Nasogastric Tube Decompression in Stomach and Small Bowel Surgery

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ABSTRACT:

INTRODUCTION: The use of nasogastric tube(NGT) after abdominal operations is intended for early return of bowel function and to avoid pulmonary complications by preventing vomiting which can cause aspiration pneumonia. Many studies in the past few decades have suggested that the routine use of nasogastric tube decompression has no benefit in preventing the postoperative morbidity. In our country, the routine use of nasogastric decompression is still in practice in most of the institutions by the surgeons. This study aims to see the outcome of NGT decompression in postoperative period in all surgeries involving stomach and small bowel.

METHOD: Between July2015 and May 2017, all the 120 patients undergoing elective resectional stomach and small bowel surgery were included for the study of which 65(54.2) were randomized to nasogastric decompression group (NGT) and 55(45.8) were randomized to no nasogastric decompression (NNGT) group. The postoperative courses of both groups were recorded. The postoperative results were analyzed and conclusion was made.

RESULT: The mean age distribution in NGT insertion and NNGT insertion group was 50.88± 15.89 and 48.93±15.54 respectively, there was no significant difference across the age distribution. The sex distribution between the groups didn't show any statistical difference (p value-0.088).The rate of abdominal distension was more in NGT group 8(12.30%) as compared to NNGT group 2(3.6%) but the difference was not statistically significant. Vomiting was seen in 1(1.5%) case in NGT group but none of the patient in NNGT group had vomiting. Anastomotic leak was seen in 7(10.8%) in NGT groupand 3(5.5%) in NNGT group which on statistical analysis didn't show any significance (p value- 0.296).The day of first bowel sound was similar in groups,2.68+/-0.752 days in NGT group and 2.67+/- 0.747 days in NNGT group (p value-0.96), without any significant difference between the groups. However the time of passage of flatus was3.25+/-0.613 days in NGT group but was earlier 3.05+/-0.731 days in NNGT group even though it was statistically not significant(p value - 0.159). The start of oral feed on postoperative days which was tolerated by the patient was similar between the groups, 2.69+/-0.748 days in NGT and 2.78+/-0.658 days in NNGT group, (p value-0.343).The rate of pulmonary complications was higher in the NGT group 9(13.8%) than4(7.3%) in NNGT group but it was not statistically significant, (P = 0.250). The overall complications rate was 29(44.60%)in NGT group whereas it was 24(43.60%) in NNGT group which was not statistically significant, (p value- 0.914). However, with regard to number of days of stay postoperatively, the NGT group had 17.899+/-6.67 days which was longer than NNGT group, 14.4+/-7.23 days, this was statistically significant in the favor of NNGT group.

CONCLUSION: Routine use of NGT seems to serve no beneficial purpose and may even be harmful in patients after abdominal surgery and it is uncomfortable for the patients as well. Therefore, NGT use may be only recommended as a therapeutic approach for abdominal distension and vomiting not as routine use in postoperative patients.

KEY WORDS: Aspiration pneumonia, Nasogastric decompression, Resection

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INTRODUCTION

Since Levin first described nasogastric tubes (NGTs) in 1921, they have been used routinely after abdominal surgery until bowel function returns in the belief that gastric decompression, by decreasing air and fluid accumulation, could prevent abdominal distension, nausea and vomiting.[1] Many studies in various disciplines have questioned this practice. Although the incidence of postoperative morbidity and mortality is similar with or without NGT, its use is associated with a higher incidence of pulmonary complications.[2,3,4, 5]

Conversely, nasogastric decompression might reduce abdominal distension and chance of anastomotic leak and postoperative vomiting, especially in patients undergoing surgery for small bowel and stomach. The prevention of distension might also lower the risk of wound dehiscence, intestinal fistulas and promote a more rapid return of bowel function. The aim of this clinical study was to assess postoperative complications in patients with NGT or no NGT (NNGT) after elective stomach and small bowel resectional surgery.

METHOD

This study was undertaken in Bir Hospital. All the patients admitted in Gastrosurgery department between July 2015 and May 2017 for resectional stomach and small bowel surgery were included in the study**.** This study is Prospective randomized study. Sample size calculation was done. Patients were randomized into two groups. In this study the randomization is done by using random digit numbers. This research protocol was approved by the Ethics Committee of NAMS.

Structured Performa included all the physiological parameters, investigations, procedures undergone by the patient and was filled by the admitting doctor before surgical intervention. The exclusion criteria was emergency surgery , surgery involving esophageal anastomosis, doubtful viability of remaining bowel e.g. when second look operation is required and patient having NGT decompression prior to surgery. Patients' characteristics such as gender, age, BMI (body mass index), NRI (Nutritional risk index ,NRI=1.519X serum albumin(g/dl) +41.7X present weight(kg)/ ideal weight(kg)), clinical diagnosis and operation procedure, along with their clinical outcomes such as postoperative complications, and length of stay were collected in Performa and entered into a SPSS database. All the operative details were noted and the postoperative course of the patients with NGT and the immediate postoperative morbidities were evaluated, entered in Performa and was compared with the patients with no NGT(NNGT).The postoperative complication variables were defined according to the validated definitions as given below. Table 1

Table1: Definition of complications[5]

Variables	Definitions
Reinsertion rate	Need for inserting nasogastric tube in postoperative period due to abdominal distension and nausea.
Abdominal discomfort/ distension	Feeling of fullness and nausea as complained by patient.
First passage of flatus	Audible bowel sounds or patient passing flatus for the first time in postoperative period
Anastomotic leak	Any dehiscence or clinical or radiological evidence of leak
Pulmonary tract infection	Symptomatic with cough, fever, increased respiratory rate, decrease in oxygen saturation

Pretesting was done for 10 patients to analyze the safety and reliability of the research.The nasogastric tube was inserted immediately after induction of anesthesia. The procedure was done by the anesthetist providing anesthesia to the patient. The size of the tube was no 16 Ryles tube with adequate lubrication by 2% xylocaine jelly. The tube was kept in place till the time of return of normal bowel sound (normal bowel sound diagnosed clinically by peristalsis audible with stethoscope or passage of flatus whichever comes first). The removal of the tube was done as the Nasogastric aspirate was less than 100ml for 2 consecutive days or else after return of normal bowel sound diagnosed clinically by peristalsis or passage of flatus whichever comes first. Removal was done by expert who had expertise with the procedure.

In cases of NNGT group, if the tube was to be inserted after surgery then the detail will be documented about the indication for insertion such as, abdominal discomfort or vomiting, symptoms and signs of anastomotic leak, reoperation . This procedure of NGT insertion was carried out in an accepted method. All patients received antibiotic prophylaxis according

to department protocol. No pharmaceutical bowel stimulants were used. Oral intake was initiated in all patients upon resumption of normal bowel sounds, starting with fluids, then stepwise increases in meal consistency.

Mortality and morbidity were defined respectively as death and complications occurring either during the hospital stay or within 30 days of surgery. Complications were stratified as reinsertion in NGT group and insertion in NNGT group, abdominal distension, nausea, anastomotic leak leading to fistula, pulmonary tract infection and time to passage of first flatus. Length of stay was defined as the length of hospital stay in days from the date of operation to the date of hospital discharge.

The follow-up period was from the date of informed consent to 30 days after operation, or date of death if patient died within 30 days of operation. Patients in the NGT group who had nasogastric tube removed before the intended time, and patients in the control group who were treated with nasogastric reinsertion when condition required were also taken up for analysis.

Continuous variables were expressed as mean ± standard deviation and compared using independent two sample t-test. Categorical variables were expressed as frequencies/percentages and statistical comparisons were made by the Chi square test. Pearson's correlation was used wherever appropriate. Two tailed p-values less than 0.05 were considered statistically significant.

The protocol was approved by ethical committee and informed consent was taken from each patient.

RESULT

Out of 120 patients, 65 were randomized into NGT group, 55 were randomized to NNGT group. All the patients were followed for 30 days after operation without death or lost to follow up. The groups were similar with regard to gender, age, diagnosis, and operation time. Total operation time and the total bleeding volume were not statistically different between the two groups (p>0.05) in a similar procedure.

Demographics of patients (Table2): The mean age distribution in NGT insertion and NNGT insertion group was 50.88 15.89 days, 48.93 15.54days respectively. There was no significant difference in distribution of patients with respect to age in both group, p=0.356. The distribution of sex between the two group was similar, 27(41.5%) male and 38(58.3%) female in NGT group whereas 29(52.7%) male and 26(47.3%) female in NNGT group and there was no statistical significant difference between the two group (p value=0.223). BMI and NRI was calculated for both the groups, which was 21.14±3.54, 94.58±8.840 for NGT and 20.81±3.71, 94.78±10.10 for NNGT respectively. There was no statistical significance between the groups.

Table 2: Demography

(n=120)	NGT	NNGT	P value
Age			
mean±SD	50.88±15.89	48.93±15.54	0.356
Sex			
Male	38(41.5%)	29(52.7%)	0.223
Female	65(58.5%)	26(47.3%)	
BMI			
mean±SD	21.14±3.54	20.18±3.71	0.335
NRI			
mean±SD	94.58±8.84	94.78±10.10	0.821

Out of 120 operations performed in both the groups the procedure for primary pathology are listed as in table4, where maximum number, 50(41.7%) of procedures are performed in biliary system and pancreas where the distribution of pancreatic surgery in both groups were equal and statistically not significant (not shown in the table). The lowest primary pathology was in small bowel with frequency of 14(11.7%) as shown in Table 3.

Table 3: Procedure according to organ

	Frequency	Percent
Stomach	31	25.8
Biliary system and pancreas	50	41.7
Small bowel	14	11.7
Colon and small bowel	25	20.8
Total	120	100.0

Postoperative data are summarized in Table 4. Overall surgical and medical morbidity rates were similar in the two groups, but the rate of pulmonary complications was higher in the NGT group but was not statistically significant, (P = 0.250). The rate of abdominal distension was more in NGT group 8(12.3%) but the incidence was not significant, whereas vomiting was seen in only one patient in NGT group. 7(10.8%) in NGT group had evidence of anastomotic leak whereas only 3(5.5%) in NNGT group, these also included postoperative

minor leaks in both groups which didn't require any intervention. The incidence of wound infections were 17(26.2%) and 18(32.7%) in NGT and NNGT group respectively. Such high incidence is because we have included minor infections which required dressings only and did not prolong the postoperative stay of the patient due to infection. However, the rates of infection did not show any statistical significance in both the groups. The day of first bowel sound was similar in both the groups however the time of passage of flatus was earlier 3.05±0.731 days in NNGT and 3.25±0.613 days in NGT group and was statistically not significant(p=0.159). Even though, the start of oral feed which was tolerated by the patient was similar between the groups. The reinsertion of NGT was required in the NGT group after removal due to abdominal distension and vomiting respectively in two patients. Of the NNGT group patients none required insertion of NGT in postoperative period. However, with regard to number of days of stay postoperatively, the NGT group had 17.899± 6.67 days which was longer than no NGT group, 14.4+/-7.23 days. This was statistically significant in the favor of NNGT group (p value-0.006). The Pearson's correlation value of 1 suggests there was strong correlation between the uses of NNGT and the postoperative hospital stay which was less than in NGT group. (Fig 1) The R^2 is 6%, which means that with use of NGT the number of postoperative days of stay increases by 6%.

Table 4: Postoperative data

	no NGT (n=55)	NGT(n=65)	p value
Day of first bowel sound	2.67+/-0.747	2.68+/-0.752	0.690
Day of passage of first flatus	3.05+/-0.731	3.25+/-0.613	0.159
Start of oral feed	2.78+/-0.658	2.69+/-0.748	0.343
Vomiting	0	1(1.5%)	0.358
Abdominal distension	2(3.6%)	8(12.3%)	0.088
Anastomotic leak	3(5.5%)	7(10.8%)	0.296
Wound infection	18(32.7%)	17(26.2%)	0.432
Pulmonary complications	4(7.3%)	9(13.8%)	0.250
Days of stay postoperatively	**14.4+/-7.23**	**17.89+/-6.67**	**0.006**
Overall complications	24 (43.60%)	29(44.60%)	0.914
Reinsertion	0	2(2.46%)	

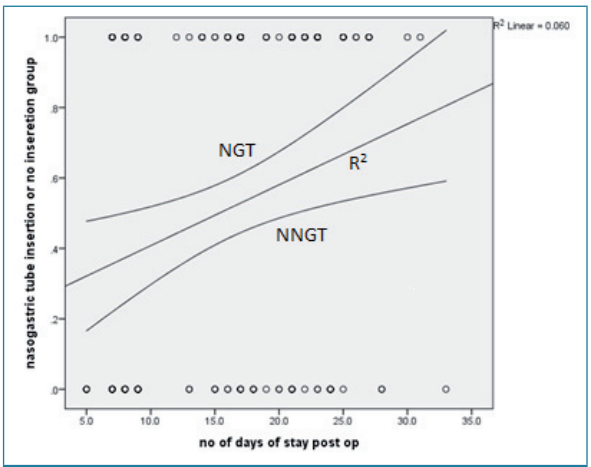

Figure 1: Correlation between the use of NGT and Postoperative days of stay

DISCCUSSION

The "fast-track surgery" was introduced in clinical practice more than a decade ago, ever since traditional perioperative interventions have gone through many reforms.[6-11]Mostoftheprocedures have been continuously improved and refined while some standard procedures were doubted, examined and in some rare cases, abandoned. Cumulated evidences have suggested that prophylactic nasogastric tube insertion is no longer required to reduce postoperative complications in most of the elective abdominal surgery including stomach, liver, biliary, pancreatic, small bowel and colorectal resection and, therefore, abandoned by most surgeons.[12, 13]

In the present study, insertion of a NGT had no effect on the return of bowel function, as noted previously for other abdominal procedures in various studies. When it was correlated with other published literatures, it has been shown that the time to passage of first flatus or the day of first bowel sound to be significantly longer in patients with NGT, probably owing to delayed ambulation.[14]This was in accordance to our study. In another study, the absence of NGT allowed an early resumption to a liquid diet.[5] In the present study we found that oral feeding was started earlier in NNGT group (when bowel function resumed).

The incidence of pulmonary complication was similar in both the groups (p>0.05) in present study which was 4(7.3%) in NGT group and 9(13.8%) in NNGT group and several studies have shown similar results as the present study.[1,15,16] However, several other studies have also proved that the use of NG decompression

also increased the risk of respiratory complications. Studies indicated that NG intubation increased the risk of atelectasis and pneumonia. The ability of patients to cough and breathe deeply after surgical intervention is severely compromised by discomfort from an NG tube. In addition, NGT insertion causes gastroesophageal reflux, increasing the risk of postoperative pneumonia.[2, 17-19]Fever, atelectasis, and pneumonia in a study by *M L Cheatham* et al were significantly less common and days to first oral intake were significantly fewer in patients managed without nasogastric tubes. Meta-analysis based on study quality revealed significantly fewer pulmonary complications, but significantly greater abdominal distension and vomiting in patients managed without nasogastric tubes.[5]

The rate of reinsertion 2(2.46%) in our study was only limited to NGT insertion group due to abdominal discomfort, nausea and vomiting. This is comparable to other published RCT where reinsertion rate was 12%.[1, 20]The 2 patients who required NG tube reinsertion were carefully examined for factors that might lead to postoperative NG reinsertion. No factors including analgesics use, preoperative gastric outlet obstruction, and history of diabetes, could be determined to be predictive of the need for postoperative NG reinsertion (data not shown). Accordingly, this is comparable to study by Chen et al where similar results were shown as in present study.[21]

Early oral feeding after elective abdominal surgery has been shown to be safe and tolerated by most patients.[22] Early mobilization and oral nutrition after elective abdominal surgery may reduce the length of hospital stay, with considerable potential cost savings. Wolff and colleagues have reported that up to US $150 could be saved for every patient undergoing elective abdominal surgery without nasogastric decompression.[18] In the present study also with regard to number of days of stay postoperatively, the NGT group had longer days of stay than no NGT group (p value-0.006) but start of oral feed was similar between the groups. This is also supported in a study by *A. Jangjooetal* where patients with NNGT did not show any postoperative complications or prolonged hospital stay. On the contrary, NGT insertion postponed return of bowel function and increased the incidence of nausea and vomiting, while it did not affect the incidence of postoperative ileus but prolonged the postoperative stay of the patient.[23]

Anastomotic disruption is a potentially fatal complication, and may lead to severe morbidity and mortality when it happens. The incidences of anastomotic leaks in both groups were similar in present study which was in 3(5.5%) cases and 7(10.8%) cases. When there was fistula it was grade A pancreatic fistula (ISGPF definition)[24]or minor bile leaks which was taken care with symptomatic treatment and the leak was not significantly associated whether it was NGT group or no NGT group. This has been supported by prospective studies from Taiwan and South Korea.[25-27]In addition, the incidence of wound infection in the present study didn't differ between the two groups, which is supported by study published by Sapkota et al, 2009 in Nepal at a tertiary care hospital.[17, 28]

Despite the accumulating evidence against its use, we can foresee that surgeons will still prefer NGT insertion under certain circumstances in some patient categories, for example, in abdominal surgical procedures with a high risk of postoperative gastric dilatation or ileus (e.g. esophageal and gastric surgery, pancreaticoduodenectomy [Whipple procedure], and ileoanal pouch procedures). However, these indications are based solely on "gut feeling," and scientific evidence is lacking to support the use of NGT Therefore, even in high-risk patients, a strategy of selective or therapeutic use of NGT seems more appropriate than a routine or prophylactic use. To avoid aspiration pneumonia, one should also be aware of the possibility that NGT may hamper glottis function and compromise the airway and thus could increase the chance of aspiration.[5, 29]In addition to these finding, the duration of hospital stay as shown in present study to be significantly increased with the use of NGT as compared to no use of NGT. This was probably due to the overall increase in complications with the use of NGT and delay in starting the oral feeding when NG tubes are placed. This might have correlated with the overall increased duration of stay in the patients with the use of NGT. We have to be aware of this finding and consider not using NGT.

CONCLUSION

Data of this study suggested that it is safe and may be favorable to get rid of the nasogastric decompression as a required procedure for patients subjected with elective surgery involving stomach and small bowel anastomosis. However, more studies are required to

confirm this statement in different situation to form a protocol.

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