ORIGINAL ARTICLE

Elective Bowel Surgery with or without Prophylactic Nasogastric Decompression: A Prospective, Randomized Trial

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ABSTRACT

Introduction: Routinely postoperative nasogastric decompression was done until the nasogastric drainage is minimal, reoccurrence of bowel sounds and passing flatus. But prolonged nasogastric intubation is associated with complications like basal atelectasis due to poor cough reflux, loss of electrolytes and increased patient morbidity. **Aims and Objectives:** To study the need for routine use of nasogastric tube post operatively in bowel surgeries with reference to (1) Return of bowel movements (2) Compare the incidence of complications (3) Duration of hospital stay. **Methodology:** 100 patients who underwent elective bowel surgery were randomized into two groups: Study group (50): Nasogastric tube was removed immediately after operation or in the recovery room. Control group (50): Underwent nasogastric tube removal postoperatively after the patient passed flatus and audible bowel sounds on auscultation. **Results:** Incidence of complications were less in the study group i.e., only three patients had vomiting, and two patients had abdominal distension which lead to postponement of oral feeds. Most of our control group patients complained of discomfort and difficulty in coughing and in bringing out sputum, which was the probable cause for high incidence of pulmonary complications. **Conclusion:** Routine use of the nasogastric tube adjunct to patient care following bowel surgery may be safely eliminated.

Key words: Bowel surgery, decompression, morbidity, nasogastric tube

INTRODUCTION

Nasogastric tube (NT) decompression after routine gastrointestinal procedures has long been considered the standard of care as a prophylactic measure to prevent nausea, vomiting, and abdominal distension, to decrease postoperative ileus and wound complications. Routinely, postoperative nasogastric decompression was performed until the nasogastric drainage is minimal, reoccurrence of bowel sounds, and passing flatus. However, prolonged nasogastric intubation is associated with complications such as basal atelectasis due to poor cough reflux, loss of electrolytes, and increased patient morbidity.[1]

In the recent decades, many studies conducted found that prolonged postoperative nasogastric decompression does not have benefits in terms of patient recovery and postoperative complications and started to believe that NT is used unnecessarily and is kept *in situ* for too long. A number of studies conducted with or without tube showed that there is no change in the recovery period and postoperative morbidity and mortality.[2]

The purpose of this study was to evaluate the need for routine use of nasogastric decompression in patients undergoing elective bowel surgery and to compare this practice with a group of patients in whom similar operative procedures had been performed but who did not receive routine nasogastric decompression in terms of time for return of auscultatory bowel sounds, acceptance of first oral feed, duration of hospital stay, and incidence of complications associated with both methods.

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Aim

To evaluate the need for routine use of nasogastric decompression in patients undergoing elective bowel resection and anastomosis.

Objectives

- To access the return of bowel movements
- To compare the incidence of complications
- To compare the duration of hospital stay.

MATERIALS AND METHODS

Data collection

This was performed independently using a detailed study protocol and standardized data collection form. Data collected for each patient included age, sex, disease process, type of procedure, time to return of adequate bowel function, time to oral diet, length of postoperative hospital stay, need for reinsertion of the tube, as well as the presence or absence of the following complications such as nausea, vomiting, abdomen distension, prolonged postoperative ileus, respiratory complications, wound infection, and anastomotic leakage.

Study period

October 2010 to September 2012.

Study design

This was a prospective, randomized control study. A total of 100 patients who underwent elective bowel surgery were randomized into two groups.

Study group (50 patients)

NT was removed immediate postoperative or in the recovery room.

Control group (50 patients)

The control group underwent NT removal postoperatively after the patient passed flatus and audible bowel sounds on auscultation.

Inclusion criteria

All patients who underwent elective bowel resection and anastomosis in the Department of General Surgery, JSS Medical College Hospital, Mysore, Karnataka, India, between October 2010 to September 2012.

Exclusion criteria

- Inflammatory bowel disease
- Paralytic ileus
- Unconscious, sedated patients
- Patients intubated, for more than 24 h
- Known chronic obstructive pulmonary disease patients.

Methods

Informed consent was obtained from all patients participating in this study. All patients who underwent elective bowel resection and anastomosis in our hospital were randomized by serial randomization. The study group mandated NT removal at immediate postoperative period or in the recovery room. Patients were stratified by age, sex, and type of procedure, and serial randomizations were performed by taking every alternate case into study and control groups. The control group required NT removal based on traditional criteria. This criterion included that the patient pass flatus, return of bowel sounds by auscultation in the right iliac fossa, absence of emesis, and no increasing abdominal discomfort. All patients were preoperatively inserted with a 16-Fr NT and secured by plaster to the nose after documenting position in the stomach by auscultation. All patients were given liquid diet after removal of NT and were advanced to a regular diet as tolerated.

Statistical analysis

1. Descriptive statistics: The descriptive procedure displays univariate summary statistics for several variables in a single table and calculates standardized values (*Z*-scores). Variables can be ordered either by the size of their means (in ascending or descending order), alphabetically, or by the order in which you select the variables (the default)
2. Chi-square test: The Chi-square test was applied for univariate analysis of categorical data, and the Poisson linear regression model was applied to test the number of events occurring in a fixed period between the two groups
3. Cross tabulations (contingency table): The crosstabs procedure forms two-way and multi-way tables and provides a variety of tests and measures of association for two-way tables. The structure of the table and whether categories are ordered determine what test or measure to use
4. Independent samples *t*-test: The independent samples *t*-test procedure compares means for two groups of cases. Ideally, for this test, the subjects should be randomly assigned to two groups so that any

difference in response is due to the treatment (or lack of treatment) and not to other factors.

The statistical operations were performed through SPSS (Statistical Presentation System Software) for Windows, Version 16.0 (SPSS, 1999. SPSS Inc., New York, USA). $P < 0.05$ was considered statistically significant.

Observation and analysis

The two groups showed statistical homogeneity of their baseline characteristics. The mean age of the patients recruited in the different groups was comparable. There were 19 male and 31 female patients in the study group and 18 male and 32 female patients in the control group. The age ranged from 18 to 75 years in our study, which was statistically comparable between the two groups. The surgical procedures were stratified into three groups, which included small bowel resection, large bowel resection, and other procedures [Table 1]. Other procedures included choledocojejunostomy with Roux-en-Y anastomosis, Roux-en-Y hepaticojejunostomy, and longitudinal pancreaticojejunostomy with Roux-en-Y anastomosis. The time of removal of NT in the study group was constant, whereas it varied in the control group depending on auscultatory finding of bowel sounds and passage of flatus. The time of removal of NT in the control group ranged from 2 to 6 days.

The postoperative day when the first bowel sound was heard was noted in the patients of two groups. The first bowel sound postoperatively was heard earlier (2.02 days) in the study group as when compared to the control group (2.96 days). The patients in the study group tolerated the first feed earlier (3.14 days) as when compared to that of the control group (4.80 days). The mean duration of hospital stay postoperatively was around 15.26 days in the study group whereas it was 17.04 in the control group [Tables 2 and 3]. The complications encountered in the patients of the two groups were distension of the abdomen, pneumonia, anastomotic site leak, electrolyte imbalance, septicemia, and vomiting [Graph 1 and Table 4].

The incidence of complications was less in the study group, i.e., two patients had vomiting, two abdominal distension, and one anastomotic leak. One patient in the control group had vomiting, one patient ended with anastomotic leak while four patients developed pneumonia; two had electrolyte imbalance and one septicemia. Four patients in our study group and one patient in the control group required reinsertion of NT due to persistent vomiting, anastomotic leak, and abdominal distension. Two patients in our study and one patient in the control group required reinsertion of NT due to persistent vomiting, anastomotic leak, and abdominal distension.

Table 1: Demographics and general considerations of the patients

	Study group (*n*=50)	Control group (*n*=50)	Contingency coefficient	*P*
Gender				
Male	19	18	0.021	0.836
Female	31	32		
Mean age (years)	47.76	44.64	0.131	0.625
Surgical procedure				
Small bowel resection	15	23	0.173	0.215
Large bowel resection	27	19		
Others	8	8		

Table 2: Postoperative course

	Mean±SD	SE	*P*
Duration of gastric decompression (day)			
Study group	1±0.000	0.000	0.000
Control group	3.60±1.178	0.167	
Time to first bowel sound (day)			
Study group	2.02±0.622	0.088	0.000
Control group	2.96±0.669	0.095	
Time to first oral intake (day)			
Study group	3.14±0.881	0.125	0.000
Control group	4.80±1.125	0.159	
Mean hospital days			
Study group	15.26±5.009	0.708	0.062
Control group	17.04±4.389	0.621	

SD – Standard deviation; SE – Standard error

Table 3: Independent samples *t*-test

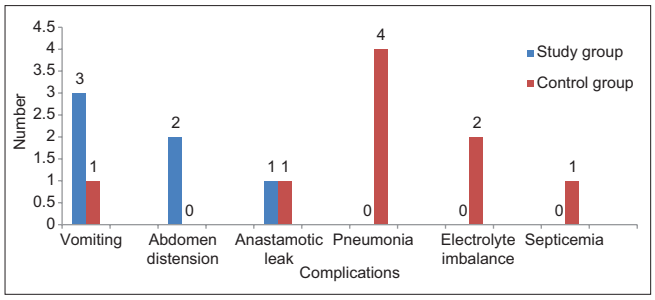
	t-test for equality		
	t	Significant (two-tailed)	Mean difference
Duration of gastric decompression (day)	−15.606	0.000	−2.60
Time to first bowel sound (day)	−7.275	0.000	−0.94
Time to first oral intake (day)	−8.216	0.000	−1.66
Mean hospital days	−1.890	0.062	−1.78

Table 4: Postoperative complications

	Study group (*n*=50)	Control group (*n*=50)	Contingency coefficient	*P*
Vomiting	3	1	0.102	0.307
Abdominal distension	2	0	0.141	0.153
Anastomotic site leak	1	1	0.000	1.000
Pneumonia	0	4	0.200	0.041
Electrolyte imbalance	0	2	0.141	0.153
Septicemia	0	1	0.100	0.315
Overall	6	9	0.303	0.120

DISCUSSION

Levin introduced NT in 1921.[3] In 1926, Iver *et al*. demonstrated that postoperative distension of abdomen is



Graph 1: Graphical representation of postoperative complications

a result of swallowed air and could be prevented by NT.[4] Wangesten and Paine in the 1930's popularized the use of NT after gastric as well as other forms of intra-abdominal operations.[5] The dictum remained essentially unchanged until 1963 when Garber stated that routine use of nasogastric decompression after surgery was not only unnecessary but also accompanied with complications, specifically related to its use.[6]

In our study group, NT was removed immediately after surgery or in the recovery room, and in the control group, the time of removal of NT ranged from 2 to 6 days with a mean of 3.60 days. The time of first bowel sound heard by auscultation was 2.02 days in the study group and 2.96 days in the control group. The time of first heard bowel sound was earlier in the study group. Similar results were found with Cheadle *et al*.,[7] where patients were randomized into four groups. Group l had NT and received placebo, Group 2 had NT and received cimetidine, Group 3 had no NT and placebo, and Group 4 had no tube and received placebo. The first bowel sounds were heard 3.20 days in no tube group and 3.6 days in tube group. The study group tolerated oral feeds earlier, i.e. 3.12 days (1–4 days) when compared to the control group 3.70 days (2–6 days). When compared to a meta-analysis published by Key and Sawyers,[8] where selective nasogastric decompression (NT placed only when required) versus routine nasogastric decompression, the selective group accepted oral feeds 3.52 days and 4.59 days, respectively. Tanguy *et al*. has concluded routine gastric decompression neither hastens the return of bowel function nor diminishes the incidence of postoperative nausea and vomiting.[9] Wolff *et al*., though reported an increase in the incidence of nausea and vomiting in their patients, concluded that routine nasogastric decompression is not warranted.[10] The duration of hospital stay was less in our study group (15.26 days) compared to control group (17.04 days).

All the patients were discharged when the surgeon felt that the patients were fit for discharge. In some patients, the hospital stay was prolonged due to postoperative wound or pulmonary infections. Most of the patients in our control group complained of discomfort and unpleasant sensation due to the tube in the nose, and they also complained of inability to bring out the sputum and difficulty in coughing due to the tube *in situ*. The tube *in situ* also causes lax lower esophageal sphincter which in turn results in increased reflux and higher chances of aspiration. Perhaps, this was the main reason for increased incidence of complications. In the control group, four patients had pneumonia, one had vomiting, one patient ended with anastomotic leak, one patient developed septicemia, and two had an electrolyte imbalance. Only three patients had vomiting, one anastomotic leak, and two patients had abdominal distension which leads to postponement of oral feeds. In Cheadle *et al*.[7] study with similar group of patients, five patients in no tube group and eleven patients in the tube group had pneumonia. Colvin *et al*.[11] and Racette *et al*.[12] reported significant increases in gastric distention over the intubated control group, and Wolff *et al*.[10] reported a similar increase in the incidence of nausea and vomiting in their patients. In the study group patients, the expenditure during hospital stay was also reduced due to less intravenous drugs and fluids.

CONCLUSION

In summary, our findings indicate that the prophylactic use of NT decompression offers no patient benefit that would offset the discomfort and potential morbidity associated with its use, and it can therefore be safely omitted as a routine adjunct to bowel surgery. Decompression can be reserved only for patients who require treatment for persistent symptoms postoperatively, thereby sparing the vast majority this unpleasant treatment measure.

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Conflicts of interest

There are no conflicts of interest.

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