
Paracolostomy Hernia Repair: Who and When?

Zachary A Gregg, MD, Haisar E Dao, MD, Steven Schechter, MD, FACS, Nishit Shah, MD

- BACKGROUND:** Paracolostomy hernia repair (PHR) can be a challenging procedure associated with significant morbidity and high recurrence rates. We sought to analyze the complication rate and 30-day mortality among patients undergoing PHR.
- STUDY DESIGN:** This is a retrospective analysis of patients with PHR, based on Current Procedural Terminology code 44346, using the NSQIP database from 2005 to 2008. Univariate analysis of 30-day outcomes after both emergent and nonemergent PHR in patients greater than or less than 70 years old was completed.
- RESULTS:** There were 519 patients who underwent PHR (mean age, 63.9 years old, female, 55.9%). Emergency PHR, performed in 59 patients (11.4%), was associated with increased rates of organ space surgical site infection (SSI) (8.5% vs 0.9%, $p = 0.0014$), pneumonia (18.6% vs 2.6%, $p \leq 0.0001$), septic shock (13.6% vs 2.6%, $p = 0.0007$), total morbidity (50.8% vs 2.6%, $p \leq 0.0001$), and death (10.2% vs 0.9%; $p = 0.0002$). In patients older than 70 years, emergent PHR amplified these differences: organ space SSI (13.8% vs 1.2%, $p = 0.0054$); pneumonia (27.6% vs 3.7%; $p = 0.0002$), septic shock (17.2% vs 4.3%; $p = 0.02$), and mortality (20.7% vs 1.9%; $p = 0.0005$).
- CONCLUSIONS:** This study revealed that most PHRs are performed electively. Although elective repair remains a relatively safe procedure, even in the elderly, emergency PHR is associated with increased morbidity, especially pulmonary and septic complications, and higher mortality. These results are amplified among patients older than 70 years undergoing emergent repair. These findings suggest that greater consideration should be given to elective repair of paracolostomy hernias in the elderly because emergency repair is associated with considerable risk and worse outcomes. (J Am Coll Surg 2014;218:1105–1112. © 2014 by the American College of Surgeons)
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Paracolostomy hernia (PH) is a common complication of colostomy formation and can be challenging to manage. The reported incidence of PH varies considerably, from 1% to 56% depending on definition, and it carries an average overall incidence of 15%.¹ The incidence has been shown to increase with length of follow-up, leading some to believe that most patients develop a PH with time.² Risk factors predisposing a patient to develop a PH include female sex, increasing age, malnutrition, steroid use, increased intra-abdominal pressure, wound infection, connective tissue disorder, size of trephine, stoma location, and emergency creation.^{3–6} Paracolostomy hernia

has been defined by examination findings of either a fascial defect or a palpable mass, with or without a cough impulse, and more recently by radiologic findings like CT scan.^{7,8} A range of morbidities from PH can be seen, from mild discomfort or pain, cosmesis, and a poorly fitting stoma appliance to the life-threatening complications of incarceration, obstruction, and strangulation.

The literature provides little guidance on the optimal timing of repair for PH. Strangulation and obstruction are absolute indications for operative intervention. Although recurrent pain and/or cosmesis are relative indications for repair, conservative management remains the recommendation for most patients.¹ Given the aging population and the lack of information on the morbidity and mortality of both elective and emergency paracolostomy hernia repair (PHR), the aim of our study was to understand the role age and emergent repair have in the short-term outcomes of PHR.

METHODS

The American College of Surgeons (ACS) NSQIP database is a validated and risk adjusted national database of more than 250 participating hospitals, which is used

Disclosure Information: Dr Schechter received honoraria from Salix Pharmaceuticals, Inc and Cubist Pharmaceuticals. All other authors have nothing to disclose.

Presented at the New England Surgical Society 94th Annual Meeting, Hartford, CT, September 2013.

Received November 6, 2013; Revised January 16, 2014; Accepted January 16, 2014.

From the Division of Colorectal Surgery, Department of Surgery, The Warren Alpert Medical School of Brown University, Providence, RI.

Correspondence address: Zachary A Gregg, MD, Department of Surgery, APC building, 4th floor, 593 Eddy St, Providence, RI 02903. email: zgregg@lifespan.org

Abbreviations and Acronyms

BMI = body mass index

PH = paracolostomy hernia

PHR = paracolostomy hernia repair

SSI = surgical site infection

to measure and report on outcomes with the goal of improving quality. Data collection is done by specifically trained surgical clinical reviewers at each institution, and they are responsible for inputting all variables that are predefined by NSQIP. This is a retrospective review using the NSQIP Participant Use Data File (PUF) from 2005 to 2008. Approval from the Institutional Review Board was not required.

We analyzed the results of all adult patients (>18 years old) who had undergone PHR based on Current Procedural Terminology (CPT) code for revision of colostomy with repair of paracolostomy hernia (44346). The primary endpoint of this study was 30-day mortality. Secondary endpoints included operative time, surgical length of stay (LOS), surgical site infection (SSI), pulmonary complications (pneumonia, reintubation, and failure to wean from a ventilator), urinary tract infection, sepsis, and septic shock.

Demographics and preoperative variables that have been suggested to be risk factors for PH (body mass index [BMI], diabetes, steroids) were collected along with variables that may be associated with postoperative complications.

Categorical data were presented in absolute number and percentage of cohort and continuous variables were stated as their mean. Fisher's exact test or chi-square was used to compare categorical data, and a Student's *t*-test was used to compare continuous variables. A *p* value <0.05 was considered statistically significant. All statistical analyses were performed using GraphPad statistical software (GraphPad Software, Inc).

RESULTS

During the study period, the NSQIP database captured 519 patients who had undergone a PHR. Ages ranged from 22 to 90 years old, with an average age of 63.9 years old; 290 (55.9%) were female; 436 (84.1%) were white; and 161 (36.6%) were 70 years or older. These patients were then analyzed based on age greater than or less than 70 years old and emergency status of the operation.

In the elderly cohort (>70 years old) there were 190 patients; these were predominantly male (51% vs 40%, *p* = 0.022), had a higher American Society of Anesthesiologists (ASA) score (2.83 vs 2.59, *p* ≤ 0.0001), were less likely to be smokers (5.3% vs 22.2%, *p* ≤ 0.0001), had a

lower BMI (27.6 kg/m² vs 31.6 kg/m², *p* ≤ 0.0001), and had shorter operative times (127 vs 156 minutes, *p* = 0.0003) (Table 1). Though the elderly were more likely to have had an emergency repair (15.3% vs 9.1%, *p* = 0.0438), incidence of SSI were lower (superficial SSI 6.8% vs 14.6%, *p* = 0.0104). However, the elderly group experienced more pulmonary complications, with both higher rates of reintubation (7.4% vs 1.5%, *p* = 0.0011) and pneumonia (7.4% vs 2.7%, *p* = 0.0245), and this group had higher rates of septic shock (6.3% vs 2.4%, *p* = 0.0333) and mortality (4.7% vs 0.3%, *p* = 0.0009).

Emergent PHR was compared with nonemergent repair, and the 2 groups were well matched for age, sex, and race, along with hernia risk factors (BMI, diabetes, steroids) and functional status (Table 2). Preoperatively, those requiring emergent repair had higher rates of both systemic inflammatory response syndrome (SIRS) (20.3% vs 3.5%, *p* ≤ 0.0001) and sepsis (5% vs 0.7%, *p* = 0.0218). Emergency PHR was also associated with higher rates of SSI (organ space SSI 8.5% vs 0.9%, *p* = 0.0014) and pulmonary complications: reintubation (15.3% vs 2.2%, *p* ≤ 0.0001), >48-hour ventilator requirement (20.3% vs 1.1%, *p* ≤ 0.0001), and pneumonia (18.6% vs 2.6%, *p* ≤ 0.0001), along with a higher incidence of septic shock (13.6% vs 2.6%, *p* = 0.0007), total morbidity (50.8% vs 24.1%, *p* ≤ 0.0001), and death (10.2% vs 0.9%, *p* = 0.0002).

Pulmonary complications, the incidence of septic shock, and death were higher in both the emergency PHR and elderly groups; therefore, subset analysis was completed. We first examined the impact of age on patients undergoing emergency repair (age greater than or less than 70 years old) (Table 3). Again, the groups were well matched for sex, race, hernia risk factors, and functional status. Additionally, they had statistically similar ASA scores and preoperative rates of SIRS or sepsis. The elderly patients had a lower BMI (25 kg/m² vs 34 kg/m², *p* = 0.0003) and shorter operative times (130 minutes vs 180 minutes, *p* = 0.0181). Although there was no difference in complications between the emergency PHR in young and old, all of the deaths seen were in the elderly (20.7% vs 0%, *p* = 0.0105).

In order to better understand the outcomes of operating on the elderly in this setting, we then compared the results of emergency surgery vs nonemergency operations in all patients older than 70 years. The emergency elderly group had a higher ASA score and an increased rate of preoperative SIRS compared with their nonemergent counterparts (Table 4). Furthermore, postoperatively, this emergency group experienced increased

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