

# Routine postoperative nasogastric or nasojejunal tube placement may be unnecessary after gastric resection

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## ABSTRACT

**Objectives:** The purpose of this study was to investigate the effects of not using routine nasogastric (NG) or nasojejunal (NJ) tubes on postoperative complications in gastric cancer patients undergoing resection.

**Methods:** This study includes 250 patients who underwent gastric resection diagnosed with gastric adenocarcinoma between November 2011 and December 2021. The patients were divided into two groups: those who routinely use NG or NJ tube in the early postoperative period and those who do not. Postoperative complications and length of hospital stay were compared between the two groups.

**Results:** Demographic, surgical, and histopathological characteristics were similar between the two groups. Oral feeding was started earlier in the non- NG or NJ tube group. There was no difference between the two groups regarding the length of hospital stay ( $p = 0.065$ ). Severe postoperative complications (Clavien Dindo  $\geq 3$ ) were significantly lower in patients who did not use a nasogastric or nasojejunal tube ( $p = 0.001$ ). Two patients in the NG/NJ tube group and one in the non-NG/NJ tube group developed anastomotic leakage.

**Conclusions:** According to the results of our study, routine NG or NJ tube use does not reduce postoperative severe complications or length of hospital stay.

**Keywords:** Gastric adenocarcinoma, gastric resection, nasogastric or nasojejunal tube, postoperative complications

Gastric cancer is the fifth most commonly diagnosed malignancy and the third leading cancer-related death in the world among cancer patients [1]. Curative treatment is gastric resection; however, perioperative mortality and morbidity rates are high after gastric cancer surgery [2].

In patients with gastric cancer, a nasogastric (NG) tube after subtotal gastrectomy and a nasojejunal (NJ) tube after total gastrectomy are routinely used in the early postoperative period. The purpose of using an NG or NJ tube is to provide decompression, prevent distension, and reduce the risk of aspiration due to

nausea and vomiting. Reducing postoperative distension due to paralytic ileus improves anastomotic safety. Most surgeons routinely use NG/NJ tubes in the early postoperative period.

However, the use of NG or NJ tubes has recently been questioned. Postoperative NG/NJ tube use does not help with recovery after gastric cancer surgery, or other abdominal surgery does not decrease paralytic ileus or the rate of postoperative complications and has an influence on patient comfort [3, 4].

The aim of this study is to investigate the effect of not using an NG/NJ tube in the postoperative period

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on early postoperative complications in gastric resection patients.

## METHODS

This study is planned retrospective research. Between November 2011 and December 2021, Prof. Dr. Cemil Tascioglu City Hospital reviewed 250 patients who underwent gastric cancer surgery and were diagnosed with gastric adenocarcinoma. The study includes patients over the age of 18 who had histological gastric adenocarcinoma and were undergoing gastric resection. Unresectable patients were excluded. D1 or D2 lymph node dissection was performed on all patients [5]. Continuity of the intestine Roux-en-Y esophagojejunostomy was performed in total gastrectomy patients, while Roux-en-Y gastrojejunostomy was performed in subtotal gastrectomy patients. Patients were given postoperative subcutaneous low molecular weight heparin for deep venous thrombosis prophylaxis and short-term perioperative antibiotic therapy.

Between November 2011 and December 2016, NG or NJ tubes were used as a routine treatment in patients undergoing gastric cancer resection. This group was defined as the NG/NJ tube group. The group that did not use routine NG/NJ tubes was determined to be between January 2017 and December 2021. The routine NG/NJ tube was not used in the postoperative period on this date. Depending on the surgeon's option, the NG/NJ tube used was 16 F or 14 F thick with a single lumen.

The tube was removed when the drainage was reduced to 150 ccs in patients who used NG/NJ tubes. Patients were given oral nutrition after the tube was removed. Parenteral or enteral nutrition (via jejunostomy) was started in patients who could not take oral food within seven days, depending on the type of complication. In patients who did not have NG/NJ tubes, the oral clear liquid diet was started on the first postoperative day.

In cases of severe vomiting and distension, NG/NJ tubes were prolonged or reinserted in clinically required patients. During the postoperative period, the time to begin oral nutrition and the length of hospital stay were recorded.

The hospital registration system was used to acquire patients' age, gender, comorbidities, body mass

index (BMI), gastrectomy type, lymph node dissection (D1/D2), operation time, and tumor stages. The AJCC Cancer Staging Manual, 8th edition, was used to establish the stage [6].

The study's goal is to assess the impact of not using NG/NJ decompression on early postoperative complications. The first 30-days following surgery were considered early complications in the postoperative period. Intra-abdominal infections, wound infections, cardiac problems, pulmonary complications, anastomotic complications, pancreatic fistula, chylous leaks, intra-abdominal and intraluminal bleeding, and NG/NJ tube-related complications were described as postoperative complications. The Clavien-Dindo (CD) classification was used to grade complications [7]. When patients had more than one complication, the higher grade according to the CD classification was accepted. Severe complications were defined as CD grade 3 and above ( $CD \geq 3$ ). The data was collected from prospectively stored patient records.

The Ethics Committee of the University of Health Sciences, Prof. Dr. Cemil Tascioglu City Hospital (2022/18) approved this retrospective study.

## Statistical Analysis

The patients were divided into two groups based on whether or not they used NG/NJ tubes. The Statistical Package for Social Sciences for Windows version 22.0 was used for statistical analysis (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. IBM Corp. Armonk, NY, USA). For each variable, descriptive statistics were calculated. The Kolmogorov-Smirnov test was used to determine the normality of the data distribution. The median [minimum-maximum] was used to represent the results of continuous variables that did not have a normal distribution. The chi-square test for categorical data was used to assess statistically significant differences between groups. Nonparametric statistics (Mann-Whitney U) were used for continuous variables.  $P$  - values  $< 0.05$  were considered statistically significant.

## RESULTS

There were 165 males and 74 females among the 239 patients. The NG/NJ group had a median age of 61 (33-87) years, while the non-NG/NJ group had a me-

dian age of 63 (29-94). Subtotal gastrectomy was performed in 87 (36.4 %) patients. In both groups, there was no significant difference in tumor stage, type of lymph node dissection (D1/D2), or length of hospital stay. Table 1 summarizes the clinicopathological parameters of patients.

Table 2 evaluates the surgical duration of tube decompression, resuming oral feeding time after tube removal, patients reinserted after tube removal, and complications associated with tube usage in patients using NG/NJ tube. The average duration to remove the tube was three days, and the postoperative diet was allowed in four days. There were 18 patients who experienced complications as a result of using an NG/NJ tube (24.4 %). Three patients' NG tubes were removed and reinserted due to tube occlusion. In 3 patients, the tube dislocated spontaneously and had to be reinserted. There were 12 patients who developed tube intolerance. Due to tube irritation, these patients suffered severe sore throats, which improved when the

tube was removed. There were no major complications, such as perforation, as a result of tube use. The number of patients in the NG/NJ tube group who had a reinserted tube after the tube was removed was 10. There was no patient in the non-NG/NJ tube group who needed tube insertion during the postoperative clinical course.

Table 3 shows a comparison of postoperative complications between the two groups. One patient in the NG/NJ tube group and 1 in the non-NG/NJ tube group developed anastomotic leakage. In either group, no patient suffered a mechanical intestinal obstruction. In patients who did not have the NG/NJ tube, an oral clear diet was started on the first postoperative day. 2 patients in the NG/NJ group developed an intra-abdominal abscess. The non-NG/NJ group had a greater rate of chylous leakage (8.6 % vs. 1.3 %). Severe postoperative complications were more common in the NG/NJ group ( $p = 0.001$ ). There were 4 postoperative mortality in the NG/NJ tube group. There was

**Table 1. Clinicopathological characteristics of patients**

| Patient characteristics       | NG/NJ group<br>(n = 77) | Non-NG/NJ group<br>(n = 162) | p value  |
|-------------------------------|-------------------------|------------------------------|----------|
| Age (years)                   | 61 (33-87)              | 63 (29-94)                   | 0.324**  |
| Sex (Female/Male)             | 24/53                   | 50/112                       | 0.962*   |
| BMI (kg/m <sup>2</sup> )      | 26 (20-43)              | 26 (18-40)                   | 0.576**  |
| Type of Resection             |                         |                              | < 0.001* |
| Total gastrectomy             | 34 (44.2 %)             | 18 (72.8 %)                  |          |
| Subtotal gastrectomy          | 43 (55.8%)              | 44 (27.2 %)                  |          |
| Type of Reconstruction        |                         |                              | < 0.001* |
| Roux-en-y gastrojejunostomy   | 43 (55.8%)              | 44 (72.8 %)                  |          |
| Roux-en-y esophagojejunostomy | 34 (44.2%)              | 118 (27.2 %)                 |          |
| Type of Lenfadenectomy        |                         |                              | 0.36*    |
| D 1                           | 9 (11.7 %)              | 13 (8 %)                     |          |
| D 2                           | 68 (88.3 %)             | 149 (92%)                    |          |
| TNM Staging                   |                         |                              | 0.159*   |
| I                             | 21 (27.3 %)             | 42 (25.9 %)                  |          |
| II                            | 20 (26 %)               | 50 (30.9 %)                  |          |
| III                           | 36 (46.8 %)             | 62 (38.3 %)                  |          |
| IV                            | 0 (0 %)                 | 8 (4.9 %)                    |          |
| Operation time (min)          | 210 (180-330)           | 240 (120-400)                | 0.002**  |
| LOS (day)                     | 7 (5-50)                | 7 (6-152)                    | 0.065**  |

Data are given as median (min-max) or n (%). LOS = Length of hospital stay, \*Chi-Square Test, \*\*Mann-Whitney U Test

**Table 2. Postoperative follow-up of patients in the NG/NJ group according to gastrectomy types**

|                               | Total<br>Gastrectomy<br>(n = 34) | Subtotal<br>Gastrectomy<br>(n = 43) | p value |
|-------------------------------|----------------------------------|-------------------------------------|---------|
| NG/NJ tube usage time (days)  | 3 (1-36)                         | 3 (1-49)                            | 0.263** |
| Reinserted tube               | 4 (11.8%)                        | 6 (14%)                             | 0.527*  |
| Oral starting diet time (day) | 4 (3-36)                         | 4 (3-49)                            | 0.83**  |
| Tube occlusion                | 2 (5.9%)                         | 1 (2.3%)                            | > 0.05* |
| Spontaneous tube dislodged    | 1 (2.9 %)                        | 2 (4.7%)                            | > 0.05* |
| Tube intolerance              | 6 (17.6%)                        | 6 (14%)                             | > 0.05* |

Data are given as median (min-max) or n (%). \*Chi-Square Test, \*\*Mann-Whitney U Test

no difference between the two groups in terms of postoperative hospital stay ( $p = 0.065$ ).

## DISCUSSION

Following gastric resection, an NG or NJ tube is commonly used for decompression. Tube usage still con-

tinues in the postoperative period because of the prolonged operation time and the possibility of paralytic ileus. Some studies have demonstrated that using NG/NJ tubes is not required in the postoperative period, but many surgeons have been discouraged from abandoning this practice [4, 8]. Patients who did not use tubes were given an oral diet earlier in the postoperative period, and no one required NG/NJ tube de-

**Table 3. Postoperative complications**

|                           | NG/NJ group<br>(n = 77) | Non-NG/NJ group<br>(n = 162) | All<br>(n = 239) | p value            |
|---------------------------|-------------------------|------------------------------|------------------|--------------------|
| All complication          | 13 (16.9%)              | 50 (30.9%)                   | 63 (26.4%)       | <b>0.022*</b>      |
| Intra- abdominal abscess  | 0                       | 2                            | 2                |                    |
| Anastomotic leakage       | 2                       | 1                            | 3                |                    |
| Pancreatic leakage        | 3                       | 0                            | 3                |                    |
| Roux necrosis             | 1                       | 0                            | 1                |                    |
| Wound infection           | 3                       | 17                           | 20               |                    |
| Myocardial infarction     | 1                       | 0                            | 1                |                    |
| Pneumonia                 | 1                       | 5                            | 6                |                    |
| COPD exacerbations        | 0                       | 1                            | 1                |                    |
| Pulmonary embolism        | 1                       | 0                            | 1                |                    |
| Intraluminal hemorrhage   | 0                       | 4                            | 4                |                    |
| Intraabdominal hemorrhage | 0                       | 6                            | 6                |                    |
| Chylous leakage           | 1                       | 14                           | 15               |                    |
| Severe complications      | 8 (10.4%)               | 5 (3.1 %)                    | 13 (5.4 %)       | <b>&lt; 0.001*</b> |
| Mortality                 | 4                       | 0                            | 4 (1.7 %)        | <b>0.01*</b>       |
| LOS (days)                | 7 (5-50)                | 7 (6-152)                    | 7 5-152)         | 0.065**            |

Data are given as median (min-max). LOS = Length of hospital stay, \*Chi-Square Test, \*\*Mann-Whitney U Test

compression. There are various potential complications with NG/NJ tube placement. It can induce gastric, esophageal, and nasal trauma in patients, as well as nasal irritation and discomfort. The tube's inflammation can cause pharyngitis, sinusitis, or, in rare cases, nasal ala necrosis and otitis by blocking the eustachian canal [9]. It has the potential to cause aspiration and aspiration pneumonia by affecting the function of the epiglottis [10]. No serious complications associated with using an NG/NJ tube were detected in this study. NG/NJ group experiences delayed oral intake, and the patient suffers greatly from tube discomfort.

In this study, chylous leakage was higher (8.6% vs. 1.2%) in patients who did not use NG/NJ tubes. It has been reported that the rates of chylous leakage are higher in patients who start oral intake early [11-13]. Since oral intake was started in the early postoperative period in patients who did not use an NG/NJ tube, the rate of chylous leak is thought to be high. These patients were discharged without event, with oral fat-free diet recommendations.

During celiac dissection in radical gastric surgery, perigastric autonomic nerves are dissected. Postoperative distension owing to paralytic ileus is possible. By providing decompression, the placement of an NG/NJ tube is thought to minimize tension on the anastomosis and provides anastomotic safety. In recent randomized controlled studies, it was shown that postoperative complications and death rates were similar between NG/NJ tube-using and non-using patient groups [3, 14]. It has been demonstrated that there is no requirement to use NG/NJ tubes for decompression [3, 4, 10, 15]. Anastomotic leakage was found in 2 patients in NG/NJ group and one non-NG/NJ group, and severe postoperative complications ( $CD \geq 3$ ) were significantly lower in patients who did not use an NG/NJ tube in this study ( $p = 0.001$ ).

Delaying oral intake in patients using NG/NJ tube may prolong the length of hospital stay [16]. In our study, there was no difference between the two groups.

According to research, all forms of gastric resection may be performed without the need for an NG/NJ tube [3, 8, 17]. In our study, regardless of the extent of gastric resection and lymphadenectomy (D1/D2), the NG/NJ tube was not used in all patients in the non-NG/NJ tube group. Patients who do not use NG/NJ tubes may have better patient comfort [16]. In

this trial, we observed patient mobilization and compliance were better which improved their quality of life in the non-NG/NJ group.

## CONCLUSION

According to the findings of this investigation, the usage of NG/NJ showed no advantage in avoiding postoperative complications. After elective gastric cancer surgery, limiting the use of NG/NJ tubes, which have a detrimental impact on patient comfort, may be discussed. Gastric cancer surgery can be performed successfully without NG or NJ tube decompression.

### Authors' Contribution

Study Conception: AA; Study Design: AA; Supervision: N/A; Funding: N/A; Materials: N/A; Data Collection and/or Processing: AA; Statistical Analysis and/or Data Interpretation: AA; Literature Review: AA; Manuscript Preparation: AA and Critical Review: MY.

### Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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