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A PROSPECTIVE COMPARATIVE STUDY OF PRIMARY CLOSURE, RESECTION ANASTOMOSIS AND PRIMARY ILEOSTOMY IN PATIENTS WITH ILEAL PERFORATIONS

General Surgery

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ABSTRACT

Introduction: A number of studies have been undertaken to find the best surgical treatment for ileal perforation. Each modality has its own drawbacks manifested in the form of anastomotic leakages, increased morbidity and mortality.
The study was to prospectively compare the outcome of primary closure, resection anastomosis, and ileostomy in cases of ileal perforations
Material and methods: A total of 90 Patients meeting the inclusion criteria admitted in emergency of general surgery department were selected and placed into 3 groups depending upon the outcome of laparotomy.
I.e. Primary closure; Resection anastomosis and Primary ileostomy
Results: 22.2%, 31.1% and 46.7% of the patients underwent Primary closure, Resection anastomosis and Primary ileostomy respectively.
Wound Dehiscence, Hypotension and Ileostomy related complications were significantly higher among the patients with Primary ileostomy ($p<0.001$).
Fistula and Relaparotomy were higher among the patients with Resection anastomosis, but not significant ($p>0.05$).
Conclusion: In cases where patients present within 72hrs & minimal soiling of the peritoneal cavity and healthy bowel, either primary closure or resection and anastomosis are an ideal procedure.

KEYWORDS

Ileal perforation, Primary closure, Resection anastomosis, Primary ileostomy.

INTRODUCTION

Ileal perforation is a frequently encountered surgical emergency in developing countries. Peritonitis arising from ileal perforations continues to be a common surgical emergency. It is caused by a variety of etiological factors and despite tremendous advances in antimicrobial agents and supportive care; it continues to have a high morbidity and mortality.

In India unlike western countries where tuberculosis and typhoid are not frequent like our countries, these diseases continue to be endemic and are the most commonly seen causes of intestinal perforation. A number of studies have been undertaken to find the best surgical treatment for ileal perforation, each one claiming one modality to be more efficacious than the other. Each modality has its own drawbacks manifested in the form of anastomotic leakages, duration of hospital stay, increased morbidity and mortality, etc. Studies with controversial outcome have been published and there remains difference of opinion as to the best surgical procedure in ileal perforation, particularly in our country where Typhoid perforation of ileum is still frequent. Various factors influence overall prognosis and outcome of surgical treatment such as delayed presentation, adequate pre-operative resuscitation, delay in surgery, number of perforation and degree of fecal contamination of peritoneal cavity.

Ameh EA, et al[1](1997) compared three operations (simple closure, wedge excision and anastomosis or segmental resection and anastomosis) and concluded as Segmental resection, to be the best treatment for typhoid perforation.

Ravindra S Mohil, et al [2] (2008) concluded in their study: that despite ileostomy patients having highest crude mortality and complication rates, after risk adjustment it was equally safe. Severity of the disease rather than the surgical option had a significant impact on the outcome in patients with ileal perforations.

Cesar G. Athie MD, et al [3] (1998) concluded in their studies that the Primary closure should be discouraged, even for a single perforation. Instead directed intestinal resection is recommended as elective surgery for all cases of typhoid fever complicated with intestinal perforation, resecting 10 cm at each side of the distal and proximal perforation.

Arshad M. Malik, et al[4] (2006) concluded that Primary ileostomy should be given priority over other surgical options in those moribund patients who present late in the course of illness, have more than one perforation with massive faecal contamination of the abdominal cavity. Primary double layer closure is preferred technique in clinically stable patients with single perforation with minimal soiling of the abdominal cavity.

Shukla VK et al. [5](2004) in their Prospective study of Enteric perforation treated surgically by single layer closure and double layer closure, concluded that it is good closure of the perforation rather than single- or double-layer closure that determines the outcome in patients with enteric perforation.

J P Kim, The present study was conducted to compare the results of different surgical techniques employed in ileal perforation in terms of overall morbidity and mortality in our set up.

The aim of the present study was to prospectively compare the outcome of primary closure, resection anastomosis, and ileostomy in cases of ileal perforations.

To compare between the three groups:
GROUP A: Primary closure.
GROUP B: Resection anastomosis.
GROUP C: Primary ileostomy, regarding mortality and morbidities like:

A) Primary:
1. Wound infection
2. Wound dehiscence

B) Secondary:
1. Anastomotic leakage
2. Intra-abdominal abscess
3. Faecal fistula.
4. Re-laparotomy.
5. Chest infection.

MATERIALS AND METHODS

It was an institution based, observational study conducted in General Surgery ward (emergency), General Surgery OT, General Surgery outpatient department (OPD) of R G Kar Medical College, Kolkata.

As per previous year statistics, it is estimated that about 90 such cases will comprise the total **sample size**

Patients admitted to the emergency of general surgery department with suspected history of ileal perforation and subjected to operative treatment were randomly selected irrespective of etiology and placed into three groups depending upon the outcome of laparotomy findings,

GROUP A: Primary closure.
GROUP B: Resection anastomosis.
GROUP C: Primary ileostomy

Inclusion criteria:
Patients suspected of having ileal perforation on strong clinical background.

Exclusion criteria:
1. Traumatic perforations
2. Very high risk patients like renal failure, ischemic heart failure, for whom emergency laparotomy could not be done due to an esthetic reasons.
3. Patient who left against medical advice at any stage of this surgery.

Study design
It is a cross-sectional observational study and 90 consecutive patients undergoing emergency laparotomy were recruited for study using following inclusion and exclusion criteria. Written informed consent was taken from all cases. Approval was taken from institutional ethical committee.

Study tools:-
1. Pretested and predesigned Proforma.
2. Erect X-ray Abdomen.
3. CECT Whole Abdomen.
4. Complete hemogram, LFT, Electrolytes, Urea, Creatinine, RBS, HIV 1 &2, HBsAg, HCV)
5. Blood: Widal test.

STUDY TECHNIQUE:-
The principal investigator collected data by use of questionnaires and direct observation of the laparotomy patient in the pre, peri-operative and postoperative periods All patients with ileal perforation, who are not fulfilling the exclusion criteria and attending the Emergency of General Surgery at R.G.KAR Medical College And Hospital, were selected based on laparotomy findings irrespective of etiology in ileal perforation, and divided into one of the three groups according to operative procedure performed by the treating surgeon,
i) Dealt with primary closure
ii) Dealt with ileal resection and anastomosis.
iii) Dealt with exteriorization of the gut (Primary ileostomy).

The operative procedure was determined by the general condition of the patient, number of perforations and degree of peritoneal contamination.

Primary ileostomy was done in patients in whom there was massive fecal contamination of peritoneal cavity and the general condition of the patients was not satisfactory, while primary double layered closure of the perforation was attempted in clinically stable patients with a single perforation anastomosis was attempted in cases where there were more than one perforations and unhealthy bowel.

Monitoring of any post-operative complication like anastomotic leakage, surgical site infection, chest infection, wound dehiscence, hypotension was done.

All data were recorded and statistical study was done between three groups..

Statistical Analysis
Statistical Analysis was performed with help of Epi Info (TM) 7.2.2.2. EPI INFO is a trademark of the Centers for Disease Control and Prevention (CDC).

Descriptive statistical analysis was performed to calculate the means with corresponding standard deviations (s.d.). Test of proportion was used to find the Standard Normal Deviate (Z) to compare the difference proportions and Chi- square (X^2) test was performed to find the associations. If any of the cell frequencies were foundless than 5, Corrected Chi-square (X^2) test was performed to find the associations. One way analysis of variance (ANOVA) followed by Tukeys post hoc test was used to compare more than two means..$p<0.05$ was taken to be statistically significant.

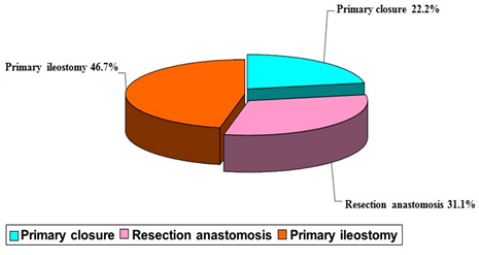
RESULT

Table-1: Distribution of type of surgery underwent of the patients

Type of surgery underwent	Number	%
Primary closure	20	22.2%
Resection anastomosis	28	31.1%
Primary ileostomy	42	46.7%
Total	90	100.0%

22.2%, 31.1% and 46.7% of the patients were underwent Primary closure, Resection anastomosis and Primary ileostomy respectively.

Chart 1



Post-operative findings:

Table-2: Distribution of post-operative complications and type of surgery underwent of the patients.

Post-operative fining	Primary closure (n=20)	Resection anastomosis (n=28)	Primary ileostomy (n=42)	Chi-square (c^2) test	p-value
Wound Infection	11(55.0%)	15(53.6%)	32(76.2%)	4.75	0.092 NS
Wound Dehiscence	6(30.0%)	7(25.0%)	23(54.8%)	7.27	0.0264*
Chest Infection	11(55.0%)	14(50.0%)	32(76.2%)	5.73	0.0569 NS
UTI	0(0.0%)	0(0.0%)	4(9.5%)	4.78	0.0914 NS
Anastomotic leak	2(10.0%)	4(14.3%)	0(0.0%)	5.96	0.0506
Intra abdomen abscess	1(5.0%)	3(10.7%)	0(0.0%)	4.55	0.01 NS
Relaparotomy	1(5.0%)	2(7.1%)	0(0.0%)	2.88	0.23 NS
Hypotension	0(0.0%)	0(0.0%)	8(19.0%)	10.03	0.0066*
Ileostomy related complications	0(0.0%)	0(0.0%)	28(66.7%)	46.45	0.0066*
Fistula	2(10.0%)	4(14.3%)	0(0.0%)	5.96	0.0506 NS
Impaired Renal Function	1(5.0%)	3(10.7%)	2(4.8%)	1.07	0.57 NS
Death	1(5.0%)	3(10.7%)	0(0.0%)	4.55	0.10 NS

Post-operative findings were more or less equally prevalent among the patients of the three groups. Wound Dehiscence, Hypotension and Ileostomy related complications were significantly higher among the patients with Primary ileostomy ($p<0.001$).

Fistula and Relaparotomy were higher among the patients with Resection anastomosis but it was not significant ($p>0.05$).

Deaths occurred in higher proportion among the patients with Resection anastomosis (10.0%) followed by Primary closure 1(5.0%) which were higher than that of Primary ileostomy (0.0%) but it was not significantly higher ($p=0.10$).

Chart 2

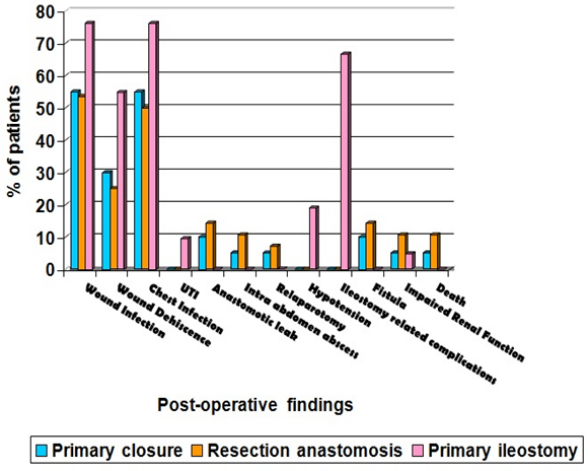


Table-3: Comparison of morbidity, mortality and without complications and type of surgery underwent of the patients

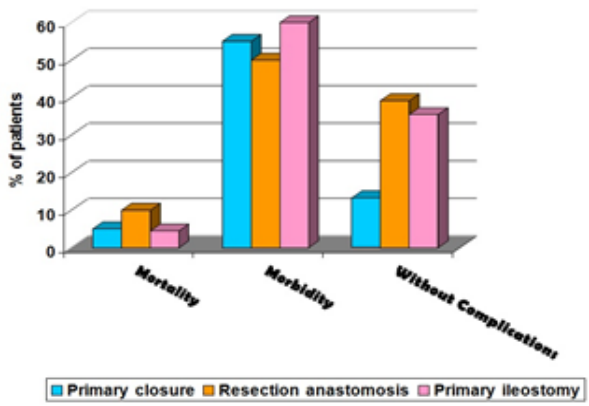
	Primary Closure (n=20)	Resection anastomosis (n=28)	Primary ileostomy (n=42)	Total (n=90)
Mortality	1(5.0%)	3(10.0%)	0(0.0%)	4(4.5%)
Morbidity	11(55.0%)	14(50.0%)	32(76.2%)	54(60%)
Without Complications	8(13.3%)	11(39.2%)	10(23.8%)	32(35.5%)

Proportion of deaths was higher among the patients with Resection anastomosis (10.0%) followed by Primary closure 1(5.0%) which were higher than that of Primary ileostomy (0.0%) but it was not significantly higher ($Z=1.46;p=0.23$).

Proportion of morbidities were significantly higher among the patients with Primary ileostomy (76.2%) than that of Primary closure (55.0%) and Resection anastomosis (50.0%) ($Z=3.15;p<0.001$).

39.2% of the patients with Resection anastomosis were without complications which was significantly ($Z=2.34;p=0.043$). However, it was significantly lowest among the patients with Primary closure (13.3%) (1.98=0.044).

Chart 3



DISCUSSION

Ileal perforation is best treated by surgery is universally accepted, but the exact nature of the surgical procedure remains controversial to date. Surgery for ileal perforation is associated with a high morbidity.

In our study 70% patients had single perforation while the remaining had more than one perforations. In a series of 112 patients studied by Arshad M. Malik et al[6], A single perforation of about 1cm size was found on the anti - mesenteric border of terminal ileum in 98(87.5%) patients, while more than one perforation was found in 14 (12.5%) patients.

In our study 66.7% patients with an ileostomy developed ileostomy related complications causing increase in the hospital stay duration upto 42 days. Faisal Ghani Siddiqui et al[7], in a study of 57 patients with ileostomy , complications such as skin excoriation, ileostomy diarrhoea, ileostomy prolapse and retraction of ileostomy caused prolonged hospital stay upto 56 days. This substantiates our findings.

The post-operative complications related with the ileostomy remained higher in our series, mainly due to improper fashion of ileostomy and inadequate post- operative nursing care of the stoma. None of the patients with ileostomy died compared to patients who underwent primary closure or resection and anastomosis. The ileostomy complications can be reduced, if not outright eliminated, by proper fashioning of the stoma and provision of adequate nursing care, patients discomfort, dissatisfaction and the need for second surgery discourage us from its use.

Resection anastomosis has been strongly advocated by many authors especially in the presence of multiple ulcers or perforations, large perforation, gangrene or unhealthy gut, hemorrhage and perforation associated with stricture. In our study resection and anastomosis carried the highest mortality. In the study conducted by Akung V et al[8], all of the post-operative complications, faecal fistula remained the most dreaded with an incidence of around 12 percent..

In our study the incidence of faecal fistula was 6.6%. Three patients with anastomotic leak underwent re–exploration, creation of ileostomy and survived while the remaining three cases died from fecal fistula before they were re operated. Those three patients with fecal fistula succumbed causing 10% mortality in Group B and 5% mortality in Group A. So there were 4 deaths in 6 cases of faecal fistula. It is widely reported as inducing high mortality rate. Nguyen[9] reported 5 cases of faecal fistula of his own experience that resulted in 4 deaths and cited Meirer who experienced 6 deaths in 8 cases of postoperative faecal fistula.

Kouame et al[10], have attributed 11(50%) deaths in their series to faecal fistula .

Faisal Ghani Siddiqui et al[7], in a study of 51 patients with primary repair/resection anastomosis without defunctioning ileostomy there were 6 deaths in 7 cases of faecal fistula . Anastomotic leakage or dehiscence of the primary repair of the perforation was by far the most frequent underlying cause for the fistula formation.

In this study Primary closure and Resection anastomosis was done in two layer technique. Shukla VK et al[5], in their prospective study of hundred cases of enteric perforation, treated surgically by single or double layer closure found that it's is good closure of perforation rather than single or double layer closure that determines the outcome .

The delay in the operation since the time of estimated perforation was mainly pre – hospital. This was due to the fact that most of the cases came from remote areas where the medical facilities are scarce. Late presentation, delay in the operation (>72hrs), multiple perforations adversely effected the severity of contamination and viability of the gut. In a study conducted by Ram chandran D Agarwal et al[11], they concluded that early surgery is the best treatment option as it ceases the source of further faecal contamination of the peritoneal cavity .

Studies to find out the best option for a given set of conditions do not show a significant degree of consistency, each study declared one modality to be more efficacious than the other. Various surgical procedures have been used for distal ileal perforations with variable results. Thus after years of trials there appear to be no consensus regarding the best possible surgical treatment for ileal perforations.

CONCLUSION

Although morbidity remained high in ileostomy group due to ileostomy related complications and prolongation of the hospital stay, it helped reduction of the incidence of fatal complications like fecal fistula thus reducing mortality.

In cases where patients present early within 72hrs with minimal soiling of the peritoneal cavity and healthy looking bowel, either primary closure or resection and anastomosis is an ideal procedure.

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Conflict of Interest: None

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