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Push versus pull gastrostomy in cancer patients: A single center retrospective analysis of complications and technical success rates

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Abstract

Purpose: To compare the technical success and complication rates of push versus pull gastrostomy tubes in cancer patients, and to examine their dependence on operator experience.

Materials and methods: A retrospective review was performed of 304 cancer patients (170 men, 134 women; mean age 60.3 ± 12.6 [SD], range: 19–102 years) referred for primary gastrostomy tube placement, 88 (29%) of whom had a previously unsuccessful attempt at percutaneous endoscopic gastrostomy (PEG) placement. Analyzed variables included method of insertion (push versus pull), indication for gastrostomy, technical success, operator experience, and procedure-related complications within 30 days of placement.

Results: Gastrostomy tubes were placed for feeding in 189 patients and palliative decompression in 115 patients. Technical success was 91%: 78% after endoscopy had previously been unsuccessful and 97% when excluding failures associated with prior endoscopy. In the first 30 days, there were 29 minor complications (17.2%) associated with push gastrostomies, and only 8 minor complications (7.5%) with pull gastrostomies ($P < 0.05$). There was no significant difference in major complications (push gastrostomy 5.3%, pull gastrostomy 5.6%). For decompressive gastrostomy tubes, the pull technique resulted in lower rates of both minor and major complications. There was no difference in complications or technical success rates for more versus less experienced operators.

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Conclusion: Pull gastrostomy tube placement had a lower rate of complications than push gastrostomy tube placement, especially when the indication was decompression. The technical success rate was high, even after a failed attempt at endoscopic placement. Both the rates of success and complications were independent of operator experience.

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Gastrostomy tubes are primarily used either to manage prolonged nutritional supplementation in patients with inadequate oral intake, or to decompress the stomach in the setting of a small bowel obstruction or gastric outlet obstruction, often in those with end stage metastatic disease [1–5]. The three primary modalities for placement are surgical, endoscopic, and radiological. There have been numerous studies to determine the best method, but the ideal technique remains controversial [6,7].

Overall, percutaneous endoscopic gastrostomy (PEG) remains the most readily available and frequently used method, largely supplanting surgical placement due to a high technical success rate and fewer complications [2,3,8]. However, its use is limited in patients with head, neck, and esophageal cancers, as the tumor might prevent passage of the endoscope, increase the risk of bleeding from passage of the tube across friable tumor, or result in tract seeding around the gastrostomy tube [9–12].

The advent of interventional radiology has given rise to fluoroscopically guided techniques that circumvent these limitations [13]. The push method allows for direct percutaneous access into the stomach and insertion of a gastrostomy tube without going through the mouth [14]. The major drawbacks of this approach are that the tubes are often smaller and an inflatable balloon or pigtail is used for tube retention, resulting in more frequent dislodgement and clogging [2,3,15,16]. The pull technique is a more recently developed hybrid approach that allows for larger tubes and more secure bumpers, but similarly to the PEG, must pass through the oral cavity and incur the risk of tract seeding in patients with head and neck malignancies [3,17–19].

Compared to PEG, radiologically inserted gastrostomies have been shown to have higher technical success rates and similar or decreased risk of complications [2,3,17,20–22]. Indeed, several studies have commented on the appreciable number of patients receiving radiological gastrostomy placements after a previously failed PEG – data that support its use even in patients with difficult anatomy [17,20,22].

While a number of studies have examined PEG vs. pull or PEG vs. push, there is a paucity of literature that evaluates the differences between push and pull radiologic gastrostomies, particularly as it relates to patients requiring palliative decompression [2,20,23–25]. Venting gastrostomy tubes are understudied but are important for palliation of malignant obstruction. They are associated with unique challenges, due to the higher risk of aspiration;

the difficulty of draining partially digested food, and the potentially distorted anatomy due to bowel obstruction or post-operative anatomy.

The purpose of this study was to compare the complication rates of push versus pull gastrostomies in a diverse population of cancer patients (including patients requiring either feeding or decompression). We evaluated the technical success of radiological gastrostomies, including patients with a prior failed attempt at PEG placement. In addition, we examined the role that operator experience plays in technical success or complication rates.

Materials and methods

Patients

This is a single-institution retrospective study that was HIPAA compliant and IRB-approved. Informed consent was waived. All patients 18-years or older who underwent attempted primary push or pull gastrostomy tube placement by interventional radiology between July 2000 and October 2015 were included. Gastrostomy tube exchanges and patients with incomplete documentation were excluded.

Outcome measures

Data related to patient demographics, gastrostomy type, indications and technique, minor and major complications, technical success, and operator characteristics were collected. Clinical notes, imaging, and procedures within one month after gastrostomy tube placement were reviewed for complications. Complications that had a clear connection to the procedure and occurred within 30 days after the initial placement were included and categorized based on SIR guidelines [26]. Minor complications included pericatheter leakage, cellulitis, tube dislodgement, tube occlusion, tube or balloon rupture or fracture, poor functionality, pneumonia or aspiration not requiring tube revision, or pneumoperitoneum not requiring drainage or surgery. Major complications included peritonitis, stomal infection causing sepsis, abscess, aspiration requiring tube revision, hemorrhage, pneumoperitoneum requiring drainage or exchange, gastrointestinal perforation, or any

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