A Prospective Treatment Protocol for Outpatient Laparoscopic Appendectomy for Acute Appendicitis

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BACKGROUND: Many laparoscopic procedures are currently performed on an outpatient basis. Laparoscopic appendectomy, however, continues to require postoperative hospitalization at most institutions. A treatment protocol for outpatient laparoscopic appendectomy was developed to determine if this could be successfully performed without increasing postoperative complications. We hypothesized that adopting an outpatient protocol for laparoscopic appendectomy will significantly increase the rate of outpatient management for uncomplicated appendicitis, without an increase in morbidity or mortality.

STUDY DESIGN: We initiated a prospective outpatient protocol for laparoscopic appendectomy in July 2010 at our institution. All patients having laparoscopic appendectomy from July 2010 to March 2011 were included as protocol patients and were retrospectively reviewed. A separate group of patients having laparoscopic appendectomy from January to September 2009 were analyzed as historical controls. These 2 groups were compared for demographics, preoperative comorbidities, outpatient management, and postoperative morbidity by chi-square analysis, with a 0.95 confidence level for statistical significance.

RESULTS: A total of 116 protocol patients were compared with 119 historical control patients. There were no significant differences in patient demographics, preoperative comorbidities, and pathologic findings between protocol patients and historical controls. Ninety-nine protocol patients (85.3%) had procedures as outpatients compared with 42 historical control patients (35.3%; $p < 0.05$). Postoperative morbidity occurred in 6 protocol patients (5.2%) and 10 historical controls (8.4%; $p = NS$). There were no readmissions or mortalities in the protocol group.

CONCLUSIONS: An outpatient protocol for laparoscopic appendectomy significantly increased the rate of outpatient management with no increase in morbidity or mortality. This practice has now become standard of care at our institution. (J Am Coll Surg 2012;215:101–106. © 2012 by the American College of Surgeons)

The treatment of acute appendicitis has evolved over the past 2 decades. The introduction of laparoscopic surgical techniques has allowed for a minimally invasive option for treating appendicitis. Laparoscopic surgery has demonstrated a number of advantages compared with open surgical techniques, including less pain, shorter hospitalization, and quicker return to full activities. Because of these advantages, many laparoscopic procedures are now performed on an outpatient basis. Several studies have demonstrated that laparoscopic cholecystectomy can be performed as an outpatient procedure, and this has now become the standard of care for elective cholecystectomy.[1-3] The trend toward outpatient laparoscopic procedures has expanded, and there are now reports of outpatient laparoscopic gastric bypass, hernia repair, and hysterectomy.[4-6]

An exception to this trend to outpatient management has been laparoscopic appendectomy. A National Surgical Quality Improvement Program (NSQIP) review of more than 32,000 patients from 2008 revealed hospitalization ranged from 1.8 to 2.2 days for acute appendicitis,[7] A previous study from our institution showed this length of stay is no different from that seen with open appendectomy.[8]

Disclosure Information: Nothing to disclose.

Presented at the Western Surgical Association 119th Scientific Session, Tucson, AZ, November 2011.

Received January 4, 2012; Revised February 24, 2012; Accepted February 24, 2012.

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ISSN 1072-7515/12/$36.00
http://dx.doi.org/10.1016/j.jamcollsurg.2012.02.024

Abbreviations and Acronyms
NSQIP = National Surgical Quality Improvement Program
PACE = Postanesthesia unit

The practice of postoperative admission after laparoscopic appendectomy can be questioned in light of the outpatient success with other laparoscopic procedures. This observation led to a selective approach to hospitalization after laparoscopic appendectomy for uncomplicated appendicitis at our institution. We recently reported a retrospective review of laparoscopic appendectomy looking at our current rates of outpatient management and the morbidity associated with this approach.[9] We found that patients could be selectively treated on an outpatient basis with no increase in morbidity or mortality. From this review, we queried whether an outpatient treatment protocol could improve the success rate of outpatient management after laparoscopic appendectomy without increasing morbidity. This study reports our results after initiation of an outpatient treatment protocol.

METHODS

We performed an IRB-approved retrospective review of patients who underwent laparoscopic appendectomy for uncomplicated appendicitis from January 2009 to September 2009. Uncomplicated appendicitis was determined by the primary surgeon, and patients who showed evidence of perforation, abscess, or gangrenous appendicitis were excluded. Patients were reviewed for demographics, comorbidities, length of stay, readmissions, and morbidity. These patients served as the historical controls.

In July 2010, an IRB-approved prospective treatment protocol was initiated for routine outpatient management after laparoscopic appendectomy for uncomplicated appendicitis. The exclusion criteria were pregnancy, age less than 18, or intraoperative findings of perforation, abscess, or gangrenous appendicitis. All patients were extensively counseled preoperatively on the plans for dismissal from the postanesthesia unit (PACU) after surgery. This group of protocol patients was separately reviewed retrospectively with regard to patient demographics, comorbidities, length of stay, readmissions, and morbidity. The protocol patients were then compared with the historical controls using chi-square analysis with a p value < 0.05 indicating statistical significance.

Protocol

All patients were identified and diagnosed with acute appendicitis with standard diagnostic methods including clinical impression and radiographic imaging. To demonstrate the full spectrum of patients with appendicitis, there were no preoperative patient exclusions based on patient age, comorbidities, or preoperative clinical impression of appendiceal rupture. If patients were found to have gangrenous or perforated appendicitis intraoperatively, they were not managed by the protocol or included for data analysis.

Arrangements were made for laparoscopic appendectomy at the next available operating time regardless of the time of presentation to the hospital. No patient was delayed until the next morning. A single dose of parenteral antibiotic was administered perioperatively. Antibiotics were not continued postoperatively without a separate clinical indication. All patients underwent laparoscopic appendectomy with a 3-trocar technique. Conversion to open appendectomy was left to the discretion of the attending surgeon. All operations were performed by the surgical resident staff with the attending surgeon's direct supervision. Trocar sites were injected with 10 mL of 0.25% bupivicane hydrochloride with epinephrine. Patients were given 30 mg of ketorolac intravenously at the end of the procedure unless they had a clinical contraindication to administration. Postoperatively, patients recovered in the PACU. They were given a full liquid diet in the PACU and instructed to advance their diet at home as tolerated. Counseling on postoperative care and restrictions was given preoperatively with a preprinted instruction sheet that also included contact information and follow-up appointments. Prescriptions for postoperative analgesia were given to family members and directions to the closest 24-hour pharmacy were provided for patients having surgery during the night. They were monitored until the following discharge criteria were met:

1. Ability to tolerate liquid intake
2. Ability to ambulate
3. Pain controlled with oral analgesics
4. Hemodynamic stability
5. Adequate respiratory effort
6. No alteration in mental status from baseline
7. Ability to urinate
8. Nausea and vomiting controlled
9. Physician approval
10. Appropriate supervision and assistance at home

Any patient with comorbidities that precluded the option of dismissal was admitted as deemed clinically necessary. In addition, selected operative interventions or complications could result in admission at the discretion of the attending surgeon and were considered failures of outpatient management. All patients were given appointments for follow-up 2 weeks postoperatively.