

# The Role of Upper Gastrointestinal Swallow Study in Patients Undergoing Proximal or Total Gastrectomy

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**ABSTRACT:** **Background:** One of the ominous complications following proximal gastrectomy or total gastrectomy is a leak from the esophagogastric or esophagojejunal anastomosis. An upper gastrointestinal swallow study is traditionally performed to confirm the anastomotic patency and lack of any leak before oral feeding can be initiated.

**Objectives:** To challenge the routine use of UGISs following proximal or total gastrectomy in order to check the integrity of the gastroesophageal or jejunoesophageal anastomosis.

**Methods:** The charts of 99 patients who underwent PG or TG for malignant pathology were retrospectively reviewed. UGISs were performed on day 6 following surgery using a water-soluble material.

**Results:** The UGISs were normal in 95 patients, with none displaying any complication related to the gastroesophageal or jejunoesophageal anastomosis. All four patients who experienced a leak from the anastomosis had an early stormy postoperative course.

**Conclusions:** Routine use of an UGIS to detect a leak following PG or TG is not justified. UGIS should be performed whenever signs of abdominal sepsis develop following this type of surgery.

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**KEY WORDS:** contrast upper gastrointestinal study, leak, proximal gastrectomy, total gastrectomy, malignant pathology

One of the ominous complications following proximal gastrectomy or total gastrectomy is a leak from the esophagogastric or esophagojejunal anastomosis. The reported rate of this complication varies between 1% and 29% [1-4] and is followed by a mortality rate of 14.4 to 50% [3,5-7].

An upper gastrointestinal swallow study is traditionally performed to confirm the anastomotic patency and lack of any leak before oral feeding can be initiated. Since the majority of UGISs performed in our patients were normal, we decided to challenge the need for the routine use of this study

UGIS = upper gastrointestinal swallow study  
PG = proximal gastrectomy  
TG = total gastrectomy

before initiation of oral feeding in asymptomatic patients following PG or TG surgery.

## PATIENTS AND METHODS

This study was approved by the Institutional Review Board and informed consent was waived. In this retrospective study the charts of patients who underwent PG or TG for malignancy at Assaf Harofeh Medical Center from 1 January 1996 to 31 December 2006 were retrospectively reviewed. All patients included in the study had undergone an UGIS before oral feeding was permitted. The UGIS was scheduled for the 6th postoperative day. The study was performed with water-soluble contrast material using the fluoroscopic technique in order to study esophageal and gastric emptying, anastomotic patency, and the presence or absence of a leak.

Patient demographics, diagnosis, type of surgery, duration of surgery, comorbid factors, postoperative clinical course, day of performance of the UGIS, and the influence of the UGIS results on resuming oral feeding were included in the study database.

Anastomotic leakage was defined as contrast material extravasation during the radiologic examination. Information regarding the results of the UGIS was extracted from the original medical records. No UGIS reevaluation was performed. A clinical leak was defined as the presence of fever, leukocytosis, abdominal pain and abnormal abdominal drain discharge. Abdominal computed tomography scan was performed only in septic patients with normal UGIS results.

## RESULTS

The study population consisted of 99 patients, 59 males and 40 females. The mean age was  $63 \pm 13.1$  years. The underlying pathology was adenocarcinoma in 85%, gastrointestinal stromal tumor in 10%, lymphoma in 4% and carcinoid tumor in 1%. The tumor was located in the stomach in 78 patients and in the distal part of the esophagus in 21 (Siewert type II and III). Fifty TGs and 49 PGs were performed. All patients who underwent PG had a stapled esophagogastric anastomosis using a circular stapler of 25 mm diameter, while those

**Table 1.** Complications in study patients

Complication	No. of patients
Pneumonia	6
Intraabdominal abscess	5
Cardiac event	4
Anastomotic leak	4
Cerebral vascular event	2
Sepsis	2
Deep vein thrombosis/pulmonary emboli	1
Biliary fistula	1
Pancreatic fistula	1
Small bowel necrosis	1
Small bowel obstruction	1

who underwent TG had a stapled esophagojejunostomy reconstruction performed either by Roux-Y (39 patients) or esophagojejunostomy plus a Braun modification enteroenterostomy in 11 patients.

A feeding jejunostomy was constructed in 85 patients. Sixteen splenectomies (16%) were performed either for gastric tumor extension or as a result of incidental splenic injury. The mean packed red blood cell transfusion was  $1.6 \pm 1.5$  units per patient. The mean operative time was  $207 \pm 39$  min:  $20 \pm 28$  min for the PG group and  $213 \pm 51$  min for the TG group.

Twenty-two patients (22%) developed 28 different complications [Table 1]. Mean hospital stay was  $17 \pm 9$  days. Four patients (4%) died. Cardiac events caused two perioperative deaths, and sepsis due to anastomotic leak resulted in another two deaths.

The UGISs were performed on day  $6 \pm 1$  day following surgery. An anastomotic leak was revealed in four patients (4%). Three patients developed the leak following TG and one following PG. The anastomotic leak was confirmed by UGIS performed on day  $5 \pm 1$ . All four patients had clinical signs and symptoms of abdominal sepsis (one of these patients had a pancreatic fistula). Three of these patients underwent reoperation and two of them died. The fourth patient had a minimal leak and was managed conservatively. One of these four patients had a splenectomy performed during the initial surgery. There was no difference in the number of transfused blood units between patients who had a leak and those who did not.

All patients with a normal UGIS result started uneventful oral feeding following the diagnostic procedure.

## DISCUSSION

A leak from an anastomosis following esophagogastric surgery is a fearful complication associated with increased morbidity and mortality [1-8]. Historically, and in current practice,

the anastomotic patency has been radiographically studied before the initiation of oral feeding. Since most surgeons follow this traditional approach, it has not been changed for many years and recent publications report that this practice is still common [4-8]. However, there are surgeons who do not adhere to this routine and perform an UGIS only when a leak is clinically suspected [9-11]. Following the "tradition," we performed an UGIS in each and every patient following PG and TG, but it was our impression that a patient whose postoperative course is uneventful will have no leak on UGIS, while in those patients with a difficult postoperative course and especially signs of abdominal sepsis an anastomotic leak will be diagnosed. In an attempt to test this hypothesis we performed this retrospective study.

Our study population included 99 patients who underwent major gastric surgery with construction of an esophagojejunostomy or esophagogastric anastomosis. Four patients had a leak diagnosed by UGIS, and all four patients had signs and symptoms of abdominal sepsis. In all four the study was performed on an emergency basis and three of the four were reoperated. The other 95 patients who had a smooth postoperative course had no evidence of a leak on a UGIS routinely performed on day  $6 \pm 1$  following surgery.

Some points need further clarification, such as the day of performing the UGIS and the material used. There is no consensus regarding the day of UGIS performance. In some series the UGIS was performed on day 4 [3], while others performed the study on day 6 or even the 14th postoperative day [4-8]. In our series the study was scheduled for the 6th postoperative day. We believe that this period can be shortened to the 4th or 5th postoperative day since in most cases the leak develops during this period [4]. Another point is the contrast material to be used for the study. Most authors used water-soluble material [8]. However, in some studies the authors recommended the use of barium as it has been reported to have a lower false-negative rate [1,12,13]. Lamb et al. [4] used water-soluble contrast material first and if no leak was documented the study was repeated with barium.

Various authors agree that in patients having a smooth postoperative course no leak will be detected on UGIS, whereas patients demonstrating any signs of sepsis should undergo a UGIS as early as possible to detect a possible leak [4,9-11]. These findings also emerge very decisively from our study where all four patients with a leak had early signs of sepsis while the other 95 patients with an uneventful postoperative course had no leak on UGIS.

Our retrospective study does not support the routine use of a radiologic investigation of anastomotic patency and absence of a leak in asymptomatic patients following gastroesophageal surgery. However, patients with signs of sepsis, an abnormal perianastomotic drain discharge, or clinical deterioration should undergo an urgent contrast examination.

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1. Swanson JO, Levine MS, Redfern RO, Rubesin SE. Usefulness of high-density barium for detection of leak after esophagogastrectomy, total gastrectomy, and total laryngectomy. *AJR Am J Roentgenol* 2003; 181: 415-20.
2. Papachristou DN, Fortner JG. Anastomotic failure complicating total gastrectomy and esophagogastrectomy for cancer of the stomach. *Am J Surg* 1979; 138: 399-402.
3. Budisin N, Budisin E, Golubovic A. Early complications following total gastrectomy for gastric cancer. *J Surg Oncol* 2001; 77: 5-41.
4. Lamb PJ, Griffin SM, Chandrashekar MV, Richardson DL, Karat D, Haves N. Prospective study of routine contrast radiology after total gastrectomy. *Br J Surg* 2004; 91: 1015-19.
5. Degiuli M, Sasako M, Calgaro M, et al. Morbidity and mortality after D1 and D2 gastrectomy for cancer: interim analysis of the Italian Gastric Cancer Study Group (IGCSG) randomised surgical trial. *Eur J Surg Oncol* 2004; 30: 303-8.
6. Bozzetti F, Marubini E, Bonfanti G, et al. Total versus subtotal gastrectomy: surgical morbidity and mortality rates in a multicenter Italian randomized trial. The Italian Gastrointestinal Tumor Study Group. *Ann Surg* 1997; 226: 613-20.
7. Danielson H, Kakkola A, Kiviluoto T, et al. Clinical outcome after D1 vs D2-3 gastrectomy for treatment of gastric cancer. *Scand J Surg* 2007; 96: 35-40.
8. Bruce J, Krukowski ZH, Al-Khairiy G, Russel EM, Park KG. Systematic review of the definition and measurement of anastomotic leak after gastrointestinal surgery. *Br J Surg* 2001; 88: 1157-68.
9. Curry TK, Carter PL, Porter CA, Watts DM. Resectional gastric bypass is a new alternative in morbid obesity. *Am J Surg* 1998; 175: 367-70.
10. Obertop H, Bosscha K, De Graaf. PW. Mediastinitis from anastomotic disruption after esophageal resection and reconstruction for cancer: results of salvage surgery. *Dis Esophagus* 1994; 7 184-7.
11. AhChong AK, Chiu KM, Law IC, Chu MK, Yip AW. Single layer continuous anastomosis in gastrointestinal surgery: a prospective audit. *Aust N Z J Surg* 1996; 66: 34-6.
12. Fan ST, Lau WY, Yip WC, Poon GP, Yeung C, Wong KK. Limitations and dangers of gastrografin swallows after esophageal and upper gastric operations. *Am J Surg* 1988; 155: 495-7.
13. Tanomkiat W, Galassi W. Barium sulfate as contrast medium for evaluation of postoperative anastomotic leaks. *Acta Radiol* 2000; 41: 482-5.