The Evidence against Prophylactic Nasogastric Intubation and Oral Restriction

Valerie P. Bauer, MD¹

¹ Department of Surgery, Baylor College of Medicine, Texas City, Texas

Clin Colon Rectal Surg 2013;26:182–185.

Address for correspondence Valerie P. Bauer, MD, Michael E. DeBakey, Department of Surgery, Baylor College of Medicine, Bay Area Colorectal Surgical Associates, PLLC, 7111 Medical Center Drive, Suite 100, Texas City, Texas 77591 (e-mail: ValerieBauerMD@BACRSA.com).

Abstract

Keywords

- prophylactic
- nasogastric tube
- decompression
- intestinal resection
- colorectal surgery
- early enteral nutrition
- early feeding
- postoperative ileus
- enhanced recovery
- complications

Evidence-based perioperative care plans after colorectal surgery serve to improve quality outcome, decrease complications, and reduce medical cost. The benefits of routine nasogastric decompression and prolonged enteral restriction after bowel resection are not supported in this new era of evidence-based surgical care. Prophylactic nasogastric decompression fails to improve bowel function, length of stay, and prevent anastomotic leak, wound complications (infection, fascial dehiscence, incisional hernia), pulmonary complications (atelectasis, aspiration, pneumonia, fever, pharyngolaryngitis), and abdominal discomfort (distension, nausea, vomiting). Patients have earlier return of bowel function without the use of a nasogastric tube (NGT). Early refeeding within 24 hours after bowel resection is well tolerated in 80 to 90% of patients, and associated with earlier hospital discharge, decreased risk of infection, and improved postoperative hyperglycemic control. Abdominal discomfort is the most common complication observed in patients treated with early feeding and without a NGT, but does not result in higher therapeutic nasogastric intubation, postoperative ileus, aspiration, or other complications. The use of multimodal adjuncts in combination with these guidelines should be considered to improve outcome. The current literature is reviewed with suggestions for achieving better outcomes after colorectal resection.

Objectives: Upon completion of this article, the reader should be able to summarize the disadvantages to prophylactic nasogastric intubation, and the advantages to early enteral nutrition in colorectal resection.

Historical Background

The nasogastric tube (NGT) was historically created to feed the sick.¹ John Hunter fashioned a makeshift orogastric tube in the 18th century by wrapping eel skin around whalebone to feed liquid nutrients to his ailing patient.² Philip Physick, a surgeon in Philadelphia who reported its first successful use to treat a child from an overdose of opiates, recognized the utility of this conduit as a “stomach pump” in the 19th century.³ Widespread use as a prophylactic sump to control intestinal secretions did not begin until the early 20th century when advances in general anesthesia and the aseptic tech-

nique promoted the success of major abdominal surgeries and along with that, postoperative side effects of nausea and vomiting.⁴ This together with enteral restriction became the indoctrinated practice of protecting the patient from aspiration pneumonia, anastomotic leak, and wound dehiscence in a tradition of “resting the bowel until it wakes up.”

The benefit of these interventions has come under question in a new era of evidence-based surgical care intended to improve surgical outcomes and medical costs. A review of the literature is provided with recommendations based on updated guidelines.

Routine NGT Decompression Fails to Improve Recovery of Bowel Function and Length of Stay

Patients undergoing any open abdominal surgery without postoperative nasogastric decompression have earlier

Issue Theme Perioperative Management; Guest Editor, Sharon L. Stein, MD, FACS

Copyright © 2013 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA.
Tel: +1(212) 584-4662.

DOI <http://dx.doi.org/10.1055/s-0033-1351136>.
ISSN 1531-0043.

return of bowel function compared with those treated with a NGT.^{5,6} A meta-analysis published in 1995 of 26 trials (3,694 patients) reports a significant decrease in the number of days to first oral intake in patients without a NGT compared with those treated with a NGT (3.35 vs. 4.59 days; $p = 0.04$).⁵ Similarly, an updated 2010 Cochrane Review of 37 prospective randomized trials (5,711 patients) reports earlier return of bowel function in patients without a NGT ($p < 0.00001$).⁶

Colorectal surgical patients recovering without a NGT have a significantly decreased time to recovery of bowel function compared with those with a NGT, as demonstrated in a subgroup analysis of randomized controlled trials (RCTs) reporting outcome in colorectal surgery.^{7–11} The average time to return of flatus in the group with a NGT is 3.7 days compared with 3.2 days in the group without a tube ($p = 0.02$).⁶ Although two of the five groups reported no difference in outcome, they conclude there is no benefit to routine use of a NGT.^{9,10}

There were no significant differences between groups in colorectal studies evaluating length of hospital stay.^{8,10,12,13} One study, however, reported decreased time to discharge of 8.4 days in patients treated without a NGT after colectomy plus early oral refeeding compared with 9.6 days in patients where a NGT was maintained until passage of flatus, ($p < 0.05$).¹¹ These findings suggest consideration for the additive effect of multiple variables in achieving improved end point criteria.

Routine NGT Decompression Does Not Reduce Risk of Anastomotic Leak, Wound, and Pulmonary Complications

Summary review of six RCTs in colorectal surgery demonstrates that prophylactic nasogastric decompression failed to establish a significant protective effect against anastomotic leak ($p = 0.79$).⁶ There are no differences between groups concerning risk reduction in wound-infection rates, fascial dehiscence,^{10–12} and incisional hernia.¹⁴ Zhou and Lei report observation of 200 mL/d output in patients with nasogastric decompression, and reason that if gastric production averages 6 to 10 L/d, nasogastric decompression following colorectal surgery cannot reduce intestinal pressure and has no obvious effect in preventing postoperative abdominal distension.^{10,11}

The 2010 Cochrane multivariate analysis of colorectal data shows no difference in risk for pulmonary complications with prophylactic nasogastric decompression after colorectal surgery (odds ratio = 1.93, confidence interval 95% CI, 0.56–6.63; $p = 0.30$).⁶ Individual studies report variable outcome in pulmonary complications ranging from no difference between groups^{8,12,15} to increased complications in patients treated with a routine NGT as measured by fever, atelectasis, pneumonia, and pharyngolaryngitis.^{10,11,14,16} The pulmonary complication for which patients with a routine NGT are at highest risk is pharyngolaryngitis, which is noted in 23% of patients versus 4% without tube ($p < 0.001$).^{10,11}

Patients without NGT Decompression Report Increased Abdominal Discomfort; Therapeutic Decompression Rates Are Low and Similar between Groups

Patients who do not undergo nasogastric decompression after colorectal resection have an increase incidence in abdominal discomfort.^{10–13,15,16} Nausea and abdominal distension are reported in ~1 in every 3 patients treated without a NGT following open colorectal surgery (27–35%), while 1 in every 4 (19–27%) report vomiting.^{15,16} Therapeutic intubation rates to relieve abdominal discomfort are reported to be as high as 13%,^{12,16} but are not statistically different than reintubation rates in patients treated with a prophylactic NGT in most RCTs.^{10,11,15,16}

Only one RCT evaluating outcome in elective colorectal surgery reports a significant difference of a 13% intubation rate in patients without a NGT compared with a 5% reintubation rate for those with a NGT; $p < 0.05$.¹² The authors were unable to determine predictive factors contributing to the need for therapeutic nasogastric intubation, but conclude that because most patients (87%) never required a postoperative NGT and only 8% required therapeutic decompression, routine nasogastric decompression should be eliminated in elective colon and rectal surgery.¹²

Although the incidence of abdominal distension, nausea, and vomiting is increased in the postoperative period without nasogastric decompression, patients develop these complications even with NGT in place. Low therapeutic intubation rates and today's use of antiemetics (not factored in the results of earlier studies) argue for the abandonment of prophylactic NGT use.

Early Feeding after Colorectal Surgery Enhances Recovery Time

Enteral restriction until return of bowel function after colorectal surgery offers no advantage to facilitating postoperative recovery as measured by return of bowel function and length of stay. Early oral feeding is safely tolerated by 80 to 90% of patients within 24 hours,^{17–20} and as soon as 2 hours after surgery as seen in enhanced recovery protocols used to improve outcome in laparoscopic and open colorectal surgery.^{21,22} In an updated Cochrane Review of 14 RCTs (1,224 patients) evaluating early enteral nutrition within 24 hours after intestinal surgery, early feeding is associated with decreased length of stay, however, aggregated results do not reach statistical significance due to study heterogeneity ($p = 0.011$).²³ A meta-analysis of 11 randomized trials also determines a significant reduction in mean length of stay by 0.84 days (0.36 to 1.33 days, $p = 0.001$) in the early refeeding group,²⁴ but loses statistical significance when two trials without complete data are excluded.^{25,26} Length of stay is significantly decreased in one RCT of 64 patients undergoing intestinal resection, from 7.1 days to 5.4 days ($p = 0.02$) when patients are managed with early feeding plus ambulation compared with traditional postoperative care, suggesting a multimodal effect on improved outcome.²⁷

Early Feeding after Colorectal Surgery Reduces Risk of Infection and Hyperglycemia

A meta-analysis evaluating postoperative complications in early enteral feeding demonstrates a significant reduction in the risk of any type of postoperative infection in patients treated with early feeding (relative risk [RR] = 0.72, 95% confidence interval [CI], 0.54–0.98; $p = 0.036$), with the greatest reduction seen in the frequency of wound infection.²⁴ Evaluation of individual complications fails to reach statistical significance for wound infection, intra-abdominal abscess, pneumonia, and anastomotic leak, but demonstrates a direction in favor of earlier feeding.^{23,24}

Early refeeding used together with preoperative carbohydrate loading and reduction of surgical stress response (laparoscopic surgery, epidural analgesia) has been shown to decrease risk of hyperglycemia though improved regulation of nitrogen balance.²⁸

Early Feeding Increases Risk of Vomiting, but not Duration of Ileus

Patients receiving early enteral nutrition have a significantly increased risk of vomiting ($p = 0.04$), with an absolute risk ranging from 21 to 50% compared with 14 to 57% in control groups.^{23,24} In those RCTs limited to lower gastrointestinal surgery, the rate of therapeutic nasogastric intubation remains the same between groups as does time to resolution of ileus, which averaged ~3.5 to 4 days in each group.^{19,26,29} The increased risk of vomiting does not confer a significant risk of postoperative pneumonia to early-fed patients, with absolute risk ranging from none to 6.3% in the treatment group, and none to 7.1% in the control ($p = 0.81$).²³ Without the use of multimodal interventions, such as pharmacotherapy to prevent nausea, vomiting,³⁰ and postoperative ileus,³¹ abdominal bloating in early feeding has been reported to impede respiratory function and ambulation.³² The use of these adjuncts in various combinations can improve outcome and is further addressed in the literature on enhanced recovery after surgery programs.^{21,22}

Conclusion

Prophylactic nasogastric decompression is no longer supported in colorectal surgery for early return of bowel function or decreased length of stay, and shows no benefit in preventing pulmonary, wound, or anastomotic complications. Avoidance of prolonged enteral restriction through early refeeding may facilitate faster recovery through decreased length of stay, while providing risk reduction for postoperative complications such as infection and hyperglycemia. Ongoing understanding of the effect of these and other interrelated variables will continue to define the best method of integrated use in achieving best outcome through optimal resource utilization.

Summary

The routine use of nasogastric decompression after colorectal resection is no longer supported for the following reasons: (1)

Prophylactic nasogastric decompression does not improve time to return of bowel function or length of hospital stay. Patients recovering from colorectal surgery without a NGT have an improved time to return of bowel function. (2) Prophylactic nasogastric decompression does not reduce risk of anastomotic leak, wound infection rate, dehiscence, and incisional hernia. (4) Prophylactic nasogastric decompression does not prevent pulmonary complications of fever, atelectasis, or aspiration pneumonia, and may, in fact, promote pharyngolaryngitis. (5) Prophylactic NGT does not prevent abdominal discomfort as measured by nausea, vomiting, and distension. Therapeutic nasogastric intubation occurs on average in less than 10% of patients, and there is no difference between groups.

Early feeding after lower gastrointestinal resection is supported for the following reasons: (1) Early feeding decreases mean length of hospital stay. (2) Early feeding decreases risk for any type of postoperative infection. (3) Early feeding coupled with preoperative carbohydrate loading and control of surgical stress response improves nitrogen balance and postoperative hyperglycemia. (4) Early enteral feeding is associated with increased vomiting, but rate of therapeutic intubation and time to recovery of bowel function remain the same in both groups. The use of multimodal adjuncts may help improve abdominal discomfort.

References

- 1 Chernoff R. An overview of tube feeding: from ancient times to the future. *Nutr Clin Pract* 2006;21(4):408–410
- 2 McCamish MA, Bournous G, Geraghty ME. History of enteral feeding: past and present perspectives. In: Rombeau JL, Rolandelli RH, eds. *Clinical Nutrition: Enteral Tube Feeding*. 3rd ed. Philadelphia, PA: WB Saunders; 1997:1–11
- 3 Flanagan RJ, Jones AL. Antidotal treatment in the nineteenth century. In: Flanagan RJ, Jones AL, Marrs TC, Maynard RL, eds. *Antidotes: Principles and Clinical Application*. London, UK: Taylor & Francis; 2001:1–34
- 4 Paine JR, Carlson HA, Wangenstein OH. The postoperative control of distention, nausea, and vomiting. A clinical study with reference to the employment of narcotics, cathartics, and nasal catheter suction-siphonage. *JAMA* 1933;100(24):1910–1917
- 5 Cheatham ML, Chapman WC, Key SP, Sawyers JL. A meta-analysis of selective versus routine nasogastric decompression after elective laparotomy. *Ann Surg* 1995;221(5):469–476, discussion 476–478
- 6 Nelson R, Edwards S, Tse B. Prophylactic nasogastric decompression after abdominal surgery. [Update of: *Cochrane Database Syst Rev* 2007;(3): CD004929] *Cochrane Database Syst Rev* 2007;(3): CD004929
- 7 Olesen KL, Birch M, Bardram L, Burcharth F. Value of nasogastric tube after colorectal surgery. *Acta Chir Scand* 1984;150(3): 251–253
- 8 Colvin DB, Lee W, Eisenstat TE, Rubin RJ, Salvati EP. The role of nasointestinal intubation in elective colonic surgery. *Dis Colon Rectum* 1986;29(5):295–299
- 9 Ortiz H, Armendariz P, Yarnoz C. Is early postoperative feeding feasible in elective colon and rectal surgery? *Int J Colorectal Dis* 1996;11(3):119–121
- 10 Lei WZ, Zhao GP, Cheng Z, Li K, Zhou ZG. Gastrointestinal decompression after excision and anastomosis of lower digestive tract. *World J Gastroenterol* 2004;10(13):1998–2001

- 11 Zhou T, Wu XT, Zhou YJ, Huang X, Fan W, Li YC. Early removing gastrointestinal decompression and early oral feeding improve patients' rehabilitation after colectostomy. *World J Gastroenterol* 2006;12(15):2459–2463
- 12 Wolff BG, Pemberton JH, van Heerden JA, et al. Elective colon and rectal surgery without nasogastric decompression. A prospective, randomized trial. *Ann Surg* 1989;209(6):670–673, discussion 673–675
- 13 Racette DL, Chang FC, Trekkell ME, Farha GJ. Is nasogastric intubation necessary in colon operations? *Am J Surg* 1987;154(6):640–642
- 14 Otchy DP, Wolff BG, van Heerden JA, Ilstrup DM, Weaver AL, Winter LD. Does the avoidance of nasogastric decompression following elective abdominal colorectal surgery affect the incidence of incisional hernia? Results of a prospective, randomized trial. *Dis Colon Rectum* 1995;38(6):604–608
- 15 Cunningham J, Temple WJ, Langevin JM, Kortbeek J. A prospective randomized trial of routine postoperative nasogastric decompression in patients with bowel anastomosis. *Can J Surg* 1992;35(6):629–632
- 16 Petrelli NJ, Stulc JP, Rodriguez-Bigas M, Blumenson L. Nasogastric decompression following elective colorectal surgery: a prospective randomized study. *Am Surg* 1993;59(10):632–635
- 17 Phillips EH, Franklin M, Carroll BJ, Fallas MJ, Ramos R, Rosenthal D. Laparoscopic colectomy. *Ann Surg* 1992;216(6):703–707
- 18 Jacobs M, Verdeja JC, Goldstein HS. Minimally invasive colon resection (laparoscopic colectomy). *Surg Laparosc Endosc* 1991;1(3):144–150
- 19 Reissman P, Teoh TA, Cohen SM, Weiss EG, Nogueras JJ, Wexner SD. Is early oral feeding safe after elective colorectal surgery? A prospective randomized trial. *Ann Surg* 1995;222(1):73–77
- 20 Carr CS, Ling KDE, Boulos P, et al. Randomized trial of safety and efficacy of immediate postoperative enteral feeding in patients undergoing gastrointestinal resection. *BMJ* 1996;312:896–871
- 21 Lassen K, Soop M, Nygren J, et al; Enhanced Recovery After Surgery (ERAS) Group. Consensus review of optimal perioperative care in colorectal surgery: Enhanced Recovery After Surgery (ERAS) Group recommendations. *Arch Surg* 2009;144(10):961–969
- 22 Wang G, Jiang ZW, Xu J, et al. Fast-track rehabilitation program vs conventional care after colorectal resection: a randomized clinical trial. *World J Gastroenterol* 2011;17(5):671–676
- 23 Andersen HK, Lewis SJ, Thomas S. Early enteral nutrition within 24 h of colorectal surgery versus later commencement of feeding for postoperative complications. *Cochrane Database Syst Rev* 2006;(4):CD004080 10.1002/14651858.CD004080.pub2
- 24 Lewis SJ, Egger M, Sylvester PA. Early enteral feeding versus nil by mouth after gastrointestinal surgery; systemic review and meta-analysis of controlled trials. *BMJ* 2001;323:1–5
- 25 Sagar S, Harland P, Shields R. Early postoperative feeding with elemental diet. *BMJ* 1979;1(6159):293–295
- 26 Binderow SR, Cohen SM, Wexner SD, Nogueras JJ. Must early postoperative oral intake be limited to laparoscopy? *Dis Colon Rectum* 1994;37(6):584–589
- 27 Delaney CP, Zutshi M, Senagore AJ, Remzi FH, Hammel J, Fazio VW. Prospective, randomized, controlled trial between a pathway of controlled rehabilitation with early ambulation and diet and traditional postoperative care after laparotomy and intestinal resection. *Dis Colon Rectum* 2003;46(7):851–859
- 28 Soop M, Carlson GL, Hopkinson J, et al. Randomized clinical trial of the effects of immediate enteral nutrition on metabolic responses to major colorectal surgery in an enhanced recovery protocol. *Br J Surg* 2004;91(9):1138–1145
- 29 Stewart BT, Woods RJ, Collopy BT, Fink RJ, Mackay JR, Keck JO. Early feeding after elective open colorectal resections: a prospective randomized trial. *Aust N Z J Surg* 1998;68(2):125–128
- 30 Carlisle JB, Stevenson CA. Drugs for preventing postoperative nausea and vomiting. *Cochrane Database Syst Rev* 2006;(3):CD004125
- 31 Delaney CP, Wolff BG, Viscusi ER, et al. Alvimopan, for postoperative ileus following bowel resection: a pooled analysis of phase III studies. *Ann Surg* 2007;245(3):355–363
- 32 Watters JM, Kirkpatrick SM, Norris SB, Shamji FM, Wells GA. Immediate postoperative enteral feeding results in impaired respiratory mechanics and decreased mobility. *Ann Surg* 1997;226(3):369–377, discussion 377–380