

ORIGINAL ARTICLE

Computed tomography classification for parastomal hernia

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Purpose: The aim of this study was to investigate the clinical and radiological incidence of parastomal hernia. **Methods:** We reviewed, retrospectively, 83 patients with end colostomy operated on from January 2003 to June 2009 at Ajou University hospital. Age, sex, surgical procedure type, body mass index (weight/length²), stoma size, and respiratory co-morbidity were documented. We compared the incidence of radiological and clinical parastomal hernia. **Results:** There were 47 males (56.6%) and 36 females (43.4%). During an overall median follow-up of 30 months (range, 6 to 45 months), 24 patients (28.9%) developed a radiological parastomal hernia postoperatively and 20 patients (24.1%) presented clinical symptoms. Using computed tomography (CT) classification, the groups were as follows: type 0 (40, 48.2%), type Ia (19, 22.9%), type Ib (8, 9.6%), type II (4, 4.8%) and type III (12, 14.5%), with 63 asymptomatic patients and 20 symptomatic patients. The aperture size was significantly different between symptomatic and asymptomatic patients (76.45 mm vs. 49.41 mm; $P = 0.000$). There was a significant correlation between aperture size and the radiological type ($P = 0.003$). **Conclusion:** This study showed the incidence of radiological parastomal hernia is acceptable compared to previous studies. CT classification may be useful to evaluate parastomal hernia.

Key Words: Parastomal hernia, Computed tomography, End colostomy

INTRODUCTION

Parastomal hernia is defined as the protrusion of abdominal contents through an abdominal wall defect in the vicinity of the stoma [1]. Factors contributing to development of a parastomal hernia include obesity [2-4], chronic obstructive airway disease [2,4], ascites [4], site of stoma placement [5], and size of the fascial opening [6]. Incidence reported in the literature ranges from 10% to 56% for end colostomies [7]. These studies have been conducted as retrospective reviews of the clinical notes. As a result, asymp-

tomatic parastomal hernias may not have been detected [8]. A recent study reported an incidence of parastomal hernia in up to 78% detected either clinically or by computed tomography (CT) [9]. However, reports investigating CT classification are lacking.

The aim of this study was to investigate the clinical and radiological incidence of parastomal hernia and the correlation between them.

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METHODS

We retrospectively reviewed 83 patients with end colostomy who underwent surgery from January 2003 to June 2009 at Ajou University hospital. Age, sex, surgical procedure type, body mass index (BMI, weight/length²), stoma size, and respiratory co-morbidity were documented.

The stoma was marked preoperatively by an experienced stoma nurse. All colostomies were intraperitoneal or extraperitoneal with fixation to the fascia.

The median follow up period was 30 months (range, 6 to 45 months). CT scans were performed routinely 6 or 12 months postoperatively and thereafter every 12 months during the postoperative follow-up period. CT scans were examined for parastomal hernia by a single radiologist. Clinical information was not given to the radiologist. Careful examination of the CT revealed patterns regarding the content and size of the hernial sac, which were used as the basis of the classification system [10]. Parastomal hernias were divided into three groups, depending on the contents of the hernia sac revealed by abdominal CT and on the relationship between the sac and the bowel forming the stoma. In type I, the hernia sac contained the bowel forming the stoma; this group was further divided into type Ia (diameter of the sac < 5 cm) and type Ib (diameter of the sac > 5 cm). Type II contained omentum inside the hernia sac, together with the bowel forming the stoma. Type III contained an intestinal loop other than that forming the stoma. Cases in which the peritoneum followed the wall and then the bowel forming the stoma were considered normal (Table 1). Types Ib, II, and III were considered true parastomal hernias. We compared the incidence of radiological and clinical parastomal hernia.

Table 1. Radiological classification by abdominal computed tomography

Type	Content of hernia sac
0	Peritoneum follows the wall of the bowel forming the stoma, with no formation of a sac
Ia	Bowel forming the colostomy with a sac < 5 cm
Ib	Bowel forming the colostomy with a sac > 5 cm
II	Sac containing omentum
III	Intestinal loop other than the bowel forming the stoma

The SPSS ver. 15.0 (SPSS Inc., Chicago, IL, USA) software package was used for the analysis. Differences between groups were assessed by the Student's t-test and analysis of variance test for continuous data. $P < 0.05$ was considered statistically significant

RESULTS

The study included 83 patients with a mean age of 66.0 years (range, 22 to 80 years). There were 47 males (56.6%) and 36 females (43.4%). The mean BMI was 23.5 kg/m² (range, 17.5 to 36.6 kg/m²). The mean body weight was 61.0 kg (range, 41 to 115 kg). The type of operation was Hartmann's procedure in 43 patients (51.8%) and abdominoperineal resection in 40 patients (48.2%) (Table 2). The median follow up period was 30 months (range, 6 to 45 months).

During an overall median follow-up period of 30 months (range, 6 to 45 months), 24 patients (28.9%) developed a radiological parastomal hernia postoperatively and 20 patients (24.1%) presented clinical symptoms. And only two patients underwent surgery due to stoma necrosis and severe abdominal pain.

Using the CT classification, the groups were as follows: type 0 (40, 48.2%), type Ia (19, 22.9%), type Ib (8, 9.6%), type II (4, 4.8%), and type III (12, 14.5%), with 63 asymptomatic patients and 20 symptomatic patients (Table 3).

Aperture size differed significantly between symptomatic and asymptomatic patients (76.45 mm vs 49.41 mm;

Table 2. Patients' characteristics

Variable	Value
Sex	
Male	47 (56.6)
Female	36 (43.4)
Age (yr, range)	66.0 (22-80)
BMI (kg/m ² , range)	23.5 (17.5-36.6)
Body weight (kg, range)	61.0 (41-115)
Operation type	
Hartmann's procedure	43 (51.8)
Abdominoperineal resection	40 (48.2)
Median follow up (month, range)	30 (6-45)

Values are presented as number (%) or mean (range).

Table 3. Relationship between symptomatic and asymptomatic stoma patients and computed tomography classification

	0	Ia	Ib	II	III	Total
Symptomatic	0	0	5	3	12	20
Asymptomatic	40	19	3	1	0	63
Total	40	19	8	4	12	83

P = 0.000).

A significant correlation was observed between aperture size and the radiological type (P = 0.003) (Table 4).

DISCUSSION

At clinical examination, parastomal hernia was defined as any protrusion in the vicinity of the stoma. Parastomal hernia is the most frequent problem following stoma formation [11]. Establishment of the actual parastomal hernia rate in surgical practice is difficult, and is probably commonly underestimated [9,12].

Assessment of incidence is also confounded by the definition of parastomal hernia, with up to 78% reported when the diagnosis was established on CT criteria in a small series of 23 patients [9]. The only clinical classification available in the literature was published by Devlin. However, it did not distinguish between the types of stoma, and, due to its complexity, it has not been widely used in clinical practice or quoted in the literature. Radiological methods, such as CT scan, have been utilized as an aid in detection of parastomal hernia and results have been reported in a few studies [9,10,13]. We classified the parastomal hernia using the method proposed by Moreno-Matias et al. [10].

This current study of data collected carefully and prospectively by well-trained stoma nurse specialists has demonstrated a prevalence of radiological parastomal hernia of 29.8%. Incidence of parastomal hernia according to radiological type was 10, 5, and 13, respectively, for types Ib, II, and III. This result is comparable to those of previous studies. Twenty-three of the 48 patients reported associated symptoms. All Type III hernias were clinically detectable, compared with 80% of type II and 60% of type Ib. Therefore, there is a relationship between the size and type of radiological parastomal hernia and clinical

Table 4. Mean aperture size measured by computed tomography (CT) scan

	Size	P-value
Sex		0.014
Male	51.37	
Femal	61.86	0.000
Symptomatic	76.45	
Asymtomatic	49.41	0.003
CT type		
Ia	56.04	
Ib	67.81	
II	62.69	
III	81.01	

symptoms. Significantly large aperture size in symptomatic patients, compared to those with no symptoms, has been demonstrated, and is correlated with radiological type. Considering that aperture size can be an important factor in evaluation of the parastomal hernia, long-term follow up of these patients may be necessary in order to determine whether or not they will develop a more advanced parastomal hernia. Type Ia radiological parastomal hernia is not associated with symptoms, since the hernia sac contains only the bowel loop forming the stoma. Because types Ib, II, and III are regarded as true parastomal hernias, the radiological prevalence is 29.8%, a figure closer to the clinical prevalence. This classification is reproducible and may be useful when surgical reconstruction of parastomal hernia is considered, because it provides preoperative information on the contents and volume of the hernia sac [10]. In this study, there was no clinical parastomal hernia for type 0/Ia. Therefore, correlation between clinical and radiological examination was shown to be more significant, compared to results reported by Moreno-Matias et al. [10].

In conclusion, compared with previous studies, this study showed an acceptable incidence of radiological parastomal hernia. CT classification may be useful in evaluation of the parastomal hernia.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article

was reported.

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