

## PANKREATEKTOMİ SONRASI GELİŞEN KOMPLİKASYONLARIN TANI VE YÖNETİMİ

Erdal KARAKÖSE<sup>52</sup>

### GİRİŞ

Pankreas hastalıklarının cerrahi tedavisi diğer abdominal organlara göre oldukça zordur.Organın anatomik lokalizasyonu ve komşuluğunda bulunan hayatı organlar cerrahiyi komplike hale getirmektedir.Son iki dekatta komplike pankreas ameliyatları azalan mortalite oranları ile daha sık yapılmaktadır.Allen et all 2007;Cameron and He , 2015;Dimic et all,2004;Jernagin et all,2002; Norton,et all,2012;Winter et all,2016

Mortalite oranlarında azalmaya rağmen morbidite oranlarında bir azalma olmamakta hatta bazı büyük serilerde özellikle major komplikasyonların aynı kaldığı belirtilmektedir.(%35-45) Cameron and He ,2015;Kreuetz et all , 2012;Nthon et all;2009;Vin et all,2008

Komplikasyon oranlarında bir azalma olmamasına rağmen mortalite oranlarında ortaya çıkan anlamlı düzelseme komplikasyonları yönetmede sağlanan gelişmenin bir sonucudur. Bu başarı özellikle geliştirilen yüksek teknolojili görüntüleme yöntemleri ve komplikasyonlarla ilgili tecrübe biriminin getirdiği erken tanı ve müdafale becerisi ile sağlanmıştır.Girişimsel radyoloji ve endoskopik işlemlerin sağladığı imkanlarda komplikasyonlar ile mücadele ederken çok önemli katkı sağlamaktadır.Bu nedenle radyologlarında komplikasyonları yöneten ekibin içinde yer alması kaçınılmaz hale gelmiştir.

Ameliyatın yapıldığı kliniğin yüksek volümlü bir merkez olması mortaliteyi azaltan en önemli etken olarak ortaya çıkması nedeni ile bu ameliyatların belirli merkezlerde yapılması önerilmektedir.(Mortalite oranları %25 lerden %2 lere kadar düşürülmüştür)

Bu bölümde pankreatektomi sonrası gelişen komplikasyonlar; işleme spesifik ve genel komplikasyonlar olarak iki grupta ayrılarak bu yazının konusu pankrektomi işlemine spesifik komplikasyonlar ve yönetimi olarak belirlendi. En sık karşılaşılan komplikasyonlar olarak Geçikmiş mide boşalımı (%8-45),pankreatik fistül (%3-30),hemoraji (%2-16),İntraabdominal apse (%1-14),yara yeri enfeksiyonu(%5-10) ve bilier komplikasyonlar (%3-9) dir.(Terhune K et all,2008)

Pankreatektomi sonrası komplikasyonlarının tanımlanmasında kullanılan kesin olmayan terminoloji ve tutarsızlıklar nedeni ile yakın zamana kadar litaratürde ortak bir kabul sağlanamamıştır.Bu tutarsızlıklar 2004 yılında Bassi ve arkadaşları tarafından belirlenmiş olup bunun üzerine ilk olarak oluşturulan Uluslararası Pankreas Fistül çalışma grubu pankreas fistülü tanımı ve sınıflandırmasını içeren standart yaklaşım gereğini kabul etti.(Bassi et all ,2005) Sonraki yıllarda oluşturulan Uluslararası Pankreas Cerrahisi çalışma grubu gecikmiş mide boşalımı ile hemoraji komplikasyonlarının tanımı ve sınıflaması konularında da çalışmalar yaptı.

<sup>52</sup> Gastroenteroloji Cerrahisi Yandal Asistanı, SBÜ Kartal Koşuyolu Yüksek İhtisas Hastanesi Genel Cerrahi Kliniği, erdalkarakose71@gmail.com

zordur çünkü bu hastalarda karaciğer fonksiyon testlerinin stabil olmaması tanı açısından gecikmeye neden olabilmektedir. Bilier MR tanı aşamasında yardımcı olur. Kolenjit; transepatisk bilier drenaj ile tedavi edilir.

### **Intraabdominal Apse**

Hastaların tekrar hastaneye yatırılmasının en önemli nedeni olup görülmeye oranı %3-8 arasındadır.(158) Yapılan randomize prospектив bir çalışmada dren koymaın apse oluşumunu engellememiği gösterilmiştir.(%6.8 vs %6.6)(159) Sıklıkla pankreatik ya da bilier fistüllerin üzerine yerleşmiş süper enfeksiyon ile oluşur. Özellikle pankreatikodenedektomi öncesinde bilier sisteme yerleştirilen hastalarda olabilir.(160)(161)

Tedavisi septik bulguları olmayan stabil hastalarda girişimsel radyoloji ile yerleştirilen katerle, septik bulgular olan hastalarda ise açık cerrahi girişimle yapılması önerilir.

### **Şilöz Asit**

Pankreatektomi sonrası görülmeye oranı yüksek olmamakla birlikte (%3.4) özellikle cisterna shili'nin bulunduğu L1-L2 vertebra seviyesinde pankreas arkasında olması ve ameliyat sırasında yaralanması en önemli nedendir.

### **Endokrin Pankreas Yetmezliği**

Özellikle pankreas dokusunun %80'inden fazlasının çıkarılması durumunda diabet gelişme riski vardır (%8) Kronik pankreatit hikayesi olan hastalarda bu risk daha fazladır. (%12-46)

### **Egzokrin Pankreas Yetmezliği**

Pankreatikodenedektomi sonrası %10-20 arasında semptomatik egzokrin yetmezlik görülür. Semptomlar; dispepsi, yemekler sonrası kramp tarzı ağrı, kötü kokulu gaitadır. Ancak ciddi bir komplikasyona neden olmadan oral pankreas enzim preparatları ile tedavi edilebilir.

### **Sonuç**

Son yıllarda mortalite oranı anlamlı şekilde azalmıştır.(162) Pankreatektomi tipi mortaliteyi etkileyen önemli faktörlerden biridir. (Pankreatikodenedektomi sonrası %9, distal pankre-

atektomi sonrası %3.5)(163) Mortaliteye etkili en önemli faktörlerden biri ameliyatın yapıldığı merkezin deneyimi olup yüksek volümlü merkezlerde bu oran DP de %1, PD de ise %3 oranında gerçekleşmektedir.(3)(5)(6)(7) Özellikle yapılan çalışmalar ile ameliyatın yapıldığı merkezin deneyimi mortalite için predictive bir değer olabileceği anlaşıldı.(162) (164)(165)(166) Bu hastalarda mortaliteye etkili olan diğer faktörler; hastanın yaşı, erkek cinsiyeti, komorbidite varlığı ve pankreas kanalının dilate olmaması olarak sıralanabilir.(163)(167)

Charlson ve arkadaşları tarafından yapılan skorlama ile pankreatektomi tipine ve hastanın ek hastalıklarına göre mortalite riski belirlenmiştir. Skoru 5'in altında olan hastalarda mortalite %2,6-9 arasında %6.2 ve 9 üzerinde olan hastalarda %13.9 olarak tesbit edilmiştir.(164)

### **KAYNAKLAR**

1. Grobmyer SR, Pieracci FM, Allen PJ, Brennan MF, Jaques DP. Defining morbidity after pancreaticoduodenectomy: use of a prospective complication grading system. J Am Coll Surg [Internet]. 2007 Mar [cited 2019 Jul 23];204(3):356-64. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17324768>
2. C.J. Y, J.L. C, T.A. S, K.D. L, H.A. P, M.A. T, et al. Six hundred fifty consecutive pancreaticoduodenectomies in the 1990s: Pathology, complications, and outcomes. Ann Surg. 1997;
3. DeOliveira ML, Winter JM, Schafer M, Cunningham SC, Cameron JL, Yeo CJ, et al. Assessment of complications after pancreatic surgery: A novel grading system applied to 633 patients undergoing pancreaticoduodenectomy. Ann Surg [Internet]. 2006 Dec [cited 2019 Jul 22];244(6):931-7; discussion 937-9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17122618>
4. Cameron JL, Riall TS, Coleman J, Belcher KA. One thousand consecutive pancreaticoduodenectomies. Ann Surg. 2006;
5. Gouma DJ, Van Geenen RCI, Van Gulik TM, De Haan RJ, De Wit LT, Busch ORC, et al. Rates of complications and death after pancreaticoduodenectomy: Risk factors and the impact of hospital volume. Ann Surg. 2000;
6. Cameron JL, Pitt HA, Yeo CJ, Lillemoe KD, Kaufman HS, Coleman J. One hundred and forty-five consecutive pancreaticoduodenectomies without mortality. Ann Surg [Internet]. 1993 May [cited 2019 Jul 22];217(5):430-5; discussion 435-8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/8098202>

7. Trede M, Schwall G, Saeger HD. Survival after pancreaticoduodenectomy. 118 consecutive resections without an operative mortality. *Ann Surg [Internet]*. 1990 Apr [cited 2019 Jul 22];211(4):447–58. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2322039>
8. Assifi MM, Lindenmeyer J, Leiby BE, Grunwald Z, Rosato EL, Kennedy EP, et al. Surgical Apgar score predicts perioperative morbidity in patients undergoing pancreaticoduodenectomy at a high-volume center. *J Gastrointest Surg [Internet]*. 2012 Feb [cited 2019 Jul 22];16(2):275–81. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22033701>
9. Bassi C, Butturini G, Molinari E, Mascetta G, Salvia R, Falconi M, et al. Pancreatic fistula rate after pancreatic resection. The importance of definitions. *Dig Surg [Internet]*. 2004 [cited 2019 Jul 22];21(1):54–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14707394>
10. Bassi C, Dervenis C, Butturini G, Fingerhut A, Yeo C, Izicki J, et al. Postoperative pancreatic fistula: An international study group (ISGPF) definition. *Surgery*. 2005;
11. Vin Y, Sima CS, Getrajdman GI, Brown KT, Covey A, Brennan MF, et al. Management and Outcomes of Postpancreatectomy Fistula, Leak, and Abscess: Results of 908 Patients Resected at a Single Institution Between 2000 and 2005. *J Am Coll Surg*. 2008;
12. Tseng WH, Canter RJ, Bold RJ. Perioperative outcomes for open distal pancreatectomy: current benchmarks for comparison. *J Gastrointest Surg [Internet]*. 2011 Nov [cited 2019 Jul 22];15(11):2053–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21938560>
13. Pannegeon V, Pessaux P, Sauvanet A, Vullierme MP, Kianmanesh R, Belghiti J. Pancreatic fistula after distal pancreatectomy: Predictive risk factors and value of conservative treatment. *Arch Surg*. 2006;
14. Fahy BN, Frey CF, Ho HS, Beckett L, Bold RJ. Morbidity, mortality, and technical factors of distal pancreatectomy. *Am J Surg*. 2002;
15. Blanc B, Sauvanet A, Couvelard A, Pessaux P, Dokmak S, Vullierme M-P, et al. [Limited pancreatic resections for intraductal papillary mucinous neoplasm]. *J Chir (Paris)*.
16. Falconi M, Zerbi A, Crippa S, Balzano G, Boninsegna L, Capitanio V, et al. Parenchyma-preserving resections for small nonfunctioning pancreatic endocrine tumors. *Ann Surg Oncol [Internet]*. 2010 Jun [cited 2019 Jul 22];17(6):1621–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2162460>
17. Greenblatt DY, Kelly KJ, Rajamanickam V, Wan Y, Hanson T, Rettammel R, et al. Preoperative factors predict perioperative morbidity and mortality after pancreaticoduodenectomy. *Ann Surg Oncol [Internet]*. 2011 Aug [cited 2019 Jul 20];18(8):2126–35. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21336514>
18. Grobmyer SR, Pieracci FM, Allen PJ, Brennan MF, Jaques DP. Defining Morbidity after Pancreaticoduodenectomy: Use of a Prospective Complication Grading System. *J Am Coll Surg*. 2007;
19. Newhook TE, LaPar DJ, Lindberg JM, Bauer TW, Adams RB, Zaydfudim VM. Morbidity and Mortality of Pancreaticoduodenectomy for Benign and Premalignant Pancreatic Neoplasms. *J Gastrointest Surg*. 2015;
20. Vallance AE, Young AL, Macutkiewicz C, Roberts KJ, Smith AM. Calculating the risk of a pancreatic fistula after a pancreaticoduodenectomy: A systematic review. *HPB*. 2015;
21. Malleo G, Vollmer CM. Postpancreatectomy Complications and Management. *Surg Clin North Am [Internet]*. 2016;96(6):1313–36. Available from: <http://dx.doi.org/10.1016/j.suc.2016.07.013>
22. Callery MP, Pratt WB, Vollmer CM. Prevention and management of pancreatic fistula. *J Gastrointest Surg*. 2009;
23. Frozanpor F, Loizou L, Ansorge C, Segersvärd R, Lundell L, Albiin N. Preoperative pancreas CT/MRI characteristics predict fistula rate after pancreaticoduodenectomy. *World J Surg [Internet]*. 2012 Aug [cited 2019 Jul 21];36(8):1858–65. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22450754>
24. Schröder FF, de Graaff F, Bouman DE, Brusse-Keizer M, Slump KH, Klaase JM. The Preoperative CT-Scan Can Help to Predict Postoperative Complications after Pancreaticoduodenectomy. *Biomed Res Int [Internet]*. 2015 [cited 2019 Jul 21];2015:824525. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26605340>
25. Dasari BVM, Rahman R, Khan S, Bennett D, Hodson J, Isaac J, et al. Safety and feasibility of an enhanced recovery pathway after a liver resection: prospective cohort study. *HPB (Oxford) [Internet]*. 2015 Aug [cited 2019 Jul 20];17(8):700–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26099347>
26. Wellner UF, Kayser G, Lapshyn H, Sick O, Makowiec F, Höppner J, et al. A simple scoring system based on clinical factors related to pancreatic texture predicts postoperative pancreatic fistula preoperatively. *HPB (Oxford) [Internet]*. 2010 Dec [cited 2019 Jul 21];12(10):696–702. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21083795>
27. Y. Y, Y. S, S. N, M. E, K. S, T. K, et al. A preoperative predictive scoring system for postoperative pancreatic fistula after pancreaticoduodenectomy. *World J Surg*. 2011;
28. Gaujoux S, Cortes A, Couvelard A, Nouillet S, Clavel L, Rebours V, et al. Fatty pancreas and increased body mass index are risk factors of pancreatic fistula after pancreaticoduodenectomy. *Surgery [Internet]*. 2010 Jul [cited 2019 Jul 21];148(1):15–23. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20138325>
29. Graham JA, Kayser R, Smirniotopoulos J, Nusbaum JD, Johnson LB. Probability prediction of a postoperative pancreatic fistula after a pancreaticoduodenectomy allows for more transparency with patients and can facilitate management of expectations. *J Surg Oncol [Internet]*. 2013 Aug [cited 2019 Jul 21];108(2):137–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23775846>

30. Miller BC, Christein JD, Behrman SW, Drebin JA, Pratt WB, Callery MP, et al. A multi-institutional external validation of the fistula risk score for pancreaticoduodenectomy. *J Gastrointest Surg* [Internet]. 2014 Jan [cited 2019 Jul 21];18(1):172–9; discussion 179-80. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24002771>
31. Shubert CR, Wagie AE, Farnell MB, Nagorney DM, Que FG, Reid Lombardo K, et al. Clinical Risk Score to Predict Pancreatic Fistula after Pancreaticoduodenectomy: Independent External Validation for Open and Laparoscopic Approaches. *J Am Coll Surg*. 2015;
32. Yang SH, Dou KF, Sharma N, Song WJ. The methods of reconstruction of pancreatic digestive continuity after pancreaticoduodenectomy: A meta-analysis of randomized controlled trials. *World J Surg*. 2011;
33. Shen Y, Jin W. Reconstruction by pancreaticogastrectomy versus pancreaticojejunostomy following pancreaticoduodenectomy: A meta-analysis of randomized controlled trials. *Gastroenterol Res Pract*. 2012;
34. Ma J-P, Peng L, Qin T, Lin J-W, Chen C-Q, Cai S-R, et al. Meta-analysis of pancreaticoduodenectomy prospective controlled trials: pancreaticogastrectomy versus pancreaticojejunostomy reconstruction. *Chin Med J (Engl)* [Internet]. 2012 Nov [cited 2019 Jul 26];125(21):3891–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23106894>
35. Mathur A, Pitt HA, Marine M, Saxena R, Schmidt CM, Howard TJ, et al. Fatty pancreas: a factor in postoperative pancreatic fistula. *Ann Surg* [Internet]. 2007 Dec [cited 2019 Jul 23];246(6):1058–64. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18043111>
36. Yoon Y-S, Kim S-W, Her K-H, Park Y-C, Ahn YJ, Jang J-Y, et al. Management of postoperative hemorrhage after pancreaticoduodenectomy. *Hepatogastroenterology* [Internet]. [cited 2019 Jul 23];50(54):2208–12. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14696500>
37. Cullen JJ, Sarr MG, Ilstrup DM. Pancreatic anastomotic leak after pancreaticoduodenectomy: Incidence, significance, and management. *Am J Surg*. 1994;
38. Büchler M, Friess H, Klempa I, Hermanek P, Sulkowski U, Becker H, et al. Role of octreotide in the prevention of postoperative complications following pancreatic resection. *Am J Surg* [Internet]. 1992 Jan [cited 2019 Jul 23];163(1):125–31. Available from: <https://linkinghub.elsevier.com/retrieve/pii/000296109290264R>
39. Yeo CJ, Cameron JL, Lillemoe KD, Sauter PK, Coleman J, Sohn TA, et al. Does prophylactic octreotide decrease the rates of pancreatic fistula and other complications after pancreaticoduodenectomy? Results of a prospective randomized placebo-controlled trial. *Ann Surg* [Internet]. 2000 Sep [cited 2019 Jul 23];232(3):419–29. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10973392>
40. Berberat PO, Friess H, Kleeff J, Uhl W, Büchler MW. Prevention and treatment of complications in pancreatic cancer surgery. *Dig Surg* [Internet]. 1999 [cited 2019 Jul 23];16(4):327–36. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10449978>
41. E. A, N. H, Y. Y, Y. S, Y. T, T. O, et al. Pancreatic leakage test in pancreaticoduodenectomy: relation to degree of pancreatic fibrosis, pancreatic amylase level and pancreatic fistula. *Fukuoka Igaku Zasshi*. 2013;
42. Belyaev O, Rosenkranz S, Munding J, Herzog T, Chromik AM, Tannapfel A, et al. Quantitative assessment and determinants of suture-holding capacity of human pancreas. *J Surg Res*. 2013;
43. S.E. L, J.-Y. J, C.-S. L, M.J. K, S.H. K, M.-A. K, et al. Measurement of pancreatic fat by magnetic resonance imaging: Predicting the occurrence of pancreatic fistula after pancreaticoduodenectomy. *Ann Surg*. 2010;
44. Suzuki Y, Fujino Y, Tanioka Y, Hiraoka K, Takada M, Ajiki T, et al. Selection of pancreaticojejunostomy techniques according to pancreatic texture and duct size. *Arch Surg* [Internet]. 2002 Sep [cited 2019 Jul 23];137(9):1044–7; discussion 1048. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12215157>
45. Ramsey AM, Martin RC. Body Mass Index and Outcomes from Pancreatic Resection: A Review and Meta-analysis. *J Gastrointest Surg*. 2011;
46. You L, Zhao W, Hong X, Ma L, Ren X, Shao Q, et al. The Effect of Body Mass Index on Surgical Outcomes in Patients Undergoing Pancreatic Resection: A Systematic Review and Meta-Analysis. *Pancreas*. 2016.
47. Lin JW, Cameron JL, Yeo CJ, Riall TS, Lillemoe KD. Risk factors and outcomes in postpancreaticoduodenectomy pancreaticocutaneous fistula. *J Gastrointest Surg*. 2004;
48. de Castro SMM, Busch ORC, van Gulik TM, Obertop H, Gouma DJ. Incidence and management of pancreatic leakage after pancreaticoduodenectomy. *Br J Surg* [Internet]. 2005 Sep [cited 2019 Jul 22];92(9):1117–23. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15931656>
49. Kunstman JW, Kuo E, Fonseca AL, Salem RR. Evaluation of a recently described risk classification scheme for pancreatic fistulæ development after pancreaticoduodenectomy without routine post-operative drainage. *HPB (Oxford)* [Internet]. 2014 Nov [cited 2019 Jul 26];16(11):987–93. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24833603>
50. Bertens KA, Crown A, Clanton J, Alemi F, Alseidi AA, Biehl T, et al. What is a better predictor of clinically relevant postoperative pancreatic fistula (CR-POPF) following pancreaticoduodenectomy (PD): postoperative day one drain amylase (POD1DA) or the fistula risk score (FRS)? *HPB*. 2017;
51. K.J. R, R.P. S, R. M, J. H, J. I, P. M, et al. Scoring system to predict pancreatic fistula after pancreaticoduodenectomy: A UK multicenter study. *Ann Surg*. 2015;
52. Hamanaka Y, Nishihara K, Hamasaki T, Kawabata A, Yamamoto S, Tsurumi M, et al. Pancreatic juice output after pancreaticoduodenectomy in relation to pancreatic consistency, duct size, and leakage. *Surgery* [Internet]. 1996 Mar [cited 2019 Jul 21];119(3):281–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/8619183>

53. Berger AC, Howard TJ, Kennedy EP, Sauter PK, Bower-Cherry M, Dutkevitch S, et al. Does Type of Pancreaticojejunostomy after Pancreaticoduodenectomy Decrease Rate of Pancreatic Fistula? A Randomized, Prospective, Dual-Institution Trial. *J Am Coll Surg*. 2009;
54. Zgarragen K, Uhl W, Friess H, Büchler MW. How to do a safe pancreatic anastomosis. *J Hepatobiliary Pancreat Surg* [Internet]. 2002 [cited 2019 Jul 21];9(6):733–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12658408>
55. WAUGH JM, CLAGETT OT. Resection of the duodenum and head of the pancreas for carcinoma; an analysis of thirty cases. *Surgery* [Internet]. 1946 Aug [cited 2019 Jul 21];20:224–32. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20994806>
56. Delcore R, Thomas JH, Pierce GE, Hermreck a S. Pancreatogastronomy: a safe drainage procedure after pancreaticoduodenectomy. *Surgery*. 1990;
57. Liu Q-Y, Zhang W-Z, Xia H-T, Leng J-J, Wan T, Liang B, et al. Analysis of risk factors for postoperative pancreatic fistula following pancreaticoduodenectomy. *World J Gastroenterol* [Internet]. 2014 Dec 14 [cited 2019 Jul 21];20(46):17491–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25516663>
58. Dong Z, Xu J, Wang Z, Petrov MS. Stents for the prevention of pancreatic fistula following pancreaticoduodenectomy. *Cochrane database Syst Rev* [Internet]. 2016 May 6 [cited 2019 Jul 26];(5):CD008914. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/27153248>
59. Büchler MW, Wagner M, Schmied BM, Uhl W, Friess H, Zgarragen K. Changes in morbidity after pancreatic resection: toward the end of completion pancreatectomy. *Arch Surg* [Internet]. 2003 Dec [cited 2019 Jul 20];138(12):1310–4; discussion 1315. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14662530>
60. Büchler MW, Friess H, Wagner M, Kulli C, Wagener V, Z'Graggen K. Pancreatic fistula after pancreatic head resection. *Br J Surg* [Internet]. 2000 Jul [cited 2019 Jul 23];87(7):883–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10931023>
61. Nathan H, Cameron JL, Goodwin CR, Seth AK, Edil BH, Wolfgang CL, et al. Risk factors for pancreatic leak after distal pancreatectomy. *Ann Surg* [Internet]. 2009 Aug [cited 2019 Jul 22];250(2):277–81. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19638926>
62. Yeo CJ, Cameron JL, Maher MM, Sauter PK, Zahurak ML, Talamini MA, et al. A prospective randomized trial of pancreaticogastrostomy versus pancreaticojejunostomy after pancreaticoduodenectomy. *Ann Surg* [Internet]. 1995 Oct [cited 2019 Jul 26];222(4):580–8; discussion 588-92. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/7574936>
63. D'Andrea AA, Costantino V, Sperti C, Pedrazzoli S. Human fibrin sealant in pancreatic surgery: is it useful in preventing fistulas? A prospective randomized study. *Ital J Gastroenterol* [Internet]. [cited 2019 Jul 26];26(6):283–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/7949264>
64. Pedrazzoli S. Pancreaticoduodenectomy (PD) and postoperative pancreatic fistula (POPF): A systematic review and analysis of the POPF-related mortality rate in 60,739 patients retrieved from the English literature published between 1990 and 2015. *Medicine* (Baltimore). 2017;
65. Matsumoto Y, Fujii H, Miura K, Inoue S, Sekikawa T, Aoyama H, et al. Successful pancreateojejunal anastomosis for pancreateoduodenectomy. *Surg Gynecol Obstet* [Internet]. 1992 Dec [cited 2019 Jul 23];175(6):555–62. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/1360173>
66. Hosotani R, Doi R, Imamura M. Duct-to-mucosa pancreaticojejunostomy reduces the risk of pancreatic leakage after pancreateoduodenectomy. *World J Surg* [Internet]. 2002 Jan [cited 2019 Jul 23];26(1):99–104. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11898041>
67. Roder JD, Stein HJ, Böttcher KA, Busch R, Heidecke CD, Siewert JR. Stented versus nonstented pancreaticojejunostomy after pancreateoduodenectomy: a prospective study. *Ann Surg* [Internet]. 1999 Jan [cited 2019 Jul 22];229(1):41–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/9923798>
68. R.T.P. P, S.T. F, C.M. L, K.K. N, W.K. Y, C. Y, et al. External drainage of pancreatic duct with a stent to reduce leakage rate of pancreaticojejunostomy after pancreaticoduodenectomy: A prospective randomized trial. *Ann Surg*. 2007;
69. Motoi F, Egawa S, Rikiyama T, Katayose Y, Unno M. Randomized clinical trial of external stent drainage of the pancreatic duct to reduce postoperative pancreatic fistula after pancreaticojejunostomy. *Br J Surg* [Internet]. 2012 Apr [cited 2019 Jul 22];99(4):524–31. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22497024>
70. Munoz-Bongrand N, Sauvanet A, Denys A, Sibert A, Vilgrain V, Belghiti J. Conservative management of pancreatic fistula after pancreaticoduodenectomy with pancreaticogastrostomy. *J Am Coll Surg* [Internet]. 2004 Aug [cited 2019 Jul 22];199(2):198–203. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15275873>
71. Yang J, Huang Q, Wang C. Postoperative drain amylase predicts pancreatic fistula in pancreatic surgery: A systematic review and meta-analysis. *Int J Surg* [Internet]. 2015 Oct [cited 2019 Jul 21];22:38–45. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26211439>
72. Palani Velu LK, Chandrabalan V V, Jabbar S, McMillan DC, McKay CJ, Carter CR, et al. Serum amylase on the night of surgery predicts clinically significant pancreatic fistula after pancreaticoduodenectomy. *HPB (Oxford)* [Internet]. 2014 Jul [cited 2019 Jul 21];16(7):610–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24246024>

73. Sutcliffe RP, Battula N, Haque A, Ali A, Srinivasan P, Atkinson SW, et al. Utility of drain fluid amylase measurement on the first postoperative day after pancreaticoduodenectomy. *World J Surg [Internet]*. 2012 Apr [cited 2019 Jul 21];36(4):879–83. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22354484>
74. H. Y. X.-F. L, Y.-F. X, H.-D. L, S. G, Y. L, et al. Application of air insufflation to prevent clinical pancreatic fistula after pancreaticoduodenectomy. *World J Gastroenterol*. 2015;
75. Pratt WB, Callery MP, Vollmer CM. The latent presentation of pancreatic fistulas. *Br J Surg [Internet]*. 2009 Jun [cited 2019 Jul 22];96(6):641–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19434658>
76. Bruno O, Brancatelli G, Sauvanet A, Vullierme MP, Barrau V, Vilgrain V. Utility of CT in the diagnosis of pancreatic fistula after pancreaticoduodenectomy in patients with soft pancreas. *AJR Am J Roentgenol [Internet]*. 2009 Sep [cited 2019 Jul 22];193(3):W175–80. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19696255>
77. C.M. H, P. G, L. B, M.N. H, R. S, J.P. N, et al. Complications of pancreatic cancer resection. *Dig Surg*. 2002;
78. Machado NO. Pancreatic fistula after pancreatectomy: definitions, risk factors, preventive measures, and management-review. *Int J Surg Oncol*. 2012;
79. Ho C-K, Kleeff J, Friess H, Büchler MW. Complications of pancreatic surgery. *HPB (Oxford) [Internet]*. 2005 [cited 2019 Jul 23];7(2):99–108. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18333171>
80. Mutignani M, Tringali A, Khodadadian E, Petruzzello L, Spada C, Spera G, et al. External pancreatic fistulas resistant to conventional endoscopic therapy: endoscopic closure with N-butyl-2-cyanoacrylate (Glubran 2). *Endoscopy [Internet]*. 2004 Aug [cited 2019 Jul 26];36(8):738–42. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15280984>
81. Post M, Wrzesinski M, Klek R, Lubikowski J, Wojcicki M. Pancreatoduodenectomy with subtotal stomach-preserving and uncut Roux reconstruction. *Eur Surg Res*. 2011;
82. Malleo G, Pulvirenti A, Marchegiani G, Butturini G, Salvia R, Bassi C. Diagnosis and management of postoperative pancreatic fistula. *Langenbeck's Arch Surg [Internet]*. 2014 Oct [cited 2019 Jul 26];399(7):801–10. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25173359>
83. Nubiola P, Badia JM, Martinez-Rodenas F, Gil MJ, Segura M, Sancho J, et al. Treatment of 27 postoperative enterocutaneous fistulas with the long half-life somatostatin analogue SMS 201-995. *Ann Surg*. 1989;
84. Bassi C, Falconi M, Salvia R, Caldironi E, Butturini G, Pederzoli P. Role of octreotide in the treatment of external pancreatic pure fistulas: a single-institution prospective experience. *Langenbeck's Arch Surg [Internet]*. 2000 Jan [cited 2019 Jul 23];385(1):10–3. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10664113>
85. Alvarez C, McFadden DW, Reber HA. Complicated enterocutaneous fistulas: failure of octreotide to improve healing. *World J Surg [Internet]*. 2000 May [cited 2019 Jul 23];24(5):533–7; discussion 538. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10787072>
86. Allen PJ, Gönen M, Brennan MF, Bucknor AA, Robinson LM, Pappas MM, et al. Pasireotide for postoperative pancreatic fistula. *N Engl J Med [Internet]*. 2014 May 22 [cited 2019 Jul 27];370(21):2014–22. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24849084>
87. Tien YW, Wu YM, Liu KL, Ho CM, Lee PH. Angiography is indicated for every sentinel bleed after pancreaticoduodenectomy. *Ann Surg Oncol*. 2008;
88. Blanc T, Cortes A, Goere D, Sibert A, Pessaix P, Belghiti J, et al. Hemorrhage after pancreaticoduodenectomy: when is surgery still indicated? *Am J Surg*. 2007;
89. Gueroult S, Parc Y, Duron F, Paye F, Parc R. Completion pancreatectomy for postoperative peritonitis after pancreaticoduodenectomy: early and late outcome. *Arch Surg [Internet]*. 2004 Jan [cited 2019 Jul 22];139(1):16–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14718268>
90. Schlitt HJ, Schmidt U, Simunec D, Jäger M, Aselmann H, Neipp M, et al. Morbidity and mortality associated with pancreatogastronomy and pancreateojejunostomy following partial pancreaticoduodenectomy. *Br J Surg [Internet]*. 2002 Oct [cited 2019 Jul 22];89(10):1245–51. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12296891>
91. Standop J, Glowka T, Schmitz V, Schäfer N, Overhaus M, Hirner A, et al. Operative re-intervention following pancreatic head resection: indications and outcome. *J Gastrointest Surg [Internet]*. 2009 Aug [cited 2019 Jul 27];13(8):1503–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19421823>
92. Halittunen J, Weckman L, Kemppainen E, Kylänpää ML. The endoscopic management of pancreatic fistulas. *Surg Endosc [Internet]*. 2005 Apr [cited 2019 Jul 22];19(4):559–62. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15696357>
93. Goasguen N, Bourrier A, Ponsot P, Bastien L, Lesurtel M, Prat F, et al. Endoscopic management of pancreatic fistula after distal pancreatectomy and enucleation. *Am J Surg*. 2009;
94. Bassi C, Büchler MW, Fingerhut A, Sarr M. Predictive factors for postoperative pancreatic fistula. *Ann Surg [Internet]*. 2015 Apr [cited 2019 Jul 27];261(4):e99. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24441806>
95. Bachellier P, Oussoultzoglou E, Rosso E, Scurtu R, Lucescu I, Oshita A, et al. Pancreatogastronomy as a salvage procedure to treat severe postoperative pancreatic fistula after pancreaticoduodenectomy. *Arch Surg*. 2008;
96. Schäfer M, Heinrich S, Pfammatter T, Clavien P-A. Management of delayed major visceral arterial bleeding after pancreatic surgery. *HPB (Oxford) [Internet]*. 2011 Feb [cited 2019 Jul 23];13(2):132–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21241431>

97. Schäfer M, Müllhaupt B, Clavien PA. Evidence-based pancreatic head resection for pancreatic cancer and chronic pancreatitis. *Annals of Surgery*. 2002.
98. Lermite E, Pessaux P, Brehant O, Teyssedou C, Pelletier I, Etienne S, et al. Risk factors of pancreatic fistula and delayed gastric emptying after pancreaticoduodenectomy with pancreaticogastrostomy. *J Am Coll Surg [Internet]*. 2007 Apr [cited 2019 Jul 22];204(4):588–96. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17382217>
99. van Berge Henegouwen MI, van Gulik TM, DeWit LT, Allema JH, Rauws EA, Obertop H, et al. Delayed gastric emptying after standard pancreaticoduodenectomy versus pylorus-preserving pancreaticoduodenectomy: an analysis of 200 consecutive patients. *J Am Coll Surg [Internet]*. 1997 Oct [cited 2019 Jul 22];185(4):373–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/9328386>
100. Disorders P, Trauma A, Wente MN, Bassi C, Dervenis C, Fingerhut A, et al. Delayed gastric emptying (DGE) after pancreatic surgery: A suggested definition by the International Study Group of Pancreatic Surgery (ISGPS). *Surgery*. 2001;
101. Horstmann O, Markus PM, Ghadimi MB, Becker H. Pylorus preservation has no impact on delayed gastric emptying after pancreatic head resection. *Pancreas [Internet]*. 2004 Jan [cited 2019 Jul 23];28(1):69–74. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/14707733>
102. Jimenez RE, Fernandez-del Castillo C, Rattner DW, Chang Y, Warshaw AL. Outcome of pancreaticoduodenectomy with pylorus preservation or with antrectomy in the treatment of chronic pancreatitis. *Ann Surg [Internet]*. 2000 Mar [cited 2019 Jul 23];231(3):293–300. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10714621>
103. Di Carlo V, Zerbi A, Balzano G, Corso V. Pylorus-preserving pancreaticoduodenectomy versus conventional whipple operation. *World J Surg [Internet]*. 1999 Sep [cited 2019 Jul 23];23(9):920–5. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10449821>
104. Mosca F, Giulianotti PC, Balestracci T, Di Candio G, Pietrabissa A, Sbrana F, et al. Long-term survival in pancreatic cancer: pylorus-preserving versus Whipple pancreaticoduodenectomy. *Surgery [Internet]*. 1997 Sep [cited 2019 Jul 23];122(3):553–66. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/9308613>
105. Lin PW, Lin YJ. Prospective randomized comparison between pylorus-preserving and standard pancreaticoduodenectomy. *Br J Surg [Internet]*. 1999 May [cited 2019 Jul 23];86(5):603–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/10361177>
106. Park YC, Kim SW, Jang JY, Ahn YJ, Park YH. Factors influencing delayed gastric emptying after pylorus-preserving pancreaticoduodenectomy. *J Am Coll Surg*. 2003;
107. Tani M, Terasawa H, Kawai M, Ina S, Hirono S, Uchiyama K, et al. Improvement of delayed gastric emptying in pylorus-preserving pancreaticoduodenectomy: results of a prospective, randomized, controlled trial. *Ann Surg [Internet]*. 2006 Mar [cited 2019 Jul 22];243(3):316–20. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16495694>
108. Sugiyama M, Abe N, Ueki H, Masaki T, Mori T, Atomii Y. A new reconstruction method for preventing delayed gastric emptying after pylorus-preserving pancreaticoduodenectomy. *Am J Surg [Internet]*. 2004 Jun [cited 2019 Jul 22];187(6):743–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15191869>
109. Wente MN, Bassi C, Dervenis C, Fingerhut A, Gouma DJ, Izicki JR, et al. Risk Factors of Pancreatic Fistula and Delayed Gastric Emptying after Pancreaticoduodenectomy with Pancreaticogastrostomy. *J Am Coll Surg*. 2003;
110. Ohwada S, Satoh Y, Kawate S, Yamada T, Kawamura O, Koyama T, et al. Low-dose erythromycin reduces delayed gastric emptying and improves gastric motility after Billroth I pylorus-preserving pancreaticoduodenectomy. *Ann Surg [Internet]*. 2001 Nov [cited 2019 Jul 23];234(5):668–74. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11685031>
111. Matsunaga H, Tanaka M, Takahata S, Ogawa Y, Naritomi G, Yokohata K, et al. Manometric evidence of improved early gastric stasis by erythromycin after pylorus-preserving pancreaticoduodenectomy. *World J Surg [Internet]*. 2000 Oct [cited 2019 Jul 23];24(10):1236–41; discussion 1242. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11071469>
112. Martignoni ME, Friess H, Sell F, Ricken L, Shrikhande S, Kulli C, et al. Enteral nutrition prolongs delayed gastric emptying in patients after whipple resection. *Am J Surg*. 2000;
113. Watters JM, Kirkpatrick SM, Norris SB, Shamji FM, Wells GA. Immediate postoperative enteral feeding results in impaired respiratory mechanics and decreased mobility. *Ann Surg [Internet]*. 1997 Sep [cited 2019 Jul 27];226(3):369–77; discussion 377–80. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/9339943>
114. Balzano G, Zerbi A, Braga M, Rocchetti S, Beneduce AA, Di Carlo V. Fast-track recovery programme after pancreaticoduodenectomy reduces delayed gastric emptying. In: *British Journal of Surgery*. 2008;
115. Patel AG, Toyama MT, Kusske AM, Alexander P, Ashley SW, Reber HA. Pylorus-Preserving Whipple Resection for Pancreatic Cancer: Is It Any Better? *Arch Surg*. 1995;
116. Kawai M, Tani M, Hirono S, Miyazawa M, Shimizu A, Uchiyama K, et al. Pylorus ring resection reduces delayed gastric emptying in patients undergoing pancreaticoduodenectomy: a prospective, randomized, controlled trial of pylorus-resecting versus pylorus-preserving pancreaticoduodenectomy. *Ann Surg [Internet]*. 2011 Mar [cited 2019 Jul 27];253(3):495–501. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21248633>

117. Vollmer CM, Sanchez N, Gondek S, McAuliffe J, Kent TS, Christein JD, et al. A root-cause analysis of mortality following major pancreatectomy. *J Gastrointest Surg* [Internet]. 2012 Jan [cited 2019 Jul 23];16(1):89–102; discussion 102-3. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22065319>
118. Welsch T, Eisele H, Zschäbitz S, Hinz U, Büchler MW, Wente MN. Critical appraisal of the International Study Group of Pancreatic Surgery (ISGPS) consensus definition of postoperative hemorrhage after pancreaticoduodenectomy. *Langenbeck's Arch Surg*. 2011;
119. Correa-Gallego C, Brennan MF, D'Angelica MI, DeMatteo RP, Fong Y, Kingham TP, et al. Contemporary experience with postpancreatectomy hemorrhage: results of 1,122 patients resected between 2006 and 2011. *J Am Coll Surg* [Internet]. 2012 Nov [cited 2019 Jul 23];215(5):616–21. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22921325>
120. Wellner UF, Kulemann B, Lapshyn H, Hoeppner J, Sick O, Makowiec F, et al. Postpancreatectomy hemorrhage--incidence, treatment, and risk factors in over 1,000 pancreatic resections. *J Gastrointest Surg* [Internet]. 2014 Mar [cited 2019 Jul 23];18(3):464–75. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24448997>
121. Yekesab EF, Wolfram L, Cataldegirmen G, Habermann CR, Bogoevski D, Koenig AM, et al. Postpancreatectomy hemorrhage: diagnosis and treatment: an analysis in 1669 consecutive pancreatic resections. *Ann Surg* [Internet]. 2007 Aug [cited 2019 Jul 23];246(2):269–80. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17667506>
122. Eckardt AJ, Klein F, Adler A, Veltzke-Schlieker W, Warnick P, Bahra M, et al. Management and outcomes of hemorrhage after pancreatogastronomy versus pancreaticojejunostomy. *Br J Surg*. 2011;
123. G. R, D.G. K, V. V, A. A, S. R, D. J, et al. Post pancreaticoduodenectomy haemorrhage: Outcome prediction based on new ISGPS Clinical severity grading. *HPB*. 2008;
124. Ansari D, Tingstedt B, Lindell G, Keussen I, Ansari D, Andersson R. Hemorrhage after Major Pancreatic Resection: Incidence, Risk Factors, Management, and Outcome. *Scand J Surg* [Internet]. 2017 Mar [cited 2019 Jul 23];106(1):47–53. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26929287>
125. Sledzianowski JF, Duffas JP, Muscari F, Suc B, Fourtanier F. Risk factors for mortality and intra-abdominal morbidity after distal pancreatectomy. *Surgery* [Internet]. 2005 Feb [cited 2019 Jul 27];137(2):180–5. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15674199>
126. Di Carlo V, Chiesa R, Pontiroli AE, Carlucci M, Staudacher C, Zerbi A, et al. Pancreatoduodenectomy with occlusion of the residual stump by Neoprene injection. *World J Surg* [Internet]. [cited 2019 Jul 27];13(1):105–10; discussion 110-1. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/2543144>
127. Tran K, Van Eijck C, Di Carlo V, Hop WCJ, Zerbi A, Balzano G, et al. Occlusion of the pancreatic duct versus pancreaticojejunostomy: a prospective randomized trial. *Ann Surg* [Internet]. 2002 Oct [cited 2019 Jul 27];236(4):422–8; discussion 428. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12368670>
128. Aranha G V, Hodul P, Golts E, Oh D, Pickleman J, Creech S. A comparison of pancreaticogastrostomy and pancreaticojejunostomy following pancreaticoduodenectomy. *J Gastrointest Surg* [Internet]. [cited 2019 Jul 27];7(5):672–82. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12850681>
129. Limongelli P, Khorsandi SE, Pai M, Jackson JE, Tait P, Tierris J, et al. Management of delayed postoperative hemorrhage after pancreaticoduodenectomy: a meta-analysis. *Arch Surg* [Internet]. 2008 Oct [cited 2019 Jul 23];143(10):1001–7; discussion 1007. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18936380>
130. Asai K, Zaydfudim V, Truty M, Reid-Lombardo K, Kendrick M, Que F, et al. Management of a delayed post-pancreatoduodenectomy haemorrhage using endovascular techniques. In: *HPB*. 2015.
131. Roulin D, Cerantola Y, Demartines N, Schäfer M. Systematic review of delayed postoperative hemorrhage after pancreatic resection. *J Gastrointest Surg* [Internet]. 2011 Jun [cited 2019 Jul 23];15(6):1055–62. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21267670>
132. Beyer L, Bonmardion R, Marciano S, Hartung O, Ramis O, Chabert L, et al. Results of non-operative therapy for delayed hemorrhage after pancreaticoduodenectomy. *J Gastrointest Surg*. 2009;
133. Wu CC, Hwang CR, Yeh DC, Hwang YC, Liu TJ, Peng FK. Treatment for dehiscence of pancreaticojejunostomy after pancreaticoduodenectomy: is resection of the residual pancreas necessary? *Hepatogastroenterology* [Internet]. [cited 2019 Jul 22];43(7):271–4. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/8682477>
134. de Castro SMM, Busch ORC, Gouma DJ. Management of bleeding and leakage after pancreatic surgery. *Best Pract Res Clin Gastroenterol* [Internet]. 2004 Oct [cited 2019 Jul 22];18(5):847–64. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15494282>
135. Yoon WJ, Brugge WR. Endoscopic evaluation of bile duct strictures. *Gastrointest Endosc Clin N Am* [Internet]. 2013 Apr [cited 2019 Jul 23];23(2):277–93. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23540961>
136. de Santibáñez E, Ardiles V, Pekolj J. Complex bile duct injuries: management. *HPB (Oxford)* [Internet]. 2008 [cited 2019 Jul 23];10(1):4–12. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18695753>
137. Way LW, Stewart L, Gantert W, Liu K, Lee CM, Whang K, et al. Causes and Prevention of Laparoscopic Bile Duct Injuries. *Ann Surg*. 2003;

138. de Castro SMM, Kuhlmann KFD, Busch ORC, van Delden OM, Laméris JS, van Gulik TM, et al. Delayed massive hemorrhage after pancreatic and biliary surgery: embolization or surgery? *Ann Surg* [Internet]. 2005 Jan [cited 2019 Jul 23];241(1):85–91. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15621995>
139. Lee HG, Heo JS, Choi SH, Choi DW. Management of bleeding from pseudoaneurysms following pancreaticoduodenectomy. *World J Gastroenterol* [Internet]. 2010 Mar 14 [cited 2019 Jul 23];16(10):1239–44. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/20222168>
140. Wente MN 1 , Veit JA , Bassi C , Dervenis C , Fingerhut A , Gouma DJ , Izbicki JR , Neoptolemos JP , Padbury RT , Sarr MG , Yeo CJ BM. Hemorragia post-pancreatectomía (HPP): definición de un Grupo de estudio internacional de cirugía pancreática (ISGPS). NCBI; 2007;
141. Patel J, Nicholson A, Puppala S, McPherson S, Kessel D. Hemorrhagic Complications After Whipple Surgery: Imaging and Radiologic Intervention. *Am J Roentgenol*. 2010;
142. Choi SH, Moon HJ, Heo JS, Joh JW, Kim Y Il. Delayed hemorrhage after pancreaticoduodenectomy. *J Am Coll Surg* [Internet]. 2004 Aug [cited 2019 Jul 23];199(2):186–91. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15275871>
143. Makowiec F, Riediger H, Euringer W, Uhl M, Hopf UT, Adam U. Management of delayed visceral arterial bleeding after pancreatic head resection. *J Gastrointest Surg* [Internet]. 2005 Dec [cited 2019 Jul 23];9(9):1293–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16332485>
144. Sato N, Yamaguchi K, Shimizu S, Morisaki T, Yokohata K, Chijiwa K, et al. Coil embolization of bleeding visceral pseudoaneurysms following pancreatectomy: the importance of early angiography. *Arch Surg* [Internet]. 1998 Oct [cited 2019 Jul 23];133(10):1099–102. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/9790208>
145. Ding X, Zhu J, Zhu M, Li C, Jian W, Jiang J, et al. Therapeutic management of hemorrhage from visceral artery pseudoaneurysms after pancreatic surgery. *J Gastrointest Surg* [Internet]. 2011 Aug [cited 2019 Jul 23];15(8):1417–25. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21584822>
146. Miura F, Asano T, Amano H, Yoshida M, Toyota N, Wada K, et al. Management of postoperative arterial hemorrhage after pancreato-biliary surgery according to the site of bleeding: re-laparotomy or interventional radiology. *J Hepatobiliary Pancreat Surg* [Internet]. 2009 [cited 2019 Jul 23];16(1):56–63. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19110653>
147. Gwon D Il, Ko G-Y, Sung K-B, Shin JH, Kim JH, Yoon H-K. Endovascular management of extrahepatic artery hemorrhage after panreatobiliary sur-
- gery: clinical features and outcomes of transcatheter arterial embolization and stent-graft placement. *AJR Am J Roentgenol* [Internet]. 2011 May [cited 2019 Jul 23];196(5):W627–34. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21512055>
148. Hur S, Yoon CJ, Kang S-G, Dixon R, Han H-S, Yoon Y-S, et al. Transcatheter arterial embolization of gastroduodenal artery stump pseudoaneurysms after pancreaticoduodenectomy: safety and efficacy of two embolization techniques. *J Vasc Interv Radiol* [Internet]. 2011 Mar [cited 2019 Jul 23];22(3):294–301. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21353982>
149. Sato A, Yamada T, Takase K, Matsuhashi T, Higano S, Kaneda T, et al. The fatal risk in hepatic artery embolization for hemostasis after pancreatic and hepatic surgery: importance of collateral arterial pathways. *J Vasc Interv Radiol* [Internet]. 2011 Mar [cited 2019 Jul 23];22(3):287–93. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21353981>
150. Distler M, Rückert F, Hunger M, Kersting S, Pilarsky C, Saeger H-D, et al. Evaluation of survival in patients after pancreatic head resection for ductal adenocarcinoma. *BMC Surg* [Internet]. 2013 Apr 22 [cited 2019 Jul 23];13:12. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23607915>
151. Kim AW, McCarthy WJ, Maxhimer JB, Quiros RM, Hollinger EF, Doolas A, et al. Vascular complications associated with pancreaticoduodenectomy adversely affect clinical outcome. *Surgery* [Internet]. 2002 Oct [cited 2019 Jul 27];132(4):738–44; discussion 744–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12407360>
152. Gaujoux S, Sauvanet A, Vullierme MP, Cortes A, Dokmak S, Sibert A, et al. Ischemic complications after pancreaticoduodenectomy: Incidence, prevention, and management. *Ann Surg*. 2009;
153. Gaujoux S, Sauvanet A. [Division of the arcuate ligament for compressive stenosis of the celiac axis noted during a pancreaticoduodenectomy]. *J Chir (Paris)* [Internet]. [cited 2019 Jul 22];145(5):466–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19106868>
154. Hasegawa K, Immura H, Akahane M, Miura Y, Takayama T, Ohtomo K, et al. Endovascular stenting for celiac axis stenosis before pancreaticoduodenectomy. *Surgery*. 2003;
155. Adam U, D M, Makowiec F, Riediger H, Schareck WD, Benz S, et al. Risk factors for complications after pancreatic head resection. *Am J Surg*. 2004;
156. Sohn TA, Yeo CJ, Cameron JL, Geschwind JF, Mitchell SE, Venbrux AC, et al. Pancreaticoduodenectomy: role of interventional radiologists in managing patients and complications. *J Gastrointest Surg* [Internet]. 2003 Feb [cited 2019 Jul 22];7(2):209–19. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12600445>

157. Reid-Lombardo KM, Ramos-De la Medina A, Thomassen K, Harmsen WS, Farnell MB. Long-term anastomotic complications after pancreaticoduodenectomy for benign diseases. *J Gastrointest Surg* [Internet]. 2007 Dec [cited 2019 Jul 22];11(12):1704–11. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17929105>
158. Schulick RD. Complications after pancreaticoduodenectomy: Intraabdominal abscess. *J Hepatobiliary Pancreat Surg*. 2008;
159. Conlon KC, Labow D, Leung D, Smith A, Jarnagin W, Coit DG, et al. Prospective randomized clinical trial of the value of intraperitoneal drainage after pancreatic resection. In: *Annals of Surgery*. 2001.
160. Cortes A, Sauvanet A, Bert F, Janny S, Sockeel P, Kianmanesh R, et al. Effect of bile contamination on immediate outcomes after pancreaticoduodenectomy for tumor. *J Am Coll Surg* [Internet]. 2006 Jan [cited 2019 Jul 22];202(1):93–9. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16377502>
161. Lermite E, Pessaux P, Teyssedou C, Etienne S, Brehant O, Arnaud J-P. Effect of preoperative endoscopic biliary drainage on infectious morbidity after pancreaticoduodenectomy: a case-control study. *Am J Surg* [Internet]. 2008 Apr [cited 2019 Jul 22];195(4):442–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/18304506>
162. McPhee JT, Hill JS, Whalen GF, Zayaruzny M, Litwin DE, Sullivan ME, et al. Perioperative mortality for pancreatectomy: a national perspective. *Ann Surg* [Internet]. 2007 Aug [cited 2019 Jul 22];246(2):246–53. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17667503>
163. F. M, B. SS, S. K, J.-M. H, G. F, A. F, et al. Risk factors for mortality and intra-abdominal complications after pancreaticoduodenectomy: multivariate analysis in 300 patients. *Surgery*. 2006;
164. Ho V, Heslin MJ. Effect of hospital volume and experience on in-hospital mortality for pancreaticoduodenectomy. *Ann Surg* [Internet]. 2003 Apr [cited 2019 Jul 22];237(4):509–14. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12677147>
165. Teh SH, Diggs BS, Deveney CW, Sheppard BC. Patient and hospital characteristics on the variance of perioperative outcomes for pancreatic resection in the United States: A plea for outcome-based and not volume-based referral guidelines. *Arch Surg*. 2009;
166. Birkmeyer JD, Stukel TA, Siewers AE, Goodney PP, Wennberg DE, Lucas FL. Surgeon volume and operative mortality in the United States. *N Engl J Med*. 2003;349:2117–27. *N Engl J Med*. 2003;
167. Charlson, Mary E. PP. Charlson\_Charlson index\_J Chron Diseases 1987.pdf. *Journal of Chronic Diseases*. 1987.