**REFERENCES**

1. Steer ML, Waxman I, Freedman S. Chronic pancreatitis. *N Engl J Med.* 1995;332:1482–1490.

2. Witt H, Apte MV, Keim V, et al. Chronic pancreatitis: challenges and advances in pathogenesis, genetics, diagnosis, and therapy. *Gastroenterology.* 2007;132:1557–1573.

3. Whitcomb DC. Hereditary pancreatitis: a model for understanding the genetic basis of acute and chronic pancreatitis. *Pancreatology.* 2001;1:565–570.

4. Yadav D, Slivka A, Sherman S, et al. Smoking is underrecognized as a risk factor for chronic pancreatitis. *Pancreatology.* 2010;10:713–719.

5. Aoun E, Chang CC, Greer JB, et al. Pathways to injury in chronic pancreatitis: decoding the role of the high-risk SPINK1 N34S haplotype using meta-analysis. *PLoS One.* 2008;3:e2003.

6. Whitcomb DC. Mechanisms of disease: advances in understanding the mechanisms leading to chronic pancreatitis. *Nat Clin Pract Gastroenterol Hepatol.* 2004;1:46–52.

7. Forsmark CE. The early diagnosis of chronic pancreatitis. *Clin Gastroenterol Hepatol.* 2008;6:1291–1293.

8. Forsmark CE. The diagnosis of chronic pancreatitis. *Gastrointest Endosc.* 2000;52:293–298.

9. Conwell DL, Wu BU. Chronic pancreatitis I: making the diagnosis. *Clin Gastroenterol Hepatol.* 2012;10(10):1088–1095.

10. Etemad B, Whitcomb DC. Chronic pancreatitis: diagnosis, classification, and new genetic developments. *Gastroenterology.* 2001;120:682–707.

11. Whitcomb DC, Yadav D, Adam S, et al. Multicenter approach to recurrent acute and chronic pancreatitis in the United States: the North American Pancreatitis Study 2 (NAPS2). *Pancreatology.* 2008;8:520–531.

12. Yadav D, Hawes RH, Brand RE, et al. Alcohol consumption, cigarette smoking, and the risk of recurrent acute and chronic pancreatitis. *Arch Intern Med.* 2009;169:1035–1045.

13. Mullady DK, Yadav D, Amann ST, et al. Type of pain, pain-associated complications, quality of life, disability and resource utilisation in chronic pancreatitis: a prospective cohort study. *Gut.* 2011;60:77–84.

14. Cote GA, Yadav D, Slivka A, et al. Alcohol and smoking as risk factors in an epidemiology study of patients with chronic pancreatitis. *Clin Gastroenterol Hepatol.* 2011;9:266–273 quiz e27.

15. Cahen DL, Gouma DJ, Nio Y, et al. Endoscopic versus surgical drainage of the pancreatic duct in chronic pancreatitis. *N Engl J Med.* 2007;356:676–684.

16. Bouwense SA, Olesen SS, Drewes AM, et al. Effects of pregabalin on central sensitization in patients with chronic pancreatitis in a randomized, controlled trial. *PLoS One.* 2012;7:e42096.

17. Dite P, Ruzicka M, Zboril V, et al. A prospective, randomized trial comparing endoscopic and surgical therapy for chronic pancreatitis. *Endoscopy.* 2003;35:553–558.

18. Deviere J, Bell RH Jr, Beger HG, et al. Treatment of chronic pancreatitis with endotherapy or surgery: critical review of randomized control trials. *J Gastrointest Surg.* 2008;12:640–644.

19. Lieb JG 2nd, Forsmark CE. Review article: pain and chronic pancreatitis. *Aliment Pharmacol Ther.* 2009;29:706–719.

20. Pezzilli R. Pain in chronic pancreatitis: from the bench to the bedside. *JOP.* 2012;13:245–246.

21. Fasanella KE, Davis B, Lyons J, et al. Pain in chronic pancreatitis and pancreatic cancer. *Gastroenterol Clin North Am.* 2007;36:335–364 ix.

22. Raimondi S, Lowenfels AB, Morselli-Labate AM, et al. Pancreatic cancer in chronic pancreatitis: aetiology, incidence, and early detection. *Best Pract Res Clin Gastroenterol.* 2010;24:349–358.

23. Stevens T, Conwell DL, Zuccaro G. Pathogenesis of chronic pancreatitis: an evidence-based review of past theories and recent developments. *Am J Gastroenterol.* 2004;99:2256–2270.

24. Vardanyan M, Rilo HL. Pathogenesis of chronic pancreatitis-induced pain. *Discov Med.* 2010;9:304–310.

25. Apte M, Pirola R, Wilson J. The fibrosis of chronic pancreatitis: new insights into the role of pancreatic stellate cells. *Antioxid Redox Signal.* 2011;15:2711–2722.

26. Guyatt GH, Oxman AD, Vist GE, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ.* 2008;336:924–926.

27. Lankisch PG, Assmus C, Maisonneuve P, et al. Epidemiology of pancreatic diseases in Luneburg County. A study in a defined German population. *Pancreatology.* 2002;2:469–477.

28. Dite P, Stary K, Novotny I, et al. Incidence of chronic pancreatitis in the Czech Republic. *Eur J Gastroenterol Hepatol.* 2001;13:749–750.

29. Yadav D, Timmons L, Benson JT, et al. Incidence, prevalence, and survival of chronic pancreatitis: a population-based study. *Am J Gastroenterol.* 2011;106:2192–2199.

30. Hirota M, Shimosegawa T, Masamune A, et al. Research Committee of Intractable Pancreatic Diseases. The sixth nationwide epidemiological survey of chronic pancreatitis in Japan. *Pancreatology.* 2012;12:79–84.

31. Tinto A, Lloyd DA, Kang JY, et al. Acute and chronic pancreatitis—diseases on the rise: a study of hospital admissions in England 1989/90-1999/2000. *Aliment Pharmacol Ther.* 2002;16:2097–2105.

32. Yang AL, Vadhavkar S, Singh G, et al. Epidemiology of alcohol-related liver and pancreatic disease in the United States. *Arch Intern Med.* 2008;168:649–656.

33. Spanier BW, Dijkgraaf MG, Bruno MJ. Trends and forecasts of hospital admissions for acute and chronic pancreatitis in the Netherlands. *Eur J Gastroenterol Hepatol.* 2008;20:653–658.

34. Yadav D, Muddana V, O'Connell M. Hospitalizations for chronic pancreatitis in Allegheny County, Pennsylvania, USA. *Pancreatology.* 2011;11:546–552.

35. Schneider A, Lohr JM, Singer MV. The M-ANNHEIM classification of chronic pancreatitis: introduction of a unifying classification systembased on a review of previous classifications of the disease. *J Gastroenterol.* 2007;42:101–119.

36. Ammann RW, Heitz PU, Klöppel G. Course of alcoholic chronic pancreatitis: a prospective clinicomorphological long-term study. *Gastroenterology.* 1996;111:224–231.

37. Ammann RW, Muellhaupt B, Meyenberger C, et al. Alcoholic nonprogressive chronic pancreatitis: prospective long-term study of a large cohort with alcoholic acute pancreatitis (1976-1992). *Pancreas.*

1994;9:365–373.

38. Cavallini G, Frulloni L, Pederzoli P, et al. Long-term follow-up of patients with chronic pancreatitis in Italy. *Scand J Gastroenterol.* 1998;33:880–889.

39. Dani R, Penna FJ, Nogueira CE. Etiology of chronic calcifyingpancreatitis in Brazil: a report of 329 consecutive cases. *Int J Pancreatol.* 1986;1:399–406.

40. Frulloni L, Gabbrielli A, Pezzilli R, et al. Chronic pancreatitis: report from a multicenter Italian survey (PanCroInfAISP) on 893 patients. *Dig Liver Dis.* 2009;41:311–317.

41. Lankisch PG, Lohr-Happe A, Otto J, et al. Natural course in chronic pancreatitis. Pain, exocrine and endocrine pancreatic insufficiency and prognosis of the disease. *Digestion.* 1993;54:148–155.

42. Layer P,Yamamoto H, Kalthoff L, et al. The different courses of early- and late-onset idiopathic and alcoholic chronic pancreatitis. *Gastroenterology.* 1994;107:1481–1487.

43. Marks IN, Bank S, Louw JH. Chronic pancreatitis in the Western Cape. *Digestion.* 1973;9:447–453.

44. Robles-Diaz G, Vargas F, Uscanga L, et al. Chronic pancreatitis in Mexico City. *Pancreas.* 1990;5:479–483.

45. Whitcomb DC, Yadav D, Adam S, et al. Multicenter approach to recurrent acute and chronic pancreatitis in the United States: the North American Pancreatitis Study 2 (NAPS2). *Pancreatology.*

2008;8:520–531.

46. Nojgaard C, Becker U, Matzen P, et al. Progression from acute to chronic pancreatitis: prognostic factors, mortality, and natural course. *Pancreas.* 2011;40:1195–1200.

47. Yadav D, Eigenbrodt ML, Briggs MJ, et al. Pancreatitis: prevalence and risk factors among male veterans in a detoxification program. *Pancreas.* 2007;34:390–398.

48. Kristiansen L, Gronbaek M, Becker U, et al. Risk of pancreatitis according to alcohol drinking habits: a population-based cohort study. *Am J Epidemiol.* 2008;168:932–937.

49. Katz M, Carangelo R, Miller LJ, et al. Effect of ethanol on cholecystokinin-stimulated zymogen conversion in pancreatic acinar cells. *Am J Physiol.* 1996;270:G171–G175.

50. Lu Z, Karne S, Kolodecik T, et al. Alcohols enhance caerulein-induced zymogen activation in pancreatic acinar cells. *Am J Physiol Gastrointest Liver Physiol.* 2002;282:G501–G507.

51. Pandol SJ, Periskic S, Gukovsky I, et al. Ethanol diet increases the sensitivity of rats to pancreatitis induced by cholecystokinin octapeptide. *Gastroenterology.* 1999;117:706–716.

52. Deng X, Wang L, Elm MS, et al. Chronic alcohol consumption accelerates fibrosis in response to cerulein-induced pancreatitis in rats. *Am J Pathol.* 2005;166:93–106.

53. Bourliere M, Barthet M, Berthezene P, et al. Is tobacco a risk factor for chronic pancreatitis and alcoholic cirrhosis?. *Gut.* 1991;32:1392–1395.

54. Lin Y, Tamakoshi A, Hayakawa T, et al. Cigarette smoking as a risk factor for chronic pancreatitis: a case-control study in Japan. Research Committee on Intractable Pancreatic Diseases. *Pancreas.* 2000;21:109–114.

55. Lowenfels AB, Zwemer FL, Jhangiani S, et al. Pancreatitis in a native American Indian population. *Pancreas.* 1987;2:694–697.

56. Morton C, Klatsky AL, Udaltsova N. Smoking, coffee, and pancreatitis. *Am J Gastroenterol.* 2004;99:731–738.

57. Talamini G, Bassi C, Falconi M, et al. Cigarette smoking: an independent risk factor in alcoholic pancreatitis. *Pancreas.* 1996;12:131–137.

58. Tolstrup JS, Kristiansen L, Becker U, et al. Smoking and risk of acute and chronic pancreatitis among women and men: a population-based cohort study. *Arch Intern Med.* 2009;169:603–609.

59. Yen S, Hsieh CC, MacMahon B. Consumption of alcohol and tobacco and other risk factors for pancreatitis. *Am J Epidemiol.* 1982;116:407–414.

60. Andriulli A, Botteri E, Almasio PL, et al. Smoking as a cofactor for causation of chronic pancreatitis: a meta-analysis. *Pancreas.* 2010;39:1205–1210.

61. Talamini G, Bassi C, Falconi M, et al. Smoking cessation at the clinical onset of chronic pancreatitis and risk of pancreatic calcifications. *Pancreas.* 2007;35:320–326.

62. Lankisch PG, Breuer N, Bruns A, et al. Natural history of acute pancreatitis: a long-term population-based study. *Am J Gastroenterol.* 2009;104:2797–2805 quiz 2806.

63. Takeyama Y. Long-term prognosis of acute pancreatitis in Japan. *Clin Gastroenterol Hepatol.* 2009;7(suppl 11):S15–S17.

64. Yadav D, O'Connell M, Papachristou GI. Natural history following the first attack of acute pancreatitis. *Am J Gastroenterol.* 2012;107:1096–1103.

65. Cohn JA, Friedman KJ, Noone PG, et al. Relation between mutations of the cystic fibrosis gene and idiopathic pancreatitis. *N Engl J Med.* 1998;339:653–658.

66. Felderbauer P, Hoffmann P, Einwachter H, et al. A novel mutation of the calcium sensing receptor gene is associated with chronic pancreatitis in a family with heterozygous SPINK1 mutations. *BMC Gastroenterol.* 2003;3:34.

67. Masson E, Chen JM, Scotet V, et al. Association of rare chymotrypsinogen C (*CTRC*) gene variations in patients with idiopathic chronic pancreatitis. *Hum Genet.* 2008;123:83–91.

68. Muddana V, Lamb J, Greer JB, et al. Association between calcium sensing receptor gene polymorphisms and chronic pancreatitis in a US population: role of serine protease inhibitor Kazal 1type and alcohol. *World J Gastroenterol.* 2008;14:4486–4491.

69. Pfutzer RH, Barmada MM, Brunskill AP, et al. SPINK1/PSTI polymorphisms act as disease modifiers in familial and idiopathic chronic pancreatitis. *Gastroenterology.* 2000;119:615–623.

70. Santhosh S, Witt H, te Morsche RH, et al. A loss of function polymorphism (G191R) of anionic trypsinogen (PRSS2) confers protection against chronic pancreatitis. *Pancreas.* 2008;36:317–320.

71. Sharer N, Schwarz M, Malone G, et al. Mutations of the cystic fibrosis gene in patients with chronic pancreatitis. *N Engl J Med.* 1998;339:645–652.

72. Whitcomb DC, Gorry MC, Preston RA, et al. Hereditary pancreatitis is caused by a mutation in the cationic trypsinogen gene. *Nat Genet.* 1996;14:141–145.

73. Witt H, Luck W, Hennies HC, et al. Mutations in the gene encoding the serine protease inhibitor, Kazal type 1 are associated with chronic pancreatitis. *Nat Genet.* 2000;25:213–216.

74. Witt H, Sahin-Toth M, Landt O, et al. A degradation-sensitive anionic trypsinogen (PRSS2) variant protects against chronic pancreatitis. *Nat Genet.* 2006;38:668–673.

75. Ooi CY, Dorfman R, Cipolli M, et al. Type of *CFTR* mutation determines risk of pancreatitis in patients with cystic fibrosis. *Gastroenterology.* 2011;140:153–161.

76. Schneider A, Singer MV. Alcoholic pancreatitis. *Dig Dis.* 2005;23:222–231.

77. Zhang L, Chari S, Smyrk TC, et al. Autoimmune pancreatitis (AIP) type 1 and type 2: an international consensus study on histopathologic diagnostic criteria. *Pancreas.* 2011;40:1172–1179.

78. Klöppel G. Chronic pancreatitis, pseudotumors and other tumor-like lesions. *Mod Pathol.* 2007;20:S113–S131.

79. Alpern MB, Sandler MA, Kellman GM, et al. Chronic pancreatitis: ultrasonic features. *Radiology.* 1985;155:215–219.

80. Tsao TF, Kang RJ, Tyan YS, et al. Color Doppler twinkling artifact related to chronic pancreatitis with parenchymal calcification. *Acta Radiol.* 2006;47:547–548.

81. Lankisch PG, Otto J, Erkelenz I, et al. Pancreatic calcifications: no indicator of severe exocrine pancreatic insufficiency. *Gastroenterology.* 1986;90:617–621.

82. Ammann RW, Muench R, Otto R, et al. Evolution and regression of pancreatic calcification in chronic pancreatitis. A prospective long-term study of 107 patients. *Gastroenterology.* 1988;95:

1018–1028.

83. Shawker TH, Linzer M, Hubbard VS. Chronic pancreatitis: the diagnostic significance of pancreatic size and echo amplitude. *J Ultrasound Med.* 1984;3:267–272.

84. Remer EM, Baker ME. Imaging of chronic pancreatitis. *Radiol Clin North Am.* 2002;40:1229–1242 v.

85. Siddiqi AJ, Miller F. Chronic pancreatitis: ultrasound, computed tomography, and magnetic resonance imaging features. *Semin Ultrasound CT MR.* 2007;28:384–394.

86. Kim DH, Pickhardt PJ. Radiologic assessment of acute and chronic pancreatitis. *Surg Clin North Am.* 2007;87:1341–1358 viii.

87. Miller FH, Keppke A, Balthazar E. Imaging pancreatitis. In: Gore RM LM, ed. *Textbook of Gastrointestinal Radiology.* 3rd ed. Philadelphia, PA: WB Saunders; 2008:1885–1914.

88. Luetmer PH, Stephens DH,Ward EM. Chronic pancreatitis: reassessment with current CT. *Radiology.* 1989;171:353–357.

89. Scuro LA, Cavallini G, Benini L, et al. Pancreatic calcifications in patients with chronic pancreatitis. A sign of long-lasting or severe disease?. *Int J Pancreatol.* 1990;6:139–150.

90. Ichikawa T, Sou H, Araki T, et al. Duct-penetrating sign at MRCP: usefulness for differentiating inflammatory pancreatic mass from pancreatic carcinomas. *Radiology.* 2001;221:107–116.

91. Johnson PT, Outwater EK. Pancreatic carcinoma versus chronic pancreatitis: dynamic MR imaging. *Radiology.* 1999;212:213–218.

92. Yamada Y, Mori H, Matsumoto S, et al. Pancreatic adenocarcinoma versus chronic pancreatitis: differentiation with triple-phase helical CT. *Abdom Imaging.* 2010;35:163–171.

93. Braganza JM, Lee SH, McCloy RF, et al. Chronic pancreatitis. *Lancet.* 2011;377:1184–1197.

94. Balci C. MRI assessment of chronic pancreatitis. *Diagn Interv Radiol.* 2011;17:249–254.

95. Cappelliez O, Delhaye M, Devière J, et al. Chronic pancreatitis: evaluation of pancreatic exocrine function with MR pancreatography after secretin stimulation. *Radiology.* 2000;215:358–364.

96. Gillams A, Lees WR. Quantitative secretin MRCP (QMRCP): results in 215 patients with know or suspected pancreatic pathology. *Eur Radiol.* 2007;17:2984–2990.

97. Punwani S, Gillams AR, Lees WR. Non-invasive quantification of pancreatic exocrine function using secretin-MRCP. *Eur Radiol.* 2003;13:273–276.

98. Bali MA, Sztantics A, Metens T, et al. Quantification of pancreatic exocrine function with secretin-MRCP: normal values and short-term effects of pancreatic duct drainage procedures in chronic pancreatitis. *Eur Radiol.* 2005;15:2110–2121.

99. Edelman RR, Salanitri G, Brand R, et al. Magnetic resonance imaging of the pancreas at 3.0 Tesla: quantitative and quantitative comparison with 1.5 Tesla. *Invest Radiol.* 2006;41:175–180.

100. Coenegrachts K, Van Steenbergen W, De Keyzer F, et al. Dynamic contrast-enhanced MRI of the pancreas: initial results in healthy volunteers and patients with chronic pancreatitis. *J Magn Reson Imaging.* 2004;20:990–997.

101. Sanyal R, Stevens T, Novak E, et al. Secretin-enhanced MRCP: review of technique and application with proposal for quantification of exocrine function. *AJR Am J Roentgenol.* 2012;198(1):124–132.

102. Sandrasegaran K, Lin C, Akisik FM, et al. State-of-the-art pancreatic MRI. *AJR Am J Roentgenol.* 2010;195(1):42–53.

103. Lankisch PG. Pancreatic ductal abnormalities documented by secretinenhanced MRCP in asymptomatic subjects with chronic pancreatic hyperenzymemia. *Am J Gastroenterol.* 2010;105(3):703–705.

104. Balci NC, Smith A, Momtahen AJ, et al. MRI and S-MRCP findings in patients with suspected chronic pancreatitis: correlation with endoscopic pancreatic function testing (ePFT). *J Magn Reson Imaging.* 2010;31(3):601–606.

105. Zuccaro P, Stevens T, Repas K, et al. Magnetic resonance cholangiopancreatography reports in the evaluation of chronic pancreatitis: a need for quality improvement. *Pancreatology.* 2009;9(6):764–769.

106. Donati F, Boraschi P, Gigoni R, et al. Secretin-stimulated MR cholangio-pancreatography in the evaluation of asymptomatic patients with non-specific pancreatic hyperenzymemia. *Eur J Radiol.*

2010;75(2):e38–e44.

107. Balci NC, Perman WH, Saglam S, et al. Diffusion-weighted magnetic resonance imaging of the pancreas. *Top Magn Reson Imaging.* 2009;20(1):43–47.

108. Erturk SM. Chronic pancreatitis and diffusion-weighted MR imaging. *Radiology.* 2009;252(1):316.

109. Akisik MF, Sandrasegaran K, Jennings SG, et al. Diagnosis of chronic pancreatitis by using apparent diffusion coefficientmeasurements at 3.0-T MR following secretin stimulation. *Radiology.* 2009;252(2):418–425.

110. Sainani NI, Conwell DL. Secretin-enhanced MRCP: proceed with cautious optimism. *Am J Gastroenterol.* 2009;104(7):1787–1789.

111. Conwell DL, Banks PA. Chronic pancreatitis. *Curr Opin Gastroenterol.* 2008;24(5):586–590.

112. Akisik MF, Aisen AM, Sandrasegaran K, et al. Assessment of chronic pancreatitis: utility of diffusion-weighted MR imaging with secretin enhancement. *Radiology.* 2009;250(1):103–109.

113. Balci NC, Momtahen AJ, Akduman EI, et al. Diffusion-weighted MRI of the pancreas: correlation with secretin endoscopic pancreatic function test (ePFT). *Acad Radiol.* 2008;15(10):1264–1268.

114. Alkaade S, CemBalci N, Momtahen AJ, et al. Normal pancreatic exocrine function does not exclude MRI/MRCP chronic pancreatitis findings. *J Clin Gastroenterol.* 2008;42(8):950–955.

115. Pascual I, Soler J, Peña A, et al. Morphological and functional evaluation of the pancreatic duct with secretin-stimulated magnetic resonance cholangiopancreatography in alcoholic pancreatitis patients. *Dig Dis Sci.* 2008;53(12):3234–3241.

116. Sai JK, Suyama M, Kubokawa Y, et al. Diagnosis of mild chronic pancreatitis (Cambridge classification): comparative study using secretin injection-magnetic resonance cholangiopancreatography

and endoscopic retrograde pancreatography. *World J Gastroenterol.* 2008;14(8):1218–1221.

117. Bilgin M, Bilgin S, Balci NC, et al. Magnetic resonance imaging and magnetic resonance cholangiopancreatography findings compared with fecal elastase 1 measurement for the diagnosis of chronic pancreatitis. *Pancreas.* 2008;36(1):e33–e39.

118. Balci NC, Alkaade S, Magas L, et al. Suspected chronic pancreatitis with normal MRCP: findings on MRI in correlation with secretin MRCP. *J Magn Reson Imaging.* 2008;27(1):125–131.

119. Czakó L. Diagnosis of early-stage chronic pancreatitis by secretinenhanced magnetic resonance cholangiopancreatography. *J Gastroenterol.* 2007;42(suppl 17):113–117.

120. Sugiyama M, Haradome H, Atomi Y. Magnetic resonance imaging for diagnosing chronic pancreatitis. *J Gastroenterol.* 2007;42(suppl 17):108–112.

121. Wiersema MJ, Wiersema LM. Endosonography of the pancreas: normal variation versus changes of early chronic pancreatitis. *Gastrointest Endosc Clin N Am.* 1995;5:487–496.

122. Wallace MB, Hawes RH, Durkalski V, et al. The reliability of EUS for the diagnosis of chronic pancreatitis: interobserver agreement among experienced endosonographers. *Gastrointest Endosc.*

2001;53:294–299.

123. Catalano MF, Lahoti S, Alcocer E, et al. Dynamic imaging of the pancreas using real-time endoscopic ultrasonography with secretin stimulation. *Gastrointest Endosc.* 1998;48:580–587.

124. Stevens T, Lopez R, Adler DG, et al. Multicenter comparison of the interobserver agreement of standard EUS scoring and Rosemont classification scoring for diagnosis of chronic pancreatitis. *Gastrointest Endosc.* 2010;71:519–526.

125. Rajan E, Clain JE, Levy MJ, et al. Age-related changes in the pancreas identified by EUS: a prospective evaluation. *Gastrointest Endosc.* 2005;61:401–406.

126. Nattermann C, Goldschmidt AJ, Dancygier H. Endosonography in chronic pancreatitis—a comparison between endoscopic retrograde pancreatography and endoscopic ultrasonography. *Endoscopy.* 1993;25:565–570.

127. Catalano MF, Sahai A, Levy M, et al. EUS-based criteria for the diagnosis of chronic pancreatitis: the Rosemont classification. *Gastrointest Endosc.* 2009;69:1251–1261.

128. Topazian M, Enders F, Kimmey M, et al. Interobserver agreement for EUS findings in familial pancreatic-cancer kindreds. *Gastrointest Endosc.* 2007;66:62–67.

129. NIH state-of-the-science statement on endoscopic retrograde cholangiopancreatography (ERCP) for diagnosis and therapy. *NIH Consens State Sci Statements.* 2002;19:1–26.

130. Adler DG, Lichtenstein D, Baron TH, et al. The role of endoscopy in patients with chronic pancreatitis. *Gastrointest Endosc.* 2006;63:933–937.

131. Axon AT, Classen M, Cotton PB, et al. Pancreatography in chronic pancreatitis: international definitions. *Gut.* 1984;25:1107–1112.

132. Ladas SD, Tassios PS, Giorgiotis K, et al. Pancreatic duct width: its significance as a diagnostic criterion for pancreatic disease. *Hepatogastroenterology.* 1993;40:52–55.

133. Kang JK, Chung JB, Moon YM, et al. The normal endoscopic pancreatogram in Koreans. *Korean J Intern Med.* 1989;4:74–79.

134. Reuben A, Johnson AL, Cotton PB. Is pancreatogram interpretation reliable?—a study of observer variation and error. *Br J Radiol.* 1978;51:956–962.

135. Anand BS, Vij JC, Mac HS, et al. Effect of aging on the pancreatic ducts: a study based on endoscopic retrograde pancreatography. *Gastrointest Endosc.* 1989;35:210–213.

136. Jones SN, McNeil NI, Lees WR. The interpretation of retrograde pancreatography in the elderly. *Clin Radiol.* 1989;40:393–396.

137. Schmitz-Moormann P, Himmelmann GW, Brandes JW, et al. Comparative radiological and morphological study of human pancreas. Pancreatitis like changes in postmortem ductograms and their morphological pattern. Possible implication for ERCP. *Gut.* 1985;26:406–414.

138. Angelini G, Cavallini G, Pederzoli P, et al. Long-term outcome of acute pancreatitis: a prospective study with 118 patients. *Digestion.* 1993;54:143–147.

139. Forsmark CE, Toskes PP. What does an abnormal pancreatogram mean?. *Gastrointest Endosc Clin N Am.* 1995;5:105–123.

140. Canto MI, Goggins M, Hruban RH, et al. Screening for early pancreatic neoplasia in high-risk individuals: a prospective controlled study. *Clin Gastroenterol Hepatol.* 2006;4:766–781 quiz 665.

141. Brentnall TA, Bronner MP, Byrd DR, et al. Early diagnosis and treatment of pancreatic dysplasia in patients with a family history of pancreatic cancer. *Ann Intern Med.* 1999;131:247–255.

142. Vitale GC, Davis BR, Zavaleta C, et al. Endoscopic retrograde cholangiopancreatography and histopathology correlation for chronic pancreatitis. *Am Surg.* 2009;75:649–653 discussion 653.

143. Sica GT, Braver J, Cooney MJ, et al. Comparison of endoscopic retrograde cholangiopancreatography with MR cholangiopancreatography in patients with pancreatitis. *Radiology.* 1999;210:605–610.

144. Calvo MM, Bujanda L, Calderon A, et al. Comparison between magnetic resonance cholangiopancreatography and ERCP for evaluation of the pancreatic duct. *Am J Gastroenterol.* 2002;97:347–353.

145. Parsi MA, Conwell DL, Zuccaro G, et al. Findings on endoscopic retrograde cholangiopancreatography and pancreatic function test in suspected chronic pancreatitis and negative cross-sectional imaging. *Clin Gastroenterol Hepatol.* 2008;6:1432–1436.

146. Malfertheiner P, Buchler M, Stanescu A, et al. Exocrine pancreatic function in correlation to ductal and parenchymal morphology in chronic pancreatitis. *Hepatogastroenterology.* 1986;33:110–114.

147. Chowdhury RS, Forsmark CE. Reviewarticle: pancreatic function testing. *Aliment Pharmacol Ther.* 2003;17:733–750.

148. Pandol SJ. Pancreatic secretion. In: Feldman M, Friedman LS, Brandt LJ, eds. *Sleisenger and Fordtran's Gastrointestinal and Liver Disease.* 8th ed. Philadelphia, PA: Saunders-Elsevier; 2006.

149. Lieb JG 2nd, Draganov PV. Pancreatic function testing: here to stay for the 21st century. *World J Gastroenterol.* 2008;14:3149–3158.

150. Hahn JU, Kerner W, Maisonneuve P, et al. Low fecal elastase 1 levels do not indicate exocrine pancreatic insufficiency in type-1 diabetes mellitus. *Pancreas.* 2008;36:274–278.

151. Amann ST, Bishop M, Curington C, et al. Fecal pancreatic elastase 1 is inaccurate in the diagnosis of chronic pancreatitis. *Pancreas.* 1996;13:226–230.

152. Gullo L,Ventrucci M, Tomassetti P, et al. Fecal elastase 1 determination in chronic pancreatitis. *Dig Dis Sci.* 1999;44:210–213.

153. Schneider A, Funk B, Caspary W, et al. Monoclonal versus polyclonal ELISA for assessment of fecal elastase concentration: pitfalls of a new assay. *Clin Chem.* 2005;51:1052–1054.

154. Johnson SG, Levitt MD. Relation between serum pancreatic isoamylase concentration and pancreatic exocrine function. *Am J Dig Dis.* 1978;23:914–918.

155. Yamamura J, Grosse R, Jarisch A, et al. Pancreatic exocrine function and cardiac iron in patients with iron overload and with thalassemia. *Pediatr Blood Cancer.* 2011;57:674–676.

156. Stormon MO, Ip WF, Ellis L, et al. Evidence of a generalized defect of acinar cell function in Shwachman-Diamond syndrome. *J Pediatr Gastroenterol Nutr.* 2010;51:8–13.

157. Cleghorn G, Benjamin L, Corey M, et al. Serum immunoreactive pancreatic lipase and cationic trypsinogen for the assessment of exocrine pancreatic function in older patients with cystic fibrosis. *Pediatrics.* 1986;77:301–306.

158. Jacobson DG, Curington C, Connery K, et al. Trypsin-like immunoreactivity as a test for pancreatic insufficiency. *N Engl J Med.* 1984;310:1307–1309.

159. Nousia-Arvanitakis S. Fecal elastase-1 concentration: an indirect test of exocrine pancreatic function and a marker of an enteropathy regardless of cause. *J Pediatr Gastroenterol Nutr.* 2003;36:314–315.

160. Herzig KH, Purhonen AK, Rasanen KM, et al. Fecal pancreatic elastase-1 levels in older individuals without known gastrointestinal diseases or diabetes mellitus. *BMC Geriatr.* 2011;11:4.

161. Le Moine O, Devaster JM, Deviere J, et al. Trypsin activity. A new marker of acute alcoholic pancreatitis. *Dig Dis Sci.* 1994;39:2634–2638.

162. Hahn JU, Bochnig S, Kerner W, et al. A new fecal elastase 1 test using polyclonal antibodies for the detection of exocrine pancreatic insufficiency. *Pancreas.* 2005;30:189–191.

163. Dominguez-Munoz JE, Iglesias-Garcia J, Vilarino-Insua M, et al. 13C-mixed triglyceride breath test to assess oral enzyme substitution therapy in patients with chronic pancreatitis. *Clin Gastroenterol Hepatol.* 2007;5:484–488.

164. Keller J, Bruckel S, Jahr C, et al. A modified (1)(3)C-mixed triglyceride breath test detects moderate pancreatic exocrine insufficiency. *Pancreas.* 2011;40:1201–1205.

165. Weintraub A, Blau H, Mussaffi H, et al. Exocrine pancreatic function testing in patients with cystic fibrosis and pancreatic sufficiency: a correlation study. *J Pediatr Gastroenterol Nutr.* 2009;48:306–310.

166. Amann ST, Josephson SA, Toskes PP. Acid steatocrit: a simple, rapid gravimetric method to determine steatorrhea. *Am J Gastroenterol.* 1997;92:2280–2284.

167. Patane R, Bottaro G, Ricca O, et al. ["Qualitative test of fecal fat" and "steatocrit," simple complementary methods for the evaluation of steatorrhea in childhood]. *Pediatr Med Chir.* 1988;10:403–408.

168. Goldberg DM. Proteases in the evaluation of pancreatic function and pancreatic disease. *Clin Chim Acta.* 2000;291:201–221.

169. Pieramico O, Nelson DK, Glasbrenner B, et al. Impaired interdigestive pancreatic polypeptide release. Early hormonal disorder in chronic pancreatitis?. *Dig Dis Sci.* 1994;39:69–74.

170. Owyang C, Scarpello JH, Vinik AI. Correlation between pancreatic enzyme secretion and plasma concentration of human pancreatic polypeptide in health and in chronic pancreatitis. *Gastroenterology.* 1982;83:55–62.

171. Dreiling DA, Hollander F. Studies in pancreatic function: preliminary series of clinical studies with the secretin test. *Gastroenterology.* 1948;11:714–729.

172. Hayakawa T, Kondo T, Shibata T, et al. Relationship between pancreatic exocrine function and histological changes in chronic pancreatitis. *Am J Gastroenterol.* 1992;87:1170–1174.

173. Go VLW, Hofmann AF, Summerskill WHJ. Simultaneous measurements of total pancreatic, biliary, and gastric outputs in man using a perfusion technique. *Gastroenterology.* 1970;58:321–328.

174. Waxman I, Steer ML, Freedman SD. Endoscopically assisted direct pancreatic function testing: a simplified technique. *Gastrointest Endosc.* 1998;44:630.

175. Stevens T, Conwell DL, Zuccaro G, et al. A prospective crossover study comparing secretin-stimulated endoscopic and Dreiling tube pancreatic function testing in patients evaluated for chronic pancreatitis. *Gastrointest Endosc.* 2008;67:458–466.

176. Conwell DL, Zuccaro G, Purich E, et al. The effect of moderate sedation on exocrine pancreas function in normal healthy subjects: a prospective, randomized, cross-over trial using the synthetic porcine secretin stimulated endoscopic pancreatic function test (ePFT). *Am J Gastroenterol.* 2005;100:1161–1166.

177. Stevens T, Conwell DL, Zuccaro G, et al. The efficiency of endoscopic pancreatic function testing is optimized using duodenal aspirates at 30 and 45 minutes after intravenous secretin. *Am J Gastroenterol.* 2007;102:297–301.

178. Moolsintong P, Burton FR. Pancreatic function testing is best determined by the extended endoscopic collection technique. *Pancreas.* 2008;37:418–421.

179. Draganov P, Patel A, Fazel A, et al. Prospective evaluation of the accuracy of the intraductal secretin stimulation test in the diagnosis of chronic pancreatitis. *Clin Gastroenterol Hepatol.* 2005;3:695–699.

180. Stevens T, Dumot JA, Parsi MA, et al. Combined endoscopic ultrasound and secretin endoscopic pancreatic function test in patients evaluated for chronic pancreatitis. *Dig Dis Sci.* 2010;55:2681–2687.

181. Kitagawa M, Naruse S, Ishiguro H, et al. Evaluating exocrine function tests for diagnosing chronic pancreatitis. *Pancreas.* 1997;15:402–408.

182. Catalano MF, Lahoti S, Geenen JE, et al. Prospective evaluation of endoscopic ultrasonography, endoscopic retrograde pancreatography, and secretin test in the diagnosis of chronic pancreatitis. *Gastrointest Endosc.* 1998;48:11–17.

183. Chowdhury R, Bhutani MS, Mishra G, et al. Comparative analysis of direct pancreatic function testing versus morphological assessment by endoscopic ultrasonography for the evaluation of chronic

unexplained abdominal pain of presumed pancreatic origin. *Pancreas.* 2005;31:63–68.

184. Heij HA, Obertop H, van Blankenstein M, et al. Relationship between functional and histological changes in chronic pancreatitis. *Dig Dis Sci.* 1986;31:1009–1013.

185. Varadarajulu S, Eltoum I, Tamhane A, et al. Histopathologic correlates of noncalcific chronic pancreatitis by EUS: a prospective tissue characterization study. *Gastrointest Endosc.* 2007;66:501–509.

186. Chong AK, Hawes RH, Hoffman BJ, et al. Diagnostic performance of EUS for chronic pancreatitis: a comparison with histopathology. *Gastrointest Endosc.* 2007;65:808–814.

187. Albashir S, Bronner MP, Parsi MA, et al. Endoscopic ultrasound, secretin endoscopic pancreatic function test, and histology: correlation in chronic pancreatitis. *Am J Gastroenterol.* 2010;105:2498–2503.

188. Vega-Peralta J, Manivel C, Attam R, et al. *Accuracy of EUS for diagnosis of minimal change chronic pancreatitis (MCCP): correlation with histopathology in 50 patients undergoing total pancreatectomy (TP) with islet autotransplantion (IAT) (Abstract). 42nd Annual Meeting of the*

*American Pancreatic Association.* Chicago, IL: Lippincott Williams & Wilkins; 2011.