



Laparoscopic Nissen fundoplication in a community hospital setting

Howard L. Beaton^{1,2}

¹Department of Surgery, Weill Cornell Medical College, New York, NY 10038, USA; ²Department of Surgery, New York Presbyterian Lower Manhattan Hospital, New York, NY 10038, USA

Correspondence to: Howard L. Beaton, MD, FACS. Associate Professor of Surgery, Weill Cornell Medical College; Attending Surgeon, New York Presbyterian Lower Manhattan Hospital; 170 William Street, New York, NY 10038, USA. Email: hlb9001@med.cornell.edu.

Abstract: Questions have arisen concerning the appropriateness of the performance of laparoscopic anti-reflux surgery in the community hospital setting. The requirements of a safe and effective program include credentialing, preoperative evaluation, creation of the surgical team, conduct of the operation, and adequacy of follow up. If these requirements are met, then results similar to those from academic medical centers can be obtained.

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Introduction

As the minimally invasive approach has become the gold standard for the surgical treatment of hiatal hernia and gastroesophageal reflux disease, questions have arisen concerning the safety and efficacy of laparoscopic Nissen fundoplication when it was performed in community hospitals, outside of the academic setting. Challenges exist in deciding who should be performing such procedures, pre-operative evaluation, creation of the surgical team, conduct of the operation and adequacy of follow up.

Credentialing

It is the responsibility of each hospital to credential members of their surgical attending staff in the performance of all invasive procedures. Requirements vary greatly from hospital to hospital. At the beginning of the laparoscopic surgery era, it was axiomatic that a surgeon needed to be credentialed in the performance of a procedure by open technique before permission would be granted for doing so laparoscopically. Today, this requirement is no longer practical. Graduates of many general surgical residencies, and even fellowships, may never have seen an open Nissen fundoplication performed.

The proliferation of fellowships beyond the completion of a 5-year general surgical residency in many academic training centers has shifted many complex laparoscopic procedures out of the experience of the residency and into the fellowship years. Only during fellowships in advanced laparoscopic surgery are procedures on the foregut routinely performed. Even then, some fellowships are heavily weighted toward bariatric surgery. A careful examination of the new graduate's experience during fellowship training may be required. A period of proctoring before independent privileges are given may be appropriate if adequate experience cannot be demonstrated.

The established surgeon who wishes to perform laparoscopic Nissen fundoplication presents a particular challenge. Skills learned to perform laparoscopic appendectomy, cholecystectomy and even colectomy are not adequate for Nissen fundoplication. Familiarity with laparoscopic dissection of the esophageal hiatus, mobilization of the intra-abdominal esophagus and proximal stomach is required, as well as facility with intracorporeal suturing and knot tying. Such surgeons may need to seek further training, practice in a simulated laboratory setting and/or partner with another surgeon and mentor who is already credentialed in the performance of

Nissen fundoplication, prior to requesting credentialing to do so independently. Permission and a prescribed process to be followed should first be obtained from the chief of surgery or the appropriate credentialing committee before proceeding.

Once obtained, the maintenance of credentialing is also a concern. Well trained young surgeons and older surgeons practicing in a community hospital without a large referral base, may have difficulty in performing a large number of complex surgical procedures, including Nissen fundoplication, on a regular basis. The equating of volume with quality of care in the performance of complex surgical procedures is becoming more common, even in community hospitals. Indeed, three prominent health systems, Johns Hopkins, Dartmouth-Hitchcock and the University of Michigan, have pledged to require their surgeons to perform a minimum number of procedures to maintain privileges, even in their affiliated community hospitals. To date, laparoscopic Nissen fundoplication has not been included in this category, but the future in this respect is unclear.

Pre-operative patient evaluation

Community hospitals routinely have available esophagogastroduodenoscopy and radiologic studies for the evaluation of patients with gastroesophageal reflux symptoms. Since such patients are initially diagnosed and managed medically, and only failures of medical management are treated surgically, a team of gastroenterologists with an interest in this disease is essential.

Esophageal manometry and pH-monitoring are essential components of the evaluation of many patients prior to surgery. The creation and maintenance of such a laboratory dedicated to esophageal diseases often falls to the interested surgeon, however its maintenance in the face of low volume of patients may be problematic. In this regard, regionalization of resources or referral to an affiliated academic medical center may sometimes be necessary.

Creation of the surgical team

In addition to the gastroenterologists mentioned above, formation of an effective surgical team is essential to successful laparoscopic Nissen fundoplication. In the absence of capable surgical residents or fellows, in community hospitals often one attending surgeon assists

another. Nurses experienced in advanced laparoscopic surgery and, in particular, intra-corporeal suturing and instrumentation are critical. New or inexperienced nurses should not be rotated through rooms where complex laparoscopic procedures including Nissen fundoplication are being performed.

Anesthesiologists must be aware of the possibility of intraoperative pneumothorax. Most importantly, anesthesiologists must be familiar with and comfortable in the passage and manipulation of the bougies that are essential to the performance of a successful laparoscopic Nissen fundoplication. Good communication between the operating surgeon and the anesthesiologist in this respect is critical in order to prevent esophageal perforation. A protocol should be established with the cooperation of the anesthesiologist for the intraoperative administration of any desired medications to minimize postoperative nausea and emesis.

Conduct of the operation

In addition to the assistant, nurses and anesthesiologists mentioned above, many other details are necessary in the operating room to insure successful laparoscopic Nissen fundoplication. The precise surgical technique may vary somewhat according to the surgeon's training and preference.

Surgeons have different preferences as to which side of the patient they wish to stand on and where video monitors are to be placed. If the surgeon wishes to stand in between the legs of the patient, a special table that allows the legs to be split may be needed. Generally, a steep Trendelenburg position is preferred, and the patient needs to be restrained in some manner so that slippage down or even off the table is not possible. Attachments to the end of the table to support the feet may be helpful in this respect.

The availability of specialized surgical equipment not routinely used in less complex laparoscopic surgery must be considered. Esophageal bougies of the appropriate style and size preferred by the surgeon are needed. Fan shaped retractors, both reusable and disposable, to elevate the left lobe of the liver are readily available. If the surgeon prefers a Nathanson retractor, this must be available with its table mounted holder. Today, division of the short gastric vessels and dissection around the esophageal hiatus is often done with the aid of energy devices, either ultrasonic or bipolar electric. Of course, the surgeon's preferred needle holders, sutures and any knot tying devices must be present on the

nurse's table.

Immediately following laparoscopic Nissen fundoplication, after recovery in the post anesthesia care unit, patients are generally safely managed on a general surgical floor in a community hospital. A pre-established protocol of medications for pain relief and the prevention of vomiting is the most helpful. If an upper GI series is to be performed on the day following surgery, this should be arranged in advance in order that it can be performed in the morning, and not late in the afternoon. The nutrition staff should be informed as to what diet the patient should have after surgery, both in the hospital and after discharge so that appropriate instructions can be provided. Much of this process can be placed in advance into the electronic medical record, so that it can be standardized for every patient.

Follow up

A key component of an effective program is the adequacy of follow up, especially in the community hospital setting where results will be looked at critically and must compare favorably to those reported in the surgical literature. Complication rates must be tracked. Ideally, relief of preoperative symptoms, postoperative complications, medication use and patient satisfaction should be recorded in a prospective data base. The use of an established scoring system, such as the Visick or Allen grading system, may be considered.

Discussion

Questions concerning the safety and efficacy of laparoscopic Nissen fundoplication when performed in the community hospital setting have prompted several authors to report their experience in the surgical literature.

Tucker *et al.* (1) from a community hospital in Washington, Missouri found no mortalities in their series of 202 patients. Major complications occurred in 7.4% of their patients, including bleeding requiring transfusion in two patients, slipped Nissen in three, pneumothorax in two and esophageal leak in two patients. Eleven patients required dilatation for postoperative dysphagia. There were no mortalities.

In a separate report, Tucker *et al.* (2) also assessed their patients' satisfaction. In total, 73.1% of their patients were completely satisfied, 22.8% were somewhat satisfied and only 5.3% were unsatisfied with their surgery. And 88.2% of their patients would recommend such surgery to others.

Althar (3) reported on his single surgeon experience

with 100 consecutive patients undergoing surgery for anti-reflux disease in three community hospitals in the Pensacola, Florida region. Seventy patients underwent laparoscopic Nissen-Rosetti fundoplication and 30 had a Toupet fundoplication. Again, in his series there were no mortalities. Only one major complication, a pulmonary embolus and small bowel perforation requiring reoperation, was noted. Two patients complained of dysphagia and underwent endoscopic balloon dilatation with resolution.

Ransom *et al.* (4), from the New Hanover Regional Medical Center in Wilmington, North Carolina, reported on a prospective study of the results of a single surgeon performing laparoscopic Nissen fundoplication in a large community, non-university teaching hospital setting. In his short term follow up, 87% of patients reported marked improvement and 13% had some improvement in their preoperative symptoms. Long term follow up showed similar results.

All of the above authors concluded that their results of laparoscopic Nissen fundoplication are similar to those reported elsewhere in the literature from university medical centers. Accordingly, at least in their hands, such surgery can be safely and effectively be performed in a community hospital as well.

Conclusions

Laparoscopic Nissen fundoplication is a complex, minimally invasive surgical procedure for which advanced surgical expertise is required. Certain unique aspects of this operation are best managed by a dedicated surgical team. When properly established, programs based in community hospitals can achieve similar results to those from university medical centers.

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