ORIGINAL ARTICLE

Role of Nasogastric Intubation After Small Bowel Anastomosis

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ABSTRACT

Objective: To determine advantages and disadvantages of postoperative nasogastric intubation after small bowel anastomosis.

Study Design: Quasi experimental.

Place and Duration of Study: Surgical Unit-I, Holy Family Hospital, Rawalpindi, from December 2003 to December 2006.

Methodology: A total of 112 patients, undergoing small bowel anastomosis were equally divided in group I and II with and without postoperative nasogastric intubation respectively. Variables compared were number of patients having episodes of vomiting, change in abdominal girth, the time for onset of bowel sounds, time to begin per oral fluids, length of hospitalization and postoperative complications.

Results: In group-I, nasogastric tube was removed on an average after 3.1 days. Average postoperative nasogastric output was 357, 154 and 64 ml/day for day 1, 2 and 3 respectively. There was no statistically significant difference between two groups in abdominal girth before and after operation, frequency of vomiting, time taken for onset of bowel sounds and start of oral sips after operation, frequency of wound infection, anastomotic leak and mortality ($p>0.05$). Length of postoperative hospital stay and frequency of postoperative respiratory complications were more in group-I as compared to group-II ($p<0.05$).

Conclusion: Nasogastric decompression does not provide added advantage after small bowel anastomosis.

Key words: *Nasogastric decompression. Nasogastric tube. Small bowel. Anastomosis.*

INTRODUCTION

Levin in 1921 and Wangensteen in 1933 popularized nasogastric decompression (NGD) after abdominal surgeries.[1,2] In the 1960s, however, reports began to question the routine use of nasogastric tubes.[3] Current studies have shown that routine nasogastric decompression is associated with pulmonary, electrolyte, mechanical and infectious complications.[4] The problems combined with the discomfort and restrictions in mobility led several to support a selective approach to use the postoperative nasogastric tubes.[5]

Nasogastric tube may cause local trauma at time of intubation and damage to gastric mucosa. It is also associated with high incidence of pulmonary infections and gastro-esophageal reflux.[6] Removal of a large volume of gastric fluid may cause an imbalance of electrolytes in the blood.

Nasogastric intubation is in routine use after abdominal surgeries for the last many years. During the last few years, better concepts of perioperative fluid management, early postoperative mobilization and good pain control have changed the whole scenario of postoperative course of patients on surgical floor. These changes have raised many questions on routine use of postoperative nasogastric decompression after small bowel anastomosis. After few studies on the role of nasogastric decompression after colonic surgery, many surgeons have stopped routine use of nasogastric decompression after colorectal surgery but are still using it after small bowel surgery.[7] Few studies are published to find out the value of prophylactic nasogastric decompression after small bowel surgery.

The aim of this study was to evaluate the advantages and disadvantages of nasogastric intubation in patients undergoing small gut anastomosis.

METHODOLOGY

This quasi experimental study was conducted in the Surgical Unit I, Holy Family Hospital, Rawalpindi, from December 2003 to December 2006. Data was collected prospectively from elective and emergency patients undergoing laparotomy and small bowel anastomosis anywhere from duodenojejunal (DJ) flexure to ileocaecal valve. It included all patients with intestinal obstruction and peritonitis due to perforation, intestinal trauma and elective cases of ileostomy/jejunostomy reversal.

A total of 112 patients were divided in two groups. Patients were briefed about the study protocol. Informed consent was taken from all patients. Every alternate patient was decided to be managed without nasogastric (NG) tube postoperatively. Nasogastric tube was passed pre-operatively in all patients of group-I (emergency and elective). Tube was also passed pre-operatively in all

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emergency cases of group-II (without NG) as part of emergency management but not in elective cases of this group. After operation, nasogastric intubation continued in patients of group-I (n=56) but removed immediately in the group-II (n=56).

Later advantages and disadvantages of postoperative nasogastric intubation were assessed by comparing following outcome variables between group-I and II. The number of patients having episodes of postoperative vomiting for three days were noted. The gastric juice of patients in group-I was collected and measured (in ml) in a bag attached with nasogastric tube. Postoperative abdominal girth was measured (cm) by circling umbilical region in the morning for three days and compared with pre-operative one. Time (days) was noted for onset of bowel sounds and start of oral sips. Total length (days) of hospitalization after operation and frequency (number of patients) of postoperative complications were recorded. Complications noted were anastomotic leak, wound infection and respiratory tract infection including cough, chest infection and pharyngolaryngitis.

Patients younger than 12 years; those with pre-operative history of pulmonary tuberculosis, Chronic Obstructive Pulmonary Diseases (COPD) and chest infections; patients undergoing major surgical procedure for any other abdominal viscera along with small bowel anastomosis, and emergency patients with multiple organ injuries were excluded.

All patients included in the study were operated by surgeons with same level of competence. Post-operatively, patients were discharged by the operating surgeon when they started oral diet and passed stool and flatus.

All required information was collected on specifically prepared proformas. Collected data was analyzed with the help of statistical software SPSS version 10. Chi-square test was used to compare categorical data. Student's t-test was applied to compare means of numerical data. P-value of less than 0.05 was considered statistically significant.

RESULTS

Patients were divided in two groups. Nasogastric decompression was done in group-I (n=56) and not done in group-II (n=56) postoperatively.

In group-I, 32 (57%) were females and 24 (43%) were males. In group-II, 30 (53.5%) were females and 26 (46.5%) were males. Mean age for group-I was 27.7±8.9 years (12-57 years) and for group-II was 31±14 years (12-66 years).

There were no significant differences between two groups in terms of age (p=0.122), gender (p=0.850) and case distribution (p=0.954). Detail of case distribution is given in Table I.

Table I: Case distribution in group-I and group-II.

Diagnosis	Group-I (n=56)		Group-II (n=56)	
	n	%	n	%
Tuberculous stricture/perforation	13	23	14	25
Enteric perforation	8	14	10	18
Ileostomy reversal	16	29	13	23
Traumatic perforations	9	16	10	18
Iatrogenic trauma while doing adenolysis	3	5	4	7
Miscellaneous (Meckels diverticulum, worm infestation, etc.)	7	13	5	9

The frequency of vomiting between two groups was not significantly different (p=0.705). Twenty nine (51.7%) patients in group-I had episodes of vomiting as compared to 27 (48%) patients of group-II. On an average, 2 episodes of vomiting were recorded on first postoperative day in both groups. For next two days, episodes of vomiting were less as compared to first postoperative day.

In group-I nasogastric tube was removed on an average after 3.1±0.77 days. Average postoperative nasogastric output was 357, 154 and 64 ml/day for day 1, 2 and 3 respectively.

Pre-operative average abdominal girth was 71.017±8.2 cm in group-I and 71.267±7.2 cm in group-II (p=0.865). There was slight increase in postoperative abdominal girth in both groups on day one but it was not statistically significant, (p=0.208 and 0.151 for group-I and II respectively). Average postoperative change in abdominal girth was 4, 3.7 and 3.6 cm for group-I and 4.1, 3.8 and 3.5 cm for group-II on day 1, 2 and 3 respectively. There was no statistically significant difference between two groups for change of abdominal girth for 3 days (p=0.857, 0.962 and 0.953 for day 1, 2 and 3 respectively, Table II).

Table II: Comparison of change in abdominal girth in both groups for three postoperative days (data expressed as average pre-operative abdominal girth and average change in girth in cm).

	Pre-operative girth (mean +SD)	Day one	Day two	Day three
Group-I (n=56)	71.017 ±8.2	4	3.7	3.6
Group-II (n=56)	71.267 ±7.2	4.1	3.8	3.5
P-value	0.865*	0.857*	0.962*	0.953*

** not significant*

No significant difference in time required for onset of bowel sounds and start of oral sips after operation was found between two groups. Bowel sounds returned on average after 1.80±0.6 days in group-I and 1.80±0.65 days in group-II (p=0.553). Oral sips were started on average in 3.1±0.77days in group-I as compared to 2.92±0.53 days in group-II (p=0.168).

Six patients in group-I were reintubated due to blockage of tube or its accidental removal.

There was statistically significant difference in length of postoperative hospital stay between two groups. In group-I, the average postoperative hospital stay was 8.1±4.4 days as compared to 5.7±1.4 days in group-II (p<0.05).

Chest infection with fever and cough was diagnosed in 8 patients (14%) of group-I and only 3 patients (5.3%) of group-II (p<0.05). Twenty five patients (44.6%) in group-I and 7 patients (12.5%) in group-II had sore throat and pharyngolaryngitis (p<0.001).

A total of 5 patients, 3 (5%) from group-I and 2 (3.5%) from group-II had anastomotic leak associated with fever, sepsis and intra-abdominal collections (p=0.647). Later on, these patients were managed by re-laparotomy.

Postoperative wound infection was present in 4 (7.1%) patients of group-I and 3 (5.3%) patients of group-II (p=0.696). Mortality was 3 (5%) patients of group-I and 2 (3.5%) patients of group-II (p=0.647, Table III).

Table III: Comparison of outcome variables in both groups.

Outcome variables	Group I (n=56)	Group II (n=56)	Test statistics	P-values
Vomiting (number of patients) (%)	29 (51.7%)	27 (48%)	χ^2=143	0.705*
Time taken for onset of B.S (mean days±SD)	1.8±0.6	1.8±0.65	t=0.596	0.55*
Time taken to start oral sips (mean days±SD)	3.1±0.77	2.92±0.53	t=1.386	0.168*
Postoperative hospital stay (mean days± SD)	8.1±4.4	5.7±1.4	t=3.782	< 0.05
Chest infection (number of patients) (%)	8 (14%)	3 (5.3%)	χ^2=3.95	< 0.05
Sore throat & pharyngitis (number of patients) (%)	25 (44.6%)	7 (12.5%)	χ^2=14.175	<0.001
Anastomotic leak (number of patients) (%)	3 (5%)	2 (3.5%)	χ^2=0.209	0.647*
Wound infection (number of patients) (%)	4 (7.1%)	3 (5.3%)	χ^2 =0.152	0.696*
Mortality (number of patients) (%)	3 (5.3%)	2 (3.5%)	χ^2 =0.209	0.647*

**not statistically significant, BS=bowel sounds*

DISCUSSION

Nasogastric intubation is widely used for decompression after small bowel anastomosis but its routine use is now questionable. The idea to use a nasogastric tube after abdominal surgery has no clear scientific grounds. Many patients forget the major operation they underwent but remember the tube in the throat.[8] The aim of this study was to evaluate the pros and cons of routine nasogastric intubation after small gut anastomosis.

Decreased frequency of vomiting is one of the reasons in favour of nasogastric decompression but in this study, the frequency of vomiting between two groups was not significantly different. After a surgical procedure, vomiting can result due to many other factors including type and amount of anaesthetic agents.[11] In addition, handling of bowel and duration of surgery can influence the incidence of vomiting in postoperative period.[12]

Development of ileus after abdominal operations is natural and transient process. This state of ileus is mostly due to motor paralysis of gut but the function of intestinal absorption is not greatly affected. Clevers *et al.* reported that paralysis of intestine could not be alleviated by gastrointestinal decompression.[13] Some studies have also been made regarding the relationship between phenomenon of postoperative intestinal paralysis and gastrointestinal decompression.[14] It is well-known that the volume of secreted digestive juices is about 5 to 9 litres per day, and the gas ingested by deglutition and secreted by intestines is about 30-300 ml per day.[15] Nasogastric decompression can never remove such a great amount of fluid and gas. In this study, average nasogastric output on day one was 357 ml/day, which is much less than the total amount of gastric juice produced per day. It is thus evident that gastrointestinal decompression could not effectively extract digestive juices.

In this study, there was no significant difference between two groups in terms of abdominal girth before and after operation. However, slight increase of postoperative abdominal girth in both groups demonstrates that there exists paralysis of intestines after operation and this is a normal and brief process. Gastrointestinal decompression can not extract the liquid and gas from intestines and there was no obvious effect upon postoperative abdominal distension between the two groups. In a study conducted in Greece, no statistically significant difference was recorded with and without nasogastric decompression concerning the occurrence of postoperative nausea, vomiting and abdominal distension.[16] Tube decompression of the stomach does not relieve intestinal paralysis after digestive operations.[17] In this study, there was no difference in time required for onset of bowel sounds and start of oral sips after operation between two groups. Bowel sounds returned at nearly the same time in both groups. Oral sips were started insignificantly later in group-I as compared to group-II.

These findings made it clear that gastrointestinal decompression could not get rid of paralysis of intestine. There is lack of literature specifically focusing on role of nasogastric decompression after small bowel anastomosis. Few studies after gastrointestinal surgery including a wide range of procedures concluded that there is no difference in onset of bowel sounds and start of oral sips in patients with and without nasogastric decompression.[18]

One of the concepts of gastrointestinal decompression is to reduce the inside pressure of gut to decrease the incidence of anastomotic leakage. But, it is very difficult for a tube placed in stomach to lower the pressure in whole of small gut. In this study, there was no statistically significant difference between two groups

regarding anastomotic leak, wound infection and mortality.

Postoperative hospital stay was markedly longer in group-I as compared to group-II. This difference in postoperative hospital stay may be due to greater frequency of postoperative complications in nasogastric decompression group. Few other studies have also reported shorter hospital stay in patients who never received a nasogastric tube.[19,20]

Nasogastric intubation leads to cough and expectoration and indirectly induces pulmonary infection. This study, like many other studies, showed higher frequency of postoperative respiratory complications demonstrating that it was more beneficial for patients to avoid routine use of nasogastric decompression. According to the report by Huerta *et al.* the incidence rate of pulmonary infection in those with gastrointestinal decompression after operation on abdominal region was 10 times higher than that in those without gastrointestinal decompression.[21]

In this study, 25 patients (44.6%) in group-I as compared to 7 patients (12.5%) in group-II had sore throat and pharyngolaryngitis. Pharyngolaryngitis could be immediately induced by long-term irritation of throat by gastrointestinal decompression tubes. Nathan *et al.* reported that the incidence rate of throat pain was greatly increased in gastrointestinal decompression group.[22] Another randomized research report showed that 70% of severe upsets were caused by gastrointestinal decompression.[16] This study also demonstrated that gastrointestinal decompression could not effectively prevent severe postoperative complications such as anastomotic leakage and instead resulted in an increased incidence rate of pharyngolaryngitis.

CONCLUSION

In this study, nasogastric decompression did not provide added advantage after small bowel anastomosis. Rather it was associated with higher frequency of throat and chest infection, increased discomfort and prolonged hospital stay. Therefore, it may be more beneficial for the patients to avoid nasogastric intubation after anastomosis of small bowel.

REFERENCES

1. Levin AL. A new gastroduodenal catheter. *JAMA* 1921; **76**: 1007-9.
2. Wangensteen OH, Paine JR. Treatment of acute intestinal obstruction by suction with the duodenal tube. *JAMA* 1933; **101**:1532-9.
3. Gerber A. An appraisal of paralytic ileus and the necessity of postoperative gastrointestinal suction. *Surg Gynecol Obstet* 1963; **117**:294-6.
4. Ghahreman IGG, Turner MA, Port RB. Iatrogenic intubation injuries of the upper gastrointestinal tract in adults. *Gastrointest Radiol* 1980; **5**:1-10.
5 Petrelli NJ, Stulc JP, Rodriguez-Bigas M, Blumenson L. Nasogastric decompression following elective colorectal surgery: a prospective randomized trial. *Am Surg* 1993; **59**:632-5.
6. Manning BJ, Winter DC, McGreal G, Kirwan WO, Redmond HP. Nasogastric intubation causes gastroesophageal reflux in patients undergoing elective laparotomy. *Surgery* 2001; **130**: 788-91.
7. 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**:604-8.
8. Naima R, Ijaz H, Jamshed A. Can nasogastric decompression be omitted in children with selected abdominal surgical procedures? *J Col Physic Surg Pak* 2002; **12**:353-5.
9. Melvadt R, Knecht B, Gibbons G. Is nasogastric suction necessary after elective colon resection. *Am J surg* 1985; **149**: 620-2.
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; **1**:1998-2001.
11. Rowbtham DJ. Current management of postoperative nausea and vomitings. *Br J Anaesth* 1992; **69**:46-59.
12. Woodhouse A, Mather LE. Nausea and vomiting in the postoperative patients controlled analgesia environment. *Anaesthesia* 1997; **52**:770-5.
13. Clevers GJ, Smout AJ. The natural course of postoperative ileus following abdominal surgery. *Neth J Surg* 1989; **41**:97-9.
14. Ying FM. Reports on 112 cases with decompression operation on biliary tract without nasogastric tube. *Linchuang Waike Zazhi* 1999; **7**:104
15. Tang YS, Zhang XZ, Han DC. Human medical parameters and concepts. 1st ed. Jinnan: *Jinan Press* 1995: 80-115.
16. Koukouras D, Mastronikolis NS, Tzoracoleftherakis E, Angelopoulou E, Kalfarentzos F, Androulakis J. The role of nasogastric tube after elective abdominal surgery. *Clin Ter* 2001; **152**:241-4
17. Savassi-Rocha PR, Conceicao SA, Ferreira JT. Evaluation of the routine use of the nasogastric tube in digestive operation by a prospective controlled study. *Surg Gynecol Obstet* 1992; **174**:317-20.
18. Michowitz M, Chen J, Waizbard E, Bawnik JB. Abdominal operations without nasogastric tube decompression of the gastrointestinal tract. *Am Surg* 1988; **54**:672-5.
19. 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**:629-32.

20. Wu CC, Hwang CR, Liu TJ: There is no need for nasogastric decompression after partial gastrectomy with extensive lymphadenectomy. *Eur J Surg* 1994; **160**:369-73.
21. Huerta S, Arteaga JR, Sawicki MP. Assessment of routine elimination of postoperative nasogastric decompression after Roux-en-Y gastric bypass. *Surgery* 2002; **132**:844-8.
22. Nathan BN, Pain JA. Nasogastric suction after elective abdominal surgery: a randomised study. *Ann R Coll Surg Engl* 1991; **73**:291-4.