

## Post Gastrectomy Early Enteral Feeding Through Naso-Jejunal Tube In Cases of Gastric Cancer: A Prospective Clinical study

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### Abstract

**Background:** Surgery remains the key answer for operable gastric cancer cases. However, early postoperative enteral feeding and the various routes of feeding are still the burning issues for debate.

**Objectives & Aim:** We conducted a prospective study to evaluate the patient's tolerability and outcome of early enteral feeding through naso-jejunal tube after gastrectomy/ gastro-jejunostomy in cases of carcinoma stomach.

**Methods:** Over a period of 5years, total numbers of 139 patients (male-102 and female 37) aged between 44 and 81 years, operated for gastric cancer were included in this study. Radical gastrectomy was performed in 116 patients and palliative gastro-jejunostomy in 43 patients. Patients were subjected to enteral (naso-jejunal tube) feeding from the first postoperative day. In all cases placement of the naso-jejunal tube was done per-operatively under vision and another second naso-gastric tube was introduced in to the stomach for decompression of the stomach. Both the tubes were fixed over the nose with adhesive tape.

**Results:** Enteral feeding was started in 137 patients on the 1<sup>st</sup> postoperative day. In two patients enteral feeding could not start from postoperative day1 due to suspicion of anastomotic bleed. Of total 139 patients; in 131 patients, scheduled early enteral naso-jejunal feeding was continued without difficulties. Eight patients failed to do so due to development of feeding related complications such as nausea/vomiting/diarrhea /abdominal blotting.

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**Conclusions:** Early enteral naso-jejunal feeding is cheap and safe. It should be advocated for its simplicity and great advantages.

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**Key words:** Carcinoma stomach, Gastrectomy, Naso-jejunal tube, Early enteral feeding.

## **Introduction**

Traditional postoperative care of patients undergoing major gastro-intestinal surgery involves bowel rest and avoidance of enteral feeding. It was practiced due to concerns about anastomosis leak and prolonged postoperative ileus.<sup>1</sup> Still many a time commencement of intravenous nutrition until the resolution of postoperative ileus is a common practice. However, recent randomized trials have proved the various benefits of early enteral feeding.<sup>2</sup> It was our noble effort to convey the message to our colleagues through our study, that early enteral feeding is safe, cheap and advantageous in various ways and naso-jejunal tube feeding is an acceptable method for early enteral feeding.

## **Methods**

This was a prospective study conducted to evaluate the outcome of early enteral feeding through naso-jejunal (NJ) tube. Over a period of 5 years total number of 139 patients visited oncosurgical clinic in Down Town hospital and BBCI cancer institute, Guwahati and in Temerloh hospital, Malaysia for the treatment of gastric cancer (curative / palliative) were included in this study. Inclusion criteria: Patients who were diagnosed as a case of gastric cancer after esophago-gastro-duodenoscopy (OGDS) and biopsy and were planned for curative or palliative surgery after staging workup. Exclusion criteria: patients operated by other consultants in our institutes, not willing to start early enteral feeding were not included in this study.

All the patients were prepared for operation following the standard protocol like nutritional optimization as much as possible preoperatively, optimum baseline investigations to clear the pre-anesthetic check up and confirmation of the staging of the disease status by CT- scan of whole abdomen and Chest X-ray etc. Patients were subjected to low residue diet two days prior to surgery if there was no gastric outlet obstruction (GOO) but naso-gastric decompression was practiced in patients with GOO. However, all patients were subjected to overnight fasting, intravenous second generation cephalosporin and metronidazole at the time of induction. Antibiotics were continued for 3 days postoperatively. Adequate analgesic (non narcotic) was used to achieve a pain free postoperative period. Strict input and output chart was maintained in all the patients for adjustment of the intravenous fluid and NJ tube feeding. Early mobilization and chest physiotherapy was encouraged. The demography and operative details of patients are shown in Table 1.

Placement of the NJ tube in all the patients was done after gastrectomy (Figure 1) and tip of the tube was pushed in to the jejunum through the open duodenectomy / jejunostomy wound under vision up to around 20/25 cm. (Figure 2). Another naso-gastric (NG) tube was placed inside stomach for decompression of the stomach (except in case of total gastrectomy patients). After satisfactory placement of the tubes, gastro-duodenal/ gastro-jejunal / esophago-jejunal or esophago-gastric anastomosis were completed. Both the tubes were fixed with adhesive tape over the nose with care to prevent migration of the tubes (Figure 3). At the end of the surgery, NG tube was connected to a closed bag and left open for continuous drainage but NJ tube was blocked with a stopper till enteral feeding was commenced and thereafter in between each feed. Common plastic Ryle's tube was used (16/14 F size) for naso-gastric and naso-jejunal tubing in place of double lumen Ryle's tube.

Routine abdominal X-ray was not performed before commencement of enteral feeding except in three patients (out of 8 patients, developed enteral feeding related complications) who developed abdominal bloating and discomfort during early NJ tube enteral feeding. Abdominal plain X-ray in these three patients confirmed the desired position of the NJ tube.

After 12-24 hours (1<sup>st</sup> postoperative day) all the patients were subjected to enteral feeding. Feeding through naso-jejunal tube was started with plain water 20ml and the amount gradually increased to 80-100 ml/hour if tolerated till the total amount reached 1500 ml/day (roughly to supplement 25 kcal/kg/day). For enteral feeding mostly we used homemade soup (Hospital nutritionist helped to balance the caloric requirements in the soup) and protein powder that is easily available in the hospital and market. Formula feeds or predigested jejunal feed were not used routinely due to its high cost. All the patients were given two packets of standard oral rehydration solution (WHO formula) after dissolving in 100 ml of plain water every day through NJ tube to help in maintain the electrolytes level. After each feed NJ tube was flushed with plain water to prevent clogging and blockage of the tube. Usually no feed was given in between 10pm to 5am. Intravenous fluid was given to all the patients in the first postoperative day and gradually reduced as enteral feeding tolerated. Intravenous fluid was completely stopped in most of the patients by 3<sup>rd</sup> postoperative day upon establishment of satisfactory enteral feeding. From third/forth post operative day upon return of normal bowel sounds and satisfactory reduction of NG tube aspiration; NG tube was removed and patient was encouraged to take orally liquid and soft diet. Subsequently NJ tube feeding was reduced according to the oral intake. Upon establishment of adequate oral intake, NJ tube was removed on 5<sup>th</sup> or 6<sup>th</sup> postoperative day in most of the patients. Patients were targeted to discharge from hospital on 6<sup>th</sup>-postoperative day. On discharge patients were advised to eat small amount of food orally 4/5 times a day and report hospital if any difficulties occur. All the patients were called for regular follow-up as per schedule and for necessary adjuvant therapy.

## **Results**

Most of the patients well tolerated early enteral feeding through NJ tube, started on 1<sup>st</sup> postoperative day and able to continue enteral feed up to the desired level as per scheduled.

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Except in one patient enteral feeding was started on 2<sup>nd</sup> and in another patient on 3<sup>rd</sup> postoperative day due to presence of fresh blood in the NG tube. However, after satisfactory reduction of the blood in the NG tube and upon exclusion of anastomotic bleeding, enteral feeding was started through NJ tube in both the patients and continued as per schedule. In 131(94.24%) patients NJ tube enteral feeding was satisfactory but in eight patients we could not continue NJ tube enteral feeding up to our desired level due to development of enteral feeding related complications. Nausea, vomiting and abdominal bloating was developed in three patients (In all three patients NJ tube was in desired position on check plain X-ray abdominal) and diarrhea developed in five patients. In these eight patients intravenous fluid was continued till the 5<sup>th</sup> postoperative day along with limited amounts of enteral feeding.

Out of total 139 patients, upon satisfactory recovery 129(92.81%) patients were discharged from hospital on 6<sup>th</sup> postoperative (PO) day. Eight patients were discharged on 8<sup>th</sup> PO day of which seven developed mild operative site wound infection and one developed urinary tract infection. One patient was discharged on 10<sup>th</sup> and another was on 12<sup>th</sup> PO day due to development of respiratory tract infection. In our study total 10 patients (7.19%) developed mild to moderate complication (other than enteral feeding related) as stated above. All these patients improved on conservative management before discharging from hospital. There was no hospital mortality in our study. Periodical assessment of hemoglobin, electrolytes (Na<sup>+</sup>& K<sup>+</sup>) and albumin levels were within normal levels.

## **Discussion**

Conventionally nil per orally (NPO) and maintenance of patients with intravenous nutrition is a common practice after major gastro-intestinal (GI) surgery. However, over the period of time total parenteral nutrition (TPN) has been proved unnecessary. TPN on the other hand also associated with various complications related to catheter, metabolic imbalance and liver function dearrangement etc. Moreover TPN is always expensive in comparison to enteral feeding. In recent time early enteral nutrition (EN) after major GI surgeries has been drawing major attention. Over the decade it has been proved by various studies that early enteral feeding is more acceptable and advantageous than TPN in various aspects. The earliest study to address enteral diet in the early postoperative period against conventional therapy after major GI surgery was done in 1979 by Sagar et al<sup>3</sup>, who concluded that patient in EN (enteral diet) did significantly better than the conventional group clinically and metabolically and lost less weight. The authors strongly recommended early enteral diet for better recovery and shorten hospitalization.

A meta-analysis done by Shrikhande et al<sup>2</sup> in October 2009 concluded that early EN irrespective of the route of administration, postoperatively considered superior to TPN. Along with its various other advantages patient in EN also does better metabolically and ensure better control of sugar levels. A randomized study showed EN definitely reduces the infectious complications and other postoperative complications.<sup>4</sup> Another randomized study comparing early EN with conventional treatment showed better maintenance of the nitrogen balance, improved protein kinetics and reduced morbidity and mortality.<sup>5</sup> Wicks et al<sup>6</sup> compared effects of early EN with

TPN and concluded that the maintenance of nutritional status was comparable in both groups. However, in EN group additional benefits in the form of decreased hospital stay and reduction of treatment cost was obvious. In a meta-analysis by Lewis et al<sup>7</sup> concluded that early EN was beneficial in comparison to delayed EN in relation to postoperative complications, hospital stay and mortality. Another comparative study in between EN and TPN in post gastrectomy patients concluded that EN reduces treatment cost, length of hospital stay and it is an effective cheaper way of providing nutrition and over that it possibly prevent intestinal atrophy.<sup>8</sup>

There was an interesting randomized study done by Braga M et al<sup>9</sup> not only proved EN is a suitable alternative to TPN after major abdominal(GI) surgery, but also demonstrated that an enteral formula enriched with arginine and omega-3 fatty acid was of benefit in malnourished patients. Over all, early EN also helps to reduce patient's anxiety and discomfort that is caused by the enforcement of postoperative fasting.<sup>1,10</sup>

In our study it was seen that majority of the patient well tolerated early enteral feeding (94.24%) and recovery was satisfactory with minimal (7.19%) minor post operative complications. Most of the patients (92.81%) were discharged from hospital within the expected short period of time, six days. Our results were comparable to the various studies that we have reviewed.<sup>1,11,12</sup> Complications such as superficial thrombophlebitis, mild urinary tract infection and mild cough with upper respiratory tract infection were seen in very few patients who were managed well without affecting the discharge schedule. So these were not included in the complication list intentionally.

Various routes of enteral feeding like oral, NJ tube feeding, percutaneous transperitoneal jejunostomy, percutaneous transperitoneal gastrostomy are described in the literature. However, most of the comparative studies concluded that percutaneous tubing methods are associated with several complications.<sup>13,14,15</sup> Catheter related complications were the most significant of all. Mohammad et al<sup>12</sup> in their comparative study concluded that enteral nutrition can be delivered by various ways but NJ feeding was most actable due to its less serious complications and greater benefits. NJ tube enteral feeding also has some minor disadvantages like uncomfoting feeling due to nasal tubing, enteral feed related diarrhea, abdominal discomfort, nausea and vomiting; which we also experienced in our study in few patients. However, enteral feed by any route also has similar disadvantages and TPN on the other hand has its own disadvantages as we discussed already. In our opinion, in comparison to the benefits of NJ tube feeding these minor disadvantages is quite acceptable. Looking at the available published result of various trials and our consideration for early enteral feeding through NJ tube in our patients, we did not perform the comparative study of the various feeding methods in our study.

Early enteral feeding in the form of oral feeding has been described in various studies as well and some even concluded as it is equivalent to enteral tube feeding.<sup>2,8,16</sup> However, most of the surgeons do not feel confident to start early enteral feeding following oral route after major gastro-intestinal surgery and a naso- gastric tube may be needed to monitor anastomotic bleeding and for decompression in some cases. On the other hand, full stomach in the early postoperative days can increase the incident of aspiration especially in older patients. To address all these issues, further randomized controlled trial is needed.

## Conclusions

Early enteral nutrition should be considered for all the patients even after major gastro-intestinal surgery due to its great advantage. NJ tube feeding is one of the most acceptable modes of enteral nutrition due to its various advantages and of minimal complications.

**Conflicts of interest:** Nil

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**Table 1:** Showing the demography and operative details of the patients.

**Demography of patients:**

Total Number of patients—139, (Male—102, Female—37).  
Age ranged from 44 years to 81 years

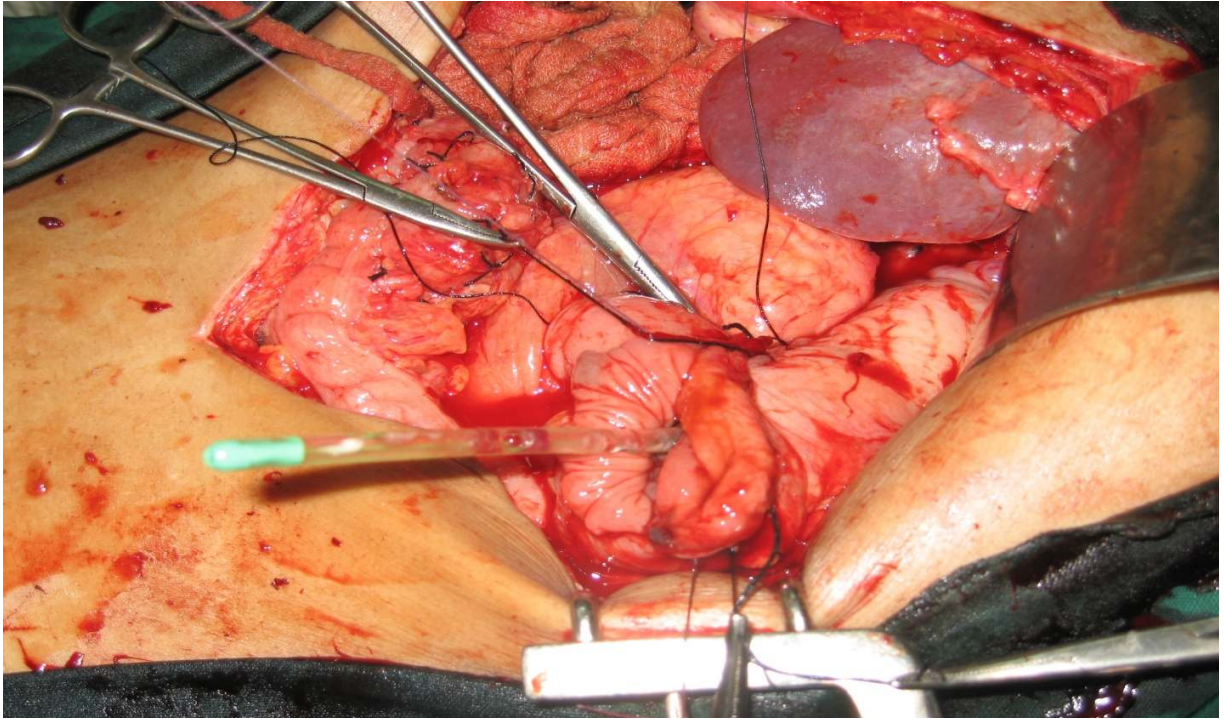
**Operative details:**

Palliative gastro-jujunostomy – 43 patients,  
*Curative surgery was performed in 96 patients as follows:*  
Distal radical gastrectomy-- 62 patients  
Total radical gastrectomy-- 28 patients  
Proximal radical gastrectomy-- 6 patients

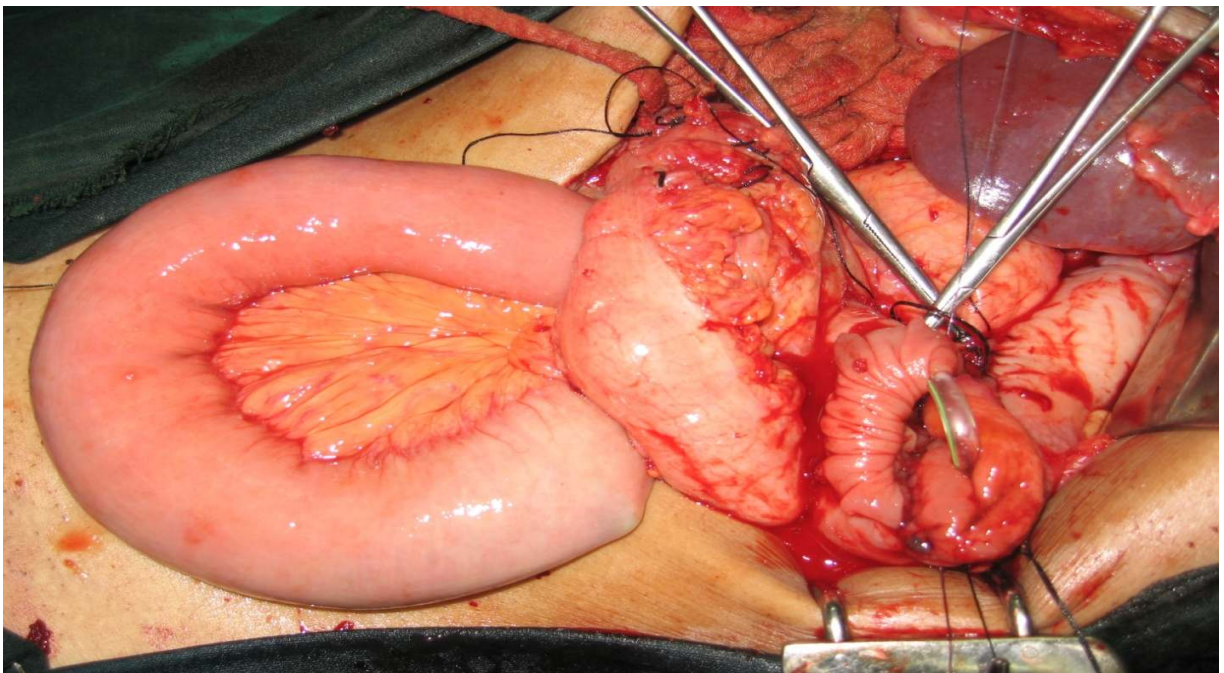
**Types of anastomosis after curative surgery( in 96 patients):**

Gastro-duodenostomy ( Billroth-I)-- 47 patients  
Gastro-Jujenostomy ( Billroth-II)-----15 patients  
Esophago-jujenostomy-----28 patients  
Esophago-gastrostomy----- 6 patients

NB: Proximal gastrectomy was done for patients with fundal / proximal stomach growth where significant amount distal stomach preservation was feasible after adequate tumour margin.



**Figure 1:** NJ tube bringing out through the gastrectomy



**Figure 2:** NJ tube is pushed to the jejunum through the jejunostomy/duodenostomy under vision





**Figure 3:** NG and NJ tube (feeding formula milk) fixed with adhesive tape over the nose