



Elective vs. Emergency Stoma Surgery Outcomes

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Abstract

Aim: The aim of this study was to compare general and stoma specific complications in patients having stoma surgery in either an emergency or elective setting during their index hospital admission.

Method: We retrospectively analysed data for all stomas created over the last three years in Milton Keynes University Hospital. This covered the period from January 2013 to January 2016. A full electronic record of patient's kept by stoma department was used besides demography we analysed the type of stoma i.e. colostomy or ileostomy, indications for the stoma, most common operation, Length of Stay (LOS) and short term complications based on the Clavien-Dindo classification and long term complication on one year follow-up.

We compared stoma specific complications, in emergency and elective cohort.

Results: A total of 199 patients had new ostomies created during the three year period. Four patients died during the inpatient stay and these were excluded from the analysis. The total number of stomas created in emergency were 60 and 135 stomas were elective procedures. The male to female ratio was 1:1.01. The average age for the emergency cohort was 6 years older than for the elective cohort. There was statistically significant difference in length of stay between two cohorts. The rate of grade 3 or 4 complications higher in the emergency cohort of patients. Long term complication was also high in patients operated in emergency i.e. 48% compared to 25% for elective patients. Most common long term complication in emergency stoma was parastomal hernia.

Conclusion: Emergency surgery procedures are frequently bowel related. Since the introduction of consultant lead services in UK the outcomes have improved significantly. Similarly we recommend any bowel surgery involving stoma should be done under direct supervision of consultant surgeons to improve long term outcomes.

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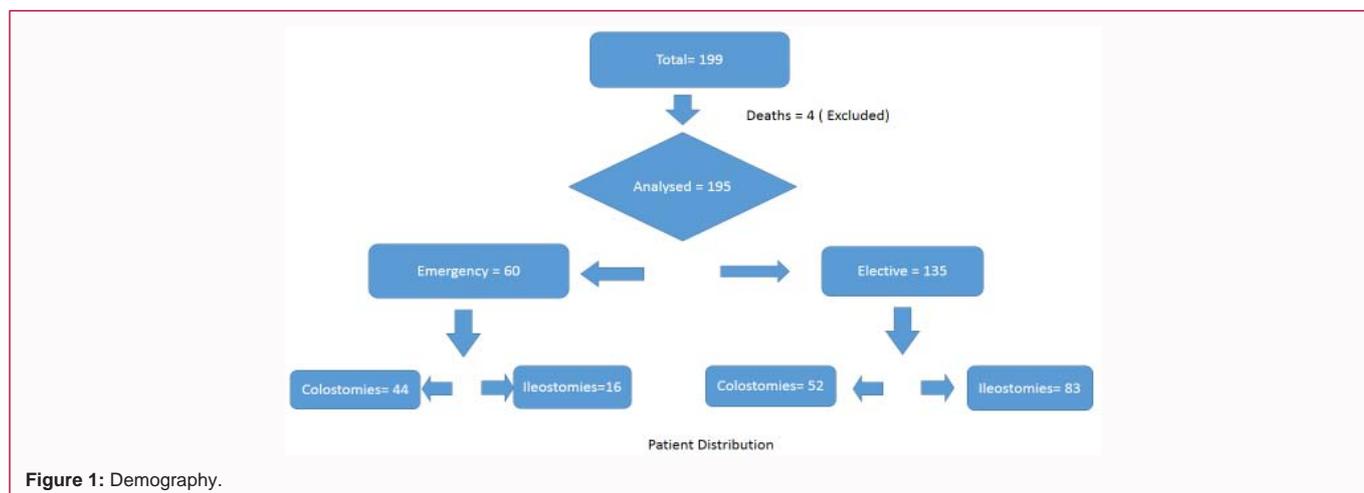
Keywords: Parastomal hernia; Stoma surgery; Ileostomy; Ostomies

Introduction

The first deliberate surgical creation of a stoma was in the early 18th century when a stoma was created to divert faecal material in anal agenesis. However, it wasn't until the twentieth century, towards the end of the world war one when this became a widespread surgical technique. A successful technique for ileostomy was described by Brooks in 1952 and this is still in use today. A stoma can be permanent or temporary and with the success of improved perioperative care, stomas are now routinely made during emergency and elective surgery [1,2].

In the elective setting trends are more towards an ileostomy as a temporary stoma, for example, defunctioning in a low anterior resection and colostomy as a permanent stoma which is easier to manage. The role of a defunctioning stoma for low anterior resection is well established, although defunctioning procedures does not decrease the anastomotic leak rate but does affect the consequences of small anastomotic leak in relation to the rate of a second operation [3]. For elective patients preoperative planning and counseling are extremely important prior to the creation of an acceptable and functional ostomy. Even with the improved stoma care support and counseling in elective settings, the psychological effects of having a stoma can affect the short and long term outcomes.

In emergency surgery a stoma may be a lifesaving procedure to control sepsis during the acute illness, this normally get reversed when the patient has fully recovered. Due to time constrains pre-operative counseling and planning are not possible especially when operating out of hours. In

**Table 1:** Diagnosis and type of stoma in the emergency cohort (n=60).

Diagnosis	Ileostomy n=16	Colostomy n=44
Diverticular Perforation	0	17
Colorectal Adenocarcinoma	4	12
Volvulus	2	6
Inflammatory bowel disease	2	0
Ischemia	6	3
Trauma	2	2
Stercoral perforation	0	4

the emergency setting stoma formation is often regarded as the least important part of an operation, which may be relegated to the most junior member of the operating team.

The stoma made in emergency surgery have high short and long term complication rate.

Emergency stomas where the site has not been marked preoperatively by a stoma therapist are more prone to complications. These complications may severely affect a patient's quality of life.

We have retrospectively evaluated 199 operations where a stoma was created. These were carried out at a single centre over a three years period. We analysed the data and identified the short and long term general and stoma specific complications in emergency and elective cohorts.

Methods and Materials

This was a retrospective analysis of data for all of the ostomy patients over the last 3 years covering the period from January 2013 to January 2016, using the electronic record system. The department stoma care team keeps a detailed record of all the patients who have had a stoma.

The inclusion criteria for the study were

- (1) All patients who had a non-urological stoma created in a last four year period.
- (2) Patient age >16 years.

The exclusion criteria was

- 1) Any patient who died within 48 hours of admission was excluded from the study.

Table 2: Diagnosis and type of stoma in the elective cohort (n=135).

Diagnosis	Ileostomy n=83	Colostomy n=52
Colorectal adenocarcinoma	65	29
Diverticular Disease	2	18
Ischemic Stricture	1	1
Inflammatory bowel disease	5	2
Constipation	10	2

There were four patients excluded from the analysis. We included all remaining patients who had either had emergency surgery or an elective stoma during this period. Patients were divided into two cohorts of elective and emergency surgery. The patient's demography, indication for the stoma, type of stoma (i.e. colostomy or ileostomy, loop or end), intension of the stoma (i.e. temporary or permanent), length of hospital stay (LOS) and early complications, were all analysed.

We used the Clavien-Dindo classification to compare the short term complication rate during the inpatient hospital stay. We also recorded how many patients given a temporary stoma subsequently their stoma had reversed. Long term stoma specific complications were compared between two cohorts.

Results

199 patients were identified over the three year study period. Four patients died within forty eight hours of their hospital admission and were therefore excluded from the analysis. One death was after elective surgery and three were emergency admissions. Patient distribution is shown in Figure 1.

Demography

The mean age was 63 ± 21 years in the emergency cohort and 57 ± 19 years in the elective cohort.

There were 102 female and 93 male patients. The male to female ratio in the elective and emergency surgery cohorts is shown in Figure 2. Most emergency stomas were female patients compared to male who had predominantly elective stomas.

Figure 3 shows the type of stomas made in emergency and elective cohort, predominant stomas in elective setting was ileostomy as compared to colostomy in emergency cohort. Surprisingly only 60 stomas were created during emergency surgery. The most common

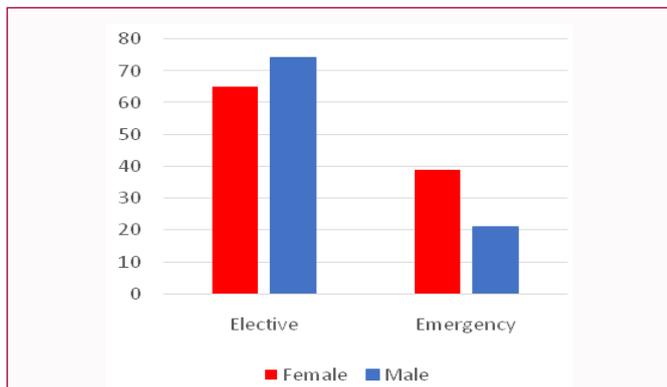


Figure 2: Male: Female.

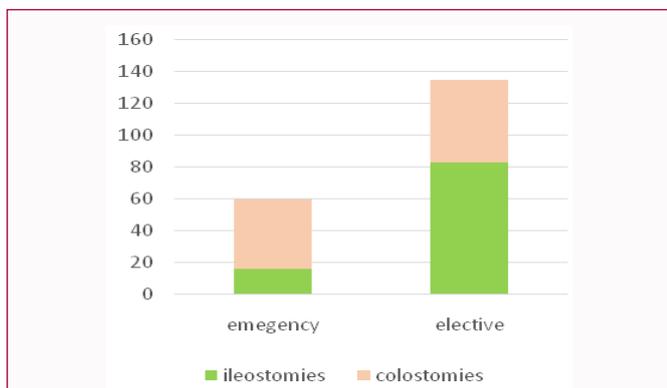


Figure 3: Type of Stoma: Emergency vs. Elective n=199.

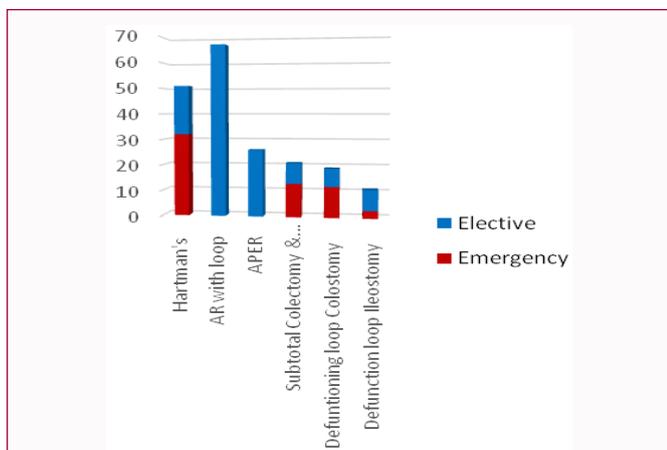


Figure 4: Type of operations: Emergency vs. Elective.

type of stoma made during emergency surgery was an end colostomy (Hartman's procedure). The emergency indications for stoma formation are shown in Table 1. The most common indication was perforated diverticular disease followed by large bowel obstruction secondary to colorectal cancer. Two colostomies were required secondary to iatrogenic trauma during gynaecological surgeries. Overall 62% (37 cases) of emergency stoma were later reversed. Patients with major co-morbidities and being high risk for a second operation were the most common reason for non-reversal of the stoma.

There were 135 elective stomas undertaken. Table 2 shows diagnosis and indication for stoma surgery in elective cohort while Figure 4 shows the type of operations in both the elective and

Table 3: Short term complication rates in emergency vs elective stoma surgery.

	Elective n=135	Emergency n=60
Grade I	14 (10%)	5 (8%)
Grade 2	33 (24%)	19 (31%)
Grade 3	08 (6%)	12 (20%)
Grade 4	2 (1%)	5 (8%)

Table 4: Long term complication emergency vs elective stoma surgery.

	Emergency (n=60)	Elective (n=135)
Skin Problems	9 (15%)	7 (5%)
Stenosis	3 (5%)	4 (2.9%)
Prolapse	3 (5%)	5 (3.7%)
Para stomal Hernias	14 (23%)	18 (13%)

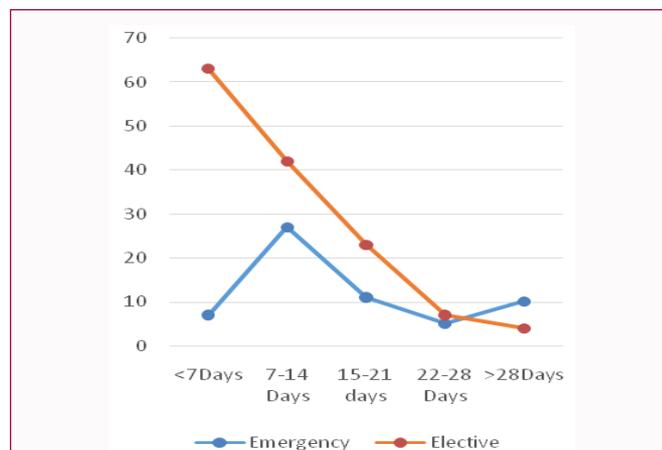


Figure 5: LOS Elective VS Emergency.

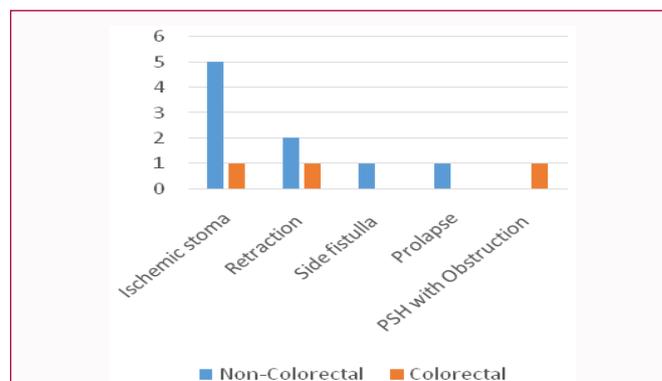


Figure 6: Stoma Complication (n=60).

emergency cohorts. The most common stoma type was an ileostomy and the most common indication was defunctioning after rectal surgery. 77% (103 cases) of the ileostomy cohort were later reversed. The main reason for non-reversal in the elective group was patient choice and this was followed by patient comorbidities.

There were 52 colostomies made in elective setting including low Hartman's, APER and defunctioning colostomies.

The average length of stay was higher in emergency group than elective group. Median stay was 11days in elective and 14 days in emergency cohort. (T-Test P Value .02). Figure 5 shows 46% of elective patients and 11% of emergency patients were discharged

home within one week of surgery. In the second week post-surgery the majority (45%) of patients discharged were in the emergency group. After the second week there was no difference between the two cohorts.

The short term complication rate was graded using the Clavien-Dindo classification (see appendix 1). There is no significant difference in grade 1 and grade 2 complications in emergency and elective stoma patients. However there is a significant higher rate of grade 3 and grade 4 complications in the emergency cohort compared to the elective cohort. This is shown in Table 3.

The majority of complications in emergency surgery group were related to the stoma (Figure 6). This includes ischemic stoma, retraction, and side fistula all requiring a second operation. Most of these surgeries are directly or indirectly supervised by consultant surgeons.

Table 4 shows the long term out come over the follow up period of 1 year only. There is 3 fold increases in skin complication in emergency group due to poor fittings and para-stomal hernias. Similarly the incidence of para-stomal hernia is much higher in patients who have emergency operation.

There were three deaths in emergency surgery cohort. The causes for which were multifactorial including pulmonary embolism, hospital acquired pneumonia and Myocardial Infarction (MI). These patients were generally unwell and had a metabolic abnormality on admission. They were operated on for a life threatening condition and the reason for stoma in this group of patients was as they would not tolerate an anastomosis or lengthy procedure. This explains the high mortality rate in this group.

One elective death was due to massive Myocardial Infarction (MI) in HDU is early post-operative period.

Discussion

On review of literature several studies were found to show that colorectal patients undergoing emergency surgery are normally older than those having elective surgery [3,4]. The reason of this is mainly due to effective screening and awareness program in western world to decrease colonic cancer mortality. Our study also showed this trend, with the mean age in the emergency cohort being 6 years older than the elective group.

The literature does not show any gender specific difference for emergency colorectal surgery. However elective colorectal surgery has a slightly higher incidence toward male patients [5]. This was also true in our study which showed a slight male predominance in the elective group. Whilst the emergency surgery group showed a slight female predominance.

Colonic emergencies remain major life threatening conditions associated with high morbidity and mortality rates [6]. Non-specific abdominal symptoms account for their delayed presentation especially in elderly patients with multiple comorbidities and limited metabolic reserves. In our study there is a significant difference in the mortality rate among the emergency and elective groups. The mortality rate in the emergency cohort was related to the underlying pathology and was not found to be a direct complication of the surgery.

It is relatively common to create stoma in both emergency and elective bowel surgery. They are necessary for several colonic and rectal conditions and represent a major change in patient quality of

life. Previous studies have discussed risk factors, complications and outcomes of stomas made in both the emergency and elective setting [7].

Emergency stomas are shown to have a higher complication rate [8]. This was also true in our study which showed a higher rate of complications in the emergency cohort. We found the majority of complications were grade 1 and 2. However surprisingly there was a significant difference for grade 3 complications between the two groups which were directly related to the stoma leading to a second operation.

The choice of stoma in emergency surgery is disease depend. In our study most of the stomas were end colostomy secondary to a recto-sigmoid resection (Hartmann's procedure). As compared to elective settings it is the surgeon choice to bring an ileostomy or a colostomy for defunctioning after an anastomosis [9]. Technically emergency stomas are much more difficult to create due oedema and inflammation of bowel.

It has been discussed that single stage colonic surgery with primary anastomosis in selected cases is deemed safe, but mainly in specialist hands. In many studies the optimal strategy proposed for perforated diverticulitis was a resection with a primary anastomosis with defunctioning stoma [10] and the colorectal surgeons were more likely to perform a single stage operation.

Stoma creation is not a trivial undertaking. It involves a careful surgical technique to minimize the complication rate (which may be relatively frequent) and promotes good ostomy function. Various studies have reported stoma complication rates of 21% to 70% [11,12].

Approximately a fifth of stomas have to be sited in emergencies. These stomas may be left permanently due to patient choice or comorbidities preventing further surgery as shown in our study too. Therefore selecting the site for stoma placement is important for a good outcome. This has been discussed in the literature which shows in the absence of input, for marking and placement of the stoma, from a stoma specialist nurse there is increase in both short and long term complications [13].

There are several classification systems for parastomal hernias that are based on size, location, contents, and radiologic findings associated with the hernia [14-17]. The evidence favour the use of mesh in elective setting to prevent the long term complication of para-stomal hernia without any increase in morbidity [18]. Although there is controversy on the type of mesh and location of the mesh used during elective setting. The use of prophylactic mesh in emergency stomas setting is still not recommended.

Skin complication related to stoma is multifactorial in origin. It can range from simple allergic reaction to skin excoriation due to poorly fitted appliances. Most of the skin related problems are dealt with stoma nurses and these patients never get to see the surgeons. In our study there is threefold increase in the skin complication among emergency group. This could be possibility due to high incidence of parastomal hernias leading to poor appliance fitting etc.

As previous studies have shown clear outcome differences between emergency and elective operation for bowel related operations, our study has focused on the stoma related outcomes in emergency and elective settings. This is very important with regards to patient morbidity and in some cases can influence long term outcomes such as the patient's quality of life.

We acknowledge that this study is subject to the limitations of a single centre retrospective study. Nevertheless, our data is a useful guide for future efforts attempting to improve outcomes for stoma surgery in emergency and elective settings.

Conclusion

Emergency stoma surgery is a challenging operation. Dealing with poorly optimised patient with poor metabolic reserves needs an expert surgeon to improve both short and long term outcomes.

Further studies are needed to show that does surgeon's subspecialty interest in colorectal surgery influence the outcome in these patients?

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