

Does the nasogastric tube has a role in elective colo-rectal surgery?

R. MACARONE PALMIERI, P.M. AMODIO, M. RIZZELLO, A. GOGLIA, M. PICIOLLO,
E. PICCIONI, P. GUGLIEMELLI, F. RUBINO

SUMMARY: Does the nasogastric tube has a role in elective colo-rectal surgery?

R. MACARONE PALMIERI, P.M. AMODIO, M. RIZZELLO, A. GOGLIA, M. PICIOLLO, E. PICCIONI, P. GUGLIEMELLI, F. RUBINO

Introduction. Routine use of nasogastric tubes (NGT) after abdominal operations is intended to hasten the return of bowel function, diminish the risk of anastomotic leakage and prevent pulmonary complications. The aim of our study was to prospectively assess the tolerability and the safety of the non use of NGT after elective colorectal open operations.

Patients and methods. Between March 2009 and December 2010, 110 consecutive patients underwent colo-rectal elective open surgery for neoplasm without nasogastric decompression. We analyzed the incidence of nausea and vomiting, the pulmonary complications, the return of bowel function the deep wound breakdown (fascial dehiscence) and the anastomotic leakage.

Results. Only 15 patients (13,6%) reported nausea without vomiting immediately after surgery and 9 cases of vomiting were observed (8%), requiring the insertion of the NGT (nasogastric tube) in 5 (4,5%). A total of 105 patients (96,3%) were NGT free.

No deep wound dehiscence was observed and only one real pneumonia occurred. Anastomotic dehiscence occurred in 4 patients (3,6%) and a second surgical procedure was needed in three cases. The return of bowel function, except in the last four patients, occurred in 3,8 days average (range 2-7 days).

Conclusion. We confirm the uselessness of the NGT in the framework of fast track program adopted in elective open colo-rectal surgery.

RIASSUNTO: Il sondino naso-gastrico ha ancora un ruolo in chirurgia colo-rettale elettiva?

R. MACARONE PALMIERI, P.M. AMODIO, M. RIZZELLO, A. GOGLIA, M. PICIOLLO, E. PICCIONI, P. GUGLIEMELLI, F. RUBINO

Introduzione. L'uso routinario del sondino naso-gastrico (SNG) in chirurgia addominale è motivato dalla convinzione di una migliore ripresa funzionale intestinale, di diminuire il rischio di deiscenza anastomotica e di prevenire le complicanze polmonari. Scopo del nostro studio prospettico è di stabilire se la chirurgia colo-rettale elettiva tradizionale possa fare a meno del SNG.

Pazienti e metodi. Da marzo 2009 a dicembre 2010, 110 pazienti consecutivi sono stati sottoposti a chirurgia colo-rettale open elettiva senza decompressione gastrica. Sono stati analizzati l'incidenza di nausea e vomito, le complicanze polmonari, la ripresa della canalizzazione intestinale, la deiscenza anastomotica e quella profonda (fasciale) della laparotomia.

Risultati. Solo 15 pazienti (13,6%) hanno riferito nausea senza vomito nell'immediato post-operatorio; sono stati osservati 9 casi di vomito (8%), di cui 5 hanno richiesto il posizionamento del SNG (4,5%). Pertanto, 105 pazienti pertanto sono rimasti senza SNG (96,3%).

Non riportiamo deiscenze profonde di ferita e un solo paziente ha avuto un focolaio bronco-pneumonico. Si sono verificate 4 deiscenze anastomotiche (3,6%) con necessità di un reintervento in tre pazienti. Escludendo questi ultimi quattro casi, la ripresa della canalizzazione intestinale è avvenuta in media in 3,8 giorni (range 2-7 giorni).

KEY WORDS: Nasogastric decompression - Colo-rectal surgery - Postoperative nausea and vomiting - Perioperative management.
Sondino naso-gastrico - Chirurgia colo-rettale - Nausea e vomito post-operatori - Trattamento perioperatorio.

Introduction

The use of the nasogastric tube (NGT) dates back to 300 years ago and since then it has been applied for both diagnostic and therapeutic purposes. During the last century advances in abdominal surgery have fostered the use

of the NGT for the prevention (1) of nausea and vomiting, the anastomotic leakage and the intestinal distension caused by postoperative ileus. Evidence of the widespread consensus on the use of the NGT is given in literature where it is described as “the standard of care” (2), “common practice” (3,4) and “unquestioned” (5).

Randomized studies (1) and metanalysis (6) have nonetheless reduced the efficacy of the gastric preventive decompression. To date the surgical practice has not changed the past routine (7) and the NGT continues to be placed only because “traditionally used by most surgeons” (8). It needs to be investigated once more if the prophylactic use of NGT really decrease the incidence of nausea and vomiting, reduces the chance of pulmonary pneumonia, fascial dehiscence, wound infection, anastomotic leakage, and facilitates an earlier return of bowel function and earlier hospital discharge.

In the framework of a fast-track program implemented by the Division of General Surgery at the “Belcolle” Hospital in Viterbo (Italy) the non use of the NGT has been promoted in the elective colo-rectal surgery. A retrospective analysis of the results obtained with reference to the incidence of vomiting, the need to reposition the NGT, pulmonary complications, the return of bowel function and anastomotic leakage are reported in this article.

Patients and methods

Between March 2009 and December 2010, 164 patients were admitted at the Unit of General Surgery of the Hospital “Belcolle” (Viterbo, Italy) with a diagnosis of colo-rectal cancer; 19 patients underwent emergency surgery for an obstructive neoplasia and then they were not considered for the study. Another criteria of exclusion was a defunctioning stoma because of its preventive use in anastomotic leakage. Therefore a consecutive series of 110 patients, 67 men and 43 women, underwent elective open surgery of any type for colo-rectal cancer and these represent our prospective non randomized cohort (Table 1).

Thirty-six patients (32,7%) reported of previous abdominal surgeries for diseases other than neoplastic ones.

Five days prior to surgery all patients followed a normal diet combined with the use of an immune modulating formula (enriched with arginine, omega-3 fatty acid and nucleotides) per os with three bricks/day equal to 711 ml/day. Patients followed the diet prescribed until the night before surgery and drank clear liquids (water or tea) or maltodextrines up to two hours before. In all the patients the intestinal preparation was done with polyethylene glycol, which was taken 24 hours prior to surgery. An antibiotic prophylaxis with Cefazolin 2 mg + Metronidazole 1 g was prescribed in the day of surgery and the dosage was to be repeated if surgery lasted more than 2,5 hours.

We adopted the P-Possum score as a scoring system of risk prediction of mortality and morbidity which respectively resulted in 4% and 38,4% on the average.

The surgical open procedures applied were: 37 right colectomies (33,6%); 31 left colectomies (28%); 40 anterior rectal resections (36,3%), 2 segmental colonic resection (1,8%). There were 27 associated procedures: 10 colecystectomies, 8 hepatic metastasectomies, 8 oopharectomies, 1 spleen-distal pancreatectomy.

The NGT was placed after induction of anaesthesia in the ope-

orative room and removed soon after the surgical procedure; it was reinserted after two episodes of vomiting over 24 hours despite the use of Metoclopramide and the absence of bowel movements.

All patients were given a continuous analgesic therapy with morphine during the first 48 post-operative hours; 12 patients were required a further dosage of analgesic. A clear liquid diet for the 24 hours following surgery was prescribed and a semiliquid diet started from the third post-operative day. However a progressive oral intake was decided based upon the requests of patients, in compliance with an early oral feeding program. The resolution of postoperative ileus was defined as having bowel movement in the absence of abdominal distention and vomiting. The patients were discharged after they were tolerating regular diet for at least 24 hours.

We evaluated the incidence of vomiting, the need of repositioning of the NGT, the deep wound breakdown (fascial dehiscence), the pulmonary pneumonia, evaluated clinically and by radiogram, the return of bowel function measured by the time of flatus and the anastomotic leakage proved by discharge of bowel content via the drain or by radiological findings.

The data were retrieved by using a computer database cointaining demographic, clinical, operative, pathologic and post-operative data.

Results

All the patients were submitted to a radical resection as it was confirmed by the histopathological exam. The resected specimens were staged according to the AJCC (American Joint Committee on cancer) /UICC (International Union against Cancer) system: 32 patients in stage I (29%), 57 in stage II (51,8%), 20 in stage III (18%); besides it was proven histologically one case of

TABLE 1 - CHARACTERISTICS OF PATIENTS.

Patients	110
Men/Women	67/43
Age *	72 years (range 36-90 years)
Previous abdominal surgeries	36 pts (32,7%)
Surgical procedures	
Right colectomy	37 (33,6%)
Left colectomy	31 (28%)
Anterior resection	40 (36,3%)
Segmental resection	2 (1,8%)
Associated procedures	
10 colecystectomies	
8 hepatic metastasectomies	
8 oopharectomies	
1 spleen-distal pancreatectomy	
P-Possum	
Mortality	4%
Morbidity	38,4%

*Average values.

TABLE 2 - ENDPOINTS OF THE STUDY.

Vomiting	9 pts (8%)
Repositioning of NGT	5 pts (4,5%)
Deep wound dehiscence	0 pts (0%)
Pulmonary complications	1 pts (0,9%)
Anastomotic dehiscence	4 pts (3,6%)
Return to bowel function	3,8 days* (range 2-7 days)

*Average values

GIST of the colon. The average operation time was 150 minutes (range 60-270 min). The intraoperative bleeding was calculated by the bag of suction device and the average blood loss was 220 ml.

We analyzed the incidence of vomiting, the repositioning of the NGT, the pulmonary complications, the return of bowel function, the fascial dehiscence and the anastomotic leakage (Table 2). Only 15 patients (13,6%) reported nausea without vomiting immediately after surgery and it was resolved spontaneously, while in 5 cases the seriousness of symptoms required the use of Metoclopramide 10 mg ev. Only 9 cases of vomiting were observed (8%), requiring the insertion of the NGT in 5 (4,5%): in four patients it was due to anastomotic dehiscence in fourth postoperative day, while another one presented a delayed postoperative ileus with more than two episodes of vomiting. Therefore 105 patients (96,3%) avoided the NGT and the majority of them tolerated the early feeding schedule.

A wound infection was observed in 18 patients (16,3%) but any deep wound dehiscence arose. The anastomotic dehiscence occurred in 4 patients (3,6%), requiring a second surgical procedure in three, while a conservative treatment was adopted successfully in one case. Excluding the late subgroup of patients, the return of bowel function, measured by time to flatus emitted by the intestine on the average occurred in 3,8 days (range 2-7 days). A pleuro-pulmonary complication, documented by a chest radiography, occurred in 6 patients (5,4%), but a real pulmonary pneumonia, confirmed by laboratory data, was observed in only one patient (0,9%) and it was treated with an antibiotic therapy. The overall morbidity was 32,7% (36 patients) and the mortality rate was 3,6% (4 patients): there were no significant differences with the P-Possum risk prediction, 38,4% ($p=0.29$) and 4% ($p=0.69$), respectively.

The average hospitalization was of 8,2 days (range 6-29 days).

Discussion

This article reports the experience of the Unit of General Surgery of "Belcolle" Hospital (Viterbo, Italy) in

non using the NGT in consecutive patients submitted to colo-rectal elective surgery.

The endpoints of this study were the incidence of vomiting, the repositioning of the NGT, the pulmonary complications, deep wound breakdown, the return of bowel function and the anastomotic leakage, regardless of the surgical procedure followed.

It is shared opinion that the NGT drains the stomach thus facilitating breathing and reducing the risk of pulmonary complications; furthermore many surgeons (2,6,7) believe that the NGT may reduce abdominal distension thus improving the patients' comfort, and the anastomosis may be protected from the passage of various organic liquids and thus from the risk of leakage.

Actually, yet in 1963, Gerber (9) informed about the correlation between the use of the nasogastric tube and the incidence of temperature and pulmonary complications. This was further confirmed by a metaanalysis carried out by Nelson (1) on nineteen studies that compared the use and the non use of the NGT in abdominal surgery.

In our group of patients we observed only one case of pulmonary infection treated with an adequate antibiotic therapy. Our data coincide with other studies in colo-rectal surgery (10-12) thus confirming the uselessness of the naso-gastric tube in the prevention of pulmonary infections. Furthermore, a tube inserted in the upper respiratory tract may quite reasonably obstruct breathing and reduce the patient's comfort.

In 15 patients (13,6%) we observed nausea soon after surgery, but the symptom disappeared spontaneously or with the intake of Metoclopramide. In 5 patients (4,5%) we had to reposition the NGT because of vomiting. In four patient the physiopathologic reason for a repositioning was a dehiscence of anastomosis requiring a second surgical procedure in three. We therefore consider that vomiting by a delayed postoperative ileus effectively occurred in one case only (0,9%) of our group of patients without NGT. This data confirm the results of a recent review (13) that reporting the use or non use of the NGT in elective abdominal surgery does not significantly prevent the incidence of nausea or vomiting. Cheatham (6), indeed reported that 30 patients out of all those who were inserted a NGT ended their hospitalization without it (Relative Risk Difference= 30,5 patients).

Following the literature, we considered the return of bowel function by time to flatus emitted by the intestine, a further endpoint in our group of patients. In six case studies (11,12,14-16) of colo-rectal surgery a range of 2,7-4 days without the use of the naso-gastric tube is reported in terms of "time of flatus" as a statistically better result compared to the patients with NGT. The Authors, therefore, believe that the gastric decompression is useless.

This study questions also the need to postpone the oral feeding patients until after the resolution of colonic ileus. As was shown, the majority of patients who were fed earlier tolerated the gradual dietary advancement before their first postoperative bowel movement. Anyway, small intestinal motility followed by gastric motility has been shown to return earlier than colonic motility (17,18).

Finally, the incidence of anastomotic leakage in our group of 110 colo-rectal consecutive resections accounted for 3,6% (four patients), thus proving that the insertion of a naso-gastric tube does not protect intestinal sutures. In this case an analysis carried out on 13 randomized studies (13) of abdominal surgery showed that the use of the NGT does not imply a lower incidence

of anastomotic fistula. The literature reports 6 randomized studies (3,11,12,14,16,19) which analysed the correlation between the use of the NGT and the anastomotic leakage. All the studies confirmed that the naso-gastric tube does not protect the sutures of the bowel ($p=0,8$).

Therefore we believe that scientific evidence confirms the uselessness of the NGT in elective colo-rectal surgery (recommendation grade A). We are convinced that this may be applied to the surgery of the small intestine as well, and that further randomized studies will confirm the first results reported for gastric surgery (20,21).

We adding that both the non use of NGT and the early oral feeding may be adopted in open colo-rectal surgery, confirming that fast track program is equivalent to potential benefits of laparoscopic colo-rectal surgery (22).

References

1. Nelson R, Tse B, Edwards S. Systematic review of prophylactic nasogastric decompression after abdominal operations. *Br J Surg* 2005;92(6):673-80.
2. Montgomery RC, Bar-natan MF, Thomas SE, Cheadle WG. Postoperative nasogastric decompression; a prospective randomized trial. *South Med J* 1996;89(11):1063-6.
3. 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):629-32.
4. Manning BJ, Winter DC, McGreal G, Kirwan WO, Redmond HP. Nasogastric intubation causes gastroesophageal reflux in patients undergoing elective laparotomy. *Surgery* 2001;130(5):788-91.
5. Savassi-Rocha PR, Conceição SA, Ferreira JT, Diniz MT, Campos IC, Fernandes VA, Garavini D, Castro LP. Evaluation of the routine use of the nasogastric tube in digestive operation by a prospective controlled study. *Surg Gynecol Obstet* 1992;174(4):317-20.
6. 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):469-78.
7. Wolff BG, Pemberton JH, van Heerden JA, Beart RW Jr, Nivatvongs S, Devine RM, Dozois RR, Ilstrup DM. Elective colon and rectal surgery without nasogastric decompression. A prospective, randomized trial. *Ann Surg* 1989;209(6):670-5.
8. Lee JH, Hyung WJ, Noh SH. Comparison of gastric cancer surgery with versus without nasogastric decompression. *Yonsei Med J* 2002;43(4):451-6.
9. Gerber A. An appraisal of paralytic ileus and necessity for postoperative gastrointestinal suction. *Surg Gynecol Obstet* 1963;117:294-6.
10. Petrelli NJ, Stulc JP, Rodriguez-Bigas M, Blumenson L. Nasogastric decompression following elective colorectal surgery: a prospective randomized study. *Am Surg* 1993;59(10):632-5.
11. 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.
12. Zhou T, Wu XT, Zhou YJ, Huang X, Fan W, Li YC. Early removing gastrointestinal decompression and early oral feeding improve patients' rehabilitation after colectomy. *World J Gastroenterol* 2006;12(15):2459-63.
13. Nelson R, Edwards S, Tse B. Prophylactic nasogastric decompression after abdominal surgery. *Cochrane Database Syst Rev* 2007;(3):CD004929.
14. 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):295-9.
15. Olesen KL, Birch M, Bardram L, Burcharth F. Value of nasogastric tube after colorectal surgery. *Acta Chir Scand* 1984;150(3):251-3.
16. Ortiz H, Armendariz P, Yarnoz C. Is early postoperative feeding feasible in elective colon and rectal surgery? *Int J Colorectal Dis* 1996;11(3):119-21.
17. Rothnie NG, Harper RA, Catchpole BN. Early postoperative gastrointestinal activity. *Lancet* 1963;2(7298):64-7.
18. Condon RE, Sarna SK. Motility after abdominal surgery. *Clin Gastroenterol* 1982;11(3):609-20.
19. Racette DL, Chang FC, Trell ME, Fahra GJ. Is nasogastric intubation necessary in colon operations? *Am J Surg* 1987;154(6):640-2.
20. Carrère N, Seulin P, Julio CH, Bloom E, Gouzi JL, Pradère B. Is nasogastric or nasojejunal decompression necessary after gastrectomy? A prospective randomized trial. *World J Surg* 2007;31(1):122-7.
21. Doglietto GB, Papa V, Tortorelli AP, Bossola M, Covino M, Paccelli F; Italian Total Gastrectomy Study Group. Nasojejun tube placement after total gastrectomy: a multicenter prospective randomized trial. *Arch Surg* 2004;139(12):1309-13.
22. Basse L, Jakobsen DH, Bardram L, Billesbølle P, Lund C, Mogenssen T, Rosenberg J, Kehlet H. Functional recovery after open versus laparoscopic colonic resection. A randomized, blinded study. *Ann Surg* 2005;241(3):416-23.