ORIGINAL ARTICLE

# Prophylactic Nasogastric Decompression for Routine Gastrectomy

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## ABSTRACT

**Objective:** To determine the necessity of using nasogastric tubes for patients with gastrectomy.
**Study Design:** A non-randomized controlled trial with two arms.
**Place and Duration of Study:** Sichuan Provincial Peoples' Hospital, China, from February 2012 to January 2014.
**Methodology:** One hundred and twenty one patients undergoing gastrectomy were assigned into intubation group and control group based on patient's own will. The intubation group was intubated with a nasogastric tube before operation and extubated at the earliest evidence of passed flatus. Clinical outcomes, such as operation time, bleeding volume, time to passage of flatus, postoperative complications, and length of stay were recorded and compared between the two groups along with patient characteristics.
**Results:** The two groups did not differ in patient characteristics with similar distribution of gender, age, diagnosis, tumor location and operation type. Nasogastric intubation before surgery was not associated with statistically significant difference in total surgery duration, bleeding volume of operation or postoperative complications. In addition, patients without nasogastric tubes resumed oral diet earlier (52.5 ± 14.1 vs.18.4 ± 2.0 hours, $p < 0.05$) and had shorter time to first passage of flatus (43.8 ± 11.2 vs. 49.0 ± 13.3 hours, $p=0.02$).
**Conclusion:** It is safe to give up nasogastric intubation for patients undergoing elective gastrectomy and may even result in a better patient outcome.

**Key Words:** *Nasogastric decompression. Nasogastric intubation. Gastrectomy. Gastric carcinoma.*

## INTRODUCTION

Prophylactic nasogastric decompression was routinely performed for patients undergoing abdominal surgery. Especially for patients with gastrectomy, nasogastric or nasojejunal decompression has been considered to be a standard of care to prevent postoperative complications such as vomiting, ileus, anastomotic leakage and so on.

In the last decade, several randomized controlled trials (RCTs) have demonstrated that nasogastric intubation may not be necessary for most elective abdominal operations.[1,2] A systematic review of these RCTs concluded routine nasogastric decompression failed to achieve the intended therapeutic goals and suggested selective usage of the procedure.[3] However, there is still a paucity of data for patients with gastrectomy. Although several RCTs have been completed in recent years,[4,5] and a meta-analysis published,[6] the total sample size is still too small and the effect of nasogastric decompression is still not well understood for stomach cancer patients.

Therefore, even though “fast-track surgery” has been applied in most parts of abdominal surgery,[7,8] patients with elective gastrectomy still have to endure the discomfort of nasogastric tube during perioperative days in most Chinese hospitals.

The goal of this study was to assess the effect of nasogastric decomposition among patients with or without the procedure before gastrectomy.

## METHODOLOGY

From a consecutive sample of patients who had gastrectomy in the Gastroenterological Neoplasm Database of Gastroenterology Department, Sichuan Provincial Peoples' Hospital between February, 2012 and January, 2014, 121 cases of patients agreed to contribute data to this study. Patients were excluded if they were, with gastrectomy history, complicated with upper gastrointestinal obstruction, or subjected to any neo-adjuvant radiotherapy. Sixty nine patients of the 121 were prophylactically intubated for gastric decompression before gastrectomy and thus classified as the intubation group. The other 52 patients underwent gastrectomy without nasogastric decompression served as the control group without nasogastric decompression.

All patients had definite pathological diagnosis or imaging evidence of gastric neoplasms such as gastric

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carcinomas and GISTs before gastrectomy. They were treated and operated by the same group of surgeons to ensure consistency in the quality of care provided. Two reviewers who did not take part in patients' treatment independently performed data collection and analysis with inconsistencies reconciled in both steps before carrying on to the next.

Standard informed consent form for contributing the data to research was signed before the operation and normal oral diet was allowed until the night before operation. At least eight hours fasting was mandatory for every patient as required for anesthesia. For patients in the intubation group, a 14-F single lumen nasogastric tube was placed into stomach (for patients with total gastrectomy, the tube was placed into proximal jejunum during the operation) hours before operation, with decompression connected and remained in place until the passage of flatus was observed after surgery. Enteral nutrition resumed as soon as the tube was taken out. For the control group without nasogastric intubation, patients were encouraged to take oral enteral diet on the first day after operation.

Patients' characteristics such as gender, age, clinical diagnosis and operation type, along with their clinical outcomes such as operation time, bleeding volume, time to passage of flatus, postoperative complications, and length of stay were collected and entered into a SPSS database. All the complications were recorded in patients' medical records. 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 intubation group who had nasogastric tube removed before the intended time, and patients in the control group who were treated with nasogastric decompression when condition required were identified as withdrawal. Every lost-to-follow-up or withdrawal were recorded and analyzed according to the “intention to treat” principle.

Statistical analyses were performed in the SPSS software, version 16.0. 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. Two sided p-values less than 0.05 were considered statistically significant.

This research protocol was approved by the Ethics Committee of Sichuan Provincial Peoples' Hospital.

## RESULTS

All patients were followed up 30 days after operation without any death or lost-to-follow-up. The two groups were similar regarding gender, age, diagnosis, tumor location and operation type, as presented in Table I.

The total operation time and total bleeding volume were not statistically different between the two groups (Table II).

Since patients without gastric decompression were encouraged to take fluid diet the day after operation, their average time to resume enteral diet was 18.4 hours post-surgery, which was significantly shorter than those of the intubation group. Although the control patients started oral nutrition earlier, the rate of nausea or vomiting complications was not different between the two groups (Table III).

**Table I:** Clinical characteristics of enrolled patients.

| Parameters | Intubation group (n=69) | Control Group (n=52) | Test value | P |
|---|---|---|---|---|
| Gender | | | | |
| Male | 46 (66.7%) | 35 (67.3%) | $\chi^2$=0.006 | 0.941 |
| Female | 23 (33.3%) | 17 (32.7%) | | |
| Age (Mean ± SD) | 60.14±12.470 | 60.67±12.894 | t=-0.227 | 0.821 |
| Diagnosis | | | | |
| Carcinoma | 53 (76.8%) | 38 (73.1%) | $\chi^2$=1.446 | 0.485 |
| GIST | 14 (20.3%) | 10 (19.2%) | | |
| Others | 2 (2.9%) | 4 (7.7%) | | |
| Resection site | | | | |
| Local resection | 11 (15.9%) | 9 (17.3%) | $\chi^2$=0.239 | 0.971 |
| Distal resection | 36 (52.2%) | 25 (48.1%) | | |
| Proximal resection | 8 (11.6%) | 6 (11.5%) | | |
| Total resection | 14 (20.3%) | 12 (23.1%) | | |
| Open or Laparoscopy | | | | |
| Open surgery | 53 (76.8%) | 40 (76.9) | $\chi^2$=0.001 | 0.989 |
| Laparoscopic surgery | 16 (23.2%) | 12 (23.1%) | | |

*GIST = Gastrointestinal stromal tumor*

**Table II:** Clinical outcomes of the two groups.

| Outcomes | Intubation group (n=69) | Control group (n=52) | Test value | P |
|---|---|---|---|---|
| Operation time (min) | 175.51±69.341 | 161.44±60.653 | 1.165 | 0.246 |
| Bleeding volume (ml) | 172.61±82.324 | 152.12±79.566 | 1.337 | 0.184 |
| Feeding time after surgery (hours) | 52.54±14.134 | 18.42±1.964 | 17.261 | <0.001 |
| Passage of flatus after surgery (hours) | 49.00±13.295 | 43.75±11.237 | 2.295 | 0.023 |
| Length of hospital after surgery (days) | 7.95±2.213 | 8.44±3.15 | -1.012 | 0.314 |

**Table III:** Postoperative complications of the two groups.

| Complications after surgery | Intubation group (n=69) | Control group (n=52) | Test value | P |
|---|---|---|---|---|
| Nausea | 16 (23.2%) | 8 (15.4%) | $\chi^2$=1.136 | 0.287 |
| Vomiting | 6 (8.7%) | 2 (3.8%) | $\chi^2$=1.129 | 0.288 |
| Ileus | 1 (1.4%) | 3 (5.8%) | $\chi^2$=1.731 | 0.188 |
| Anastomotic leakage | 0 (0) | 0 (0) | - | - |
| Death | 0 (0) | 0 (0) | - | - |
| Respiratory complication | 3 (4.3%) | 0 (0) | $\chi^2$=2.318 | 0.128 |
| Surgical site infection | 3 (4.3%) | 3 (5.8) | $\chi^2$=0.127 | 0.721 |
| Reoperation | 1 (1.4%) | 1 (1.9%) | $\chi^2$=0.041 | 0.840 |

The average duration of nasogastric tube placement and time of first passage of flatus after the surgery for the intubation group were 53.1 hours and 49.0 hours, respectively. The time of first passage of flatus was remarkably shorter in the control group than that of the intubated patients (43.8 ± 11.2 versus 49.0 ± 13.3 hours, p=0.023). The length of hospital stay after surgery of the two groups were similar (8.0 ± 2.2 versus 8.4 ± 3.2 days, p=0.314).

No death or anastomotic leakage was observed within 30 days after surgery as presented in table 3. No significant difference was found in other postoperative complications such as ileus and surgical site infection. Three patients in the intubation group were diagnosed with postoperative pulmonary infection, while none was observed in the control group. However, the difference was not statistically significant (p=0.128).

## DISCUSSION

Ever since "fast-track surgery" was introduced in clinical practice more than a decade ago,[7-12] traditional perioperative interventions have gone through many reforms. Most procedures 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 intubation is no longer required for most elective abdominal surgery including colorectal resection and, therefore, abandoned by most surgeons.[13,14] With limited research of the matter among patients with gastric carcinoma, physicians may remain doubtful about the safety of not performing the once required procedure of gastric decomposition before gastrectomy.

In later 2011, a team of gastroenterology surgeons in Sichuan Provincial Peoples' Hospital started this study as the sub-study of the "Fast-Track Surgery Research Program", which was a provincial research project. This study was designed as a non-randomized clinical controlled trial, within which treatments allocation was determined by patients' will to put a nasogastric tube or not before gastrectomy.

In this study, the authors did not observe any obvious confounding effects which might bias the results. Most patients in this study were diagnosed with gastric carcinoma according to the WHO's classification of tumours of the digestive system,[15] and were to be treated according to the NCCN guidelines. Although the treatment allocation was not random, the baseline characteristics of the two groups of patients were not statistically different.

This study illustrated that, for patients with elective gastrectomy, nasogastric decompression was not associated with differences either in measures for surgical procedure, or the rate of postoperative complications. Furthermore, this data showed that patients without nasogastric tubes could resume oral diet much sooner as their first time to passage of flatus was significantly shorter than patients intubated, which is consistent with other studies.[16-20]

Despite the shorter time to resume diet after operation among the patients without intubation, the length of hospital stay after operation did not differ between the two groups. The current discharge standard of gastrectomy patients dictates that no patient is to be discharged before 7 days of operation for absolute assurance of no anastomotic leakage. Although patients without nasogastric tubes might have recovered sooner than those intubated, all patients had to stay in the hospital at least 7 days by which time all patients had resumed enteral diet.

The tumor classification and TNM stages were not included for analysis due to the consideration that all patients were diagnosed and treated according to the same standard by the same group of surgeons, and therefore, they were not as important as operation time and bleeding volume. It was hypothesized that the placement of gastric decompression would not have an impact on the disease related survival; hence post-discharge survival rate and disease-free surviving time were not collected.

## 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 gastrectomy.

## REFERENCES

1. Wolff BG, Pembeton JH, van Heerden JA. Elective colon and rectal surgery without nasogastric decompression. A prospective, randomized trial. *Ann Surg* 1989; **209**:670-3.
2. 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**:1998-2001
3. Nelson R, Edwards S, Tse B. Prophylactic nasogastric decompression after abdominal surgery. *Cochrane Database Syst Rev* 2007; (3) CD004929.
4. Yoo CH, Son BH, HanWK, PaeWK. Nasogastric decompression is not necessary in operations for gastric cancer: prospective randomised trial. *Eur J Surg* 2002; **168**:379-83.
5. Doglietto GB, Papa V, Tortorelli AP, Bossola M, Covino M, Pacelli F. Naso-jejunal tube placement after total gastrectomy: a multicenter prospective randomized trial. *Arch Surg* 2004; **139**:1309-13.
6. Yang Z, Zheng Q, Wang Z. Meta-analysis of the need for nasogastric or nasojejunal decompression after gastrectomy for gastric cancer. *Br J Surg* 2008; **95**:809-16
7. Wilmore DW, Kehlet H. Recent advances: management of patients in fast track surgery. *BMJ* 2001; **322**:473-6.

8. Kehlet H,Slim K. The future of fast-track surgery. *Br J Surg* 2012, **99**:1025-6
9. Wind J, Polle SW, Fung Kon Jin PH. Systematic review of enhanced recovery programmes in colonic surgery. *Br J Surg* 2006; **93**:800-9
10. Grantcharov TP,Kehlet H .Laparoscopic gastric surgery in an enhanced recovery programme. *Br J Surg* 2010; **97**:1547-51.
11. Lovely JK,Maxson PM,Jacob AK. Case-matched series of enhanced versus standard recovery pathway in minimally invasive colorectal surgery. *Br J Surg* 2012; **99**:120-6
12. Hamilton SR, Aaltonen LA. World Health Organization Classification of Tumours. Pathology and Genetics of Tumours of the Digestive System. IARC Press: Lyon 2000
13. Li K, Zhou Z, Chen Z. Fast track nasogastric decompression of rectal cancer surgery. *Front Med* 2011; **5**:306-9.
14. Fonseca AL,Schuster KM, Maung AA. Routine nasogastric decompression in small bowel obstruction: is it really necessary? *Am Surg* 2013; **79**:422-8.
15. Rao W,Zhang X,Zhang J. The role of nasogastric tube in decompression after elective colon and rectum surgery: a meta-analysis. *Int J Colorectal Dis* 2011; **26**:423-9
16. Rossetti G, Fei L, Docimo L. Is nasogastric decompression useful in prevention of leaks after laparoscopic sleeve gastrectomy? A randomized trial. *J Invest Surg* 2014; **27**: 234-9
17. Wang D, Li T, Yu J. Is Nasogastric or nasojejunal decompression necessary following gastrectomy for gastric cancer? a systematic review and meta-analysis of randomised controlled trials. *J Gastrointest Surg* 2014 (on line).
18. Pacelli F, Rosa F, Marrelli D. Naso-gastric or naso-jejunal decompression after partial distal gastrectomy for gastric cancer. Final results of a multicenter prospective randomized trial. *Gastric Cancer* 2014; **17**:724-32.
19. Li C, Mei JW, Yan M. Nasogastric decompression for radical gastrectomy for gastric cancer: a prospective randomized controlled study. *Dig Surg* 2011; **28**:167-72.
20. Chen CJ, Liu TP, Yu JC. Roux-en-Y reconstruction does not require gastric decompression after radical distal gastrectomy. *World J Gastroenterol* 2012; **18**:251-6.