First arter yaklaşımı ; Standart tekniğe göre avantajları?

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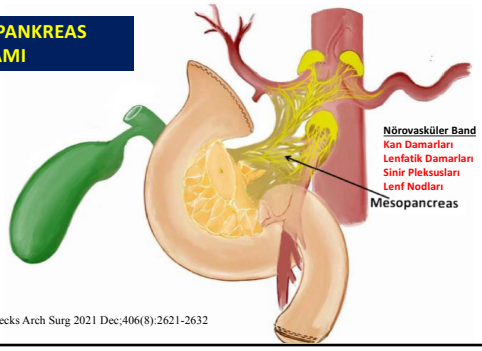
Pankreas Cerrahisinde Amaç

- **Pankreas kanserinde amaç R0 rezeksiyon sağlamak**
- R1 rezeksiyon overall survi için kötü prognostik
- R0 rezeksiyon için bütün marj'larda **en az 1 mm sağlam sınır**
- **ISGPS'ye göre 7 bölgede bu marj sağlanmalı:**
  - SMA
  - Posterior yüzey
  - Pankreas boynu
  - SMV Groove
  - Bile Duct
  - Gastik/Enterik Margin
  - Anterior yüzey

Pankreatektomide en sık rekürrens nedeni

- Pankreatikoduodenektomi sonra rekürrens oranları **% 8.0 to 84%** arasında değişir.
- En sık pozitif alan the medial/SMA **(%15 - 45%)**
- İnkomplet lenfadenektomi ve perinöral diseksiyon rekürrensle ilgili faktörler olarak düşünülür
- İnkomplet rezeksiyonla ilgili en önemli neden **SMA'nın sağının tümörden temizlenmemesidir**

MESOPANKREAS KAVRAMI



Langenbecks Arch Surg 2021 Dec;406(8):2621-2632

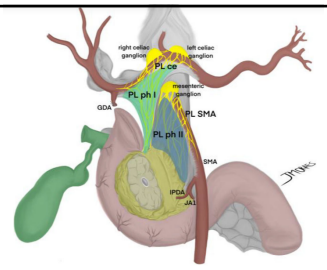


Fig. 3 Anatomic definition of the mesopancreas was performed according to the Japan Cancer Society (pancreatic head plexus) [29]. Legend: PL ph I, pancreatic head plexus 1; PL ph II, pancreatic head plexus 2; PL SMA, superior mesenteric artery plexus; PL ce, celiac plexus; GDA, gastroduodenal artery; SMA, superior mesenteric artery; IPDA, inferior pancreatoduodenal artery; JA1, first jejunal artery

Mesopankreas

Terms for mesopancreas

	Author	Term	Year	Ref
1	Gockel	Mesopancreas	2007	42
2	Gaedcke	Mesopancreatic resection	2010	23
3	Agrawal	Does not exist	2010	32
4	Japan Pancreas Society	Pancreatic head plexus	2012	29
5	Adham	Mesopancreas triangle	2012	50
6	Bouassida	Retroportal lamina	2013	33
7	Sharma	Pseudomesopancreas	2016	35
8	Wu	Two mesopancreas (ant and post)	2016	51
9	Kawabata	Mesopancreatoduodenum	2016	49
10	Muro	P-A ligament	2021	30

Mesopankreas rezeksiyonunun sonuçlara etkisi

Author	Results	TME	SPD	p	Ref
Kawabata et al. (2012)	R0 resection (%)	92.8	60	0.019	39
	R1 resection (%)	7.2	40		
	Recurrence (%)	14.2	64	0.036	
Aimoto et al. (2013)	R0 resection (%)	74	68	NS	41
	R1 resection (%)	26	30	NS	
	Local recurrence (%)	0	37	<0.01	
Xu et al. (2017)	Median DFS (Months)	16.9	13.4	0.044	37
	Median OS (Months)	19.9	22.5	0.176	
	1-year total recurrence rate (%)	31.8	55.3	0.054	
	1-year local recurrence rate (%)	18.2	39.5	0.018	
Quero et al. (2021)	Disease-free survival (%)	22.3	14.8	0.04	38
	R1 Mesopancreas margin (%)	5.0	16.7	0.04	
	Local tumor recurrence (%)	26.8	55.5	0.002	

Legends: *TME*, total mesopancreas excision; *SPD*, standard pancreatoduodenectomy; *DFS*, disease-free survival; *OS*, overall survival; *NS*, no significant

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Mesopankreas rezeksiyonu nasıl yapılır?

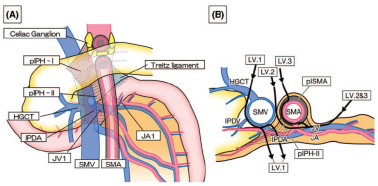


TABLE 1. Aim and Indication of Each Dissection Level

	Dissection Level		
	Level 1	Level 2	Level 3
Aim of dissection			
1. Early inflow control	○	○	○
2. En bloc mesopancreas dissection		○	○
3. Gaining a cancer-free margin for invasive pancreatic cancer			○
Disease and indication			
1. Low-grade malignancy, CIS, IPMN	○		
2. Ampullary/lower bile duct/duodenal cancer		○	△*
3. Invasive pancreatic ductal cancer		△†	○

*Potentially indicative for nonpancreatic cancer suspected to have perineural invasion toward the SMA.
†Potentially indicative for pancreatic cancer apart from the SMA, or high-risk patients for extended surgical invasion.
○ indicates carcinoma in situ; IPMN, intraductal papillary mucinous neoplasm.

FIGURE 1. Anatomy and concept of systematic mesopancreas dissection using the supracolic anterior approach. A, Frontal view of the mesopancreas, which is represented as the neurovascular bundle connecting the pancreas head to the right celiac ganglion (pIPH-I) and the SMA (pIPH-II). In this schema, the IPDA forms a common trunk with the JA. B, Transverse view of the pancreas head, mesopancreas, and mesojejunum. The dissection lines of each dissection level are indicated.

Ann Surg 2015;262:1092–1101)

Anatomik Varyasyonlar

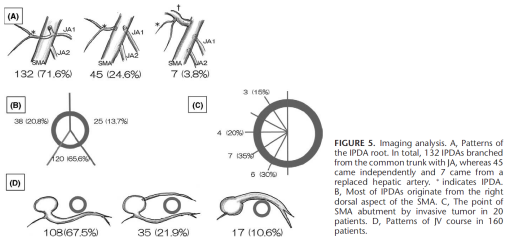


FIGURE 5. Imaging analysis. A, Patterns of the IPDA root. In total, 132 IPDAs branched from the common trunk with JA, whereas 45 came independently and 7 came from a replaced hepatic artery. * indicates IPDA. B, Most of IPDAs originate from the right dorsal aspect of the SMA. C, The point of SMA abutment by invasive tumor in 20 patients. D, Patterns of JV course in 160 patients.

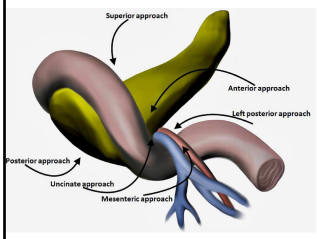
Pankreatektomi Önce Arter Yaklaşımı

- **Mesopankreas konsepti ve TME** retroperitoneumda lenfatiklerin "en bloc" rezeksiyonunu sağlamak için için kullanılır
- **Bu konsept "Artery-first" teknikleri olarak tanımlanan yeni yaklaşımın kullanımına yol açtı**
- Artery-first yaklaşım TME'nin yapılabilmesi için bazı merkezlerde standart pratik olarak rutin olarak kullanılmaktadır.

First Arter Yaklaşımın avantajları

- Tümör planlarına uygun rezeksiyon olacağı için hücre yayılımı azalır
- R0 rezeksiyonu arttırır, lokal rekürrensi azaltır
- Pleksuslar çevresindeki peripankreatik retroperitoneal dokular tam rezeke edilir
- Artmış lenf nodu temizliği
- Non rezektabilite erken değerlendirilir (SMA tutulumu)
- SMA ve RHA anomalileri daha iyi tanımlanır
- No touch tekniği ile SMV-PV'nin enblok rezeksiyonu ve rekonstrüksiyonu daha kolaydır
- Azalmış operatif zaman ve kan kaybı (IPDA/JA1'in erken ligasyonu)

First Arter Yaklaşımın Tipleri



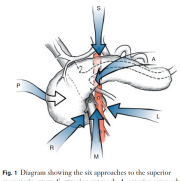


Fig. 1 Diagram showing the six approaches to the superior mesenteric artery: S, superior approach; A, anterior approach; P, posterior approach; L, left posterior approach; R, right/medial uncinate approach; M, mesenteric approach

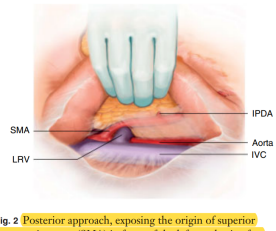


Fig. 2 Posterior approach, exposing the origin of superior mesenteric artery (SMA) in front of the left renal vein after kocherization. For clarity the SMA has been made more apparent. IPDA, inferior pancreatoduodenal artery; LRV, left renal vein; IVC, inferior vena cava

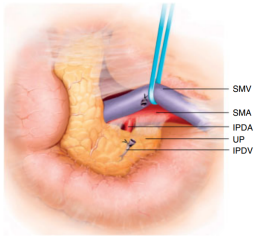
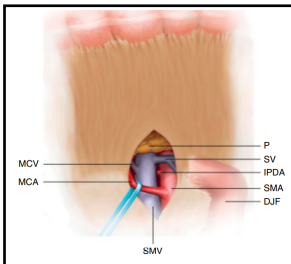


Fig. 3 Medial uncinate approach, demonstrating the uncinate process (UP), inferior pancreatoduodenal artery (IPDA) and vein (IPDV), superior mesenteric artery (SMA) and vein (SMV) after kocherization and mobilization of the duodenojejunal flexure



ig. 4 Inferior infracolic approach (mesenteric approach) xposing the superior mesenteric artery (SMA) and vein (SMV) nd branches after dividing the peritoneum to the right of the uodenojejunal flexure (DJF) in the transverse mesocolon. , pancreas; SV, splenic vein; MCV, middle colic vein; IPDA, nferior pancreatoduodenal artery; MCA, middle colic artery

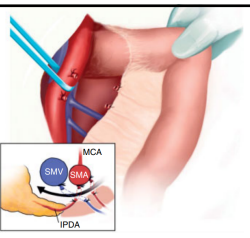


Fig. 5 Left posterior approach, exposing the first and second jejunal arteries at their origin on the superior mesenteric artery (SMA) in the transverse mesocolon. Further traction on the proximal jejunum produces a counterclockwise rotation to the SMA that allows identification and division of the inferior pancreatoduodenal artery (IPDA) arising from the posterior surface of the SMA (inset). MCA, middle colic artery; SMV, superior mesenteric vein

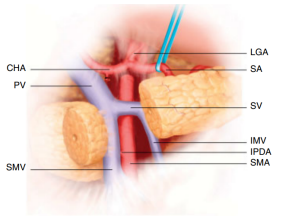


Fig. 6 Inferior supracolic approach (anterior approach), demonstrating the superior mesenteric artery (SMA) and vein (SMV), splenic vein (SV) and coeliac axis and its branches after division of the neck of the pancreas. LGA, left gastric artery; CHA, common hepatic artery; SA, splenic artery; PV, portal vein; IMV, inferior mesenteric vein; IPDA, inferior pancreatoduodenal artery

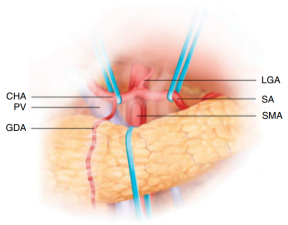


Fig. 7 Superior approach demonstrating the coeliac axis and its branches and the superior mesenteric artery (SMA) in the lesser sac above the neck of the pancreas. LGA, left gastric artery; CHA, common hepatic artery; SA, splenic artery; PV, portal vein; GDA, gastroduodenal artery

Approach	Indication(s)	Advantages	Disadvantages
Posterior[12]	Posteromedial tumour in head/neck, especially involving PV–SMV Periampullary tumour extending from body to head	Early identification of SMA involvement Identification of replaced RHA Enables adequate retropancreatic lymphadenectomy Early identification of SMV involvement and facilitates *en bloc* resection	Difficult in patients with peripancreatic inflammation and adhesions around head of pancreas
Medial uncinate[18,22]	Malignant tumours of uncinate process	Early identification of SMA involvement at uncinate Early ligation of IPDA minimizes bleeding Useful approach in peripancreatic inflammation with difficulty tunnelling above PV Useful approach for total pancreatectomy as mobilization can be achieved without transecting gland	Late identification of replaced RHA
Inferior infracolic (mesenteric)[19]	Locally advanced tumours with questionable infiltration of SMA at its origin from aorta Malignant tumours of uncinate and ventral pancreas	Early identification of replaced RHA Allows better exposure and dissection of region posterior to SMA Early ligation of IPDA minimizes bleeding	Difficult in morbidly obese patients Difficult exposure in patients with high origin of SMA
Left posterior[20]	Tumours along uncinate and ventral pancreas	Facilitates skeletonization of SMA in retroperitoneum without kocherization of duodenum Early ligation of IPDA	Extensive dissection of SMA requiring antidiarrhoeals
Inferior supracolic (anterior)[21]	Tumours along inferior border of pancreas	Facilitates better retroperitoneal dissection, especially with locally advanced tumours with neoadjuvant treatment 'No-touch' technique with *en bloc* kocherization theoretically prevents tumour cell dissemination	Early division of stomach and neck of pancreas
Superior	Malignant tumours of superior border of pancreas	Early identification of CHA, coeliac and SMA involvement	Difficult exposure in patients with low origin of SMA

PV, portal vein; SMV, superior mesenteric vein; SMA, superior mesenteric artery; RHA, right hepatic artery; IPDA, inferior pancreatoduodenal artery; CHA, common hepatic artery.

First Arter Yaklaşımın Sonuçları-Metaanaliz

- **İntraoperatif kanama daha az**
- İntraoperatif transfüzyon daha az
- Perioperatif morbidite daha az
- B/C pankreatik fistül insidensi daha az
- Mortalitede fark yok
- **R0 rezeksiyon oranı daha fazla**
- Overall/3 yıllık Survival daha uzun
- Posterior yaklaşımın klinik etkinliği daha iyi

BJS 2018; 105:628-636
Int J Surg 2020; 73:14-24

First Arter Yaklaşımın Sonuçları-RCT

- 10 Üniversite Hastanesi
- R0 oranları aynı
- Postoperatif morbidite aynı
- Postoperatif mortalite aynı

- SONUÇ: FARK YOK

176 Hasta Randomize edildi (75 ST-PD, 78 AFA-PD)

R0 rezeksiyon oranları	ST-PD	77.3%
	AFA-PD	67.9%
Komplikasyon oranları	ST-PD	73.3%
	AFA-PD	67.9%
Postoperatif mortalite	ST-PD	4
	AFA-PD	6.4

Ann Surg 2019;270:738–746

Pankreatektomi yapılan serimiz 805 hasta

Variables	Total (805 patients)	PBD (574 patients)	None- PBD (231 patients)	p Value
Total complication (Clavien Dindo) grade				<0.001
I	207 (25.7%)	163 (28.4%)	44 (19%)	
II	164 (20.4%)	128 (22.3%)	36 (15.6%)	
III	104 (12.9%)	78 (13.6%)	26 (11.3%)	
IV	11 (1.4%)	8 (1.4%)	3 (1.3%)	
V	65 (8.07%)	50 (8.71%)	15(6.49%)	
Severe complications (III-V)	180 (22.36%)	134 (23.34%)	44(19.4%)	<0.001
Pancreatic leakage				0.19
Grade A	143 (17.8%)	106 (18.5%)	37 (16%)	
Grade B	72 (8.9%)	55 (9.6%)	17 (7.4%)	
Grade C	42 (5.2%)	31 (5.4%)	11 (4.8%)	
Hepaticojejunostomy leakage	26 (3.2%)	20 (3.5%)	6 (2.6%)	0.52
Abdominal collection or abscess	84 (10.4%)	59 (10.3%)	25 (10.8%)	0.82
Wound infection	174 (21.6%)	144 (25.1%)	30 (13%)	<0.001
Delayed gastric emptying	22 (2.7%)	17 (3%)	5 (2.2%)	0.008
Intraabdominal Hemorrhage	45 (5.6%)	32 (5.6%)	13 (5.6%)	<0.001
Others	46 (5.71%)	40 (%6.96)	6 (%2.59)	
Median postoperative hospital stay (day)	16 (2-150)	17 (2-150)	14 (6-144)	0.41

Arch Iran Med. 2021 Oct 1;24(10):771-778

Bizim Sonuçlarımız (Triangle LND)

- **Toplam 47 hasta**
- Yaş ortalaması: 58 (36-80)
- Komplikasyon
  - Grade 0,1,2: 39
  - **Grade 3,4: 6 (%13)** (1 hasta re-opere Wirsungostomi)
  - **Grade 5: 2 (% 4,2)**
- Hastane yatış süresi: 20,4 gün (7-40)
- Fistül: Grade A: 6 Grade B,C: 5(%6)
- 3 Hasta Şilöz fistül (medikal tedavi)
- **19 Hastada semptomatik diare gelişti, 2 hasta 6 aydan uzun süre diare ve kilo kaybı**

Bizim Sonuçlarımız

- **8 SMV/Portal ven rezeksiyonu**
- R0/**R1:** 36/11 **24 %**

(3 hasta 1mm<, 8 hasta direkt)

- Operasyon süresi (h): median 7 (6-10) Mean: 7,39
- **ELN Median: 36 (12 - 65)** Mean: 37,79 ± 11,3
- **Bizim analiz ettiğimiz 805 vakalık Pankreatikoduodenektomi serimizde ortanca çıkarılan LN sayısı 14 (2-72) idi**
- Triangle LN sayısı: **Mean 2,17 median: 2 (0-5)**

11 hastada periferik sinir, fibröz doku, adrenal gland

- **PTLND: 3**
  - 2 LN (T1N2 16 + LN / T2N2 4 +LN)
  - 1 Sinir invazyonu