Rectal Prolapse in the Elderly: Trends in Surgical Management and Outcomes from the American College of Surgeons National Surgical Quality Improvement Program Database

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BACKGROUND: Full thickness rectal prolapse (FTRP) is managed with an abdominal or perineal operation. Traditionally, the approach has been determined by patient age and comorbidities. Our aim was to determine operative trends and outcomes for repair of FTRP in elderly patients using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database.

STUDY DESIGN: We queried the ACS NSQIP database from 2006 to 2009 for patients with FTRP who were 70 years of age or older. Patients were grouped according to type of surgical repair: laparoscopic (LR), open (OR), or perineal (PR) technique. We reviewed demographics, operative trends of surgical technique, and short-term outcomes for each group.

RESULTS: A total of 816 patients were analyzed; 596 (73%) PR, 130 (16%) OR, and 90 (11%) LR patients. Patients who received OR and LR had lower mean American Society of Anesthesiologists (ASA) scores than PR patients (2.6, 2.5, and 2.7, respectively, p < 0.001). The percentage of LR and OR procedures decreased as age increased by decade; the inverse was seen for PR (p < 0.001). The distribution of operative techniques has not changed from year to year. Length of stay was significantly shorter for LR (3.77 days) and PR (3.44 days) patients vs OR patients (6.23 days) (p < 0.01). Complication rates were 2.22%, 8.72%, and 12.31% for LR, PR, and OR, respectively (p = 0.021). Open surgery was the only factor associated with an increased complication rate, with an odds ratio of 6.29 (95% CI 1.38 to 28.6, p < 0.02).

CONCLUSIONS: Despite the appeal of perineal proctectomy in the elderly and debilitated patient, the approach to FTRP is slowly evolving in the era of laparoscopic surgery. Laparoscopic repair of FTRP in the elderly is associated with improved short-term outcomes when compared with OR and PR.

There are a number of procedures described for the repair of full thickness rectal prolapse (FTRP), all of which fall into 1 of 2 categories: an abdominal repair or a perineal repair. Surgical training, patient age, American Society of Anesthesiologists (ASA) score, and history of previous pelvic surgery have influenced the approach to repair in the past, with age and ASA score being a focus in the literature. Various studies have shown the safety and efficacy of a perineal approach in elderly patients, especially if the patient is debilitated. These studies support the use of this approach in a cohort of patients who may not tolerate an abdominal operation, thereby optimizing short-term outcomes. However, studies have shown a significantly higher recurrence rate in the perineal approach when compared with abdominal repairs.

The application of minimally invasive laparoscopic techniques to colorectal surgery have improved outcomes, with a significant reduction in postoperative length of hospital stay (LOS), return of bowel function, complication rate, and postoperative pain when compared with open surgery.
roscopic techniques have been applied to abdominal repairs of FTRP in elderly patients. Little is known about the penetration of laparoscopic colorectal surgery in patients with FTRP, and more specifically, in elderly patients who commonly suffer from this pelvic disorder.

The purpose of this study was to determine the trends in operative repair of FTRP in the elderly using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database, and to compare the short-term outcomes of laparoscopic repair (LR), open repair (OR), and perineal proctectomy (PR) in this cohort of patients.

**METHODS**

The ACS-NSQIP is a nationally validated, risk-adjusted, outcomes-based program intended to measure and improve the quality of surgical care by collecting data on preoperative, intraoperative, and postoperative variables and outcomes for patients undergoing major surgical procedures. With approval from the institutional review board at Scott and White Hospital, we used the ACS-NSQIP Participant Use Data Files from 2006 through 2009 for this study.

We identified patients 70 years of age and older with the International Classification of Diseases, Ninth Revision code for rectal prolapse, 569.1. We then grouped all patients undergoing repair by the Current Procedural Terminology (CPT) codes 45402 and 45400 for laparoscopic rectopexy with or without sigmoid colectomy (OR), and 45130 for perineal proctectomy (PR). Outcomes studied included type of anesthesia used, operative time, estimated blood loss, length of stay, reoperation within 30 days, superficial wound infections, deep incisional surgical site infection, organ/space infection, wound disruption, pneumonia, unplanned reintubation, pulmonary embolism, on ventilator for more than 48 hours, urinary tract infection, stroke/cerebral vascular accident, cardiac arrest requiring CPR, myocardial infarction, bleeding requiring transfusion, deep vein thrombosis and thrombophlebitis, sepsis, and death. Patients with incomplete data were excluded. Recurrence rates for rectal prolapse are not collected in this database so this variable has not been included for analysis. The trends of operative techniques were analyzed year to year and according to age by decade.

Continuous variables (age, height, weight, body mass index, ASA score) were compared between the 3 groups using ANOVA test and the distribution of discrete variables (operative year, sex, anesthesia type, presence of any comorbidity, presence of individual comorbidities, LOS, complications, anesthesia, and operative times) were compared using the Fisher exact test. A logistic regression model was built for predicting occurrence of any complication. The covariates included were sex, race, operation type, age, height, weight, presence of any comorbidity, and ASA score. All of the statistical analyses were carried out using the R statistical package (R, Developmental, Core, 204 Team, R: A Language and Environment for Statistical Computing 2009, http://www.R-project.org). Statistically significant data are defined as having a p value less than 0.05.

**RESULTS**

**Demographics**

Our search revealed 816 patients 70 years of age and older who met inclusion criteria. Of these, 782 patients were female, and 34 were male, with a female: male ratio of 23: 1. For each calendar year the numbers of patients found were 91 (2006), 165 (2007), 258 (2008), and 302 (2009). The mean age was 82 years (SD = 5.98 years); 265 (32.5%) were 70 to 79 years old, 428 (52.5%) were 80 to 89 years old, and 123 (15%) were 90+ years old.

As shown in Table 1, there were 90 (11%) patients in the PR group, 129 (16%) in the OR group, and 596 (73%) in the LR group. No statistically significant difference was seen in height, weight, or body mass index between the 3 groups. As shown in Table 1, no difference was found in ASA score between the OR and LR groups; however, the PR group had a significantly higher ASA score distribution (p < 0.001).

At total of 363 patients suffered from 1 or more medical comorbidity. The most common comorbidities are shown in Table 1, and there was no significant difference in rates between the 3 groups.

**Trends of operations**

Next, we examined the trends in operative repair. The distribution of operations did not vary significantly from year to year (Fig. 1). The majority of patients (68.4% to 78.02%) had a perineal proctectomy followed by open rectopexy with or without resection (13.25% to 20.61%), with laparoscopic rectopexy with or without resection being the least common procedure (5.49% to 13.25%). There is a trend, however, of
increasing percentage of LR over this time frame. Examining patients by age in decades (70 to 79, 80 to 89, and 90 years and older), we noticed a significant trend in the type of surgical repair performed (Fig. 2). The percentage of laparoscopic cases decreased with decade (15.85%, 9.58%, and 5.69%, respectively). Open repair followed this similar trend (25.66%, 12.58%, and 5.69%, respectively). The percentage of patients undergoing perineal repair increased as age increased (58.5%, 77.6%, and 88.62%, respectively).

Intraoperative outcomes
As shown in Table 2, general anesthesia was most common in all groups analyzed. Although 95.56% of the laparoscopic operations and 97.70% of the open operations used general anesthesia, only 83.56% of perineal operations used this modality. Perineal repair patients had a higher percentage of spinal anesthesia, regional anesthetics, or monitored anesthesia care compared with OR and LR (p < 0.001). Overall, mean operative time for all patients was 96.22 minutes (SD = 49.02 minutes). However, the mean operative time for the PR group was 84.9 ± 37.3 minutes, and was significantly shorter than both LR and OR by 40 to 50 minutes (p < 0.001).

Postoperative outcomes
Mean LOS in days was similar for the LR (3.77 ± 2.20) and PR (3.44 ± 3.93) groups, and both were significantly
shorter than the OR group by more than 2 days (p = 0.01) (Table 3). Although the PR and LR groups had similar LOS, both were significantly shorter when compared with OR (p < 0.01). The overall mortality rate was 1.7% (n = 14) for the study, and there was no significant difference seen in mortality between the 3 groups.

The overall complication rate was 8.6% for the entire study, with the most common complications being sepsis (1.5%), urinary tract infection (3.2%), and pneumonia (1.8%). A significant difference in overall complication rate was seen between the 3 groups, with the LR group having the lowest complication rate of 2.22% followed by the PR group at 8.72% and finally the OR group with a rate of 12.31% (p = 0.021). Open repair patients had a higher superficial wound infection rate, at 3.85%, when compared with LR (1.11%) and PR (0.33%) patients.

We built a logistic regression model for the occurrence of complication, with the covariates of sex, race, OR vs PR vs LR, height, and weight. This model has the effect of stratifying or evening out the risk factors. The only significant factor for the occurrence of a complication was open surgery, with an odds ratio of 6.29 (95% CI 1.38 to 28.6, p < 0.05).

**DISCUSSION**

Laparoscopy is being used with increasing frequency for the treatment of various diseases affecting the colon and rectum.20 The improved short-term outcomes associated with minimally invasive surgery have contributed to this trend and studies supporting this approach for rectal prolapse repair are increasing in number. A recent meta-analysis of open vs laparoscopic repair of FTRP has shown comparable morbidity and recurrence rates, with a significant decrease in length of stay with a minimally invasive abdominal approach.15

Elderly women are the most common cohort of patients diagnosed with FTRP. Despite advanced age and multiple comorbidities, the majority of these patients undergo general anesthesia no matter which approach is undertaken. We and others have clearly shown that outcomes favor laparoscopic surgery compared with open surgery for FTRP.17 The lower complication rate and

| Variable                  | LR          | OR          | PR          | p Value 
|---------------------------|-------------|-------------|-------------|---------
| Anesthesia, n (%)         |             |             |             | <0.001  
| General                   | 86 (95.56)  | 127 (97.70) | 498 (83.56) |         
| Spinal                    | 3 (3.33)    | 2 (1.54)    | 58 (9.73)   |         
| Regional                  | 0 (0)       | 0 (0)       | 11 (1.85)   |         
| Monitored                 | 0 (0)       | 0 (0)       | 27 (4.53)   |         
| Epidural                  | 0 (0)       | 1 (0.77)    | 1 (0.17)    |         
| Local                     | 0 (0)       | 0 (0)       | 1 (0.17)    |         
| Other                     | 1 (1.11)    | 0 (0)       | 0 (0)       |         
| Operative time, min, mean (SD) | 133.23 (59.76) | 122.33 (63.67) | 84.94 (37.35) | <0.001  

LR, laparoscopic repair; OR, open repair; PR, perineal repair.
LOS compared with OR suggests this approach should be considered if the surgeon is experienced in laparoscopic techniques. These outcomes for LR, furthermore, are comparable and slightly better when compared with PR in the elderly based on the presented data.

The most important outcomes variables for FTRP repair are recurrence rates, improvement in fecal incontinence or constipation, and quality of life. One limitation of our study is the lack of these data, which are not collected in the NSQIP database currently. Because of this limitation, larger, multicenter trials are needed to elucidate the benefit of LR compared with PR in the elderly in regard to postoperative function.

The reported recurrence rate for PR of FTRP ranges from 0% to 18%, with mean follow-up of 17 to 47 months.16,17,21-25 This rate is no different than that reported after abdominal repair (range from 0% to 15%), with a mean follow-up of 16 to 49 months.7,8,15,26 Purkayastha and colleagues15 reported the outcomes of laparoscopic vs open abdominal rectopexy in a meta-analysis of randomized and nonrandomized comparative studies. They showed no significant difference in the recurrence rate between laparoscopic and open repair (odds ratio, 0.94; 95% CI, 0.26 to 3.44; chi-square = 0.66; p = 0.72) with a mean follow-up ranging from 12 to 31 months. Up to now, the literature has suggested that functional outcomes are equivalent but the data are overall poor.

Despite numerous studies supporting the use of laparoscopic surgery for the repair of FTRP, our study shows the trends of operative repair in the United States have not changed over the 4-year period of 2006 to 2009 for elderly patients. Perineal proctectomy remains the most common procedure performed for the repair of FTRP in patients over 70 years of age, and is followed in frequency by open repair and last, laparoscopic repair. There is a trend toward increasing numbers of laparoscopic procedures for FTRP during this time frame, however. Interestingly, there is a significant difference in the approach based on age by decades. The rate of perineal proctectomy increases as age increases, while open and laparoscopic repairs decrease. One limitation to these observations is the assumption that the ACS NSQIP database is an adequate sampling of surgeons’ outcomes and approach nationally. Although we cannot say these results are from a random sampling of surgeons nationally, we can draw some meaningful conclusions from this large, nationally recognized dataset. Another limitation is the possible exclusion of cases that may have used CPT codes for anterior resections rather than the aforementioned codes used in this study. These cases may affect the results described here, but their exclusion ensured a more precise cohort of patients.

CONCLUSIONS

Despite growing data supporting the use of LR for the management of FTRP in the elderly, there has been no paradigm shift in the way this cohort of patients has been managed recently. The laparoscopic approach should be considered in elderly patients with FTRP.

Author Contributions

Study conception and design: Clark
Acquisition of data: Clark, Jupiter
Analysis and interpretation of data: Clark, Jupiter, Papaconstantinou
Drafting of manuscript: Clark
Critical revision: Jupiter, Thomas, Papaconstantinou

REFERENCES


Table 3. Comparison of Postoperative Outcomes

<table>
<thead>
<tr>
<th>Variable</th>
<th>LR</th>
<th>OR</th>
<th>PR</th>
<th>p Value</th>
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<tr>
<td>Complications, %</td>
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<td></td>
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<tr>
<td>Superficial wound infection</td>
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<td>Myocardial infarction</td>
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<td>0.34</td>
<td>1</td>
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<tr>
<td>Urinary tract infection</td>
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<td>3.85</td>
<td>3.36</td>
<td>0.52</td>
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<tr>
<td>Sepsis</td>
<td>0.021</td>
<td>3.08</td>
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<td>Cardiac arrest</td>
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<td>0.77</td>
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<tr>
<td>Overall complications, %</td>
<td>2.22</td>
<td>12.31</td>
<td>8.72</td>
<td>0.021</td>
</tr>
<tr>
<td>Mortality, %</td>
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<td>2.01</td>
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<tr>
<td>Length of stay, d, mean (SD)</td>
<td>3.77 (2.2)</td>
<td>6.23 (4.76)</td>
<td>3.44 (3.93)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

LR, laparoscopic abdominal repair; OR, open abdominal repair; PR, perineal repair.


