

Parastomal Hernia Repair Outcomes: A Nine-Year Experience

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Parastomal hernias (PHs) frequently complicate enterostomy creation. Decision for PH repair (PHR) is driven by patient symptoms due to the frequency of complications and recurrences. The **European Hernia Society (EHS) PH** classification is based on the PH defect size and the presence/absence of concomitant incisional hernia. The aim of this study was to evaluate PHR outcomes based on EHS classification. An Institutional Review Board–approved retrospective review of a prospective database between 2009 and 2017 was performed. Patient demographics, enterostomy type, EHS classification, operative technique, and clinical outcomes (postoperative complications, 30-day readmission, and PH recurrence) were obtained. Cases were analyzed by EHS classifications I and II (SmallPH) versus III and IV (LargePH). Sixty-two patients underwent PHR (35: SmallPH, 27: LargePH). Patient groups (SmallPH vs LargePH) were similar based on American Society of Anesthesiologists Class III and obesity. Hernia recurrence was seen in 26 per cent of repairs with no difference between groups. The median recurrence-free survival was 3.9 years. There was no difference in superficial SSI, deep SSI, nonwound complications, or readmission between SmallPH and LargePH. Both small and large PHs experience similar outcomes after repair. Strategies to improve outcomes should be developed and implemented universally across all EHS PH classes.

THE CREATION OF enterostomy (ileostomy, colostomy, and ileal conduit) is associated with significant morbidity and mortality.¹ Parastomal hernias (PHs) are among the most common complications after the creation of an enterostomy of any type,^{2–5} with the majority occurring within five years of the original operation.^{6–7} PHs can significantly decrease the quality of life by causing a wide range of symptoms, including pain, leakage, obstruction, incarceration, strangulation, and perforation.^{3, 6, 7} Conservative management of PHs is preferred for asymptomatic patients; however, surgical management is indicated in cases in which obstruction, incarceration, or strangulation occurs and in cases in which symptoms greatly interfere with the quality of life. As PH repair (PHR) is associated with high rates of complication and recurrence,^{8, 9} the decision for PHR is predicated on patient symptoms.

The European Hernia Society (EHS) has classified PHs based on the hernia defect size and the presence or absence of a concomitant incisional hernia (cIH).¹⁰

The classification divides PH into four types. Type I includes PH ≤ 5 cm without cIH, Type II includes PH ≤ 5 cm with cIH, Type III includes PH > 5 cm without cIH, and Type IV includes PH > 5 cm with cIH.¹⁰ The EHS classification of PH allows for the comparison of treatment outcomes between different subgroups. It is presently unknown whether there is any difference in the PHR outcome between PHs of different EHS types or whether the EHS classification can be used to guide differences in treatment. The aim of this present study was to evaluate the outcomes of PHR at a single institution over nearly a decade based on EHS classification.

Materials and Methods

An Institutional Review Board–approved retrospective review of a single-surgeon prospective database of PHR between 2009 and 2017 was performed. Surgical databases were reviewed to identify all patients who underwent PHR during the time frame. Patient demographics and comorbidity status, enterostomy type, EHS PH type, operative technique, and clinical outcomes were obtained via review of electronic medical records. Postoperative outcomes studied included postoperative surgical site occurrence and

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infection, nonwound complications, unplanned reoperation, 30-day hospital readmission, and PH recurrence and reoperation. Cases were analyzed based on hernia size as per EHS classification: Types I and II (SmallPH) *versus* Types III and IV (LargePH). Perioperative characteristics and clinical outcomes were compared between groups using chi-squared, Fisher's exact, or Mann-Whitney U test, as appropriate.

Results

Sixty-two patients underwent PHR during the time period described. The cases were categorized by EHS type. Sixteen cases were Type I, 19 were Type II, 10 were Type III, and 17 were Type IV. Types I and II were grouped together as SmallPH as they represent hernia sizes less than 5 cm, and Types III and IV were grouped together as LargePH. There were 35 patients in the SmallPH group and 27 in the LargePH group. SmallPH and LargePH groups were similar in age, American Society of Anesthesiologists Class III, diabetes, cancer, and obesity (Table 1).

CDC wound class other than Class 1 was greater among LargePH than SmallPH (64% *vs* 50%, $P = 0.04$). Operative duration ≥ 241 minutes was similar between groups (41% *vs* 26%, $P = 0.337$); similar proportions of patients in each group (LargePH *vs* SmallPH) underwent open *versus* laparoscopic hernia repair (52% *vs* 57%, $P = 0.798$) and underwent colostomy *versus* urinary diversion (54% *vs* 74%, $P = 0.123$). Additional comparisons of operative factors between groups are presented in Table 2.

Forty per cent of patients experienced wound complications postoperatively with seroma/hematoma and superficial SSI being the most common occurrences (See Table 3.). There was no difference in superficial SSI (11% *vs* 33%, $P = 0.058$), deep SSI (14% *vs* 15%, $P = 1.000$), nonwound complications (43% *vs* 44%,

$P = 1.0$), unplanned return to OR (3% *vs* 11%, $P = 0.309$), or 30 days readmission (14% *vs* 22%, $P = 0.510$) between SmallPH and LargePH, respectively. The median hospital length of stay across all cases was five days (IQR: 3, 9), whereas the length of stay varied between SmallPH and LargePH (4 *vs* 7 days, $P = 0.086$), respectively.

Hernia recurrence was seen in 26 per cent of repairs overall with no difference in recurrence between LargePH and SmallPH. At one year postoperatively, the cumulative percentage of patients without recurrence was 94 per cent \pm SE 3 per cent and was 63 per cent \pm 8 per cent after three years (Fig. 1). There was no significant difference in hernia recurrence rates between LargePH and SmallPH (Wilcoxon $P = 0.972$) nor when comparing colostomy and urostomy (Wilcoxon $P = 0.684$).

Discussion

Parastomal hernias are a common complication after the creation of all enterostomies, including end ileostomy, end colostomy, loop ileostomy, loop colostomy, and ileal conduit.^{3-5, 11-13} Because of the high frequency in which PHs occur, the management is generally conservative until patients' experience symptoms. Furthermore, PHR is reported to have high recurrence rates.^{2, 6, 8} When feasible, stoma reversal is the preferred method for repairing a PH, although many enterostomies are permanent, limiting treatment strategies to observation or PHR. Patients may experience a myriad of symptoms from their PHs, including pain, bowel obstruction, cosmetic deformity, skin changes, and difficulties in managing stoma appliances. Once symptoms have developed, operative management is generally required.

Surgical strategies for the treatment of a PH in which the stoma may not be reversed are numerous. The ideal

TABLE 1. Comparison of Preoperative Patient Characteristics by EHS Classes I–II *vs* III–IV

	EHS I–II	EHS III–IV	Total	P-Value
No of patients (%)	56%	44%	62	
Age, years (SD)	59 (13)	62 (13)	61 (13)	0.444
Males	51%	30%	42%	0.120
BMI > 30 kg/m ² (obese)	63%	67%	65%	0.795
American Society of Anesthesiologists class				0.724
2	23%	15%	19%	
3	74%	81%	77%	
4	3%	4%	3%	
Active smokers	9%	22%	15%	0.160
Diabetic	20%	37%	27%	0.160
HTN	63%	67%	65%	0.795
Asthma	9%	15%	11%	0.689
COPD	17%	30%	23%	0.359
CAD	23%	33%	27%	0.401
Cancer	77%	52%	66%	0.058

HTN, hypertension; CAD, coronary artery disease.

TABLE 2. Comparison of Operative Factors between EHS Classes I–II vs III–IV

	EHS I–II	EHS III–IV	Total	P-Value
No of patients	35 (56%)	27 (44%)	62	
% Open vs laparoscopic	57%	52%	55%	0.798
With ventral incisional hernia	54%	59%	57%	0.798
Colonic ostomy vs urinary diversion	54%	74%	63%	0.123
Any concomitant	37%	48%	42%	0.443
No of previous PHRs				0.564
0	57%	59%	58%	
1	29%	22%	26%	
2+	14%	19%	16%	
Previous infected mesh	9%	7%	8%	1.000
Open abdominal wound preop	3%	19%	10%	0.077
Previous abdominal wall infection	12%	7%	10%	0.685
Duration of operation				0.337
≤180 minutes	37%	22%	31%	
181–240 minutes	37%	37%	37%	
241+ minutes	26%	41%	32%	
Wound class				0.040
1	50%	36%	44%	
2	32%	20%	27%	
3	9%	40%	22%	
4	9%	4%	7%	
Resiting of ostomy	11%	30%	19%	0.106
Component separation	43%	41%	42%	1.000
Mesh type				0.327
Synthetic	57%	48%	53%	
Biologic	17%	33%	24%	
Bioresorbable	26%	19%	23%	

TABLE 3. Comparison of Postoperative Complications between EHS Classes I–II vs III–IV

	EHS I–II	EHS III–IV	Total	P-Value
No of patients	35 (56%)	27 (44%)	62	
Median LOS (IQR)	4 (3–7)	7 (3–11)	5 (3–9)	0.086
Wound complication	40%	41%	40%	1.000
Seroma/hematoma	26%	15%	21%	0.358
Superficial SSI	11%	33%	21%	0.058
Deep SSI	14%	15%	15%	1.000
Dehiscence	20%	11%	16%	0.491
Nonwound complication	43%	44%	44%	1.000
Return to OR within 30 days	3%	11%	7%	0.309
Readmission within 30 days	14%	22%	18%	0.510

LOS, length of stay; OR, operating room.

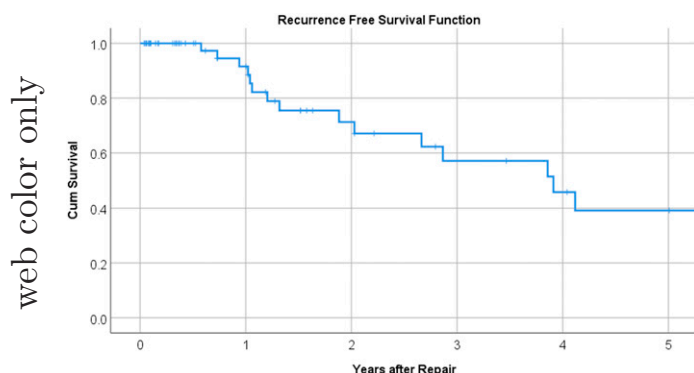


FIG. 1. Patients without hernia recurrence over five years.

repair strategy remains to be elucidated in light of the many repair techniques available, which include stoma relocation, suture-based repair, and laparoscopic and

open mesh repairs. Among repair types, each has unique advantages and drawbacks, but the repair choice is often based on surgeon preference or experience.^{14, 15} Furthermore, it is unclear whether PH defect size is a risk factor for hernia repair outcomes. Because of the heterogeneity of PH characteristics based on the size of the defect and the presence or absence of a concomitant midline incisional hernia, the EHS classification may provide a method to help set expectations for hernia repair outcomes based on unique characteristics.

The goal of this study was to assess PHR outcomes based on EHS classification at a single institution over a nine-year period of time. Although this study represents one of the larger reported series of PHRs, the relatively small number of patients prompted us to coalesce EHS groups into small and large sizes for

comparison purposes, with the small group inclusive of all PHs less than 5 cm in size. The groups were well matched with regard to preoperative characteristics, suggesting that both groups may experience similar outcomes. Interestingly, there were no detectable differences in outcomes between small and large PHRs. The incidence of laparoscopic repair was similar between groups, thus minimizing the likelihood of a bias toward performing laparoscopic repair in either group. Nevertheless, in a retrospective study of this nature, selection bias must be acknowledged as a possible factor influencing outcomes.

In the present study, PHR was associated with high rates of complication and recurrence. Surgical site events occurred in approximately 40 per cent of patients. Although not statistically significant, there was a notable difference in superficial surgical site infections between small and large PHs. We believe that the greater subcutaneous dissection associated with larger PHs, with the potential for contamination associated with the presence of a stoma, may be responsible for this trend, although a larger population would be required to test this hypothesis. As this study represents the experience of a tertiary care referral center over nine years, we feel a multicenter study would likely be required to further test this hypothesis.

The incidence of hernia recurrence did not differ between small and large PHRs in this study, although recurrence rates were disappointing after three years of follow-up. Although the early recurrence rate of 6 per cent was promising, with longer term follow-up, the recurrence rate exceeded 30 per cent. In light of the high incidence of later recurrences, longer term follow-up should be considered after repair. However, our practice is to only offer re-repair among patients who have become symptomatic.

The EHS classification for PH provides a method for stratifying patients based on defect size and the presence or absence of a midline hernia. However, in this study, the size of the parastomal defect was not predictive of outcomes. Although some may interpret this outcome to suggest the relatively poor outcomes among small PHRs, we also infer the lack of inferior outcomes among patients undergoing repair of large PHs.

Conclusions

Postoperative complications and hernia recurrence are not uncommon after PHR. Based on EHS

classification, both small and large PHs experienced similar outcomes after repair. In light of the similar outcomes between small and large PHRs, strategies to improve outcomes should be developed and implemented universally across all EHS PH types. Unquestionably, further studies are required to further delineate ideal strategies for PHR in an effort to reduce both complications and recurrences.

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