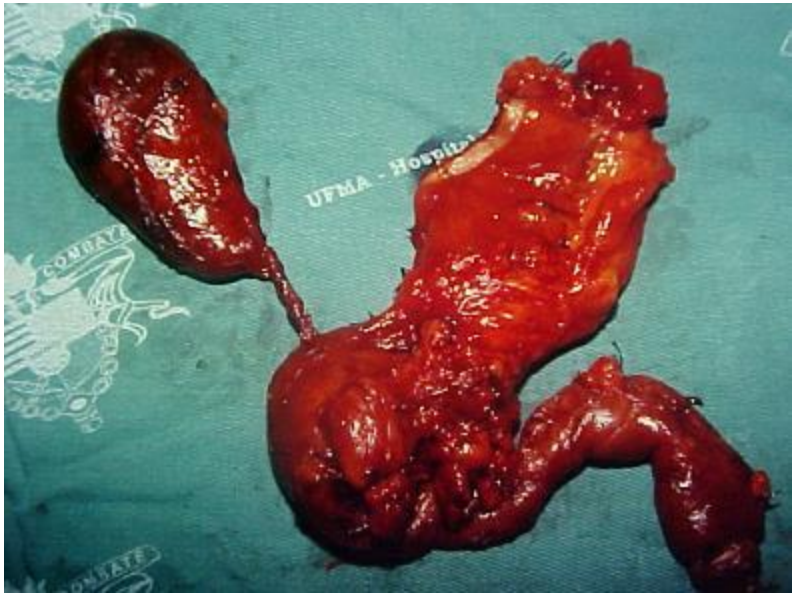
Pylorus preserving *versus* standard pancreatoduodenectomy

Orlando Jorge M. Torres
Full Professor and Chairman
Department of Gastrointestinal Surgery
Hepatopancreatobiliary Unit
Universidade Federal do Maranhão - Brazil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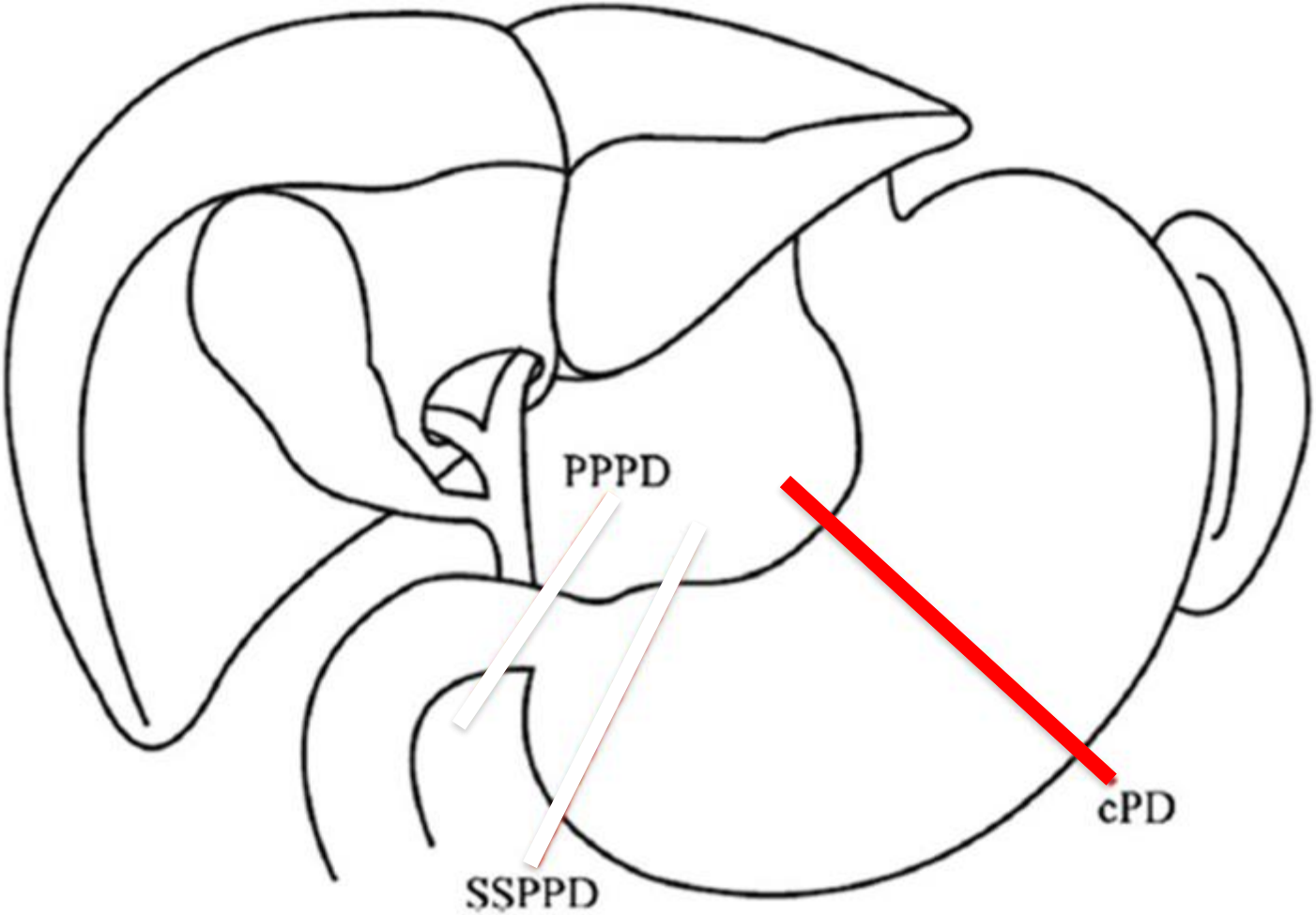


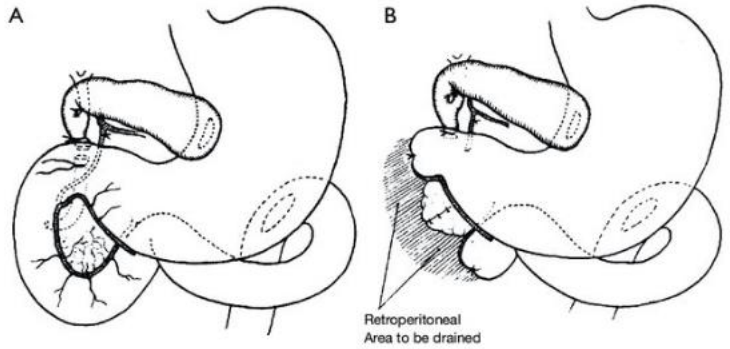
Dr. Allen Whipple
1881-1963.

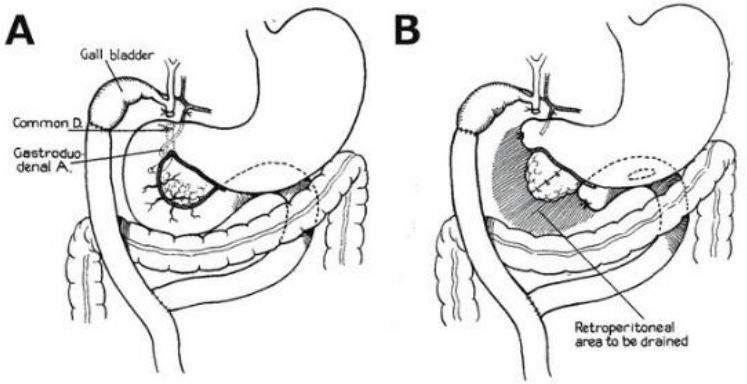
1935

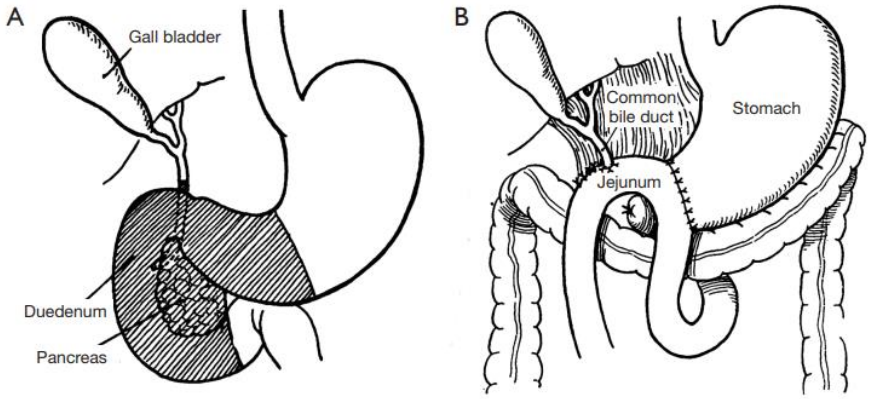
1º Classic Whipple (cPD)

Whipple AO. N Engl J Med 1942;226:515-18

Whipple operation







- Dumping
- Diarrhea
- Dyspepsia

Traverso LW, Longmire WP. Surg Gynecol Obstet 1978;146:959.

Preservation of the Pylorus in Pancreaticoduodenectomy

A Follow-up Evaluation

L. WILLIAM TRAVERSO, M.D., WILLIAM P. LONGMIRE, JR., M.D.

From the Department of Surgery, UCLA School of Medicine, Los Angeles, California

We have previously reported our efforts to minimize post-gastrectomy symptoms in two patients with benign disease who

Traverso LW, Longmire WP. Ann Surg 1980;192:306-9.

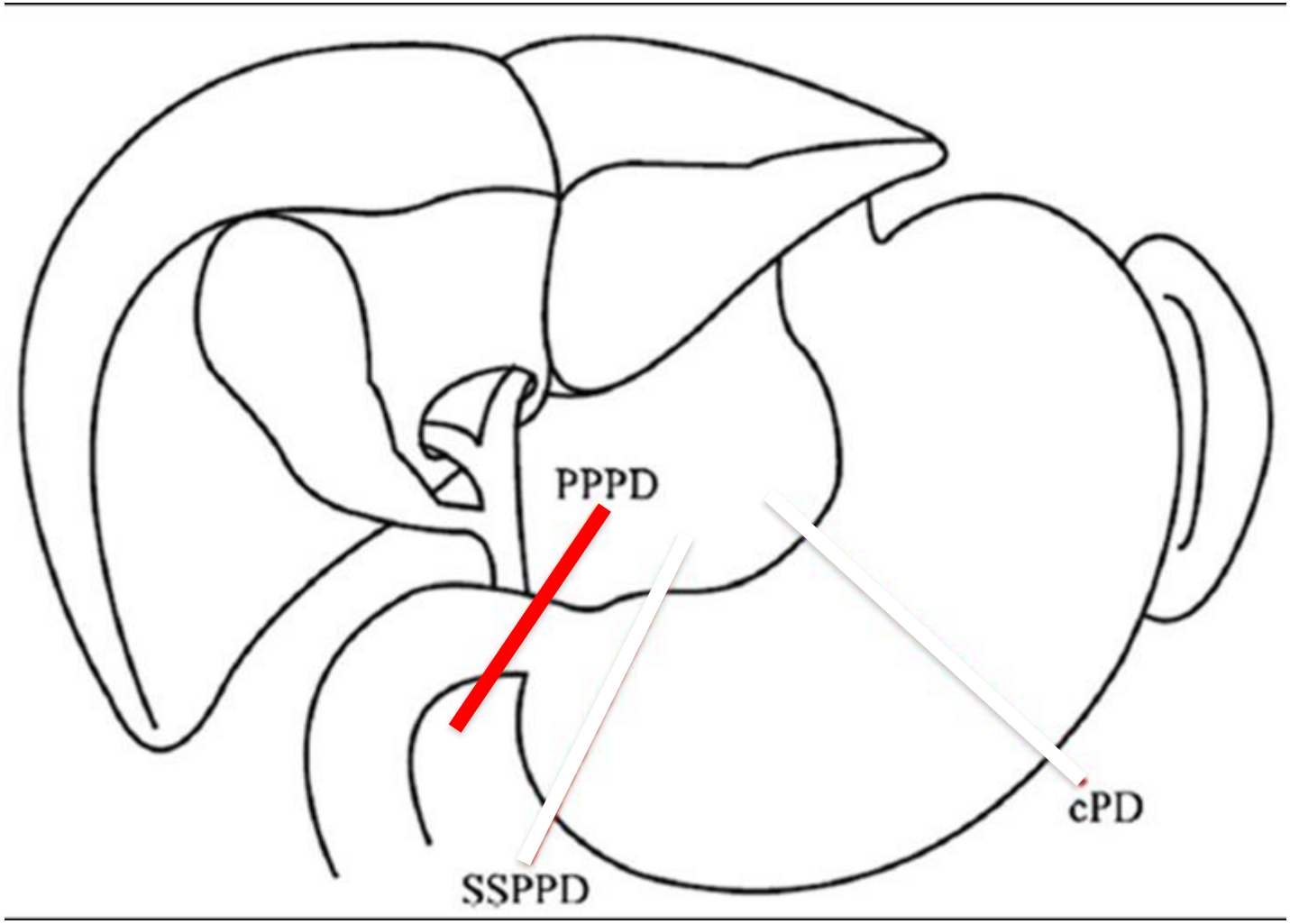
DURING PANCREATICODUODENECTOMY for pancreatic cancer, a 50–70% gastrectomy with or without truncal vagotomy is customarily performed to prevent marginal ulcer from developing at the gastrojejunostomy and to provide an adequate pancreatic tumor resection. However, removal of the pylorus during pancreaticoduodenectomy for benign disease may needlessly predispose the patient to postgastrectomy symptoms of dumping, diarrhea, or dyspepsia.

Traverso LW, Longmire WP. Ann Surg 1980;192:306-9.

Materials and Methods

In the two-year period between 1977 and 1979, 18 patients underwent pancreaticoduodenectomy (four total pancreatectomies) with preservation of the pylorus for chronic pancreatitis or for early periampullary carcinoma. Eight patients were available for evaluation from two months to one year postoperation.

Traverso LW, Longmire WP. Ann Surg 1980;192:306-9.



1978

2º Pylorus preserving (PPPD)

Traverso LW, Longmire WP. Ann Surg 1980;192:306-9.

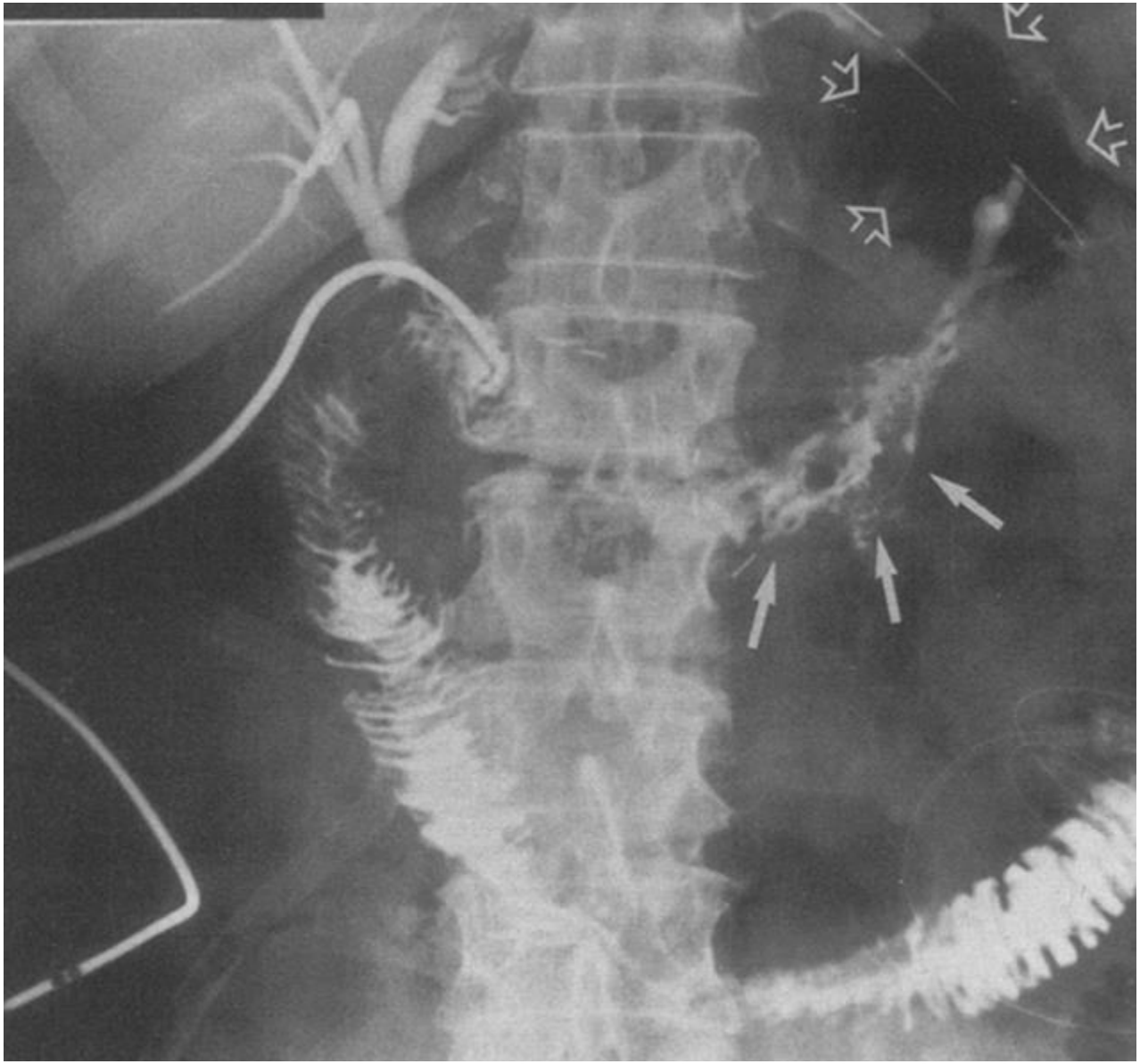


FIG 2. Cholangiogram in a patient after pylorus preserving pancreaticoduodenectomy with gastric stasis at 16 days postoperatively. The open arrows show the atonic gastric fundus.

Van Berge Henegouwewn MI. J Am Coll Surg 1997;185:373-9.

Delayed gastric emptying

1 Cite Share

Pylorus-preserving pancreaticoduodenectomy with complete preservation of the pyloroduodenal blood supply and innervation.

Gauvin JM, Sarmiento JM, Sarr MG.

Arch Surg. 2003 Nov;138(11):1261-3. doi: 10.1001/archsurg.138.11.1261.

PMID: 14609879 No abstract available.

6 Cite Share

Intraoperative endoluminal pyloromyotomy as a novel approach to reduce **delayed gastric emptying** after pylorus-preserving pancreaticoduodenectomy-a retrospective study.

Schrempf MC, Pinto DRM, Gutschon J, Schmid C, Hoffmann M, Geissler B, Wolf S, Sommer F, Anthuber M.

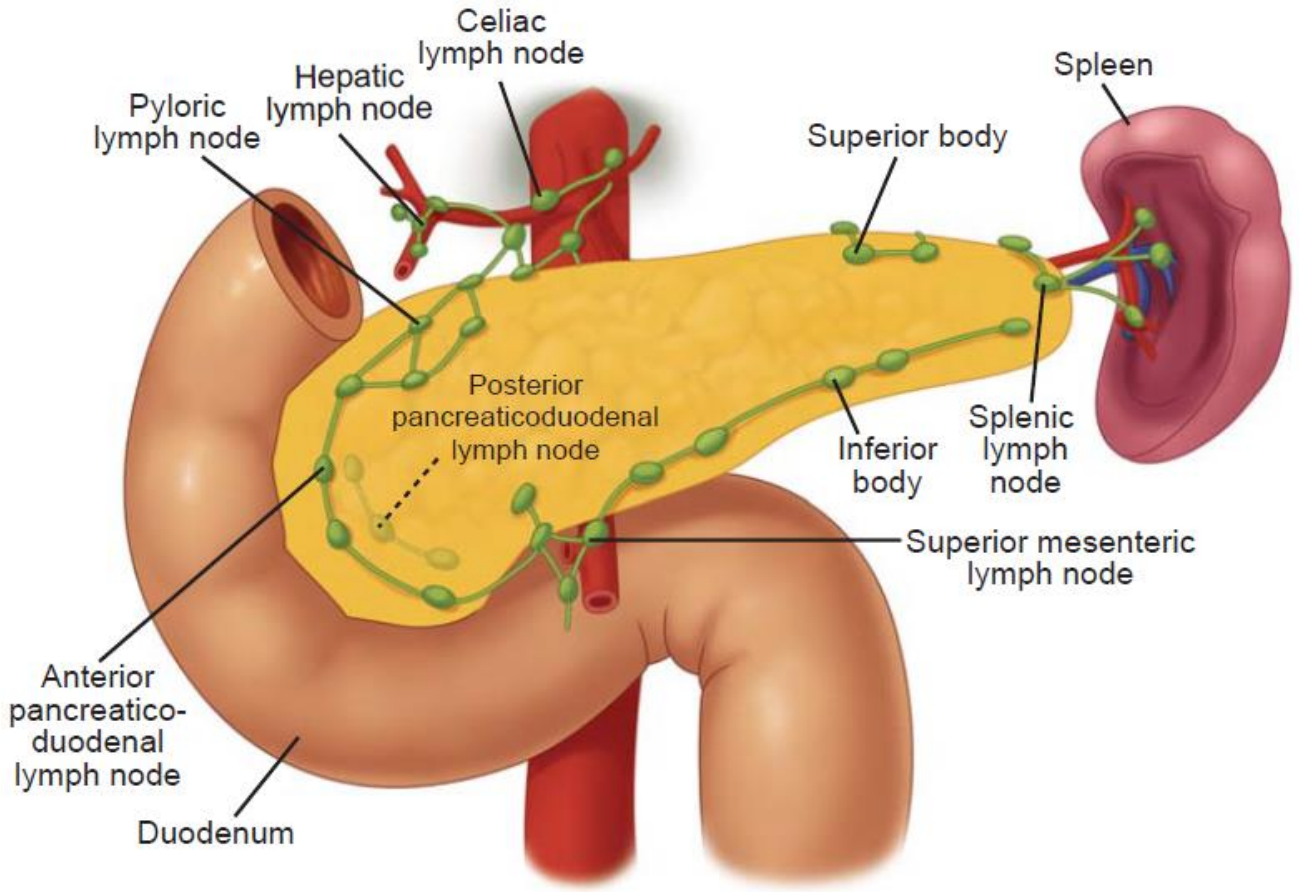
Langenbecks Arch Surg. 2021 Jun;406(4):1103-1110. doi: 10.1007/s00423-020-02008-5. Epub 2020 Oct 14.

Delayed gastric emptying

- Pylorus spasm
  - Rupture of the vagal nerve system
  - Reduced vascular supply
  - Pyloric ischemia

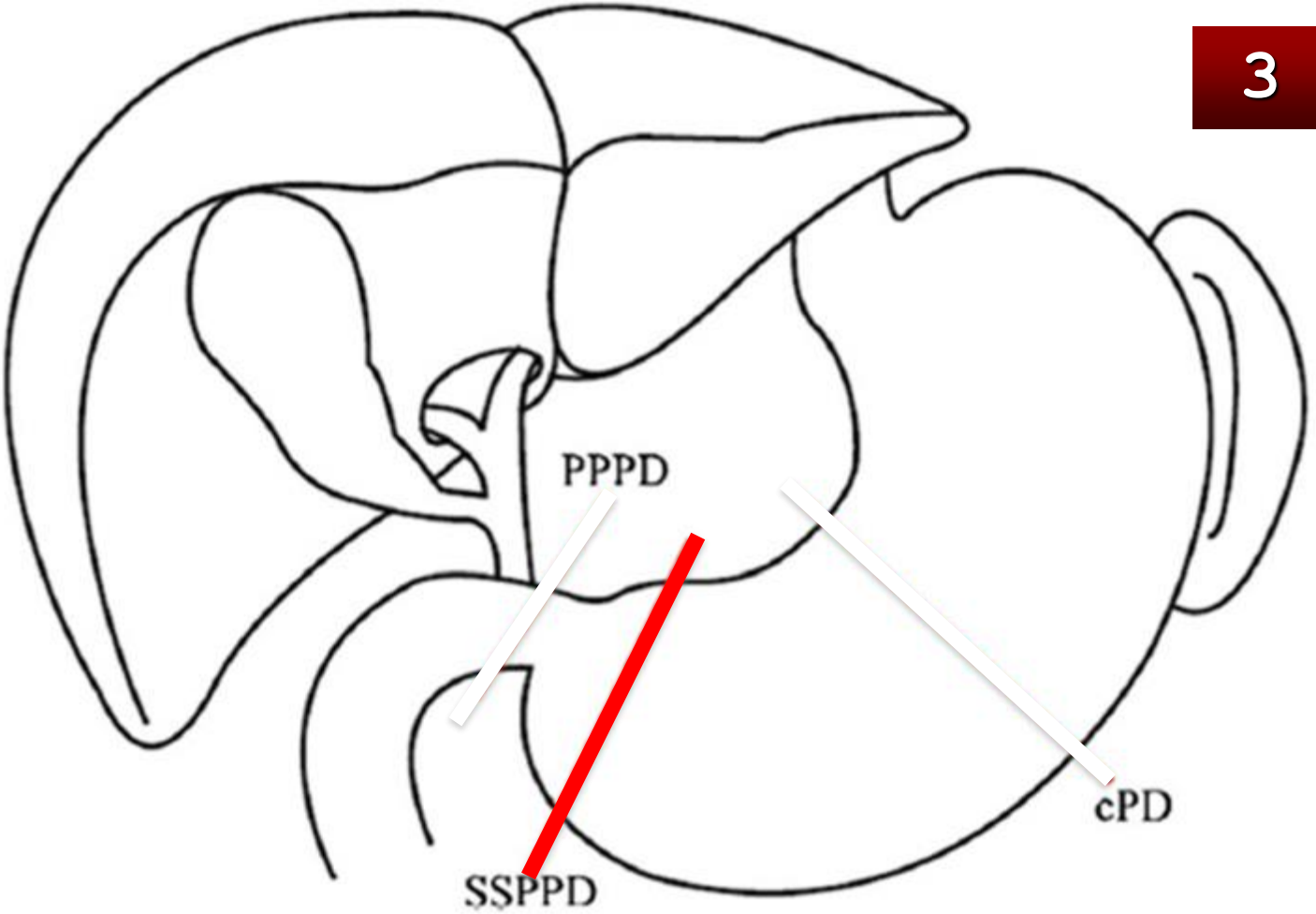
Hayashibe A, et al. J Surg Oncol 2007;95:106-9

Pylorus preserving



- Gastroduodenal is ligated
- Lymph node disection
- Extent of the procedure

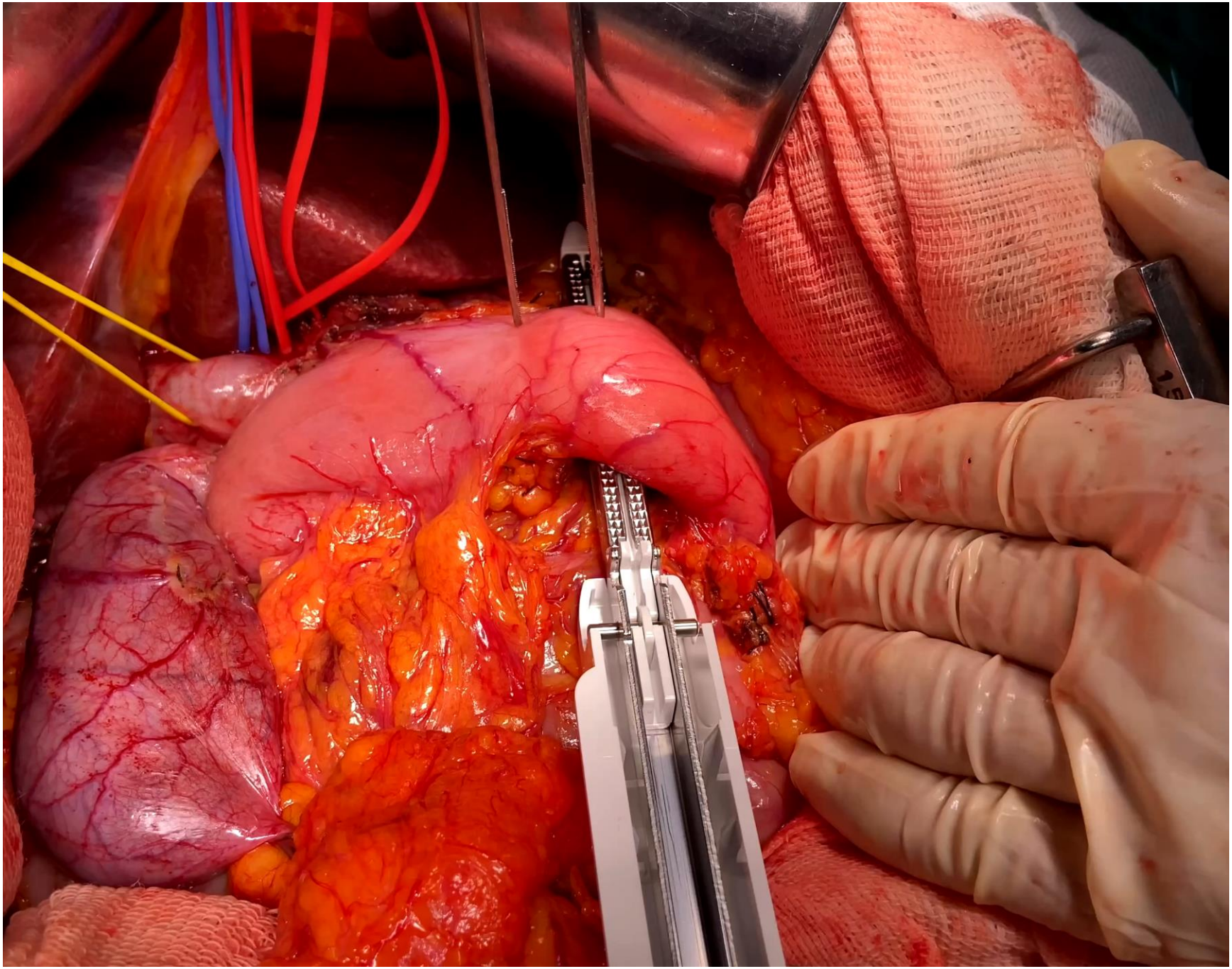
3 moments:

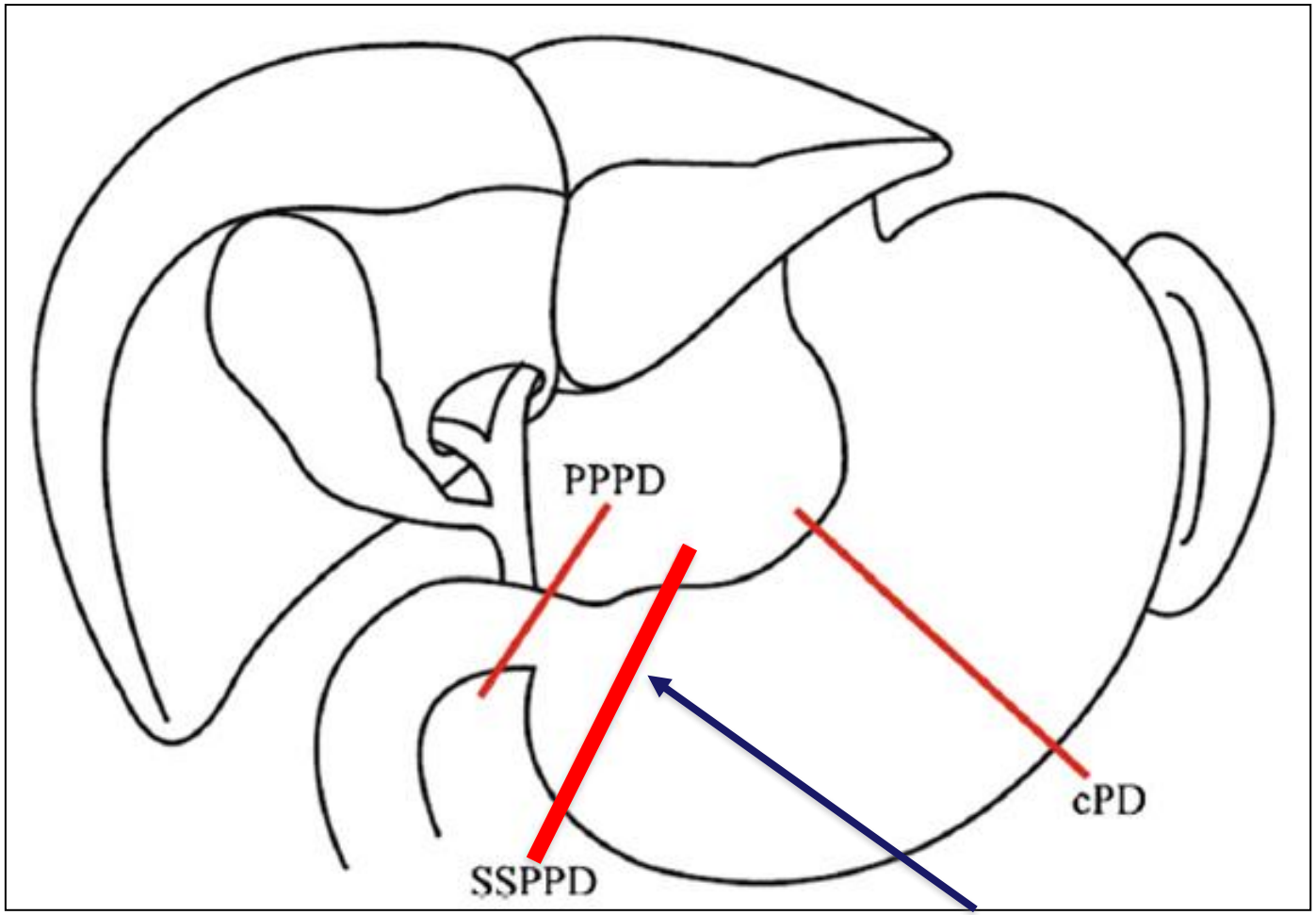


1995

3º Stomach preserving (SSPPD)

Japan





- Larger gastric outlet
- No pylorus:
  - Denervated
  - Devascularized

Hayashibe A, et al. J Surg Oncol 2007;95:106-9

ABCD Arq Bras Cir Dig
2017;30(3):190-196
DOI: /10.1590/0102-6720201700030007

Original Article

PANCREATODUODENECTOMY: BRAZILIAN PRACTICE PATTERNS*

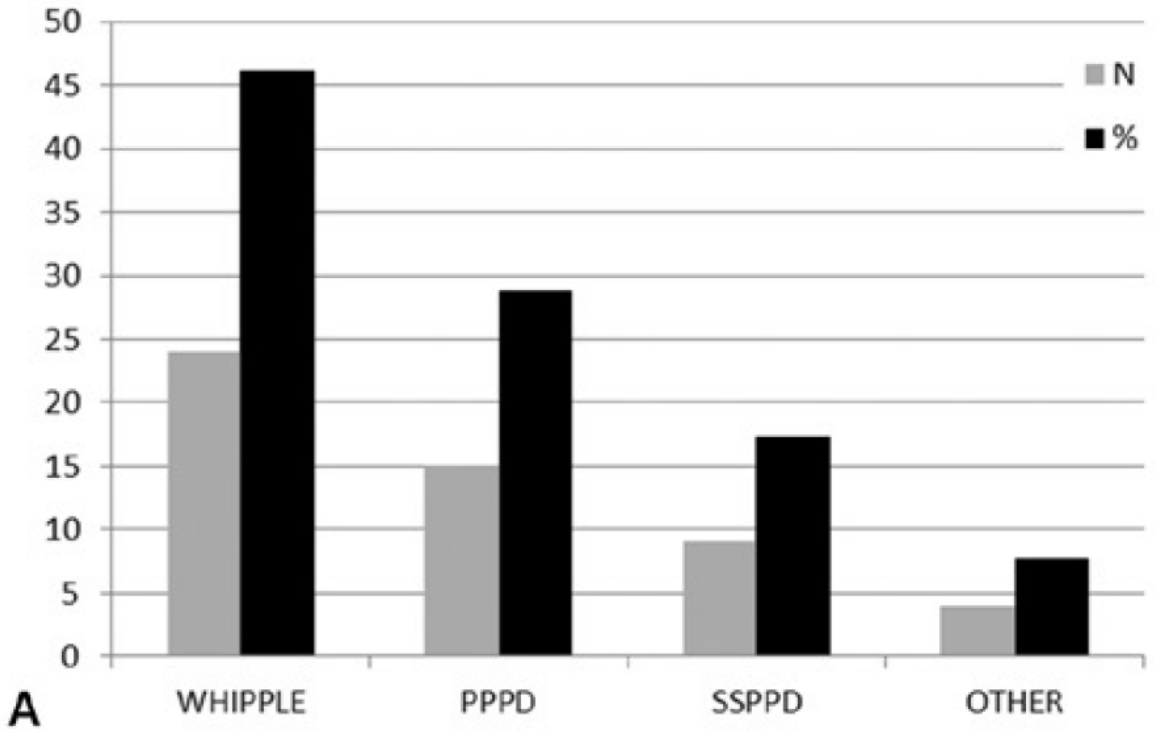
*Duodenopancreatectomia: prática padrão do Brasil**

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

From the [1]Departamento de Cirurgia, Universidade Federal do Maranhão, São Luís, MA; [2]Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ; [3]Santa Casa de Misericórdia de Porto Alegre, Porto Alegre, RS; [4]Hospital São Rafael, Salvador, BA; [5]Hospital Santa Marcelina, São Paulo,SP; [6]Hospital Santa Lucia,

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 pancreatoduodenectomy. ***Method***: A questionnaire was designed

RESECTION



Torres OJ, et al. Arq Bras Cir Dig 2017;30:190-6

Papers

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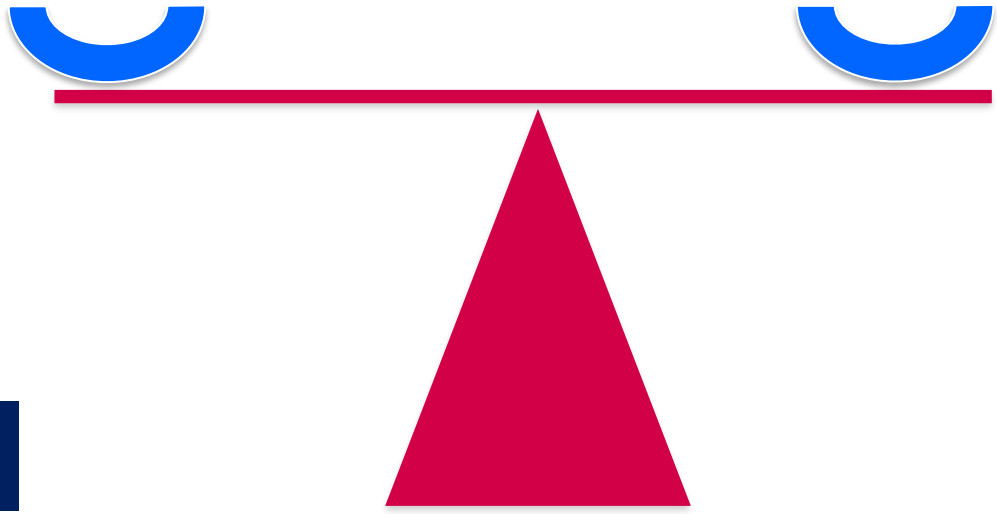
Title
193
Abstract
31

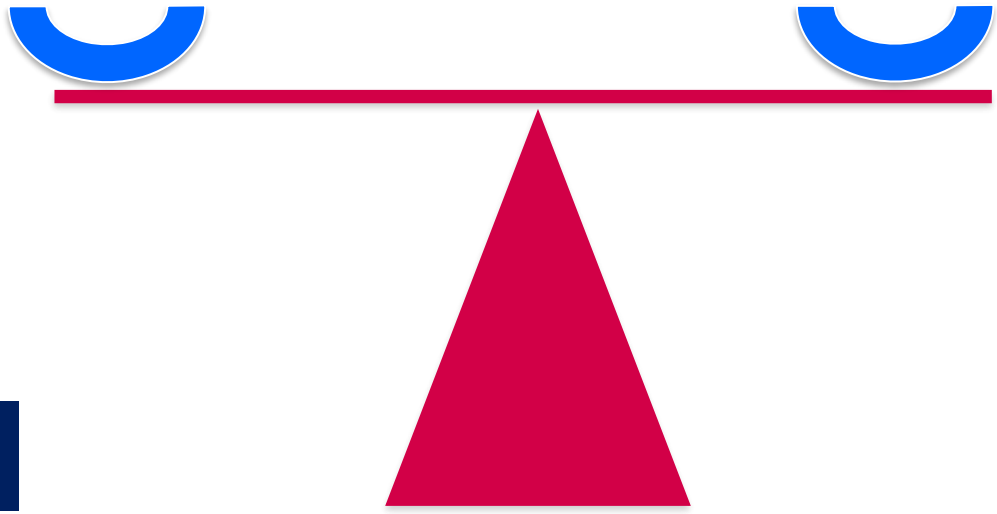


SSPPD

PPPD

NS

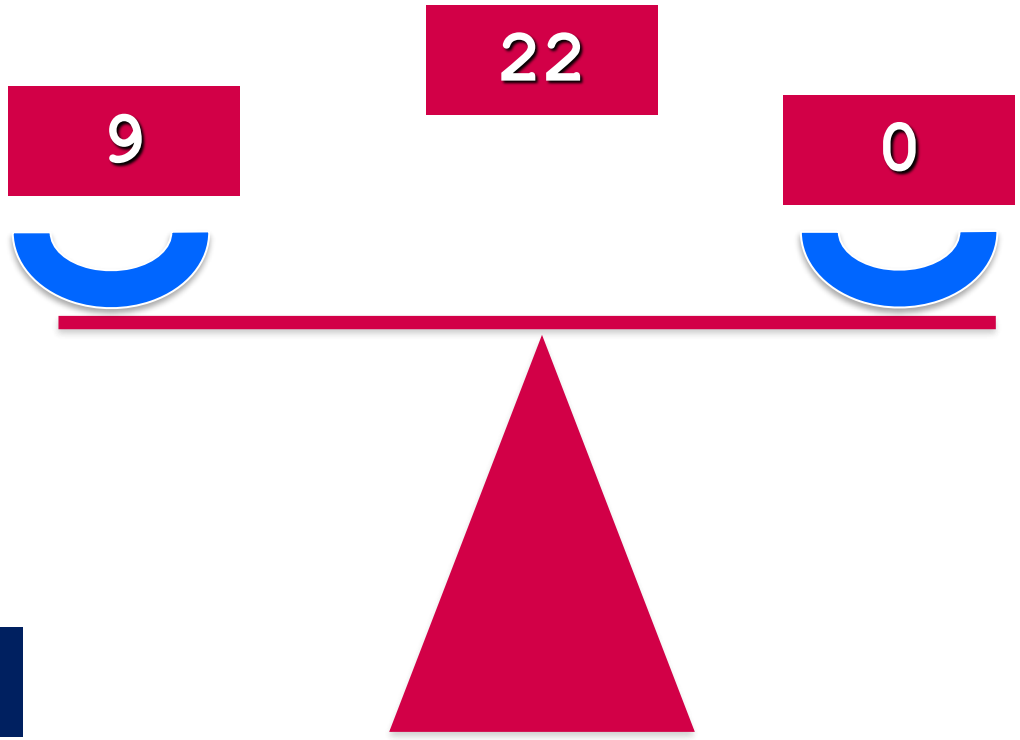
22



SSPPD

PPPD

NS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SSPPD
PPPD
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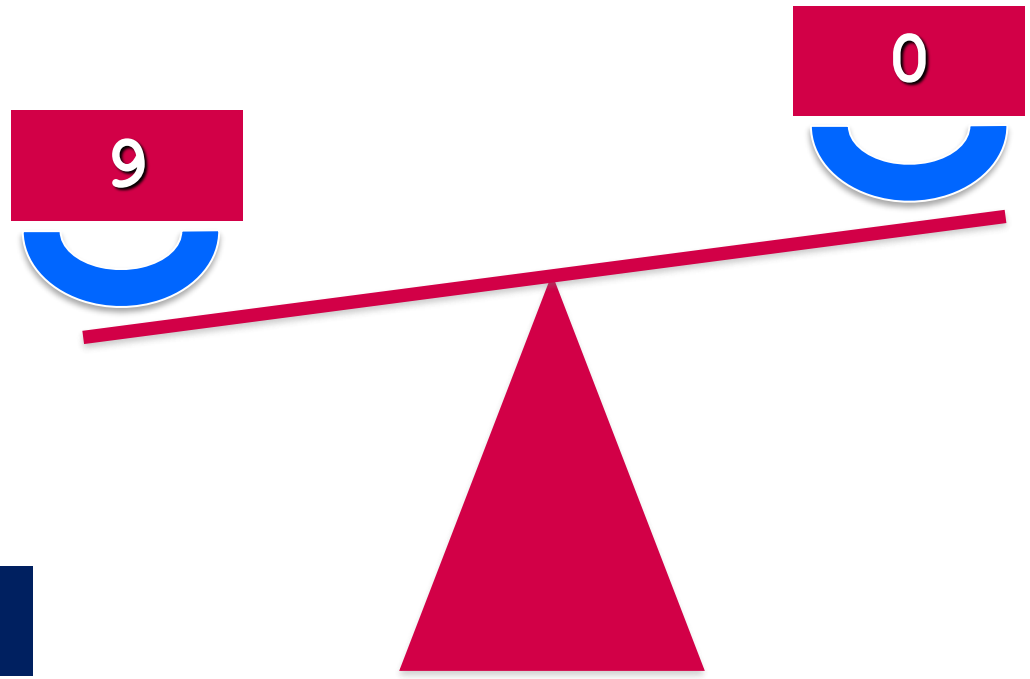


SSPPD

PPPD

NS

- ❑ Delayed gastric emptying
- ❑ Lymph node dissection
- ❑ Nutritional status
- ❑ Gastric outlet diameter

Received: 20 December 2018 | Revised: 8 January 2019 | Accepted: 20 January 2019

DOI: 10.1002/jso.25398

Check for updates

RESEARCH ARTICLE

WILEY Journal of SURGICAL ONCOLOGY

Risk factors for post-pancreaticoduodenectomy delayed gastric emptying in the absence of pancreatic fistula or intra-abdominal infection

TABLE 3 Bivariate associations between operative characteristics and isolated delayed gastric emptying (N = 10502)

Operative characteristics	With DGE n (%)	*P* values
Resection type		0.001
Traditional Whipple	697 (10.8)	
Pylorus-sparing Whipple	526 (13.0)	
Surgical approach		0.159
Open	1129 (11.7)	
Minimally invasive[a]	94 (11.1)	
Reconstruction technique		0.631
Pancreaticojejunal invagination	102 (12.5)	
Pancreaticojejunal duct-to-mucosa	993 (11.4)	
Other/unknown	128 (13.3)	
Reconstruction path		0.149
Antecolic	298 (10.9)	
Retrocolic	144 (12.1)	
Unknown	781 (11.9)	
Vascular reconstruction		0.299
No	975 (11.4)	
Yes	236 (12.7)	
Unknown	12 (12.4)	

Pylorus preserving p= 0.001

Ellis RJ, et al. J Surg Oncol. 2019;1-7

Asian Journal of Surgery 44 (2021) 137–142

Contents lists available at ScienceDirect

Asian Journal of Surgery

journal homepage: www.e-asianjournalsurgery.com

ORIGINAL ARTICLE

Is delayed gastric emptying associated with pylorus ring preservation in patients undergoing pancreaticoduodenectomy?

Table 2
The incidence of delayed gastric emptying and postoperative course.

Variables	PpPD ($n = 51$)		PrPD (n = 57)		P
Delayed gastric emptying	20	(39.2%)	5	(8.8%)	**<0.001**
Grade B	6	(11.8%)	0	(0.0%)	**0.025**
Grade C	11	(21.6%)	5	(8.8%)	0.110
Removal of NGT (day)	2.5	±1.3	1.1	±0.5	**<0.001**
Reinsertion of NGT	10	(19.6%)	5	(8.8%)	0.178
Reinsertion day of NGT	1.9	±4.9	0.9	±3.1	0.100
Start of Solid diet (day)	5	±1.7	4.1	±0.7	**0.001**
Postoperative hospital stay (day)	26.6	±17.2	21.7	±12.7	0.103
Requirement of total parenteral nutrition	17	(33.3%)	5	(8.8%)	**0.003**
Re-operation	1	(2.0%)	0	(0.0%)	0.955

NGT, nasogastric tube; PpPD, pylorus-preserving pancreaticoduodenectomy; PrPD, pylorus-resecting pancreaticoduodenectomy.

Pylorus preserving p< 0.001

Lee YH, et al. Asian J Surg 2021

J Gastrointest Surg
DOI 10.1007/s11605-015-2816-1

Meta-Analysis

REVIEW ARTICLE

Delayed Gastric Emptying After Pancreaticoduodenectomy: Is Subtotal Stomach Preserving Better or Pylorus Preserving?

Mena Hanna[1] · Rahul Gadde[1,2] · Leonardo Tamariz[2] · Casey Allen[1] · Jonathan Meizoso[1] · Danny Sleeman[1,3] · Alan Livingstone[1,3] · Danny Yakoub[1,3,4]

Delayed gastric emptying

Hanna M, et al. J Gastrointest Surg 2015

Delayed gastric emptying

*ISGPS - International Study Group of Pancreatic Surgery

Year	DGE definition	Study design	Number of patients, *N*		DGE, *N* (%)	
			PPPD	SSPPD	PPPD	SSPPD
2007	NGT≥POD 10/solid food≥POD 14	NRCT	34	30	3 (9 %)	3 (10 %)
2007	NGT≥POD 10/regular diet≥POD 14	Retro	12	21	6 (50 %)	3 (14 %)
2010	ISGPS	Retro	48	64	31 (65)	35 (55 %)
2011	ISGPS	RCT	64	66	11 (17 %)	3 (5 %)
2012	ISGPS	Retro	33	56	9 (27 %)	3 (5 %)
2012	ISGPS	Retro	40	40	17 (43 %)	6 (15 %)
2013	ISGPS	Retro	28	27	27 (96 %)	16 (59 %)
2014	ISGPS	RCT	50	50	10 (20 %)	6 (12 %)

Conclusion SSPPD was associated with less DGE than PPPD.

Hanna M, et al. J Gastrointest Surg 2015

Journal of Surgical Oncology 2007;95:106–109

The Surgical Procedure and Clinical Results of Subtotal Stomach Preserving Pancreaticoduodenectomy (SSPPD) in Comparison With Pylorus Preserving Pancreaticoduodenectomy (PPPD)

AKIRA HAYASHIBE, MD,[1]* MASAO KAMEYAMA, MD,[1] MASAYA SHINBO, MD,[2] AND SHINICHIRO MAKIMOTO, MD[2]

[1]*Department of Surgery, Bell Land General Hospital, 500-8 Higashiyama, Sakai-city, Osaka 599-8247, Japan*
[2]*Department of Surgery, Kishiwada Tokushukai Hospital, 4-27-1, Kamoricho, Kishiwada-city, Osaka, 596-8522, Japan*

Delayed gastric emptying

Hayashibe A, et al. J Surg Oncol 2007;95:106-9.

TABLE III. Operative and Postoperative Findings in Patients with PPPD and SSPPD

	PPPD (n = 12)	SSPPD (n = 21)	*P*-value
Days of hospital stay (days)	33.1 ± 4.0	32.5 ± 4.7	0.7
Operation time (min)	450.5 ± 63.8	494.5 ± 138.9	0.2
Operative blood loss (cc)	1321.7 ± 682.0	1843.2 ± 987.7	0.09
Morbidity	0	2	0.2
Wound infection	0	1	
Pneumothorax	0	1	
Pancreatic leakage	0	0	
Mortality	0	0	
Days of nasogastric intubation	10.5 ± 6.4	6.1 ± 1.3	0.002
Days untill liquid diet	14.7 ± 4.2	10.0 ± 2.0	0.004
Delayed gastric emptying	6 (50%)	3 (14%)	0.02

Conclusions: We consider SSPPD as one of the most favorable procedures in patients who undergo pancreaticoduodenectomy.

Hayashibe A, et al. J Surg Oncol 2007;95:106-9.

DOI:10.1111/hpb.12358 HPB

Meta-Analysis

ORIGINAL ARTICLE

A case-matched comparison and meta-analysis comparing pylorus-resecting pancreaticoduodenectomy with pylorus-preserving pancreaticoduodenectomy for the incidence of postoperative delayed gastric emptying

Yanming Zhou*, Liang Lin*, Lupeng Wu, Donghui Xu & Bin Li

Delayed gastric emptying

Zhou Y, et al. HPB 2015;17:337-43

Meta-Analysis

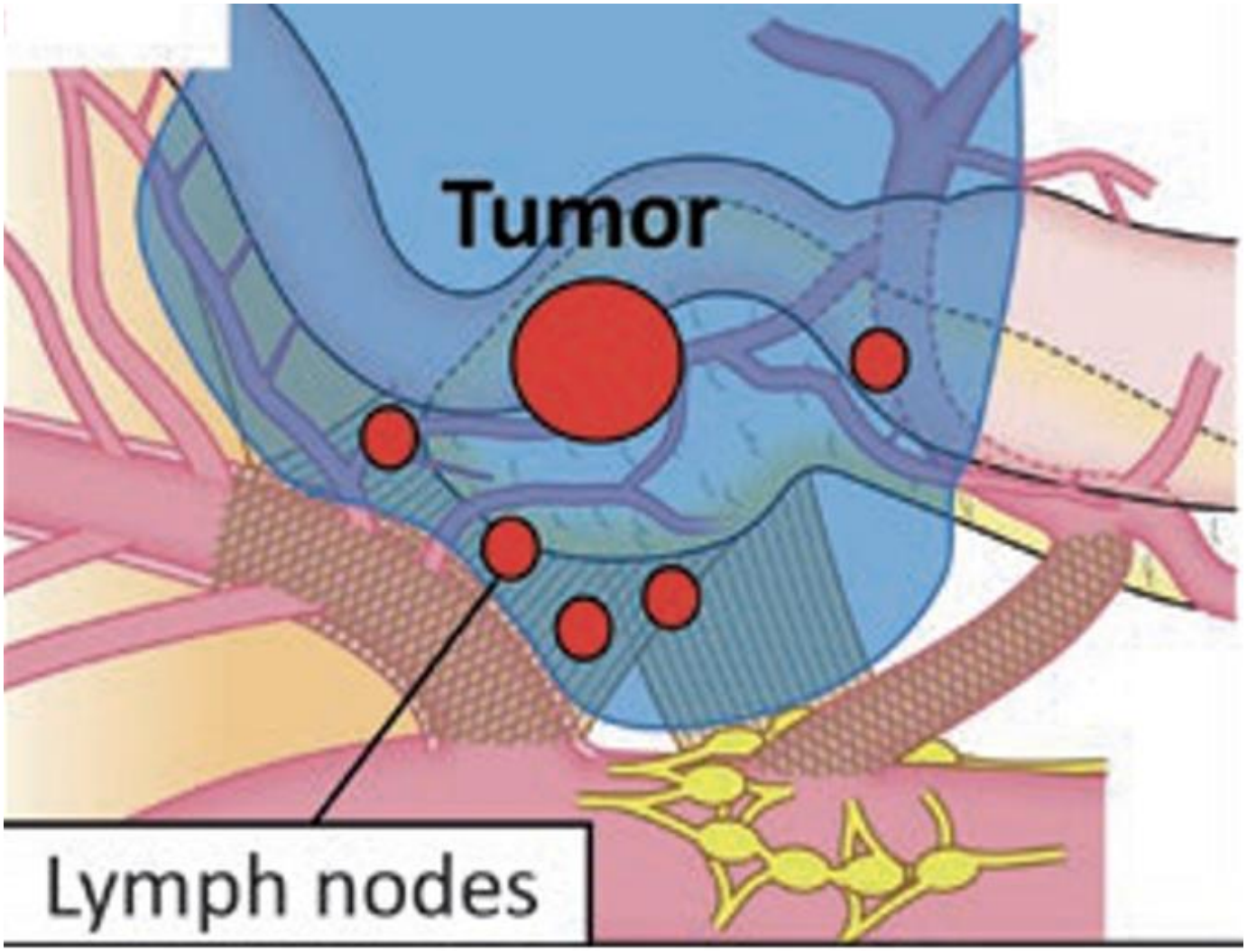
Table 1 Patient characteristics and surgical outcomes in the two groups

Variable	PrPD group (n = 37)	PpPD group (n = 37)	P-value
Morbidity, *n*			
DGE grade (A/B/C)	(5/0/1)	(9/3/5)	0.006
DGE grade (B/C)	1	8	0.013
Primary DGE	2	8	0.041
Pancreatic fistula grade (A/B/C)	(5/1/0)	(7/0/1)	0.553
Intra-abdominal abscess	3	5	0.454
Biliary leakage	0	1	0.314
Haemorrhage	1	2	0.556
Wound infection	4	3	0.691
Ileus	1	3	0.304
Re-exploration	0	1	0.314
Length of hospital stay, days, median (range)	16 (11–43)	28 (10–75)	0.017

Conclusions: Pylorus-resecting pancreaticoduodenectomy is a safe procedure associated with less severe and less frequent postoperative DGE than PpPD.

Zhou Y, et al. HPB 2015;17:337-43

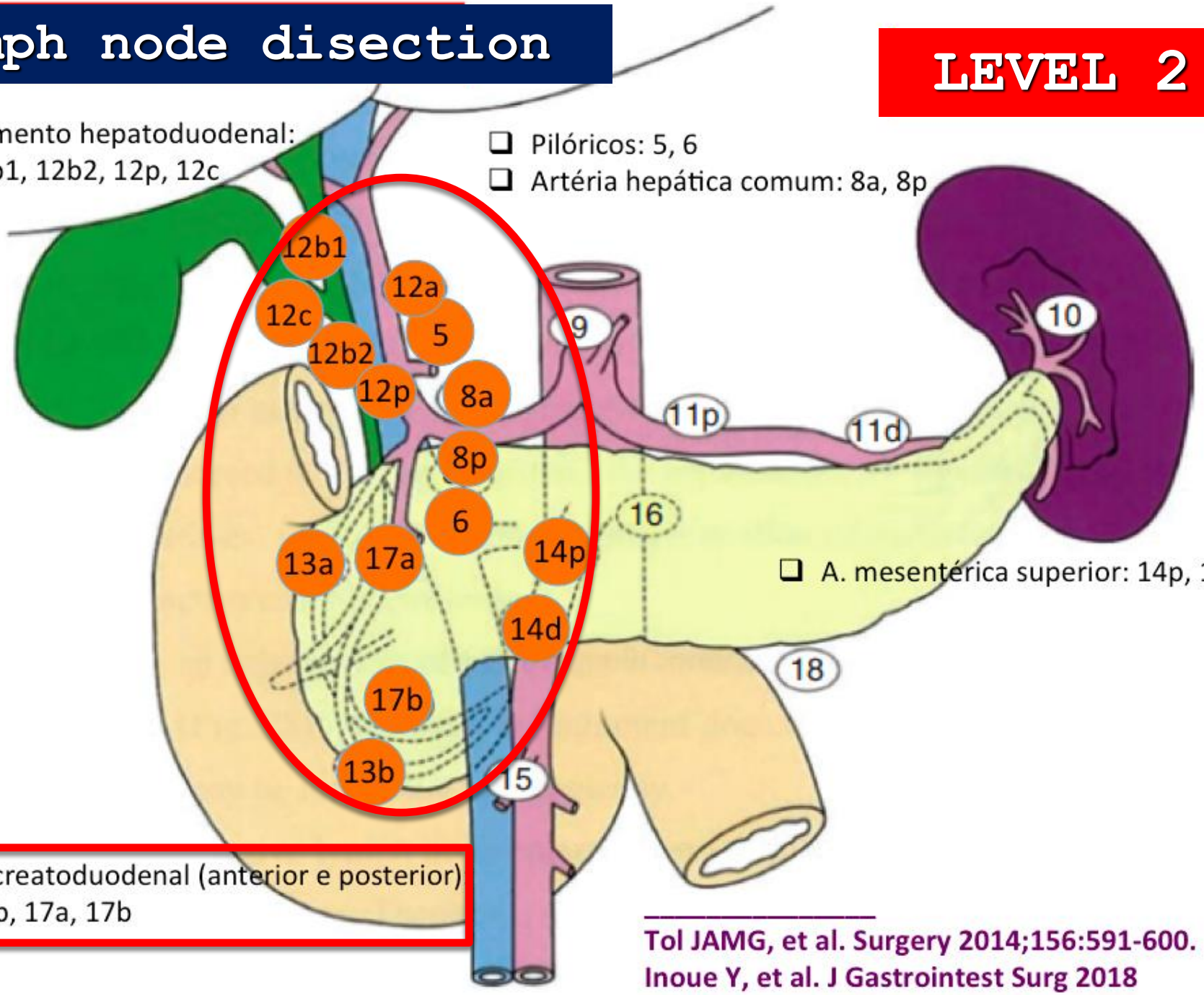
Lymph node dissection



Inoue Y, et al. J Gastrointest Surg 2017

Lymph node disection

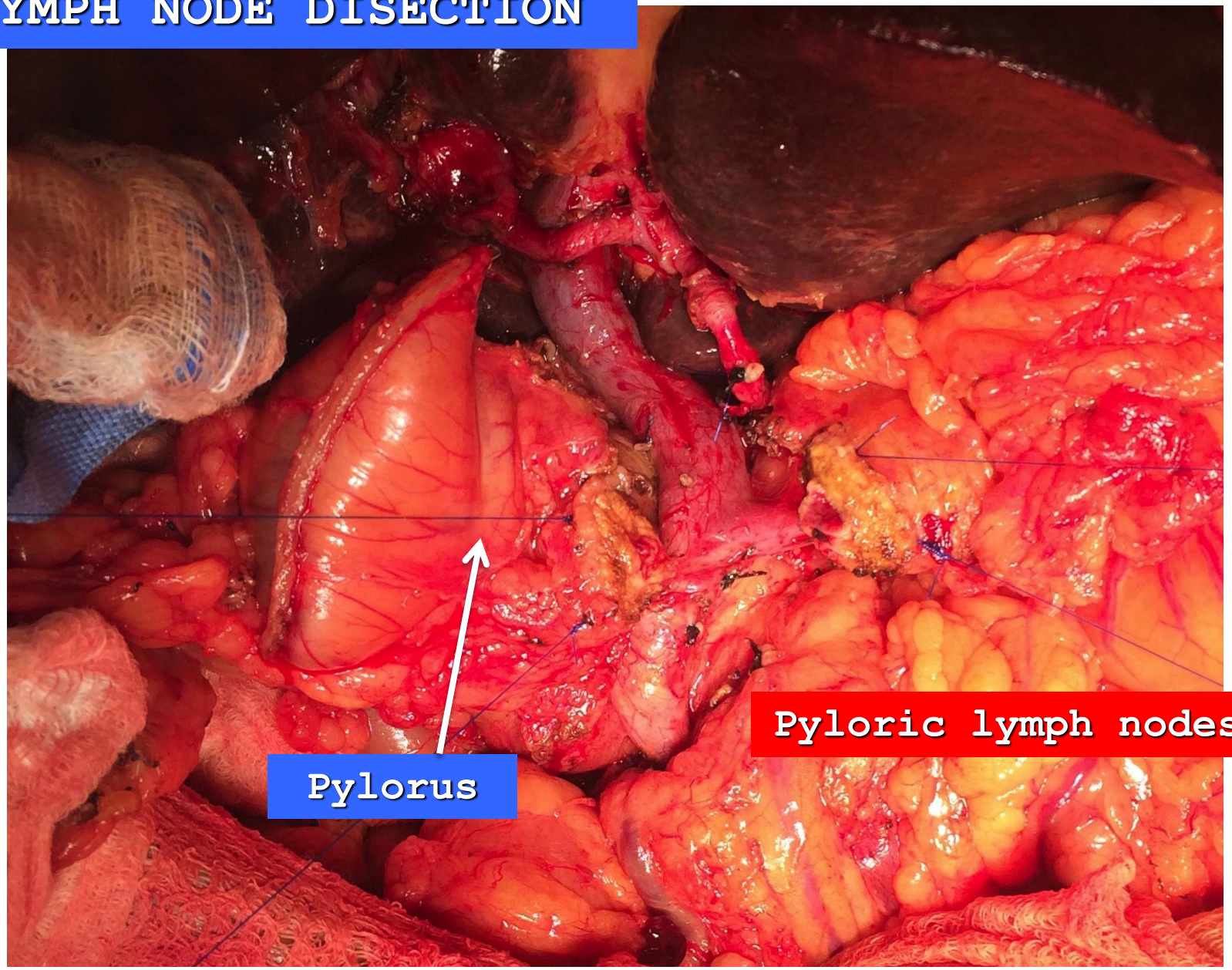
LEVEL 2



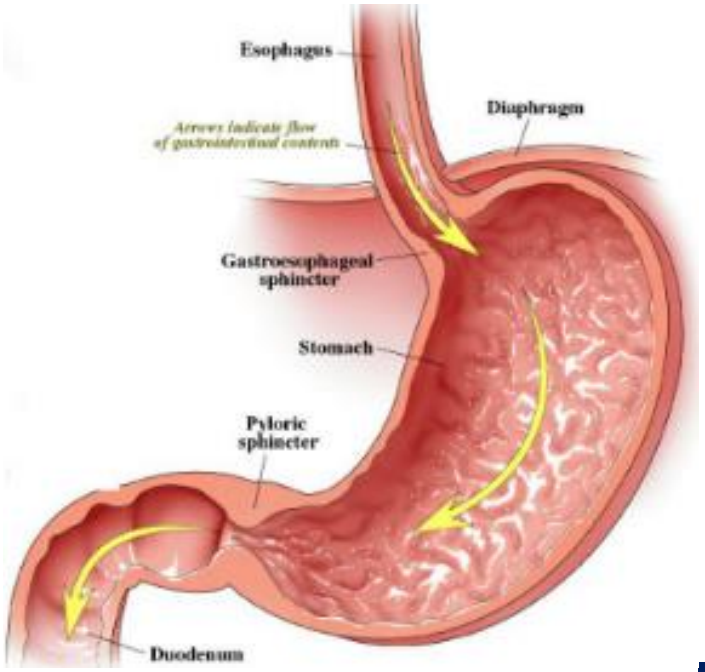
- Ligamento hepatoduodenal: 12a, 12b1, 12b2, 12p, 12c
- Pilóricos: 5, 6
- Artéria hepática comum: 8a, 8p
- A. mesentérica superior: 14p, 14d
- Pancreatoduodenal (anterior e posterior) 13a, 13b, 17a, 17b

Tol JAMG, et al. Surgery 2014;156:591-600.
Inoue Y, et al. J Gastrointest Surg 2018

LYMPH NODE DISECTION



Peripyloric Lymph Node Metastasis



❑ Lesser curvature	0	0%
❑ Greater curvature	1	0,3%
❑ Suprapyloric	3	0,8%
❑ Infrapyloric	34	9,5%

Fujii T, et al. Ann Surg Oncol 2012;19:176-83.

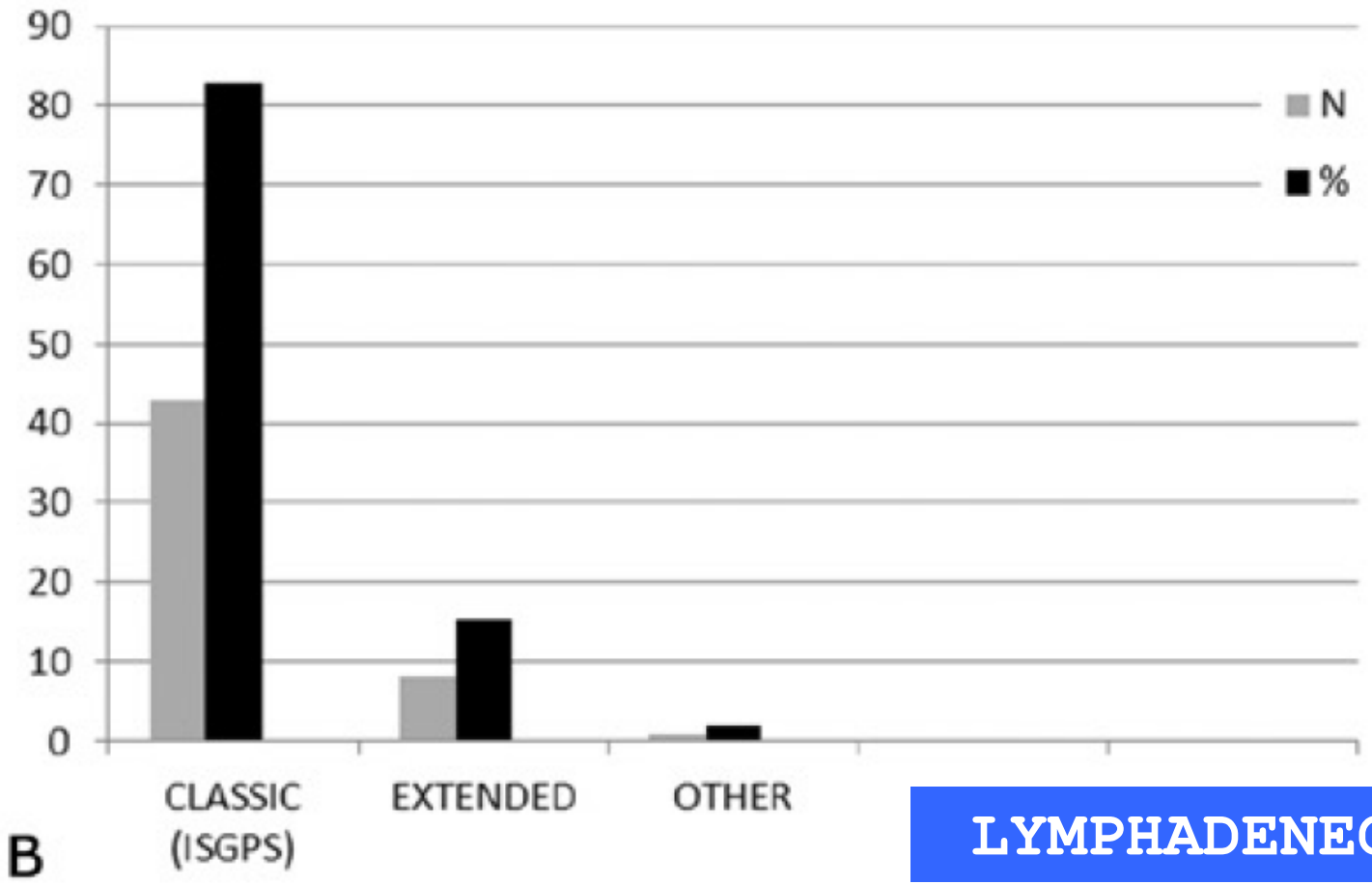
ABCD Arq Bras Cir Dig
2017;30(3):190-196
DOI: /10.1590/0102-6720201700030007

Original Article

PANCREATODUODENECTOMY: BRAZILIAN PRACTICE PATTERNS*

*Duodenopancreatectomia: prática padrão do Brasil**

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



LYMPHADENECTOMY

Torres OJ, et al. Arq Bras Cir Dig 2017;30:190-6

Journal of Surgical Oncology 2010;102:615–619

Subtotal Stomach-Preserving Pancreaticoduodenectomy (SSPPD) Prevents Postoperative Delayed Gastric Emptying

HIROSHI KURAHARA, MD,[1]* SONSHIN TAKAO, MD,[2] HIROYUKI SHINCHI, MD,[1] YUKO MATAKI, MD,[1] KOUSEI MAEMURA, MD,[1] MASAHIKO SAKODA, MD,[1] SHINICHI UENO, MD,[1] AND SHOJI NATSUGOE, MD[1]

[1]*Department of Surgical Oncology and Digestive Surgery, Graduate School of Medical Sciences, Kagoshima University, Japan*
[2]*Frontier Science Research Center, Kagoshima University, Japan*

Lymph node dissection

Kurahara H, et al. J Surgical Oncol 2010;102:615-9

TABLE IV. Incidence of DGE in Patients Who Underwent PPPD Versus SSPPD With D1 Lymph Node Dissection

	PPPD (n = 25)	SSPPD (n = 10)	*P*
DGE grade A[a]	44.0 (11)	30.0 (3)	0.4397[b]
DGE grade B/C[a]	8.0 (2)	20.0 (2)	0.3348[b]
DGE including all grades[a]	52.0 (13)	50.0 (5)	0.9148[b]
Postoperative hospital stay without postoperative chemotherapy[‡]	24.0 (n = 24)	27.9 (n = 10)	0.1383[c]

TABLE V. Incidence of DGE in Patients Who Underwent PPPD Versus SSPPD With D2 Lymph Node Dissection

	PPPD (n = 23)	SSPPD (n = 54)	*P*
DGE grade A[a]	43.5 (10)	42.6 (23)	0.9427[b]
DGE grade B/C[a]	34.8 (8)	13.0 (7)	0.0326[b]
DGE including all grades[a]	78.3 (18)	55.6 (30)	0.0534[b]
Postoperative hospital stay without postoperative chemotherapy[‡]	32.7 (n = 22)	25.6 (n = 43)	0.0476[c]

Kurahara H, et al. J Surgical Oncol 2010;102:615-9

CONCLUSIONS

In conclusion, for appropriate surgery involving secure RLND, SSPPD instead of PPPD might be recommended in order decrease the incidence of postoperative DGE.

RLND – Regional lymph node dissection

Kurahara H, et al. J Surgical Oncol 2010;102:615-9

Whipple operation

- The vagal innervation around the pyloric ring is destroyed after the peripyloric lymph node dissection.
- Preservation of the vagal nerve is not compatible with skeletonization of the hepatoduodenal ligament for radical lymph node dissection.

Fujii T, et al. Ann Surg Oncol 2012;19:176-83.

Total mesopancreas excision

Shailesh Shrikhande (Mumbai)

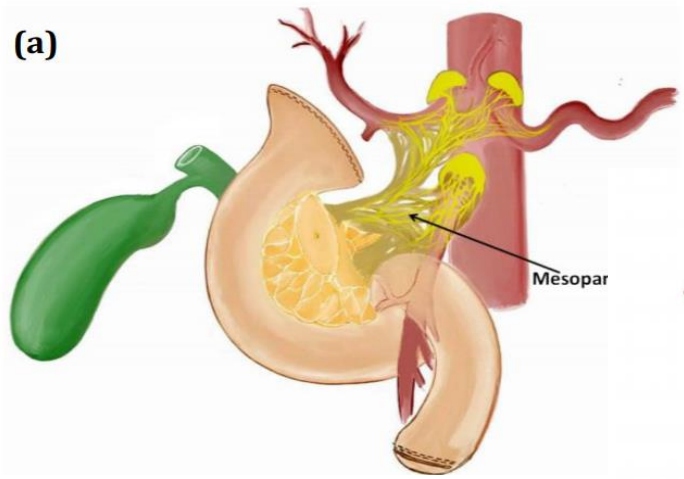
Markus Buchler (Heidelberg)

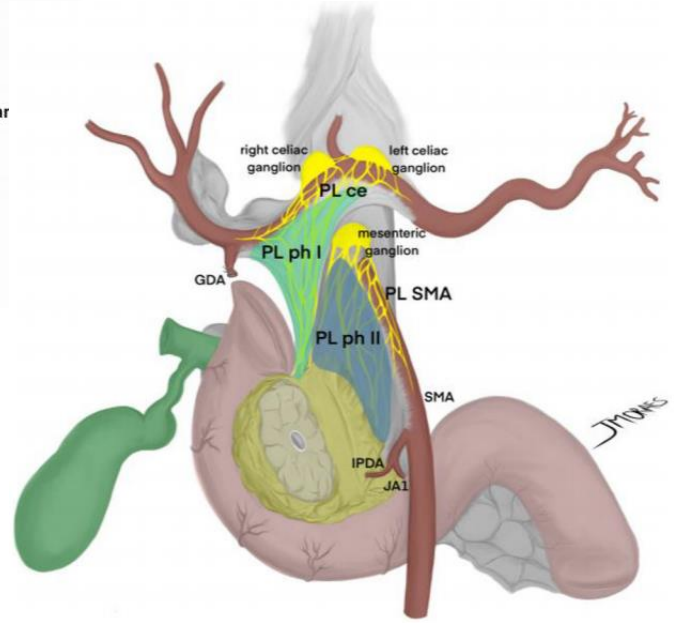
Langenbeck's Archives of Surgery
https://doi.org/10.1007/s00423-021-02211-y

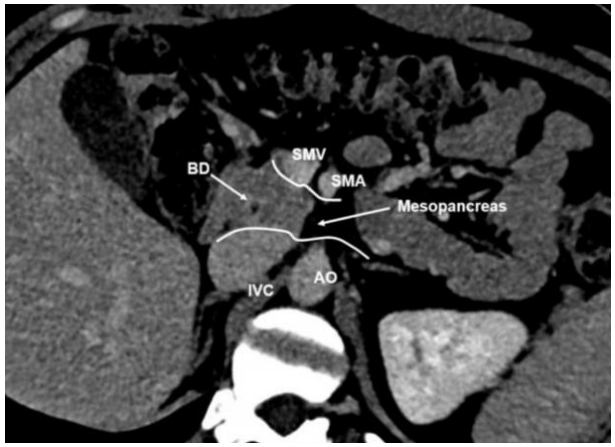
REVIEW ARTICLE

What do surgeons need to know about the mesopancreas

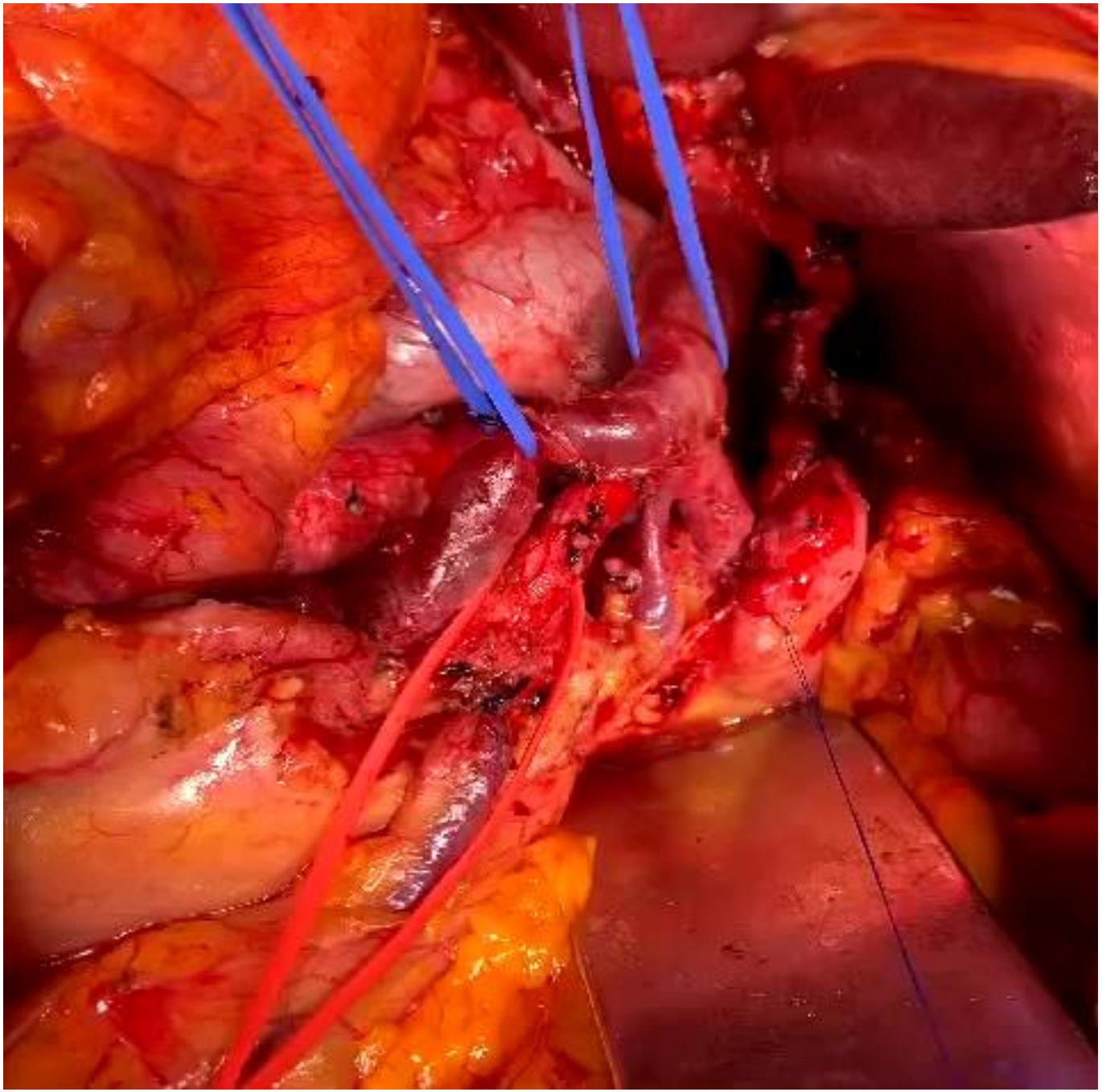
Eduardo de Souza M. Fernandes [1,2] · Oliver Strobel [3,4] · Camila Girão [1,2] · Jose Maria A. Moraes-Junior [5,6] · Orlando Jorge M. Torres [5,6]







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



Ann Surg Oncol (2012) 19:176–183
DOI 10.1245/s10434-011-1901-2

Annals of
SURGICAL ONCOLOGY
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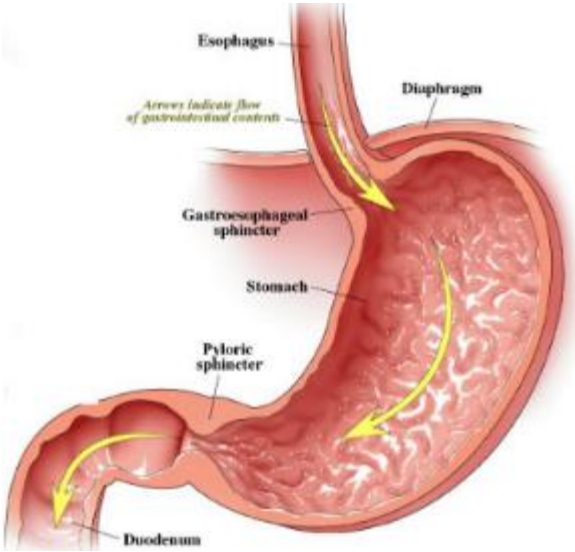
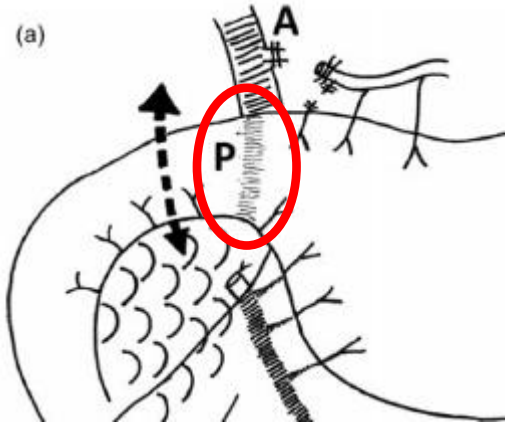
ORIGINAL ARTICLE – PANCREATIC TUMORS

Preservation of the Pyloric Ring Has Little Value in Surgery for Pancreatic Head Cancer: A Comparative Study Comparing Three Surgical Procedures

❑ Adjust the diameter of the gastric outlet is possible





PPPD 33 ± 5mm
SSPPD 47 ± 7mm
p< 0,0001

Gastric outlet diameter

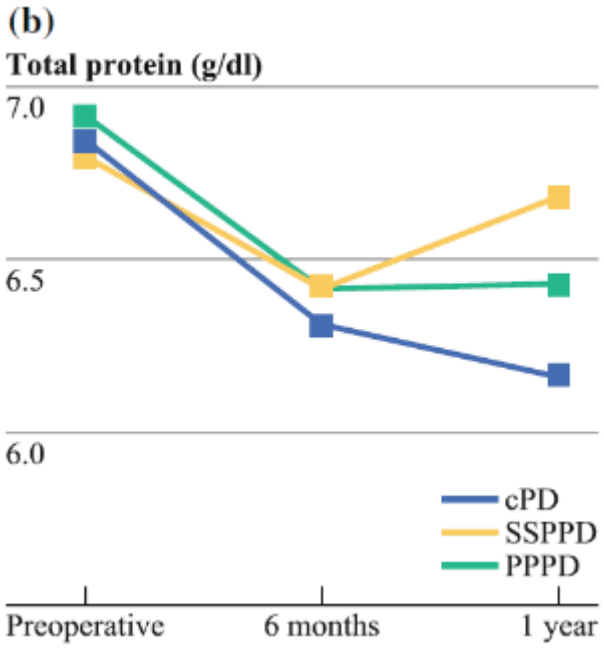
Fujii T, et al. Ann Surg Oncol 2012;19:176-83.

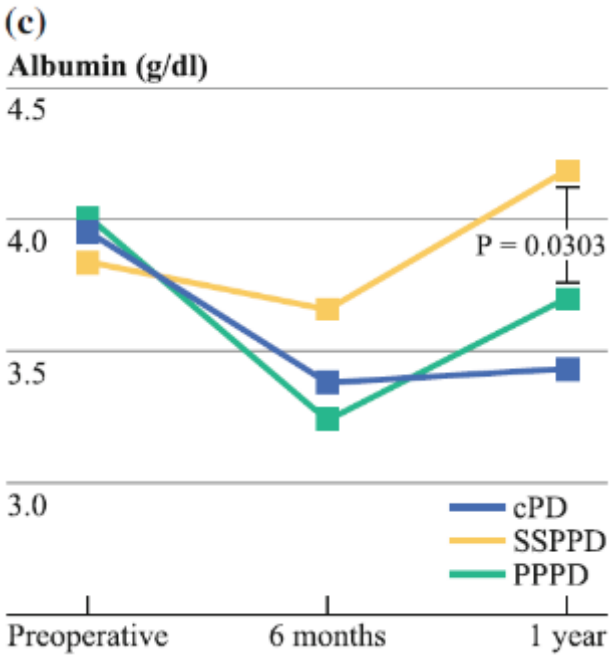
TABLE 2 Comparisons of perioperative and short-term follow-up

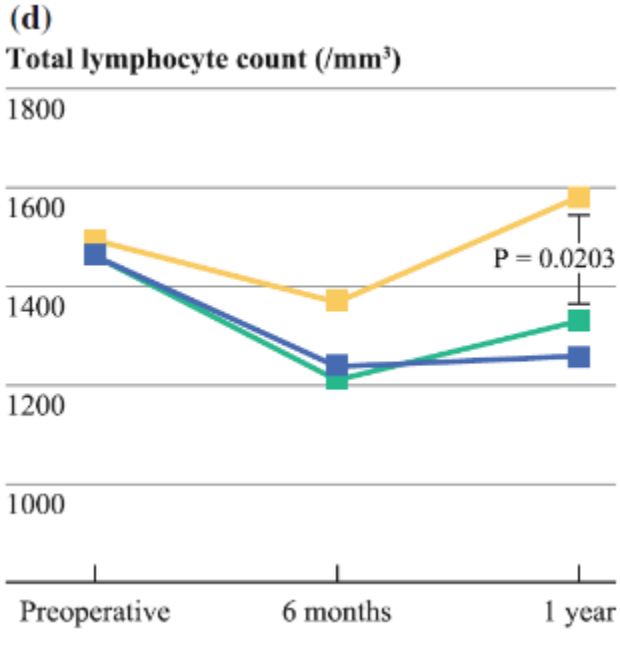
Characteristic	cPD ($n = 69$)	SSPPD ($n = 56$)	PPPD ($n = 33$)	P value
Mortality	0	0	0	
Overall morbidity (Clavien grade III or more)	25 (36.2%)	21 (37.5%)	13 (39.4%)	0.932
Pancreatic fistula (ISGPF grade B or more)	16 (23.2%)	17 (30.4%)	7 (21.2%)	0.592
DGE (ISGPS grade B or more)	4 (5.8%)	3 (5.4%)	9 (27.3%)	0.0012
Grade B/C	3/1	2/1	7/2	
Length of the nasogastric tube (days)	2.1 ± 1.6	1.3 ± 0.7	2.7 ± 6.1	0.0006
Days to start oral intake (days)	9.7 ± 5.7	8.6 ± 4.7	15.2 ± 7.8	<0.0001
Use of gastroprokinetic agent	13 (18.8%)	6 (10.7%)	9 (27.3%)	0.135
Use of antiulcer agent	45 (65.2%)	39 (69.6%)	23 (69.7%)	0.839
Postoperative peptic ulcer	2 (2.9%)	3 (5.4%)	2 (6.1%)	0.704
Gastric dumping syndrome	0	0	0	
Postoperative adjuvant chemotherapy	50 (72.5%)	36 (64.3%)	18 (54.5%)	0.194
Length of the hospital stay (days)	41.5 ± 21.6	39.4 ± 16.9	49.1 ± 46.6	0.926

- ❑ DGE grade B or more p=0.0012
- ❑ Length of the nasogastric tube p=0.0006
- ❑ Days to start oral intake p=<0.0001

Fujii T, et al. Ann Surg Oncol 2012;19:176-83.







Conclusions. Our results suggest that preservation of the pyloric ring without vagal innervation has little significance, and that SSPPD with better perioperative and long-term outcomes is more suitable as a standard procedure for patients with pancreatic head cancer.

Fujii T, et al. Ann Surg Oncol 2012;19:176-83.

ORIGINAL ARTICLE

Pylorus Ring Resection Reduces Delayed Gastric Emptying in Patients Undergoing Pancreatoduodenectomy

A Prospective, Randomized, Controlled Trial of Pylorus-Resecting Versus Pylorus-Preserving Pancreatoduodenectomy

Manabu Kawai, MD, Masaji Tani, MD, Seiko Hirono, MD, Motoki Miyazawa, MD, Atsushi Shimizu, MD, Kazuhisa Uchiyama, MD, and Hiroki Yamaue, MD

Kawai M, et al. Ann Surg 2011;253:495-501

TABLE 2. Delayed Gastric Emptying and Postoperative Course

	PpPD (n = 64)	PrPD (n = 66)	*P*
Delayed gastric emptying*	11 (17.2%)	3 (4.5%)	0.0244
Grade A	6 (9.4%)	1 (1.5%)	
Grade B	5 (7.8%)	1 (1.5%)	
Grade C	0 (0%)	1 (1.5%)	
Removal of nasogastric catheter, d	0.6 ± 0.9	0.6 ± 1.0	0.9410
Reinsertion of nasogastric catheter	8 (12.5%)	2 (3.0%)	0.0527
Start of solid diet, d	6.3 ± 3.7	5.6 ± 3.3	0.1138
Postoperative hospital stay, d	24.1 ± 14.8	24.3 ± 15.5	0.9305

*Delayed gastric emptying is defined according to the International Study Group of Pancreatic Surgeons.

Kawai M, et al. Ann Surg 2011;253:495-501

TABLE 3. Results of Gastric Emptying Assessed by ^{13}C-Acetate Breath Test

	PpPD (n = 64)	PrPD (n = 66)	*P*
Postoperative upper gastrointestinal gastrografin series, s*	27.2 ± 31.3	10.1 ± 9.0	0.0001
^{13}C-acetate breath test, min†			
1 mo after surgery	34.0 ± 24.1	18.7 ± 29.7	<0.0001
3 mo after surgery	26.5 ± 21.1	17.3 ± 11.7	0.0136
6 mo after surgery	26.7 ± 18.8	17.4 ± 13.2	0.0197

*Time for the passage of gastrografin from esophagogastric junction to gastrojejunostomy or duodenojejunostomy was measured on postoperative day 7.

†Gastric emptying was evaluated by the time of peak $^{13}CO_2$ content in ^{13}C-acetate breath test at 1, 3, and 6 months after surgery.

Conclusion: Pylorus-resecting pancreatoduodenectomy significantly reduces of the incidence of DGE compared with PpPD.

Kawai M, et al. Ann Surg 2011;253:495-501

ABCDDV/1175

ABCD Arq Bras Cir Dig
2016;29(2):71-72
DOI: /10.1590/0102-6720201600020001

Editorial

THE OBITUARY OF THE PYLORUS-PRESERVING PANCREATODUODENECTOMY

O obituário da duodenopancreatectomia com preservação pilórica

Orlando Jorge Martins **TORRES**, Rodrigo Rodrigues **VASQUES**, Camila Cristina S. **TORRES**
From the Department of Surgery, Federal University of Maranhão, São Luiz, MA, Brazil

Pancreatoduodenectomy is the treatment of choice for patients with benign and malignant disease of pancreatic head. Classic pancreatoduodenectomy was described by Whipple originally and included distal hemigastrectomy. Pylorus-preserving pancreatoduodenectomy (pylorus-preserving) was popularized in the late 1970s for benign disease and it included full preservation of the pylorus. However, delayed gastric emptying after pylorus-preserving is a frustrating complication. Its incidence varying from 19% to 61% in previous series and it results in discomfort, prolonged length of stay and increases the risk of respiratory complications. Delayed gastric emptying contributes to increased hospital costs and decreased quality of life. There has been no evidence from prospective studies and meta-analyses to indicate the superiority of pylorus preserving in terms of quality of life or delayed gastric emptying[2,4,5,7].

More recently, and mostly in Japan since the late 1990s, subtotal stomach-preserving pancreatoduodenectomy (stomach-

Auditório: Dr. Alexandre, o Sr. preserva o piloro em suas duodenopancreatectomias?
Dr. Alexandre: Sim

Dr. Alexandre: eu preservo em formalina tamponada à 10%

Dr. Alexandre Prado de Resende

Obrigado!