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Prospective study to compare outcome between primary repair versus stoma formation in cases of emergency laparotomies

General Surgery

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ABSTRACT

Background – choice of surgery is difficult in managing emergency surgeries so we reviewed the management regarding the decision of type of surgery and morbidity. Material and method – a prospective study was conducted by including 120 patients underwent emergency laparotomy for various indications at department of surgery JLNMCH Bhagalpur Bihar from feb 2016 to jan2017.

Half of the patient underwent for primary repair while other half underwent stoma formation. Patients were assessed for pertinent clinical information and individuals requiring either of the two surgeries were compared. Result –Non- traumatic perforation constituted 61% of indication for Primary repair and Stoma formation. An adverse set of preoperative and intraoperative parameters were found in patients who underwent Stoma formation compared to Primary repair group. Wound infection was the most common complication (30%) and (26%)in group A and group B respectively. Overall mortality was 8%. Morbidity, in either groups, is significantly influenced by an advanced age, a low Hb, hypoalbuminemia, an advanced lag period (>72 hours) and poor hemodynamic stability at the time of operation. The mean duration of hospital stay following either PR or SF is 10±3 days. PR is a safe procedure in emergency surgeries as long as patient is stable preoperatively and peritoneal cavity is non- compromised. SF seems to be a better option in adverse patient conditions. Patient outcome is influenced by poor clinical parameters and patient demographic in either surgery.

KEYWORDS:

emergency surgery, wound infection, primary repair versus stoma formation, prospective study.

INTRODUCTION-

in emergency laparotomies mostly done for acute peritonitis due to intestinal perforation either pathological or due to trauma . in our region most common cause of peritonitis is perforated bowel due to enteric fever or tuberculosis or in some cases nonspecific enteritis[1-3]. Management of such cases is done either by approximation of edges with absorbable sutures called primary repair or exteriorization of diseased bowel segment known as stoma.In either mode of treatment need of consideration between anastomotic leak and stoma inconvenience. Although in several studies primary repair has shown advantages over stoma formation in emergency trauma surgeries[4-6]. We have reviewed our institutions experience with management of cases of severe peritonitis requiring exploratory laparotomy followed by primary repair/ resection anastomosis and compared it with a similar cohort who underwent stoma formation. We hypothesise that a combination of preoperative and intra-operative adverse patient condition necessitates bowel exteriorisation. Moreover, complications following either surgery are governed by the clinical profile of the patient.

MATERIAL AND METHOD–

It was a prospective study including 120 patients presented with acute peritonitis at surgical emergency, at department of surgery JLNMCH Bhagalpur, bihar underwent laparotomy. Study period was from December 2014 to November 2016.

DATA COLLECTION-

Patient data were collected retrospectively from medical records and operating room registries. Patient demographics and laboratory tests were recorded. Paediatric population, patients undergoing a primary repair along with diverting stomas and patients in whom a follow up of at least 6 weeks would not be feasible were excluded from the study.

MANAGEMENT–

All patients were evaluated clinically and radiologically to establish the diagnosis. Resuscitation done with intravenous fluids and antibiotics until hemodynamically stability achieved. preoperative antibiotic coverage given with third generation cephalosporins and metronidazole. In all cases, laparotomy was performed by midline incision, under general endotracheal anaesthesia. The lag period from onset of symptoms to operative intervention, nature and volume of peritoneal fluid, location of insult, nature of bowel wall, were considered and recorded. The operative procedure done was one of the following, stoma formation, which was done using a standard technique of circular skin opening, incision of anterior and posterior rectus sheath, muscle splitting, placing of supporting rod/feeding tube (if necessary) ,bowel exteriorisation and placing of sutures from bowel(full thickness) to the deep dermal layers of skin. In case of intestinal resection, a primary anastomosis was created in a double layer; an inner all coats layer using vicryl (absorbable suture material) and an outer seromuscular layer using silk (non-absorbable suture material). Regarding primary repair, the technique adopted consisted of an inner layer of full thickness sutures placed using vicryl 2-0 followed by an outer seromuscular layer of sutures placed using silk 2-0. Debridement of edges of perforation was done in all cases.

The peritoneal cavity was thoroughly washed with warm saline. Abdomen was closed after placement of pelvic drains.

Patients who underwent emergency laparotomies with intraoperative enterosotomy/ primary repair/anastomoses were randomly selected based on the records and grouped into two groups: group A (REPAIR) group B (STOMA)

Table 1 : groups

Group A (n = 60)	Underwent primary repair/resection anastomosis
Group B (n = 60)	Underwent stoma formation

Following discharge from hospital, follow up of the patient was done for a period of 6weeks to enquire about any delayed complications.

STATISTICAL ANALYSIS-

Statistical analysis was done using SPSS software version 17. Quantitative data was analysed using independent t test and a p value greater than 0.05 was taken as significant. Ordinal data was compared using chi square test. A Pearson $\chi 2$ value less than 0.05 were considered significant.

RESULTS –

Of the 120 patients included in the study 78% were males. The mean age of patients in Stoma (B) group was 45.7±13.01 years and 39.46±11.76 years in Repair (A) group with maximum patients presenting in their third to sixth decade of life. The age and gender distribution in two groups were found to be comparable with no statistically significant difference (p value 0.618).

Most common indication for exploratory laparotomy was non traumatic perforation (76%) followed by sub-acute intestinal obstruction(16%), traumatic perforation(6%) and sigmoid volvulus (4%). In Group A, primary repair was done in 50 patients and the rest 10 patients underwent resection anastomosis. In Group B, 55 patients underwent ileostomy (n=35 loop ileostomy; n=5 double barrel ileostomy; n=15 end ileostomy) and 5 patients underwent end colostomy.

The time period from onset of symptoms to operative intervention was taken as the lag period, which was >72 hours in 70% of cases in Group B and 48% of cases in group A. On comparison of preoperative investigations of both groups, it was seen that the mean hemoglobin, mean serum albumin and Mean MAP (Mean Arterial Pressure) were 9.842±0.52, 2.90±0.22, 78.66±4.51 in Group B and 10.36±0.42, 3.190±0.246, 91.39±6.42 in Group A respectively. The p values of these 3 parameters were <0.05 on comparison. Intraoperative parameters on comparison, revealed an intraperitoneal collection>1000ml in 52% cases in group B and 2% cases in group A. The nature of collection was feculent in 66% cases in group B and 20% cases in Group A. The bowel wall was edematous in 96% case in group B, whereas it was non-edematous in 94% of group A patients. These preoperative and intraoperative data are summarised in Table 1.

Group	Lag period >72 hours %	Mean Hb %	Mean sralb %	Mean MAP mmHg	Ipf>1000ml%	Feculent ipf%	Edematous wall %
A(N=60)	48	10.36±0.42	3.190±0.246	91.39±6.42	2	20	6
B(n=60)	70	9.842±0.52	2.90±0.22	78.66±4.51	52	66	96

Hr, hour; Hb, hemoglobin; MAP, Mean Arterial Pressure; ipf, intraperitoneal fluid; bw, bowel wall.

Post operative complications noted in both groups –

Table 2-

General complications	Group A (%)	Group B (%)
Wound infection	30	26
Wound dehiscence	14	12
Chest infection	12	12
Cardiac problems	4	3
Re-perforation	2	1

Table 3 – procedure specific complications

Complications	Group A (%)	Group B (%)
Skin excoriations	16	18
Stomal prolapse	8	16
Parastomal hernia	8	8
necrosis		6
Local abscess		6
Stoma retraction		4
obstruction		2

DISCUSSION –

In our study, of the 120 patients selected, majority were males (72%) between their second and fourth decades. Studies conducted by Mittal S et al. and other authors have come up with similar result [6, 1]. The most common indication for exploratory laparotomy in both the groups was non-traumatic perforation (64% in Group B and 58% in Group A).Perforation peritonitis is still a major indication of exploratory laparotomy in our country, the most common non traumatic cause being typhoid perforation followed by tuberculosis [6]. Ileostomy was the most commonly performed stoma surgery (48%), which is concurrent with incidence of multiple ileal perforation in typhoid perforation peritonitis.

An advanced lag period of >72 hours is associated with deterioration of general condition of patient and increased peritoneal contamination. These two factors, besides others, warrant an exteriorisation of bowel, as primary repair in such conditions is unlikely to hold, as put forward by Rasslan S et al. [7]. In our study, 70% patients in Group B had a lag period of >72 hours, whereas the number was less in Group A (48%). These findings are similar to the findings of Stone H et al. [8] who concluded that lag period was more in the patients with stomas. The number of patients having a lag period >72 hours is high predominantly due to poor infrastructure and delay in referring patients from rural areas.

In our study, the mean Hb, mean S Alb. and Mean MAP of the stoma group were 9.842±0.52 g, 2.90±0.22 g and 78.66±4.51 mm of Hg respectively. These values in Group R were 10.36±0.42g, 3.190±0.246 g and 91.39±6.42mm Hg respectively, which were significantly higher ($p<0.05$) than the stoma group (Group B). These preoperative findings, along with an increased lag period of > 72 hours point towards a poor general condition of the patient at presentation and such patients have been shown to have better outcome with bowel exteriorisation [9]. High volume, feculent intraperitoneal collection and bowel wall oedema are unfavourable factors for holding sutures and such cases are better managed by exteriorisation. The results of our study are comparable to Gupta S et al. [10] who analysed numerous studies on perforation peritonitis in the subcontinent and reported that bowel oedema warranted exteriorisation. Other authors have advocated stoma surgery in patients having intraperitoneal collections more than 1000 ml [3, 9].

The most common general post- operative complication encountered in our study was wound infection 30%. Similar studies on cases of emergency laparotomies done by other authors, have yielded comparable results [3, 11]. Among procedure related complications, in Group B, the most common complication was excoriation of parastomal skin, seen in 18 % cases. This may be due to the fact that ileostomy was the most commonly performed stoma procedure in this group.Our findings are in accordance with Ahmad QA et al. and other authors [9, 12], who performed a study on the indications and complications of intestinal stoma and concluded that parastomal skin excoriation was the most common complication (25%).

Parastomal skin excoriation in our patients was managed by patient education, liberal use of skin protectants and changing from adhesive collecting systems to belt held pouches. Other complications like stomal prolapse, parastomal hernia, stomal retraction, and local abscess weren't severe enough to warrant repositioning of stoma and were managed conservatively. One case of stomal obstruction was due to a proximal stricture, found during re-exploration. Other two cases responded to liberal stoma lavage. Stomal necrosis was a dreaded complication in our study as all three patients who developed it expired. This was probably due to the fact that these patients were already in a poor general condition prior to surgery.

Group A had incidence of anastomotic leak (8%). The leak rates of our study are comparable to the results of Jain BK et al. (having leak rates of 11%) and Agaba AE et al. (who reported a leak rate of 6% following colorectal anastomosis) [3, 13]. As reported by these authors, mortality in leak patients was high with three of the four

patients dying inspite of re- exploration. The one patient who survived was reexplored and exteriorisation of the leak segment was performed. Incidence of complications in stoma group (64%) was more than in repair group (48%). This corresponds to findings of Atamanalp SS et al. [14] who retrospectively evaluated the records of 86 patients operated for typhoid intestinal perforations and found out that complications were more in the stoma group than the primary repair group. Preoperative factors that have a bearing on post- operative complications have been studied using various scoring systems like Manheim's scoring system, APACHE III and POSSUM score [15]. From these, some of the factors which could be reproduced in the context of our study were selected and compared between the cases which had complications and the remaining cases in both study groups A and B.

Factors like mean age, gender, mean hemoglobin, mean serum albumin, mean map, lag period, volume of intraperitoneal content and its nature were compared in both groups for their prognostic significance in predicting post-operative complications. From the results it is clear that an advanced age (>50 yrs), females, a low serum albumin (<3 g %), a low hemoglobin (10 g %), a low MAP (<80 mm Hg), an increased lag period (>72 hrs), presence of high volume peritoneal contamination (>1000ml) and its feculent nature were associated with a higher incidence of complications. Such results have been obtained in studies conducted by various authors like, Bortolin M et al. [16] who concluded that hemodynamically stable patients have lesser complications following primary repair; Chatterjee H et al. [17] and Ahmad Z et al. [18] who postulated that a greater lag period influenced morbidity; Reilly HM et al. [19] who showed that preoperative low serum albumin is associated with increased postoperative complications; Van Raamscorst GH et al. [20] who concluded that mean age and mean Hb are predictive risk factors for complications; Murray JA et al. [11] who concluded that hypotension is associated with an increase of anastomotic leak in colon surgeries and Edino ST et al. [13] who described an increased incidence of post -operative complications in patients having high volume feculent peritoneal contamination.

CONCLUSION–

Decision regarding the ideal surgery for managing an enterotomy in a patient, is best governed by a combination of pre-operative and intra-operative parameters. Choosing the best method is imperative in minimisingshort term complications and long term morbidities. Patients having improved preoperative parameters like early presentation, non-anaemic, non- hypoproteinemic and good hemodynamic stability along with non-compromising intraoperative findings, such as low volume, non feculentintraperitoneal collection and healthy, non edematous bowel wall are the ideal candidates for primary repair. Patients having an adverse set of preoperative and intraoperative parameters are best managed by bowel exteriorisation. Morbidity is significantly influenced by an advanced age, a low Hb, hypoalbuminemia, late presentation, high volume fecal peritonitis and poor hemodynamic stability at the time of operation, in both set of surgeries.

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