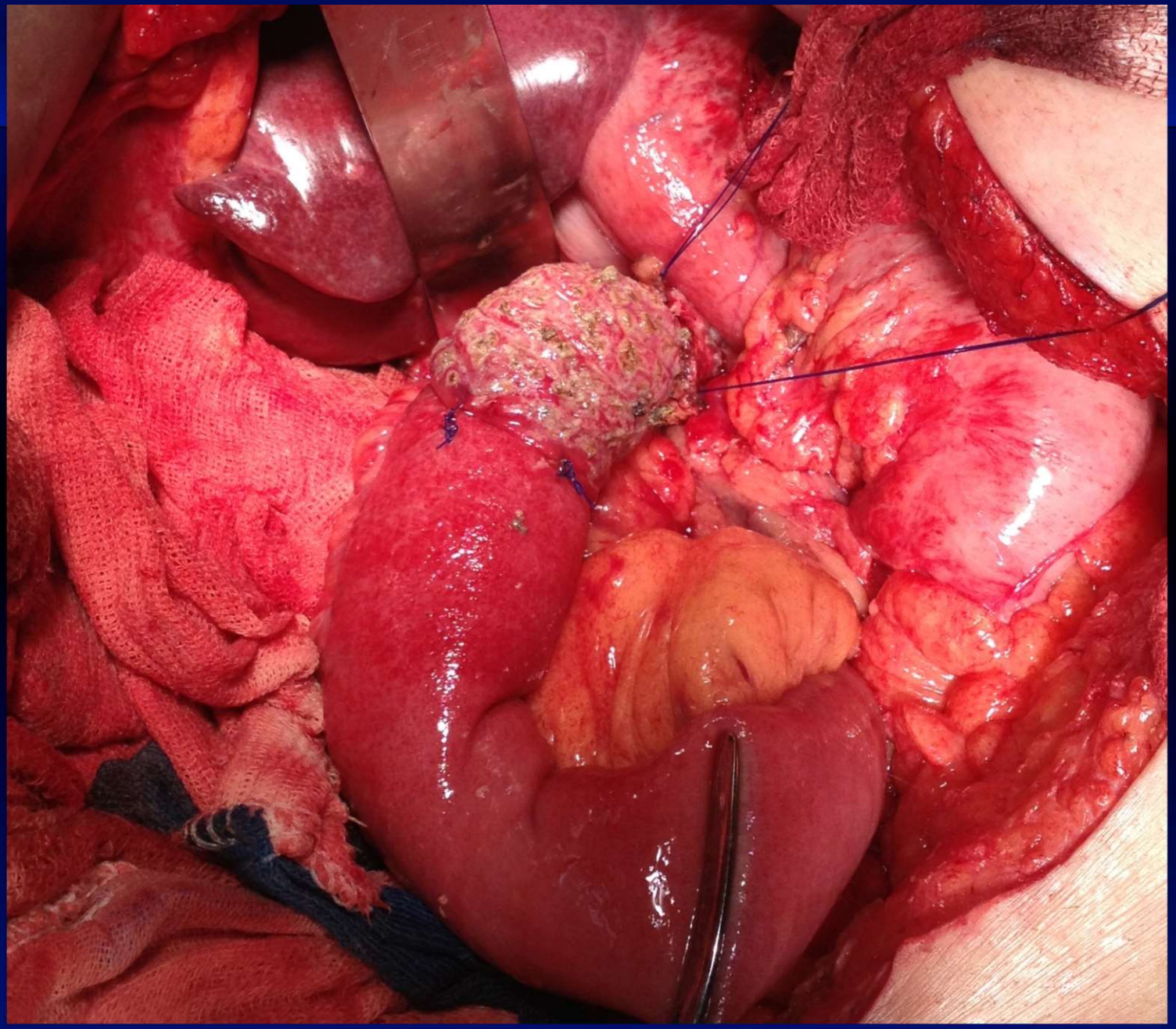


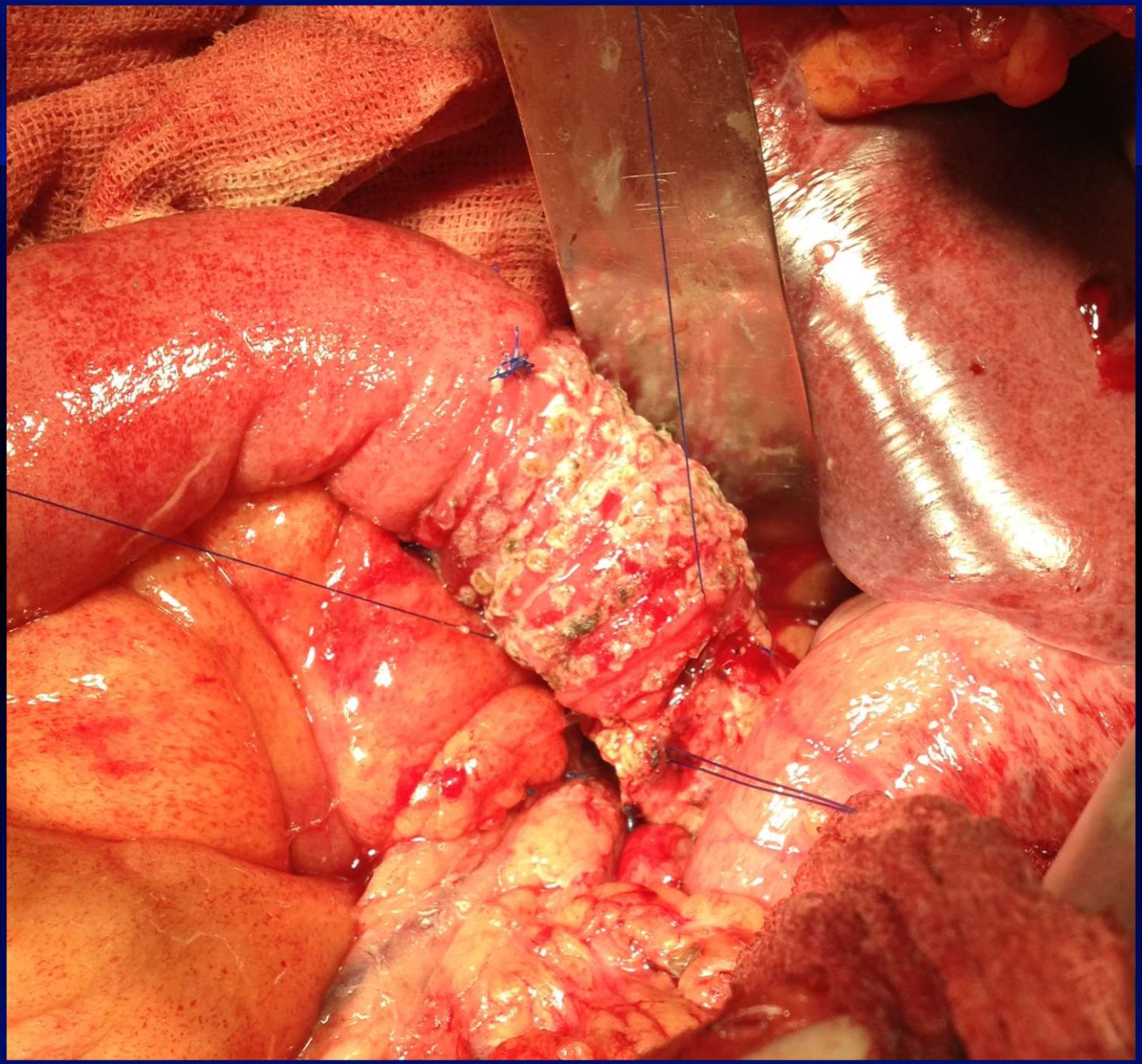


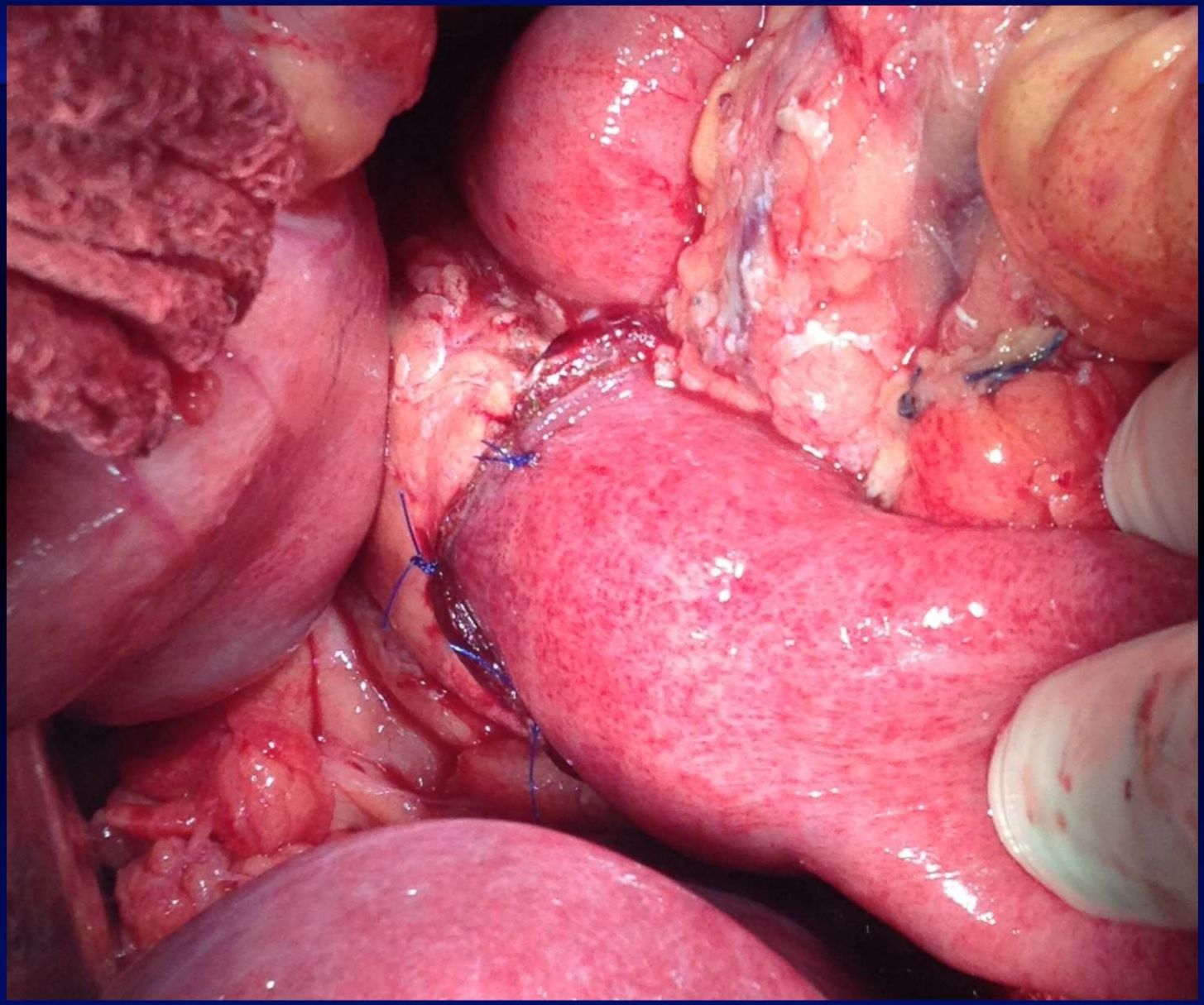


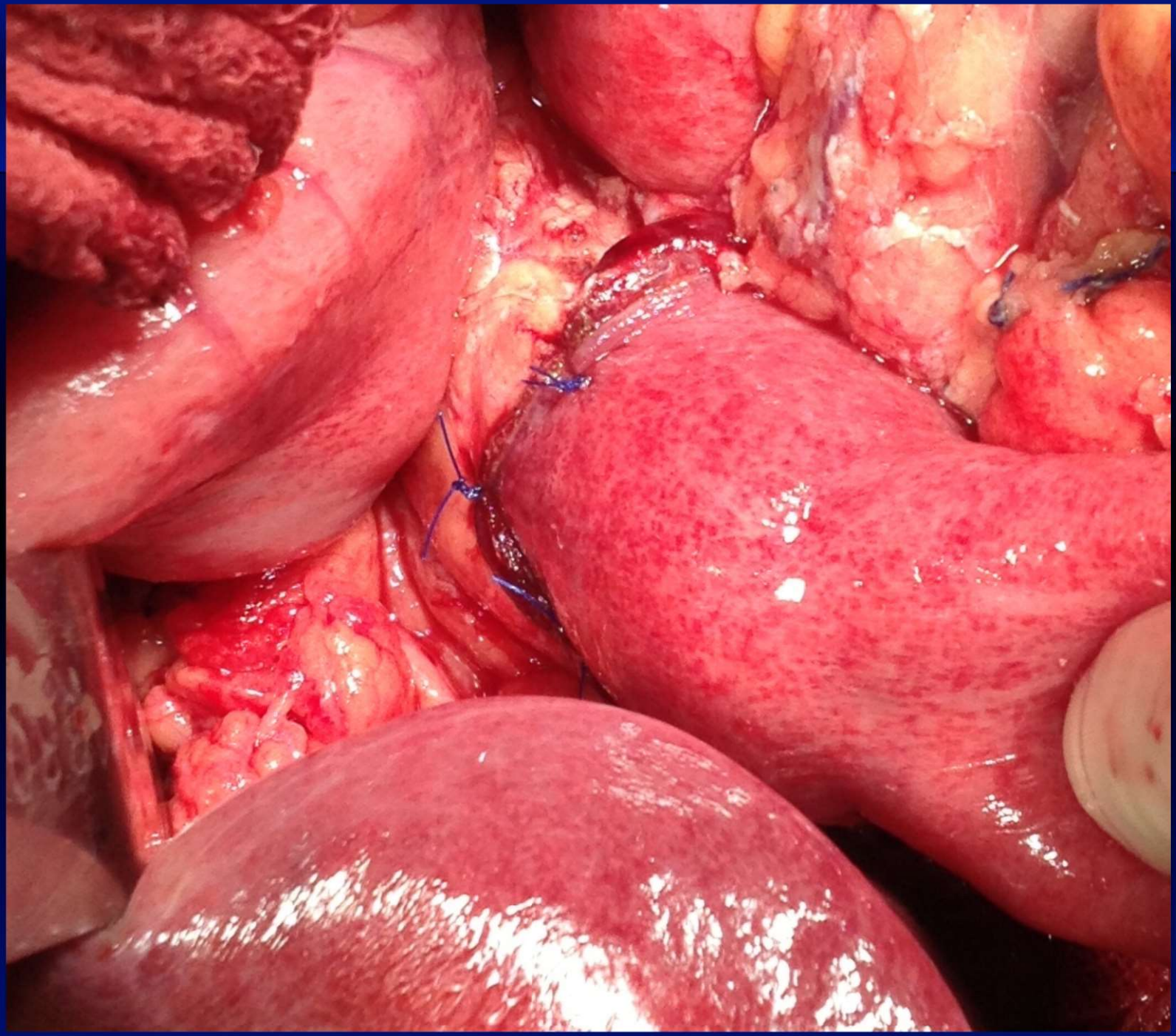


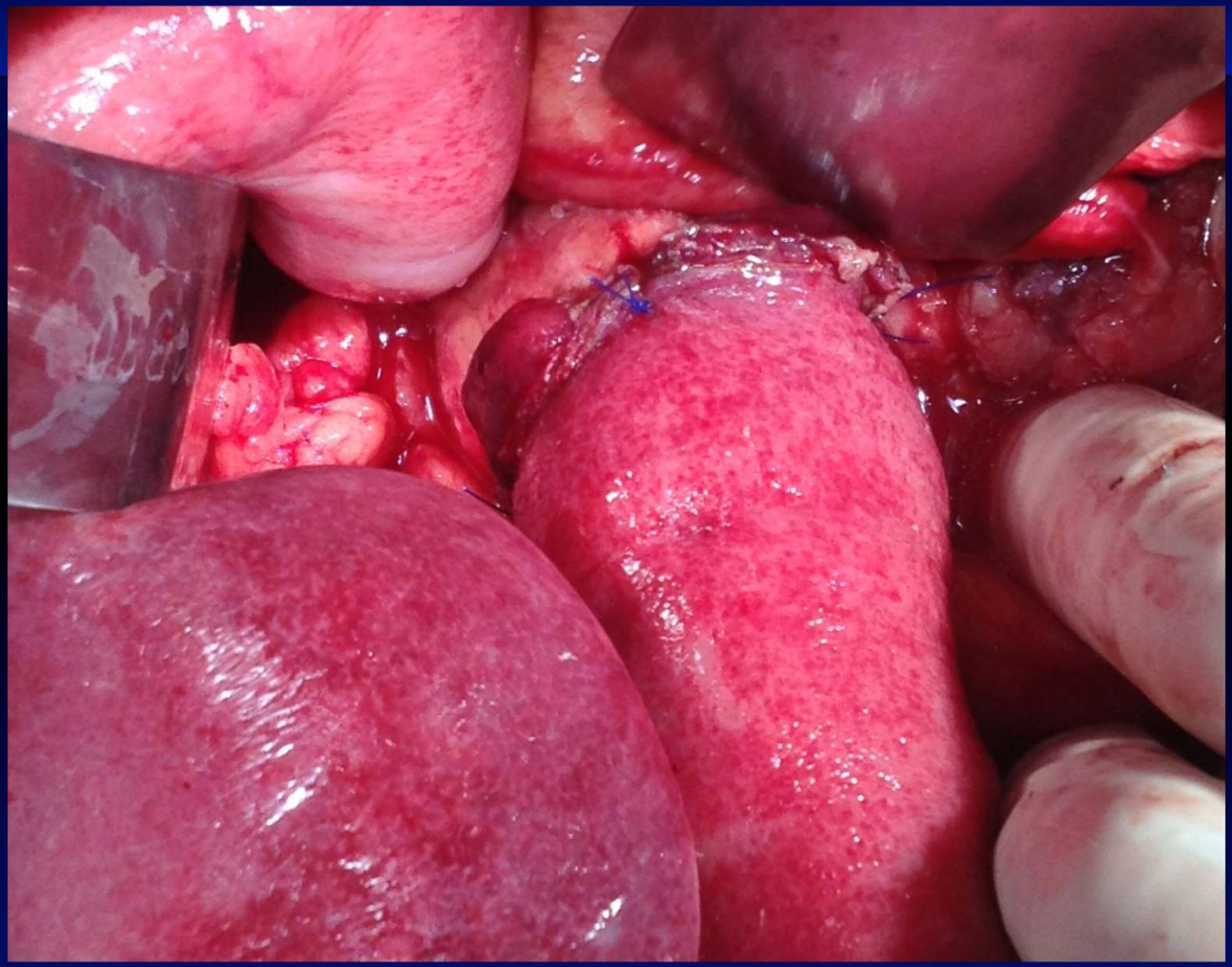


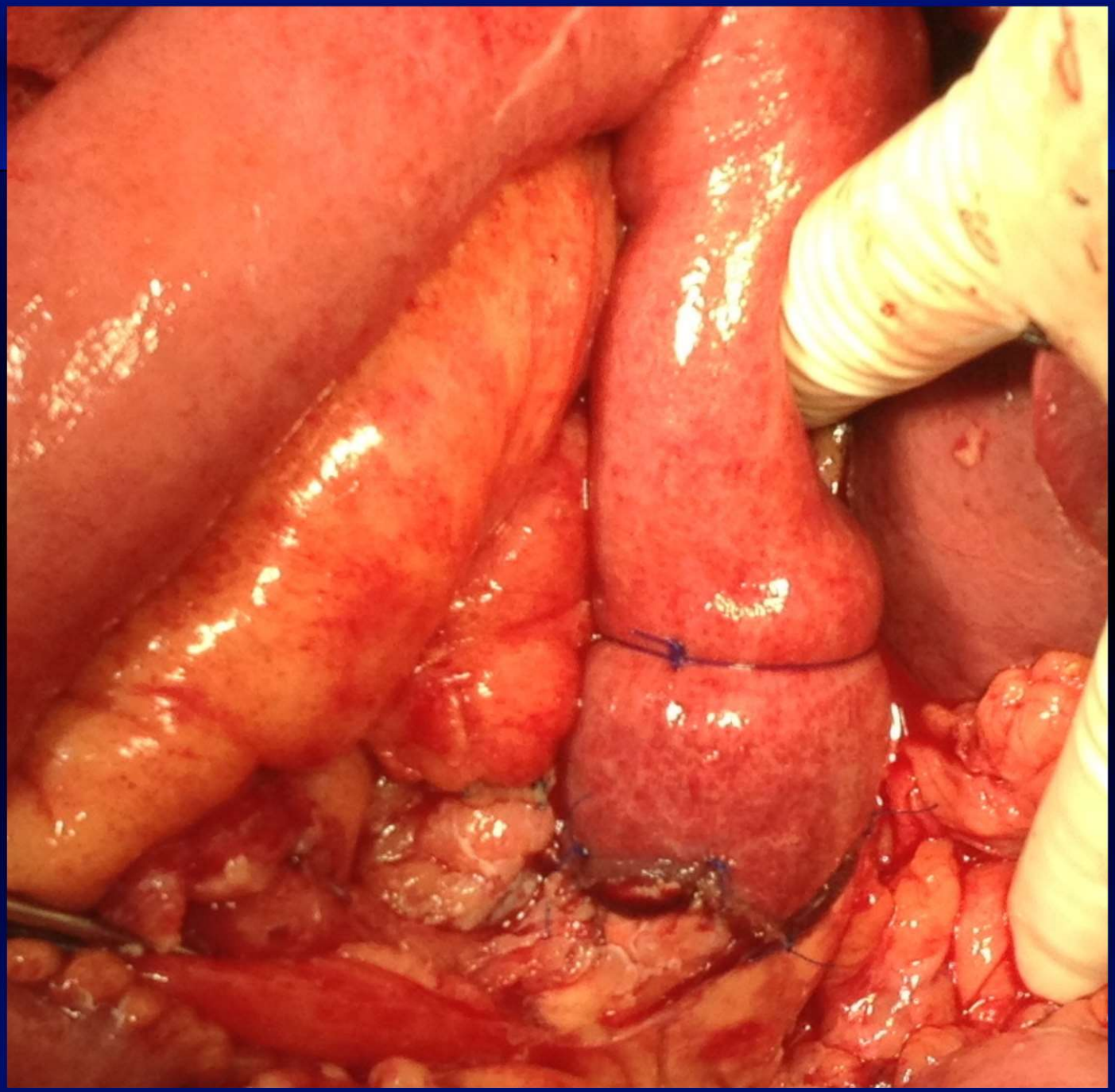








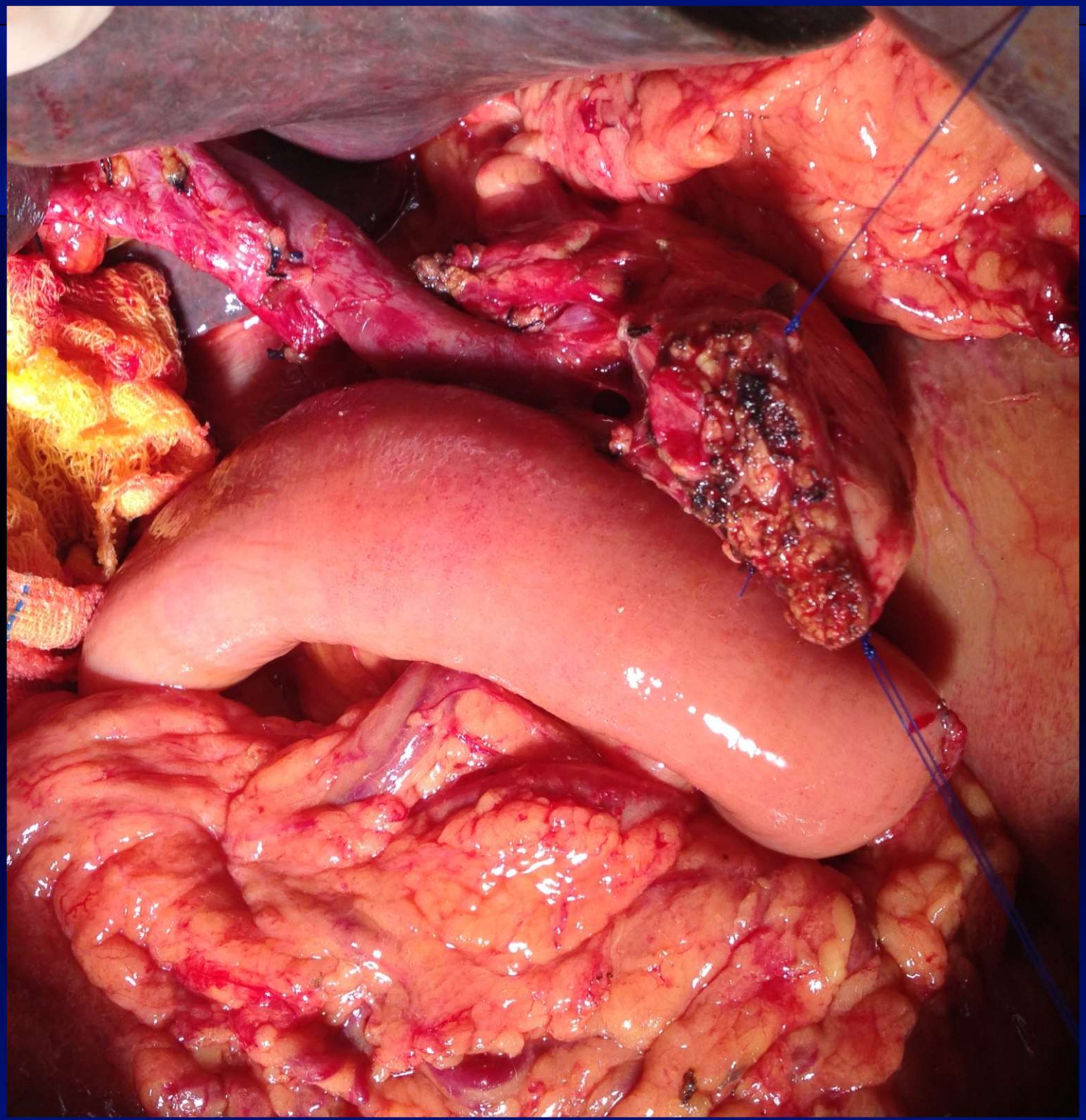


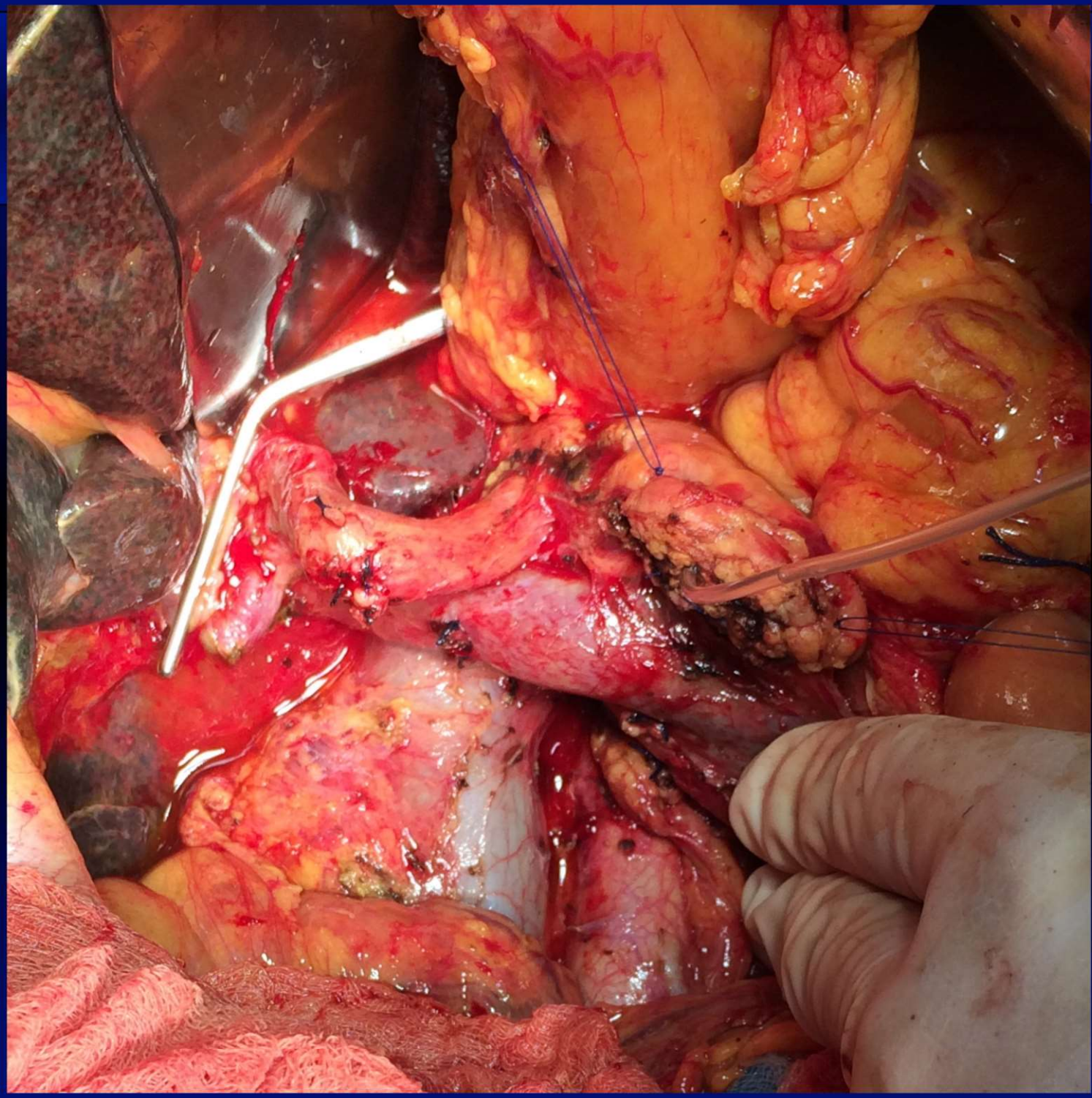


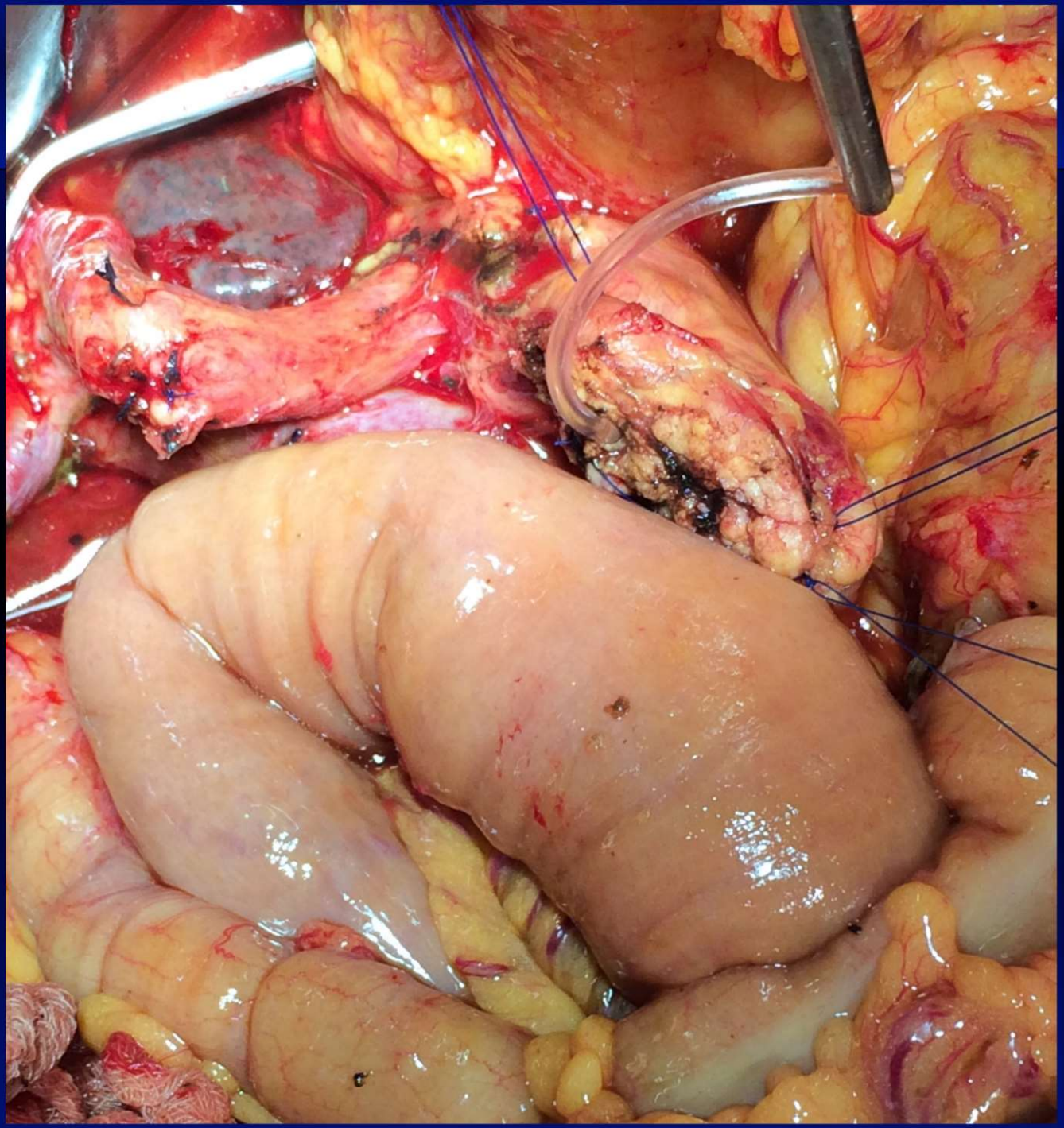
Ducto-mucosa

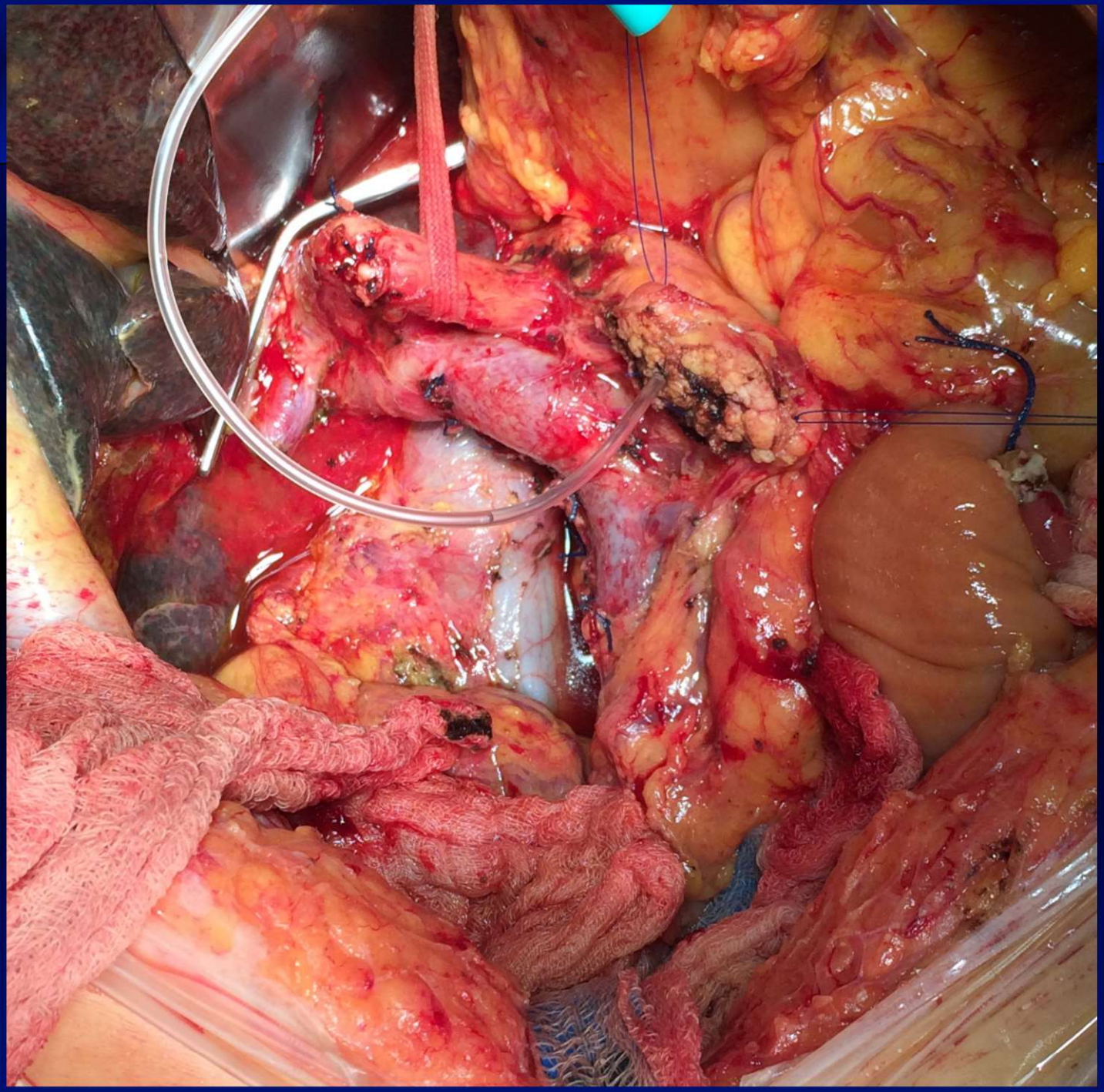

Hospital
Santo Domingos
CENTRO CIRÚR

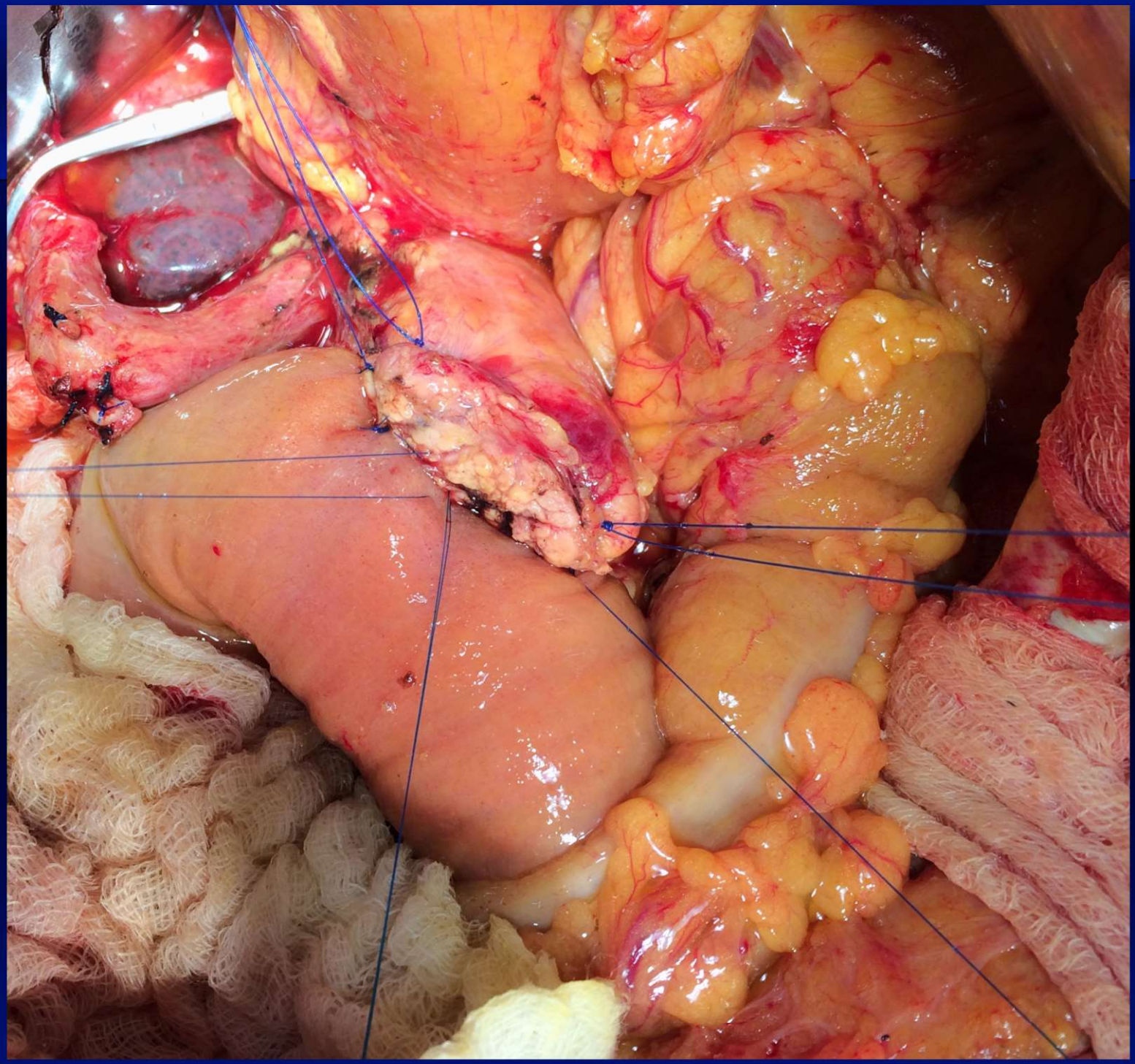

São
Domingos
Hospital & Maternidade

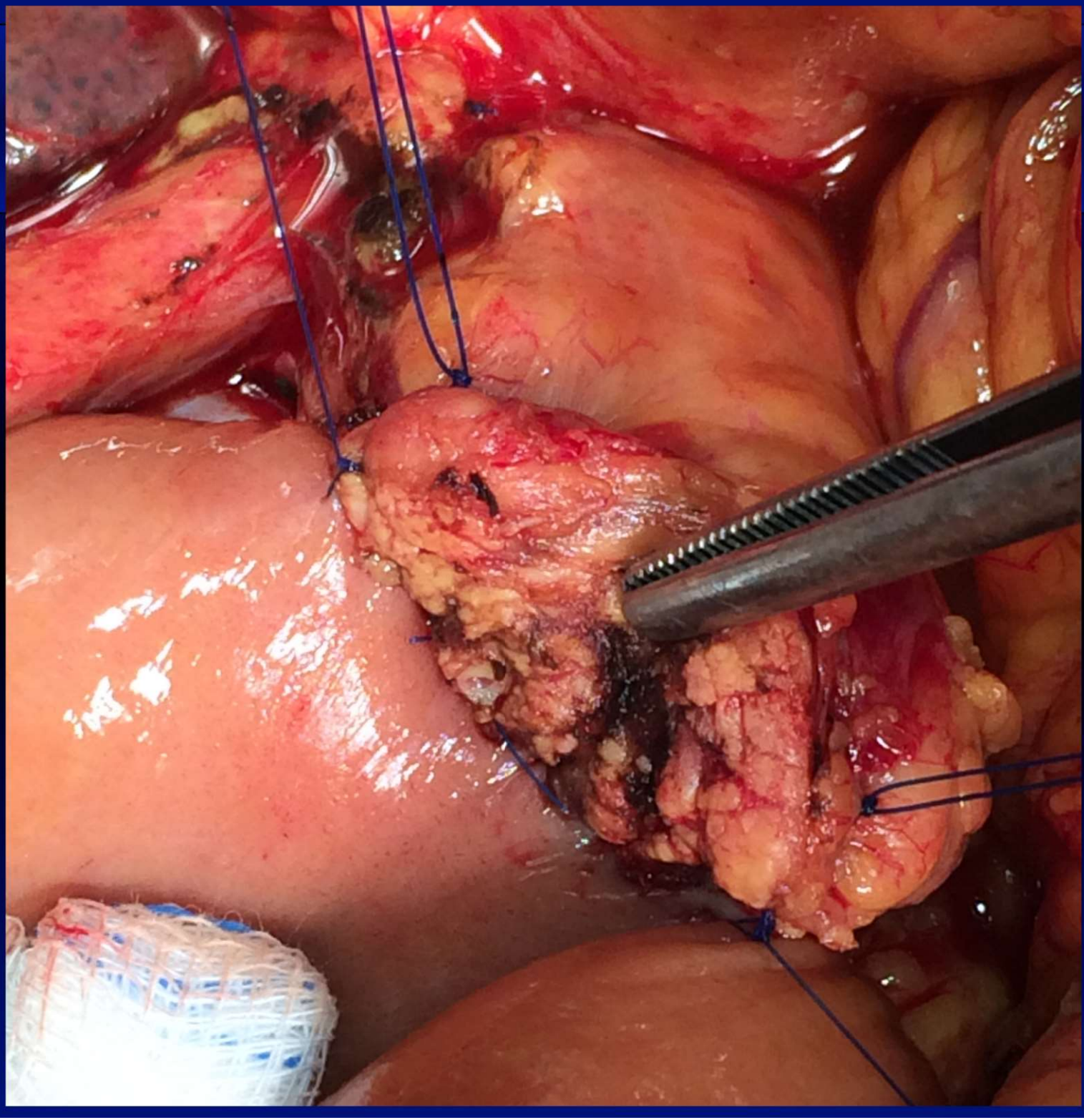


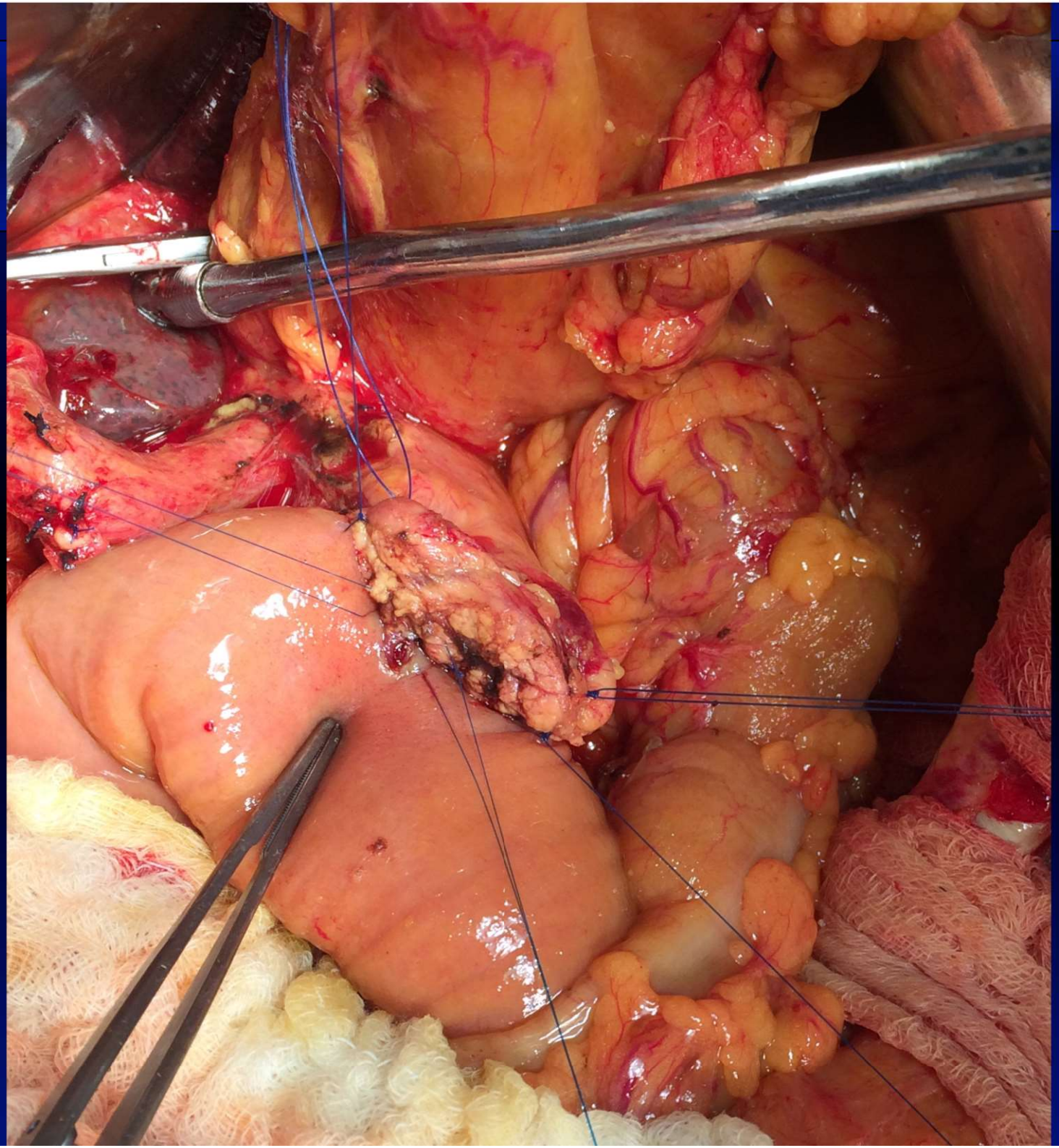


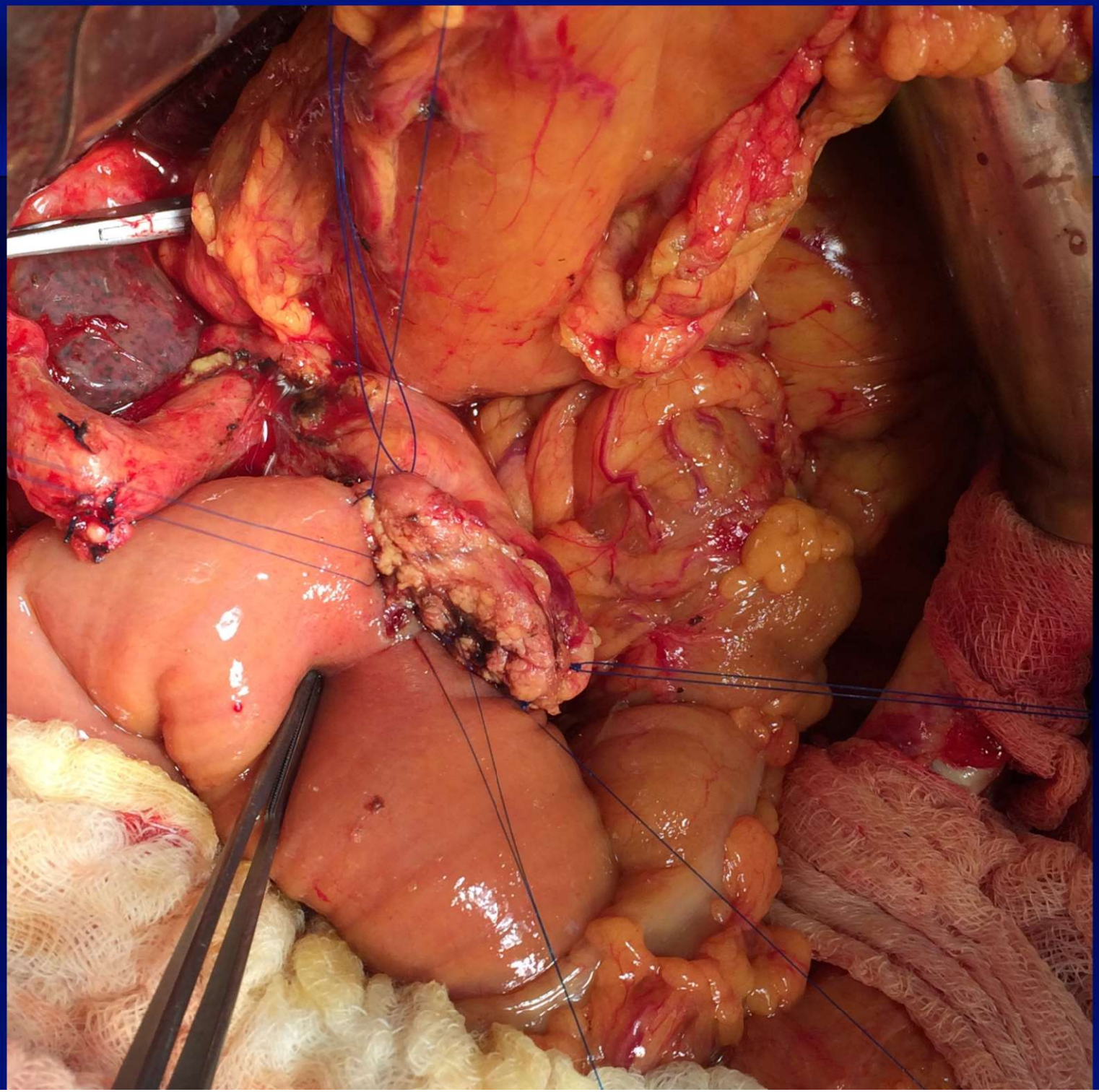


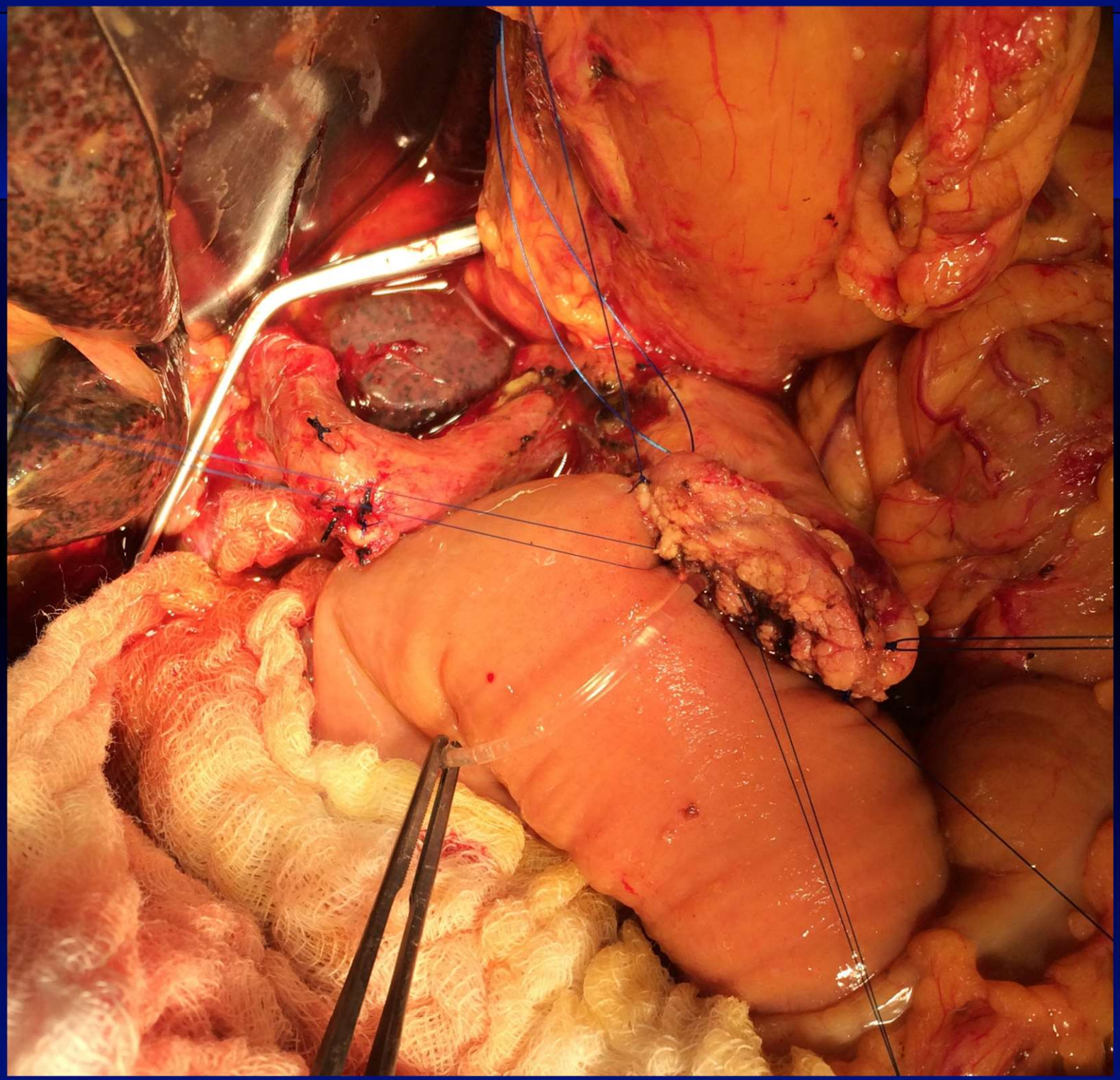


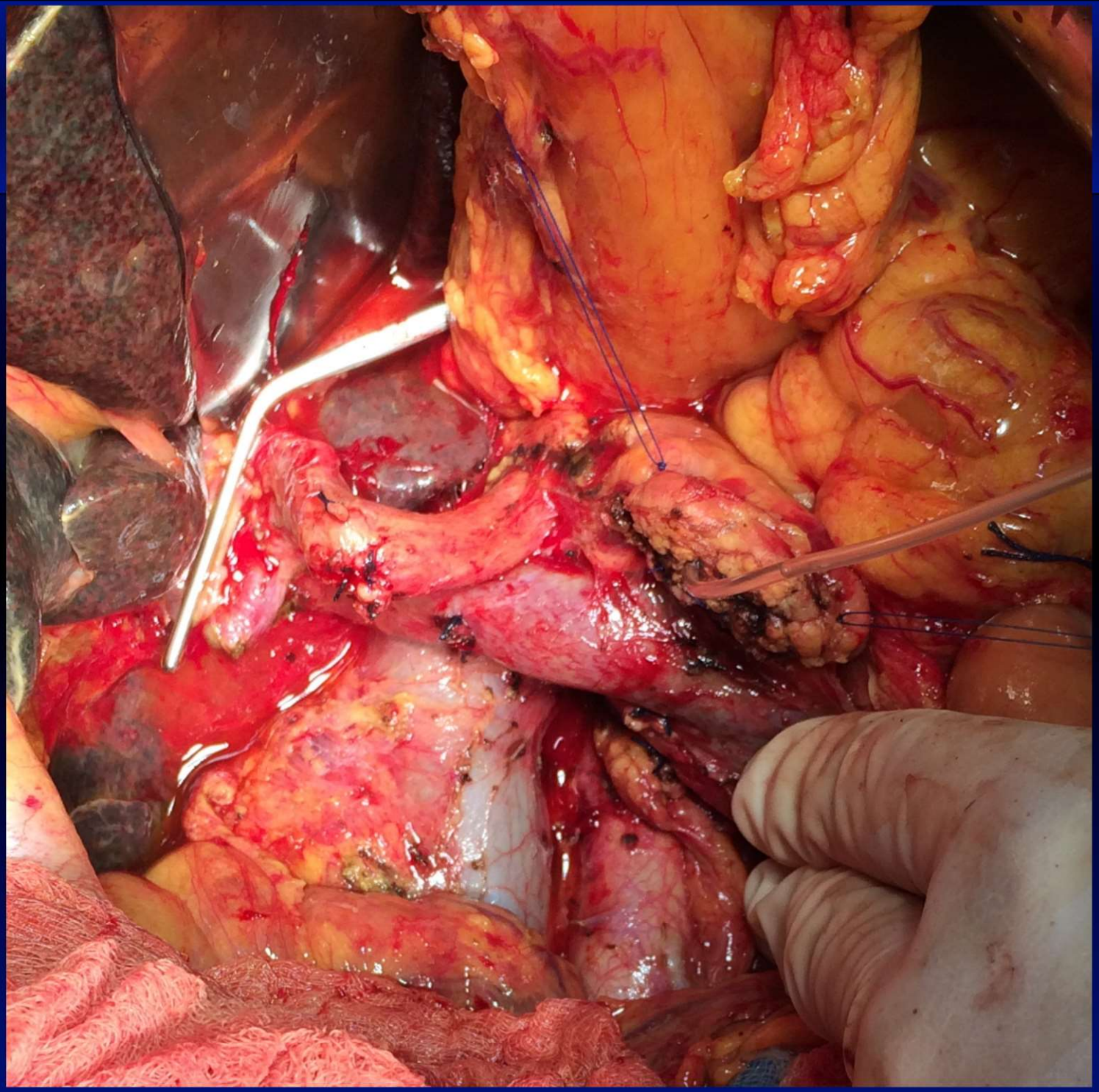


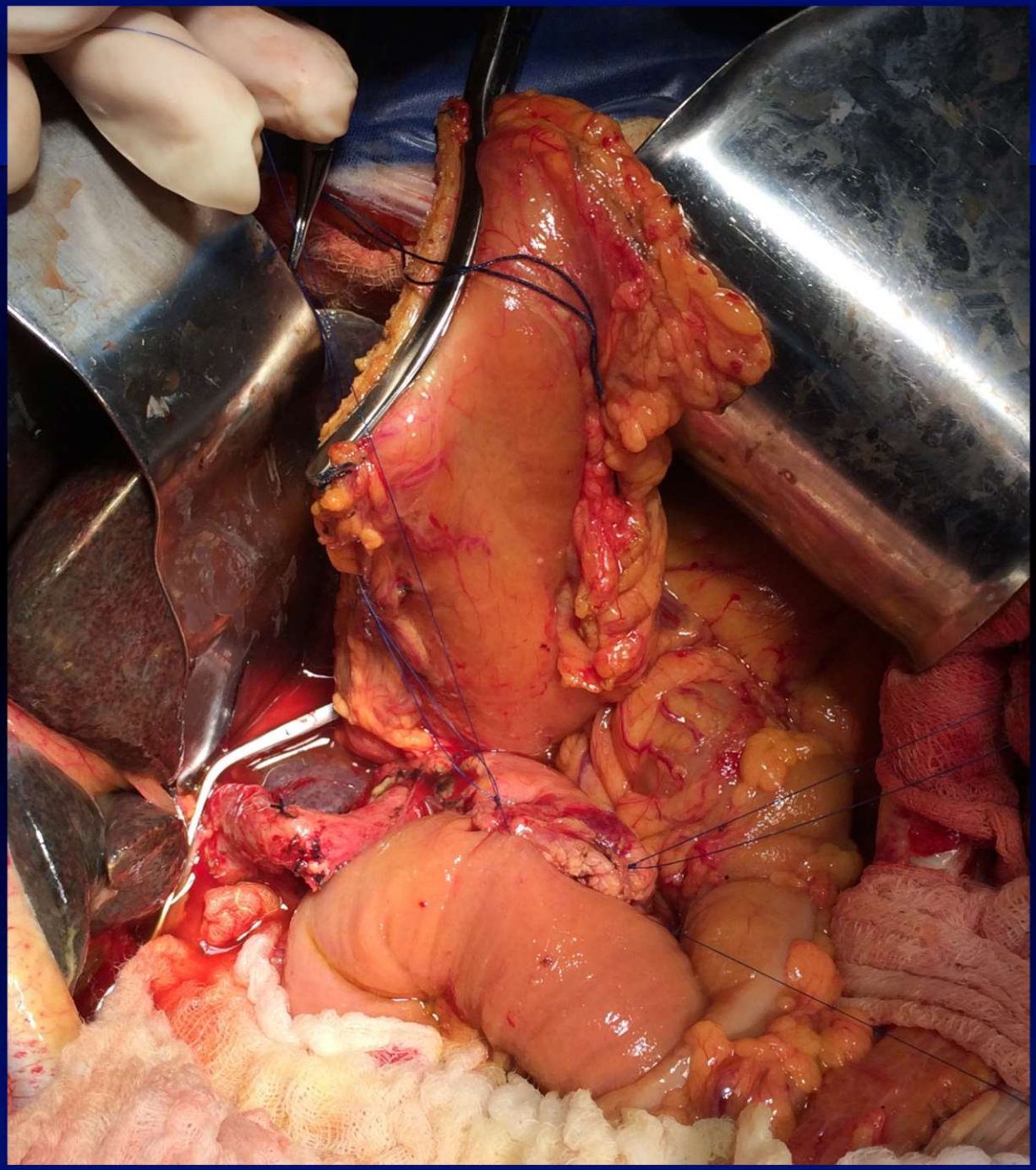


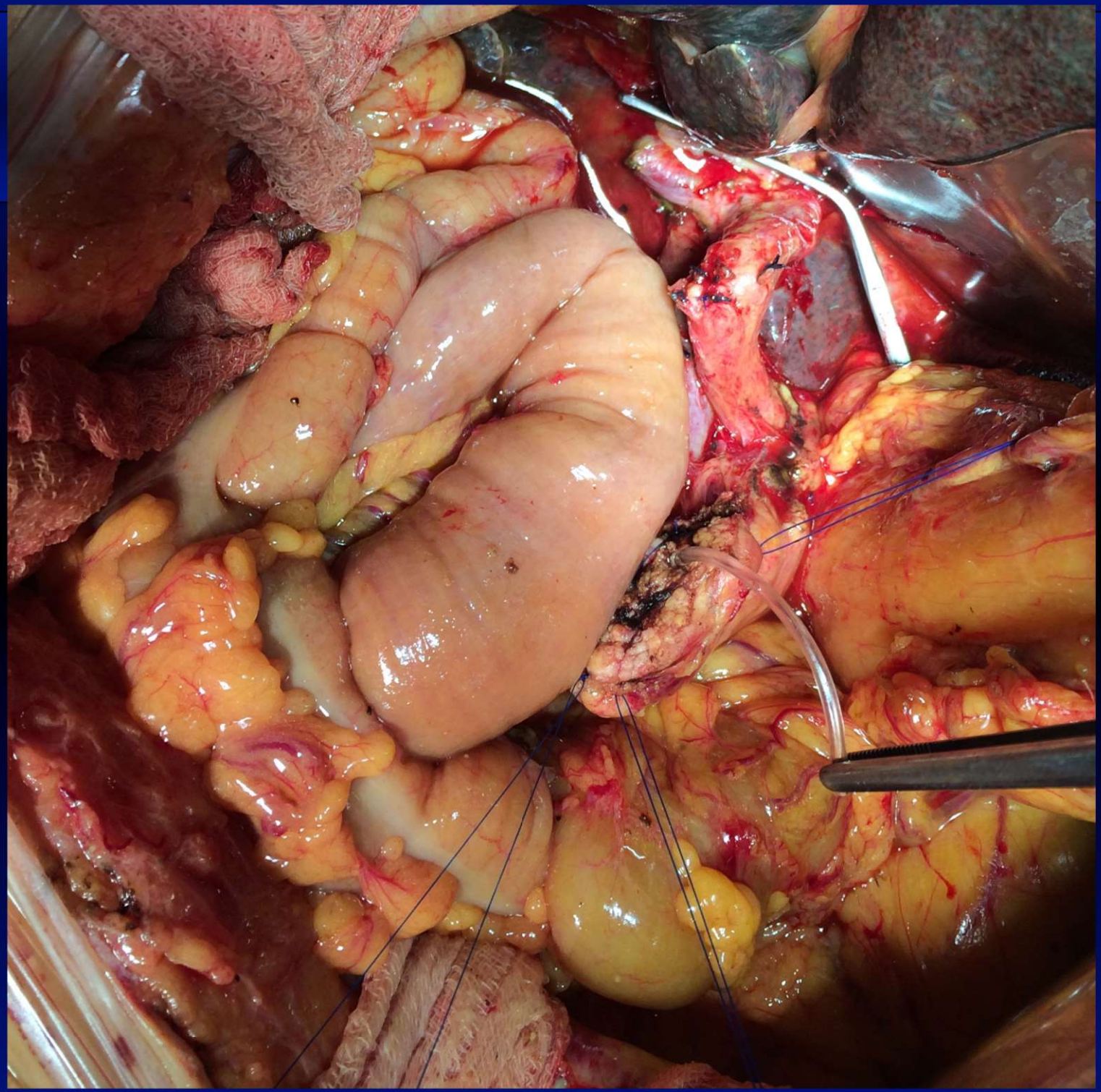


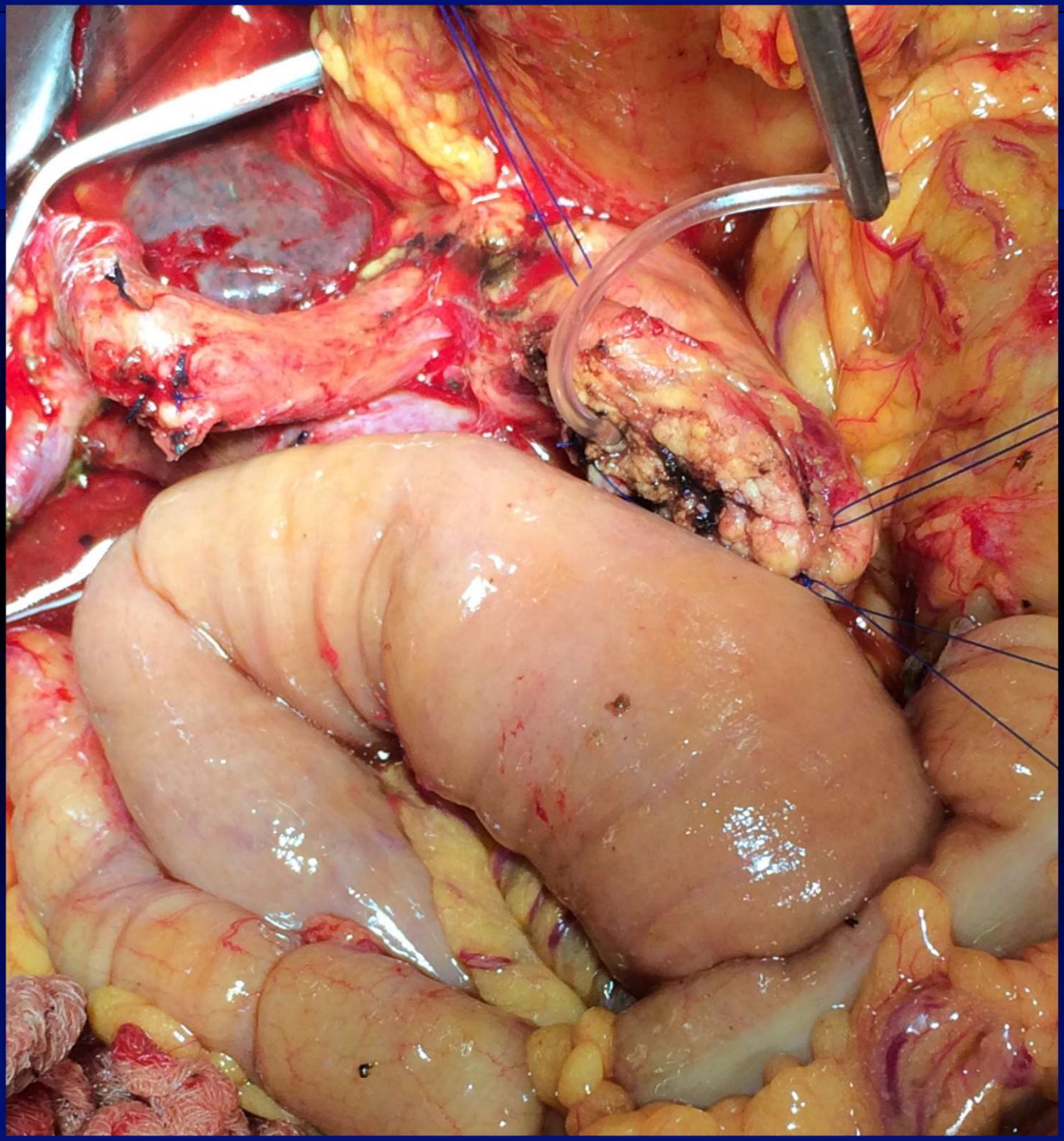


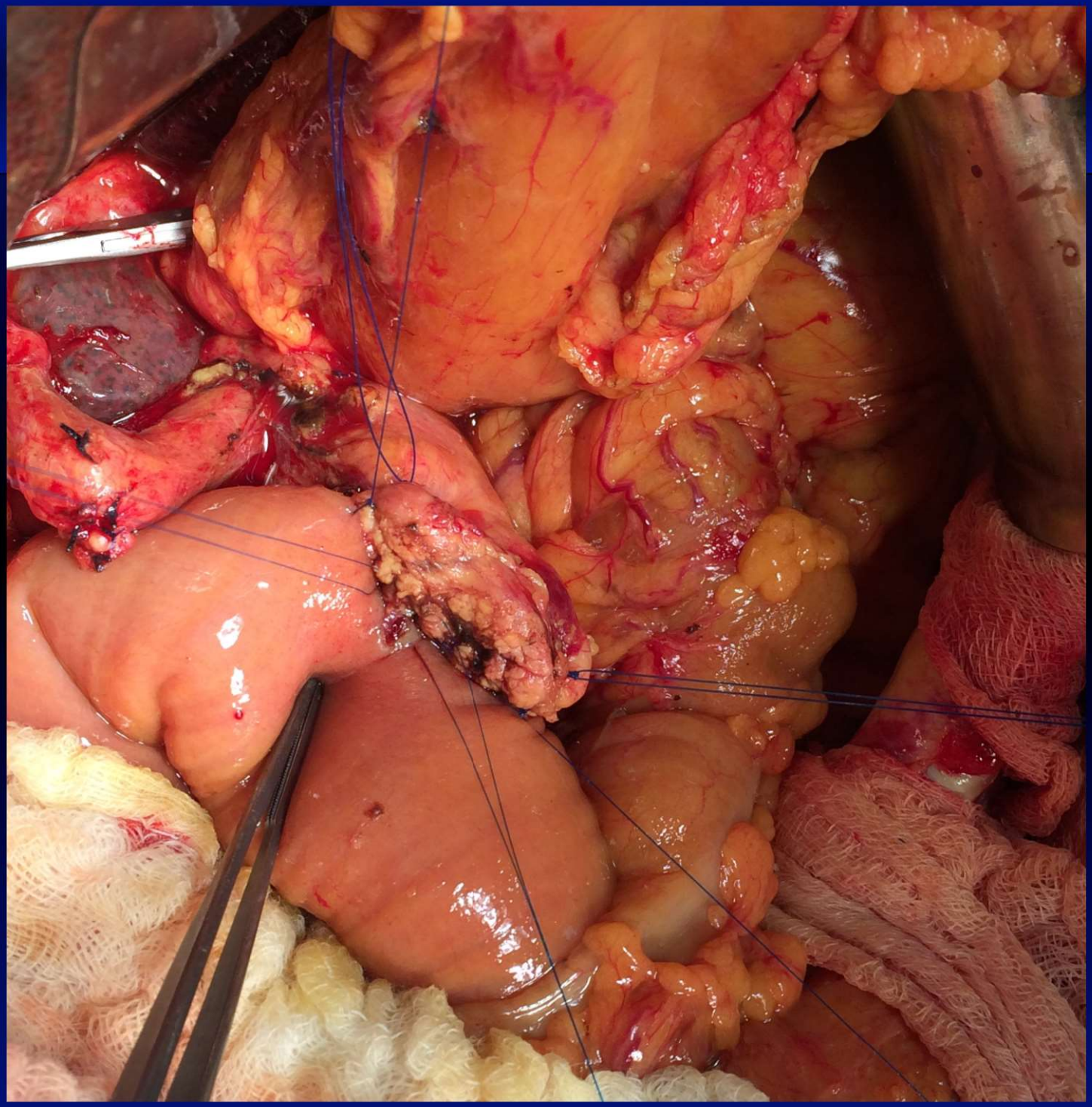


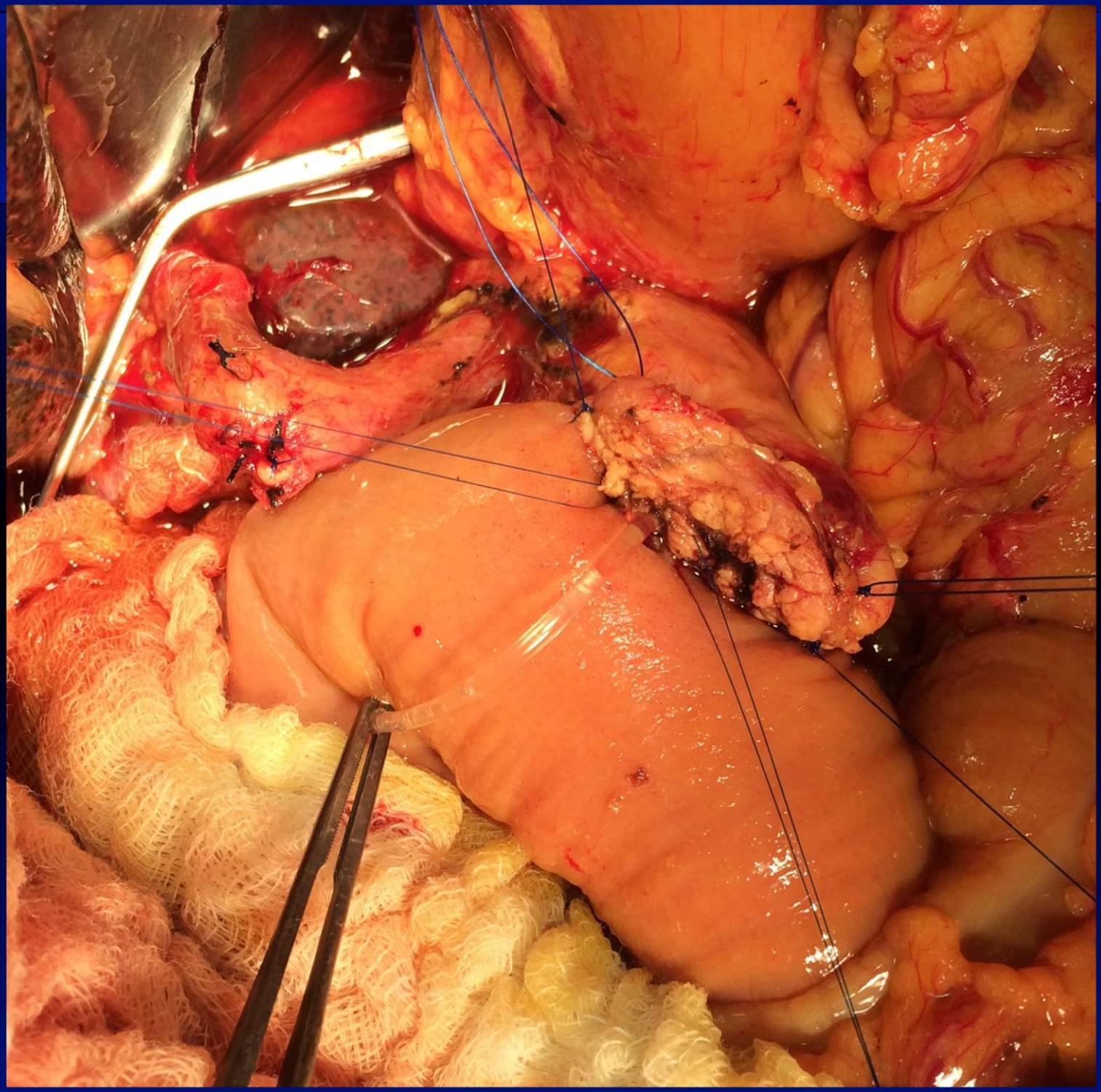


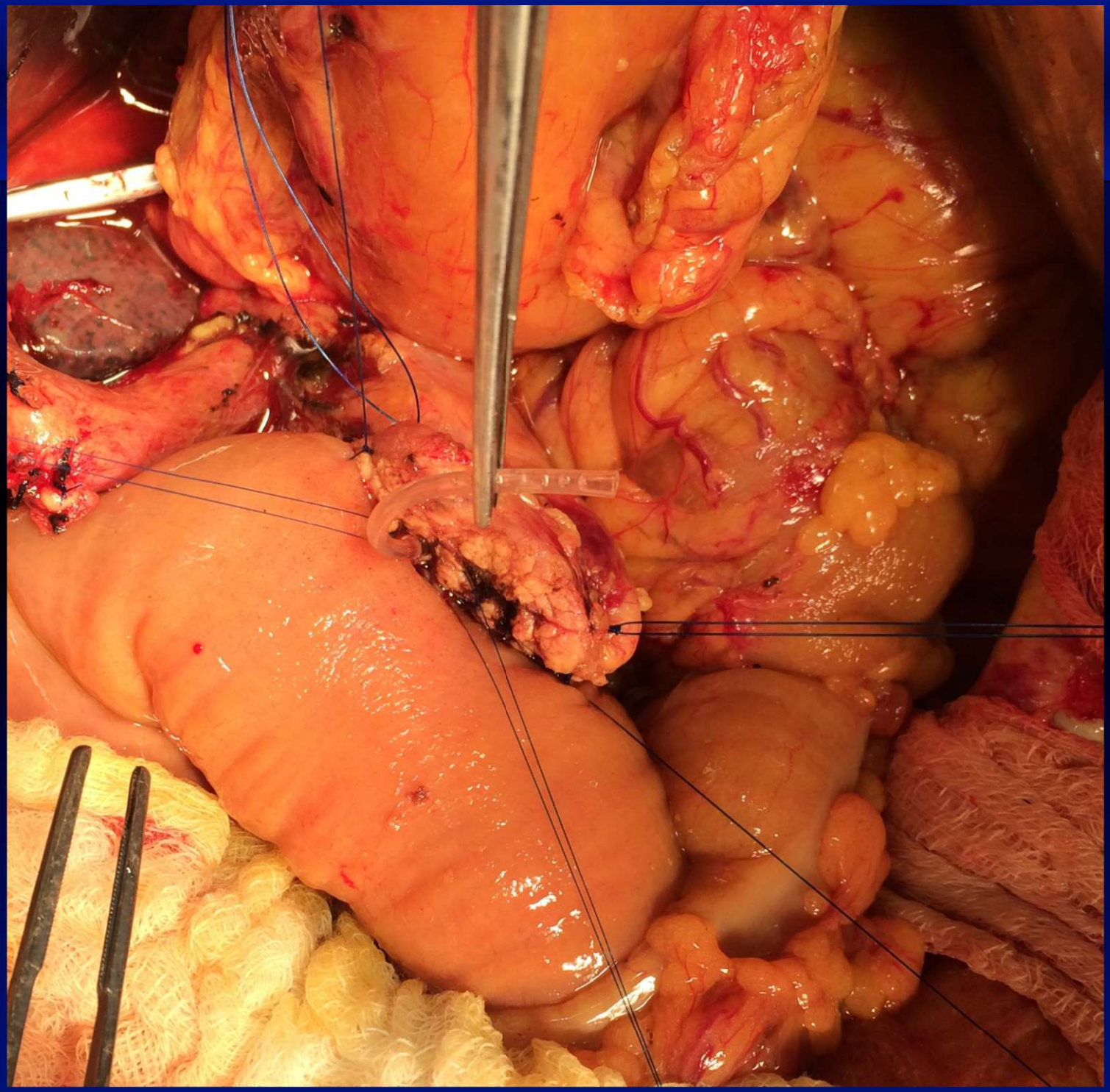


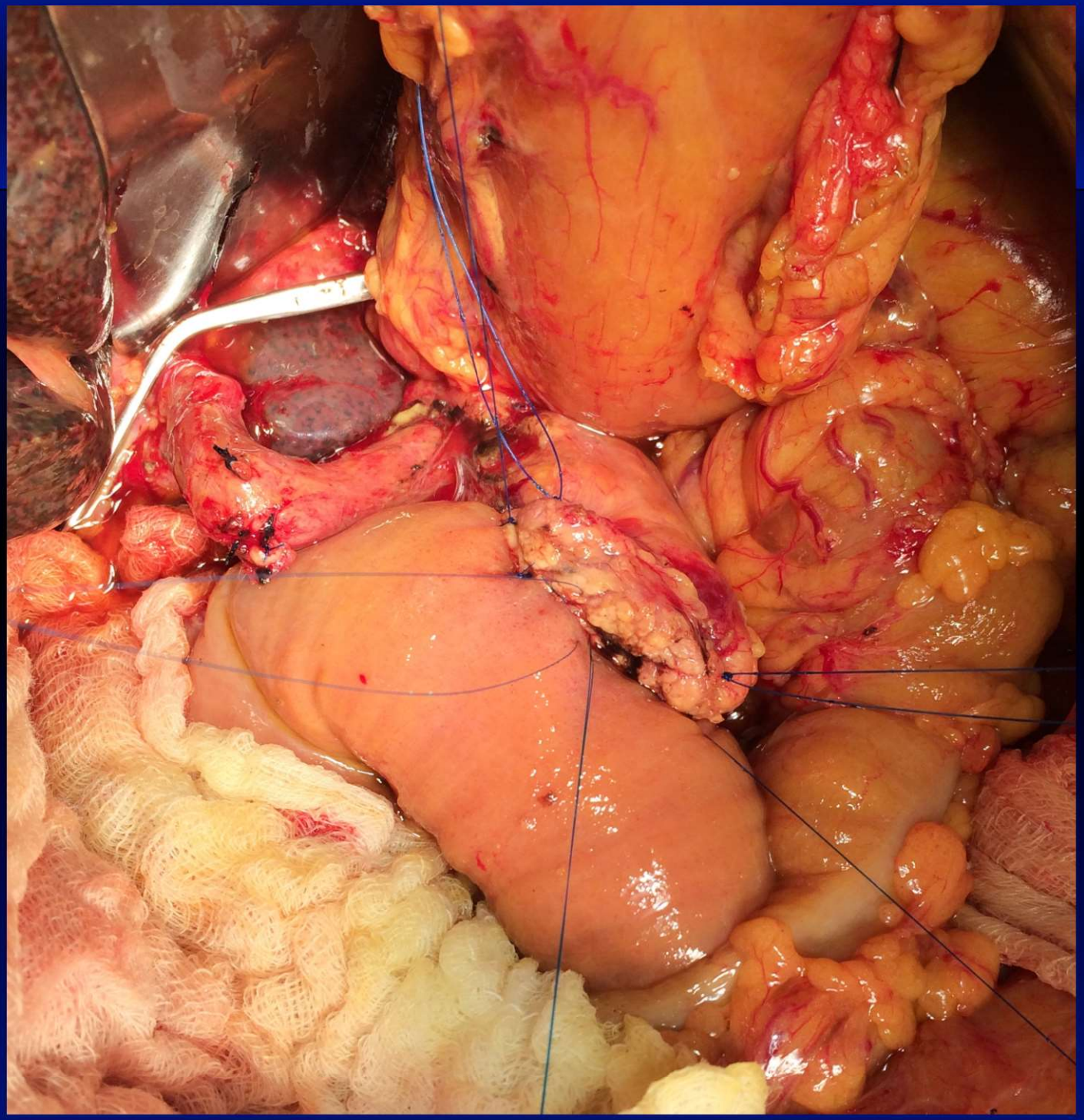


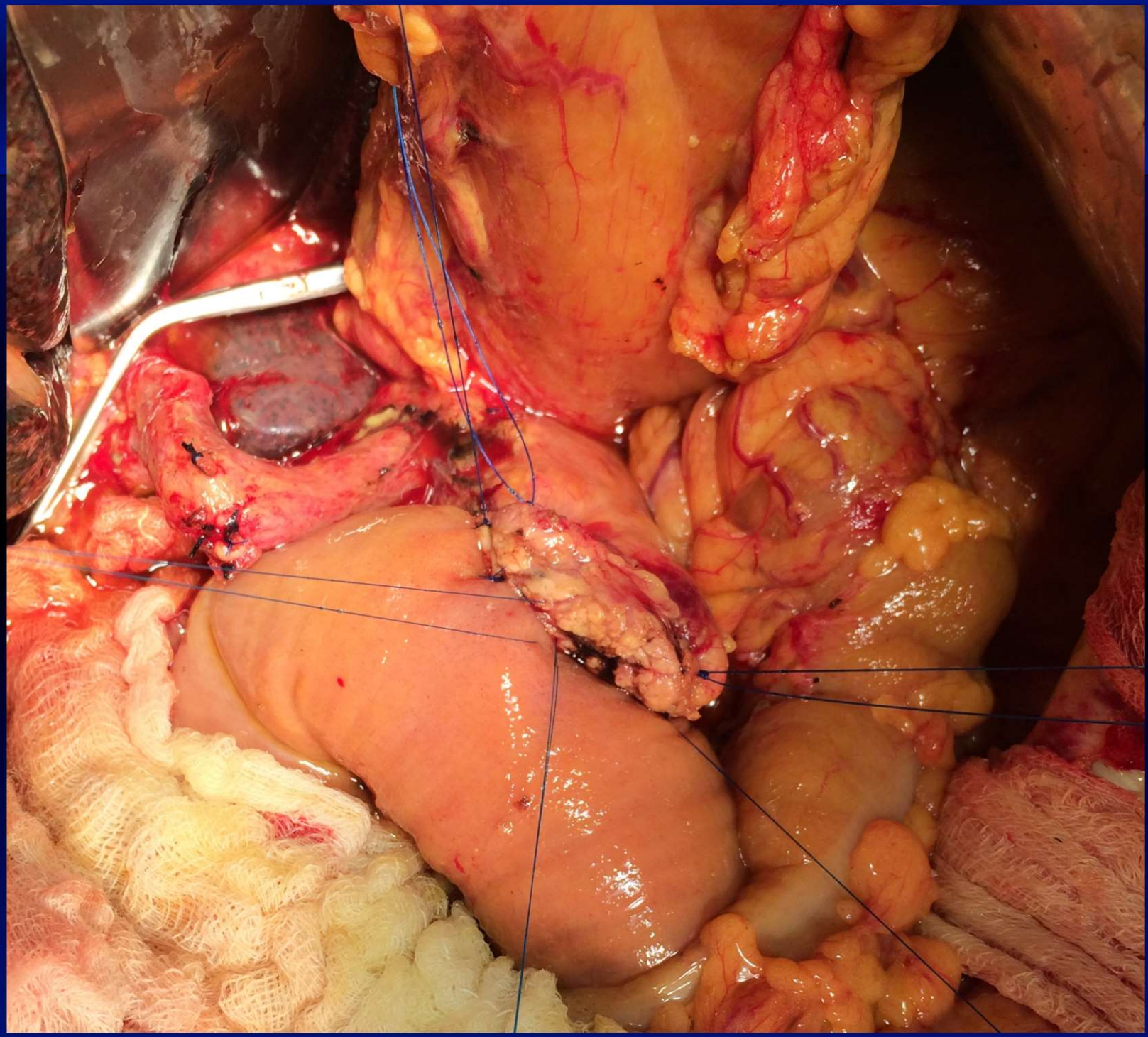


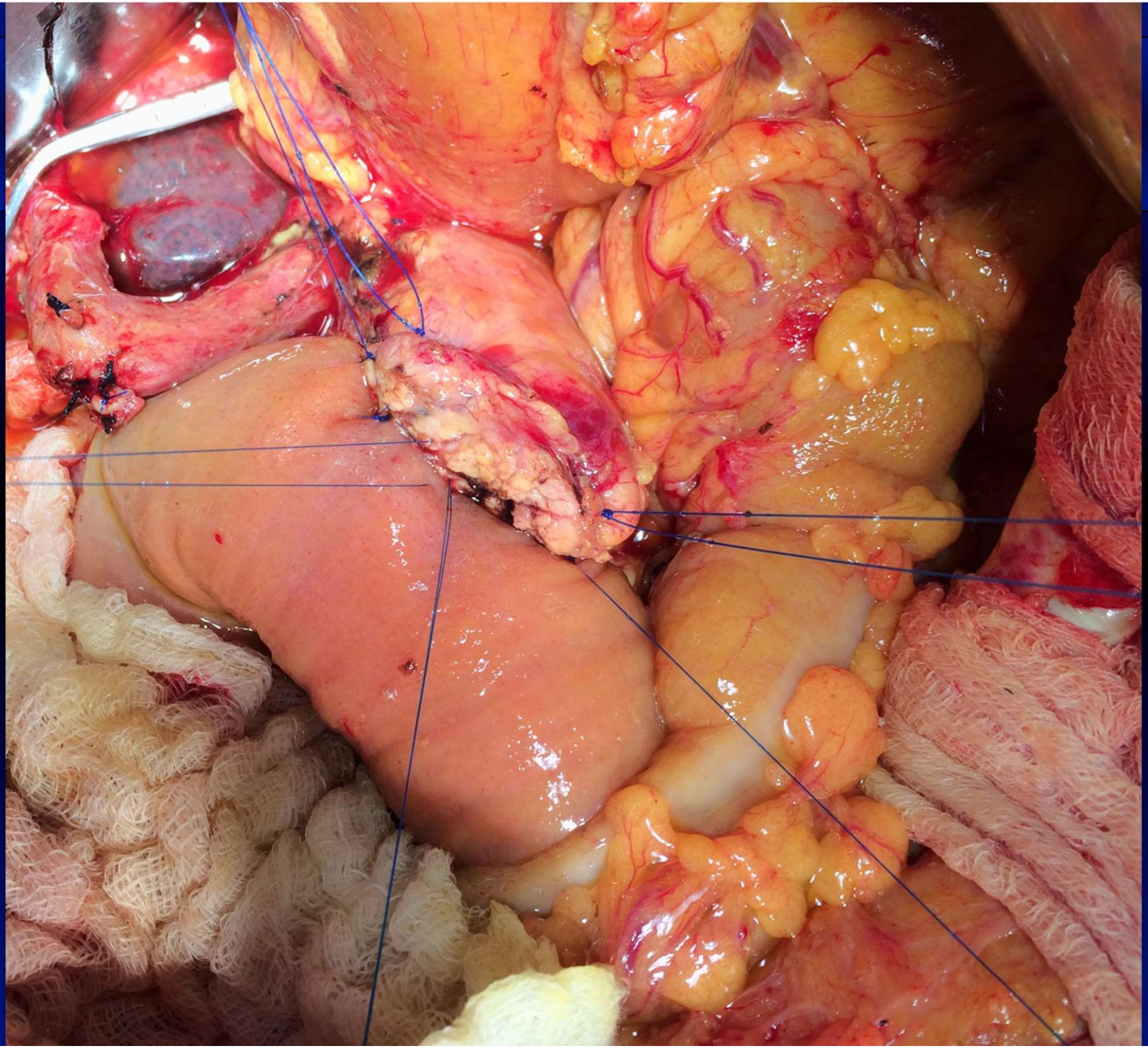


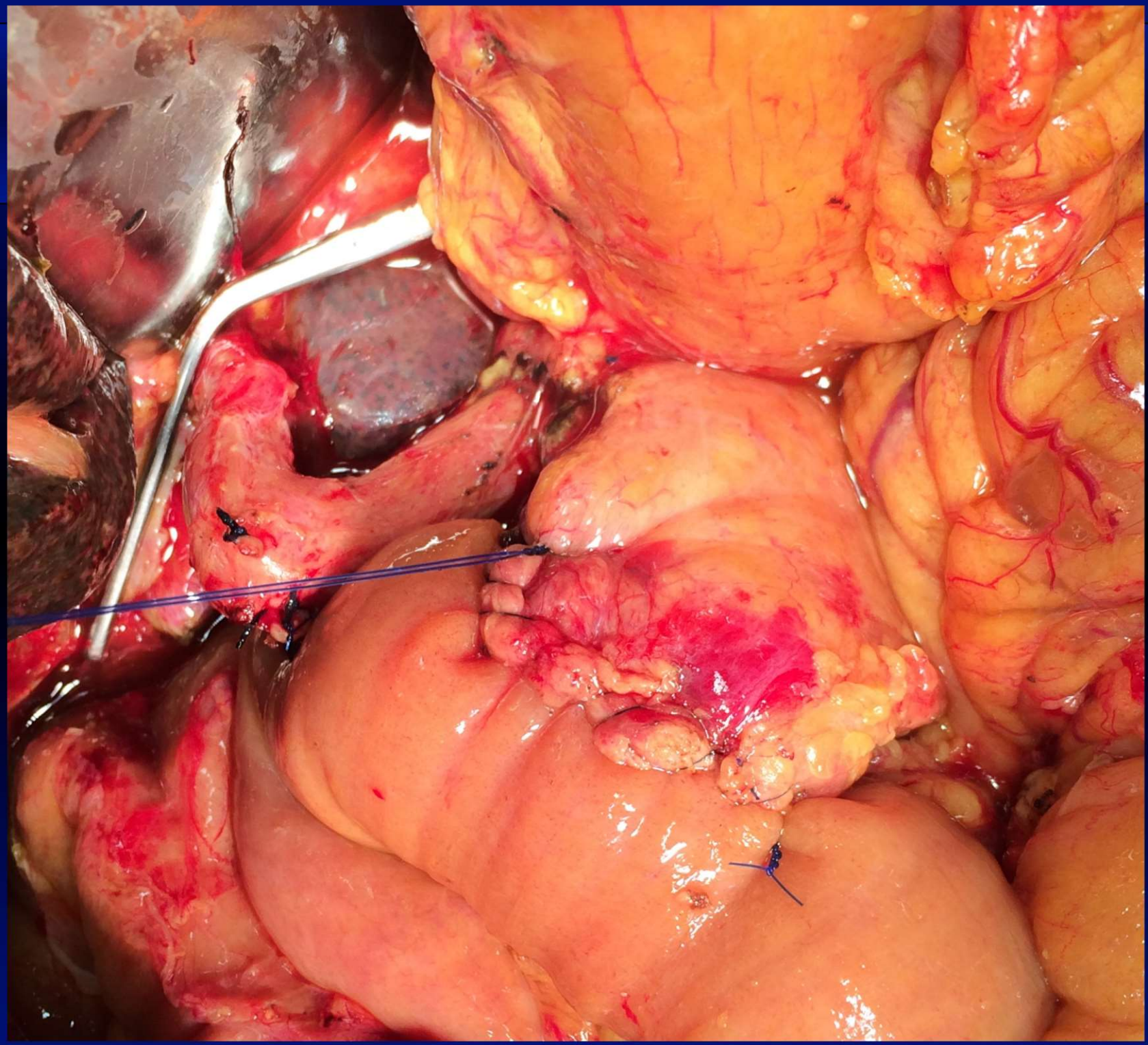






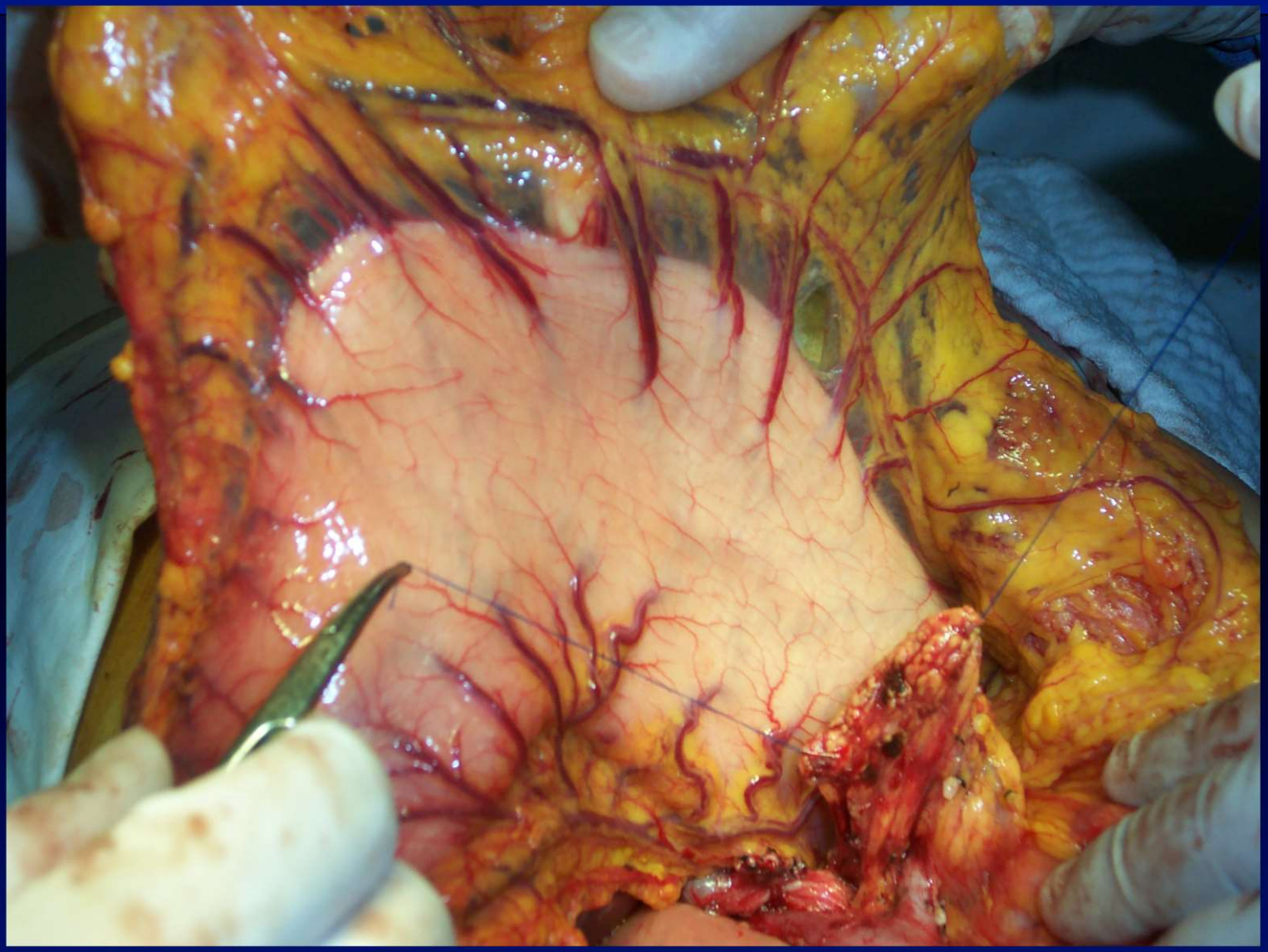






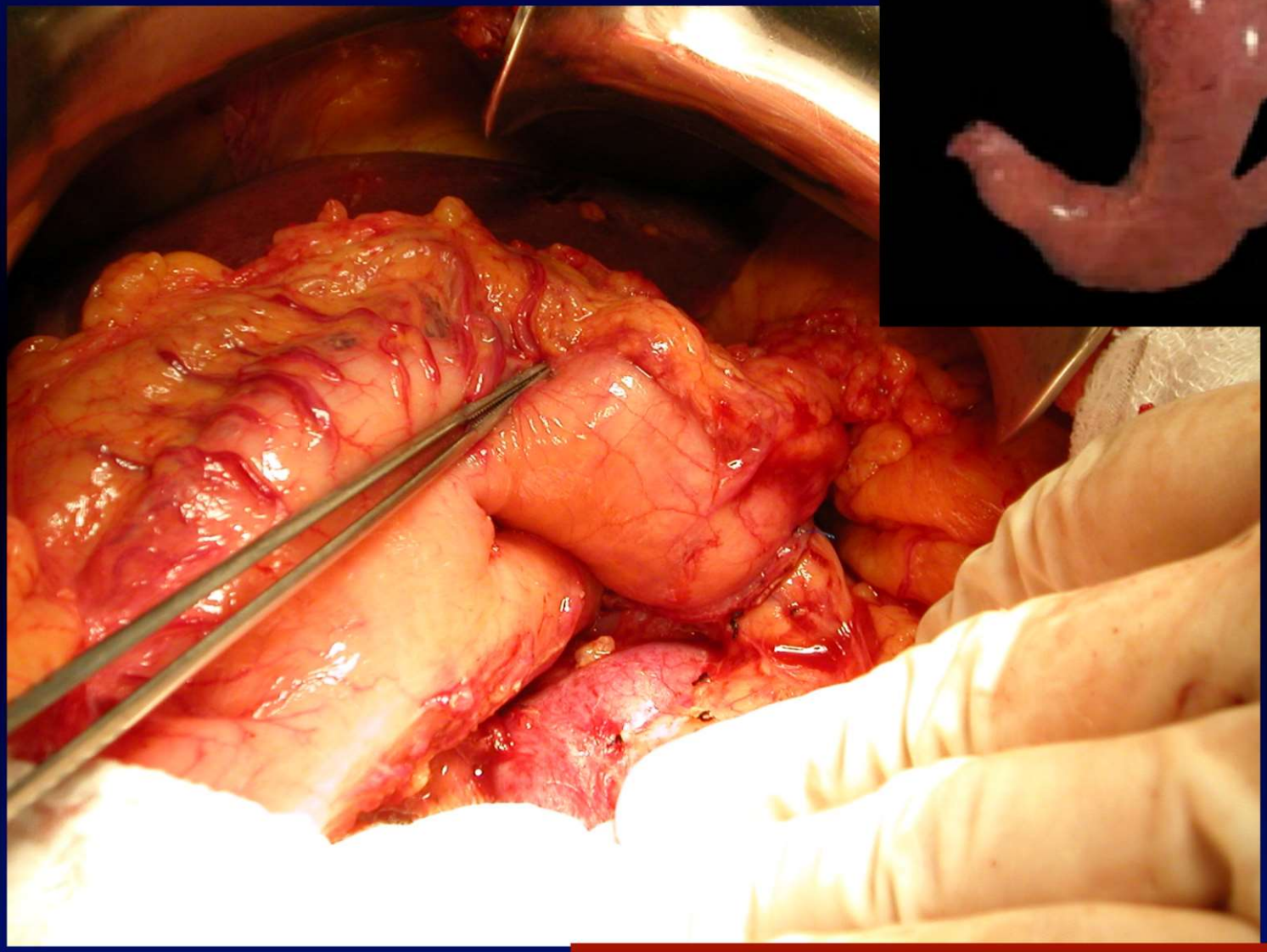
Pancreatogastro

Pancreatogastrostomia
Técnica de Montenegro



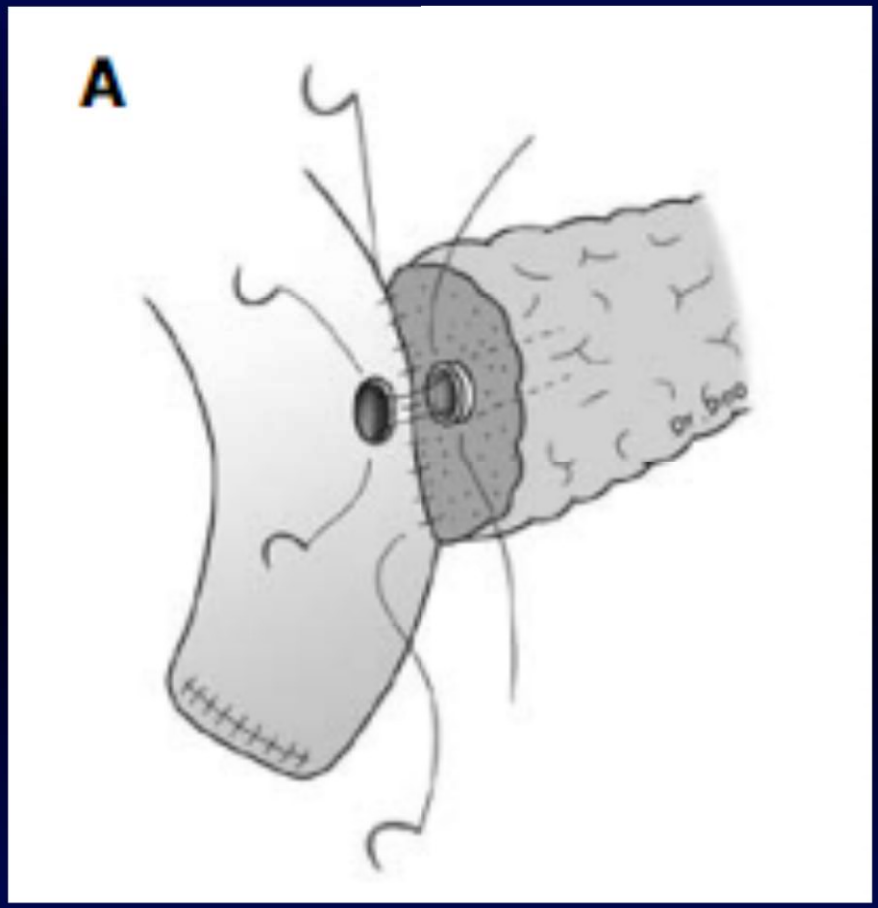
Cortesia do Dr. Roland Montenegro Costa

Pancreatogastrostomia
Técnica de Montenegro



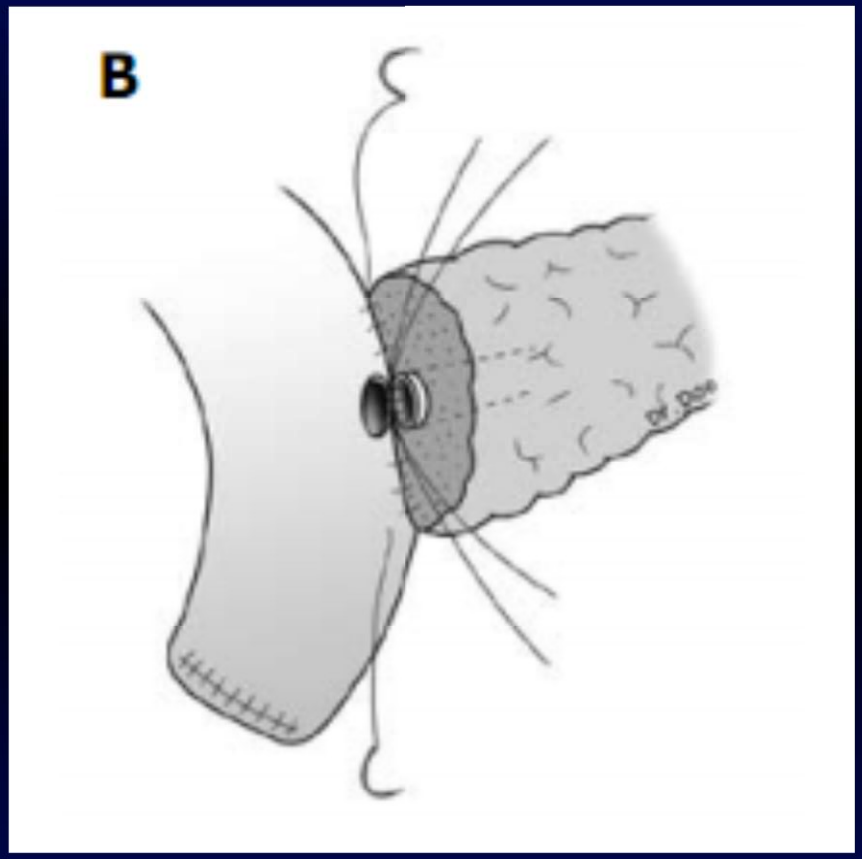
Cortesia do Dr. Roland Montenegro Costa

Pancreatojejunostomia



Lee SE, et al. World J Gastroenterol 2007;13:5351-6

Pancreatojejunostomia



Lee SE, et al. World J Gastroenterol 2007;13:5351-6

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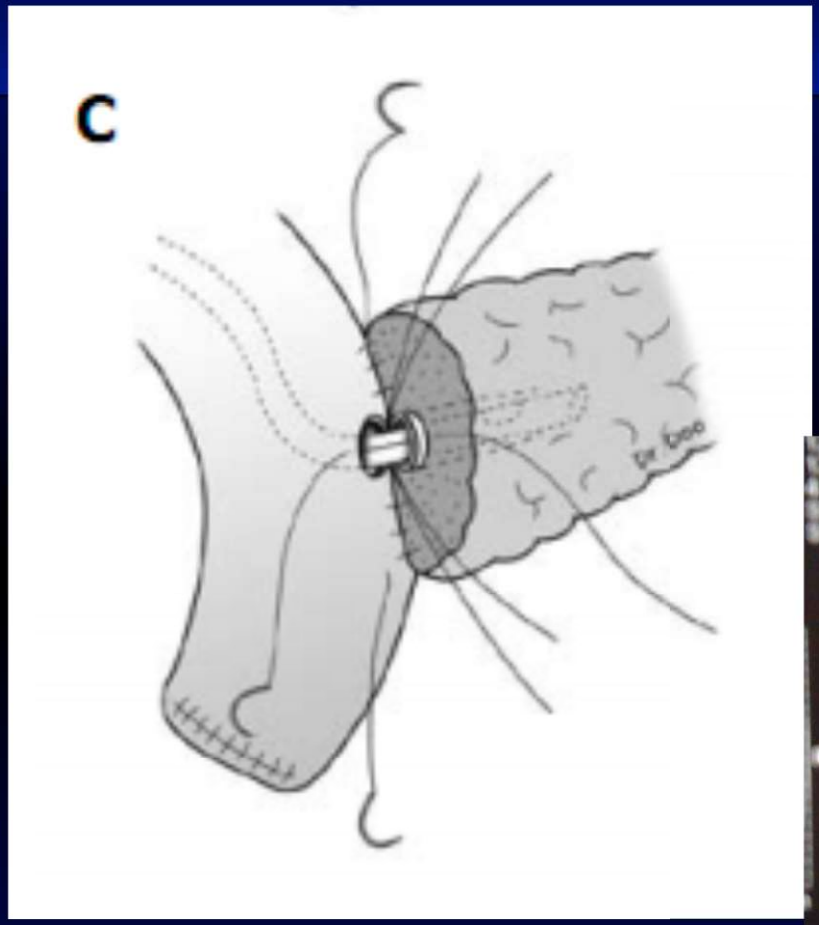

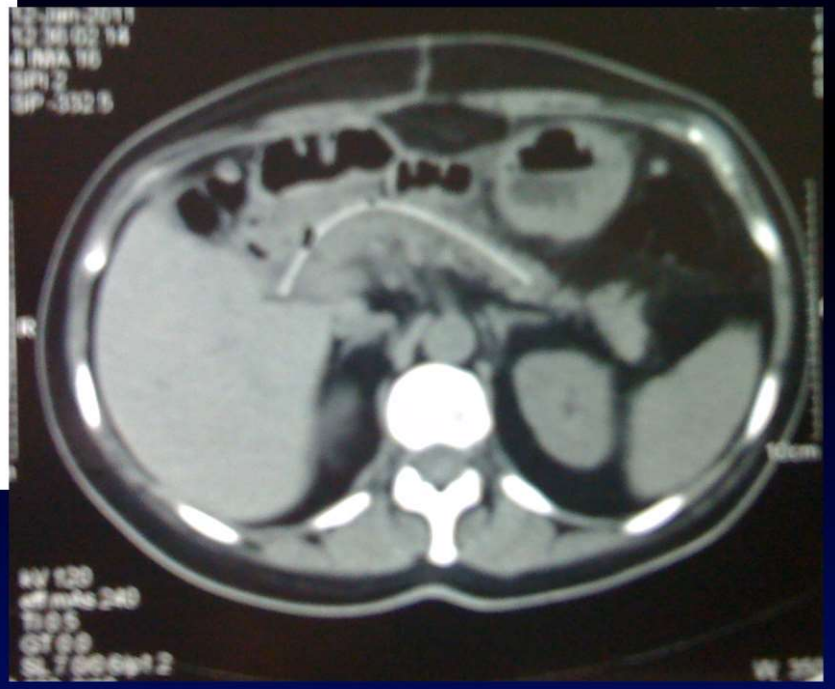

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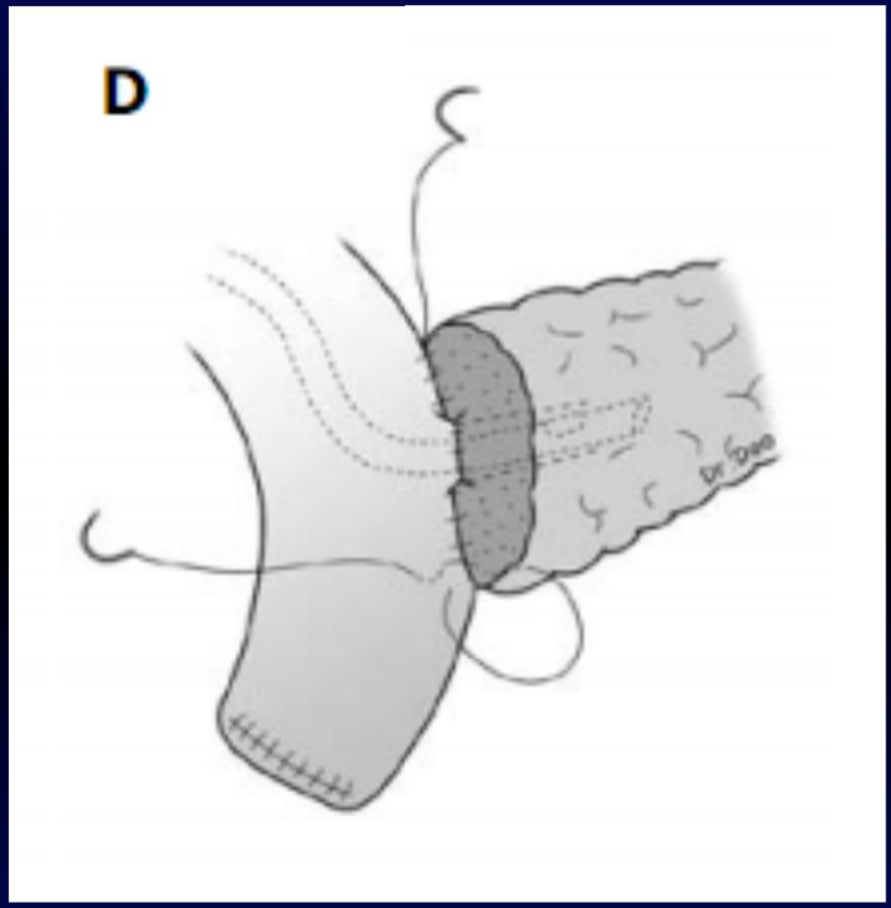

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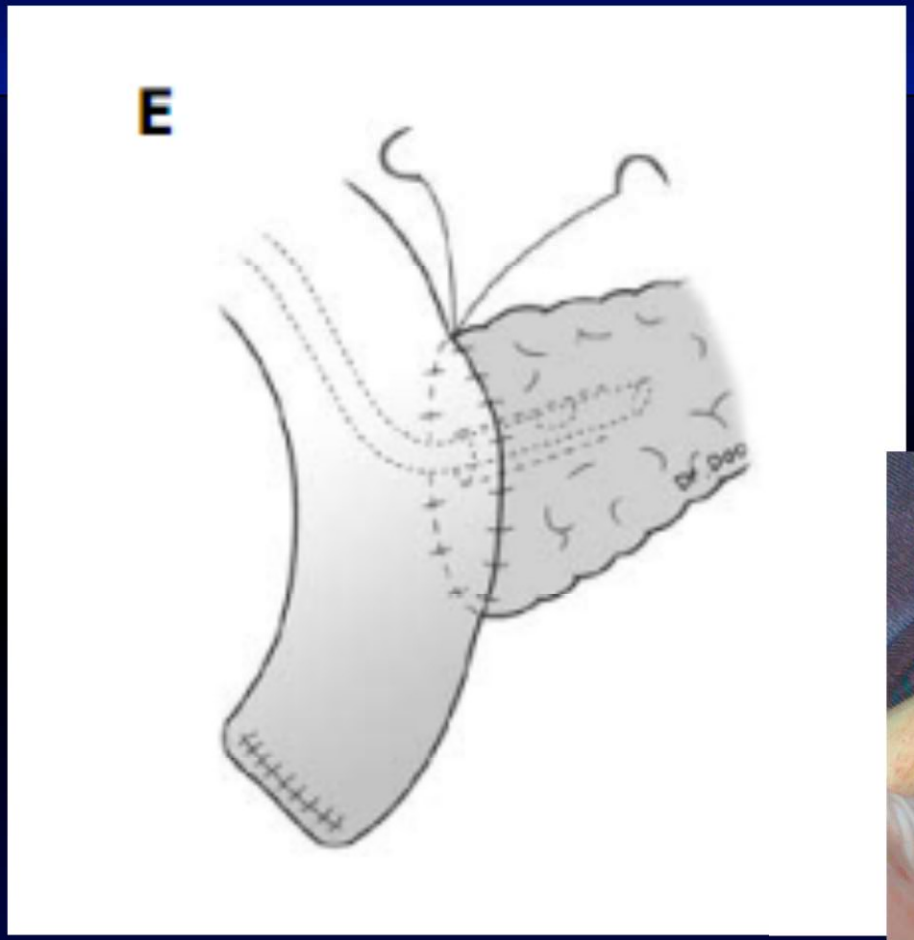
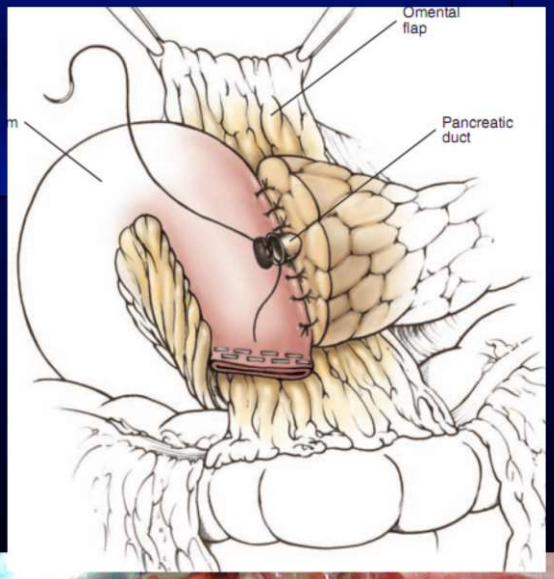
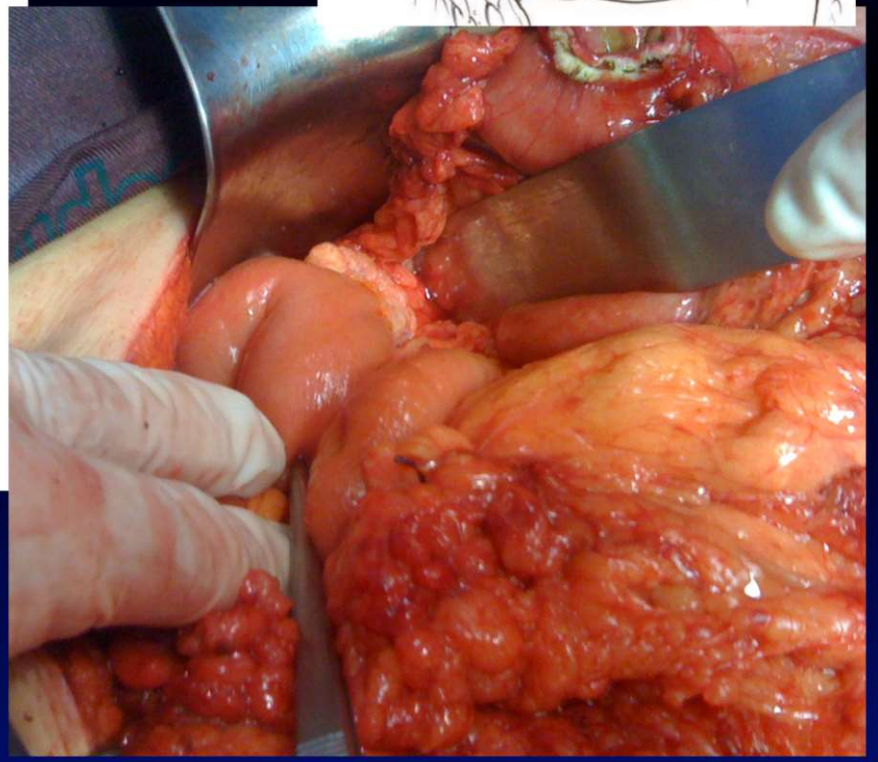
Pancreatojejunostomia

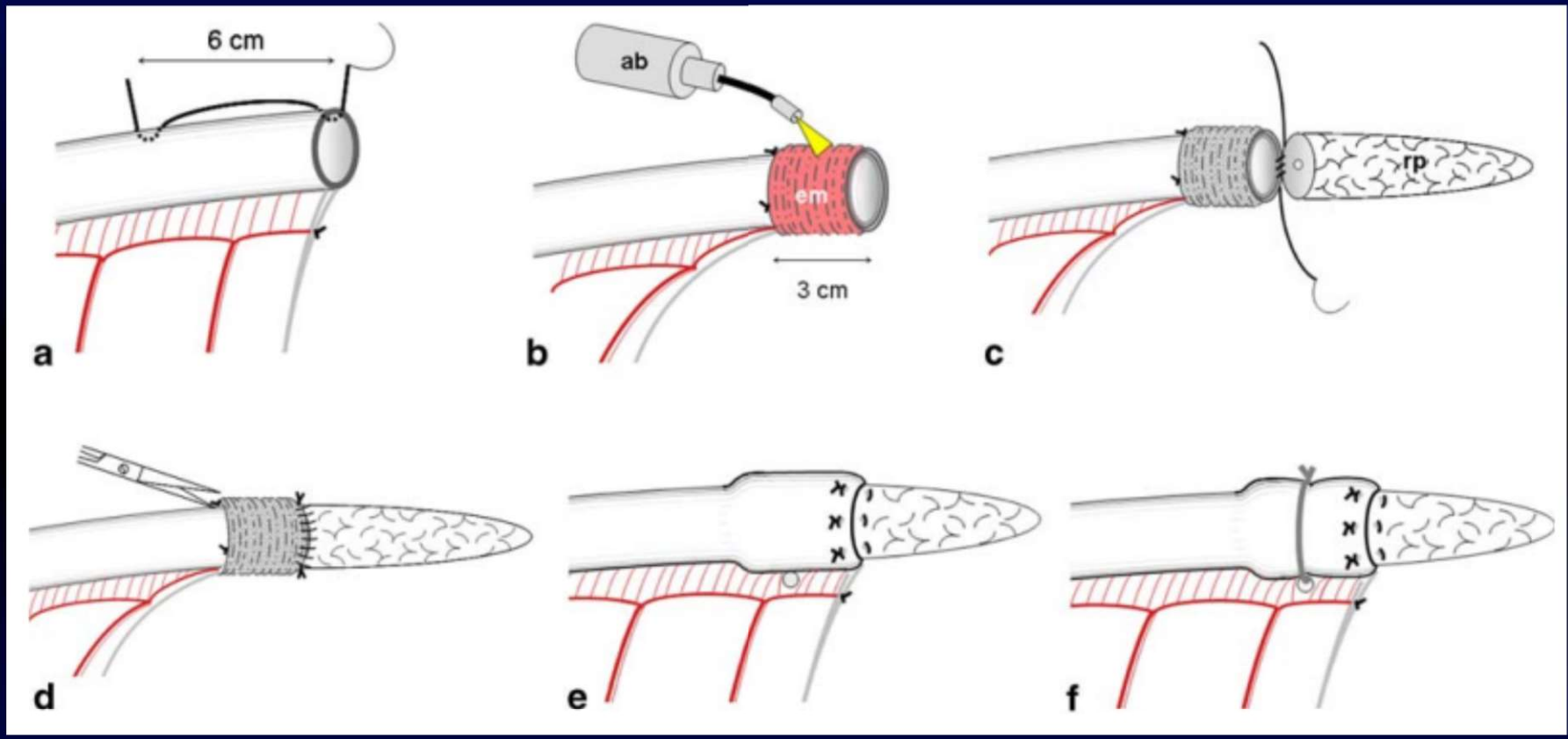






Lee SE, et al. World J Gastroenterol 2007;13:5351-6

Técnica de Peng



Peng S, et al. Am J Surg 2002;183:283-5

Pancreatojejunostomia

ORIGINAL ARTICLE

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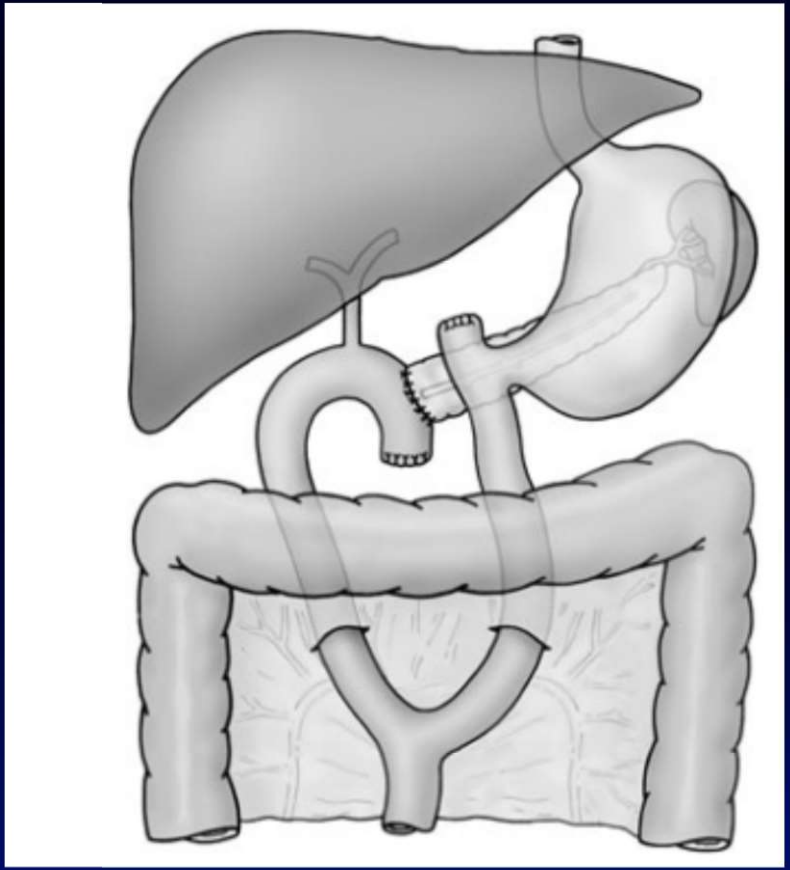
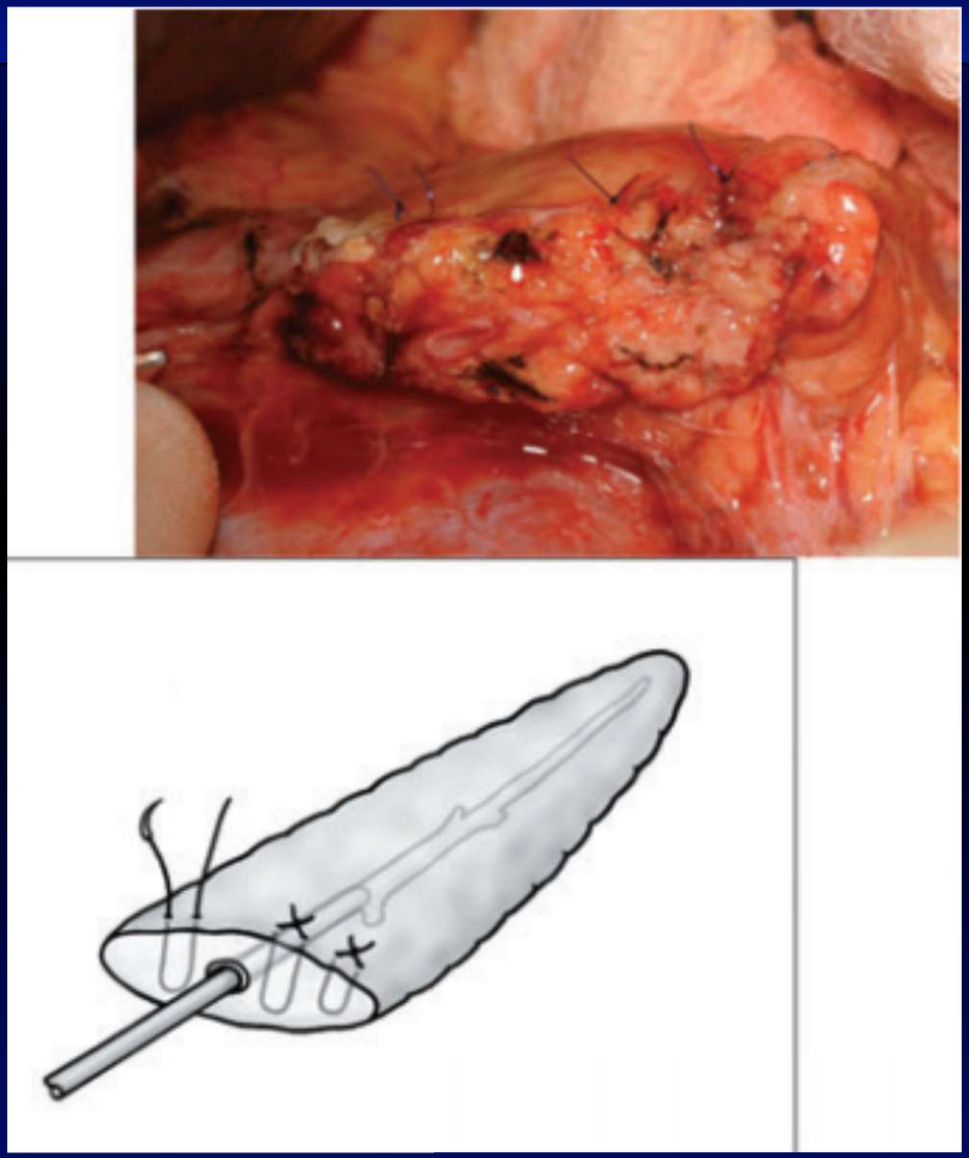


Hilal MA A, et al. HPB 2009; 11:154-60

Pâncreas consistência amolecida



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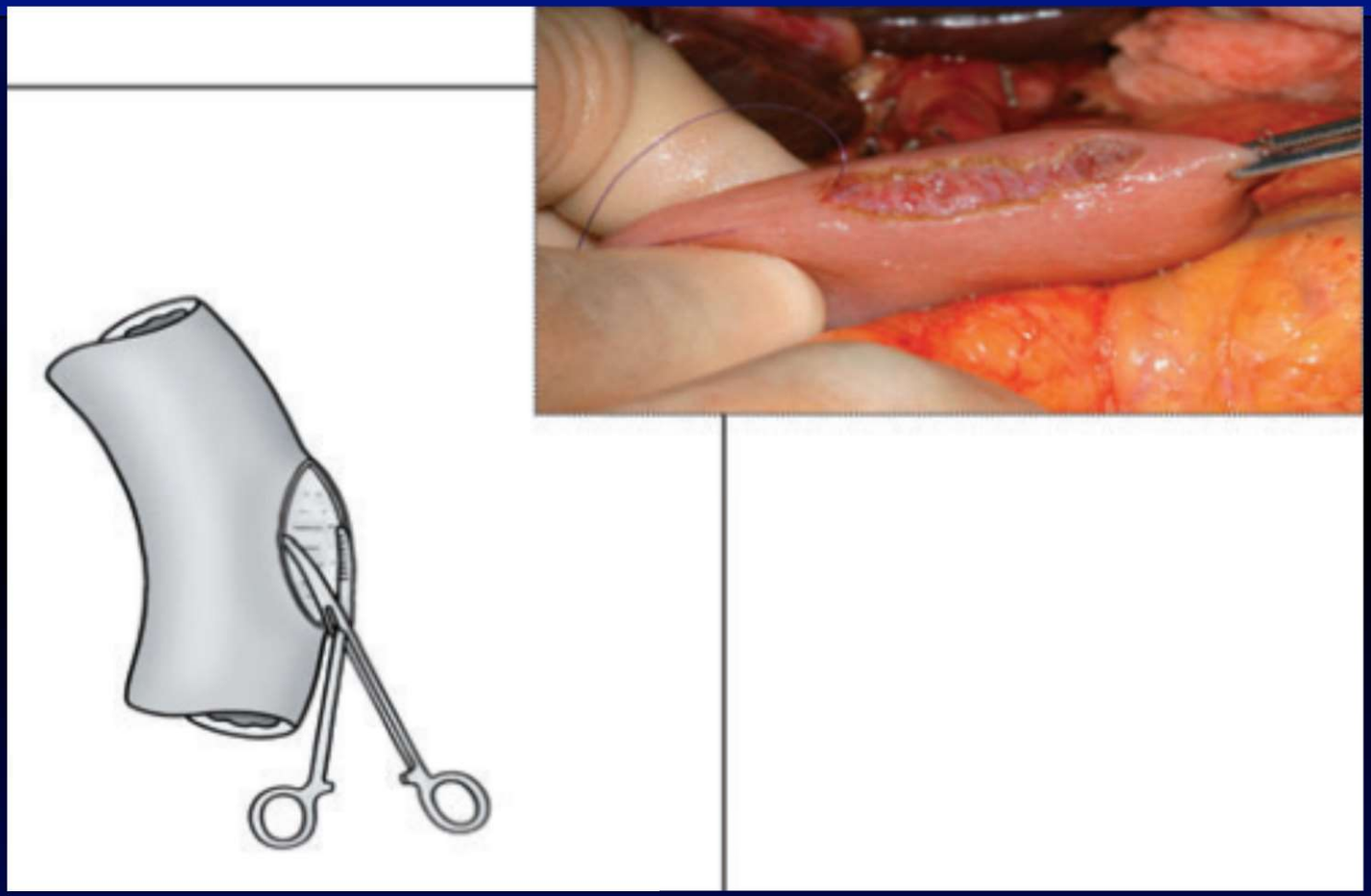
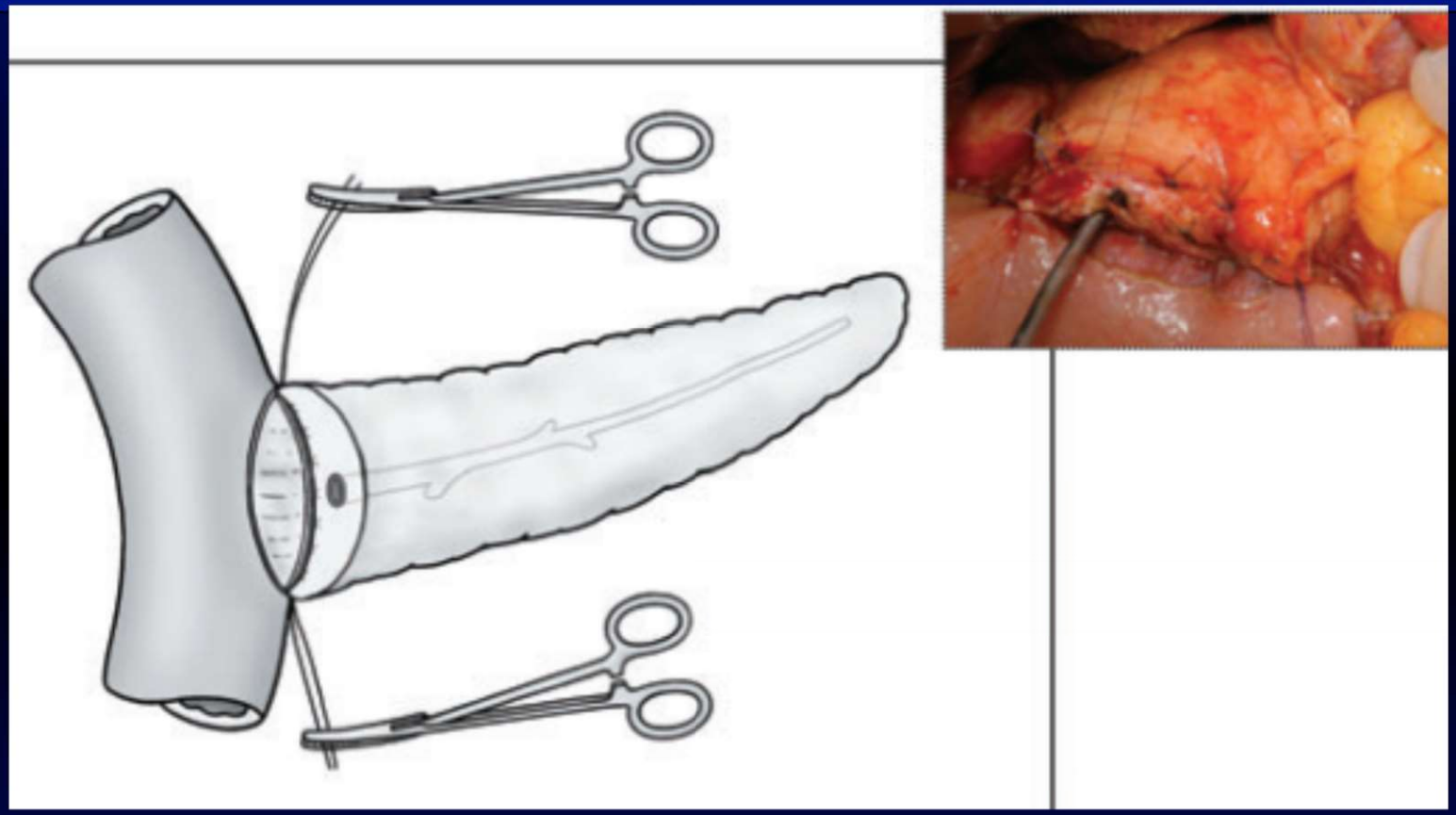
Pâncreas consistência amolecida



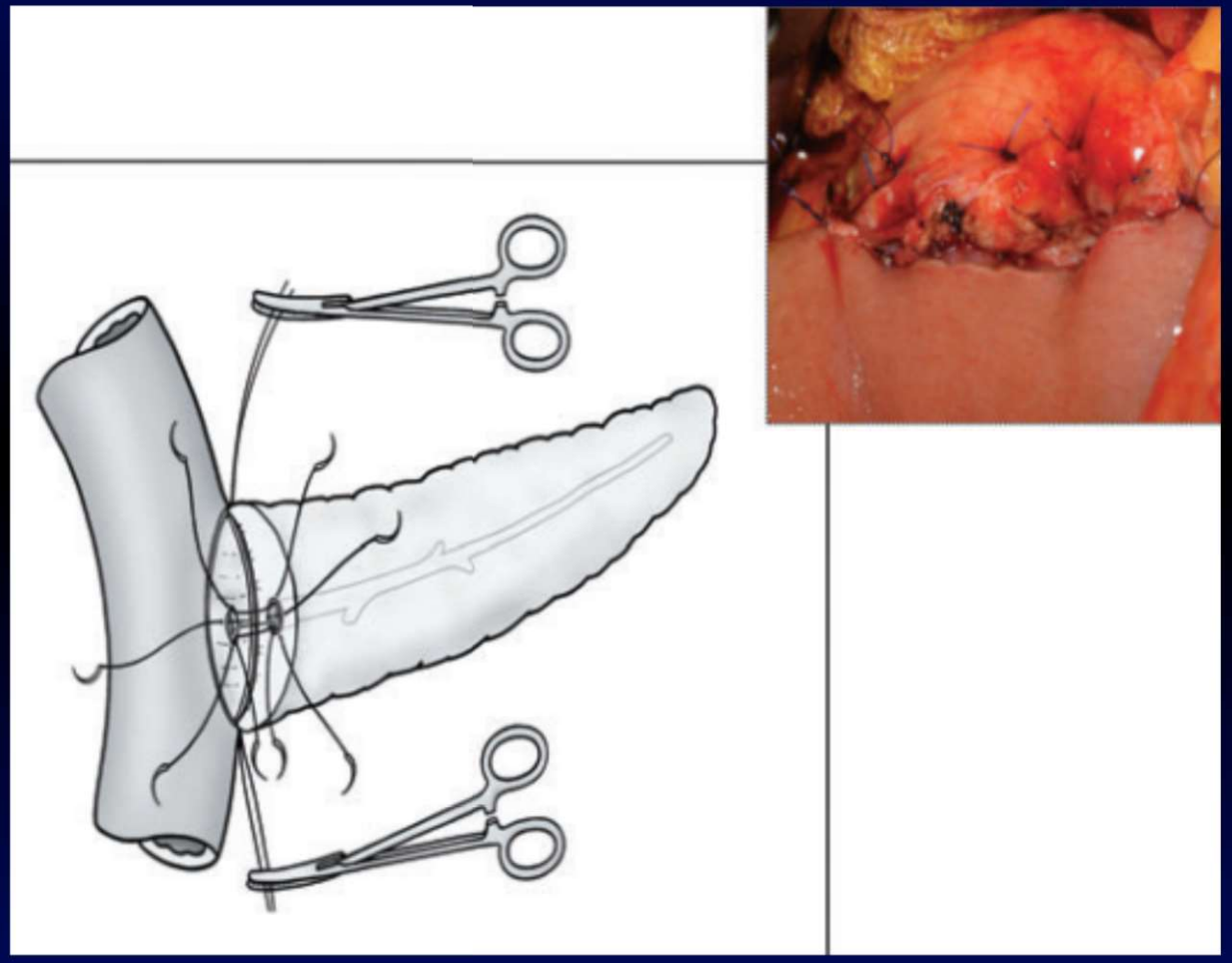
Hilal MA A, et al. HPB 2009; 11:154-60

Pâncreas consistência amolecida



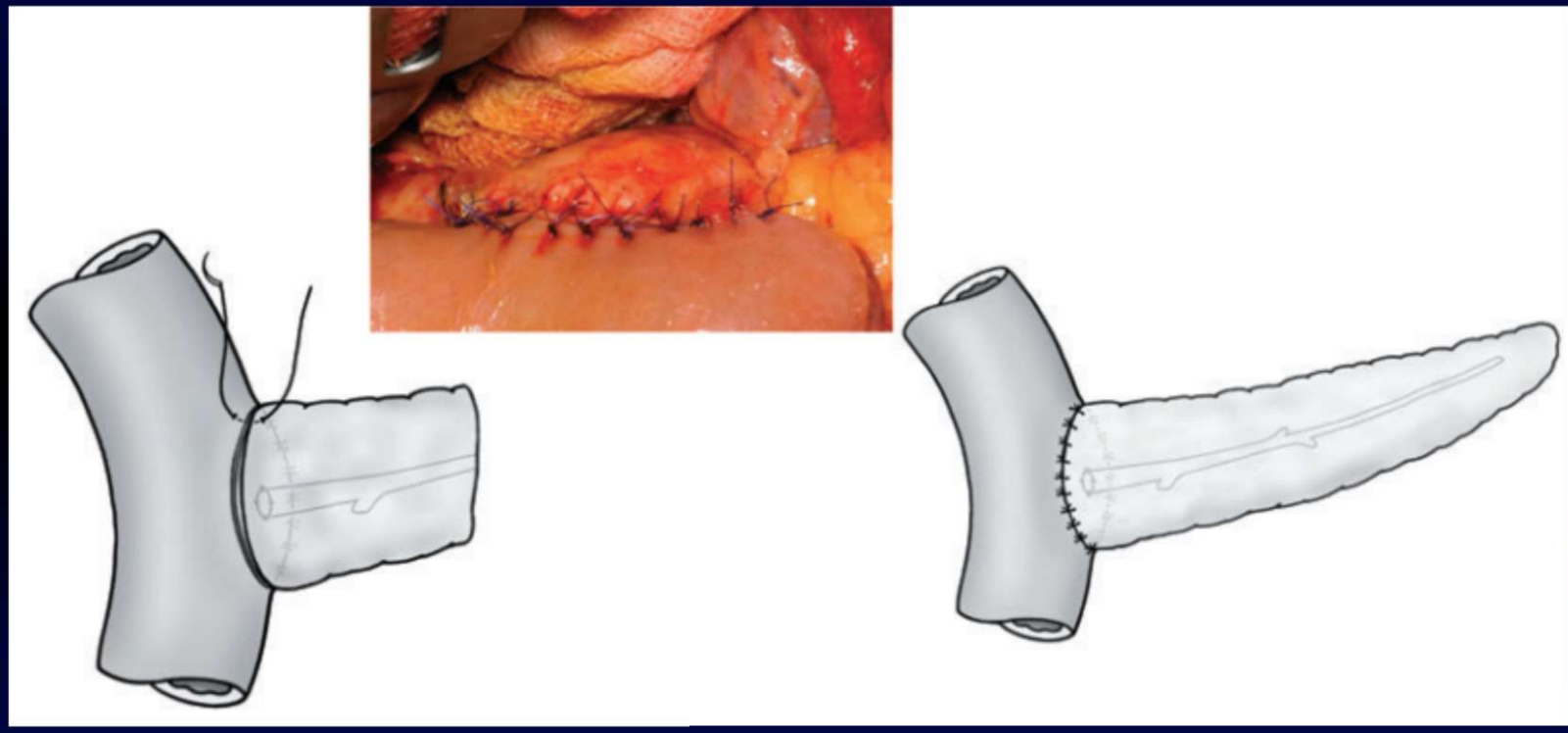
Hilal MA A, et al. HPB 2009; 11:154-60

Pâncreas consistência amolecida



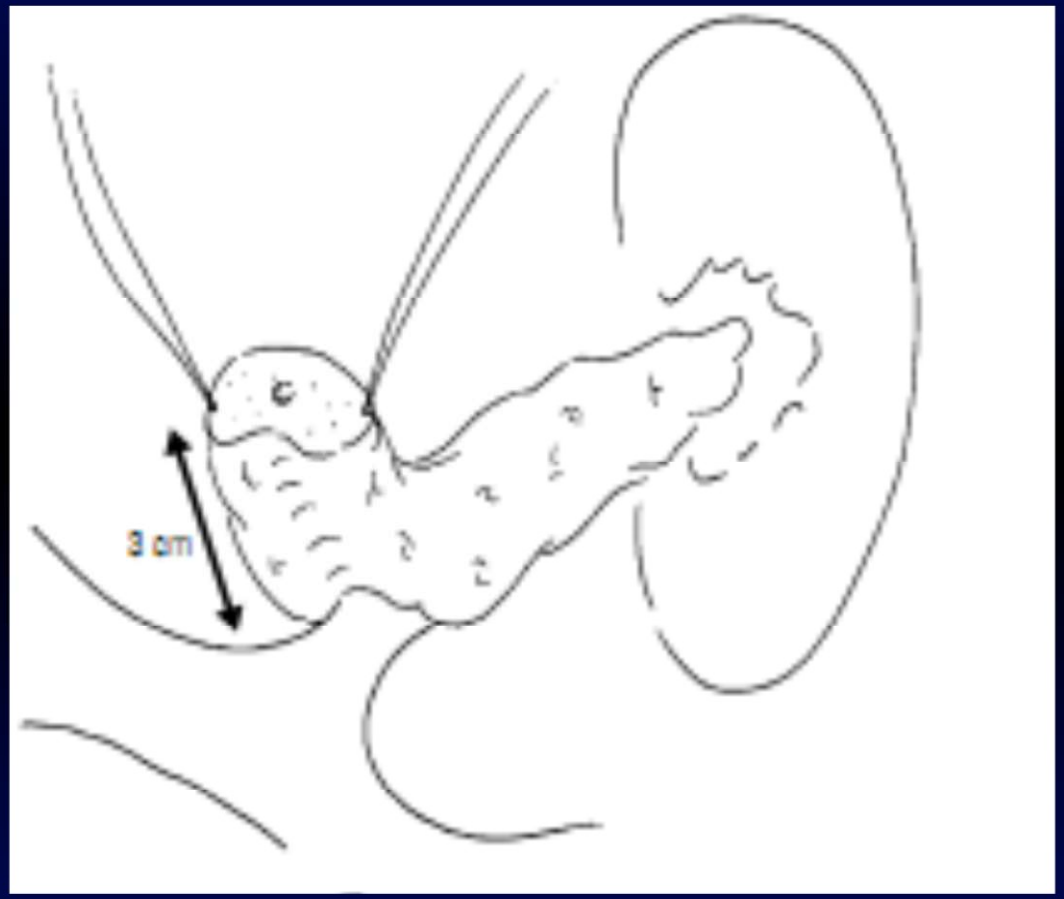
Hilal MA A, et al. HPB 2009; 11:154-60

Pâncreas consistência amolecida



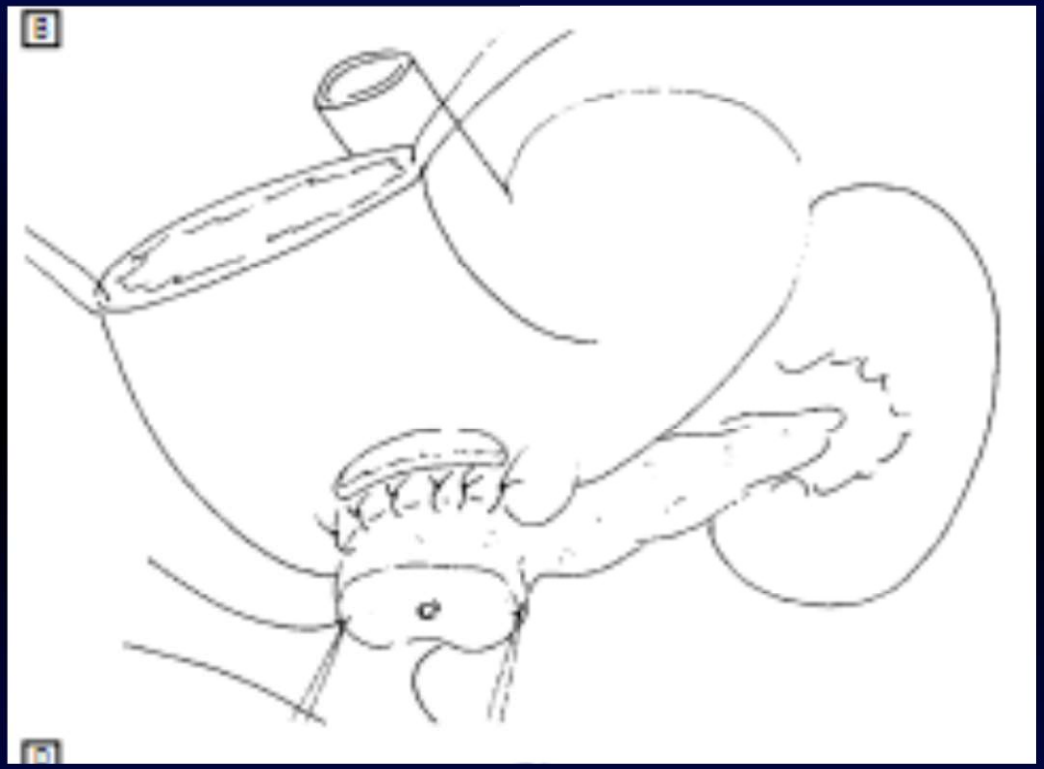
Hilal MA A, et al. HPB 2009; 11:154-60

Pancreatogastrostomia



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

Pancreatogastrostomia

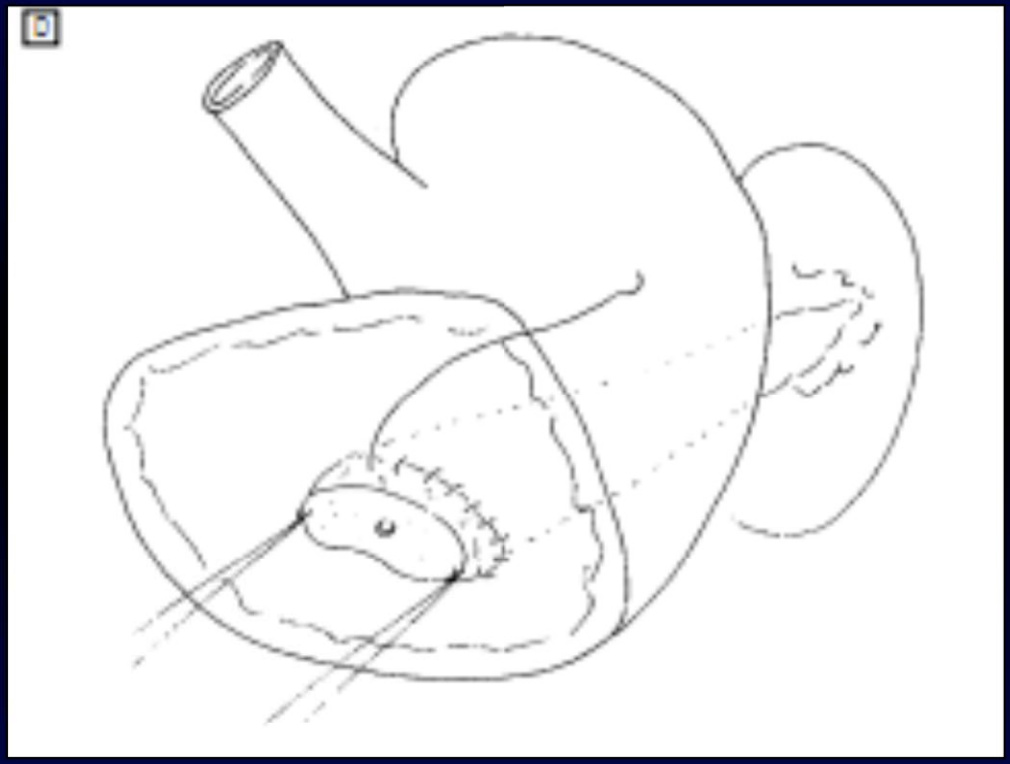


Oussoultzoglou E, et al. Arch Surg 2004; 139:327-35

Pancreatogastrostomia

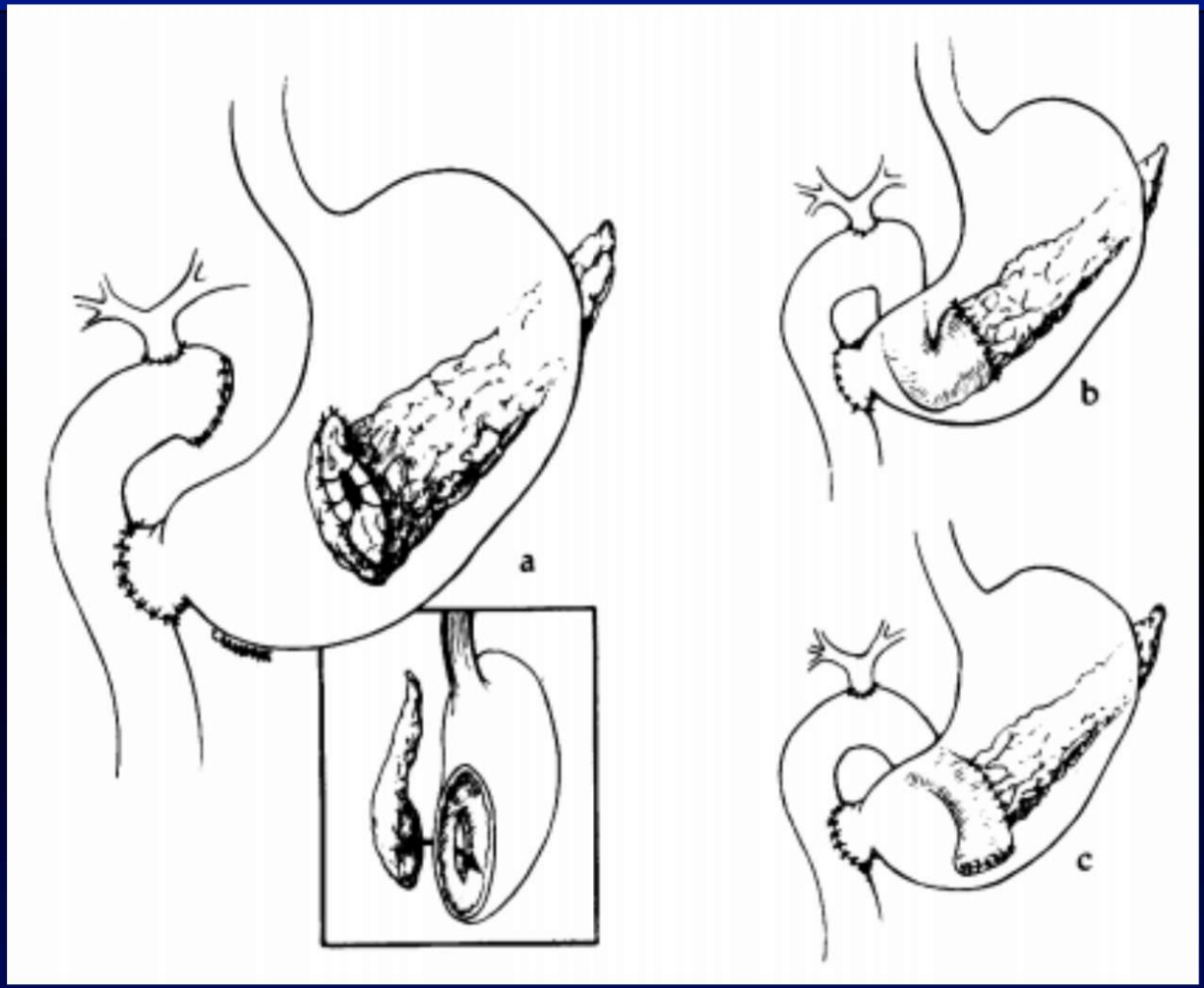
Oussoultzoglou E, et al. Arch Surg 2004; 139:327-35

Pancreatogastrostomia



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

Pancreatogastro ou pancreatojejuno?



Yeo CJ, et al. Ann Surg 1995;222:580-592

TABLE 3. One Thousand Pancreaticoduodenectomies

	No.	%
Pylorus preserving pancreaticoduodenectomy	787	79
Classic pancreaticoduodenectomy	213	21
Head resection	955	95
Total pancreatectomy	45	5
Gland texture	200	
Normal	78	39
Moderate	72	36
Firm	50	25
Pancreaticojejunostomy		87
Pancreaticogastrostomy		13

Cameron JL, et al. Ann Surg 2006;244:10-15

Pancreatogastro ou pancreatojejuno?

Table 3. POSTOPERATIVE FACTORS AND COMPLICATIONS

	PG (n = 73)	PJ (n = 72)	p Value
Delayed gastric emptying*	16 (22)	16 (22)	NS
Wound infection	14 (19)	11 (15)	NS
Pancreatic fistula†	9 (12)	8 (11)	NS
Cholangitis	4 (5)	6 (8)	NS
Pneumonia	5 (7)	2 (3)	NS
Intra-abdominal abscess	4 (5)	2 (3)	NS
Cardiac arrhythmia	3 (4)	2 (3)	NS
Bile leak	1 (1)	3 (4)	NS
Urinary tract infection	2 (3)	1 (1)	NS
Postoperative pancreatitis	1 (1)	1 (1)	NS
Peptic ulcer	2 (3)	0 (0)	NS
Duodenojejunostomy leak	0 (0)	2 (3)	NS
No. of patients with above complications	36 (49)	31 (43)	NS
No. of patients commencing total parenteral nutrition postoperatively	21 (29)	31 (43)	NS
Total output from pancreatic drains (mL)	1224 ± 166	1200 ± 177	NS
Postoperative hospital stay (days)	17.1 ± 1.6	17.7 ± 1.5	NS

Yeo CJ, et al. Ann Surg 1995;222:580-592

Pancreatogastro ou pancreatojejuno?

TABLE 3. Specific Complications Observed in 151 Cases of Pancreaticoduodenectomy

	Group PG (n = 69)	Group PJ (n = 82)	*P*
Complicated patients	20 (29%)	32 (39%)	NS
Single complication	15 (75%)	10 (31%)	0.002
Multiple complications	5 (25%)	22 (68%)	
Pancreatic fistula	9 (13%)	13 (16%)	NS
Biliary fistula	0	7 (8.5%)	0.01
Enteric fistula	4 (6%)	7 (8.5%)	NS
Pancreatitis of the cuff	1 (1.5%)	4 (5%)	NS
Intra-abdominal fluid collection	7 (10%)	22 (27%)	0.01
Abdominal bleeding	3 (4%)	6 (7%)	NS
Delayed gastric empting	2 (3%)	10 (12%)	0.03
Reoperations	5 (7%)	5 (6%)	NS
Mortality	0	1 (1%)	NS

Bassi C, et al. Ann Surg 2005;242:767-73

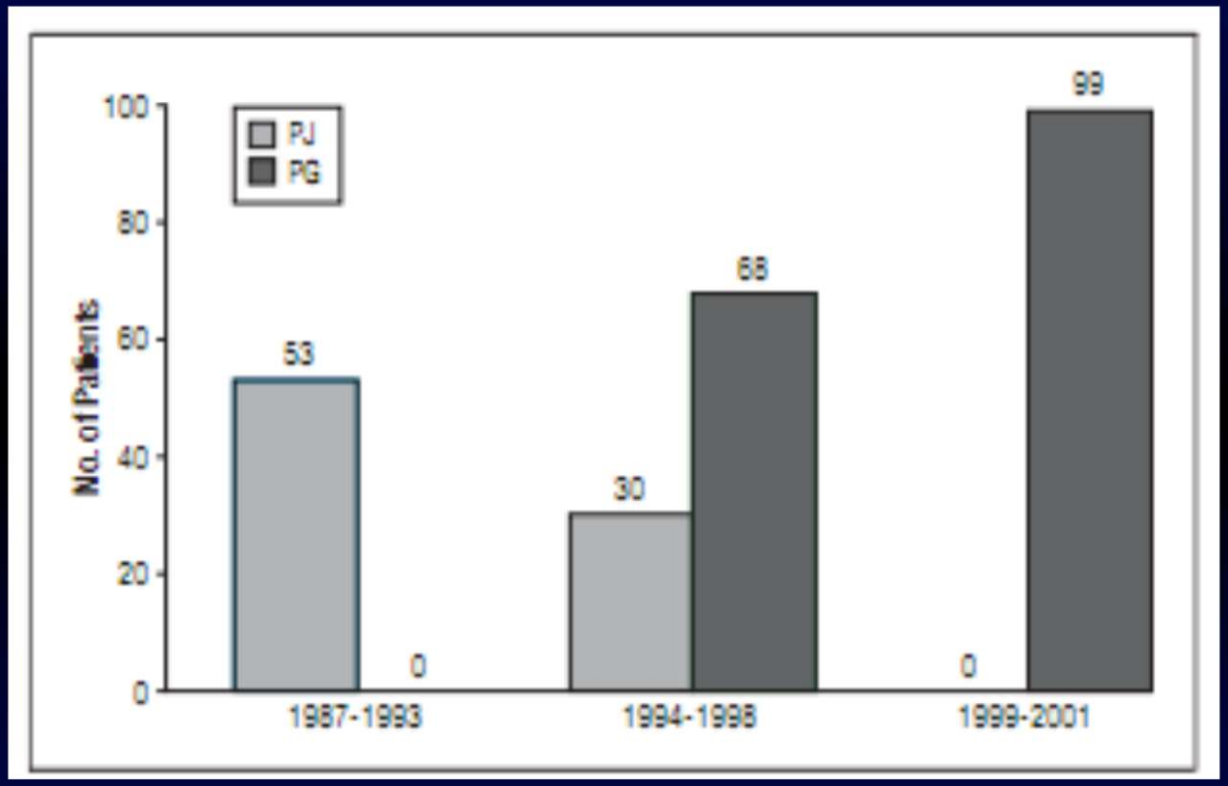
Pancreatogastro ou pancreatojejuno?

Table 3. Comparison of Postoperative Outcomes in Patients Undergoing Pancreaticogastrostomy (PG) and Pancreaticojejunostomy (PJ)*

Outcome	PG Group (n = 167)	PJ Group (n = 83)	*P* Value
Major complications			
Pancreatic fistula†	4 (2.3)	17 (20.4)	<.001
Delayed gastric emptying	6	6	.20
Postoperative erosive hemorrhage due to pancreaticfistula	0	3	.03
Postoperative hemorrhage from the operative field	1	1	.61
Gastrointestinal bleeding from pancreatic cut edge	3	1	.72
Other gastrointestinal bleeding	1	0	.47
Wound infection	5	2	.49
Sepsis	16	14	.09
Intra-abdominal collection	7	6	.30
Biliary leakage	1	2	.21
Leakage of gastrojejunostomy	0	2	.10
Obstruction of the hepaticojejunostomy	1	0	.47
Liver necrosis	1	0	.47
Portal vein thrombosis	1	0	.47

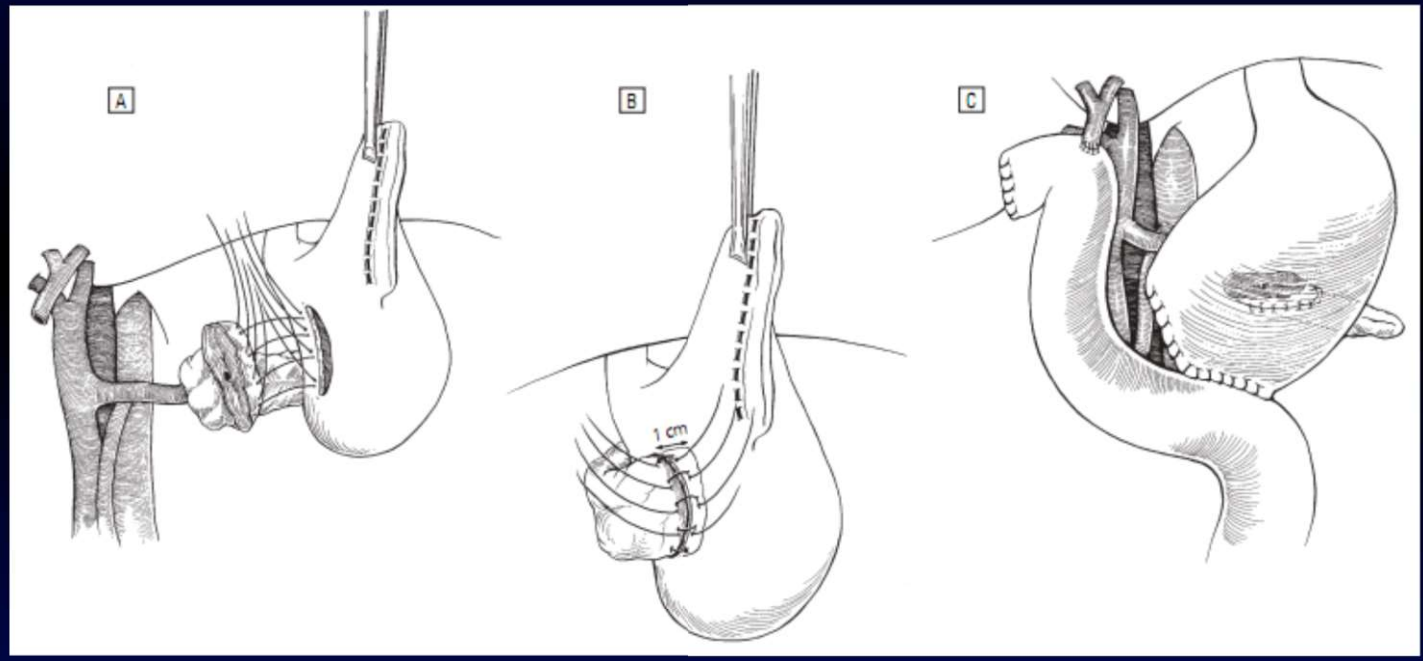
Oussoultzoglou E, et al. Arch Surg 2004; 139:327-35

Pancreatogastro ou pancreatojejuno?



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

Critical Analysis of a Large Series of Pancreaticogastrostomy After Pancreaticoduodenectomy



Aranha GV, et al. Arch Surg 2006;141:574-80

Table 3. Postoperative Complications

Complication	Patients, No. (%)
Mortality	2 (0.9)
Pancreatic leak	32 (13.6)
Intra-abdominal abscess	14 (6)
Delayed gastric emptying	14 (6)
Wound infection	13 (5.5)
Cardiac complications	8 (3.4)
Small intestinal obstruction	5 (2.1)
Pulmonary complications	5 (2.1)
Hemorrhage	4 (1.7)
Gastric leak	3 (1.3)
Bile leak	2 (0.9)
Reexploration	3 (1.3)
Miscellaneous	18 (7.7)

Aranha GV, et al. Arch Surg 2006;141:574-80

Pancreatojejunoanastomose

(a) Multivariate analysis of factors predictive of pancreatic fistula.

Predictive factor	Odds ratio	*P*-value
Invaginated pancreaticojejunostomy	3.30	.01
Closed suction drainage	2.24	.05
Diagnosis of pancreatitis	0.22	.05
Pre-op endoscopic biliary stent	0.34	.05

(c) Multivariate analysis of factors predicting pancreatic fistula in 294 patients with periampullary adenocarcinoma subgroup.

Predictive factor	Odds ratio	Stats
Invaginated pancreaticojejunostomy	11.78	.0002
Pre-op endoscopic biliary stent	0.194	.04
Gender (Female)	0.238	.03
Pre-op diabetes	0.146	.07

Schmidt CM, et al. HPB 2009;11:1-8

Pancreatogastrostomia pós DP com tubo gástrico?

- Maior proximidade com o pâncreas
- Melhor riqueza vascular do estômago
- Melhor espessura da parede muscular
- Ajustabilidade para qualquer diâmetro pancreático
- Não há exclusão de segmento intestinal jejunal
- Pode ser realizada com preservação do piloro ou com gastrectomia parcial
- Facilidade de acesso através de endoscopia (sangramento/ stent/estenose ductal)

Montenegro-Costa R, et al. New technical method of pancreatogastrostomy using an isoperistaltic tubing. EHPBA 2005 Congress-Heidelberg-Germany

Pancreatogastrostomia pós DP com tubo gástrico?

- Economiza tempo cirúrgico
- A desconexão pancreatogástrica é quase impossivel
- O esvaziamento gástrico não fica prejudicado
- Bloqueio da ativação de enzimas pancreáticas pelo suco gástrico.
- Facilidade de descompressão do estômago por uma sonda nasogástrica.
- Fácil acessibilidade à anastomose hepático-jejunal
- A anastomose é segura mesmo em pâncreas normais e com ductos < 3mm.
- Diminui relaparotomia para drenagem de coleções ou abscessos.
- A incidência de sangramento gastrintestinal é igual entre os dois grupos.

Montenegro-Costa R, et al. New technical method of pancreatogastrostomy using an isoperistaltic tubing. EHPBA 2005 Congress-Heidelberg-Germany

Anastomose com o estômago

Table I. Technical advantages of the pancreogastric anastomosis after PD.

- The stomach and the pancreas are closed, facilitating a tension-free anastomosis.
- The stomach wall has a good blood supply, enhancing anastomotic healing.
- In the absence of enterokinase activity and thanks to the gastric acid pH, pancreatic enzymes are not activated, thus reducing the risk of leakage.
- The pancreatic anastomosis can be controlled in the postoperative course through endoscopy, possible anastomotic bleeding can be treated easily.

Crippa S, et al. HPB 2007;9:8-15

Conventional Versus Binding Pancreaticojejunostomy After Pancreaticoduodenectomy

A Prospective Randomized Trial

TABLE 3. Postoperative Course and Complications

	Binding Group (n = 106)	Conventional Group (n = 111)	*P*
Drain outputs (mL)	86.7 ± 36.3	83.8 ± 46.3	NS
Amylase (U/L) [mean (range)]	38.0 (0–762.5)	63.8 (8.6–1654.0)	0.0005
Abdominal complications [no. (%)]			
Pancreatic anastomotic leakage	0 (0)	8 (7.2)	0.014
Biliary leakage	7 (6.6)	6 (5.4)	NS
Gastric-enteric anastomotic leakage	1 (0.9)	1 (0.9)	NS
Delayed gastric emptying	4	3	NS
Pancreatitis	1	1	NS
Intraperitoneal hemorrhage	2	3	NS
Intraperitoneal abscess	0	3	NS
Ascites	1	2	NS
Wound infection	6	7	NS
Incision wound dehiscence	1	3	NS

Peng S, et al. Ann Surg 2007;245:692-8

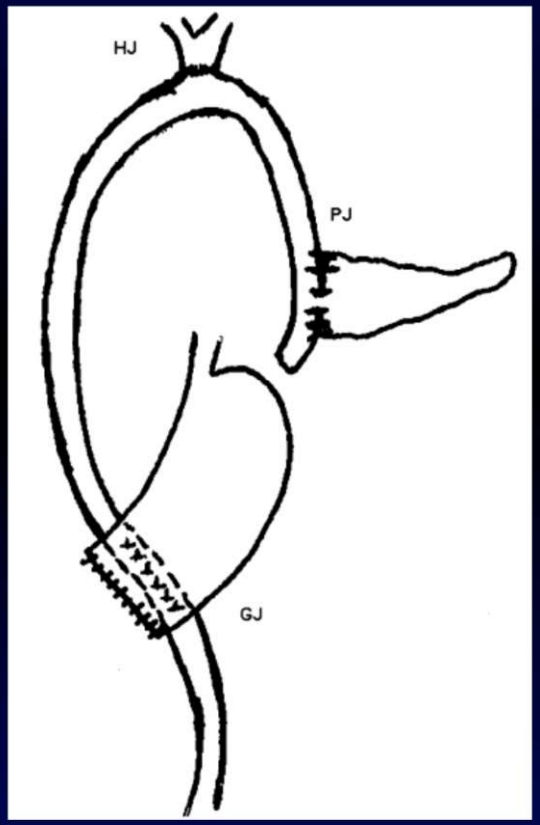
Pancreatojejunoanastomose

TABLE 4. Pancreatic Anastomotic Leakage in the Different Risk Categories

	Binding Group	Conventional Group	*P*
High risk			
Leakage	0	6	
No leakage	37	33	0.039
Low risk			
Leakage	0	2	
No leakage	69	70	NS
Total	106	111	

Peng S, et al. Ann Surg 2007;245:692-8

Convencional ou Y de Roux?



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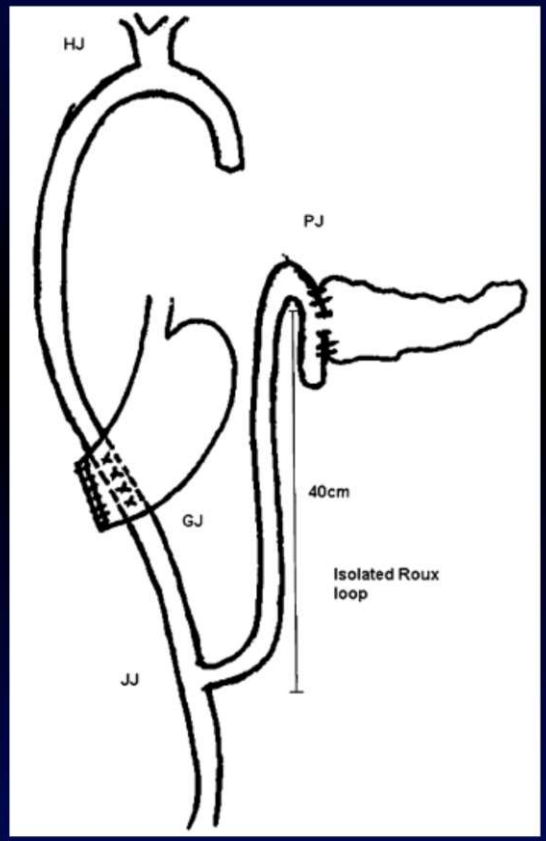


Perwaiz A, et al. HPB 2009; 11:326-331

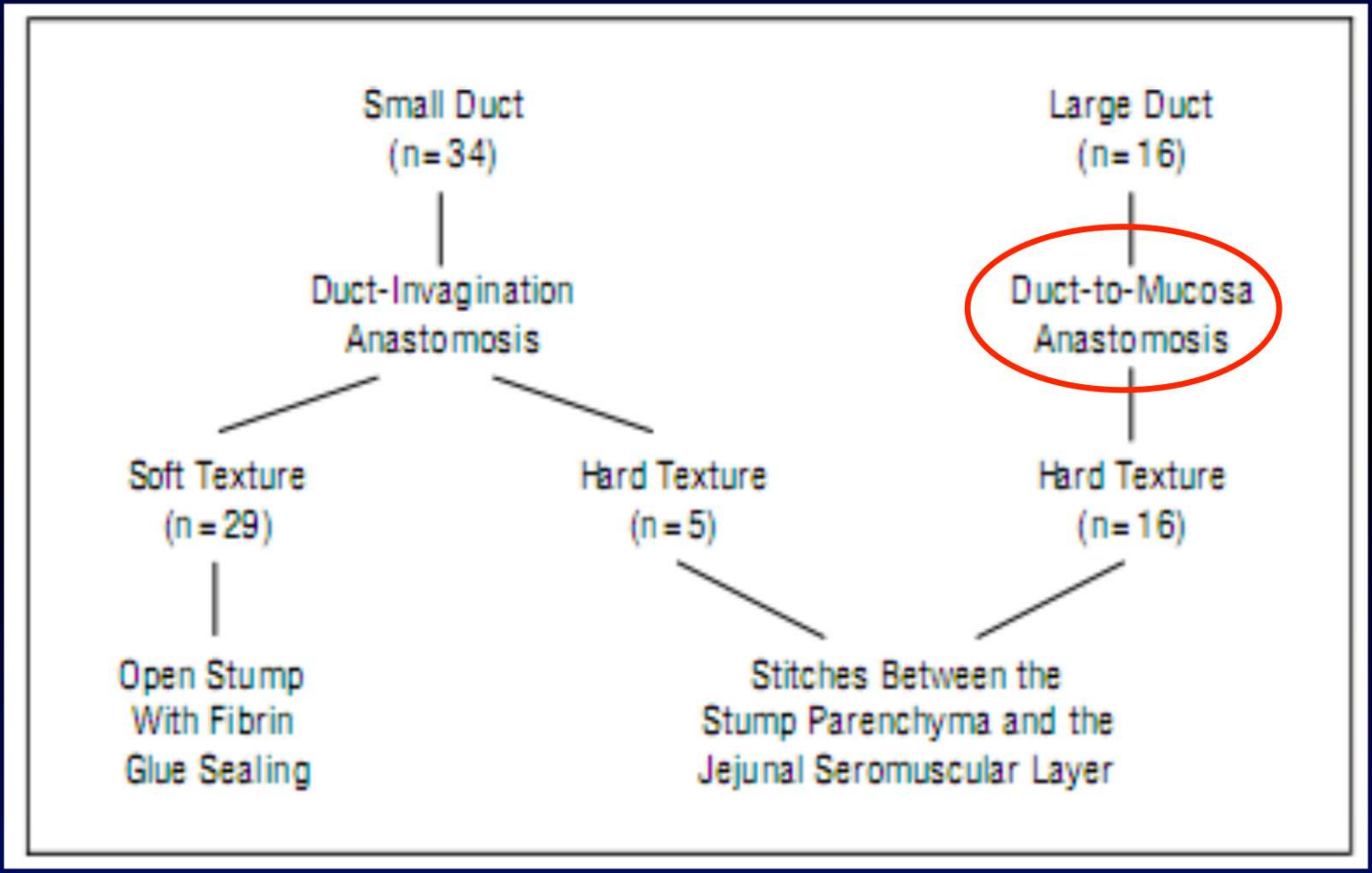
Convencional ou Y de Roux?

Table 2 Comparison of clinical outcomes between the two groups (n = 108)

Outcome	Total (n = 108)	Group 1 (IPJ) n = 53	Group 2 (CPJ) n = 55	P-value (group 1 vs. group 2)
Overall complications	32 (29.6%)	17 (32%)	15 (27.3%)	0.674
Nature of complications				
Pancreatic fistula	11 (10.1%)	5 (9.4%)	6 (10.9%)	0.800
DGE	9 (8.3%)	5 (9.4%)	4 (7.2%)	0.739
Wound infection	8 (7.4%)	5 (9.4%)	3 (5.4%)	0.484
Bleeding	4 (3.7%)	2 (3.7%)	2 (3.6%)	1.000
Operative mortality	4 (3.7%)	2 (3.7%)	2 (3.6%)	1.000
Mean duration of surgery, min (95% CI, OR)		442 (300–510) ± 32.0	370 (240–500) ± 38.5	0.005
Mean hospital stay, days (95% CI, OR)		10.1 (5–27) ± 3.7	9.5 (4–26) ± 5.0	0.483

Perwaiz A, et al. HPB 2009; 11:326-331

Selection of Pancreaticojejunostomy Techniques According to Pancreatic Texture and Duct Size



Suzuki Y, et al. Arch Surg 2002;137:1044-1047

Frequency of a Pancreatic Fistula (SL) Relating to Pancreatic Texture and Duct Size*

Variable	Pancreatic Texture and Duct Size: Soft and Small	Hard and Small	Hard and Large	Total
Disease				
Pancreas cancer	0/2	0/3	0/6	**0/11**
Ampullary cancer	1/9	0/0	0/1	**1/10**
Cystic tumor	1/7	0/0	0/2	**1/9**
Chronic pancreatitis	0/2	0/1	0/5	**0/8**
Duodenal cancer	1/3	0/0	0/2	**1/5**
Bile duct cancer	1/4	0/0	0/0	**1/4**
Gastric cancer	0/1	0/1	0/0	**0/2**
Aneurysm	0/1	0/0	0/0	**0/1**
Surgical procedure				
PD	1/12	0/4	0/15	**1/31**
PpPD	3/17	0/1	0/1	**3/19**
Total†	**4/29** (14)	**0/5**	**0/16**	**4/50** (8)

Suzuki Y, et al. Arch Surg 2002;137:1044-1047

Pancreatectomy for Intraductal Papillary Mucinous Neoplasm of the Pancreas: Could Pancreaticogastrostomy Be the Anastomosis of Choice?

Stavros Gourgiotis, Nikolaos S Salemis, Dimitrios Kanakopoulos, Stylianos Germanos

Second Surgical Department, 401 General Army Hospital of Athens. Athens, Greece

- Acesso direto ao pâncreas
- Coleta de material
- Estudo por imagem

Gourgiotis S et al. J Pancreas 2010;11:407-8

Conclusões

- Os fatores de risco devem ser valorizados
- Qualquer técnica é factível em pacientes sem fatores de risco
- As anastomoses com estômago ou intestino parecem ser equivalentes
- A pancreatojejunoanastomose é a preferida. Ducto-mucosa melhor que invaginação
- Pancreatojejuno convencional ou Y de Roux são equivalentes
- A pancreatogastrostomia tem sido muito utilizada com evolução
- A cirurgia por câncer de pâncreas apresenta melhores resultados
- A técnica de Peng é ser uma opção em pacientes com fator de risco
- Pancreatogastrostomia em IPMN


Obrigado!