



## BÖLÜM 67

### Pankreas Cerrahisi Sonrası Yoğun Bakım Desteği

Dilan AKYURT <sup>1</sup>  
Hatice BAHADIR ALTUN <sup>2</sup>

#### ÖZET

Cerrahi, pankreas kanserlerinde yaşam süresini uzatabilen tek tedavi yöntemidir. Bazı kronik pankreatit vakalarında ve nadiren de olsa benign periampuller tümörlerde cerrahi endikasyonu vardır. Cerrahi sonrası gelişmiş iyileşme (ERAS), cerrahi stresi azaltmak ve cerrahi sonrasında iyileşmeyi artırmak için sıkça kullanılan çok bileşenli bir yoldur. Postoperatif dönemde görülen komplikasyonları, hastanede kalma süresini ve maliyeti azalttığı için pek çok cerrahi türünde kullanılmaktadır. Postoperatif dönemde karşılaşılan anemi, semptomatik değilse (halsizlik, sıvı açığı ile açıklanamayan taşikardi, hava açlığı hissi) ve hastanın iskemik kalp hastalığı yoksa hemogloblin düzeyi 7g/dL'nin altına düşene kadar kan desteği önerilmez. İskemik kalp hastalığı olan kişilerde 10 g/dL sınırına uyulur.

#### Giriş

Pankreas cerrahisi geçiren hastalarda gerek eşlik eden komorbid hastalıklar gerek de cerrahinin kendisine bağlı olarak post operatif yoğun bakım takibi önem arz etmektedir. Bu bölümde standart hemodinamik monitorizasyona ek olarak pankreas cerrahisi sonrası özellikle dikkat edilmesi gereken parametreler üzerinde durulacaktır.

Cerrahi, pankreas kanserlerinde yaşam süresini uzatabilen tek tedavi yöntemidir(1). Bazı

kronik pankreatit vakalarında ve nadiren de olsa benign periampuller tümörlerde cerrahi endikasyonu vardır(2,3,4).

Cerrahi sonrası gelişmiş iyileşme (ERAS), cerrahi stresi azaltmak ve cerrahi sonrasında iyileşmeyi artırmak için sıkça kullanılan çok bileşenli bir yoldur. Postoperatif dönemde görülen komplikasyonları, hastanede kalma süresini ve maliyeti azalttığı için pek çok cerrahi türünde kullanılmaktadır (5,6,7).

<sup>1</sup> Uzm. Dr. Dilan AKYURT, SBÜ Samsun Eğitim ve Araştırma Hastanesi Anesteziyoloji ve Reanimasyon Bölümü, dilanakyurt@gmail.com

<sup>2</sup> Uzm. Dr. Hatice BAHADIR ALTUN, SBÜ Samsun Eğitim ve Araştırma Hastanesi Anesteziyoloji ve Reanimasyon Bölümü, haticebahadirmd@hotmail.com

İndüksiyon tedavisi; esas olarak akut rejeksiyon epizodlarını azaltmak amacıyla intraoperatif olarak veya kısa bir süre sonra başlatılır. İndüksiyon immünoterapötiklerinin kullanımı, ajanların güçlü anti-T hücre immünsupresif özellikleriyle ilgilidir. Günümüzde indüksiyon tedavisinin ana seçimi anti-timosit globulin (ATG), alemtuzumab ve basiliximabtır. Bazı B-hücresi tüketen tedaviler bildirilmiştir, ancak çok seyrek olarak kullanılmıştır. İdame tedavisi; reddedilme riskini azaltmak için genellikle takrolimus, mikofenolat mofetil ve steroidlerin bir kombinasyonu olan uzun süreli oral ilaçlardan oluşur (64).

### Beslenme

Hem Amerika hem de Avrupa enteral ve parenteral beslenme topluluklarınca (ASPEN ve ESPEN) yoğun bakıma alınan hastalarda erken enteral beslenme önerilmektedir (67). Abdominal cerrahiler sonrası erken enteral nutrisyonla ilgili endişeler temel olarak anastomozlarla ilişkilidir. Pankreas nakli hastalarında erken enteral nutrisyonun yararı belirlenmemiş olsa da diğer abdominal cerrahilerdeki açık, kanıtlanabilir yarar ve SPK hastalarındaki güvenilir veriler erken enteral nutrisyonun pankreas nakli ERAS protokolü içerisinde olması gerekliliğini düşündürmektedir (64). Hastalar nazogastrik tüp olmadan tedavi edilmeli, mümkün olan en kısa sürede oral beslenme başlanmalı ve toleransa göre normal diyeteye geçilmelidir (67).

### Postoperatif Bulantı Kusma

Postoperatif bulantı ve kusmanın hasta için son derece rahatsız edici olduğu, ayrıca dehidrasyona ve taburculuğun gecikmesine neden olduğu bilinmektedir. Pankreas transplantasyonu sonrası bulantı kusma hakkında literatürde çok az çalışma bulunmaktadır. Deksmetomidin kullanımı prospektif çalışmalarda cerrahinin birçok alanında kanıtlanmıştır. Analjezik yararları ve postoperatif bulantı kusmayı azaltıcı etkilerinden dolayı pankreas transplantasyonunda önerilmektedir (64).

### Gastroparezi

Gastroparezi, diyabetik hastalarda yaygın görülen bir komplikasyondur (79). Kronik hiperglisemi kaynaklı nöronal hasar mide kasılmasının zayıflamasına neden olur; bu da erken doyma, mide bulantısı ve kusma ile sonuçlanır (80). Gastroparezi varlığında opioid kullanımı mortalite artışı ve postoperatif kalışın uzamasına neden olabilir. Tedavide dopamin antagonistleri (metoklopramid ve domperidon) ve motilin agonistleri (eritromisin) dahil prokinetik ajanlar kullanılabilir (64).

### Mobilizasyon

Kritik hastalarda ve cerrahi yoğun bakım ünitesinde erken mobilizasyonun uygulanabilir, güvenli ve etkili olduğu, yoğun bakımda kalış sürelerini azalttığı, kas gücünü artırdığı ve taburculuğu hızlandırdığı gösterilmiştir. Pankreas cerrahisi sonrası sonuç üzerinde kesin etkisi yokmuş gibi görülmeye diren sayısının azaltılması ve erken dönemde çıkarılması mobilizasyona yardımcı olabilir(5).

### Kaynaklar

1. Schryver ND, Wittebole X, Hubert C, et al. BMC Anesteziol. 2015;15: 1069. Doi: 10.1186/s12871-015-0093-x.
2. Castillo CE, Oyarvide VM, McGrath D, et al. Evolution of the Whipple procedure at the Massachusetts General Hospital Surgery. 2012 Sep;152(3 Suppl 1): S56-63. doi: 10.1016/j.surg.2012.05.022.
3. Yeo CJ, Sohn TA, Cameron JL, et al. Periampullary adenocarcinoma: analysis of 5-year survivors. Ann Surg. 1998 Jun;227(6):821-31. doi:10.1097/0000658-199806000-00005.
4. Sauvenet A. Functional results of pancreatic surgery Rev Prat. 2002 Sep 15;52(14):1572-5.
5. Cerantola Y, Valerio M, Persson B, et al. Guidelines for perioperative care after radical cystectomy for bladder cancer: Enhanced Recovery After Surgery (ERAS) society recommendations. Clin Nutr. 2013 Dec;32(6):879-87. doi: 10.1016/j.clnu.2013.09.014.
6. Muller S, Zalunardo MP, Hubner M, et al. A fast-track program reduces complications and length of hospital stay after open colonic surgery Gastroenterology. 2009 Mar;136(3):842-7. doi: 10.1053/j.gastro.2008.10.030.
7. Roulin D, Donadini A, Gander S, et al. Cost-effectiveness of the implementation of an enhanced recovery protocol for colorectal surgery Br J Surg. 2013 Jul;100(8):1108-14. doi: 10.1002/bjs.9184.
8. Hounsome J, Lee A, Greenhalgh J. A systematic review of information format and timing before scheduled adult surgery for peri-operative anxiety Anaesthesia. 2017

- Oct;72(10):1265-1272. doi: 10.1111/anae.14018.
9. Carli F, Charlebois P, Stein B, et al. Randomized clinical trial of prehabilitation in colorectal surgery. *Br J Surg*. 2010 Aug;97(8):1187-97. doi: 10.1002/bjs.7102.
  10. Barberan-Garcia A, Ubré M, Roca J, et al. Personalised Prehabilitation in High-risk Patients Undergoing Elective Major Abdominal Surgery: A Randomized Blinded Controlled Trial. *Ann Surg*. 2018 Jan;267(1):50-56. doi: 10.1097/SLA.0000000000002293.
  11. Pöpping DM, Elia N, Marret E, et al. Protective effects of epidural analgesia on pulmonary complications after abdominal and thoracic surgery: a meta-analysis *Arch Surg*. 2008 Oct;143(10):990-9; discussion 1000. doi: 10.1001/archsurg.143.10.990.
  12. McNicol ED, Ferguson MC, Haroutounian S, et al. Single dose intravenous paracetamol or intravenous propacetamol for postoperative pain *Cochrane Database Syst Rev*. 2016 May 23;2016(5):CD007126. doi: 10.1002/14651858.CD007126.pub3.
  13. Teerawattananon C, Tantayakom P, Suwanawiboon B, et al. Risk of perioperative bleeding related to highly selective cyclooxygenase-2 inhibitors: A systematic review and meta-analysis *Semin Arthritis Rheum*. 2017 Feb;46(4):520-528. doi: 10.1016/j.semarthrit.2016.07.008.
  14. Brummett CM, Waljee JF, Goesling J, et al. New Persistent Opioid Use After Minor and Major Surgical Procedures in US Adults *JAMA Surg*. 2017 Jun 21;152(6):e170504. doi: 10.1001/jamasurg.2017.0504.
  15. Roberts SM, Bezinover DS, Janicki PK. (2012) Reappraisal of the role of dolasetron in prevention and treatment of nausea and vomiting associated with surgery or chemotherapy. *Cancer Manag Res* 4:67-73.
  16. Balzano G, Zerbi A, Braga M, et al. (2008) Fast-track recovery programme after pancreaticoduodenectomy reduces delayed gastric emptying. *Br J Surg* 95(11):1387-1393
  17. Son J, Yoon H. (2018) Factors affecting postoperative nausea and vomiting in surgical patients. *J Perianesth Nurs* 33(4):461-470
  18. Roberts GW, Bekker TB, Carlsen HH, et al. (2005) Postoperative nausea and vomiting are strongly influenced by postoperative opioid use in a dose-related manner. *Anesth Analg* 101(5):1343-1348
  19. De Pietri L, Montalti R, Begliomini B. (2014) Anaesthetic perioperative management of patients with pancreatic cancer. *World J Gastroenterol* 20(9):2304-2320
  20. Torossian A. (2008) Thermal management during anesthesia and thermoregulation standards for the prevention of inadvertent perioperative hypothermia. *Best Pract Res Clin Anaesthesiol* 22(4):659-668
  21. Wong PF, Kumar S, Bohra A, et al. (2007) Randomized clinical trial of perioperative systemic warming in major elective abdominal surgery. *Br J Surg* 94(4):421-426
  22. Kurz A, Sessler DI, Lenhardt R. (1996) Perioperative normothermia to reduce the incidence of surgical-wound infection and shorten hospitalization. Study of wound infection and temperature group. *N Engl J Med* 334(19):1209-1215
  23. Ljungqvist O. (2010) Insulin resistance and outcomes in surgery. *J Clin Endocrinol Metab* 95(9):4217-4219
  24. Ljungqvist O, Jonathan E. (2012) Rhoads lecture 2011: insulin resistance and enhanced recovery after surgery. *JPEN J Parenter Enter Nutr* 36(4):389-398
  25. Van den Berghe G, Wouters P, Weekers F, et al. (2001) Intensive insulin therapy in critically ill patients. *N Engl J Med* 345(19):1359-1367
  26. Takesue Y, Tsuchida T. (2017) Strict glycemic control to prevent surgical site infections in gastroenterological surgery. *Ann Gastroenterol Surg* 1(1):52-59
  27. Investigators N-SS, Finfer S, Chittock DR et al. (2009) Intensive versus conventional glucose control in critically ill patients. *N Engl J Med* 360(13):1283-1297
  28. Investigators N-SS, Finfer S, Liu B, et al. (2012) Hypoglycemia and risk of death in critically ill patients. *N Engl J Med* 367(12):1108-1118
  29. Griesdale DE, de Souza RJ, van Dam RM, et al. (2009) Intensive insulin therapy and mortality among critically ill patients: a meta-analysis including NICE-SUGAR study data. *CMAJ* 180(8):821-827
  30. Gustafsson UO, Thorell A, Soop M, et al. (2009) Haemoglobin A1c as a predictor of postoperative hyperglycaemia and complications after major colorectal surgery. *Br J Surg* 96(11):1358-1364
  31. Jacobi J, Bircher N, Krinsley J, et al. Guidelines for the use of an insulin infusion for the management of hyperglycemia in critically ill patients. *Crit Care Med* 2012;40:3251-76.
  32. Furnary AP, Gao G, Grunkemeier GL, et al. Continuous insulin infusion reduces mortality in patients with diabetes undergoing coronary artery bypass grafting. *J Thorac Cardiovasc Surg* 2003;125:1007-21.
  33. Kulemann B, Fritz M, Glatz T, et al. (2017) Complications after pancreaticoduodenectomy are associated with higher amounts of intra- and postoperative fluid therapy: a single center retrospective cohort study. *Ann Med Surg* 16:23-29
  34. Behman R, Hanna S, Coburn N, et al. (2015) Impact of fluid resuscitation on major adverse events following pancreaticoduodenectomy. *Am J Surg* 210(5):896-903
  35. Callery MP, Pratt WB, Kent TS, et al. (2013) A prospectively validated clinical risk score accurately predicts pancreatic fistula after pancreatoduodenectomy. *J Am Coll Surg* 216(1):1-14
  36. McMillan MT, Fisher WE, Van Buren G 2nd, et al. (2015) The value of drains as a fistula mitigation strategy for pancreatoduodenectomy: something for everyone? Results of a randomized prospective multi-institutional study. *J Gastrointest Surg* 19(1):21-30 discussion-1
  37. Ven Fong Z, Correa-Gallego C, Ferrone CR, et al. (2015) Early drain removal—the middle ground between the drain versus no drain debate in patients undergoing pancreaticoduodenectomy: a prospective validation study. *Ann Surg* 262(2):378-383
  38. Maggino L, Malleo G, Bassi C, et al. (2017) Identification of an optimal cut-off for drain fluid amylase on postoperative day 1 for predicting clinically relevant fistula after distal pancreatectomy: a multi-institutional analysis and external validation. *Ann Surg* 21:21
  39. Beane JD, House MG, Ceppa EP, et al. (2017) Variation in drain management after pancreatoduodenectomy: early versus delayed removal. *Ann Surg* 23:23

40. McPhail MJ, Abu-Hilal M, Johnson CD. (2006) A meta-analysis comparing suprapubic and transurethral catheterization for bladder drainage after abdominal surgery. *Br J Surg* 93(9):1038–1044
41. Lyman GH. (2011) Venous thromboembolism in the patient with cancer: focus on burden of disease and benefits of thromboprophylaxis. *Cancer* 117(7):1334–1349
42. Kakkos SK, Caprini JA, Geroulakos G, et al. (2008) Combined intermittent pneumatic leg compression and pharmacological prophylaxis for prevention of venous thromboembolism in high-risk patients. *Cochrane Database Syst Rev* 4:CD005258
43. Melloul E, Lassen K, Roulin D, et al. *World Journal of Surgery* volume 44, pages2056–2084 (2020) Guidelines for Perioperative Care for Pancreatoduodenectomy: Enhanced Recovery After Surgery (ERAS) Recommendations 2019
44. Futagawa Y, Kanehira M, Furukawa K, et al. (2017) Impact of delayed gastric emptying after pancreaticoduodenectomy on survival. *J Hepato-Biliary-Pancreat Sci* 24(8):466–474
45. Beane JD, House MG, Miller A, et al. (2014) Optimal management of delayed gastric emptying after pancreatotomy: an analysis of 1089 patients. *Surgery* 156(4):939–946
46. Liu C, Du Z, Lou C, et al. (2011) Enteral nutrition is superior to total parenteral nutrition for pancreatic cancer patients who underwent pancreaticoduodenectomy. *Asia Pac J Clin Nutr* 20(2):154–160
47. Earnshaw SR, Kauf TL, McDade C, et al. (2015) Economic impact of alvimopan considering varying definitions of postoperative ileus. *J Am Coll Surg* 221(5):941–950
48. Keim V, Klar E, Poll M, et al. Postoperative Care Following Pancreatic Surgery *Dtsch Arztebl Int.* 2009 Nov; 106(48): 789–794. Published online 2009 Nov 27. doi: 10.3238/arztebl.2009.0789
49. Gilliland TM, Villafane-Ferriol N, Shah KP, et al. II Nutritional and Metabolic Derangements in Pancreatic Cancer and Pancreatic Resection Nutrients. 2017 Mar; 9(3): 243. doi: 10.3390/nu9030243
50. Olsén MF, Becovic S, Dean E. Short-term effects of mobilization on oxygenation in patients after open surgery for pancreatic cancer: a randomized controlled trial *BMC Surg.* 2021 Apr 7;21(1):185. doi: 10.1186/s12893-021-01187-2.
51. Husain FA, Martin MJ, Mullenix PS, et al. Serum lactate and base deficit as predictors of mortality and morbidity *Am J Surg.* 2003 May;185(5):485-91. doi: 10.1016/s0002-9610(03)00044-8.
52. Trzeciak S, Dellinger RP, Chansky ME, et al. Serum lactate as a predictor of mortality in patients with infection *Intensive Care Med.* 2007 Jun;33(6):970-7. doi: 10.1007/s00134-007-0563-9.
53. Yeh YC, Wang MJ, Chao A, et al. Correlation between early sublingual small vessel density and late blood lactate level in critically ill surgical patients *J Surg Res.* 2013 Apr;180(2):317-21. doi: 10.1016/j.jss.2012.05.006.
54. Tripodaki ES, Tasoulis A, Koliopoulou A, et al. Microcirculation and macrocirculation in cardiac surgical patients *Crit Care Res Pract.* 2012;2012:654381. doi: 10.1155/2012/654381.
55. Gutierrez G, Williams JD, The riddle of hyperlactatemia *Crit Care.* 2009;13(4):176. doi: 10.1186/cc7982.
56. Watanabe I, Mayumi T, Arishima T, et al. Hyperlactatemia can predict the prognosis of liver resection *Shock.* 2007 Jul;28(1):35-8. doi: 10.1097/shk.0b013e3180310ca9.
57. Kogan A, Preisman S, Bar A, et al. The impact of hyperlactatemia on postoperative outcome after adult cardiac surgery *J Anesth.* 2012 Apr;26(2):174-8. doi: 10.1007/s00540-011-1287-0.
58. Jawa RS, Anillo S, Huntoon K, et al. Analytic review: Interleukin-6 in surgery, trauma, and critical care: part I: basic science *J Intensive Care Med.* Jan-Feb 2011;26(1):3-12. doi: 10.1177/0885066610395678.
59. Ansoorge C, Regner S, Segersvärd R, et al. Early intra-peritoneal metabolic changes and protease activation as indicators of pancreatic fistula after pancreaticoduodenectomy *Br J Surg.* 2012 Jan;99(1):104-11. doi: 10.1002/bjs.7730.
60. Amara D, Braun HJ, Shui AM, et al. Long-Term Lower Extremity and Cardiovascular Complications after Simultaneous Pancreas-Kidney Transplant. *Clin. Transplant.* 2020, 35, e14195
61. Redfield R, Scalea JR, Odorico JS. Simultaneous pancreas and kidney transplantation: Current trends and future directions. *Curr. Opin. Organ Transplant.* 2015, 20, 94–102
62. Medina-Polo J, Domínguez-Esteban M, Morales JM, et al. Cardiovascular events after simultaneous pancreas-kidney transplantation. *Transplant. Proc.* 2010, 42, 2981–2983
63. Scalea JR, Redfield R, Arpali E, et al. Pancreas transplantation in older patients is safe, but patient selection is paramount. *Transpl. Int.* 2016, 29, 810–818
64. Elango M, Papalois V. Working towards an ERAS protocol for pancreatic transplantation: A narrative review. *J. Clin. Med.* 2021, 10, 1418. <https://doi.org/10.3390/jcm10071418>
65. Anesi JA, Blumberg EA, Abbo LM. Perioperative Antibiotic Prophylaxis to Prevent Surgical Site Infections in Solid Organ Transplantation. *Transplantation* 2018, 102, 21–34
66. Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Surg Infect (Larchmt)* 2013;14(1):73–156
67. Wittebole X, Laterre PF, Castanares-Zapatero D. (2020) Postoperative care of the pancreas transplant patient. Orlando P, Piemonti L(Eds), *Transplantation, Bioengineering and Regeneration of the Endocrine Pancreas* (pp.209-216). United Kingdom, United States:Elsevier Inc.
68. Mittel AM, Wagener G. Anesthesia for kidney and pancreas transplantation. *Anesthesiol Clin.* 2017;35(3):439–452
69. Qaseem A, Humphrey LL, Chou R, et al. Clinical Guidelines Committee of the American College of Physicians. Use of intensive insulin therapy for the management of glycemic control in hospitalized patients: a clinical practice guideline from the American College of Physicians. *Ann Intern Med.* 2011;154:260–267

70. Qaseem A, Chou R, Humphrey LL, et al. Inpatient glycemic control: best practice advice from the Clinical Guidelines Committee of the American College of Physicians. *Am J Med Qual* 2014;29:95–98
71. Dean M. Opioids in renal failure and dialysis patients. *J Pain Symptom Manag*. 2004, 28, 497–504
72. Tran DQ, Bravo D, Leurcharusmee P, et al. Transversus abdominis plane block: A narrative review. *Anesthesiology* 2019, 131, 1166–1190
73. Karaarslan E, Topal A, Avci O, et al. Research on the efficacy of the rectus sheath block method. *Agri* 2018, 30, 183–188.
74. Akerman M, Pejčić N, Veličković I. A review of the quadratus lumborum block and ERAS. *Front. Med.* 2018, 5, 44
75. Kinoshita J, Fushida S, Kaji M, et al. A randomized controlled trial of postoperative intravenous acetaminophen plus thoracic epidural analgesia vs. thoracic epidural analgesia alone after gastrectomy for gastric cancer. *Gastric Cancer* 2019, 22, 392–402
76. Subramaniam B, Shankar P, Shaefi S, et al. Effect of Intravenous Acetaminophen vs Placebo Combined with Propofol or Dexmedetomidine on Postoperative Delirium among Older Patients Following Cardiac Surgery: The DEXACET Randomized Clinical Trial. *J. Am. Med. Assoc.* 2019, 321, 686–696
77. Ohkura Y, Haruta S, Shindoh J, et al. Effectiveness of postoperative intravenous acetaminophen (Acelio) after gastrectomy A propensity score-matched analysis. *Medicine* 2016, 95
78. Humar A, Johnson EM, Gillingham KJ, et al. Venous thromboembolic complications after kidney and kidney-pancreas transplantation: a multivariate analysis. *Transplantation*. 1998;65(2):229–234
79. Cerise A, Chen JM, Powelson JA, et al. Pancreas transplantation would be easy if the recipients were not diabetic: A practical guide to post-operative management of diabetic complications in pancreas transplant recipients. *Clin. Transplant*. 2021, e14270
80. Bharucha AE, Kudva YC, Prichard DO. Diabetic Gastroparesis. *Endocr. Rev.* 2019, 40, 13