



# D2 Lymph Node Dissection: to Whom? How?

## Surgical Techniques in Gastric Cancers

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No conflicts of interest with regard to the content of the presentation.

Medtronic - Kurs eğitmeni honorarium (>3 yıl)

Bard - Kurs eğitmeni honorarium (>3 yıl)

Eczacıbaşı - Konuşmacı honorarium (>3 yıl)

Nutricia - Konuşmacı (>3 yıl)

Fresenius - Konuşmacı honorarium

Abbott - Konuşmacı honorarium

## Plan

Extent (Proximal-Distal-Total)

**Lymphadenectomy (D0 - D1 - D1+ - D2 - D2+PALN)**

Omentectomy (Total- Partial)

Bursectomy (Total- Partial)

Splenectomy

Distal pancreatectomy

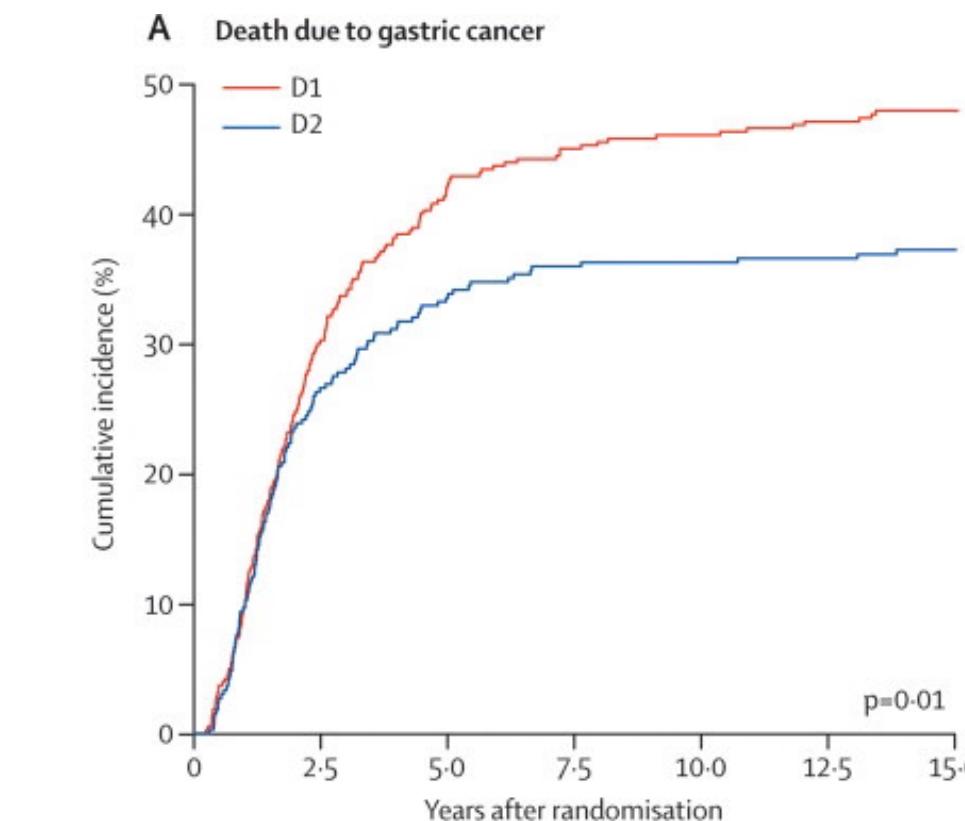
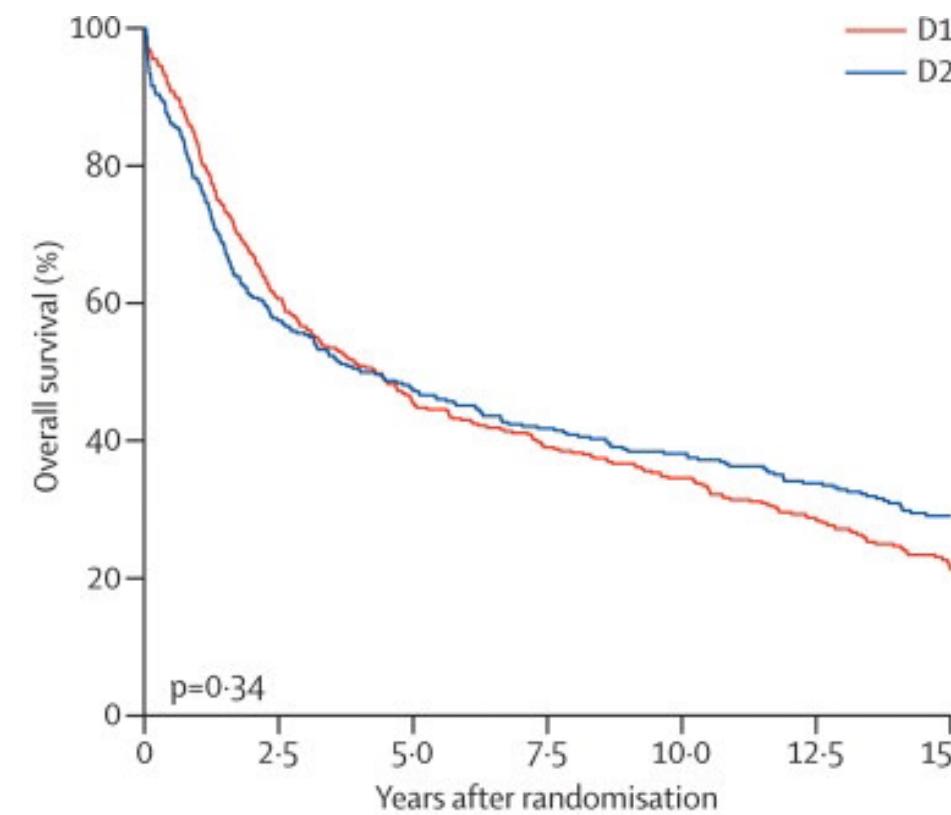
## Lymphadenectomy



D1 vs D2

D2 vs D2+PALN

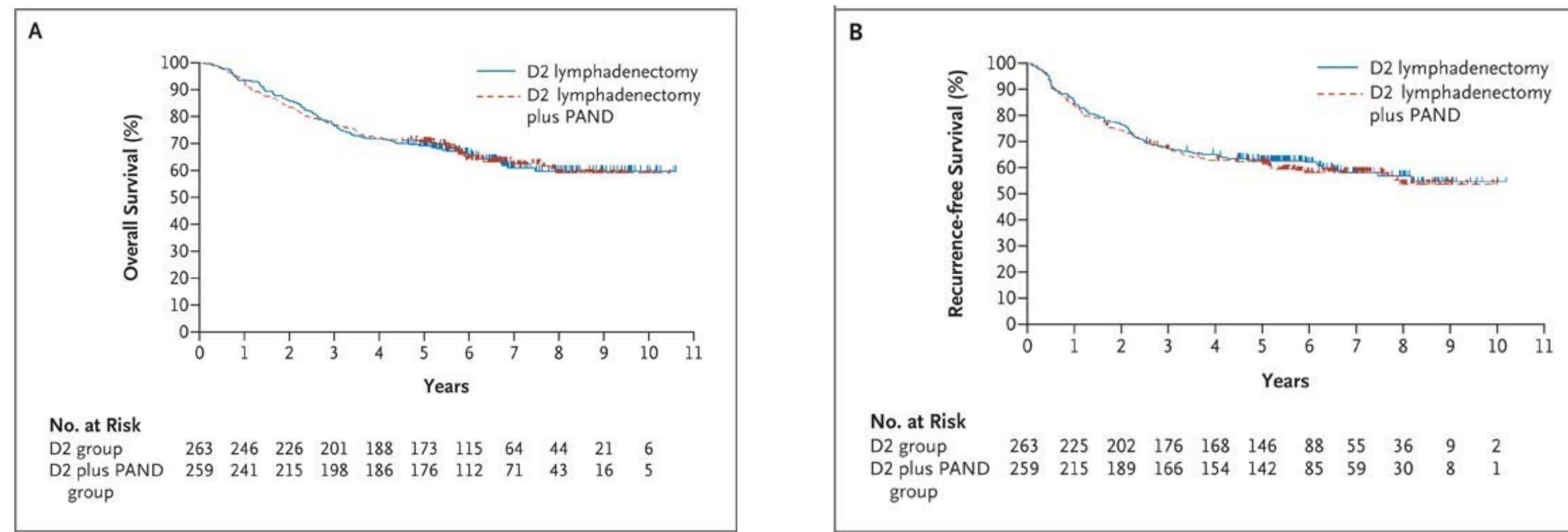
## D1 vs D2



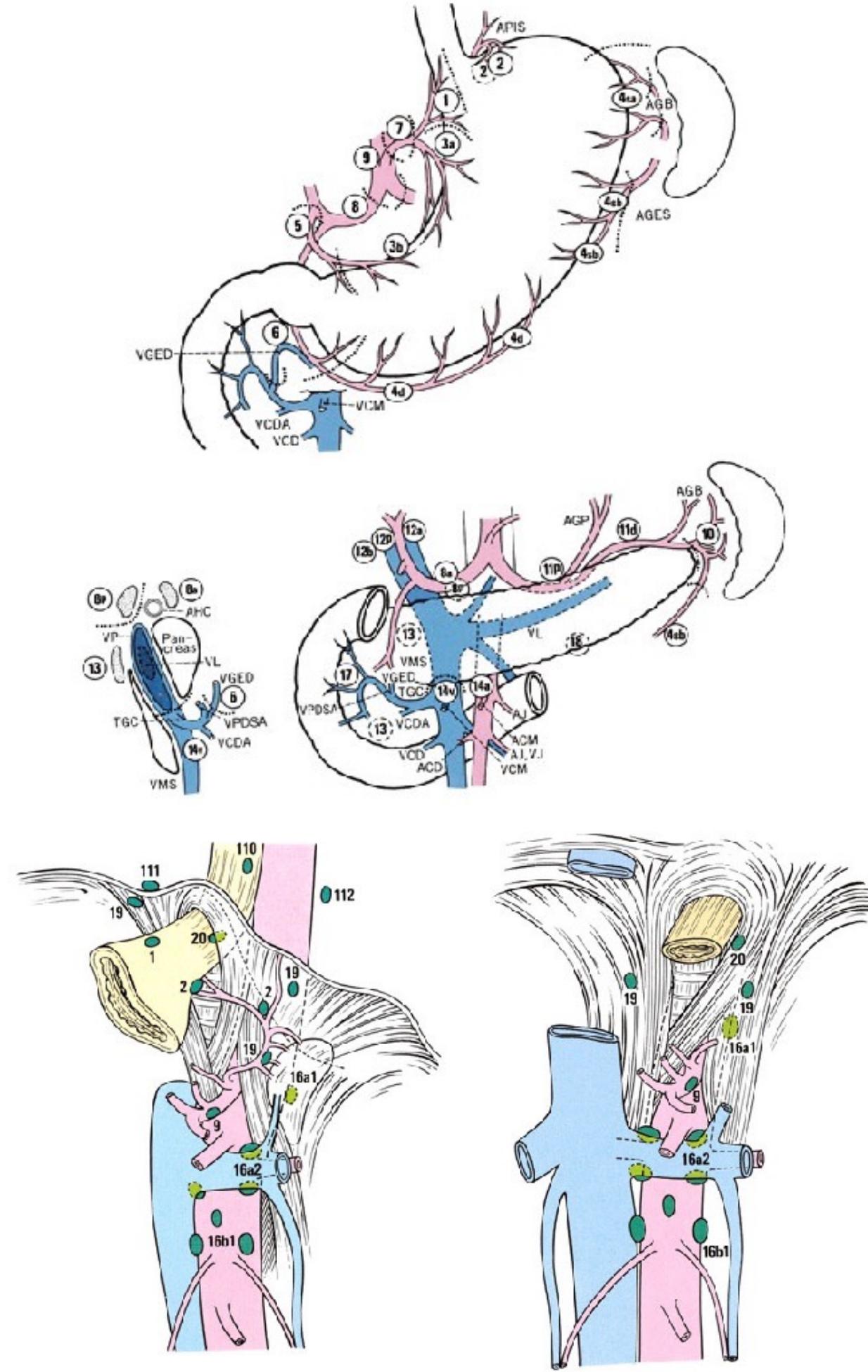
D2 lymphadenectomy is associated with lower locoregional recurrence and gastric-cancer-related death rates than D1 surgery.

D2 lymphadenectomy is the recommended surgical approach for patients with resectable (curable) gastric cancer.

## D2 vs D2+PALN



As compared with D2 lymphadenectomy alone, treatment with  
**D2 lymphadenectomy plus PAND does not improve the survival**  
rate in curable gastric cancer.

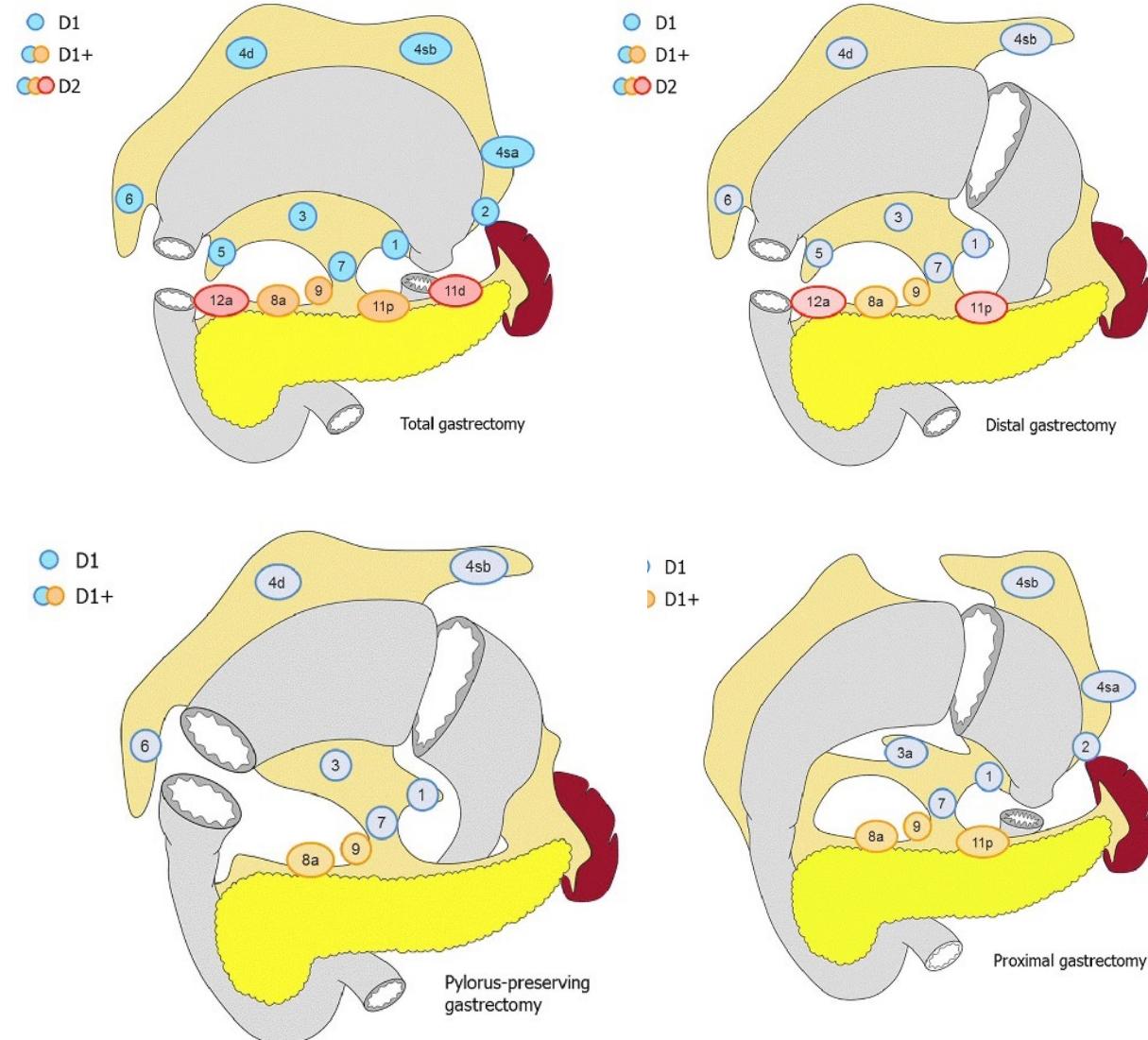


- 1 Right paracardial LNs, including those along the first branch of the ascending limb of the left gastric artery.
- 2 Left paracardial LNs including those along the esophagocardiac branch of the left subphrenic artery
- 3a Lesser curvature LNs along the branches of the left gastric artery
- 3b Lesser curvature LNs along the 2nd branch and distal part of the right gastric artery
- 4sa Left greater curvature LNs along the short gastric arteries (perigastric area)
- 4sb Left greater curvature LNs along the left gastroepiploic artery (perigastric area)
- 4d Rt. greater curvature LNs along the 2nd branch and distal part of the right gastroepiploic artery
- 5 Suprapyloric LNs along the 1st branch and proximal part of the right gastric artery
- 6 Infrapyloric LNs along the first branch and proximal part of the right gastroepiploic artery down to the confluence of the right gastroepiploic vein and the anterior superior pancreaticoduodenal vein
- 7 LNs along the trunk of left gastric artery between its root and the origin of its ascending branch
- 8a Anterosuperior LNs along the common hepatic artery
- 8p Posterior LNs along the common hepatic artery
- 9 Celiac artery LNs
- 10 Splenic hilar LNs including those adjacent to the splenic artery distal to the pancreatic tail, and those on the roots of the short gastric arteries and those along the left gastroepiploic artery proximal to its 1st gastric branch
- 11p Proximal splenic artery LNs from its origin to halfway between its origin and the pancreatic tail end
- 11d Distal splenic artery LNs from halfway between its origin and the pancreatic tail end to the end of the pancreatic tail
- 12a Hepatoduodenal ligament LNs along the proper hepatic artery, in the caudal half between the confluence of the right and left hepatic ducts and the upper border of the pancreas
- 12b Hepatoduodenal ligament LNs along the bile duct, in the caudal half between the confluence of the right and left hepatic ducts and the upper border of the pancreas
- 12p Hepatoduodenal ligament LNs along the portal vein in the caudal half between the confluence of the right and left hepatic ducts and the upper border of the pancreas
- 13 LNs on the posterior surface of the pancreatic head cranial to the duodenal papilla
- 14v LNs along the superior mesenteric vein
- 15 LNs along the middle colic vessels
- 16a1 Paraaortic LNs in the diaphragmatic aortic hiatus
- 16a2 Paraaortic LNs between the upper margin of the origin of the celiac artery and the lower border of the left renal vein
- 16b1 Paraaortic LNs between the lower border of the left renal vein and the upper border of the origin of the inferior mesenteric artery
- 16b2 Paraaortic LNs between the upper border of the origin of the inferior mesenteric artery and the aortic bifurcation
- 17 LNs on the anterior surface of the pancreatic head beneath the pancreatic sheath
- 18 LNs along the inferior border of the pancreatic body
- 19 Infradiaphragmatic LNs predominantly along the subphrenic artery
- 20 Paraesophageal LNs in the diaphragmatic esophageal hiatus
- 110 Paraesophageal LNs in the lower thorax
- 111 Supradiaphragmatic LNs separate from the esophagus
- 112 Posterior mediastinal LNs separate from the esophagus and the esophageal hiatus

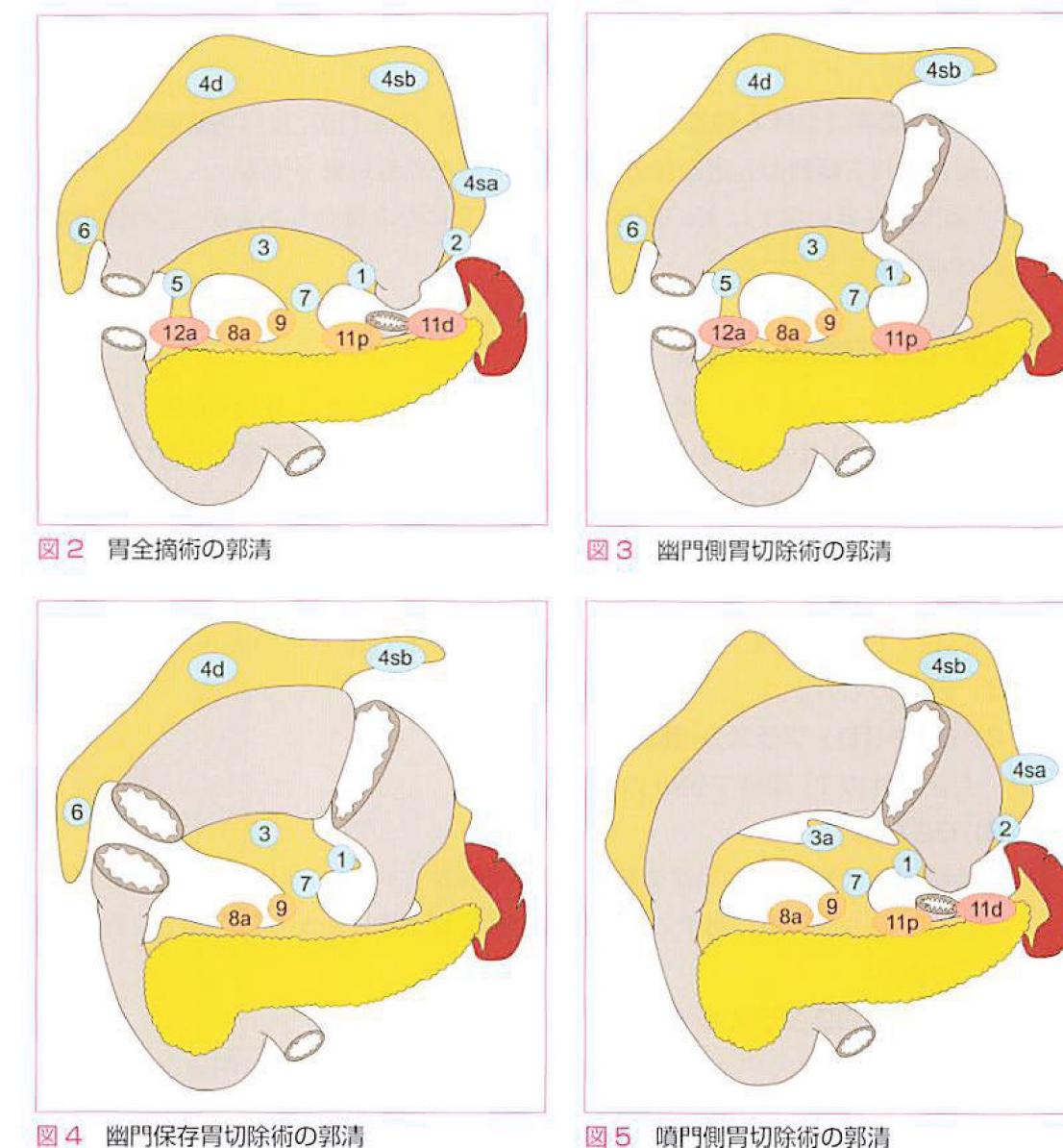
# Japanese Classification of Gastric Carcinoma - 2<sup>nd</sup> English Edition

Location Lymph node station	LMU / MUL MLU / UML	LD / L	LM / M / ML	MU / UM	U	E+
No. 1 rt paracardial	1	2	1	1	1	
No. 2 lt paracardial	1	M	3	1	1	
No. 3 lesser curvature	1	1	1	1	1	
No.4sa short gastric	1	M	3	1	1	
No.4sb lt gastroepiploic	1	3	1	1	1	
No.4d rt gastroepiploic	1	1	1	1	2	
No.5 suprapyloric	1	1	1	1	3	
No.6 infrapyloric	1	1	1	1	3	
No.7 lt gastric artery	2	2	2	2	2	
No.8a ant comm hepatic	2	2	2	2	2	
No.8b post comm hepatic	3	3	3	3	3	
No.9 celiac artery	2	2	2	2	2	
No.10 splenic hilum	2	M	3	2	2	
No.11p proximal splenic	2	2	2	2	2	
No.11d distal splenic	2	M	3	2	2	
No.12a lt hepatoduodenal	2	2	2	2	3	
No.12b,p post hepatoduod	3	3	3	3	3	
No.13 retropancreatic	3	3	3	M	M	
No.14v sup mesenteric v.	2	2	3	3	M	
No.14a sup mesenteric a.	M	M	M	M	M	
No.15 middle colic	M	M	M	M	M	
No.16a1 aortic hiatus	M	M	M	M	M	
No.16a2,b1 paraaortic, middle	3	3	3	3	3	
No.16b2 paraaortic, caudal	M	M	M	M	M	
No.17 ant pancreatic	M	M	M	M	M	
No.18 inf pancreatic	M	M	M	M	M	
No.19 infradiaphragmatic	3	M	M	3	3	2
No.20 esophageal hiatus	3	M	M	3	3	1
No.110 lower paraesophag	M	M	M	M	M	3
No.111 supradiaphragmatic	M	M	M	M	M	3
No.112 post mediastinal	M	M	M	M	M	3

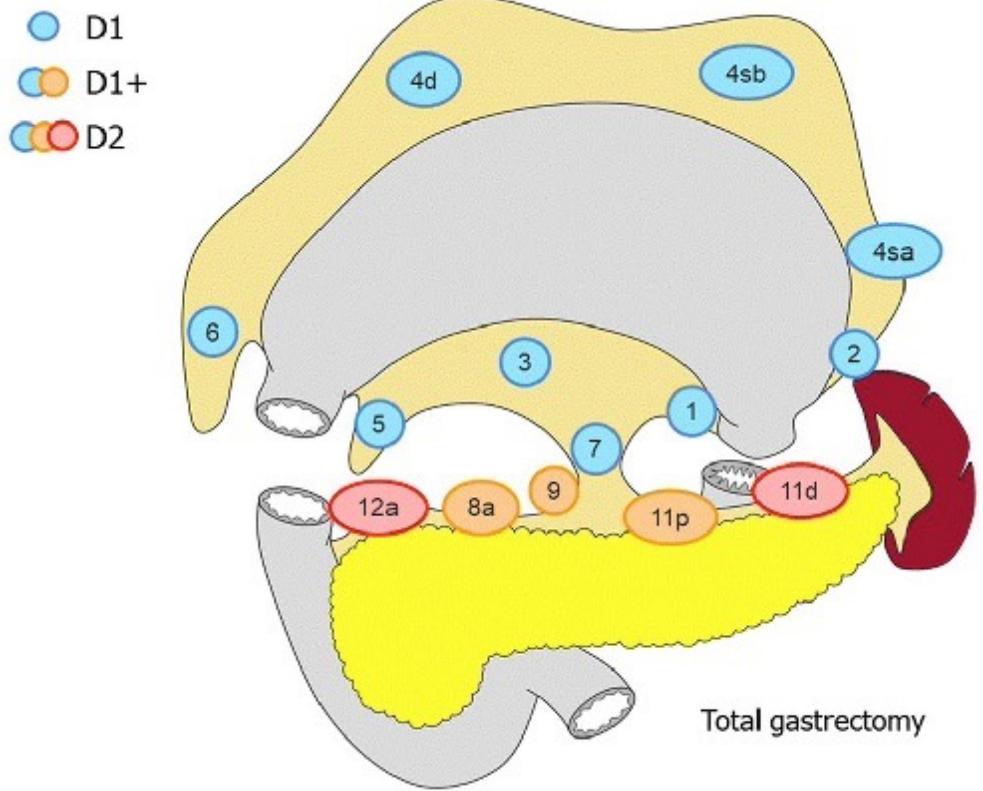
## Japanese Classification of Gastric Carcinoma – 4<sup>th</sup>/5<sup>th</sup> English Edition.



## Japanese Classification of Gastric Carcinoma – 6<sup>th</sup> Japanese Edition.



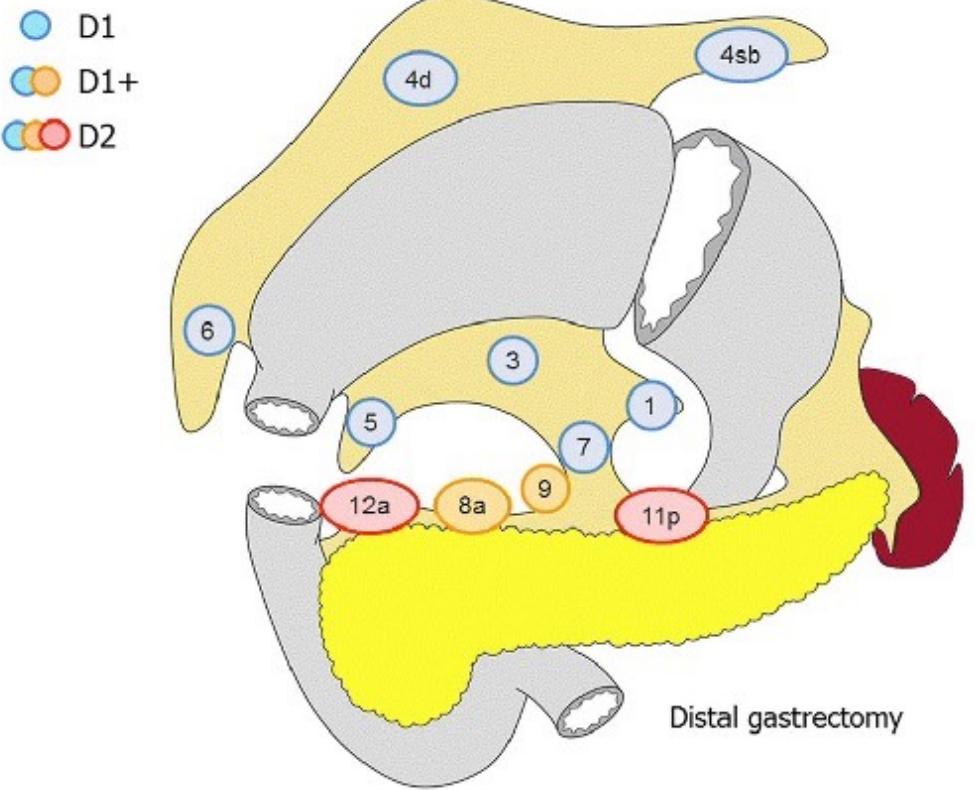
## Total gastrectomy



	Total gastrectomy			Distal gastrectomy			PPG			Proximal gastrectomy		
	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2
1	+			+			+			+		
2	+									+		
3	+			+			+			+	(3a)	
4	+			+			+			+	(-4d)	
5	+			+								
6	+			+			+					
7	+			+			+			+		
8a		+			+			+				+
9		+			+			+				+
11p		+					+					+
11d			+									+
12a			+				+					
19/20*			+									
110*		+	+									
111*			+									

Optional: 10, 14v, 13

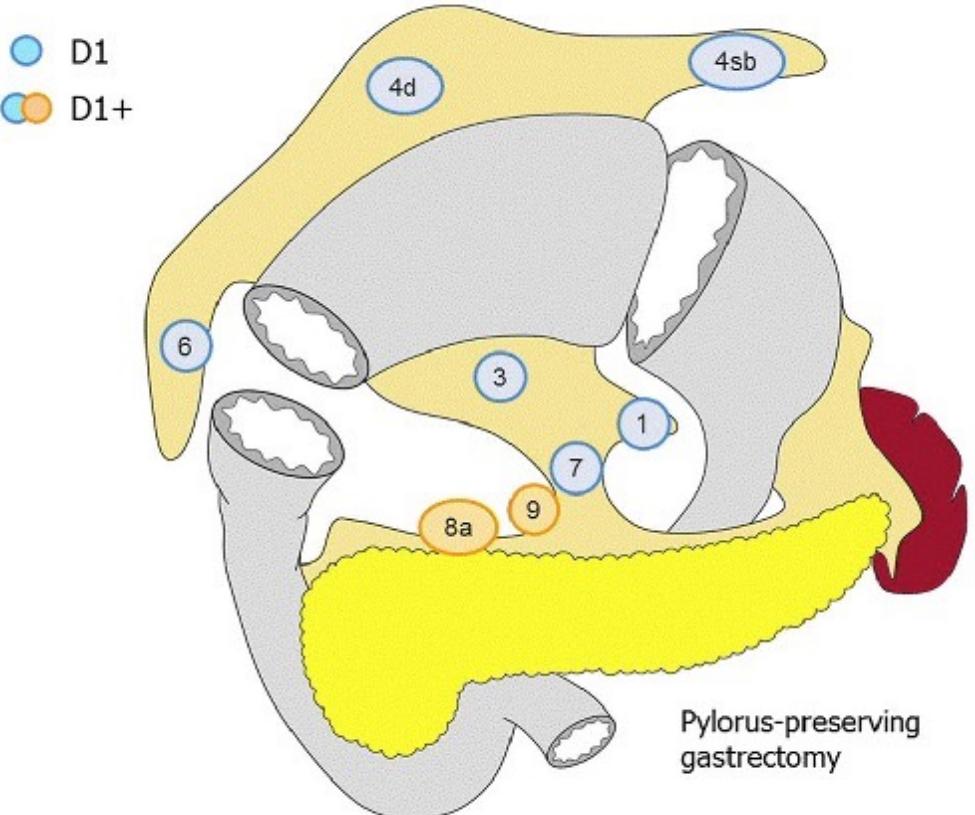
## Distal gastrectomy



	Total gastrectomy			Distal gastrectomy			PPG			Proximal gastrectomy		
	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2
1	+			+			+			+		
2	+									+		
3	+			+			+			+	(3a)	
4	+			+			+			+	(-4d)	
5	+			+								
6	+			+			+					
7	+			+			+			+		
8a		+			+			+			+	
9		+			+			+			+	
11p		+					+				+	
11d			+									+
12a			+				+					
19/20*			+									
110*		+	+									
111*			+									

Optional: 10, 14v, 13

## Pylorus-preserving gastrectomy



	Total gastrectomy			Distal gastrectomy			PPG			Proximal gastrectomy		
	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2
1	+			+			+			+		
2	+									+		
3	+			+			+			+	(3a)	
4	+			+			+			+	(-4d)	
5	+			+								
6	+			+			+					
7	+			+			+			+		
8a		+			+			+				+
9		+			+			+				+
11p		+				+						+
11d			+									+
12a			+			+						
19/20*			+									
110*		+	+									
111*			+									

Optional: 10, 14v, 13

## Proximal gastrectomy

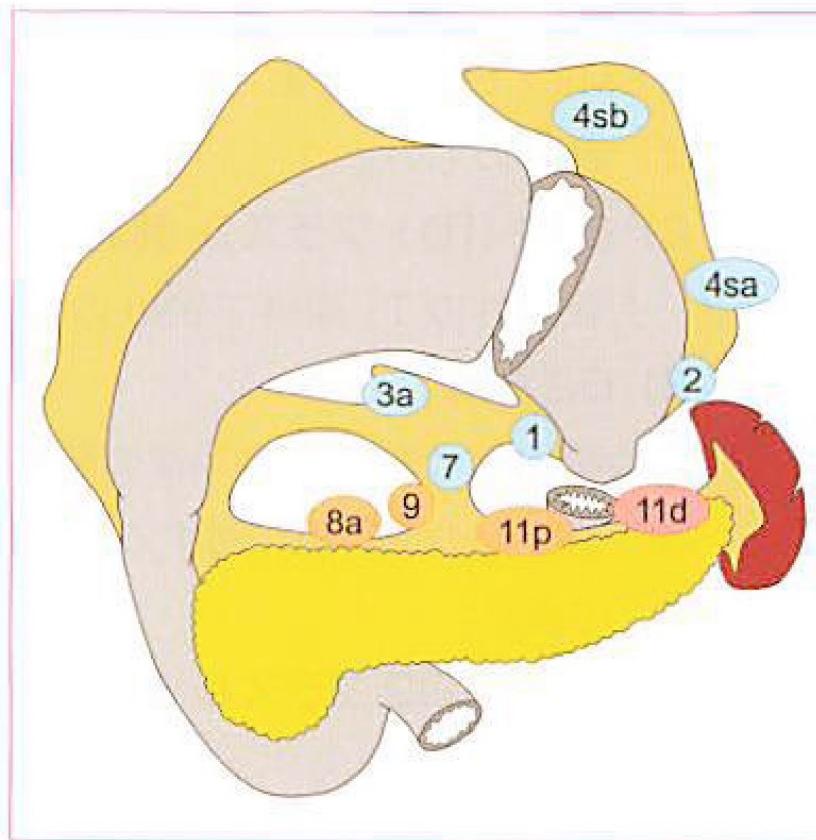
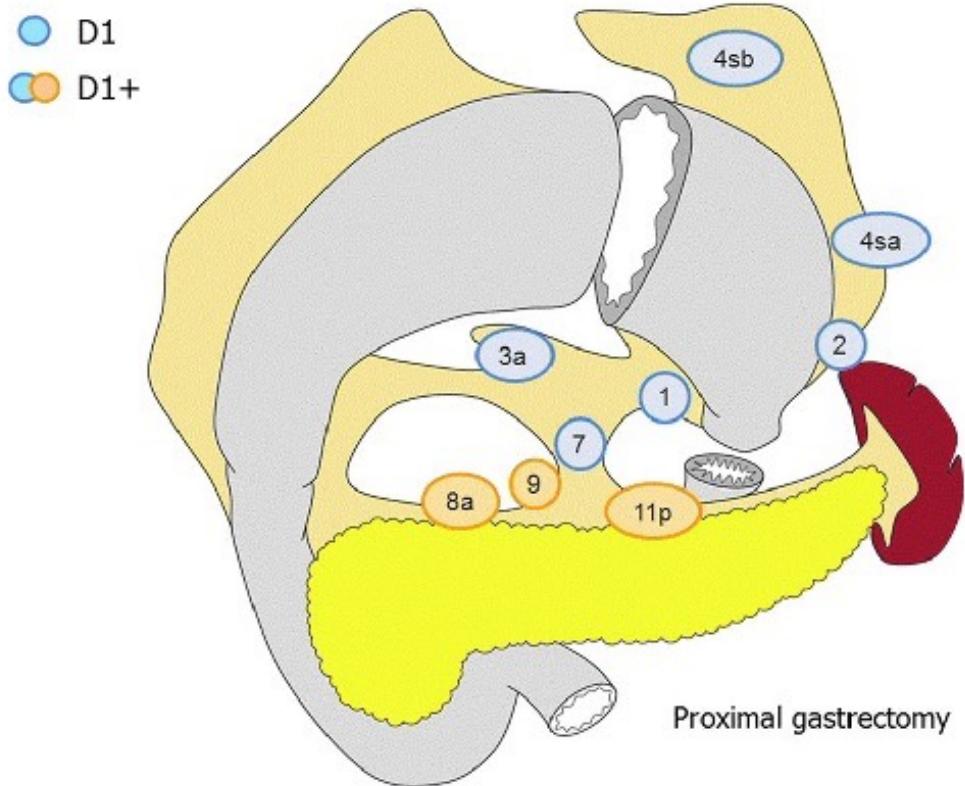
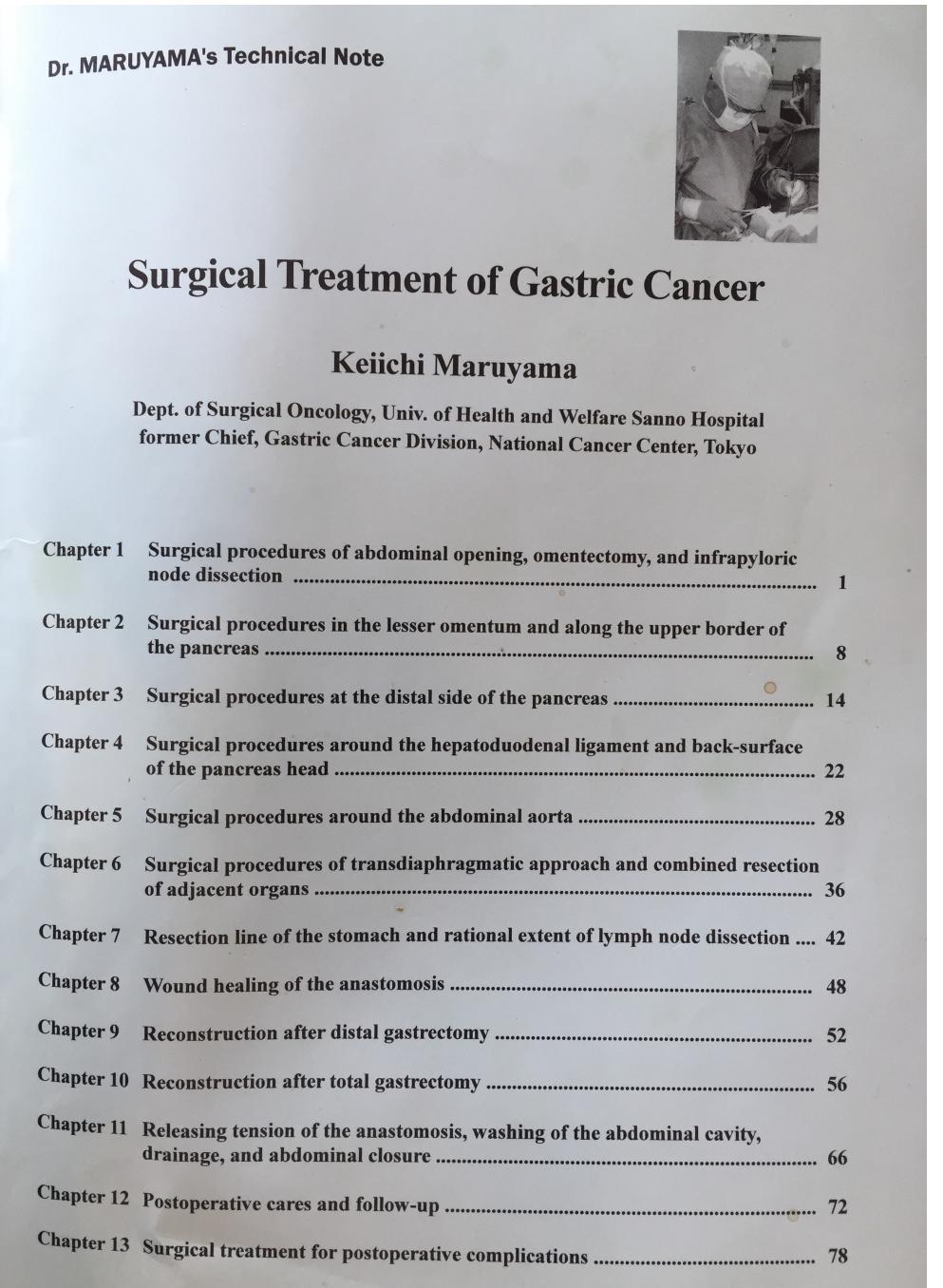


図5 噴門側胃切除術の郭清

	Total gastrectomy			Distal gastrectomy			PPG			Proximal gastrectomy		
	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2	D1	D1+	D2
1	+			+			+			+		
2	+									+		
3	+			+			+			+	(3a)	
4	+			+	(-4sa)		+	(-4sa)		+	(-4d)	
5	+			+								
6	+			+			+					
7	+			+			+			+		
8a		+			+			+				+
9		+			+			+				+
11p		+					+					+
11d			+									+
12a			+				+					
19/20*			+									
110*		+	+									
111*			+									

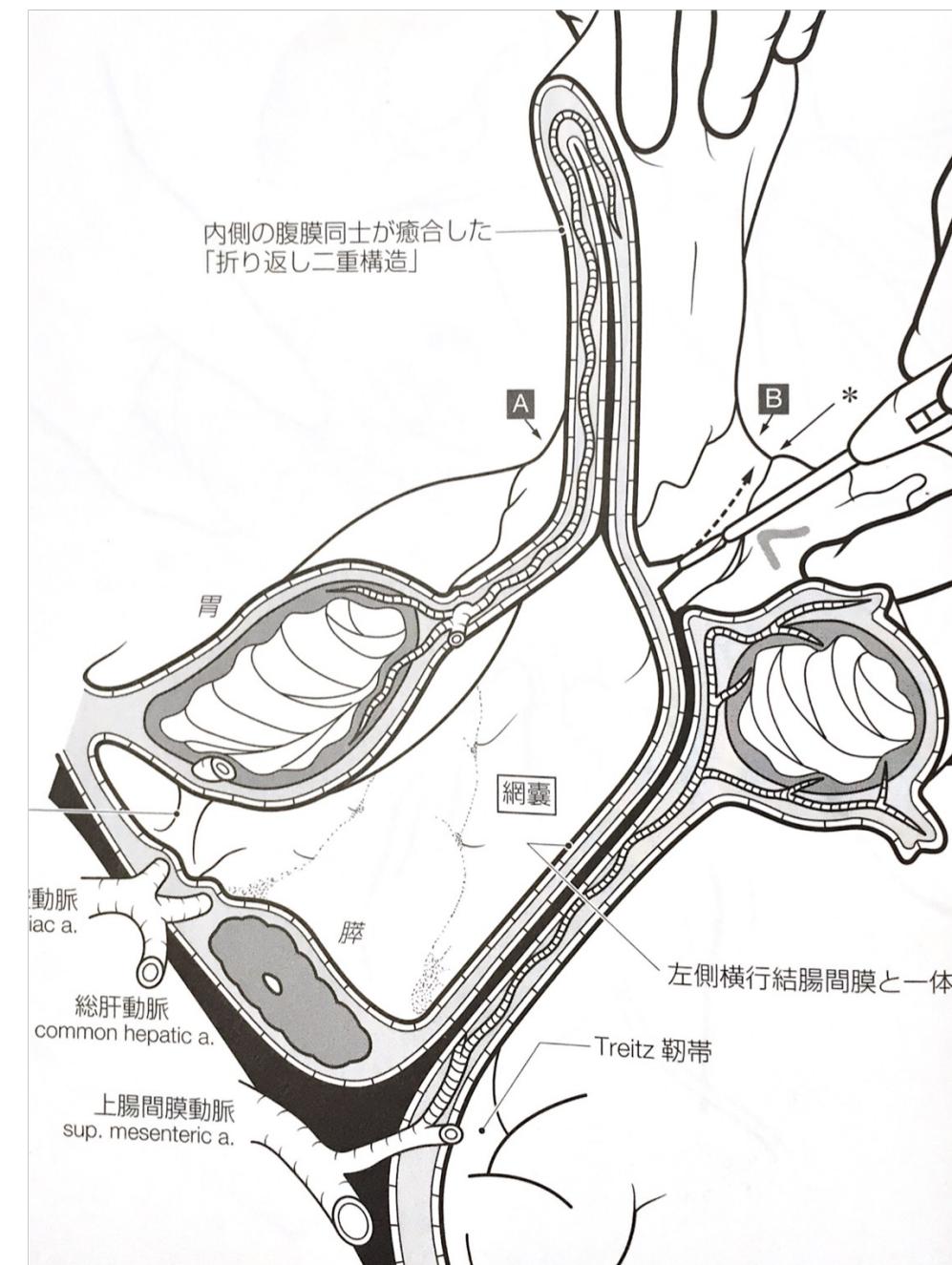
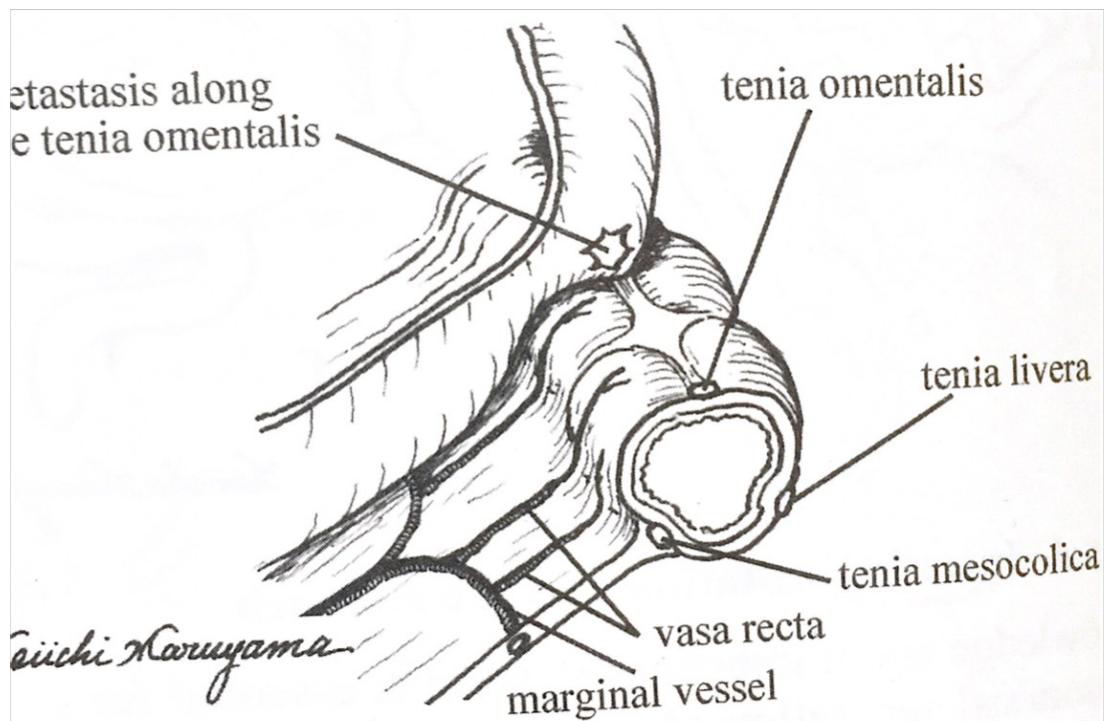
Optional: 10, 14v, 13

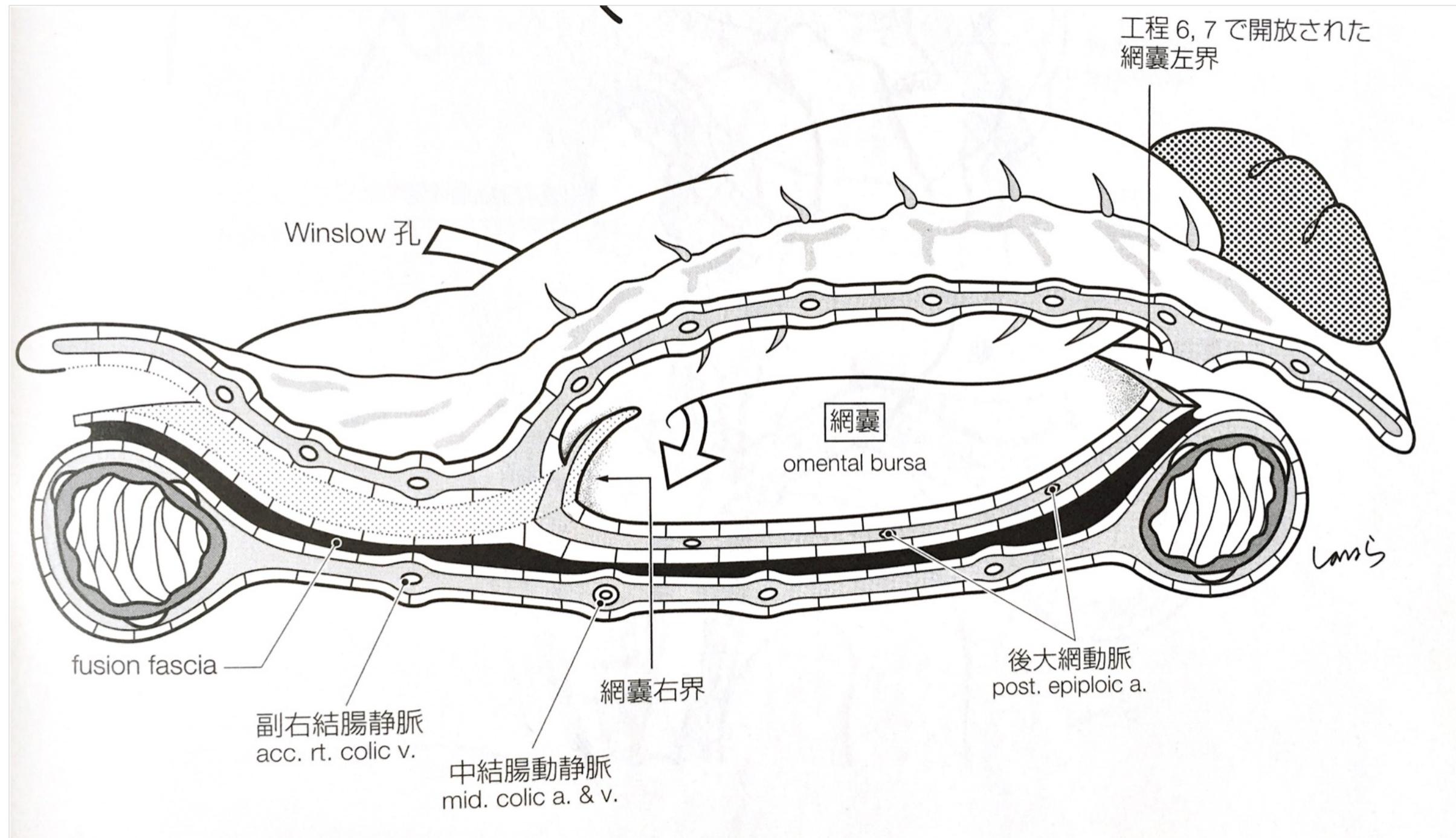


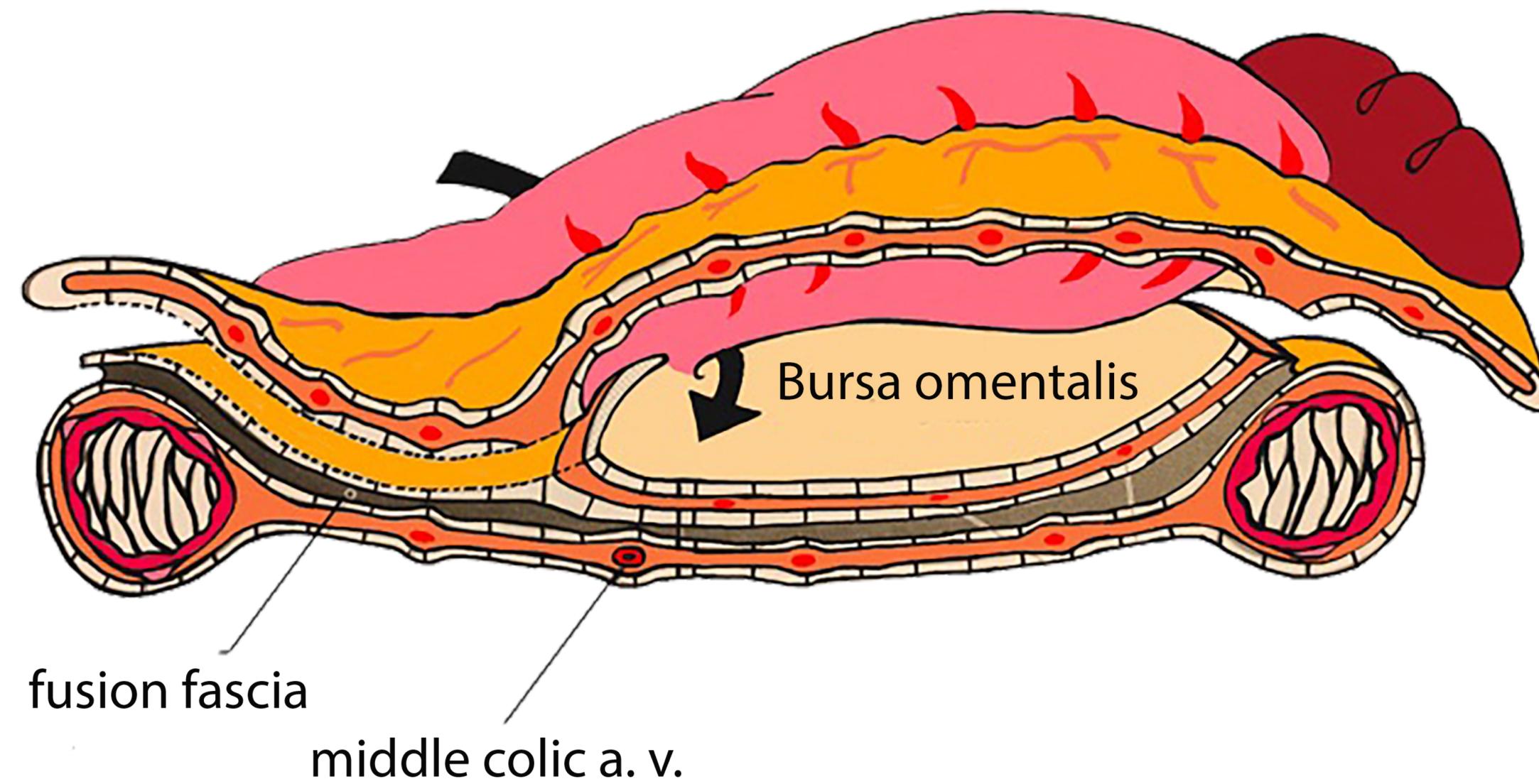
## Incision - Exposure- Cytology



# Omentectomy



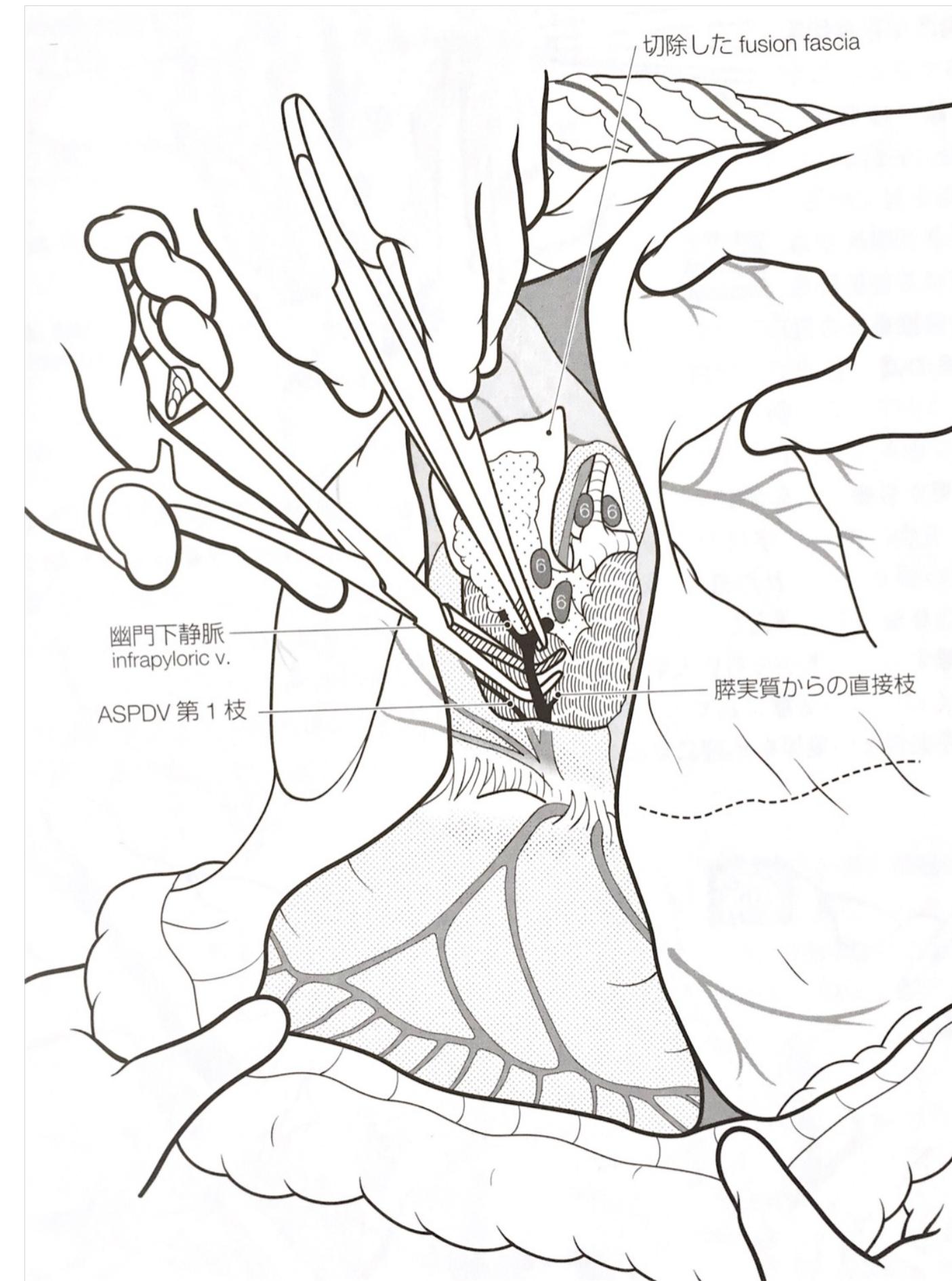
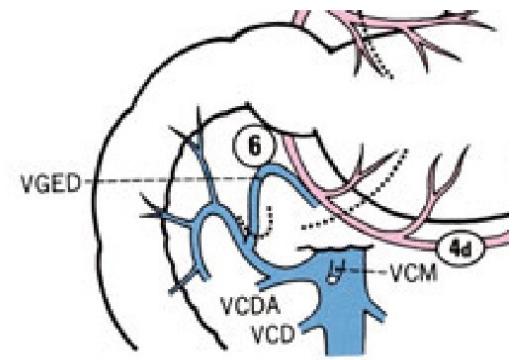




# Infragastric (Sağ-taraf)

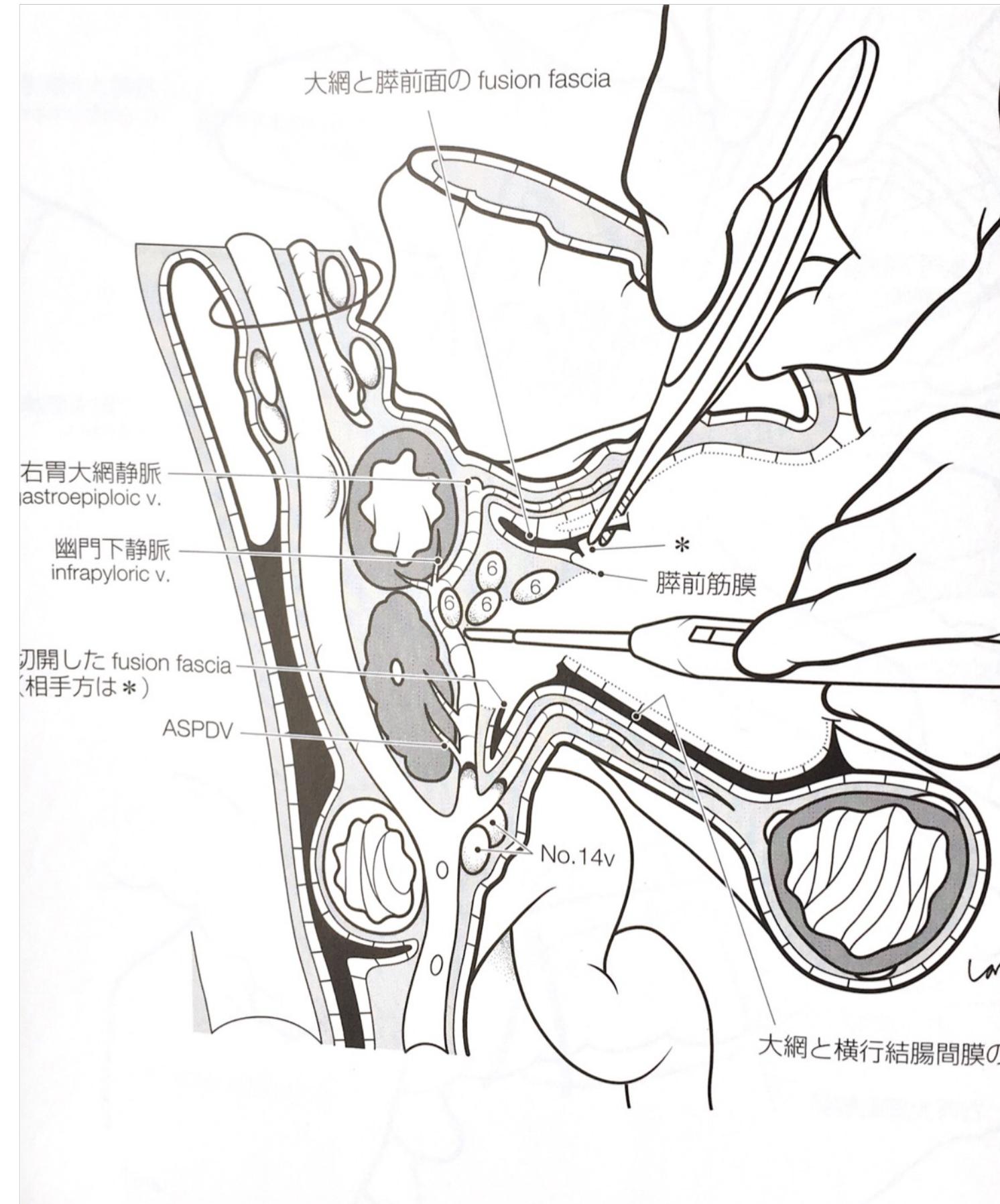
## #6 LN disseksiyonu

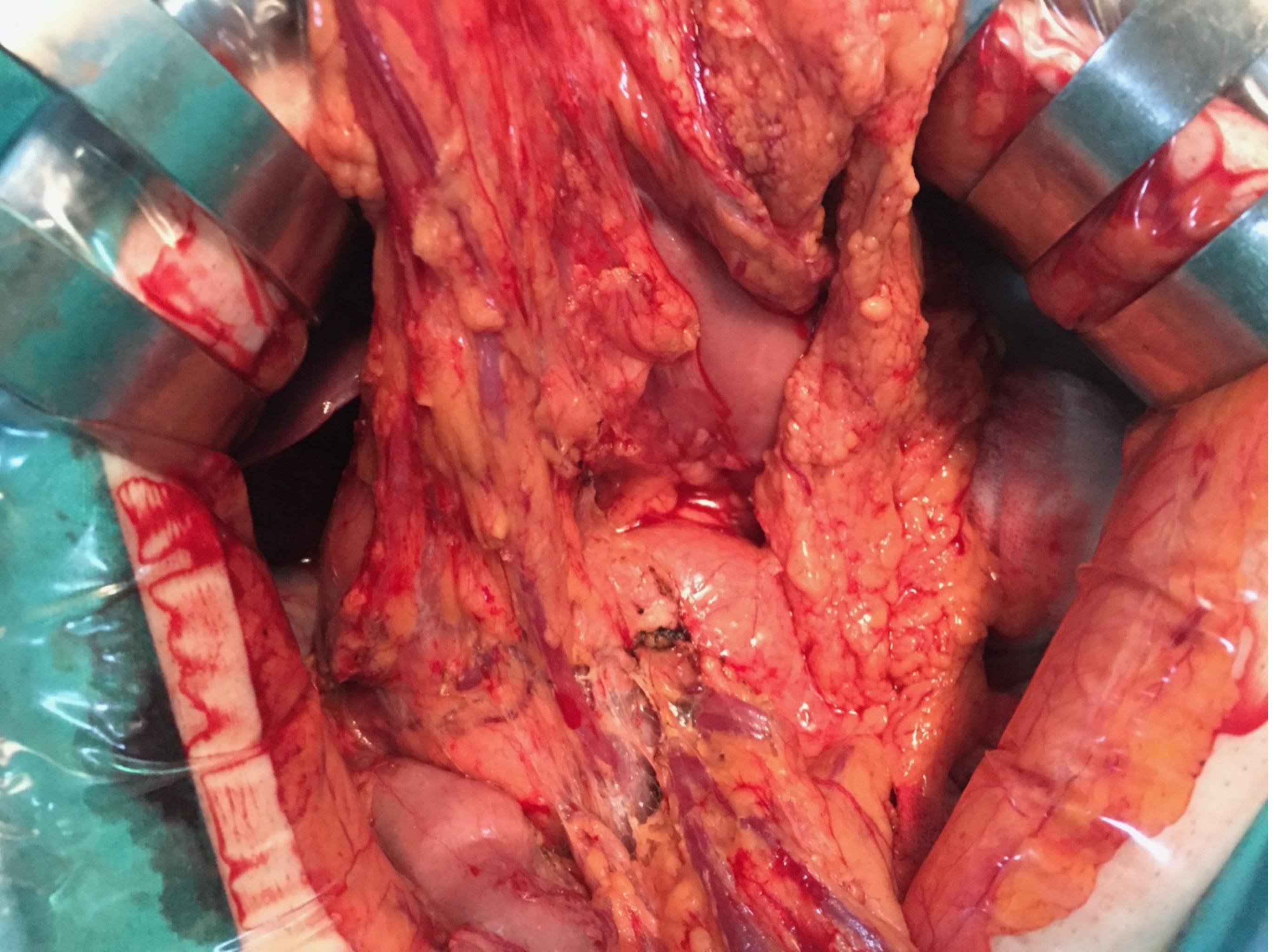
- 6 Infrapyloric LNs along the first branch and proximal part of the right gastroepiploic artery down to the confluence of the right gastroepiploic vein and the anterior superior pancreaticoduodenal vein



## Infragastrik (Sağ-taraf)

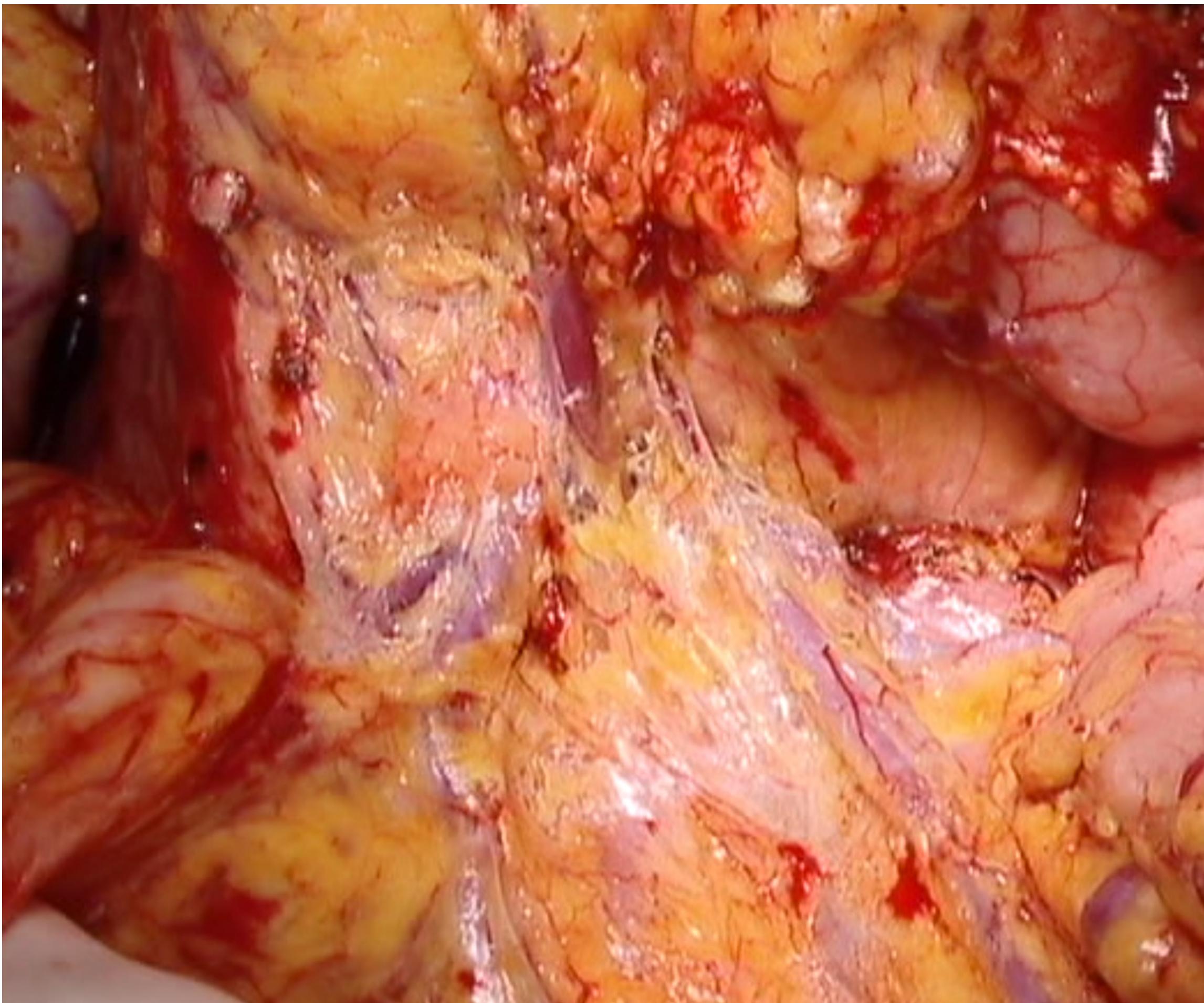
### #6 LN disseksiyonu





Infragastrik (Sağ-taraf)

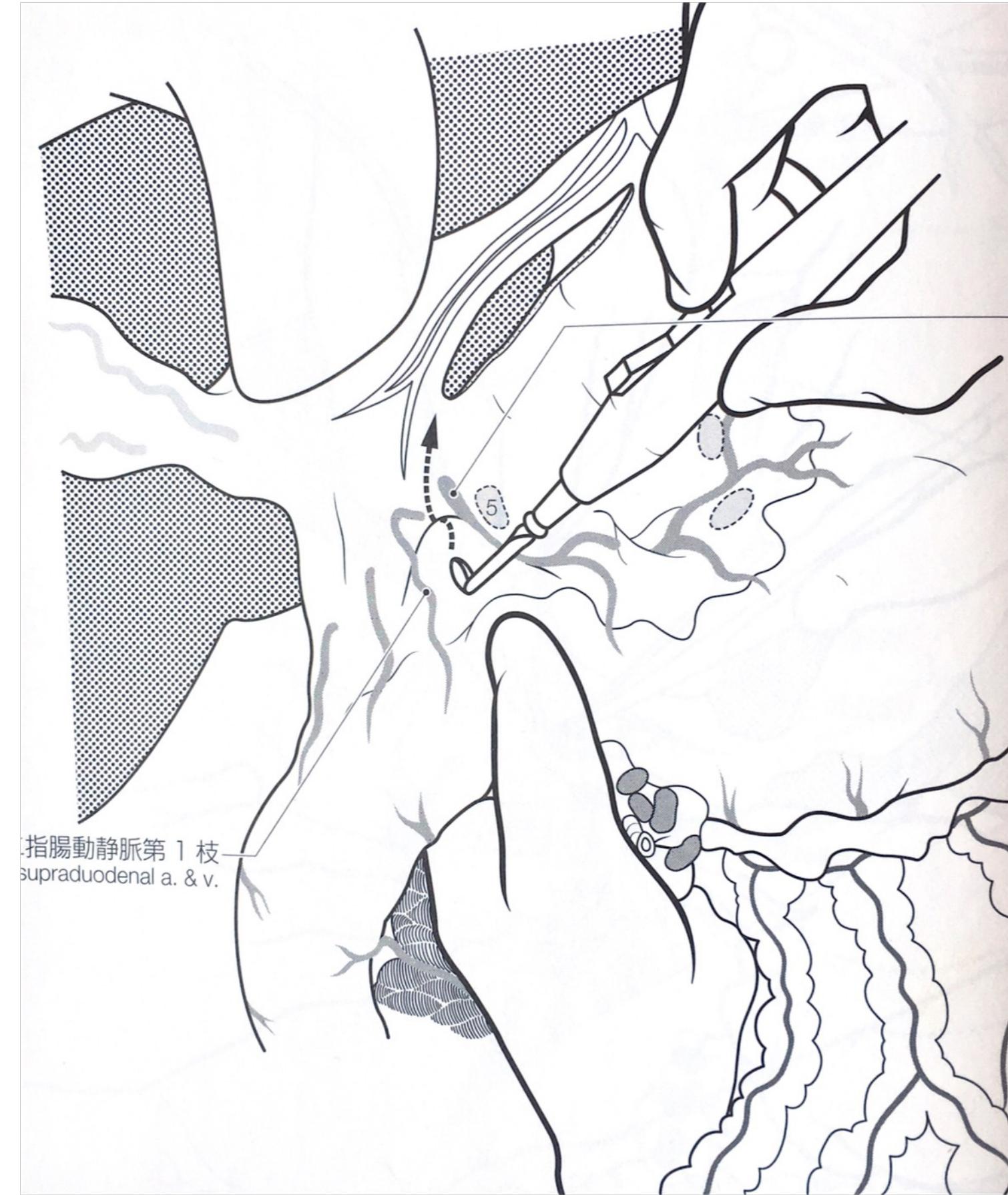
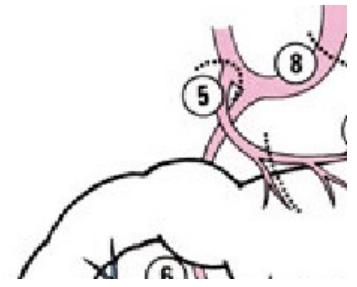
#6 LN disseksiyonu



## supragastric (Sağ-taraf)

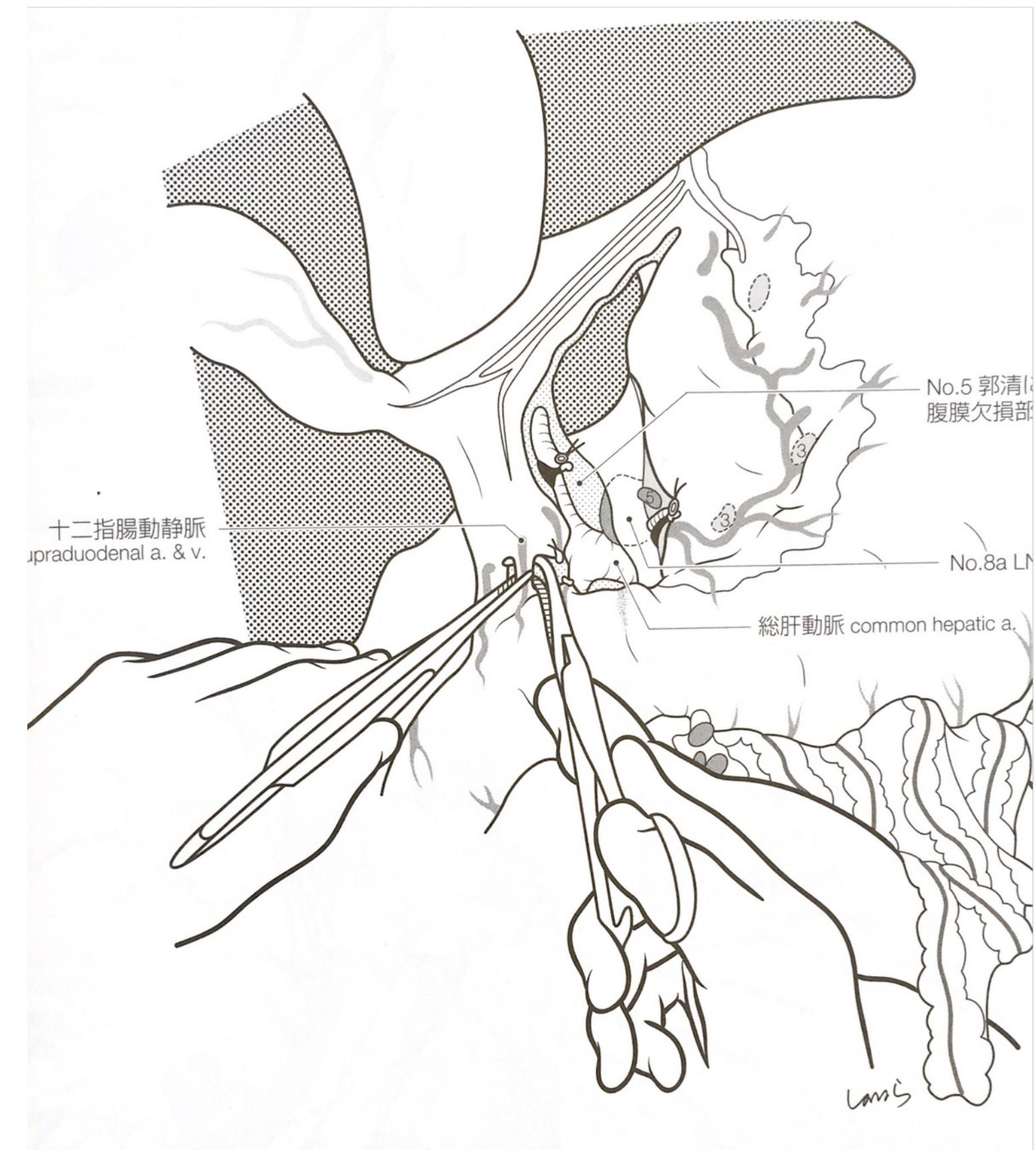
### #5 LN disseksiyonu

- 5 Suprapyloric LNs along the 1st branch and proximal part of the right gastric artery



## supragastric (Sağ-taraf)

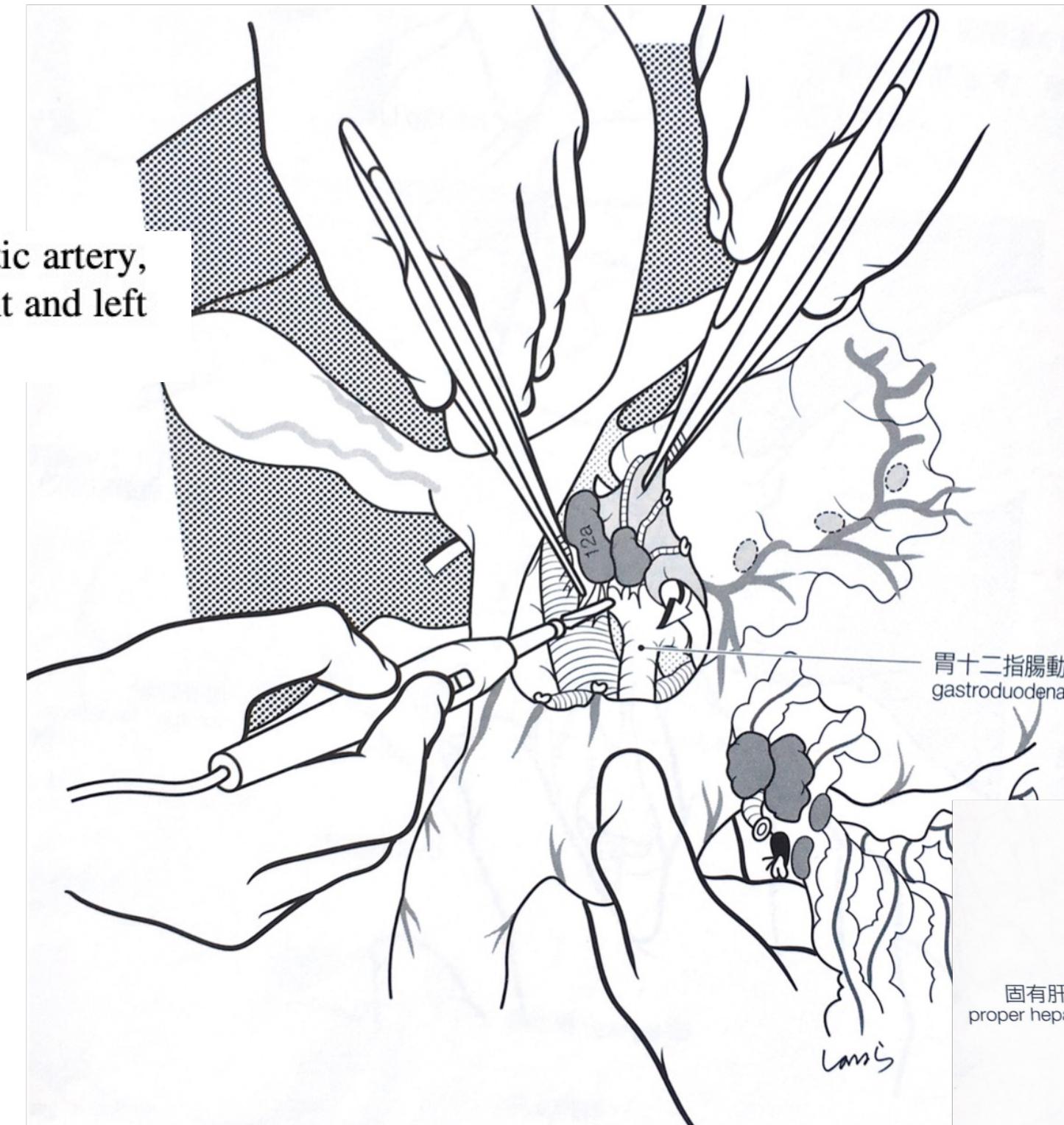
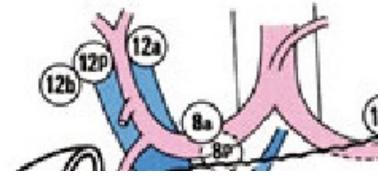
### #5, #12a LN disseksiyonu



## supragastric (Sağ-taraf)

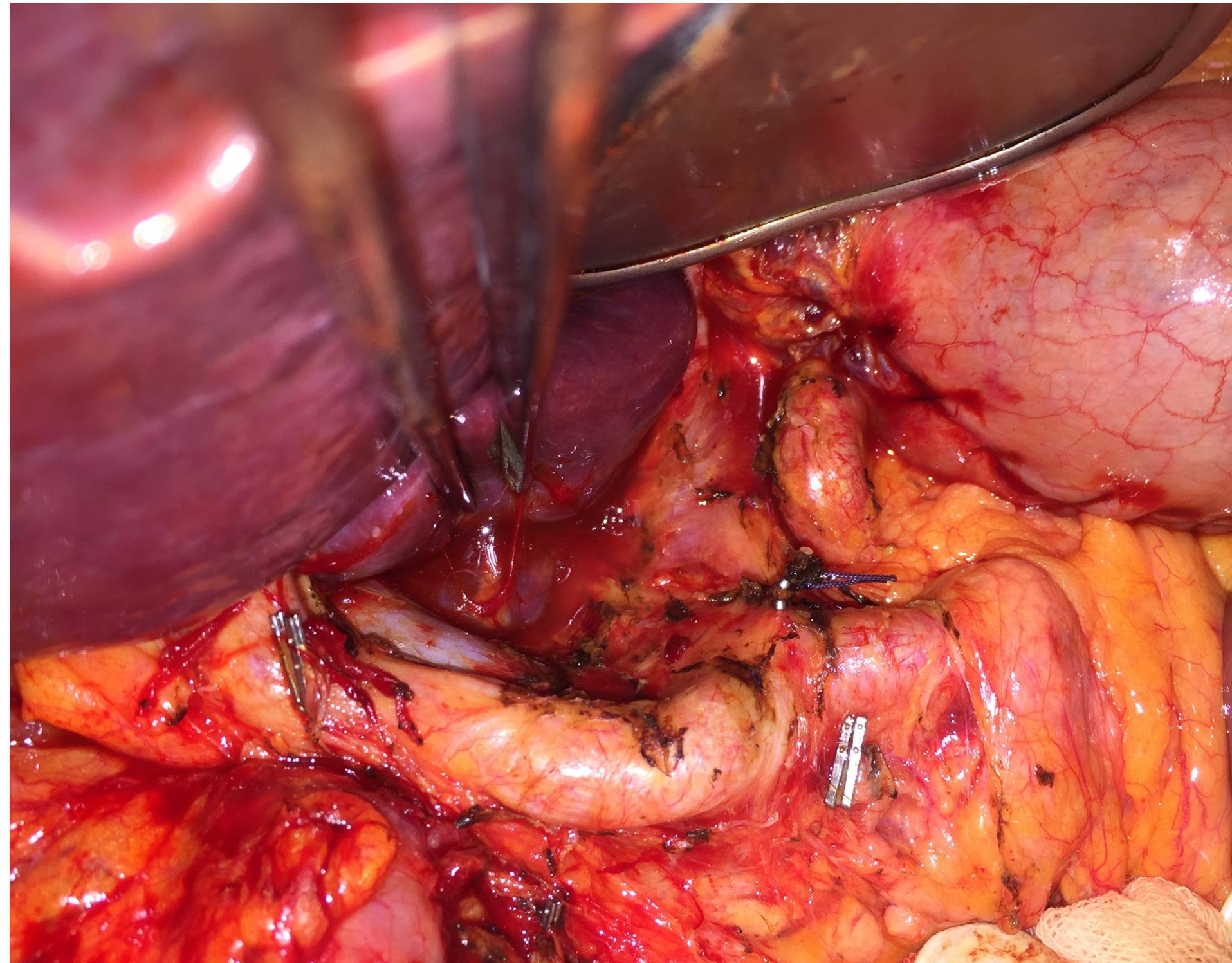
### #5, #12a LN disseksiyonu

- 12a Hepatoduodenal ligament LNs along the proper hepatic artery, in the caudal half between the confluence of the right and left hepatic ducts and the upper border of the pancreas

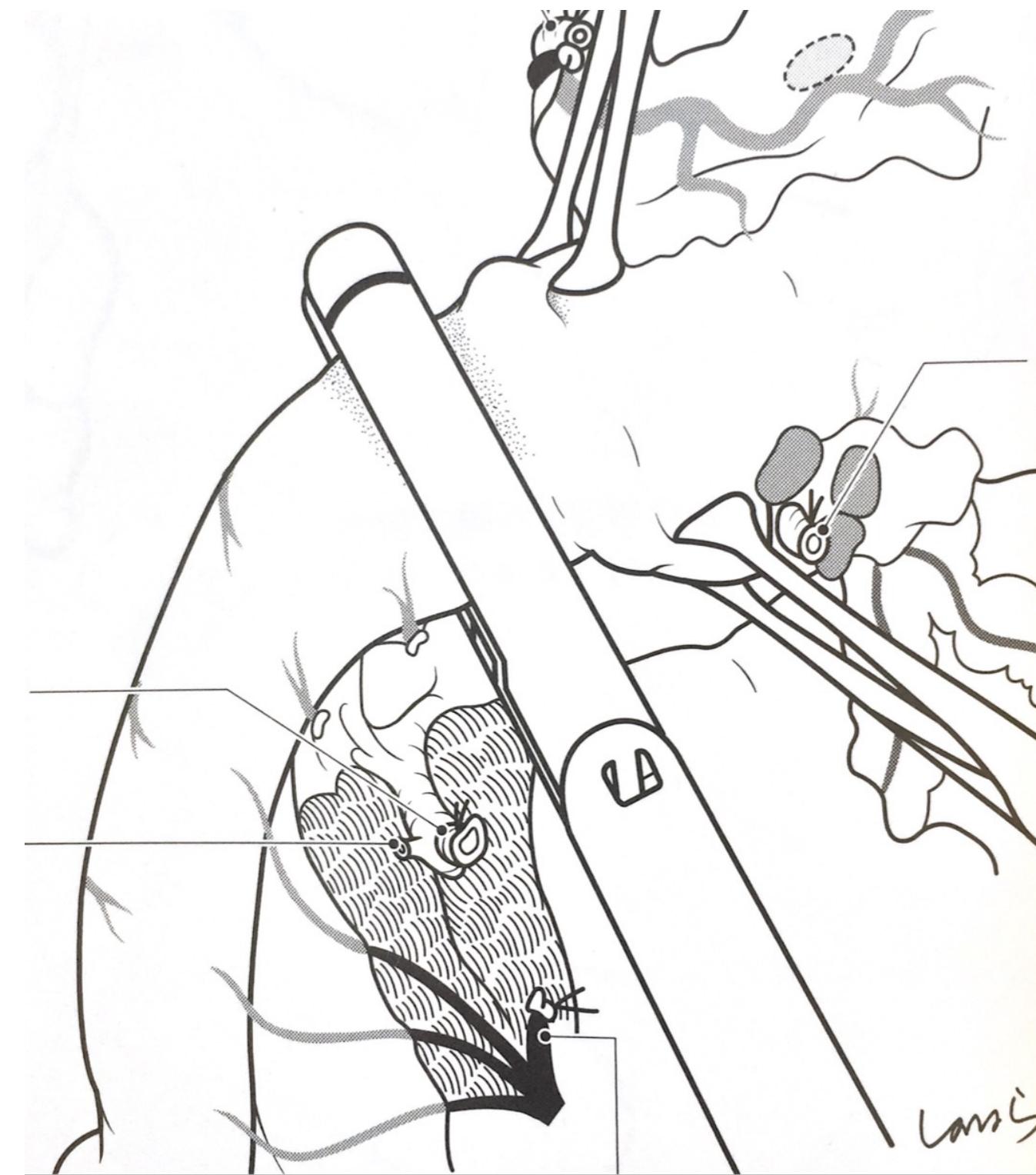


**supragastric (Sağ-taraf)**

**#5, #12a LN disseksiyonu**



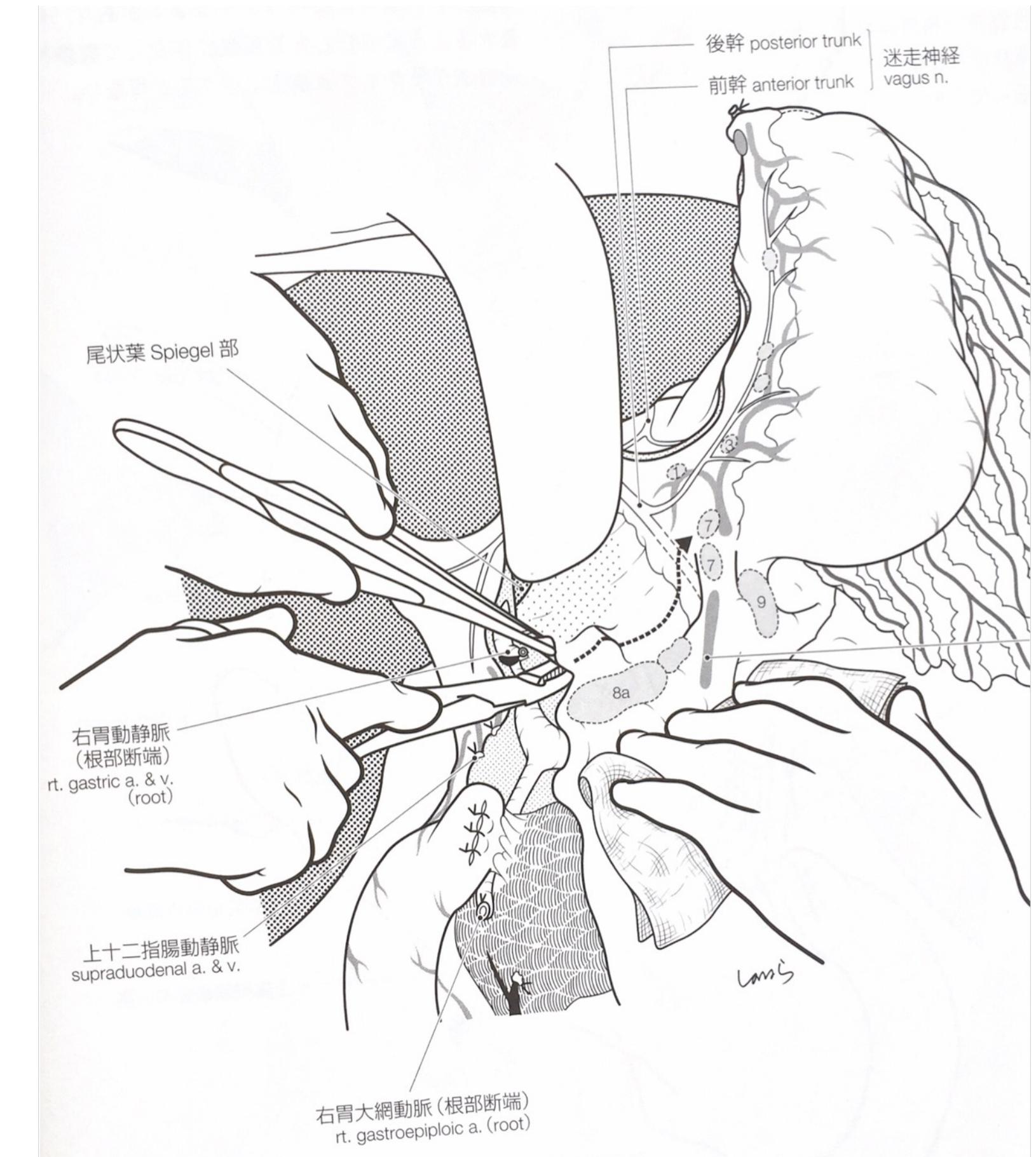
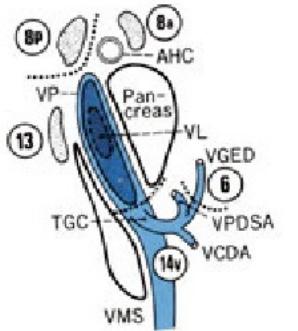
## Duodenum transeksiyonu



## Suprapankreatik (Sağ-taraf)

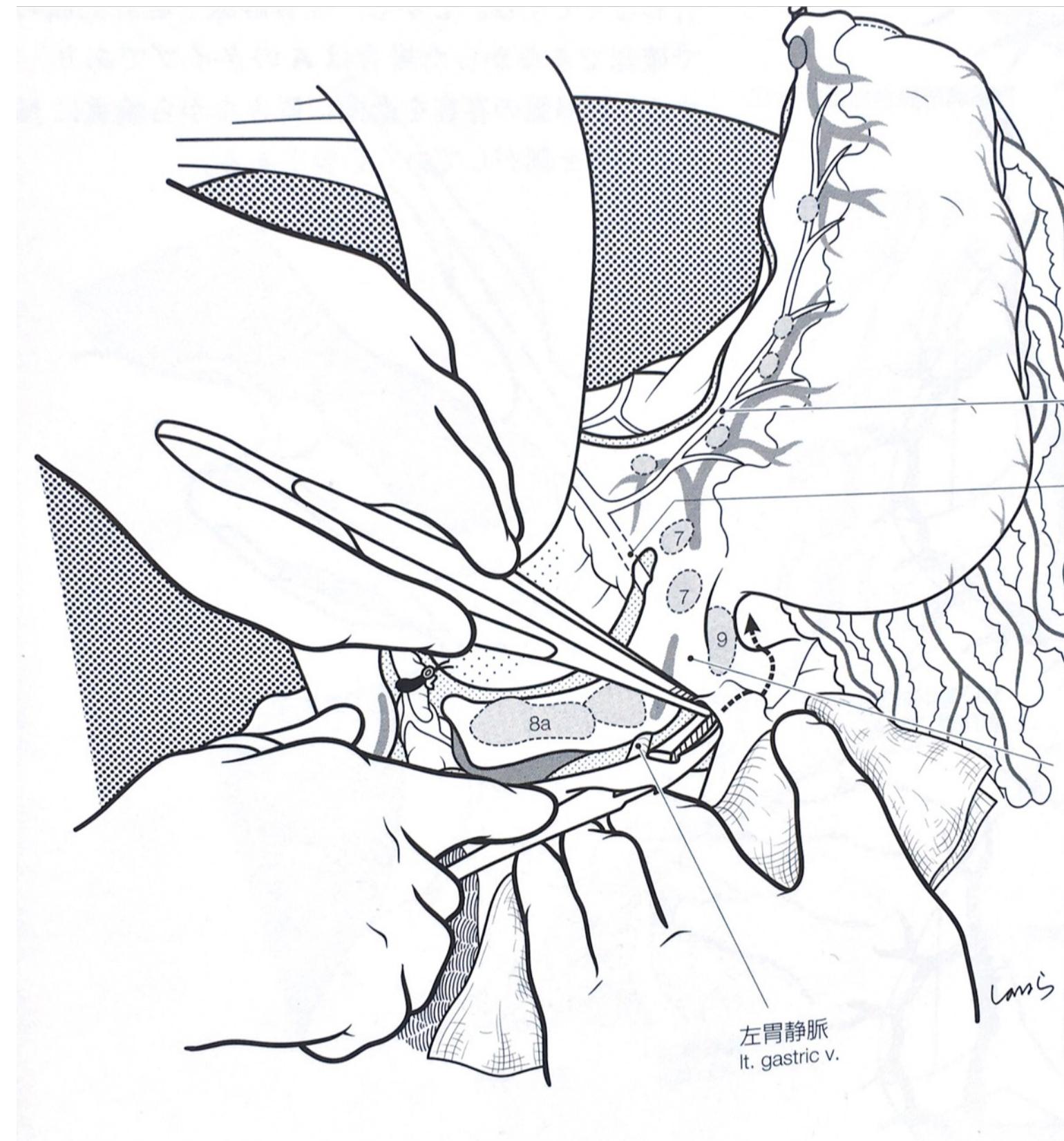
### #8, #9 LN disseksiyonu

- 8a Anterosuperior LNs along the common hepatic artery
- 8p Posterior LNs along the common hepatic artery
- 9 Celiac artery LNs



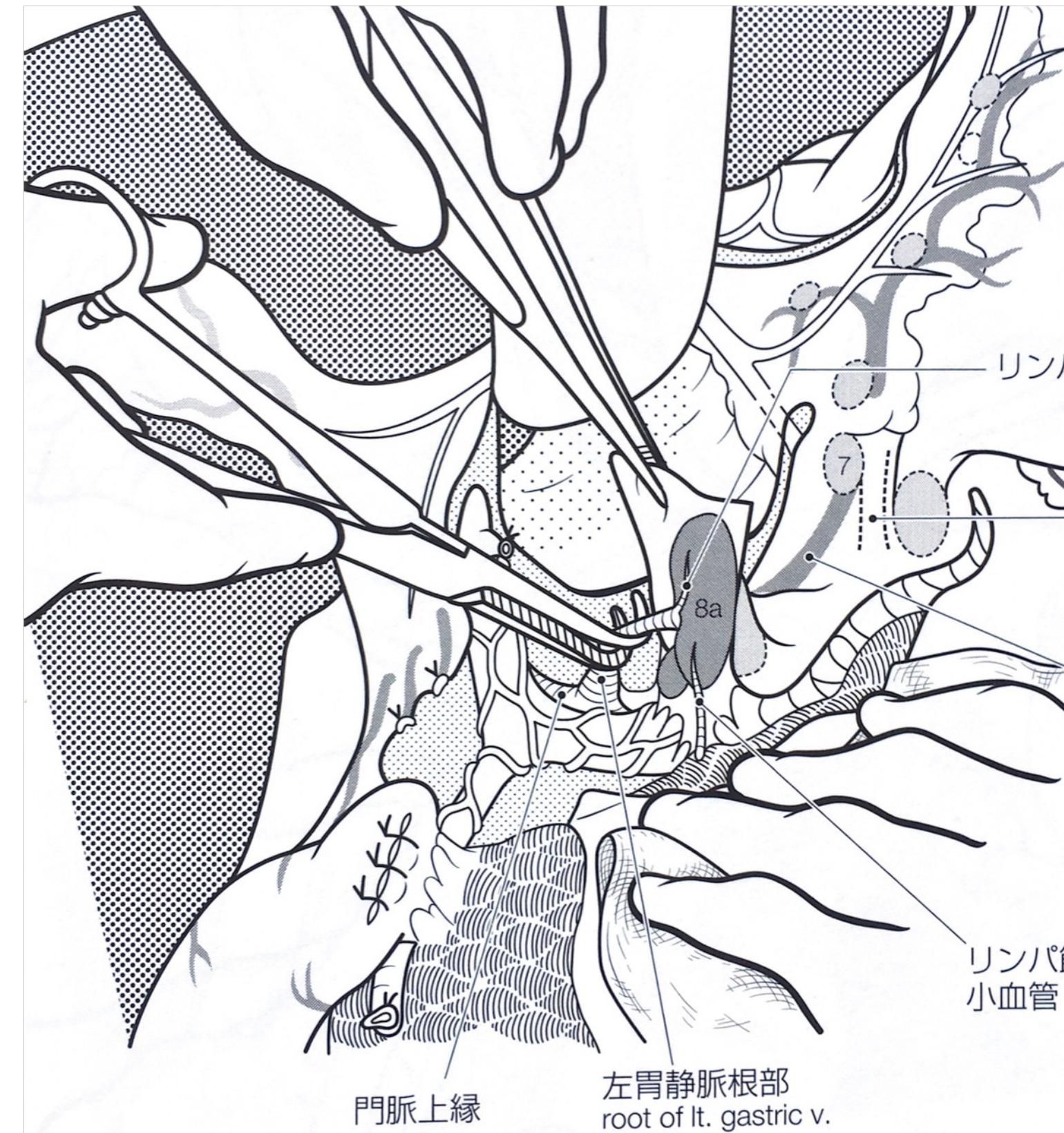
## Suprapankreatik (Sağ-taraf)

### #8, #9 LN disseksiyonu



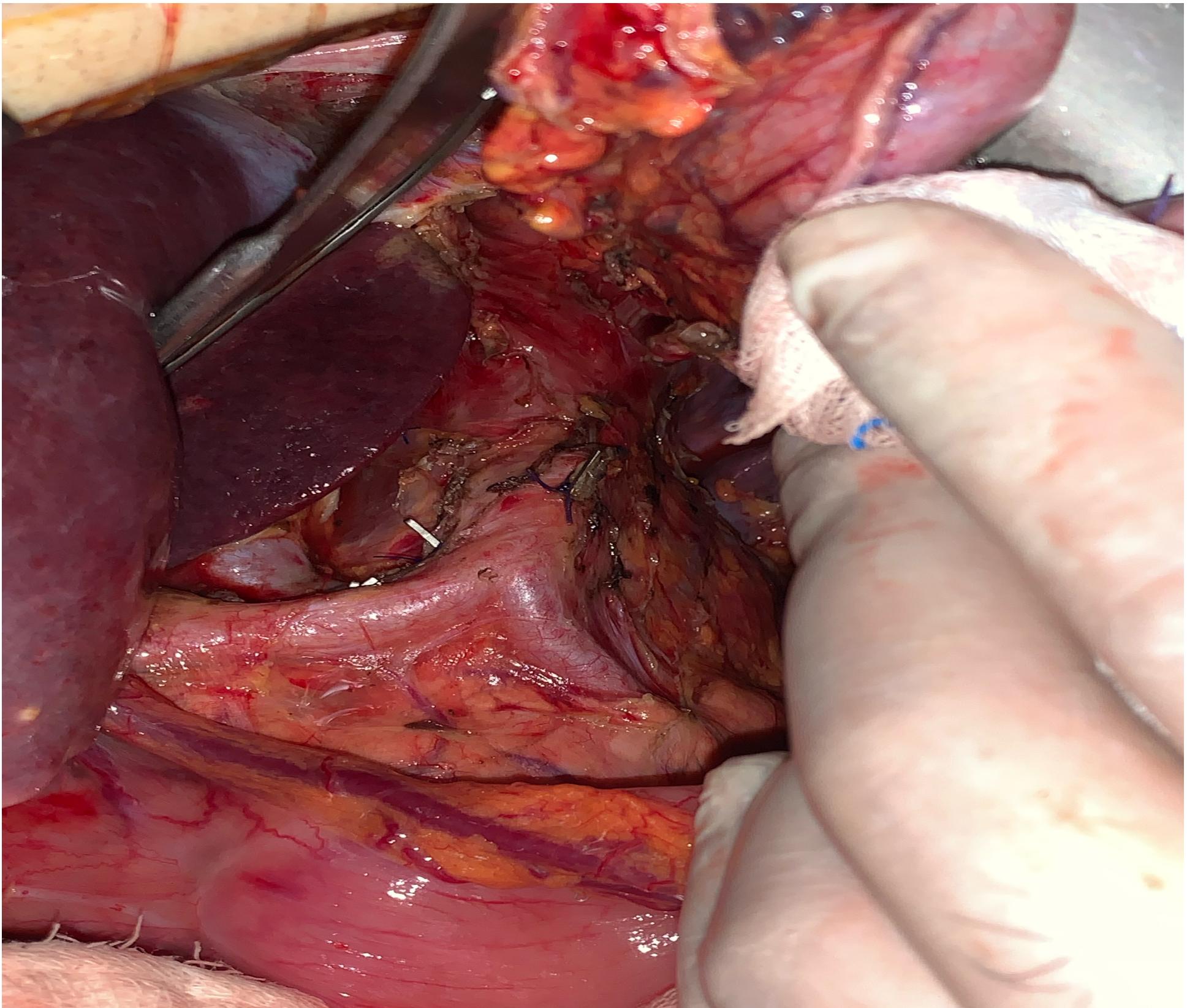
## Suprapankreatik (Sağ-taraf)

### #8, #9 LN disseksiyonu



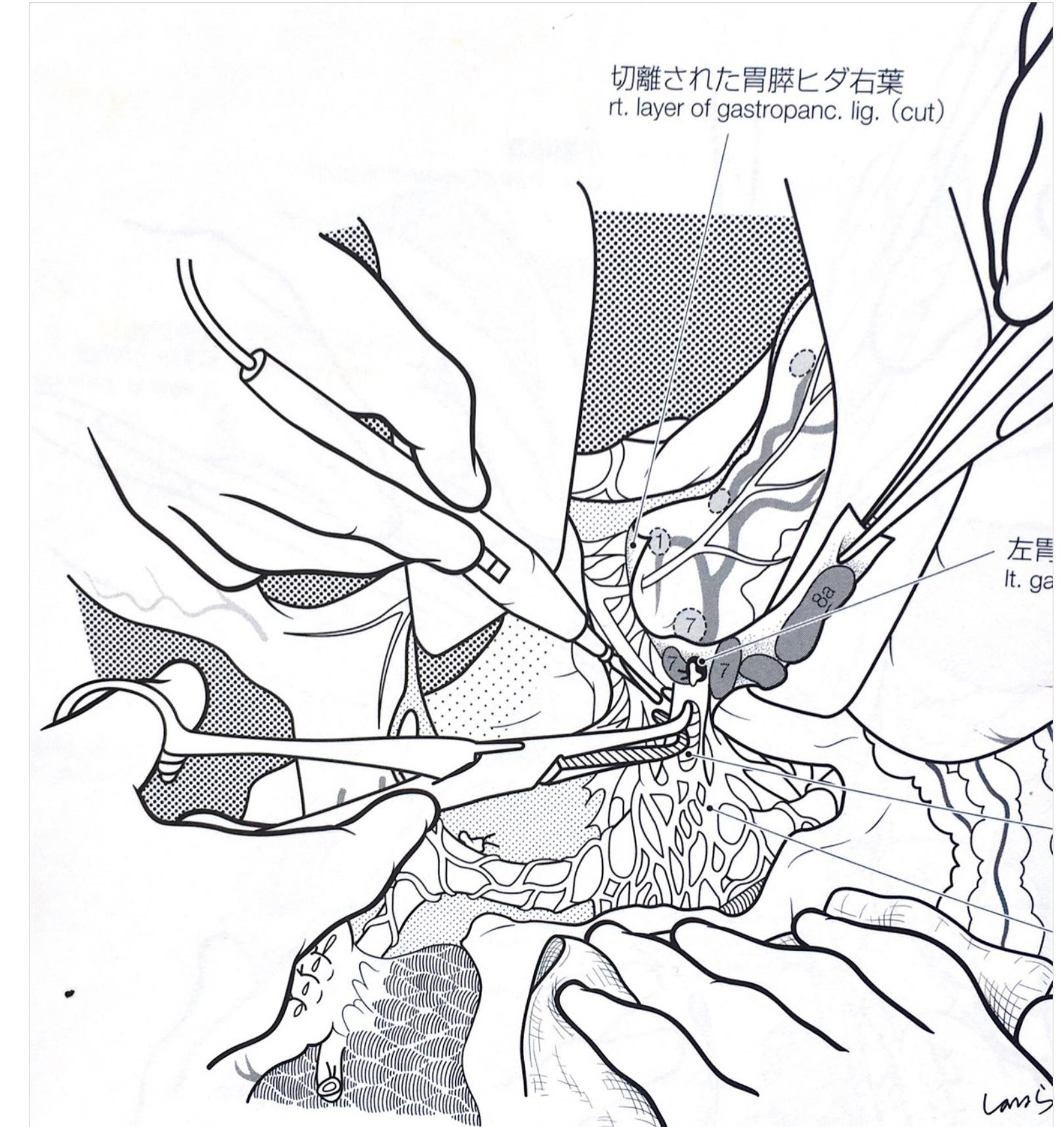
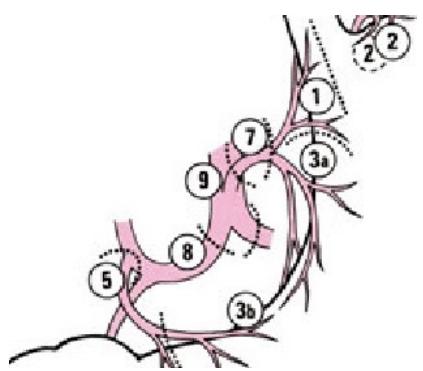
**Suprapankreatik (Sağ-taraf)**

**#8, #9 LN disseksiyonu**



# LGA ligasyonu

- 7 LNs along the trunk of left gastric artery between its root and the origin of its ascending branch



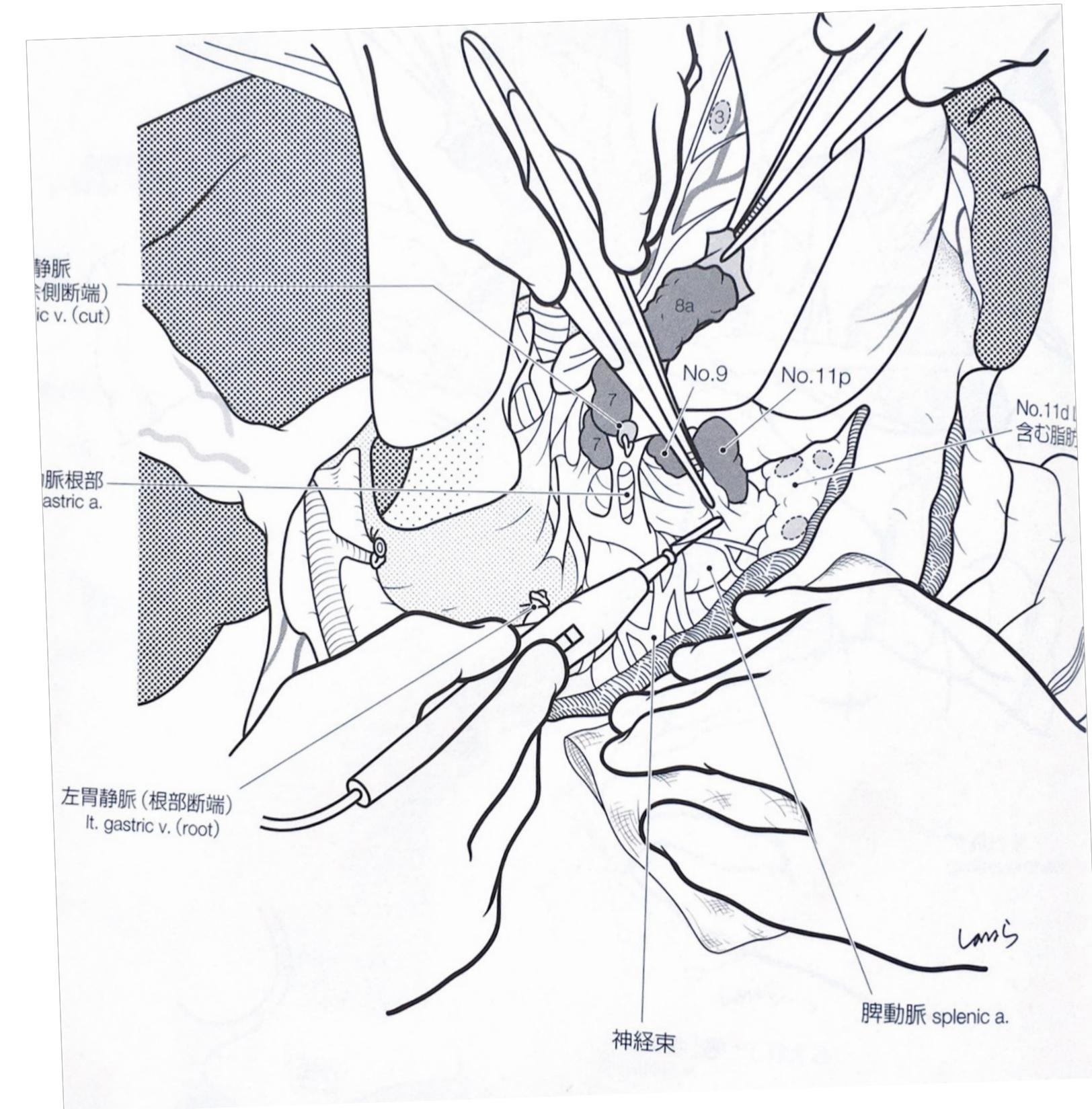
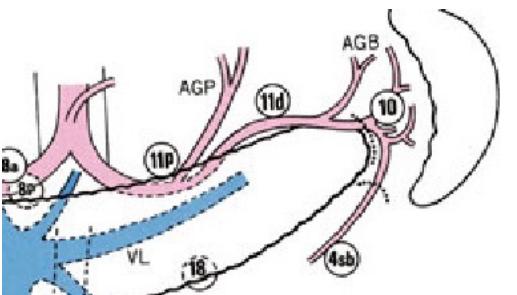
## LGA ligasyonu



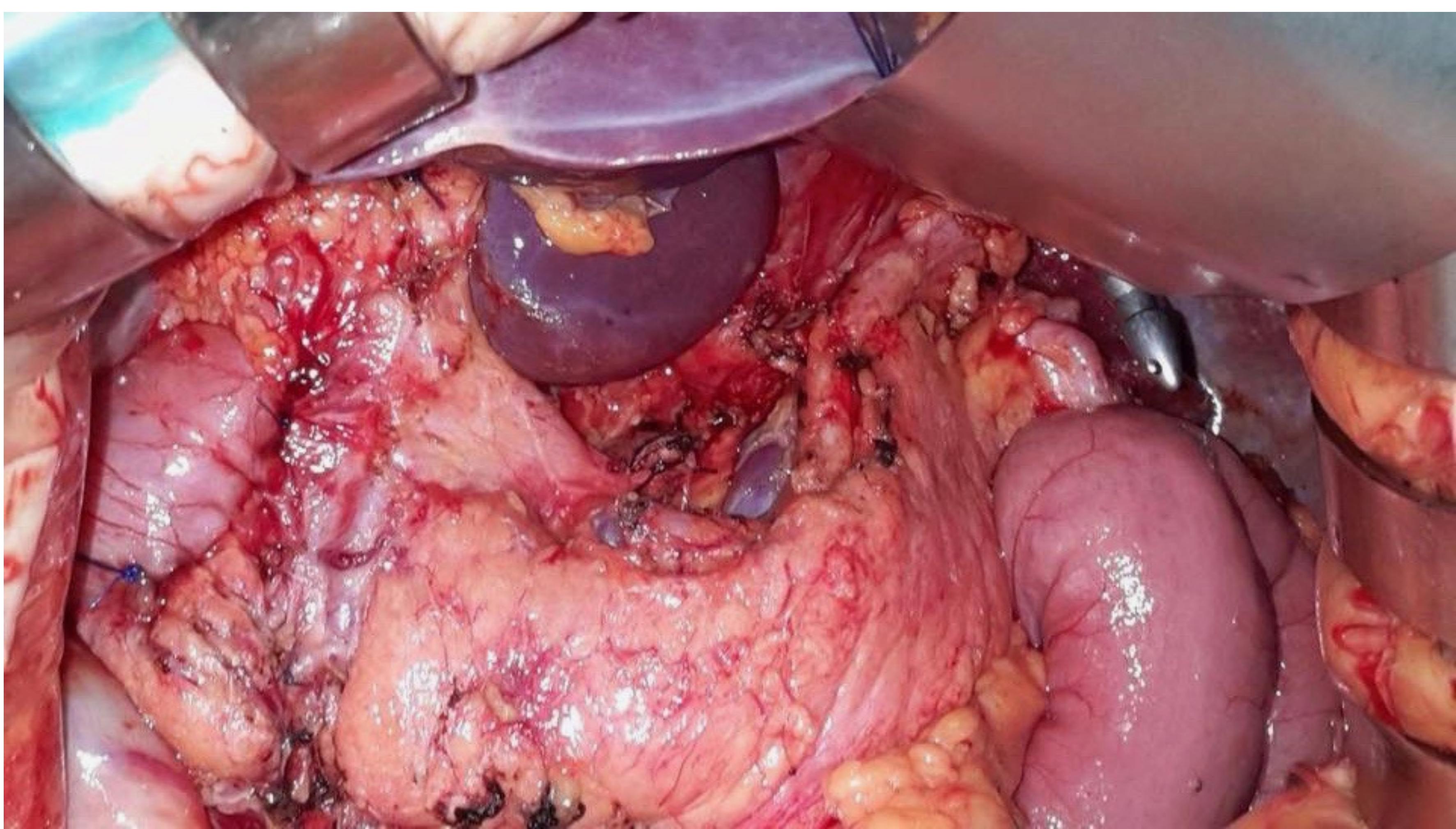
## Suprapankreatik (Sol-taraf)

### #7, #11p, #9 LN disseksiyonu (#11d, #10, #2)

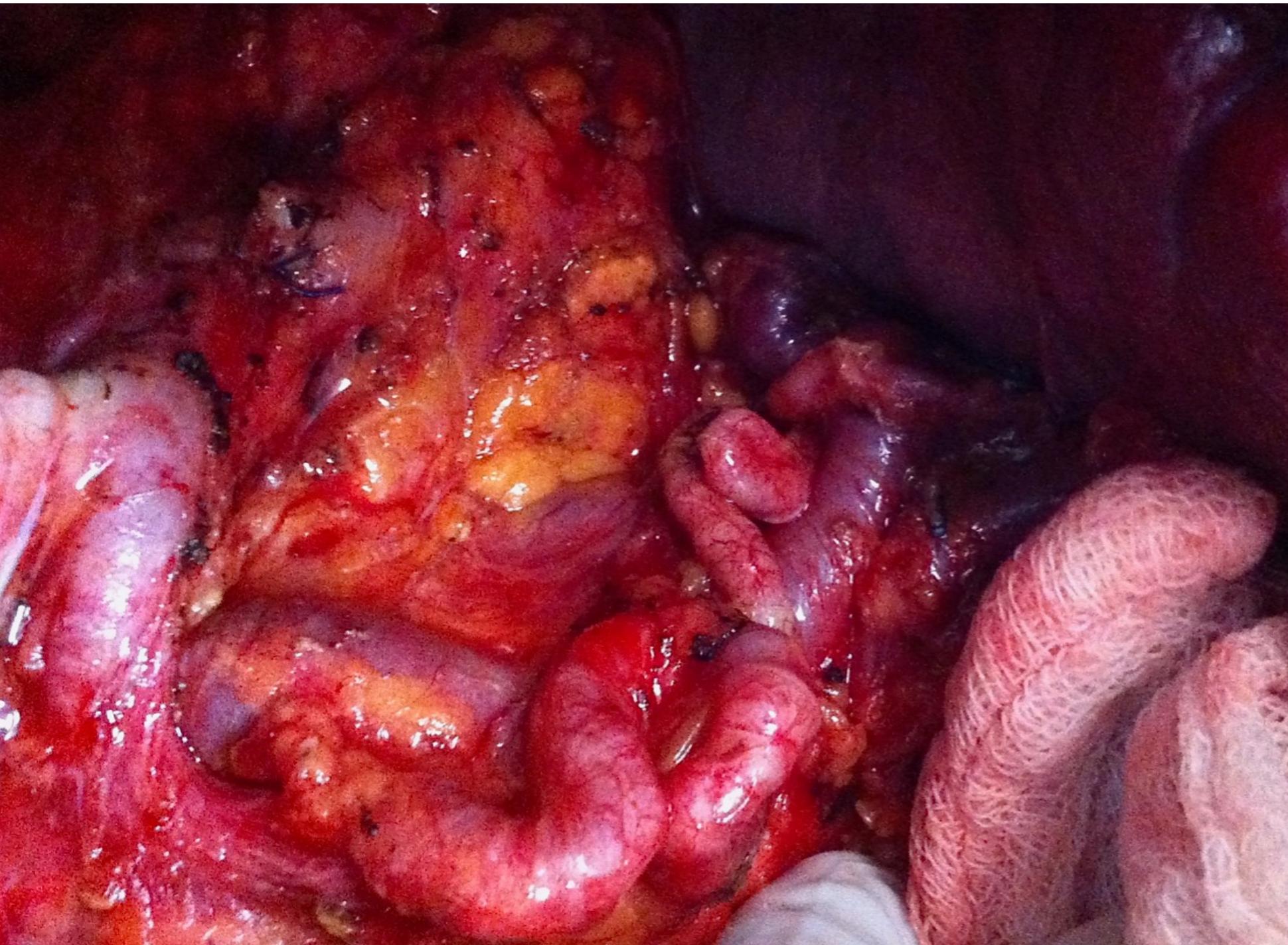
- 11p Proximal splenic artery LNs from its origin to halfway between its origin and the pancreatic tail end



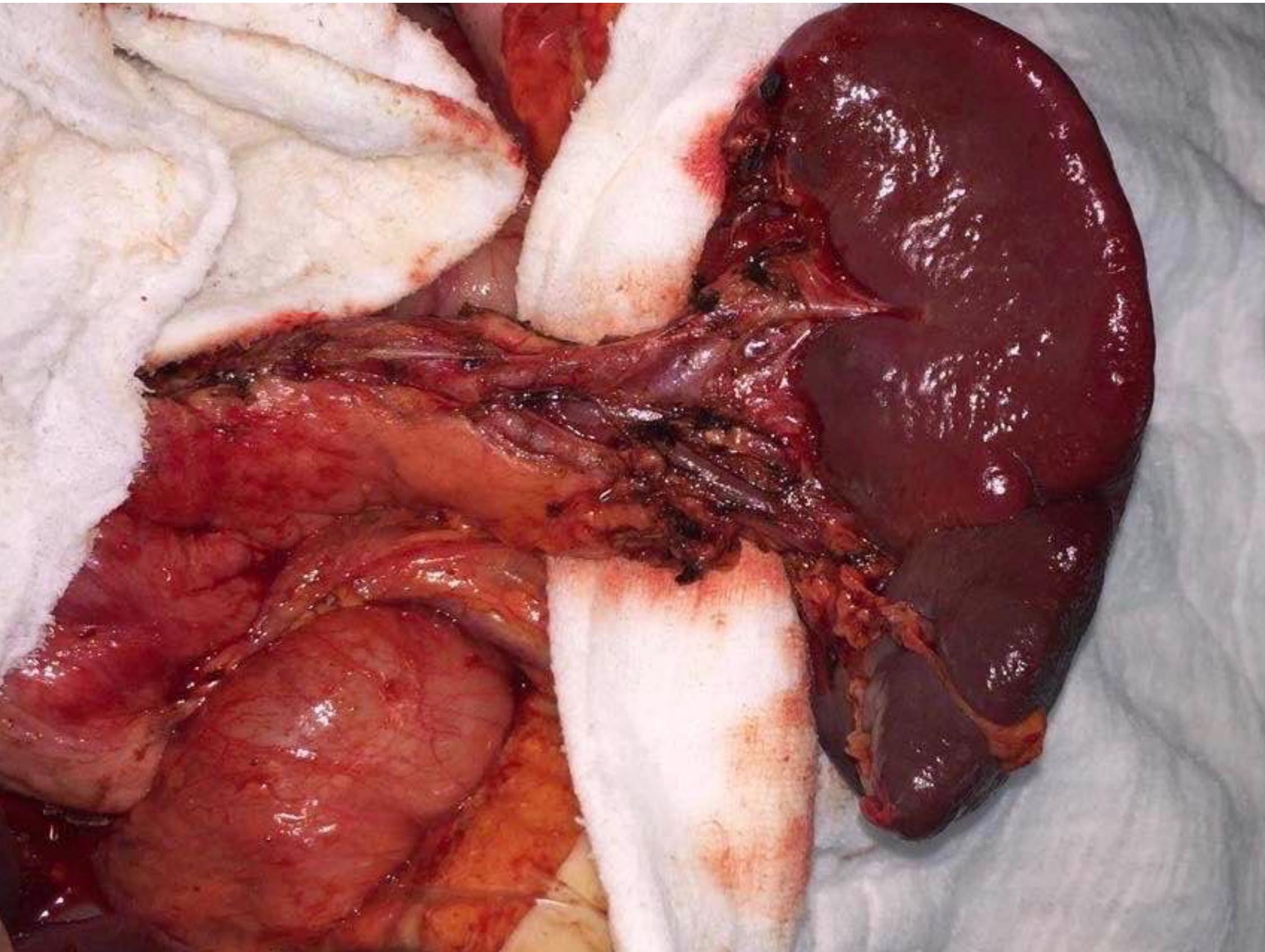




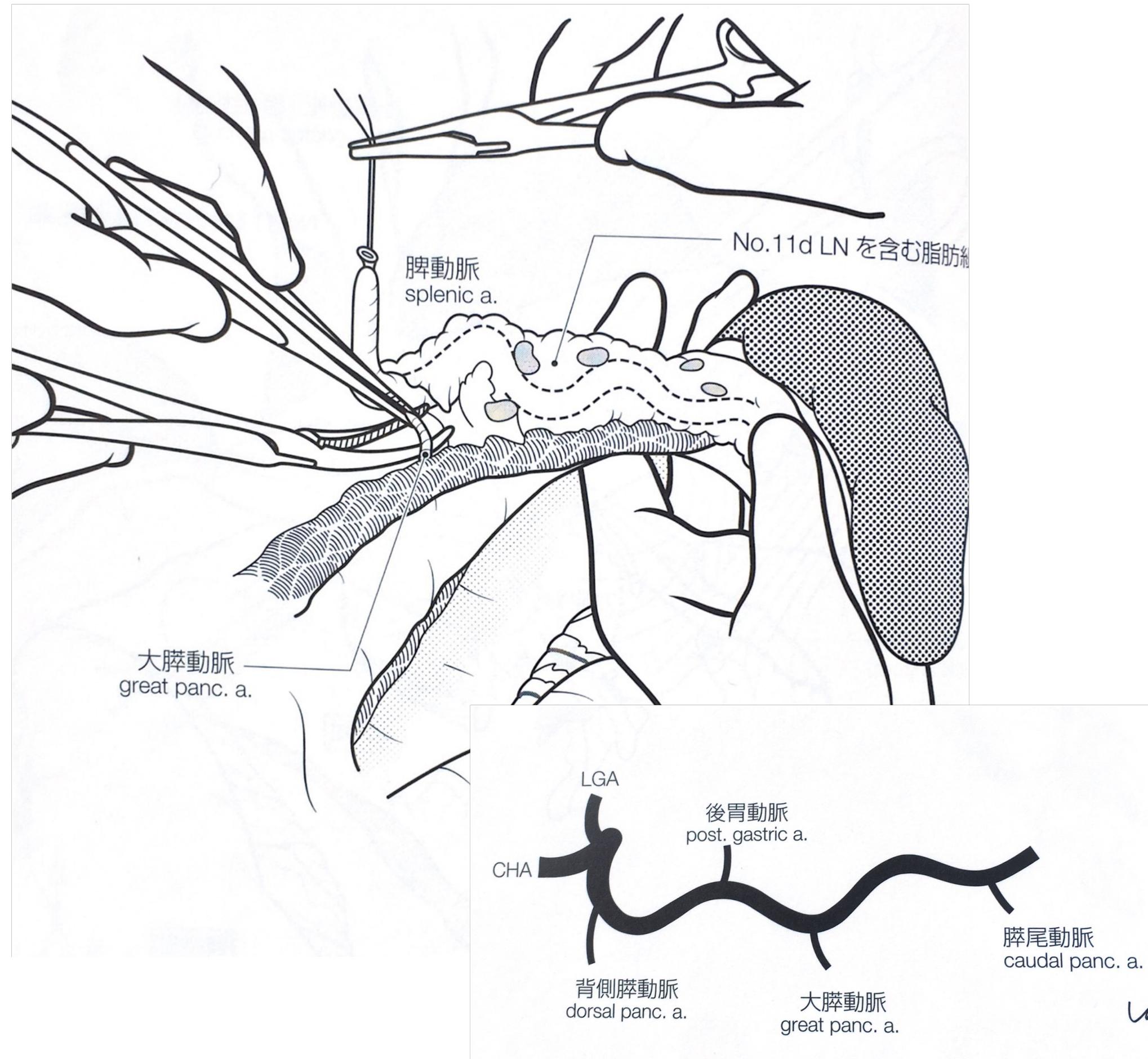
## #11d, #10? disseksiyonu



## #11d, #10? disseksiyonu

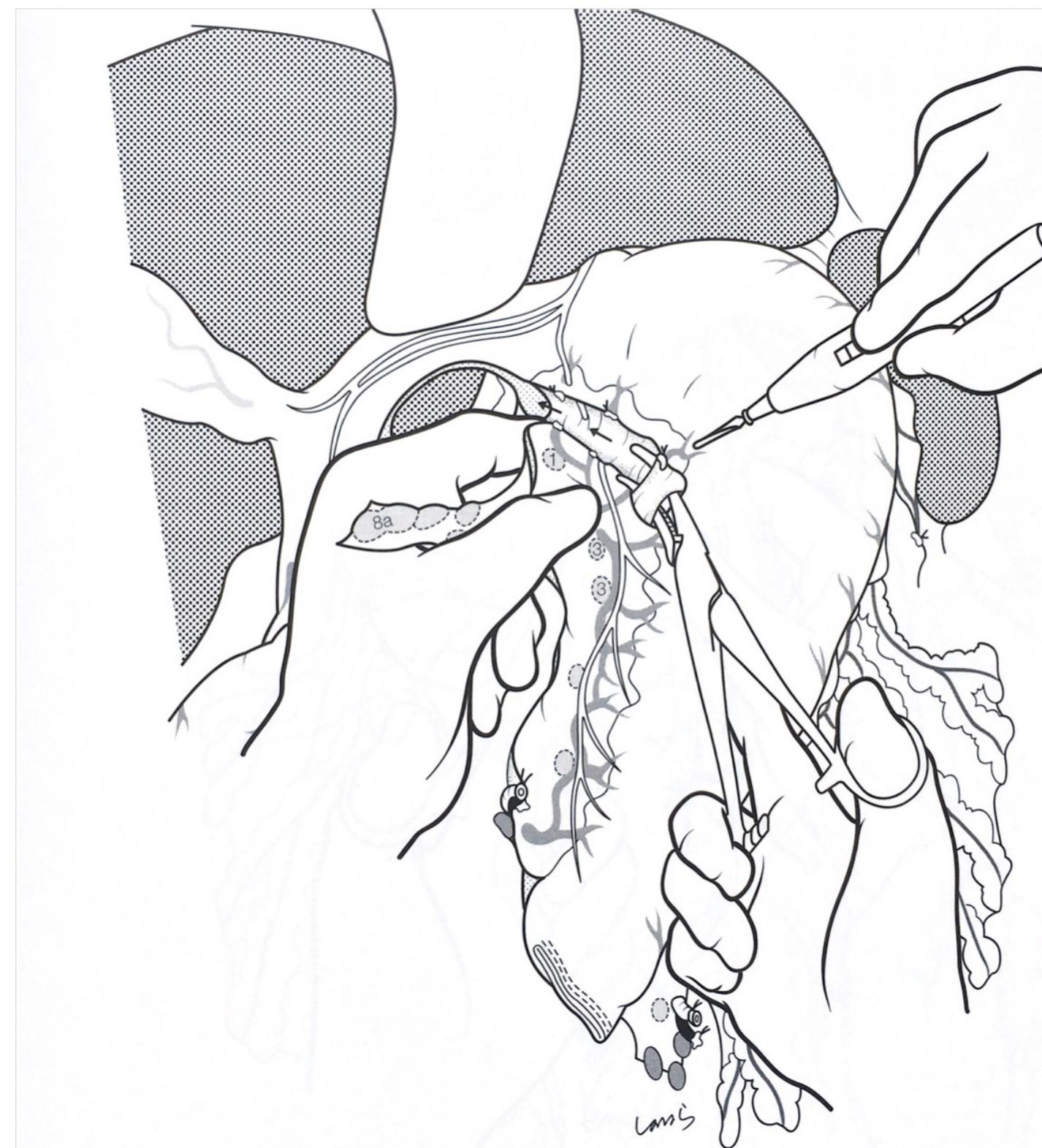
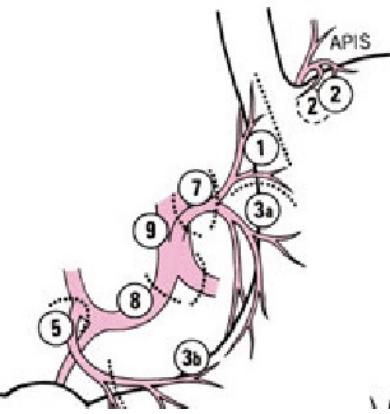


## #11d, #10? disseksiyonu



## #1, #3 disseksiyonu

- 1 Right paracardial LNs, including those along the first branch of the ascending limb of the left gastric artery.
- 2 Left paracardial LNs including those along the esophagocardiac branch of the left subphrenic artery
- 3a Lesser curvature LNs along the branches of the left gastric artery
- 3b Lesser curvature LNs along the 2nd branch and distal part of the right gastric artery



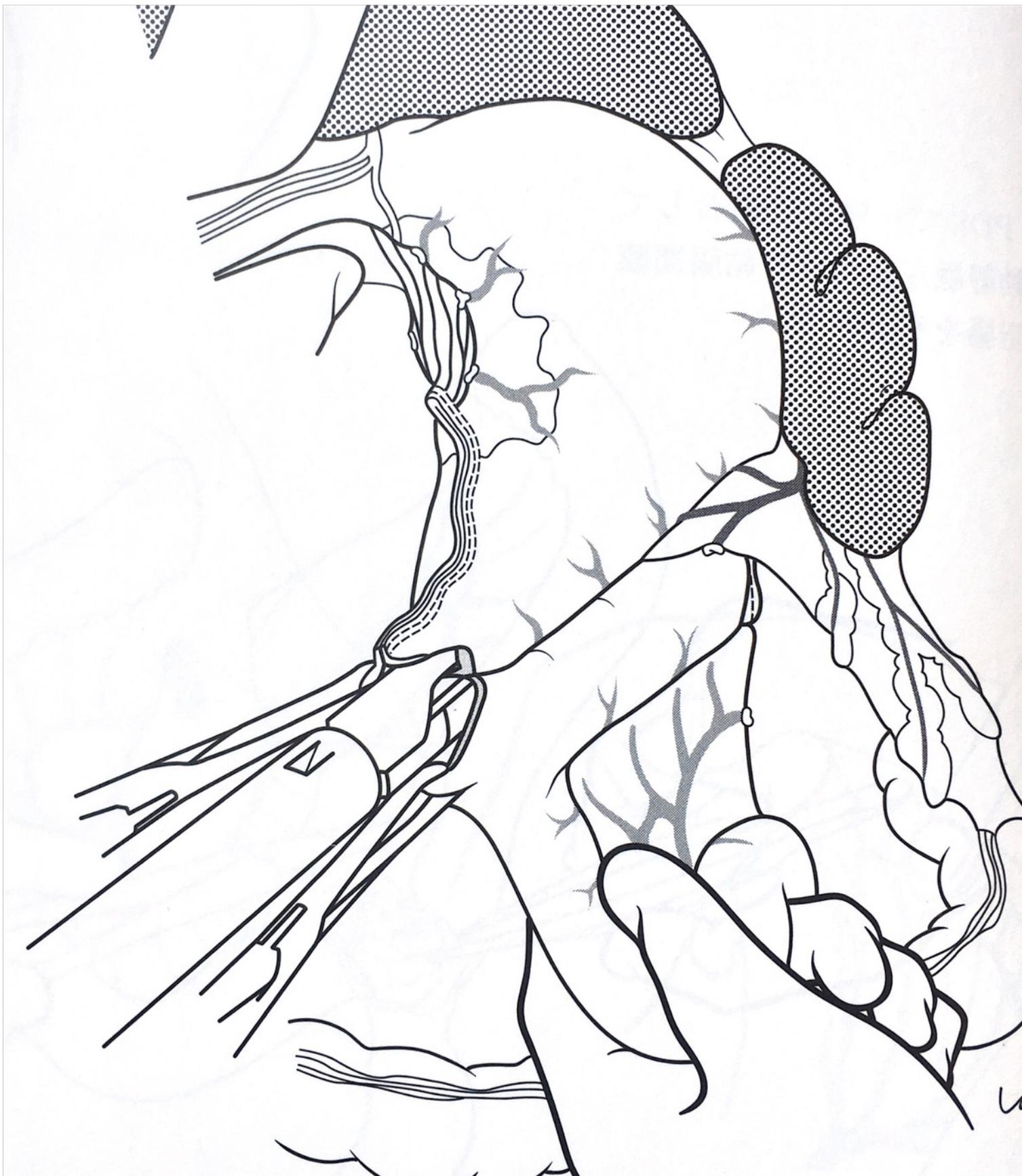
## #1, #3 disseksiyonu

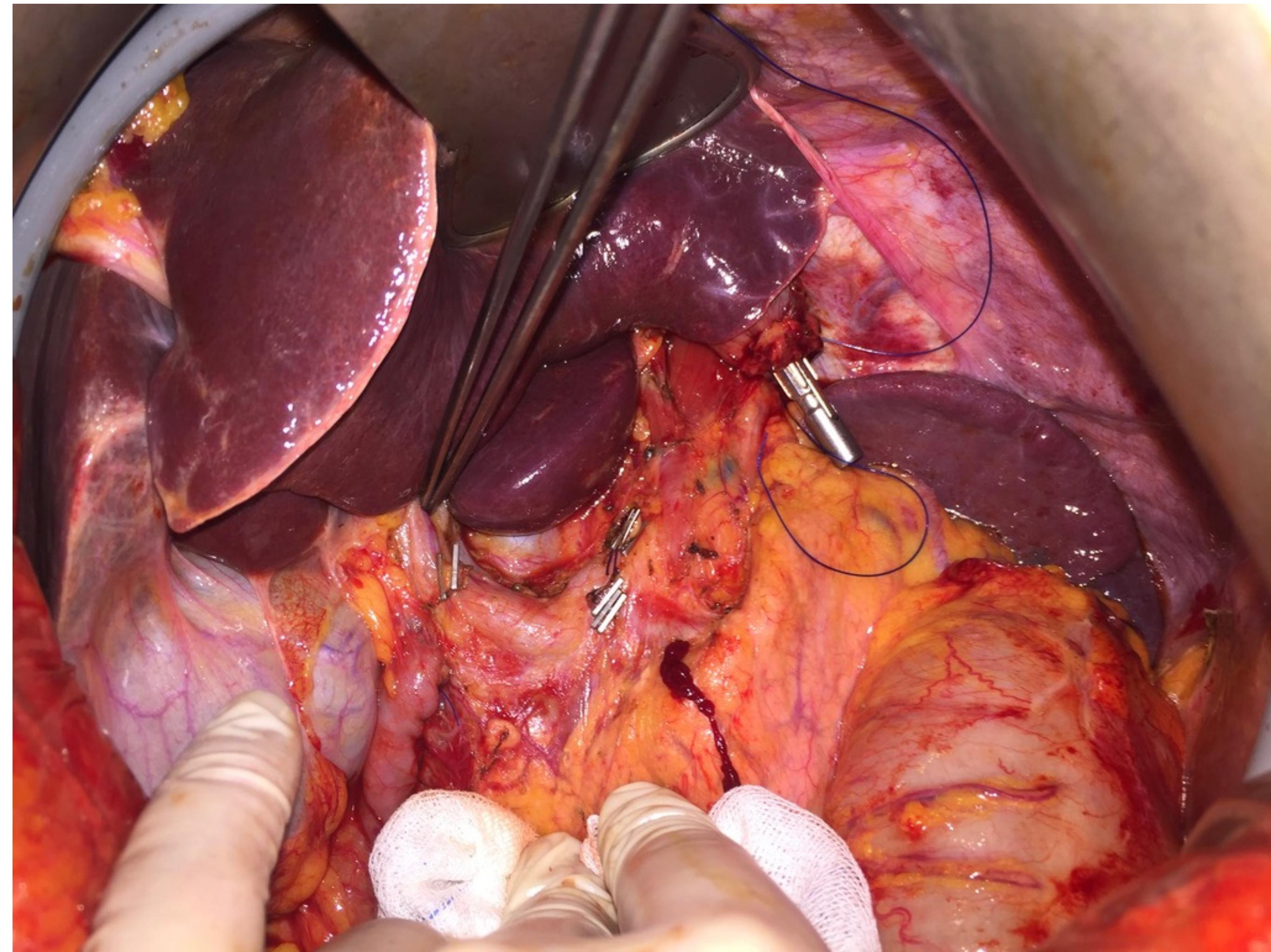


# Rezeksiyon

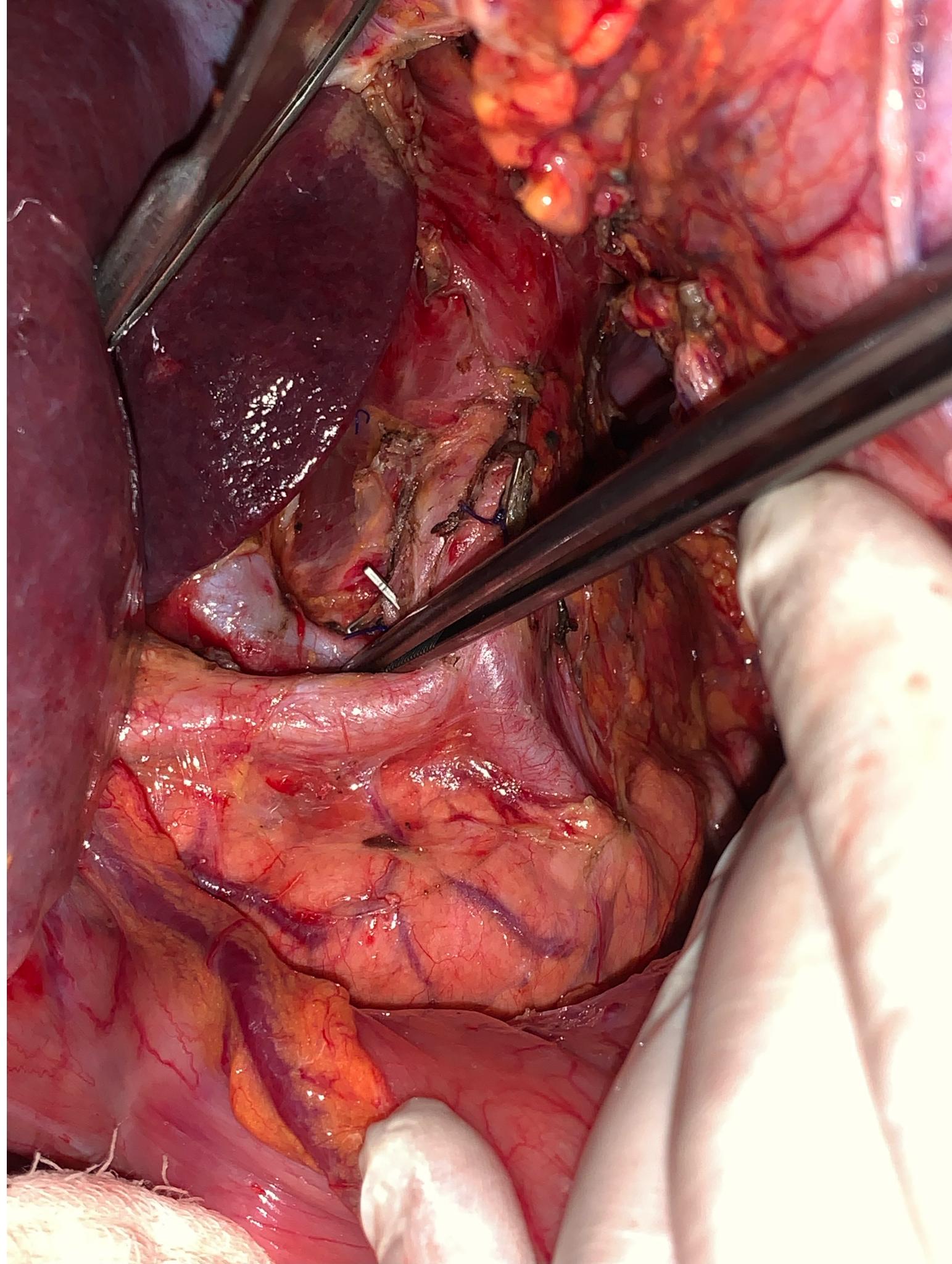


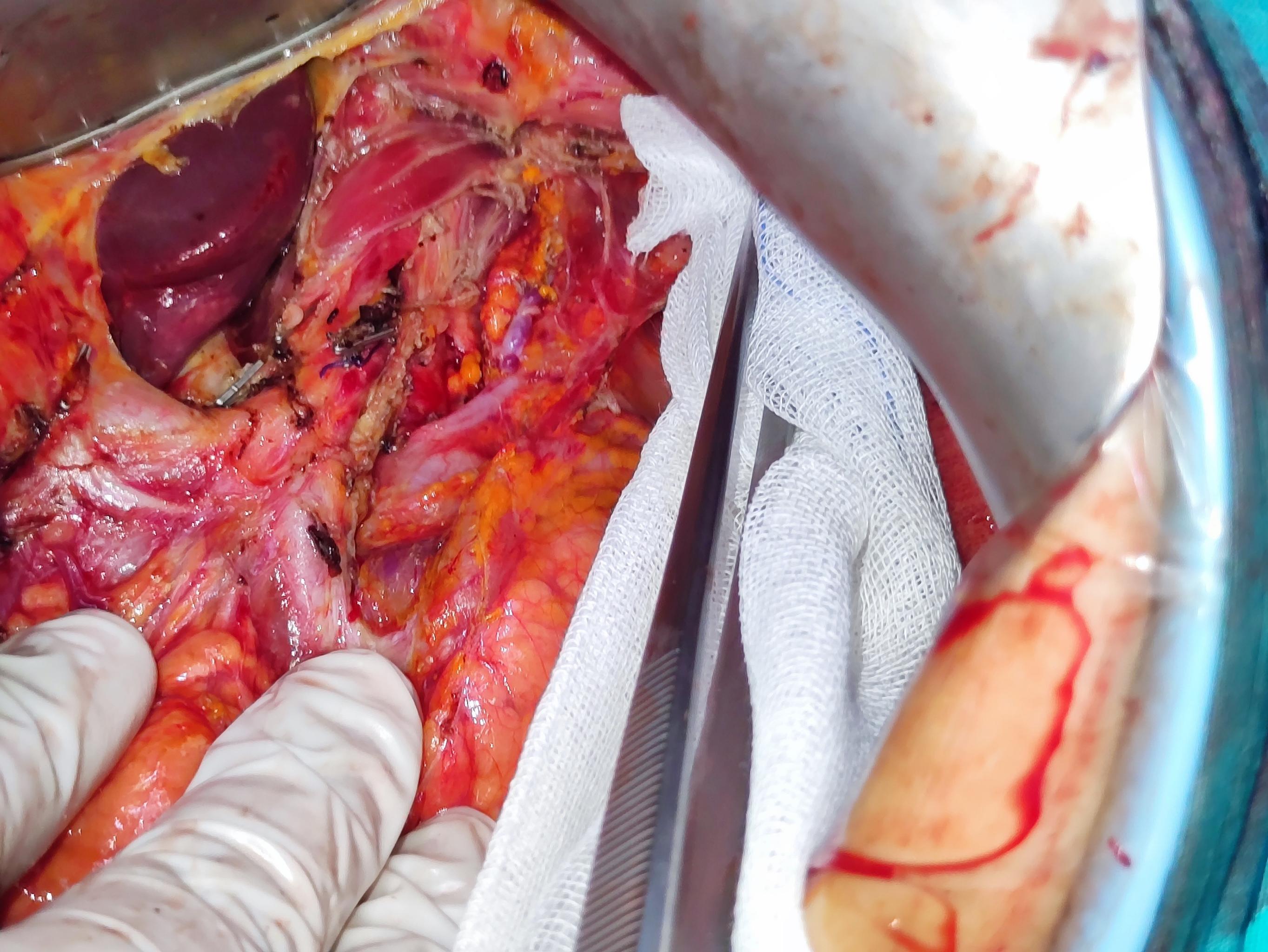
# Anastomoz











## **KTU General Surgery (Personal database)**

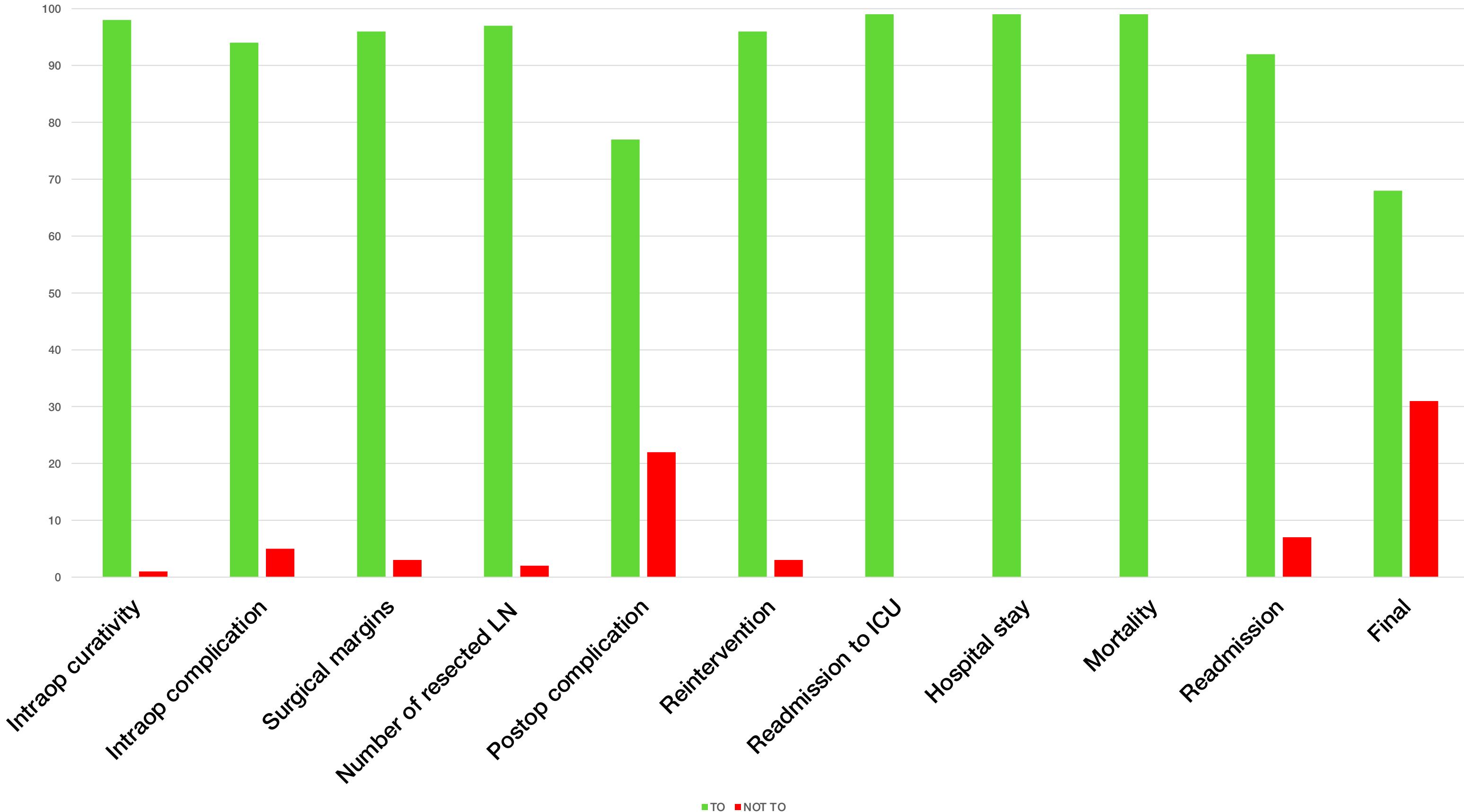
- After 2016
- 279 patients underwent surgery for Gastric Cancer
- 213 Curative gastrectomy
  - D1: 2 patients
  - D1+: 11 patients
  - D2: 197 patients
  - D2 + PALND: 3 patients
- Total removed LNs: 43.0 (33.0 to 53.0) (Max: 193)

## KTU General Surgery (Personal database)

- After 2016
- 279 patients underwent surgery for Gastric Cancer
- 213 Curative gastrectomy
  - D1: 2 patients
  - D1+: 11 patients
  - D2: 197 patients
  - D2 + PALND: 3 patients
- Total removed LNs: 43.0 (33.0 to 53.0) (Max: 193)
- Intraop complication: 5.2%
  - Splenic injury -> transfusion (2 patients)
  - Splenic injury -> Splenectomy (1 patients)
  - Splenic arter injury -> ligation (1 patient)
  - Splenic vein injury -> repair (2 patients)
  - LGA bleeding -> transfusion (1 patient)
  - CHA injury -> 1 patient
  - Portal vein injury -> repair (2 patients)
- Overall complication: 33.6%
  - $\geq$  gII complication: 22.2%
  - $\geq$  gIII complication: 5.4%
  - 30d-mortality: 2/213 patients (0.9%)

- Hepatic arter injury
- Splenic arter/vein injury
- Portal vein injury
- Vena cava injury
- Bile duct injury
- Splenic injury
- Bowel resection
- Pancreatic injury
- Intraoperative bleeding
- Unexpected medical condition
- Unknown

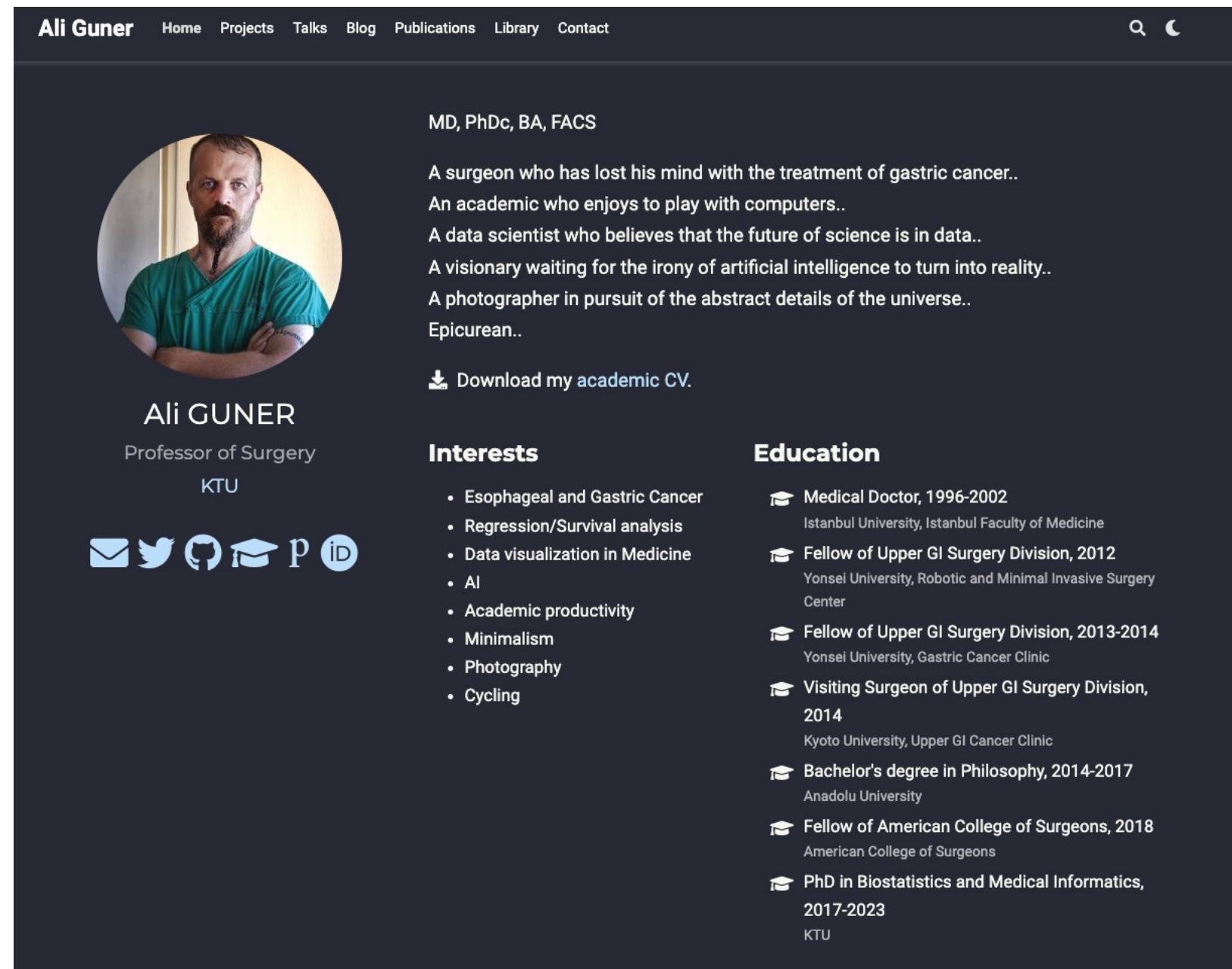
## Textbook Outcome: 68.8% (202 patients)



■ TO ■ NOT TO

Thanks

Slides will be available at:



The screenshot shows a dark-themed website for "Ali Guner". At the top, there is a navigation bar with links to Home, Projects, Talks, Blog, Publications, Library, and Contact. A search icon and a moon icon are also present. Below the navigation, there is a circular profile picture of a man with a beard, wearing a green scrub top. To the right of the profile picture, the text "MD, PhDc, BA, FACS" is displayed. Below this, a series of descriptive statements are listed:

- A surgeon who has lost his mind with the treatment of gastric cancer..
- An academic who enjoys to play with computers..
- A data scientist who believes that the future of science is in data..
- A visionary waiting for the irony of artificial intelligence to turn into reality..
- A photographer in pursuit of the abstract details of the universe..
- Epicurean..

Below these statements is a link with the text "Download my academic CV." followed by a download icon. On the left side of the main content area, there is a sidebar with the name "Ali GUNER" in large capital letters, followed by "Professor of Surgery" and "KTU". Below this, there are icons for email, Twitter, LinkedIn, a graduation cap, and a "p" symbol. The main content area is divided into two columns: "Interests" and "Education". The "Interests" column contains a bulleted list of hobbies and professional interests:

- Esophageal and Gastric Cancer
- Regression/Survival analysis
- Data visualization in Medicine
- AI
- Academic productivity
- Minimalism
- Photography
- Cycling

The "Education" column lists several academic achievements with graduation caps:

- Medical Doctor, 1996-2002  
Istanbul University, Istanbul Faculty of Medicine
- Fellow of Upper GI Surgery Division, 2012  
Yonsei University, Robotic and Minimal Invasive Surgery Center
- Fellow of Upper GI Surgery Division, 2013-2014  
Yonsei University, Gastric Cancer Clinic
- Visiting Surgeon of Upper GI Surgery Division, 2014  
Kyoto University, Upper GI Cancer Clinic
- Bachelor's degree in Philosophy, 2014-2017  
Anadolu University
- Fellow of American College of Surgeons, 2018  
American College of Surgeons
- PhD in Biostatistics and Medical Informatics, 2017-2023  
KTU

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