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Research Article

Short-term outcomes of laparotomy in the two teaching hospitals of gulu university, northern uganda

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Abstract

Purpose: The purpose of this study was to examine the clinical indication for laparotomy, the intra-operative findings and the 30 days post-operative outcome of laparotomy in Gulu university teaching hospitals.

Methods: Using an approved protocol, a six month descriptive longitudinal study was conducted on patients undergoing laparotomy in the two main Gulu University teaching hospitals of St. Mary's Hospital Lacor and Gulu regional referral. Using a sample size of 66, cases were recruited consecutively, clerked, investigated and conventionally prepared for surgery. Intra-operative diagnosis was ascertained as well as the operative procedure and post-operatively the patients were followed up for 30 days complications including death.

Results: Overall, the mean age was 35.04yrs (SD+/- 16.522), but there were more males (59.4%) than females (40.6%). There was a statistically significant positive correlation between the clinical diagnosis and the intraoperative findings (r = 0.405, P *value* = 0.001). Within the 30days, the most frequent complication observed was surgical site infection (SSI) (20%, n=13), followed by wound dehiscence (17.2%, n=11), crude mortality rate was 15.6%, (n=10) and complication requiring emergency re-operation (10.9%, n=7). Ileal perforations tended to have bad outcomes. Age of patient was found to be a significant factor in determining the outcome.

Conclusion: Descriptive longitudinal study on both elective and emergency laparotomy is possible in our setting. Whereas patients' age is an important factors in determining outcome and ileal perforation tend to do better if prioritized with ileostomy, overall the 30days mortality rate for laparotomy was 15.6%.

Introduction

The word *laparotomy* is derived from the Greek words *lapara*, meaning *flank*, and *tomy*, meaning *cut*. In surgical practice, this translates to a big cut in the abdomen to gain access to the peritoneal cavity often midline along the linea alba [1]. Laparotomy is therefore a surgical incision into the abdominal cavity [2]. Laparotomies are the most common operations performed in many hospitals for both emergency and elective conditions for example intra-abdominal infections, bowel obstructions, tumors, hernias and abdominal trauma [3]. In the United Kingdom, this is a common procedure with approximately 30,000 to 50,000 performed annually [1]. Broadly, its indications could be divided into acute abdomen and trauma but of the acute abdomens, 57% are due to gastrointestinal perforation, 33 % have intestinal obstruction and in trauma 63 % have blunt abdominal trauma and the rest penetrating injury [4]. Kakande, et al. (2001) reported that

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intestinal obstruction represent the commonest indication for laparotomies [5]. Other authors however report that trauma associated with hemodynamic instability tops amongst the indications [6,7].

However in the Post-laparatomy period, some patients recover and are discharged uneventfully whereas others develop complications which can lead to prolonged hospital stay, morbidity and mortality [3,8]. According to Tengberg, et al. (2016), major complication occur in 47% of all laparatomy patients within 30 days of the surgery out of which the unadjusted 30 day mortality accounts for, 20.2% [9]. Another study found that nausea & vomiting account for (56%) post laparotomy outcome, followed by chest infection(38%), wound complications (33%) and paralytic ileus (26%) to name but a few [10].

Rationale: Many patients undergo laparotomy but its outcome in not well documented in our setting. Indeed limited data is have been published describing the indications, postoperative course and the temporal pattern of complications after laparotomy, thus this study.

Objective

1. To examine the extent of clinical indication for laparotomy compared to the intra-operative findings
2. The Examine the 30days post-operative outcome of laparotomy in Gulu university teaching hospitals.

Methods

Using an approved protocol, a descriptive longitudinal study was conducted on patients undergoing laparotomy between 1st July 2017 and 31st December 2017 in the two Gulu University teaching hospital of Gulu Regional Referral Hospital and St Mary's Hospital, Lacor. Gulu regional Referral Hospital is a 450 bed government hospital, found in the middle of Gulu City while St Mary's Hospital Lacor is a 482 bed and a faith based Not for Profit hospital located about 5 Km from Gulu City center along Juba road.

Patients presented to these hospitals either as emergency or elective, they were clerked and examined in the conventional way and a diagnosis reached. Baseline investigation like complete blood count (CBC ultrasonograhy (US), plain x-ray was done and when needed a senior surgeon was consulted on the way forward. Patients whose diagnosis needed a laparotomy intervention were then prepared in the routine way and after their consent for the surgery, the research assistant approached them for informed consent to enrolled into the study. Amongst those enrolled in the study, data was then collected consecutively by double blinded but trained research assistants (medical officers). The sample size was 66 participants determined by Kish, Leslie. 1965 formula.

The quantitative data collection instrument used was approved by the local research ethics committee and consisted of a coded semi-structured interviewer administered questionnaire designed to allow post-operative follow-up of the study participants up to 30 days or day of death. The following variables were collected, entered and analysed using SPSS version20: biographic information, clinical diagnosis (indication for laparotomy including relevant investigation), intra-operative findings and the major outcome like recovery or death, wound dehiscence, Surgical Site infection, duration hospitalization, post-operative peritonitis, leakage, re-laparotomy and organ failure as outcome measures. The result was the presented in the tables below.

Results

A total of 66 patients participated in the study out of whom only 64(97%) had complete data for analysis. All the participants underwent laparotomy operation either as elective or emergency between 1st July 2017 and 31st December 2017.The majority of whom were peasant farmers (58%, N=64), followed by students (16%, N=64), civil servants (4.7%, N=64) and drivers, car mechanic, security guards each accounted for 3.1% respectively (Chi-square 222.524, P *value* 0.000). Furthermore there were more males than female.

Age and sex distribution: As shown in Table 1, the majority of patients who underwent laparotomy procedure in our setting were the youth of 19-35yrs (N=64, n= 23, 36%) and Adults of 36-65yrs (N=64, n=22, 34.4%). Overall, the mean age was 35.04yrs (SD+/- 16.522). However, there were more males (59.4%) than females (40.6%) who underwent laparotomy with male: female ratio of 1.5:1 respectively. Except for children within the age groups of 10-18yrs, there was a tendency of male gender predominance amongst those who were operated though the difference was not statistically significant (Chi-Square 3.265, P value > 0.05).

Table 1: Age Sex Distribution.

Age group of patients	Gender of Participant		
	Male	Female	Total
Child (10-18yrs)	4 (40%)	6 (60%)	10 (15.6%)
Youth (19-35yrs)	15 (65.2%)	8 (34.8%)	23 (35.9%)
Adult (36-65yrs)	13 (59.1%)	9 (40.9%)	22 (34.3%)
Elderly (>65yrs)	2 (100%)	0	2 (3.1%)
Others (<10yrs)	4 (57.1%)	3 (42.9%)	7 (11%)
Total	38 (59.4%)	26 (40.6%)	64 (100%)

Clinical diagnosis (indication) and Intraoperative Finding: Table 2 shows a comparison between clinical indication for laparotomy and the intra-operative findings. Whereas the commonest clinical indication for laparotomy in this study was found to be peritonitis (36%, N=64, n=23) followed by intestinal obstruction (23.4%, N=64, n=15) and gut perforation, Appendicitis, penetrating abdominal injury each accounting for 7.8% respectively, the intra-operative finding majorly were peritonitis (17.1%) of which perforated peptic ulcer (PUD) accounted for 6.3% (n=4), perforation of ileum (n=7, 10.9%), followed by intestinal obstruction due to adhesions (n=8, 12.5%) and Appendicitis (n=5, 7.8%).

Furthermore from Table 2, out of the n=23 patients who presented with clinical signs and symptoms of peritonitis, 26.1% were found to have perforated of ileum and perforated PUD accounted for 17.4%. The majority of patients who presented

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Table 2: Correlation of Clinical Diagnosis and the Intra Operative Findings.

	Clinical Diagnosis													
Intra-operative finding	Peritonitis	Liver injury	Intestinal Obstruction	Paralytic Ileus	Gut perfora-tion	Penetrating Abdominal injury	Appendi-sitis	Cancer colon	Intussuc-eption	Blunt abdominal Trauma	CA head Pancreas	Abdominal Abscess	FB Stomach	Total
Perforated ileum	6 (26.1%)	0	1 (6.7%)	0	0	0	0	0	0	0	0	0	0	7 (10.9%)
Perforated PUD	4 (17.4%)	0	0	0	0	0	0	0	0	0	0	0	0	4 (6.3%)
Perforated jujenum	1 (4.3%)	0	0	0	0	0	0	0	0	0	0	0	0	1 (1.6%)
Liver Laceration	0	1 (100%)	0	0	0	0	0	0	0	1(33.3%)	0	0	0	2(3.1)
Appenditis	1 (4.3)	0	2 (13.3%)	1 (100%)	0	0	0	1 (50%)	0	0	0	0	0	5(7.8%)
Intestinal Gangrene	0	0	1(6.7%)	0	2(40%)	0	0	0	1(100%)	0	0	0	0	4 (6.3%)
Normal abdomen	3 (13%)	0	0	0	0	2(40)	0	0	0	0	0	0	0	5 (7.8%)
Cancer colon	0	0	0	0	0	0	1(20%)	0	0	0	0	0	0	1 (1.6%)
Compound volvulus	2 (8.7%)	0	1 (6.7%)	0	0	0	0	0	0	0	0	0	0	3 (4.7%)
Leaking Anastomosis	1 (4.3%)	0	0	0	0	0	0	0	0	0	0	0	0	1 (1.6%)
Redundant Sigmoid colon	0	0	0	0	0	0	0	1 (50%)	0	0	0	0	0	1 (1.6%)
Adhesions	2 (8.7%)	0	5 (33.3%)	0	0	0	0	0	0	0	0	1 (100%)	0	8 (12.5%)
Perforated Stomach	0	0	0	0	1 (20%)	1 (20%)	0	0	0	0	0	0	0	2 (3.1%)
Ileo-ileal knotting	0	0	1 (6.7%)	0	0	0	1 (20%0	0	0	0	0	0	0	2 (3.1%)
Terminal ileitis	1 (4.3%)	0	0	0	0	0	1 (20%0	0	0	0	0	0	0	2 (3.1%)
Ruptured Kidney	0	0	0	0	0	0	0	0	0	1(33.3%)	0	0	0	1 (1.6%)
Sigmoid Volulus	0	0	1 (6.7%)	0	1 (20%)	0	0	0	0	0	0	0	0	2 (3.1%)
Perforated Duodenum	0	0	0	0	1(20%)	0	0	0	0	0	0	0	0	1 (1.6%)
Intussuception	0	0	2 (13.3%)	0	0	0	0	0	0	0	0	0	0	2 (3.1%)
Cecal mass	0	0	0	0	0	0	1(20%)	0	0	0	0	0	0	1 (1.6%)
Cancer Pancreas	0	0	0	0	0	0	0	0	0	0	1 (100%)	0	0	1 (1.6%)
Ruputred Spleen	0	0	0	0	0	0	0	0	0	1 (33.3%)	0	0	0	1(1.6%)
Messenteric Adenitis	1 (4.3%)	0	0	0	0	0	0	0	0	0	0	0	0	1 (1.6%)
Perforated Cecum	0	0	0	0	0	2(40%)	0	0	0	0	0	0	0	2 (3.1%)
Abdominal Abscess	0	0	1 (6.7%)	0	0	0	0	0	0	0	0	0	0	1 (1.6%)
FB Stomach	0	0	0	0	0	0	0	0	0	0	0	0	1 (100%)	1 91.6%0
Perforated Appendix	1 (4.3%)	0	0	0	0	0	1 (20%)	0	0	0	0	0	0	2 (3.1%)
Total	23	1	15	1	5	5	5	2	1	3	1	1	1	64 (100%)

with features of intestinal obstruction were found to have adhesion (33.3%), followed by Intussusception, appendicitis (13.3%) and ileal perforation, abdominal abscess and sigmoid volvulus (each accounted for 6.7% respectively). Overall negative laparotomy findings were 13%, compound volvulus were 8.7%, Intestinal adhesion were 8.7% and terminal ileitis and mesenteric adenitis each accounted for 4.3% respectively. Overall there was a statistically significant positive correlation between the clinical diagnosis and the intraoperative findings ($r = 0.405$, P *value* = 0.001).

Operative procedures: Table 3, shows the various operative procedures offered to patients who underwent laparotomy within the study period. Most of the surgeries were performed by medical officers but consultants were always on standby whenever required. The medical officers consisted of surgical residents and pre-residency medical doctor attached in the department of surgery. As shown in Table 3, a variety of surgical procedures were performed depending on the intra-operative finding. Remarkably of the patients whose intraoperative finding was adhesion (n=8), 62.5% were operated adhesiolysis,

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Table 3: Operative procedure.

	Operative Procedure																
Intra-operative finding	Ileos-tomy	Resection anasto-mosis	Adhesio-lysis	Repair	Append-ectomy	Lavage and closed	Hemicol-ectomy	Colo-stomy	Modified Grahams	Nephre-ctomy	Biopsy	By-pass surgery	DOT	Splene-ctomy	Drainage and lavage	FB re-moval	Total
Adhesions	1 (12.5%)	2 (25%)	5 (62.5%)	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Perforated ileum	4 (57.1%)	2 (28.6%	0	0	0	0	0	0	0	0	0	1 (14.3%)	0	0	0	0	7
Perforated PUD	0	0	0	0	0	0	0	0	4 (100%)	0	0	0	0	0	0	0	4
Normal abdomen	0	0	0	0	1 (20%)	4 (80%)	0	0	0	0	0	0	0	0	0	0	5
Appenditis	0	0	0	0	5 (100%)	0	0	0	0	0	0	0	0	0	0	0	5
Intestinal Gangrene	0	3 (75%)	0	0	0	0	0	0	0	0	0	0	1 (25%)	0	0	0	4
Compound volvulus	0	1 (33.3%)	0	0	0	0	0	2 (66.7%)	0	0	0	0	0	0	0	0	3
Liver Laceration	0	0	0	1 (50%)	0	1 (50%)	0	0	0	0	0	0	0	0	0	0	2
Perforated Stomach	0	0	0	1 (50%)	0	0	0	0	1 (50%)	0	0	0	0	0	0	0	2
Ileo-ileal knotting	1 (50%)		1 (50%)	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Terminal ileitis	0	0	0	0	1 (50%)	1 (50%)	0	0	0	0	0	0	0	0	0	0	2
Intuss-uception	0	2 (100%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Sigmoid Volulus	0	1 (50%)	0	0	0	0	0	1 (50%)	0	0	0	0	0	0	0	0	2
Cancer colon	0	0	0	0	0	0	1(100%)	0	0	0	0	0	0	0	0	0	1
Leaking Anast-omosis	0	0	0	0	0	0	0	1 (100%)	0	0	0	0	0	0	0	0	1
Redundant Sigmoid colon	0	1 (100%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Perforated jujenum	0	1 (100%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Perforated Duodenum	0	0	0	1 (100%)	0	0	0	0	0	0	0	0	0	0	0	0	1
Ruptured Kidney	0	0	0	0	0	0	0	0	0	1 (100%)	0	0	0	0	0	0	1
Cecal mass	0	0	0	0	0	0	0	0	0	0	1 (100%)	0	0	0	0	0	1
Cancer Pancreas	0	0	0	0	0	0	0	0	0	0	0	1 (100%)	0	0	0	0	1
Ruputred Spleen	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (100%)	0	0	1
Messenteric Adenitis	0	0	0	0	0	1 (100%)	0	0	0	0	0	0	0	0	0	0	1
Perforated Cecum	0	0	0	2 (100%)	0	0	0	0	0	0	0	0	0	0	0	0	2
Abdominal Abscess	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (100%)	0	1
FB Stomach	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 (100%)	1
Perforated Appendix	0	0	0	0	2 (100%)	0	0	0	0	0	0	0	0	0	0	0	2
Total	6 (9.4%)	13 (20.3%)	6 (9.4%)	5 (7.8%)	9 (14.1%)	7 (10.9%)	1 (1.6%)	4 (6.3%)	5 (7.8%)	1 (1.6%)	1 (1.6%)	2 (3.1%)	1 (1.6%)	1 (1.6%)	1 (1.6%)	1 (1.6%)	64 (100%)

but resection and anastomosis was done in 25% of adhesion cases and ileostomy accounted 12.5% due to inadvertent ileal injury. In patients with ileal perforation (n=7) the majority were treated with temporary loop or double end ileostomy (57.1%), resection-anastomosis was done in 28.6%, ileo-transverse bypass in 14.3% of cases.

However in all patients who had appendicitis (n=5), conventional appendectomy was done. Furthermore there were

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5 cases of negative laparotomy findings, of which 80% were larvaged and closed and 20% had prophylactic appendectomy. Patients in whom small intestinal gangrene was found, resection anastomosis was performed in 75% of the cases and 25% had a DOT (death on Table). These differences when compared was found to be statistically significant (Chi-square 378.864, df 390, P value 0.000001). Therefore, a significantly proportion of cases of ileal perforation were treated with temporary ileostomy as well as adhesion with adhesiolysis, appendicitis with appendectomy, intestinal gangrene with resection anastomosis and negative laparotomy with larvage and closure.

Outcome of laparotomy; A variety of outcomes were recorded during the 30 days follow-up of patients after laparotomy and matched for the intra-operative (actual diagnosis, Table 4). As shown in Table 4, out of the 64 patients studied, the most frequent complication observed was surgical site infection (SSI) (20%, n=13), followed by wound dehiscence (17.2%, n=11), crude mortality rate was 15.6%, (n=10) and complication requiring emergency re-operation (10.9%, n=7). Furthermore the surgical condition with most prevalent complication was ileal perforation, out of the seven, 38.5% developed SSI, wound dehiscence accounted for 27.3% and 2 died. Indeed amongst the 10 patients who died 2 (20%, n=10) had perforated ileum. Postoperative peritonitis tended to be more common in patients with intestinal gangrene (33.3%) of which 14.3% needed re-operation.

Also compared to rest of the surgical conditions, patients with ileal perforation were the most common groups whose duration of hospitalization was greater than 2weeks (25%). Whereas all the above differences were not statistically significant (P *value* > 0.05), outcome of laparotomy such as wound dehiscence, SSI, and tendency to develop peritonitis and anastomotic leak were statistically significant (P *value* ≤ 0.05) when disaggregated within the different age groups. Therefore age is a significant factor in outcome of laparotomy.

Discussion

Despite low income countries having major burdens of the surgical diseases, one of commonest procedure - laparotomy, has been found to have a high mortality rate in many Sub-Saharan African countries [11]. Depending on patient-related, disease-related and intervention-related factors, surgical patients have different outcomes of which some recover un-eventfully, some get complications which cause debilitation and others succumb to these morbidities [12,13]. In this study pre, intra and post laparotomy 30 days follow up was done to discern the temporal outcome of this common procedure in our setting.

In a study by Abebe, et al. [14], the mean age of laparotomy patients were found to be 29 years representing the youth and this is close to what was found in this study. Other researcher have reported a higher average ages for laparotomy patients with developed nations tending to have older patients [15,16]. Although the male: female ratio for laparotomy patients reported by Abebe , et al. (2019) is 6.2:1 [14], Khalilur, et al. (2018) reported Male: Female ratio of 2.5:1 [17] and Lebowa, et al. [18], found a female: male ratio of 1.3:1 [18]. This study found Male: Female ratio of 1.5:1 close to that of Lebowa, et al. [18]. It appears therefore that laparotomy tend to have no particular gender related predilection.

In the study there was a positive correlation between clinical examination and the intra-operative findings (r = 0.405, P *value* = 0.001). Mir-Zeeshan, and Vamsee- Krishna (2019) also found that there is a 95% accuracy rate of clinical diagnosis when compared to intra op diagnosis, Kappa is 0.912 (p<0.0001) [19]. Therefore clinical judgment is key to diagnosis of acute abdomen and investigations are only supplementary. Regarding intra operative procedures, approximately 8%, (n=5, N=64) had negative laparotomy a figure which is close the 5% rate reported by Abebe, et al. (2019). However in our setting clinical diagnosis and outcome of the intervention may be influenced by delay in presentation amongst others which include use of medications, premorbid conditions, and multiple visits to clinics prior to reaching a hospital where surgical services are offered.

Whereas appendicitis, intestinal adhesions, gangrene, peptic ulcer perforation and the other conditions were treated in a conventional way, ileal perforation was special (Table 3). In this study, ileostomy was preferred in 57.1%, resection and primary anastomosis was done in 28.6%, ileo-transverse bypass in 14.3% of cases of ileal perforation (Chi-square 378.864, d.f 390, P value 0.000001). Previously another study also recommended that in ileal perforation, ileostomy may be given priority over other surgical options since post-operative complication rate is less (17.85%) compared to 32.14% in cases of primary closure [17].

During the 30 days longitudinal follow-up of the post laparotomy patients, wound dehiscence rate was found to be 17.2%. This finding is within range since rates of wound dehiscence following laparatomy have was previously found range from 0% to 44% depending on the wound type with contaminated/dirty wound having the highest rate of wound dehiscence [20]. Other authors have reported lower rates of wound dehiscence as low as 2.9% [21] and 5.1% [22] respectively but all aver that the rate of wound dehiscence depend on status of the wound. Indeed Surgical site infection (SSI) is a risk factor for developing wound dehiscence [21]. This study also found surgical site infection (SSI) rate of 20%. Other researchers have found similar SSI rates of 16.4% [24] and 23.2% [25] respectively. Furthermore, immunosuppressive medications, open cholecystectomy, and dirty wound have been found to be significantly associated with SSI [23]. In 2014, Ramneesh, , et al. reported that the risk of wound dehiscence is more common in emergency laparotomy and 88% of patients with contaminated or dirty wounds tend to develop wound dehiscence.

The crude mortality rate of 15.6% reported in this study is similar the mortality rate of 16.7%, reported by Hietbrink, et al. [7] and is within post-laparatomy mortality range of 10.5-21% previously reported Anwar, et al. [15] and 9.6-33% by Howes, et al. (2015) [26]. Baison [11] found the post-operative mortality

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Table 4: The Outcome of Laparotomy - Editable.

	30Days Outcome							
Intra-op Findings	Wound dehiscence	Surgical site Infection	Peritonitis	Anastomotic Leak	Re-operated	Organ failure	Died	Hospitalized more than 2weeks
Perforated ileum *(n=7)*	3 (27.3%)	5 (38.5)	1 (16.7%%	1 (25%)	2 (28.6%)	1 (20.0%)	2(20%)	2 (25%)
Perforated PUD *(n=4)*	2 (18.2%)	1 (7.70%)	1 (16.7%%	1 (25%)	2 (28.6%)	0	0	1 (12.5%)
Perforated jujenum *(n=1)*	0	0	0	0	0	0	0	0
Liver Laceration *(n=2)*	1 (9.1%)	0	0	0	0	1 (20.0%)	1 (10%)	1 (12.5%)
Appenditis *(n=5)*	0	1 (7.70%)	1 (16.7%%	0	0	1 (20.0%)	1 (10%)	0
Intestinal Gangrene *(n=4)*	1 (9.1%)	2 (15.4%)	2 (33.3%)	1 (25%)	1 (14.3%)	1 (20.0%)	2(20%)	1 (12.5%)
Normal abdomen *(n=5)*	0	0	0	0	0	0	0	0
Cancer colon *(n=1)*	0	1 (7.70%)	1 (16.7%)	1 (25%)	1 (14.3%)	0	1 (10%)	1 (12.5%)
Compound volvulus *(n=3)*	1 (9.1%)	0	0	0	0	0	0	1 (12.5%)
Leaking Anastomosis *(n=1)*	1 (9.1%)	1 (7.70%)	0	0	0	0	0	
Redundant Sigmoid colon *(n=1)*	0	0	0	0	0	0	0	0
Adhesions *(n=8)*	1 (9.1%)	0	0	0	1 (14.3%)	0	0	0
Perforated Stomach (n=2)	0	0	0	0	0	0	0	0
Ileo-ileal knotting *(n=2)*	0	0	0	0	0	0	0	0
Terminal ileitis *(n=2)*	0	0	0	0	0	0	0	0
Ruptured Kidney*(n=1)*	0	0	0	0	0	0	0	
Sigmoid Volulus *(n=2)*	0	0	0	0	0	0	0	0
Perforated Duodenum *(n=1)*	0	0	0	0	0	0	0	0
Intussuception *(n=2)*	1 (9.1%)	2 (15.4%)	0	0	0	0	0	1 (12.5%)
Cecal mass **(***n=1)*	0	0	0	0	0	0	0	0
Cancer Pancreas *(n=1)*	0	0	0	0	0	0	0	0
Ruputred Spleen *(n=1)*	0	0	0	0	0	0	0	0
Messenteric Adenitis (n=1)	0	0	0	0	0	0	0	0
Perforated Cecum (n=2)	0	0	0	0	0	0	1 (10%)	0
Abdominal Abscess *(n=1)*	0	0	0	0	0	0	1 (10%)	
FB Stomach *(n=1)*	0	0	0	0	0	0	0	0
Perforated Appendix *(n=2)*	0	0	0	0	0	1 (20.0%)	1 (10%)	0
Total	11 (100%)	13 (100%)	6 (100%)	4 (100%)	7 (100%)	5 (100%)	10 (100%)	8 (100%)

rate in Rwanda to be 12% following laparotomy surgery. This study found unplanned emergency re-operation rate was 11%. In Ethiopia, similar re-laparatomy rates (12%) was found by Nurhusien, et al. [27]. Generally, ileal perforations tend to more ominous than all the other indications for laparotomy. Other researchers found ileal perforations to have higher mortality ranges from 11.5% to 50% [28]. Regarding ileal perforations early presentation and diagnosis, adequate resuscitation, prompt surgery and vigorous post-operative management improves mortality rates and complication rates are less when treated with ileostomy [17,28]. Furthermore as in this study, age was been found to significantly affect outcome of laparotomy as was similarly found by other researchers [26,29,30].

Conclusion

Pre-operative clinical examination, investigation are important to determine the need for laparotomy since it positively correlates with the intra-operative findings (r = 0.405, P *value* = 0.001). Whereas in 30days post laparotomy period wound complications tend predominate, ileal perforation need special attention because of the less favorable outcome especially where ileostomy is not prioritized. Age tend to significantly affect laparotomy outcome (P *value* ≤ 0.05).

Foot note

Contribution of the authors

1. Dr Amone Derrick is the principle investigator who developed the proctocol, corrected it until approval by the Research Ethics Committee (REC). He supervised the data collection, data entry and wrote the manuscript.

2. Dr Okello Tom Richard, is the co-principle investigator. He supervised the protocol development data entry, analysis and wrote the manuscript.

3. Dr Okot Christoper and Dr Kitara David Lagoro supervised the protocol development, presentation to the REC, proof read the manuscript

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4. Dr Mugabi Patrick Participated in protocol development, he also supervised the data analysis and writing of the result section of this manuscript

5. Dr Ogwang David Martin proof read the manuscript and particularly revised and improved the discussion part of the manuscript.

Declaration of conflict of interest: We the authors hereby aver that we do not have any conflict of interest neither have we received notice nor declaration of conflict of interest in this research project from inception, protocol development and approval as well as conducting study and writing the report and manuscript.

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