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Facilitating factors in same-day discharge after pediatric laparoscopic appendectomy



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ABSTRACT

Background: Appendicitis has been cited to be the most common abdominal disorder that requires acute care surgery in the pediatric population. Enhanced Recovery After Surgery protocols are multimodal perioperative care pathways designed to achieve early recovery after surgical procedures by maintaining preoperative organ function and reducing the profound stress response following surgery. Such pathways have been found to enhance quality of care for surgical patients as well as improve recovery and shorten hospital stays. The purpose of this study was to determine the key factors that facilitate same-day discharge (SDD) and early return to normal activities after laparoscopic appendectomies in children.

Methods: This is a single-center retrospective chart review of pediatric patients (<18 y old) who underwent appendectomies for acute appendicitis from January 2015 to April 2017. The patient population was divided into two groups: those with SDD and those who were discharged one or more days after surgery. SDD was defined as discharge less than 24 h of surgical admission. Patient factors, including prehospital, preoperative, perioperative, and postoperative factors, were compared and analyzed between the two groups and statistically evaluated using Fisher's exact test for categorical data and student t-test for continuous variables.

Results: Two hundred forty eight patients were found under International Classification of Diseases-9 and International Classification of Diseases-10 codes for acute appendicitis. Of these, 63 were excluded due to perforated appendicitis, nonoperative management, interval appendectomies, or misdiagnosis. The remaining 185 had laparoscopic appendectomies; 59.5% ($n = 110$) were SDDs and 40.5% ($n = 75$) stayed more than one day. No significant difference was found for time between emergency room arrival and surgical admission (5.27 versus 5.4 h; $P = .08$.) but SDD patients had a significantly shorter time between surgical admission and operation (5.8 versus 11.4 h; $P < 0.001$). SDD patients and non-SDD patients had no significant difference in rate of complications (0% versus 1.3%; $P = 0.4$). There was no significant difference in readmission rates between the two groups (2.7% versus 2.7%; $P = 1$). Total hospital charges, which indirectly reflect costs, were significantly less for SDD (\$29,195 versus \$33,703; $P < 0.001$).

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Conclusions: Surgical leadership can be effective in facilitating SDD without increasing readmission rates or complications and helps reduce hospital costs, decreases chances of nosocomial infection, and increases patient and family satisfaction.

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Introduction

Appendicitis is one of the most common abdominal surgical presentations in the pediatric population. Same-day discharge (SDD) after surgery has been found to show no significant changes in complication or readmission rates while keeping patient and family satisfaction and alleviating costs and hospital burden.¹⁻⁵ However, there are currently no standards in place for facilitated discharge after laparoscopic appendectomy for uncomplicated appendicitis. The Enhanced Recovery After Surgery protocol is a multimodal approach to alleviate surgical stress and expedite recovery and has been found to not only reduce length of hospital stay but also reduce costs, readmissions, and complications in the adult colorectal surgery patient population.^{6,7} The purpose of this study was to determine the factors involved in differentiating patients who were discharged same day as surgery *versus* those who stayed longer than one day.

Materials and methods

Patients

From January 2015 to April 2017, pediatric patients (under the age of 18 y old) who presented to the Emergency Department at our institution under International Classification of Diseases-9 and International Classification of Diseases-10 codes for acute appendicitis were considered for this retrospective study. Institutional review board approval was obtained for data collection as was a waiver of consent. All patients clinically diagnosed as having appendicitis at our facility were admitted. Patients in this study were categorized as either SDD or non-SDD only. Post-anesthesia care unit (PACU) discharges were also considered SDD.

Patients who were diagnosed with perforated appendicitis either clinically in the operating room or by pathology report were excluded. Patients who proceeded with nonoperative management or alternate procedure other than laparoscopic appendectomy or interval appendectomy at a later date were also excluded. The remaining patients were those with uncomplicated acute appendicitis treated with laparoscopic appendectomy and for the purpose of this study, then divided into two groups: those who were discharged on the same day and those discharged after greater than one day in the hospital. SDD was defined as discharge within 24 h of surgical admission. Most patients were eligible for SDD postsurgery. Medical indications for inpatient admission status included those with nausea, per os intolerance, uncontrolled pain, fever, or other surgical complications. Nonmedical indications for inpatient admission included parental reluctance for postsurgical discharge or other social issues.

Our technique for laparoscopic appendectomy uses a three-port technique and has been described elsewhere in literature.⁸ Most patients are administered one dose of antibiotic before the operation, normally Zosyn. No further post-op doses are administered unless the surgeon determines that intraoperative findings warranted doing so. Patients are monitored in the PACU and discharged home from the PACU or from the surgical floor. Patients and parents are appraised about SDD to home and its benefits during informed surgical consent.

Variables

Patient factors were compared and analyzed between the two groups. These factors include prehospital (age, gender, race, body mass index), preoperative (white blood cell count, presence of fever, number of imaging studies, family history of appendicitis), and postoperative factors (length of hospital stay). Time between emergency department (ED) arrival and consult and time between consult and operation were also compared.

Statistical analysis

The data were statistically evaluated using Fisher's exact test for categorical data and unpaired student t-test for continuous variables. A $P < 0.05$ was considered statistically significant for both statistical tests.

Results

One hundred eighty five children in total underwent laparoscopic appendectomy for noncomplicated acute appendicitis within the 28-mo period. Of these children, 59.5% ($n = 110$) were SDD and 40.5% ($n = 75$) were non-SDD (See [Tables 1 and 2](#)).

Patient demographics

The ages of patients who were SDD ranged from 4 to 17 y old with an average age of 11.9 y. Those who were not SDD ranged from 5 to 17 y old with an average age of 10.6 y ($P = 0.014$). Males were more likely to present with appendicitis and undergo surgery in general ($n = 105$, 57%, $P = 0.54$). There was no difference in gender between SDD and non-SDD patients ($P = 0.55$). Patients of minority groups (Hispanic or African-American) were more likely to stay greater than 24 h than majority (Caucasian) groups (58.7% *versus* 41.3%; $P < 0.01$).

Preoperative factors

There was no significant difference in average white blood cell count between the two groups (13.6 *versus* 14.9; $P = 0.07$) nor was there a difference in percentage of those with elevated white

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