

**Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures: An Updated Report**

*American Society of Anesthesiologists*

**Bibliography in Alphabetical Order**

1. Abe K, Shibata M, Demizu A, Hazano S, Sumikawa K, Enomoto H, Mashimo T, Tashiro C, Yoshiya I: Effect of oral and intramuscular famotidine on pH and volume of gastric contents. *Anesth Analg* 1989; 68:541-544
2. Adelhoj B, Petring OU, Frosig F, Bigler DR, Jensen BN: Influence of cigarette smoking on the risk of acid pulmonary aspiration. *Acta Anaesthesiol Scand* 1997; 31:7-9
3. Andersson H, Zarén B, Frykholm P: Low incidence of pulmonary aspiration in children allowed intake of clear fluids until called to the operating suite. *Pediatric Anesthesia* 2015;25:770-777
4. Awad S, Constantin-Teodosiu D, Constantin D, Rowlands B, Fearon KCH, Macdonald IA, Lobo D: Cellular mechanisms underlying the protective effects of preoperative feeding: A randomized study investigating muscle and liver glycogen content, mitochondrial function, gene and protein expression. *Ann of Surg* 2010;252:247-253
5. Awad S, Stephens F, Shannon C, Lobo DN: Perioperative perturbations in carnitine metabolism are attenuated by preoperative carbohydrate treatment: Another mechanism by which preoperative feeding may attenuate development of postoperative insulin resistance. *Clin Nutr* 2012;31:717-720
6. Bhatia N, Palta S, Arora K: Comparison of the effect of a single dose of erythromycin with pantoprazole on gastric content volume and acidity in elective general surgery patients. *J Anaesthesiol Clin Pharmacol* 2011;27:195-8
7. Bhattacharyya T, Sarbapalli D, Pal R, Sarkar U, Kar S, Kundu KK, Zaman FA: Evaluating ranitidine, pantoprazole and placebo on gastric pH in elective surgery. *Saudi J Anaesth* 2011;5:67-72
8. Bisgaard T, Kristiansen VB, Hjortso NC, Jacobsen LS, Rosenberg J, Kehlet H: Randomized clinical trial comparing an oral carbohydrate beverage with placebo before cholecystectomy. *Br J Surg* 2004; 91:151-158
9. Bopp C, Hofer S, Klein A, Weigand MA, Martin E, Gust R: A liberal preoperative fasting regimen improves patient comfort and satisfaction with anesthesia care in day-stay minor surgery. *Minerva Anesthesiol* 2011;77:680-686
10. Borges Dock-Nascimento D, Aguilar-Nascimento JE, Caporossi C, Sepulveda Magalhães Faria M, Bragagnolo R, Caporossi FS, Linetzky Waitzberg D: Safety of oral glutamine in the abbreviation of preoperative fasting: a double-blind, controlled, randomized clinical trial. *Nutr Hosp* 2011;26:86-90
11. Breuer J., von Dossow V, von Heymann C, Griesbach M, von Schickfus M, Mackh E, Hacker C, Elgeti U, Konertz W, Wernecke KD, Spids CD: Preoperative oral carbohydrate administration to ASA III-IV patients undergoing elective cardiac surgery. *Anesth Analg* 2006: 103:1099-1108
12. Breuer JP, Prochnow L.: Pre-operative fasting: a nationwide survey of German anaesthesia departments. *Acta Anaesth Scandinavica* 2010;54:313-20

13. Callander P, Humphrey D, Brock utne JG: The use of gastrozepin as a prophylaxis against pulmonary acid aspiration: a new muscarinic receptor antagonist. *Eur J Anaesthesiol* 1987; 4:149-153
14. Castillo-Zamora C, Castillo-Peralta LA, Nava-Ocampo AA: Randomized trial comparing overnight preoperative fasting period vs oral administration of apple juice at 06:00-06:30 am in pediatric orthopedic surgical patients. *Paediatr Anaesth* 2005; 15:638-642
15. Coombs DW, Hooper D, Colton T: Acid-aspiration prophylaxis by use of preoperative oral administration of cimetidine. *Anesthesiology* 1979; 51:352-356
16. Coombs DW, Hooper D, Colton T: Pre-anesthetic cimetidine alteration of gastric fluid volume and pH. *Anesth Analg* 1979; 58:183-188
17. Coombs DW, Hooper DW: Cimetidine as a prophylactic against acid aspiration at tracheal extubation. *Can Anaesth Soc J* 1981, 28:33-38
18. Cramb R, Fargas Babjak A, Hirano G: Intraoperative prochlorperazine for prevention of post-operative nausea and vomiting. *Can J Anaesth* 1989; 36:565-567
19. Crawford M, Lerman J, Christensen S, Farrow Gillespie A: Effects of duration of fasting on gastric fluid pH and volume in healthy children. *Anesth Analg* 1990; 71:400-403
20. Cruickshank RH, Morrison DA, Bamber PA, Nimmo WS: Effect of i.v. omeprazole on the pH and volume of gastric contents before surgery. *Br J Anaesth* 1989; 63:536-540
21. Dattatraya G, Ullhas M: A Comparative efficacy of conventional H<sub>2</sub> receptor blocker ranitidine and newer proton pump inhibitors omeprazole, pantoprazole and esomeprazole for improvement of gastric fluid property in adults undergoing elective surgery. *IOSR-JDMS* 2015;14:45-8
22. de Aguilar-Nascimento JE, Caporossi C, Metelo JS, Tanajura GH, Canevari-de-Oliveira M, da Cunha Costa R: Safe intake of an oral supplement containing carbohydrates and whey protein shortly before sedation to gastroscopy; a double blind, randomized trial. *Nutr Hosp* 2014;29:681-6
23. de Aguilar-Nascimento JE, Salomao AB, Caporossi C, Diniz BN: Clinical benefits after the implementtion of a multimodal perioperative protocol in elderly patients. *Arq Gastr* 2010;47:178-83
24. de Oliveira KGB, Balsan M, de Souza Oliveira S, Aguilar-Nascimento JE: Does abbreviation of preoperative fasting to two hours with carbohydrates increase the anesthetic risk? *Res Bras Anesthesiol* 2009;59:577-84
25. De Silva AP, Amarasiri L, Liyanage MN, Kottachchi D, Dassanayake AS, de Silva HJ: One-hour fast for water and six-hour fast for solids prior to endoscopy provides good endoscopic vision and results in minimum patient discomfort. *J Gastroenterol Hepatol* 2009;24:1095-7
26. Dennhardt N, Beck C, Huber D, Nickel K, Sander B, Witt LH, Boething D, Sumpelmann R: Impact of preoperative fasting times on blood glucose concentration, ketone bodies and acid-base balance in children younger than 36 months: A prospective observational study. *Eur J Anaesth* 2015;32:857-61
27. Detmer MD, Pandit SK, Cohen PJ: Prophylactic single-dose oral antacid therapy in the preoperative period--comparison of cimetidine and Maalox. *Anesthesiology* 1979; 51:270-273
28. Dimich I, Katende R, Singh PP, Mikula S, Sonnenklar N: The effects of intravenous cimetidine and metoclopramide on gastric pH and volume in outpatients. *J Clin Anesth* 1991; 3:40-44

29. Dunham CM, Hileman BM, Hutchinson AE, Chance EA, Huang GS. Perioperative hypoxemia is common with horizontal positioning during general anesthesia and is associated with major adverse outcomes: a retrospective study of consecutive patients. *BMC Anesthesiol* 2014;14:43
30. Durrant JM, Strunin L: Comparative trial of the effect of ranitidine and cimetidine on gastric secretion in fasting patients at induction of anaesthesia. *Can Anaesth Soc J* 1982; 29:446-451
31. Engelhardt T, Wilson G, Horne L, Weiss M, Schmitz A: Are you hungry? Are you thirsty? -fasting times in elective outpatient pediatric patients. *Paediatr Anaesth* 2011;21:964-8
32. Enoki T, Hatano Y, Tsujimura Y, Nomura R: Attenuation of gastric effects of famotidine by preoperative administration of intravenous fluids. *Anesth Analg* 1992; 74:68-71
33. Escolano F, Castano J, Pares N, Bisbe E, Monterde J: Comparison of the effects of famotidine and ranitidine on gastric secretion in patients undergoing elective surgery. *Anaesthesia* 1989; 44:212-215
34. Faria MS, de Aguilar-Nascimento JE, Pimenta OS, Alvarenga LC Jr, Dock-Nascimento DB, Shlessarenko N: Preoperative fasting of 2 hours minimizes insulin resistance and organic response to trauma after video-cholecystectomy: a randomized, controlled, clinical trial. *World J Surg* 2009; 33:1158-1164
35. Faure EAM, Lim HS, Block BS, Tan PL, Roizen MF: Sodium bicarbonate buffers gastric acid during surgery in obstetric and gynecologic patients. *Anesthesiology* 1987; 67:274-277
36. Foulkes E, Jenkins LC: A comparative evaluation of cimetidine and sodium citrate to decrease gastric acidity: effectiveness at the time of induction of anaesthesia. *Can Anaesth Soc J* 1981; 28:29-32
37. Francis RN, Kwik RS: Oral ranitidine for prophylaxis against Mendelson's syndrome. *Anesth Analg* 1982; 61:130-132
38. Gawecka A, Mierzewska-Schmidt M: Tolerance of, and metabolic effects of, preoperative oral carbohydrate administration in children - a preliminary report. *Anaesthesiol Intensive Ther* 2014; 46:61-4
39. Gilbert SS, Easy WR, Fitch WW: The effect of pre-operative oral fluids on morbidity following anaesthesia for minor surgery. *Anaesthesia* 1995; 50:79-81
40. Gipson SL, Stovall TG, Elkins TE, Crumrine RS: Pharmacologic reduction of the risk of aspiration. *South Med J* 1986; 79:1356-1358
41. Gombar S, Dureja J, Kiran S, Gombar K, Chhabra B: The effect of pre-operative intake of oral water and ranitidine on gastric fluid volume and pH in children undergoing elective surgery. *J Indian Med Assoc* 1997; 95:166-168
42. Gonzalez ER, Butler SA, Jones MK, Morford DA, Walsh WM, Kallar SK: Cimetidine versus ranitidine: single-dose, oral regimen for reducing gastric acidity and volume in ambulatory surgery patients. *Drug Intell Clin Pharm* 1987; 21:192-195
43. Gonzalez ER, Kallar SK, Dunnivant BW: Single-dose intravenous H2 blocker prophylaxis against aspiration pneumonitis: assessment of drug concentration in gastric aspirate. *AANA J* 1989; 57:238-243
44. Goodwin AP, Rowe WL, Ogg TW, Samaan A: Oral fluids prior to day surgery. The effect of shortening the pre-operative fluid fast on postoperative morbidity. *Anaesthesia* 1991; 46:1066-1068

45. Gouda BB, Lyndon AM, Badhe A, Shorten GD: A comparison of the effects of ranitidine and omeprazole on volume and pH of gastric contents in elective surgical patients. *Eur J Anaesth* 2004; 21:260-264
46. Goudsouzian N, Cot'e CJ, Liu LM, Dedrick DF: The dose-response effects of oral cimetidine on gastric pH and volume in children. *Anesthesiology* 1981; 55:533-536
47. Gronnebech H, Johansson G, Smedebol M, Valentin N: Glycopyrrolate vs. atropine during anaesthesia for laryngoscopy and bronchoscopy. *Acta Anaesthesiol Scand* 1993; 37:454-457
48. Hardy JF, Lepage Y, Bonneville Chouinard N: Occurrence of gastroesophageal reflux on induction of anaesthesia does not correlate with the volume of gastric contents. *Can J Anaesth* 1990; 37:502-508
49. Harris PW, Morison DH, Dunn GL, Fargas Babjak AM, Moudgil GC, Smedstad KG, Woo J: Intramuscular cimetidine and ranitidine as prophylaxis against gastric aspiration syndrome--a randomized double-blind study. *Can Anaesth Soc J* 1984; 31:599-603
50. Harter RL, Kelly WB, Kramer MG, Perez CE, Dzwonczyk RR: A comparison of the volume and pH of gastric contents of obese and lean surgical patients. *Anesth Analg* 1998; 86:147-152
51. Haskins DA, Jahr JS, Texidor M, Ramadhyani U: Single-dose oral omeprazole for reduction of gastric residual acidity in adults for outpatient surgery. *Acta Anesth Scand* 1992; 36:513-515
52. Hausel J, Nygren J, Lagerkranser M, Hellström PM, Hammarqvist F, Almström C, Lindh A, Thorell A, Ljungqvist O: A carbohydrate-rich drink reduces preoperative discomfort in elective surgery patients. *Anesth Analg* 2001; 93:1344-1350
53. Henderson JM, Spence DG, Clarke WN, Bonn GG, Noel LP: Sodium citrate in paediatric outpatients. *Can J Anaesth* 1987; 34:560-562
54. Hester JB, Heath ML: Pulmonary acid aspiration syndrome: should prophylaxis be routine? *Br J Anaesth* 1977; 49:595-599
55. Hett DA, Scott RC, Risdall JE: Lansoprazole in the prophylaxis of acid aspiration during elective surgery. *Br J Anaesth* 1995; 74:614-615
56. Hirota K, Imai A, Kudo M, Hashimoto H, Kushikata T: Efficacy of a single 24-hour pre-anesthetic dose of proton pump inhibitors. *J Gastroenterol Hepatol* 2009;24:1244-7
57. Husemeyer RP, Davenport HT, Rajasekaran T: Cimetidine as a single oral dose for prophylaxis against Mendelson's syndrome. *Anaesthesia* 1978; 33:775-778
58. Hutchinson A, Maltby JR, Reid CR: Gastric fluid volume and pH in elective patients. Part I: coffee or orange juice versus overnight fast. *Can J Anaesth* 1988; 35:12-15
59. Hutchinson BR: Preoperative magnesium trisilicate in infants. *Anaesth Intensive Care* 1976; 4:192-195
60. Ingebo KR, Rayhorn NJ, Hecht RM, Shelton MT, Silber GH, Shub MD: Sedation in children: adequacy of two-hour fasting. *J Pediatr* 1997; 131:155-158
61. Ishihara H, Singh H, Giesecke AH: Relationship between diabetic autonomic neuropathy and gastric contents. *Anesth Analg* 1994; 78:943-947
62. Ito K, Fukuyama T, Sasabuchi Y, Yasuda H, Suzuki N, Hinenoya H, Kim C, Sanui M, Taniguchi H, Miyao H, Seo N, Takeuchi M, Iwao Y, Sakamoto A, Fujita Y, Suzuki T: Safety and efficacy of oral rehydration therapy until 2 h before surgery: a multicenter randomized controlled trial. *J Anesth* 2012;26:20-7

63. Jacobs BR, Swift CA, Dubow HD, Kosarussavadi B, McGoldrick K, O'Connor TZ, Silverman DG: Time required for oral ranitidine to decrease gastric fluid acidity. *Anesth Analg* 1991; 73:787-789
64. Jahr JS, Burckart G, Smith SS, Shapiro J, Cook DR: Effects of famotidine on gastric pH and residual volume in pediatric surgery. *Acta Anaesthesiol Scand* 1991; 35:457-460
65. Järvelä K, Maaranen P, Sisto T: Pre-operative oral carbohydrate treatment before coronary artery bypass surgery. *Acta Anaesthesiol Scand* 2008; 52:793-797
66. Jellish WS, Kartha V, Fluder E, Slogoff S: Effect of metoclopramide on gastric fluid volumes in diabetic patients who have fasted before elective surgery. *Anesthesiology* 2005; 102:904-909
67. Jorgensen BG, Holm HE: Anaesthetic implications of long term diabetic complications. *Acta Anaesthesiol Scand* 1995; 39:560-562
68. Kaska M, Grosmanova T, Havel E, Hyspler R, Petrova Z, Brtko M, Bares P, Bares D, Schusterova B, Pyszkova L, Tosnerova V, Sluka M: The impact and safety of preoperative oral or intravenous carbohydrate administration versus fasting in colorectal surgery – a randomized controlled trial. *Wiener Klinische Wochenschrift* 2010;122:23-30
69. Kemmotsu O, Mizushima M, Morimoto Y, Numazawa R, Kaseno S, Yamamura T, Yokota S: Effect of preanesthetic intramuscular ranitidine on gastric acidity and volume in children. *J Clin Anesth* 1991; 3:451-455
70. Khan MU, Agil M, Hussain A, Zahrani TA, Hillis M: Comparison of the Effect of Pre-operative Single Oral Dose of Tramadol and Famotidine on Gastric Secretions pH and Volume in Patients Scheduled for Laparoscopic Cholecystectomy. *J Coll Physicians Surg Pak* 2015;25:320-3
71. Kirkegaard P, Sorensen O: Cimetidine in the prevention of acid aspiration during anesthesia. *Acta Anaesthesiol Scand* 1980; 24:58-60
72. Kitagawa E, Kubota M, Kaekura N, Fujisawa T, Fukushima K: Effect of roxatidine acetate for handicapped patients under general anesthesia. *Anesth Prog* 1989; 36:169-171
73. Kraus GB, Braun GG, Gotz H, Raithel S, Danner U: Administration of famotidine for anesthesia in pediatric patients. Effect of various doses on the pH and volume of the gastric juice. *Anaesthesist* 1990; 39:587-592
74. Laha B, Hazra A, Mallick S: Evaluation of antiemetic effect of intravenous palonosetron versus intravenous ondansetron in laparoscopic cholecystectomy: a randomized controlled trial. *Indian J Pharmacol* 2013;45:24-9
75. Lauwick SM, Kaba A, Maweja S, Hamoir EE, Joris JL: Effects of oral preoperative carbohydrate on early postoperative outcome after thyroidectomy. *Acta Anaesth Belg* 2009;60:67-73
76. Lehot JJ, Deleat-Besson R, Bastien O, Brun Y, Adeleine P, Robin J, Estanove S: Should we inhibit gastric acid secretion before cardiac surgery? *Anesth Analg* 1990; 70:185-190
77. Litman RS, Wu CL, Quinlivan JK: Gastric volume and pH in infants fed clear liquids and breast milk prior to surgery. *Anesth Analg* 1994; 79:482-485
78. Ljunggren S, Hahn RG: Oral nutrition or water loading before hip replacement surgery; a randomized clinical trial. *Trials* 2012;13:97
79. Maekawa N, Mikawa K, Yaku H, Nishina K, Obara H: Effects of 2-, 4- and 12-hour fasting intervals on preoperative gastric fluid pH and volume, and plasma glucose and lipid homeostasis in children. *Acta Anaesthesiol Scand* 1993; 37:783-787

80. Maekawa N, Nishina K, Mikawa K, Shiga M, Obara H: Comparison of pirenzepine, ranitidine, and pirenzepine-ranitidine combination for reducing preoperative gastric fluid acidity and volume in children. *Br J Anaesth* 1998; 80:53-57
81. Maile CJD, Francis RN: Preoperative ranitidine: effect of a single intravenous dose on pH and volume of gastric aspirate. *Anaesthesia* 1983; 38:324-326
82. Maltby JR, Lewis P, Martin A, Sutherland LR: Gastric fluid volume and pH in elective patients following unrestricted oral fluid until three hours before surgery. *Can J Anaesth* 1991; 38:425-429
83. Maltby JR, Koehli N, Shaffer EA: Gastric fluid volume, pH, and emptying in elective inpatients. Influences of narcotic-atropine premedication, oral fluid, and ranitidine. *Can J Anaesth* 1988; 35:562-566
84. Maltby JR, Reid CR, Hutchinson A: Gastric fluid volume and pH in elective inpatients. Part II: Coffee or orange juice with ranitidine. *Can J Anaesth* 1988; 35:16-19
85. Maltby JR, Sutherland AD, Sale JP, Shaffer EA: Preoperative oral fluids: is a five-hour fast justified prior to elective surgery? *Anesth Analg* 1986; 65:1112-1116
86. Manchikanti L, Colliver JA, Marrero TC, Roush JR: Assessment of age-related acid aspiration risk factors in pediatric, adult, and geriatric patients. *Anesth Analg* 1985; 64:11-17
87. Manchikanti L, Colliver JA, Marrero TC, Roush JR: Ranitidine and metoclopramide for prophylaxis of aspiration pneumonitis in elective surgery. *Anesth Analg* 1984; 63:903-910
88. Manchikanti L, Colliver JA, Roush JR, Canella MG: Evaluation of ranitidine as an oral antacid in outpatient anesthesia. *South Med J* 1985; 78:818-822
89. Manchikanti L, Grow JB, Colliver JA, Hadley CH, Hohlbein LJ: Bicitra (sodium citrate) and metoclopramide in outpatient anesthesia for prophylaxis against aspiration pneumonitis. *Anesthesiology* 1985; 63:378-384
90. Manchikanti L, Marrero TC, Roush JR: Preanesthetic cimetidine and metoclopramide for acid aspiration prophylaxis in elective surgery. *Anesthesiology* 1984; 61:48-54
91. Manchikanti L, Roush JR: Effect of preanesthetic glycopyrrolate and cimetidine on gastric fluid pH and volume in outpatients. *Anesth Analg* 1984; 63:40-46
92. Martay K, Vater Y, Hunter C, Ross B: Preoperative fasting after soft drink intake: 2 hours may be enough. *J Anesth* 2002; 16:179-180
93. McGrady EM, Macdonald AG: Effect of the preoperative administration of water on gastric volume and pH. *Br J Anaesth* 1988; 60:803-805
94. McNeill MJ, Ho ET, Kenny NC: Effect of IV metoclopramide on gastric emptying after opioid premedication. *Br J Anaesth* 1990; 64:450-452
95. Meakin G, Dingwall AE, Addison GM: Effects of fasting and oral premedication on the pH and volume of gastric aspirate in children. *Br J Anaesth* 1987; 59:678-682
96. Melis GC, van Leeuwen PA, von Blomberg-van der Flier BM, Goedhart-Hiddinga AC, Uitdehaag BM, Strack van Schijndel RJ, Wuisman PI, van Bokhorst-de van der Schueren MA: A carbohydrate-rich beverage prior to surgery prevents surgery-induced immunodepression: a randomized, controlled, clinical trial. *JPEN J Parenter Enteral Nutr* 2006; 30:21-26
97. Memiş D, Turan A, Karamanlioglu B, Saral P, Türe M, Pamukçu Z: The effect of intravenous pantoprazole and ranitidine for improving preoperative gastric fluid properties in adults undergoing elective surgery. *Anesth Analg* 2003; 97:1360-1363

98. Mikawa K, Nishina K, Maekawa N, Asano M, Obara H: Gastric fluid volume and pH after nizatidine in adults undergoing elective surgery: influence of timing and dose. *Can J Anaesth* 1995; 42:730-734
99. Mikawa K, Nishina K, Maekawa N, Asano M, Obara H: Lansoprazole reduces preoperative gastric fluid acidity and volume in children. *Can J Anaesth* 1995; 42:467-472
100. Miller BR, Tharp JA, Issacs WB: Gastric residual volume in infants and children following a 3-hour fast. *J Clin Anesth* 1990; 2:301-305
101. Miller M, Wishart HY, Nimmo WS: Gastric contents at induction of anaesthesia. Is a 4-hour fast necessary? *Br J Anaesth* 1983; 55:1185-1188
102. Mirakhur RK: Premedication with atropine or glycopyrrolate in children. Effects on heart rate and rhythm during induction and maintenance of anesthesia. *Anaesthesia* 1982; 37:1032-1036
103. Mohamed F, Firas D, Riadh B, Walid D, Lasaad S, Abdelhamid K: Combined use of metoclopramide and dexamethasone as a prophylactic antiemetic in elective cesarean section under spinal anesthesia. *Middle East J Anaesthesiol* 2012;21:829-34
104. Morison DH, Dunn GL, Fargas Babjak AM, Moudgil GC, Smedstad K, Woo J: A double-blind comparison of cimetidine and ranitidine as prophylaxis against gastric aspiration syndrome. *Anesth Analg* 1982; 61:988-992
105. Moyao-García D, Corrales-Fernández MA, Blanco-Rodríguez G, Sánchez-Hernández E, Nava-Ocampo AA: Benefits of oral administration of an electrolyte solution interrupting a prolonged preoperative fasting period in pediatric patients. *J Pediatr Surg* 2001; 36:457-459
106. Murphy GS, Ault ML, Wong HY, Szokol JW: The effect of a new NPO policy on operating room utilization. *J Clin Anesth* 2000; 12:48-51
107. Nakai K, Niwa H, Kitayama M, Satoh Y, Hirota K: Effects of oral rehydration therapy on gastric volume and pH in patients with preanesthetic H<sub>2</sub> antagonist. *J Anesth* 2012;26:936-8
108. Newson AJ: The effectiveness and duration of preoperative antacid therapy. *Anaesth Intensive Care* 1977; 5:214-217
109. Nicolson SC, Dorsey AT, Schreiner MS: Shortened preanesthetic fasting interval in pediatric cardiac surgical patients. *Anesth Analg* 1992; 74:694-697
110. Nishimura M, Nakano S, Ueyama H, Uchiyama A, Tashiro C: Effect of preanesthetic rectal famotidine on pH and volume of gastric contents in pediatric outpatients. *J Clin Anesth* 1991; 3:207-210
111. Nishina K, Mikawa K, Maekawa N, Takao Y, Shiga M, Obara H: A comparison of lansoprazole, omeprazole, and ranitidine for reducing preoperative gastric secretion in adult patients undergoing elective surgery. *Anesth Analg* 1996; 82:832-836
112. Nishina K, Mikawa K, Maekawa N, Tamada M, Obara H: Omeprazole reduces preoperative gastric fluid acidity and volume in children. *Can J Anaesth.* 1994; 41:925-929
113. Nishina K, Mikawa K, Takao Y, Shiga M, Maekawa N, Obara H: A comparison of rabeprazole, lansoprazole, and ranitidine for improving preoperative gastric fluid property in adults undergoing elective surgery. *Anesth Analg* 2000; 90:717-721

114. O'Connor TA, Basak J, Parker S: The effect of three different ranitidine dosage regimens on reducing gastric acidity and volume in ambulatory surgical patients. *Pharmacotherapy* 1995; 15:170-175
115. Oyama Y, Iwasaka H, Shiihara K, Hagiwara S, Kubo N, Fujitomi Y, Noguchi T: Effects of preoperative oral carbohydrates and trace elements on perioperative nutritional status in elective surgery patients. *Middle East J Anaesthesiol* 2011;21:375-83
116. Padmaja R, Kranthi KGTS, Murali YV: Study on intravenous rabeprazole and intravenous ranitidine for improving perioperative gastric fluid properties in patients undergoing elective surgery under general anesthesia. *Asian Pac J Health Sci* 2014;1:559-65
117. Pandit SK, Kothary SP, Pandit UA, Mirakhur RK: Premedication with cimetidine and metoclopramide. Effect on the risk factors of acid aspiration. *Anaesthesia* 1986; 41:486-492
118. Payne K, Ireland P: Plasma glucose levels in the peri-operative period in children. *Anaesthesia* 1984; 39:868-872
119. Perrone F, da-Silva-Filho AC, Adorno IF, Anabuki NT, Leal FS, Colombo T, da Silva BD, Dock-Nascimento DB, Damiao A, de Aguilar-Nascimento JE: Effects of preoperative feeding with a whey protein plus carbohydrate drink on the acute phase response and insulin resistance. A randomized trial. *Nutr* 2011;10:66-72
120. Peixe-Machado PA, de Oliveira BD, Dock-Nascimento DB, de Aguilar-Nascimento JE: Shrinking preoperative fast time with maltodextrin and protein hydrolysate in gastrointestinal resections due to cancer. *Nutr* 2013;29:1054-69
121. Phillips S, Hutchinson S, Davidson T: Preoperative drinking does not affect gastric contents. *Br J Anaesth* 1993; 70:6-9
122. Phillips S, Liang SS, Formaz-Preston A, Stewart PA: High-risk residual gastric content in fasted patients undergoing gastrointestinal endoscopy: a prospective cohort study of prevalence and predictors. *Anaesth Intensive Care* 2015;43:728-733
123. Pisegna JR, Karlstadt RG, Norton JA, Fogel R, Oh DS, Jay Graepel G, Dorr MB: Effect of preoperative intravenous pantoprazole in elective-surgery patients: a pilot study. *Dig Dis Sci* 2009; 54:1041-1049
124. Protic A, Turina D, Matanic D, Spanjol J, Zuvic-Butorac M, Sustic A: Effect of preoperative feeding on gastric emptying following spinal anesthesia: a randomized controlled trial. *Wiener Klinische Wochenschrift* 2010;122:50-3
125. Radwan KG, Omar SH, Youssef MA, Farouk H, Kamal NM, Sabra ANA: Pre-operative intravenous co-administration of ranitidine and metoclopramide: effect on gastric content in laparoscopic cholecystectomy. *Med J Cairo Univ* 2010;78:125-130
126. Rao TL, Madhavareddy S, Chinthagada M, El Etr AA: Metoclopramide and cimetidine to reduce gastric fluid pH and volume. *Anesth Analg* 1984; 63:1014-1016
127. Read MS, Vaughan RS: Allowing pre-operative patients to drink: effects on patients' safety and comfort of unlimited oral water until 2 hours before anaesthesia. *Acta Anaesth Scand* 1991; 35:591-595
128. Redfern N, Addison GM, Meakin G: Blood glucose in anaesthetised children. Comparison of blood glucose concentrations in children fasted for morning and afternoon surgery. *Anaesthesia* 1986; 41:272-275
129. Riley Kristin A, Baer James Austin, Harkins Gerald J, and Rao Srikantha L: Preoperative oral hydration in gynecologic laparoscopy. *J Gynecologic Surgery* 2015;31:135-8

130. Rowbotham DJ, Bamber PA, Nimmo WS: Comparison of the effect of cisapride and metoclopramide on morphine-induced delay in gastric emptying. *Br J Clin Pharm* 1988; 26:741-746
131. Sada F, Krasniqi A, Hamza A, Gecaj-Gashi A, Bicaj B, Kavaja F: A randomized trial of preoperative oral carbohydrates in abdominal surgery. *BMC Anesthesiol* 2014;14:93
132. Salem MR, Wong AY, Mani M, Bennett EJ, Toyama T: Premedication drugs and gastric juice pH and volume in pediatric patients. *Anesthesiology* 1976; 44:216-219
133. Salmenpera M, Korttila K, Kalima T: Reduction of the risk of acid pulmonary aspiration in anaesthetized patients after cimetidine premedication. *Acta Anaesthesiol Scand* 1980; 24:25-30
134. Sandhar BK, Goresky GV, Maltby JR, Shaffer EA: Effect of oral liquids and ranitidine on gastric fluid volume and pH in children undergoing outpatient surgery. *Anesthesiology* 1989; 71:327-330
135. Scarr M, Maltby JR, Jani K, Sutherland LR: Volume and acidity of residual gastric fluid after oral fluid ingestion before elective ambulatory surgery. *Can Med Assoc J* 1989; 141:1151-1154
136. Schmidt JF, Jorgensen BC: The effect of metoclopramide on gastric contents after preoperative ingestion of sodium citrate. *Anesth Analg* 1984; 63:841-843
137. Schreiner MS, Triebwasser A, Keon TP: Ingestion of liquids compared with preoperative fasting in pediatric outpatients. *Anesthesiology* 1990; 72:593-597
138. Sengupta A, Gupta PK, Pandey K: Investigation of glycopyrrolate as a premedication drug. *Br J Anaesth* 1980; 52:513-516
139. Sethi AK, Chatterji C, Bhargava SK, Narang P, Tyagi A: Safe pre-operative fasting times after milk or clear fluid in children. A preliminary study using real-time ultrasound. *Anaesthesia* 1999; 54:51-59
140. Singh BN, Dahiya D, Bagaria D, Saini V, Kaman L, Kaje V, Vagadiya A, Sarin S, Edwards R, Attri V, Jain K: Effects of preoperative carbohydrate drinks on immediate postoperative outcome after day care laparoscopic cholecystectomy. *Surgical Endoscopy* 2015;29:3267-72
141. Solanki DR, Suresh M, Ethridge HC: The effects of intravenous cimetidine and metoclopramide on gastric volume and pH. *Anesth Analg* 1984; 63:599-602
142. Somboonviboon W, Kijmahatrakul W: Blood glucose concentration in pediatric outpatient surgery. *J Med Assoc Thai* 1996; 79:236-239
143. Soreide E, Holst Larsen H, Reite K, Mikkelsen H, Soreide JA, Steen PA: Effects of giving water 25-450 ml with oral diazepam premedication 1-2 h before operation. *Br J Anaesth* 1993; 71:503-506
144. Splinter WM, Baxter MR, Gould HM, Hall LE, MacNeill HB, Roberts DJ, Komocar L: Oral ondansetron decreases vomiting after tonsillectomy in children. *Can J Anaesth* 1995; 42:277-280
145. Splinter WM, Schaefer JD, Zunder IH: Clear fluids three hours before surgery do not affect the gastric fluid contents of children. *Can J Anaesth* 1990; 37:498-501
146. Splinter WM, Schaefer JD: Ingestion of clear fluids is safe for adolescents up to 3 h before anaesthesia. *Br J Anaesth* 1991; 66:48-52
147. Splinter WM, Schaefer JD: Unlimited clear fluid ingestion two hours before surgery in children does not affect volume or pH of stomach contents. *Anaesth Intens Care* 1990; 18:522-526

148. Splinter WM, Stewart JA, Muir JG: Large volumes of apple juice preoperatively do not affect gastric pH and volume in children. *Can J Anaesth* 1990; 37:36-39
149. Splinter WM, Stewart JA, Muir JG: The effect of preoperative apple juice on gastric contents, thirst, and hunger in children. *Can J Anaesth* 1989; 36:55-58
150. Stock JG, Sutherland AD: The role of H<sub>2</sub> receptor antagonist premedication in pregnant day care patients. *Can Anaesth Soc J* 1985; 32:463-467
151. Stoelting RK: Gastric fluid pH in patients receiving cimetidine. *Anesth Analg* 1978; 57:675-677
152. Stoelting RK: Gastric fluid volume and pH after fentanyl, enflurane, or halothane-nitrous oxide anesthesia with or without atropine or glycopyrrolate. *Anesth Analg* 1980; 59:287-290
153. Stoelting RK: Responses to atropine, glycopyrrolate, and riopan of gastric fluid pH and volume in adult patients. *Anesthesiology* 1978; 48:367-369
154. Sutherland AD, Maltby JR, Sale JP, Reid CRG: The effect of preoperative oral fluid and ranitidine on gastric fluid volume and pH. *Can J Anaesth* 1987; 34:117-121
155. Taniguchi H, Sasaki T, Fujita H: Preoperative management of surgical patients by "Shortened Fasting Time": A study on the amount of total body water by multi-frequency impedance method. *Int J Med Sci* 2012;9:567-74
156. Tauhid-ul-mulk M, Rehman SMF, Ali NP, Haque M, Chowdhury MRA: Influence of preoperative fasting time on maternal and neonatal blood glucose level in elective caesarean section under subarachnoid block. *JAFMC Bangladesh* 2010;6:21-24
157. Thomas DK: Hypoglycaemia in children before operation: its incidence and prevention. *Br J Anaesth* 1974; 46:66-68
158. Tiret L, Desmonts JM, Hatton F, Vourc'h G: Complications associated with anaesthesia: a prospective survey in France. *Can Anaesth Soc J* 1986; 33:336-344
159. Tryba M, Wruck G, Thole H, Zenz M: The use of roxatidine acetate in fasting patients prior to induction of anaesthesia as prophylaxis against the acid aspiration syndrome. *Drugs* 1988; 35:20-24
160. Tryba M, Yildiz F, Kuhn K, Dziuba M, Zenz M: Rectal and oral cimetidine for prophylaxis of aspiration pneumonitis in paediatric anaesthesia. *Acta Anaesthesiol Scand* 1983; 27:328-330
161. van der Walt JH, Carter JA: The effect of different pre-operative feeding regimens on plasma glucose and gastric volume and pH in infancy. *Anaesth Intensive Care* 1986; 14:352-359
162. van der Walt JH, Foate JA, Murrell D, Jacob R, Bentley M: A study of preoperative fasting in infants aged less than three months. *Anaesth Intensive Care* 1990; 18:527-531
163. Vaughan RW, Bauer S, Wise L: Volume and pH of gastric juice in obese patients. *Anesthesiology* 1975; 43:686-689
164. Viegas OJ, Ravindran RS, Shumacker CA: Gastric fluid pH in patients receiving sodium citrate. *Anesth Analg* 1981; 60:521-523
165. Viganò J, Cereda E, Caccialanza R, Carini R, Cameletti B, Spampinato M, Dionigi P: Effects of preoperative oral carbohydrate supplementation on postoperative metabolic stress response of patients undergoing elective abdominal surgery. *World J Surg* 2012;36:1738-43

166. Wang ZG, Wang Q, Wang WJ, Qin HL: Randomized clinical trial to compare the effects of preoperative oral carbohydrate versus placebo on insulin resistance after colorectal surgery. *Br J Surg* 2010;97:317-27
167. Warner MA, Warner ME, Weber JG: Clinical significance of pulmonary aspiration during the perioperative period. *Anesthesiology* 1993; 78:56-62
168. Weber L, Hirshman CA: Cimetidine for prophylaxis of aspiration pneumonitis: comparison of intramuscular and oral dosage schedules. *Anesth Analg* 1979; 58:426-427
169. Wilkinson DJ: Contac 400: a possible cause of aspiration under anaesthesia. *Hum Toxicol* 1987; 6:529-531
170. Williams JG, Strunin L: Preoperative intramuscular ranitidine and cimetidine: double blind comparative trial, effect on gastric pH and volume. *Anaesthesia* 1985; 40:242-245
171. Wilson SL, Mantena NR, Halverson JD: Effects of atropine, glycopyrrolate, and cimetidine on gastric secretions in morbidly obese patients. *Anesth Analg* 1981; 60:37-40
172. Wright DJ, Pandya A: Smoking and gastric juice volume in outpatients. *Can Anaesth Soc J* 1979; 26:328-330
173. Yagci G, Can MF, Ozturk E, Dag B, Ozgurtas T, Cosar A, Tufan T: Effects of preoperative carbohydrate loading on glucose metabolism and gastric contents in patients undergoing moderate surgery: a randomized, controlled trial. *Nutrition* 2008; 24:212-216
174. Yildiz H, Gunal SE, Yilmaz G, Yucel S: Oral carbohydrate supplementation reduces preoperative discomfort in laparoscopic cholecystectomy. *J Investigative Surgery* 2013;26:89-95
175. Yilmaz N, Çekmen, Bilgin F, Erten E, Özhan MÖ, Coşar: Preoperative carbohydrate nutrition reduces postoperative nausea and vomiting compared to preoperative fasting. *J Res Med Sci* 2013;18:827-32