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Original article

Accuracy of routine postoperative swallow study in predicting leak or obstruction after gastric bypass

Logan Rawlins, M.D.*, Rachel Penn, B.S., Bruce Schirmer, MD, FACS, Pete Hallowell, MD, FACS

Department of Surgery, University of Virginia, Charlottesville, Virginia

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Abstract

Background: Many bariatric surgeons use a routine postoperative day 1 swallow study after Roux-en-Y gastric bypass to rule out leak or obstruction. The authors' practice adheres to this dictum, but the aim of this study was to determine how accurate this testing is in properly predicting complications.

Methods: A retrospective chart review of all patients undergoing gastric bypass in the past 5 years (2008–2012) was performed; the results of their swallow study was examined and compared with their actual clinical outcome within 30 days of operation.

Results: The records of 501 patients were reviewed, and there were 15 leaks and 29 obstructions for a total prevalence rate of 9%. When the swallow study was negative, 33 complications were missed and 433 reports were correct. When the swallow study was positive, only 11 complications were correctly identified and 24 of the reports were false positive. The sensitivity of the test was only 25%. The positive predictive value was only 31%. The result of the swallow study was incorrect 12% of the time.

Conclusion: Routine postoperative swallow study after gastric bypass was a poor method of accurately detecting clinically significant obstruction or leak. This test may be unnecessary for all patients and might best be used when clinically indicated. (Surg Obes Relat Dis 2015;11:1–5.) Published by Elsevier Inc. on behalf of American Society for Metabolic and Bariatric Surgery.

Keywords: Routine; Swallow study; UGI; Complications; Gastric bypass

Roux-en-Y gastric bypass, the most commonly performed bariatric surgical procedure as of 2012, involves the placement of multiple gastrointestinal staple lines designed to mechanically restrict and divert flow of ingested food. The concern for leak or obstruction after this procedure often leads the surgeon to perform investigational studies in the operating room, the day after surgery, or possibly even both. The most common postoperative study is a contrasted upper gastrointestinal series (also known as a swallow study). Many surgeons who perform this study do it as a routine procedure on the day after surgery, with fewer ordering it when an ominous clinical scenario dictates. This testing is not without drawbacks though. It is expensive, resource- and time-consuming, and uncomfortable for the patient. This begs the question of whether the potential benefits of the study outweigh the drawbacks. The goal of this study was to determine how accurate routine postoperative swallow study testing is in properly identifying complications, the results of which might confirm or refute the utility of this type of testing.

Methods

A retrospective chart review was performed of all patients undergoing gastric bypass in the past 5 years (2008–2012) at an academic medical center (University of

*Correspondence: Logan Rawlins, M.D., Dept of General Surgery, 101 Bodin Cir, Travis AFB, CA 94535.
E-mail: rawlinml@yahoo.com

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Virginia). The results of each patient's postoperative day 1 (POD1) swallow study were examined and compared with actual clinical outcome within 30 days of operation. The 2 radiologically relevant clinical outcomes examined were leak and obstruction. The study was approved by the hospital institutional review board before data collection. The swallow study was performed the first day after surgery in the radiology fluoroscopy suite by a rotating radiology resident and attending. This typically involved the standardized use of no more than 100 cc of orally ingested water soluble contrast.

The surgical technique for gastric bypass involved a retro-gastric, retro-colic, linear stapled gastrojejunostomy (GJ) with double-layer, hand-sewn closure of the enterotomy and a bidirectional linear stapled jejuno-jejunostomy (JJ) with hand-sewn or linear-stapled closure of the enterotomy. All mesenteric defects were closed at the time of the surgery. No staple line reinforcement was used on patients in this study. All patients underwent routine upper endoscopy or methylene blue testing at the time of surgery to examine for GJ leak. A routine upper gastrointestinal series was also performed the morning after surgery.

Results

The records of 501 patients who underwent gastric bypass were reviewed; there were 15 leaks and 29 obstructions, for a total prevalence rate of 9%. When the swallow study was read as negative, 33 complications were missed and 433 reports were correct (for an 86% overall true negative rate). When the swallow study was positive, only 11 complications were correctly identified (2% overall true positive), and 24 of the reports were false positive. The sensitivity of the test was only 25%, and the specificity was 95%. The positive predictive value was only 31%. The result of the swallow study was incorrect 12% of the time (Tables 1 and 2).

When the swallow study was positive and correct, it accurately identified 3 GJ leaks, 4 JJ obstructions, and 4 GJ obstructions, all of which required reoperation or endoscopic management. In 24 of the studies, the radiologist reported evidence of a GJ or JJ obstruction and the patients had no clinical problem and tolerated oral feeding well. An additional 33 patients developed complications with a normal POD1 swallow study. Among those were 7 missed GJ obstructions, 6 missed JJ obstructions, 2 missed transverse mesocolic defect obstructions, 6 missed port site or internal hernia obstructions (2 of which developed GJ leaks), 3 missed JJ leaks, and 9 more missed GJ leaks. Missed leaks were detected between POD5 and POD28 (POD5, 5, 7, 10, 10, 12, 15, 20, and 28; mean: day 12, median: day 10) (Table 3).

Table 1
Swallow study 2×2 contingency table (N = 501)

	Complication (n)	Clinically normal (n)
Swallow positive	11	24
Swallow negative	33	433

Table 2
Swallow study statistical probabilities

Prevalence	9%	Overall complication rate of leak or obstruction
Sensitivity	25%	Probability of a positive swallow study when leak or obstruction was present
Specificity	95%	Probability of a normal swallow study when leak or obstruction was absent
PPV	31%	Probability of a leak or obstruction when the swallow study was positive
NPV	93%	Probability of no complication when the swallow study was negative
True positive	2%	
True negative	86%	
False positive	5%	
False negative	7%	12% Overall missed diagnosis rate

NPV = negative predictive value; PPV = positive predictive value.

Discussion

The results of the present study clearly raise doubts as to the usefulness of routine postoperative swallow studies in bariatric patients undergoing gastric bypass. An 86% overall true negative rate clearly shows that most of these tests are unnecessary. A 2% true positive rate shows the very low likelihood of a positive finding being correctly identified. It is likely that these positive findings could have been identified by clinical presentation alone, prompting the directed use contrasted evaluation. Most concerning is the combined 12% rate of either incorrect radiographic interpretation or predictable temporal destiny (i.e., the swallow study is not timed correctly on POD1 to correctly identify

Table 3
Clinical analysis of results other than true negative

Result/Outcome	N	Details
+ Study, no complication	24	Incorrectly called GJ or JJ stricture obx
+ Study, + Complication	3	Correctly identified GJ leak
	4	Correctly identified GJ obx
	4	Correctly identified JJ obx
NEG Study, + Complication	9	Missed GJ leak
	3	Missed JJ leak
	7	Missed GJ obx
	6	Missed JJ obx
	6	Missed bowel obx (port site or internal hernia <30 d)
	2	Missed transverse mesocolic obstruction

GJ = gastrojejunostomy; JJ = jejunojejunostomy; obx = obstruction; NEG = normal.