

# Konu 2

## Postoperatif Komplikasyonlar

Dr. Afig GOJAYEV

### Giriş

Laparoskopik minimal invaziv bir yöntem olmasına rağmen ameliyat sonrası birçok komplikasyon gelişebilmektedir. 2000'li yıllarda yapılan bazı çalışmalarda laparoskopik gastrektomi sonrası komplikasyon görülme sıklığı % 4,7 ile % 23,3 arasında değişen oranlarda bildirilmiştir (2-5). 2010 yılından beri cerrahi teknik ve aletlerin gelişmesine rağmen postoperatif komplikasyon oranında değişiklik olmamıştır (6-8). Laparoskopik gastrektomi sonrası gelişen komplikasyonlar erken ve geç komplikasyonlar olmak üzere iki grup altında incelenebilir.

### Erken Postoperatif Komplikasyonlar

Erken postoperatif komplikasyonlar genellikle hastalığın evresi, hasta ile ilişkili anatomik ve fizyolojik anomaliler, cerrahi ehliyet ve en önemlisi ise kullanılan cerrahi teknik ile ilişkilidir. Erken komplikasyonlar arasında, kanama (hematom, lumenal kanama, port yeri kanaması, masif abdominal kanama), anastomoz ilişkili komplikasyonlar (darlık, kaçak), pankreatik fistül ve akut pankreatit, duodenal güdük kaçağı, nekroz gelişimi (gastrok remnant nekrozu, jejunal nekroz), evisserasyon ve inkarserasyon gösterilebilir.

### Risk Faktörleri

Ameliyat sonrası erken komplikasyonların ortaya çıkışmasında birçok faktör rol oynamaktadır. Bu risk faktörleri hasta-ilişkili, tümör-ilişkili ve ameliyat-ilişkili olarak üç farklı grup altında incelenebilir. Kore çok-merkezli randomize kontrollü çalışma grubunun (KLASS) yaptığı ve 1485 hastanın dahil edildiği çalışmada, komorbidite ve komplikasyon gelişmesinde esas önemini hasta-ilişkili faktör olduğu belirlenmiştir (5). Ciddi kardiyovasküler ve pulmoner hastalıkların varlığının postoperatif komplikasyonları artırdığı bazı çalışmalarda gösterilmiştir (6,7). Bunun dışında yaş, cinsiyet ve beslenme durumu, ASA skoru gibi diğer faktörler de hasta-ilişkili risk faktörlerine dahil edilebilir (5,9-12). Erkeklerde komplikasyonlara daha sık rastlanmaktadır ve bu erkeklerin muhtemel daha çok sigara ve alkol kullanmasına bağlanmıştır. Yaş, hastanın ASA skoruyla ilişkili fiziksel durumunu ve komorbiditelerini etkileyen faktördür. KLASS grubu çalışmasında 60 yaş üzeri hastalarda, Nagasako ve ark. yaptığı çalışmada ise 70 yaş üzerinde olan hastalarda sistemik komplikasyon insidansı daha yüksek saptanmıştır (5, 13). Ancak yaş faktörünün komplikasyonlara etki etmediğini gösteren bazı çalışmalar da mevcuttur (7, 14). Tümör-ilişkili faktörler ise tümörün

## Kaynaklar

1. Kitano S, Iso Y, Moriyama M et al. Laparoscopy-assisted Billroth I gastrectomy. *Surg Laparosc Endosc.* 1994;4(2):146-8.
2. Adachi Y, Shiraishi N, Shiromizu A et al. Laparoscopy-assisted Billroth I gastrectomy compared with conventional open gastrectomy. *Arch Surg.* 2000;135(7):806-10.
3. Huscher CG, Mingoli A, Sgarzini G et al. Laparoscopic versus open subtotal gastrectomy for distal gastric cancer: five-year results of a randomized prospective trial. *Ann Surg.* 2005;241(2):232-7.
4. Kitano S, Shiraishi N, Uyama I et al. Japanese Laparoscopic Surgery Study G. A multicenter study on oncologic outcome of laparoscopic gastrectomy for early cancer in Japan. *Ann Surg.* 2007;245(1):68-72.
5. Kim MC, Kim W, Kim HH et al. Risk factors associated with complication following laparoscopy-assisted gastrectomy for gastric cancer: a large-scale korean multicenter study. *Ann Surg Oncol.* 2008;15(10):2692-700.
6. Lee KG, Lee HJ, Yang JY et al. Risk factors associated with complication following gastrectomy for gastric cancer: retrospective analysis of prospectively collected data based on the Clavien-Dindo system. *J Gastrointest Surg.* 2014;18(7):1269-77.
7. Jung MR, Park YK, Seon JW et al. Definition and classification of complications of gastrectomy for gastric cancer based on the accordion severity grading system. *World J Surg.* 2012;36(10):2400-11.
8. Zhao Y, Yu P, Hao Y et al. Comparison of outcomes for laparoscopically assisted and open radical distal gastrectomy with lymphadenectomy for advanced gastric cancer. *Surg Endosc.* 2011;25(9):2960-6.
9. Jung HS, Park YK, Ryu SY et al. Laparoscopic Total Gastrectomy in Elderly Patients (>/=70 Years) with Gastric Carcinoma: A Retrospective Study. *J Gastric Cancer.* 2015;15(3):176-82.
10. Kim MG, Yook JH, Kim KC et al. Influence of obesity on early surgical outcomes of laparoscopic-assisted gastrectomy in gastric cancer. *Surg Laparosc Endosc Percutan Tech.* 2011;21(3):151-4.
11. Lee JY, Kim HI, Kim YN et al. Clinical Significance of the Prognostic Nutritional Index for Predicting Short- and Long-Term Surgical Outcomes After Gastrectomy: A Retrospective Analysis of 7781 Gastric Cancer Patients. *Medicine (Baltimore).* 2016;95(18):e3539.
12. Sah BK, Zhu ZG, Chen MM et al. Effect of surgical work volume on postoperative complication: superiority of specialized center in gastric cancer treatment. *Langenbecks Arch Surg.* 2009;394(1):41-7.
13. Nagasako Y, Satoh S, Isogaki J et al. Impact of anastomotic complications on outcome after laparoscopic gastrectomy for early gastric cancer. *Br J Surg.* 2012;99(6):849-54.
14. Ryu KW, Kim YW, Lee JH et al. Surgical complications and the risk factors of laparoscopy-assisted distal gastrectomy in early gastric cancer. *Ann Surg Oncol.* 2008;15(6):1625-31.
15. Kodera Y, Sasako M, Yamamoto S et al. Identification of risk factors for the development of complications following extended and superextended lymphadenectomies for gastric cancer. *Br J Surg.* 2005;92(9):1103-9.
16. Park JY, Kim YW, Eom BW et al. Unique patterns and proper management of postgastrectomy bleeding in patients with gastric cancer. *Surgery.* 2014;155(6):1023-9.
17. Park DJ, Lee HJ, Kim HH et al. Predictors of operative morbidity and mortality in gastric cancer surgery. *Br J Surg.* 2005;92(9):1099-102.
18. Song W, Yuan Y, Peng J et al. The delayed massive hemorrhage after gastrectomy in patients with gastric cancer: characteristics, management opinions and risk factors. *Eur J Surg Oncol.* 2014;40(10):1299-306.
19. Mita K, Ito H, Murabayashi R et al. Postoperative bleeding complications after gastric cancer surgery in patients receiving anticoagulation and/or antiplatelet agents. *Ann Surg Oncol.* 2012;19(12):3745-52.
20. Jeong O, Park YK, Ryu SY et al. Predisposing factors and management of postoperative bleeding after radical gastrectomy for gastric carcinoma. *Surg Today.* 2011;41(3):363-8.
21. Xie XS, Lin JX, Li P et al. A risk prediction system of postoperative hemorrhage following laparoscopy-assisted radical gastrectomy with D2 lymphadenectomy for primary gastric cancer. *Oncotarget.* 2017;8(46):81511-9.
22. Yang J, Zhang XH, Huang YH et al. Diagnosis and Treatment of Abdominal Arterial Bleeding After Radical Gastrectomy: a Retrospective Analysis of 1875 Consecutive Resections for Gastric Cancer. *J Gastrointest Surg.* 2016;20(3):510-20.
23. Sah BK, Chen MM, Yan M et al. Reoperation for early postoperative complications after gastric cancer surgery in a Chinese hospital. *World J Gastroenterol.* 2010;16(1):98-103.
24. Kim MC, Choi HJ, Jung GJ et al. Techniques and complications of laparoscopy-assisted distal gastrectomy (LADG) for gastric cancer. *Eur J Surg Oncol.* 2007;33(6):700-5.
25. Hori S, Ochiai T, Gunji Y et al. A prospective randomized trial of hand-sutured versus mechanically stapled anastomoses for gastroduode-

- nostomy after distal gastrectomy. *Gastric Cancer.* 2004;7(1):24-30.
26. Nguyen NT, Rivers R, Wolfe BM. Early gastrointestinal hemorrhage after laparoscopic gastric bypass. *Obes Surg.* 2003;13(1):62-5.
  27. Tanizawa Y, Bando E, Kawamura T et al. Early postoperative anastomotic hemorrhage after gastrectomy for gastric cancer. *Gastric Cancer.* 2010;13(1):50-7.
  28. Fernandez-Esparrach G, Bordas JM, Pellise M et al. Endoscopic management of early GI hemorrhage after laparoscopic gastric bypass. *Gastrointest Endosc.* 2008;67(3):552-5.
  29. Mayer G, Lingenfelter T, Ell C. The role of endoscopy in early postoperative haemorrhage. *Best Pract Res Clin Gastroenterol.* 2004;18(5):799-807.
  30. Jamil LH, Krause KR, Chengelis DL et al. Endoscopic management of early upper gastrointestinal hemorrhage following laparoscopic Roux-en-Y gastric bypass. *Am J Gastroenterol.* 2008;103(1):86-91.
  31. Jeong GA, Cho GS, Kim HH et al. Laparoscopy-assisted total gastrectomy for gastric cancer: a multicenter retrospective analysis. *Surgery.* 2009;146(3):469-74.
  32. Lee MS, Lee JH, Park DJ et al. Comparison of short- and long-term outcomes of laparoscopy-assisted total gastrectomy and open total gastrectomy in gastric cancer patients. *Surg Endosc.* 2013;27(7):2598-605.
  33. Wada N, Kurokawa Y, Takiguchi S et al. Feasibility of laparoscopy-assisted total gastrectomy in patients with clinical stage I gastric cancer. *Gastric Cancer.* 2014;17(1):137-40.
  34. Lee JH, Park DJ, Kim HH et al. Comparison of complications after laparoscopy-assisted distal gastrectomy and open distal gastrectomy for gastric cancer using the Clavien-Dindo classification. *Surg Endosc.* 2012;26(5):1287-95.
  35. Strong VE, Devaud N, Allen PJ et al. Laparoscopic versus open subtotal gastrectomy for adenocarcinoma: a case-control study. *Ann Surg Oncol.* 2009;16(6):1507-13.
  36. Yasunaga H, Horiguchi H, Kuwabara K et al. Outcomes after laparoscopic or open distal gastrectomy for early-stage gastric cancer: a propensity-matched analysis. *Ann Surg.* 2013;257(4):640-6.
  37. Kim W, Kim HH, Han SU et al. Decreased Morbidity of Laparoscopic Distal Gastrectomy Compared With Open Distal Gastrectomy for Stage I Gastric Cancer: Short-term Outcomes From a Multicenter Randomized Controlled Trial (KLASS-01). *Ann Surg.* 2016;263(1):28-35.
  38. Inokuchi M, Otsuki S, Fujimori Y et al. Systematic review of anastomotic complications of esophagojejunostomy after laparoscopic total gastrectomy. *World J Gastroenterol.* 2015;21(32):9656-65.
  39. Oshi M, Kunisaki C, Miyamoto H et al. Risk Factors for Anastomotic Leakage of Esophagojejunostomy after Laparoscopy-Assisted Total Gastrectomy for Gastric Cancer. *Dig Surg.* 2018;35(1):28-34.
  40. Gong W, Li J. Combat with esophagojejunal anastomotic leakage after total gastrectomy for gastric cancer: A critical review of the literature. *Int J Surg.* 2017;47:18-24.
  41. Umemura A, Koeda K, Sasaki A et al. Totally laparoscopic total gastrectomy for gastric cancer: literature review and comparison of the procedure of esophagojejunostomy. *Asian J Surg.* 2015;38(2):102-12.
  42. Shim CN, Kim HI, Hyung WJ et al. Self-expanding metal stents or nonstent endoscopic therapy: which is better for anastomotic leaks after total gastrectomy? *Surg Endosc.* 2014;28(3):833-40.
  43. Carboni F, Valle M, Federici O et al. Esophagojejunal anastomosis leakage after total gastrectomy for esophagogastric junction adenocarcinoma: options of treatment. *J Gastrointest Oncol.* 2016;7(4):515-22.
  44. Messager M, Warlaumont M, Renaud F et al. Recent improvements in the management of esophageal anastomotic leak after surgery for cancer. *Eur J Surg Oncol.* 2017;43(2):258-69.
  45. Wang Q, Liu ZS, Qian Q et al. Treatment of upper gastrointestinal fistula and leakage with personal stage nutrition support. *World J Gastroenterol.* 2008;14(32):5073-7.
  46. Kim YJ, Shin SK, Lee HJ et al. Endoscopic management of anastomotic leakage after gastrectomy for gastric cancer: how efficacious is it? *Scand J Gastroenterol.* 2013;48(1):111-8.
  47. Ott C, Ratius N, Endlicher E et al. Self-expanding Polyflex plastic stents in esophageal disease: various indications, complications, and outcomes. *Surg Endosc.* 2007;21(6):889-96.
  48. Freeman RK, Ascioti AJ, Wozniak TC. Postoperative esophageal leak management with the Polyflex esophageal stent. *J Thorac Cardiovasc Surg.* 2007;133(2):333-8.
  49. Babor R, Talbot M, Tyndal A. Treatment of upper gastrointestinal leaks with a removable, covered, self-expanding metallic stent. *Surg Laparosc Endosc Percutan Tech.* 2009;19(1):e1-4.
  50. van Boeckel PG, Sijbring A, Vleggaar FP et al. Systematic review: temporary stent placement for benign rupture or anastomotic leak of the oesophagus. *Aliment Pharmacol Ther.* 2011;33(12):1292-301.
  51. Lee KM, Shin SJ, Hwang JC et al. Proximal-releasing stent insertion under transnasal endoscopic guidance in patients with postoperative esophage-

- al leakage. *Gastrointest Endosc.* 2010;72(1):180-5.
52. Tekinbas C, Erol MM, Akdogan R et al. Treatment of anastomotic leaks after esophagectomy with endoscopic hemoclips. *J Thorac Cardiovasc Surg.* 2009;137(3):766-7.
  53. Pohl J, Borgulya M, Lorenz D et al. Endoscopic closure of postoperative esophageal leaks with a novel over-the-scope clip system. *Endoscopy.* 2010;42(9):757-9.
  54. Kirschniak A, Subotova N, Zieker D et al. The Over-The-Scope Clip (OTSC) for the treatment of gastrointestinal bleeding, perforations, and fistulas. *Surg Endosc.* 2011;25(9):2901-5.
  55. Brangewitz M, Voigtlander T, Helfritz FA et al. Endoscopic closure of esophageal intrathoracic leaks: stent versus endoscopic vacuum-assisted closure, a retrospective analysis. *Endoscopy.* 2013;45(6):433-8.
  56. Smallwood NR, Fleshman JW, Leeds SG et al. The use of endoluminal vacuum (E-Vac) therapy in the management of upper gastrointestinal leaks and perforations. *Surg Endosc.* 2016;30(6):2473-80.
  57. Aurello P, Magistri P, D'Angelo F et al. Treatment of esophagojejunal anastomosis leakage: a systematic review from the last two decades. *Am Surg.* 2015;81(5):450-3.
  58. Oh SJ, Choi WB, Song J et al. Complications requiring reoperation after gastrectomy for gastric cancer: 17 years experience in a single institute. *J Gastrointest Surg.* 2009;13(2):239-45.
  59. Ramos M, Pereira MA, Barchi LC et al. Duodenal fistula: The most lethal surgical complication in a case series of radical gastrectomy. *Int J Surg.* 2018;53:366-70.
  60. Cozzaglio L, Coladonato M, Biffi R et al. Duodenal fistula after elective gastrectomy for malignant disease : an italian retrospective multicenter study. *J Gastrointest Surg.* 2010;14(5):805-11.
  61. Paik HJ, Lee SH, Choi CI et al. Duodenal stump fistula after gastrectomy for gastric cancer: risk factors, prevention, and management. *Ann Surg Treat Res.* 2016;90(3):157-63.
  62. Cornejo Mde L, Priego P, Ramos D et al. Duodenal fistula after gastrectomy: Retrospective study of 13 new cases. *Rev Esp Enferm Dig.* 2016;108(1):20-6.
  63. Kostakis ID, Alexandrou A, Armeni E et al. Comparison Between Minimally Invasive and Open Gastrectomy for Gastric Cancer in Europe: A Systematic Review and Meta-analysis. *Scand J Surg.* 2017;106(1):3-20.
  64. Orsenigo E, Di Palo S, Tamburini A et al. Laparoscopy-assisted gastrectomy versus open gastrectomy for gastric cancer: a monoinstitutional Western center experience. *Surg Endosc.* 2011;25(1):140-5.
  65. Sarela AI. Entirely laparoscopic radical gastrectomy for adenocarcinoma: lymph node yield and resection margins. *Surg Endosc.* 2009;23(1):153-60.
  66. Aurello P, Sirimarco D, Magistri P et al. Management of duodenal stump fistula after gastrectomy for gastric cancer: Systematic review. *World J Gastroenterol.* 2015;21(24):7571-6.
  67. Orsenigo E, Bissolati M, Socci C et al. Duodenal stump fistula after gastric surgery for malignancies: a retrospective analysis of risk factors in a single centre experience. *Gastric Cancer.* 2014;17(4):733-44.
  68. Yakoub D, Athanasiou T, Tekkis P et al. Laparoscopic assisted distal gastrectomy for early gastric cancer: is it an alternative to the open approach? *Surg Oncol.* 2009;18(4):322-33.
  69. Kim SY, Nam SH, Min JS et al. Laparoscopic reinforcement suture on staple-line of duodenal stump using barbed suture during laparoscopic gastrectomy for gastric cancer. *Ann Surg Treat Res.* 2017;93(6):305-9.
  70. Kim MC, Kim SY, Kim KW. Laparoscopic Reinforcement Suture (LARS) on Staple Line of Duodenal Stump Using Barbed Suture in Laparoscopic Gastrectomy for Gastric Cancer: a Prospective Single Arm Phase II Study. *J Gastric Cancer.* 2017;17(4):354-62.
  71. Ri M, Hiki N, Ishizuka N et al. Duodenal stump reinforcement might reduce both incidence and severity of duodenal stump leakage after laparoscopic gastrectomy with Roux-en-Y reconstruction for gastric cancer. *Gastric Cancer.* 2019;22(5):1053-9.
  72. Zizzo M, Ugoletti L, Manzini L et al. Management of duodenal stump fistula after gastrectomy for malignant disease: a systematic review of the literature. *BMC Surg.* 2019;19(1):55.
  73. Garden OJ, Dykes EH, Carter DC. Surgical and nutritional management of postoperative duodenal fistulas. *Dig Dis Sci.* 1988;33(1):30-5.
  74. Wong SK, Lam YH, Lau JY et al. Diagnostic and therapeutic fistuloscopy: an adjuvant management in postoperative fistulas and abscesses after upper gastrointestinal surgery. *Endoscopy.* 2000;32(4):311-3.
  75. Lee JY, Ryu KW, Cho SJ et al. Endoscopic clipping of duodenal stump leakage after Billroth II gastrectomy in gastric cancer patient. *J Surg Oncol.* 2009;100(1):80-1.
  76. Oh JS, Lee HG, Chun HJ et al. Percutaneous management of postoperative duodenal stump leakage with foley catheter. *Cardiovasc Intervent Radiol.* 2013;36(5):1344-9.
  77. Ali BI, Park CH, Song KY. Outcomes of Non-O-

- perative Treatment for Duodenal Stump Leakage after Gastrectomy in Patients with Gastric Cancer. *J Gastric Cancer.* 2016;16(1):28-33.
78. Cozzaglio L, Giovenzana M, Biffi R et al. Surgical management of duodenal stump fistula after elective gastrectomy for malignancy: an Italian retrospective multicenter study. *Gastric Cancer.* 2016;19(1):273-9.
  79. Komatsu S, Ichikawa D, Kashimoto K et al. Risk factors to predict severe postoperative pancreatic fistula following gastrectomy for gastric cancer. *World J Gastroenterol.* 2013;19(46):8696-702.
  80. Matsunaga T, Saito H, Murakami Y et al. Usefulness of T-Shaped Gauze for Precise Dissection of Supra-Pancreatic Lymph Nodes and for Reduced Postoperative Pancreatic Fistula in Patients Undergoing Laparoscopic Gastrectomy for Gastric Cancer. *Yonago Acta Med.* 2016;59(3):232-6.
  81. Fujita T, Ohta M, Ozaki Y et al. Collateral thermal damage to the pancreas by ultrasonic instruments during lymph node dissection in laparoscopic gastrectomy. *Asian J Endosc Surg.* 2015;8(3):281-8.
  82. Jiang X, Hiki N, Nunobe S et al. Postoperative pancreatic fistula and the risk factors of laparoscopy-assisted distal gastrectomy for early gastric cancer. *Ann Surg Oncol.* 2012;19(1):115-21.
  83. Guerra F, Giuliani G, Formisano G et al. Pancreatic Complications After Conventional Laparoscopic Radical Gastrectomy Versus Robotic Radical Gastrectomy: Systematic Review and Meta-Analysis. *J Laparoendosc Adv Surg Tech A.* 2018;28(10):1207-15.
  84. Miyai H, Hara M, Hayakawa T et al. Establishment of a simple predictive scoring system for pancreatic fistula after laparoscopy-assisted gastrectomy. *Dig Endosc.* 2013;25(6):585-92.
  85. Bassi C, Dervenis C, Butturini G et al. Postoperative pancreatic fistula: an international study group (ISGPF) definition. *Surgery.* 2005;138(1):8-13.
  86. Vather R, Trivedi S, Bissett I. Defining postoperative ileus: results of a systematic review and global survey. *J Gastrointest Surg.* 2013;17(5):962-72.
  87. Liang W, Li J, Zhang W et al. Prolonged postoperative ileus in gastric surgery: Is there any difference between laparoscopic and open surgery? *Cancer Med.* 2019;8(12):5515-23.
  88. Wehner S, Vilz TO, Stoffels B et al. Immune mediators of postoperative ileus. *Langenbecks Arch Surg.* 2012;397(4):591-601.
  89. Baig MK, Wexner SD. Postoperative ileus: a review. *Dis Colon Rectum.* 2004;47(4):516-26.
  90. Camilleri M, Parkman HP, Shafi MA et al. American College of G. Clinical guideline: management of gastroparesis. *Am J Gastroenterol.* 2013;108(1):18-37; quiz 8.
  91. Paik HJ, Choi CI, Kim DH et al. Risk factors for delayed gastric emptying caused by anastomosis edema after subtotal gastrectomy for gastric cancer. *Hepatogastroenterology.* 2014;61(134):1794-800.
  92. Dong K, Yu XJ, Li B et al. Advances in mechanisms of postsurgical gastroparesis syndrome and its diagnosis and treatment. *Chin J Dig Dis.* 2006;7(2):76-82.
  93. Hirao M, Fujitani K, Tsujinaka T. Delayed gastric emptying after distal gastrectomy for gastric cancer. *Hepatogastroenterology.* 2005;52(61):305-9.
  94. Kim DH, Yun HY, Song YJ et al. Clinical features of gastric emptying after distal gastrectomy. *Ann Surg Treat Res.* 2017;93(6):310-5.
  95. Meng H, Zhou D, Jiang X et al. Incidence and risk factors for postsurgical gastroparesis syndrome after laparoscopic and open radical gastrectomy. *World J Surg Oncol.* 2013;11:144.
  96. Yilmaz M, Akbulut S, Isik B et al. Chylous ascites after liver transplantation: incidence and risk factors. *Liver Transpl.* 2012;18(9):1046-52.
  97. Ijichi H, Soejima Y, Taketomi A et al. Successful management of chylous ascites after living donor liver transplantation with somatostatin. *Liver Int.* 2008;28(1):143-5.
  98. Evans JG, Spiess PE, Kamat AM et al. Chylous ascites after post-chemotherapy retroperitoneal lymph node dissection: review of the M. D. Anderson experience. *J Urol.* 2006;176(4 Pt 1):1463-7.
  99. Steinemann DC, Dindo D, Clavien PA et al. Atraumatic chylous ascites: systematic review on symptoms and causes. *J Am Coll Surg.* 2011;212(5):899-905 e1-4.
  100. Lu J, Wei ZQ, Huang CM et al. Small-volume chylous ascites after laparoscopic radical gastrectomy for gastric cancer: results from a large population-based sample. *World J Gastroenterol.* 2015;21(8):2425-32.
  101. Chen FP, Lo TS, Soong YK. Management of chylous ascites following laparoscopic presacral neurectomy. *Hum Reprod.* 1998;13(4):880-3.
  102. Mine S, Sano T, Tsutsumi K et al. Large-scale investigation into dumping syndrome after gastrectomy for gastric cancer. *J Am Coll Surg.* 2010;211(5):628-36.
  103. Tanizawa Y, Tanabe K, Kawahira H et al. Specific Features of Dumping Syndrome after Various Types of Gastrectomy as Assessed by a Newly Developed Integrated Questionnaire, the PGSAS-45. *Dig Surg.* 2016;33(2):94-103.
  104. van der Kleij FG, Vecht J, Lamers CB et al. Diagnostic value of dumping provocation in patients after gastric surgery. *Scand J Gastroenterol.*

- 1996;31(12):1162-6.
105. Yamada M, Ohru T, Asada M et al. Acarbose attenuates hypoglycemia from dumping syndrome in an elderly man with gastrectomy. *J Am Geriatr Soc.* 2005;53(2):358-9.
  106. Britton JP, Johnston D, Ward DC et al. Gastric emptying and clinical outcome after Roux-en-Y diversion. *Br J Surg.* 1987;74(10):900-4.
  107. Gustavsson S, Ilstrup DM, Morrison P et al. Roux-Y stasis syndrome after gastrectomy. *Am J Surg.* 1988;155(3):490-4.
  108. van der Mijle HC, Beekhuis H, Bleichrodt RP et al. Transit disorders of the gastric remnant and Roux limb after Roux-en-Y gastrojejunostomy: relation to symptomatology and vagotomy. *Br J Surg.* 1993;80(1):60-4.
  109. Morrison P, Miedema BW, Kohler L et al. Electrical dysrhythmias in the Roux jejunal limb: cause and treatment. *Am J Surg.* 1990;160(3):252-6.
  110. Noh SM. Improvement of the Roux limb function using a new type of “uncut Roux” limb. *Am J Surg.* 2000;180(1):37-40.
  111. Park YS, Shin DJ, Son SY et al. Roux Stasis Syndrome and Gastric Food Stasis After Laparoscopic Distal Gastrectomy with Uncut Roux-en-Y Reconstruction in Gastric Cancer Patients: A Propensity Score Matching Analysis. *World J Surg.* 2018;42(12):4022-32.
  112. Miwa K, Hattori T, Miyazaki I. Duodenogastric reflux and foregut carcinogenesis. *Cancer.* 1995;75(6 Suppl):1426-32.
  113. Nishijima K, Miwa K, Miyashita T et al. Impact of the biliary diversion procedure on carcinogenesis in Barrett's esophagus surgically induced by duodenoesophageal reflux in rats. *Ann Surg.* 2004;240(1):57-67.
  114. Tu BN, Sarr MG, Kelly KA. Early clinical results with the uncut Roux reconstruction after gastrectomy: limitations of the stapling technique. *Am J Surg.* 1995;170(3):262-4.
  115. Takiguchi N, Takahashi M, Ikeda M et al. Long-term quality-of-life comparison of total gastrectomy and proximal gastrectomy by postgastrectomy syndrome assessment scale (PGSAS-45): a nationwide multi-institutional study. *Gastric Cancer.* 2015;18(2):407-16.
  116. Yamaoka Y, Fujitani K, Tsujinaka T et al. Skeletal muscle loss after total gastrectomy, exacerbated by adjuvant chemotherapy. *Gastric Cancer.* 2015;18(2):382-9.
  117. Adachi S, Takiguchi S, Okada K et al. Effects of ghrelin administration after total gastrectomy: a prospective, randomized, placebo-controlled phase II study. *Gastroenterology.* 2010;138(4):1312-20.
  118. Takiguchi S, Miyazaki Y, Takahashi T et al. Impact of synthetic ghrelin administration for patients with severe body weight reduction more than 1 year after gastrectomy: a phase II clinical trial. *Surg Today.* 2016;46(3):379-85.
  119. Lee JH, Hyung WJ, Kim HI et al. Method of reconstruction governs iron metabolism after gastrectomy for patients with gastric cancer. *Ann Surg.* 2013;258(6):964-9.
  120. Hu Y, Kim HI, Hyung WJ et al. Vitamin B(12) deficiency after gastrectomy for gastric cancer: an analysis of clinical patterns and risk factors. *Ann Surg.* 2013;258(6):970-5.
  121. Zobolas B, Sakorafas GH, Kouroukli I et al. Alkaline reflux gastritis: early and late results of surgery. *World J Surg.* 2006;30(6):1043-9.
  122. Csendes A, Burgos AM, Smok G et al. Latest results (12-21 years) of a prospective randomized study comparing Billroth II and Roux-en-Y anastomosis after a partial gastrectomy plus vagotomy in patients with duodenal ulcers. *Ann Surg.* 2009;249(2):189-94.
  123. Fukuhara K, Osugi H, Takada N et al. Correlation between duodenogastric reflux and remnant gastritis after distal gastrectomy. *Hepatogastroenterology.* 2004;51(58):1241-4.
  124. Bondurant FJ, Maull KI, Nelson HS et al. Bile reflux gastritis. *South Med J.* 1987;80(2):161-5.
  125. Aranow JS, Matthews JB, Garcia-Aguilar J et al. Isoperistaltic jejunal interposition for intractable postgastrectomy alkaline reflux gastritis. *J Am Coll Surg.* 1995;180(6):648-53.
  126. Mabrut JY, Collard JM, Romagnoli R et al. Oesophageal and gastric bile exposure after gastro- duodenal surgery with Henley's interposition or a Roux-en-Y loop. *Br J Surg.* 2004;91(5):580-5.
  127. Klingler PJ, Perdikis G, Wilson P et al. Indications, technical modalities and results of the duodenal switch operation for pathologic duodenogastric reflux. *Hepatogastroenterology.* 1999;46(25):97-102.
  128. Mine S, Nunobe S, Watanabe M. A Novel Technique of Anti-reflux Esophagogastrostomy Following Left Thoracoabdominal Esophagectomy for Carcinoma of the Esophagogastric Junction. *World J Surg.* 2015;39(9):2359-61.
  129. Xiong JJ, Nunes QM, Huang W et al. Laparoscopic vs open total gastrectomy for gastric cancer: a meta-analysis. *World J Gastroenterol.* 2013;19(44):8114-32.
  130. Zuiki T, Hosoya Y, Kaneda Y et al. Stenosis after use of the double-stapling technique for reconstruction after laparoscopy-assisted total gastrectomy. *Surg Endosc.* 2013;27(10):3683-9.
  131. Fukagawa T, Gotoda T, Oda I et al. Stenosis of

- esophago-jejuno anastomosis after gastric surgery. *World J Surg.* 2010;34(8):1859-63.
132. Fischer A, Thomusch O, Benz S et al. Nonoperative treatment of 15 benign esophageal perforations with self-expandable covered metal stents. *Ann Thorac Surg.* 2006;81(2):467-72.
  133. Fukagawa T, Katai H, Saka M et al. Gallstone formation after gastric cancer surgery. *J Gastrointest Surg.* 2009;13(5):886-9.
  134. Nunobe S, Okaro A, Sasako M et al. Billroth 1 versus Roux-en-Y reconstructions: a quality-of-life survey at 5 years. *Int J Clin Oncol.* 2007;12(6):433-9.
  135. Bernini M, Bencini L, Sacchetti R et al. The Cholegas Study: safety of prophylactic cholecystectomy during gastrectomy for cancer: preliminary results of a multicentric randomized clinical trial. *Gastric Cancer.* 2013;16(3):370-6.
  136. Baird DR, Wilson JP, Mason EM et al. An early review of 800 laparoscopic cholecystectomies at a university-affiliated community teaching hospital. *Am Surg.* 1992;58(3):206-10.
  137. Bergemann JL, Hibbert ML, Harkins G et al. Omental herniation through a 3-mm umbilical trocar site: unmasking a hidden umbilical hernia. *J Laparoendosc Adv Surg Tech A.* 2001;11(3):171-3.
  138. Bloom DA, Ehrlich RM. Omental evisceration through small laparoscopy port sites. *J Endourol.* 1993;7(1):31-2; discussion 2-3.
  139. Helgstrand F, Rosenberg J, Bisgaard T. Trocar site hernia after laparoscopic surgery: a qualitative systematic review. *Hernia.* 2011;15(2):113-21.
  140. Aoki M, Saka M, Morita S et al. Afferent loop obstruction after distal gastrectomy with Roux-en-Y reconstruction. *World J Surg.* 2010;34(10):2389-92.
  141. Wise SW. Case 24: Afferent loop syndrome. *Radiology.* 2000;216(1):142-5.
  142. Kim DJ, Lee JH, Kim W. Afferent loop obstruction following laparoscopic distal gastrectomy with Billroth-II gastrojejunostomy. *J Korean Surg Soc.* 2013;84(5):281-6.
  143. Paroz A, Calmes JM, Giusti V et al. Internal hernia after laparoscopic Roux-en-Y gastric bypass for morbid obesity: a continuous challenge in bariatric surgery. *Obes Surg.* 2006;16(11):1482-7.
  144. Ojima T, Nakamori M, Nakamura M et al. Internal Hernia After Laparoscopic Total Gastrectomy for Gastric Cancer. *Surg Laparosc Endosc Percutan Tech.* 2017;27(6):470-3.
  145. Schneider C, Cobb W, Scott J et al. Rapid excess weight loss following laparoscopic gastric bypass leads to increased risk of internal hernia. *Surg Endosc.* 2011;25(5):1594-8.
  146. Obeid A, McNeal S, Breland M et al. Internal hernia after laparoscopic Roux-en-Y gastric bypass. *J Gastrointest Surg.* 2014;18(2):250-5; discussion 5-6.
  147. Hwang RF, Swartz DE, Felix EL. Causes of small bowel obstruction after laparoscopic gastric bypass. *Surg Endosc.* 2004;18(11):1631-5.
  148. Ortega J, Cassinello N, Sanchez-Antunez D et al. Anatomical basis for the low incidence of internal hernia after a laparoscopic Roux-en-Y gastric bypass without mesenteric closure. *Obes Surg.* 2013;23(8):1273-80.
  149. Kimura H, Ishikawa M, Nabae T et al. Internal hernia after laparoscopic gastrectomy with Roux-en-Y reconstruction for gastric cancer. *Asian J Surg.* 2017;40(3):203-9.
  150. Yoshikawa K, Shimada M, Kurita N et al. Characteristics of internal hernia after gastrectomy with Roux-en-Y reconstruction for gastric cancer. *Surg Endosc.* 2014;28(6):1774-8.
  151. Comeau E, Gagner M, Inabnet WB et al. Symptomatic internal hernias after laparoscopic bariatric surgery. *Surg Endosc.* 2005;19(1):34-9.
  152. Campanile FC, Boru CE, Rizzello M et al. Acute complications after laparoscopic bariatric procedures: update for the general surgeon. *Langenbecks Arch Surg.* 2013;398(5):669-86.
  153. Kojima K, Inokuchi M, Kato K et al. Petersen's hernia after laparoscopic distal gastrectomy with Roux-en-Y reconstruction for gastric cancer. *Gastric Cancer.* 2014;17(1):146-51.
  154. Hosoya Y, Lefor A, Ui T et al. Internal hernia after laparoscopic gastric resection with antecolic Roux-en-Y reconstruction for gastric cancer. *Surg Endosc.* 2011;25(10):3400-4.
  155. Gilson BS, Gilson JS, Bergner M et al. The sickness impact profile. Development of an outcome measure of health care. *Am J Public Health.* 1975;65(12):1304-10.
  156. Ware JE, Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care.* 1992;30(6):473-83.
  157. Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. *Psychol Med.* 1998;28(3):551-8.
  158. Svedlund J, Sjodin I, Dotevall G. GSRS--a clinical rating scale for gastrointestinal symptoms in patients with irritable bowel syndrome and peptic ulcer disease. *Dig Dis Sci.* 1988;33(2):129-34.
  159. Aaronson NK, Ahmedzai S, Bergman B et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in

- oncology. J Natl Cancer Inst. 1993;85(5):365-76.
160. Nakada K, Ikeda M, Takahashi M et al. Characteristics and clinical relevance of postgastrectomy syndrome assessment scale (PGSAS)-45: newly developed integrated questionnaires for assessment of living status and quality of life in postgastrectomy patients. Gastric Cancer. 2015;18(1):147-58.
161. Kim YW, Baik YH, Yun YH et al. Improved quality of life outcomes after laparoscopy-assisted distal gastrectomy for early gastric cancer: results of a prospective randomized clinical trial. Ann Surg. 2008;248(5):721-7.
162. Kim YW, Yoon HM, Yun YH et al. Long-term outcomes of laparoscopy-assisted distal gastrectomy for early gastric cancer: result of a randomi-
- zed controlled trial (COACT 0301). Surg Endosc. 2013;27(11):4267-76.
163. Vinuela EF, Gonen M, Brennan MF. Laparoscopic versus open distal gastrectomy for gastric cancer: a meta-analysis of randomized controlled trials and high-quality nonrandomized studies. Ann Surg. 2012;255(3):446-56.
164. Lee SS, Ryu SW, Kim IH. Quality of life beyond the early postoperative period after laparoscopy-assisted distal gastrectomy: the level of patient expectation as the essence of quality of life. Gastric Cancer. 2012;15(3):299-304.
165. Misawa K, Fujiwara M, Ando M et al. Long-term quality of life after laparoscopic distal gastrectomy for early gastric cancer: results of a prospective multi-institutional comparative trial. Gastric Cancer. 2015;18(2):417-25.