Original Article

Comparison of Outcome the Primary Repair Versus Ileostomy in Typhoid Ileal Perforation Patients

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ABSTRACT

OBJECTIVE: To compare the outcome and usefulness of primary repair and ileostomy procedures in cases of typhoid perforation.

METHODOLOGY: This study conducted at Bolan Medical Complex Hospital Quetta; from November 2015 to May 2016. Total 150 cases of typhoid perforation included in the study and patients were divided into two groups of 75 patients each. In one group primary repair (group A) was done and in another group ileostomy (group B) was done. It's a cross sectional comparative study and patients were evaluated for postoperative outcome of both surgical procedures. The Statistical software SPSS version 20.0 used for data analysis and p-value ≤0.05 was considered as significant.

RESULTS: The wound infection rate in patients with ileostomy was 24% (18 out of 75) and mean duration of wound discharge was 2.94±1.39 days. In the patients with primary repair the wound infection rate was 40% (30 out of 75) and mean duration of wound discharge was 2.76±1.38 days. The cosmesis acceptance rate in patients with ileostomy was 93.3% (70 out of 75 patients) and in patients with primary repair the cosmesis rate was 80% (60 out of 75 patients). In this study increased rate of postoperative complications seen in group A compared to group B and cosmesis acceptance rate is lower in group A compared to group B.

CONCLUSION: This study observed that ileostomy procedure plays an important role in cases of ileal perforation over other surgical options.

KEY WORDS: Wound Discharge, Intra-Abdominal Collection, Ileostomy, Typhoid ileal Perforation.

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INTRODUCTION

Historically gastrointestinal perforations have been observed surgical problem across the world[1]. It can occur in any part of gastrointestinal tract from esophagus to rectum and cause peritonitis.[1] In Indian subcontinent the fifth common cause of abdominal emergency is Ileal perforation peritonitis and it's due to high incidence rate of enteric fever[1]. Despite availability of modern medical diagnostic technology and treatment procedures the disease abrupt onset and rapid downhill causing high mortality[1]. The peritonitis mortality rate is 5-62% and incase of late presentation the perioperative mortality rate rises up to 80% [5].

Typhoid fever is recognized as a severe febrile and life threatening disease and major threat to public health. The major cause of disease is gram negative bacillus salmonella typhi and it transmitted through Oro-fecal route[1]. The incidence rate is >100 /100,000 cases per year globally and endemic regions are developing countries[2]. Typhoid fever is a global public health issue and main reason of occurrence is poor waste disposal system and improper sanitation in developing countries[3]. Typhoid fever witnessed numerous complications and most common one is intestinal hemorrhage. But the lethal cause of high morbidity and mortality among typhoid fever patients is perforation in terminal ileum[4]. Among 9-39% patients, the Payer's patches abundance on anti-mesenteric border of terminal ileum causes longitudinal ulcers and eventually leads to perforation. Inadequate antimicrobial therapy, male sex, and leucopenia are short term symptoms of typhoid fever and leads to enteric perforation in typhoid fever patients[5].

Globally, despite practice of several surgical techniques, the widely acceptable surgical procedure in typhoid ileal perforation still not established[1]. Therefore, several type of surgical procedures currently available to treat typhoid perforation which includes primary double layered closure, segmental resection with end- to- end anastomosis and primary ileostomy[1]. Researches observed that in primary repair procedure wound infection and abdominal collection rates are higher than ileostomy[8]. Many researchers worldwide recommended ileostomy the most successful procedure in cases of typhoid perforation because of low mortality, morbidity and short hospital stay as compared to only primary

anastomosis procedure[6]. Additional surgery for closure of ileostomy is the major disadvantage of ileostomy procedure which could leads to ileostomy related complications among typhoid patients[7]. Most of studies found better cosmesis acceptance in primary repair but there is another study conducted in South Korea observed higher cosmesis acceptance rate in ileostomy group of patients[18]. Researchers observed that the gender, cause of perforation, pus amount, fecal fistula and intra-abdominal abscesses are main prognostic factors and provoked the need of further research on topic[15]. In context of Balochistan province of Pakistan very scarce research conducted and being a developing country, we have to face typhoid perforation commonly in Pakistan. There is need to establish more successful procedure to reduce morbidity in terms of wound infection in our population. The aim of this study is to compare the outcome and usefulness of primary repair and ileostomy procedures in cases of typhoid ileal perforation patients at Bolan Medical Complex Hospital Quetta.

METHODOLOGY

This study was conducted at Bolan Medical Complex Hospital, Bolan Medical College Quetta from November 2015 to May 2016. Total 150 cases of typhoid perforation included in the study and patients were divided into two groups of 75 patients each. In one group primary repair (group A) was done and in another group ileostomy (group B) was done. It's a cross sectional comparative study and patients were evaluated for postoperative outcome of both surgical procedures. The hypothesis was that there is difference on post-operative wound infection between primary closure and ileostomy. The non-probability consecutive technique was used for sampling and inclusion criteria was patients who underwent typhoid perforation surgery, age between 25-60 years, both gender and given consent for study. Patients with Lung disease FEV<70 on pulmonary function test, malignant on basis of biopsy report and those not willing to participate in study were excluded. Randomization was done by senior surgeons by picking up cards of both groups and all operations were done by group of three experienced surgeons and all performed the same technique. Hand sewn method used for all procedures and interpretation was done by senior surgeon.

This study was approved by College of physicians & surgeons Pakistan (CPSP) and Bolan Medical Complex Hospital Quetta (BMCH). Those patients who fulfilled the criteria of study were asked for written consent and selected patients taken up for emergency surgery after resuscitation. Patients were divided into two groups and both groups of patients were injected 3rd generation antibiotics.

Two different surgical procedures done for each group, group A patients underwent for primary repair and group B patients underwent for ileostomy procedure. Three surgeons applied the same technique in procedures and used hand sewn method. The group A patients underwent for primary closure and two layer method applied. The 3-0 poly glycolic acid (vicryl) was used to close inner layer and silk 3-0 was used to close outer layer. The group B patients underwent for ileostomy procedure and both group of patients observed for post-operative complications during five days of hospital stay, later covering of ileostomy procedure done in group B patients.

The tool of assessment was predesigned proforma to record all information of the patients and inclusion/ exclusion criteria applied in the study to control bias. Statistical software SPSS version 20.0 was used for data analysis. Mean and standard deviation calculated for quantitative variables and frequencies/percentages for description. The statistical test "chi square" applied to find association of post-operative outcome with two surgical procedures in both group of patients and p value <0.05 considered significant. The variables were age, gender and acceptance of cosmesis. Stratification procedure was done to see the effect of modifiers on outcome in both groups of patients. Moreover, this study assessed cosmesis acceptance among two treatment groups with both genders.

RESULTS

This study compared postoperative surgical complications in two groups of patients who underwent for primary closure and ileostomy. There was higher number of male patients 66% (99 out of 150 patients) in the study and female contribution remained only 34% (51 out of 150 patients). Likewise in group wise distribution the male patients were in higher number than female patients. In group A male patients were 62.6% (47 out of 75 patients) and female were only 37.4% (28 out of 75 patients). Similarly in group B male patients were 69.3% (52 out of 75 patients) and female patients remained only 30.7% (23 out of 75).

In this study the cumulative mean age of the study subject was 43.73±10.15 years. Likewise in group A patients the mean age was 42.29±9.67 and in group B patients 45.17±10.48 years. In group A about 61.3% (45 out of 75 patients) patients were ≤45 years and 38.7% (29 out of 75 patients) were >45 years of age. In group B about 41.3% (31 out of 75 patients) patients were ≤45 years of age and 58.7% (44 out of 75 patients) were >45 years of age (Table I). There were higher number of patients with <45 years of age in group A but on other hand there were higher number of patients >45 years of age in group B. Thus, this study observed that most of younger patients underwent for primary repair procedure and older patients underwent for ileostomy procedure. Furthermore, in this study the median age data

TABLE I: DESCRIPTIVE STATISTICS OF AGE AMONG GROUP A (PRIMARY REPAIR) AND GROUP B (ILEOSTOMY)

	Range		Median (IQR)		Mean + SD	
Primary Repair Group A (n=75)	< 45 years (n=46)	>45 years (n=29)	< 45 years (n=46)	>45 years (n=29)	< 45 years (n=46)	>45 years (n=29)
	19	**12**	**35.00 (10.25)**	**53.00 (6.50)**	**35.91+6.10**	**52.41+3.78**
Ileostomy Group B (n=75)	< 45 years (n=31)	>45 years (n=44)	< 45 years (n=31)	>45 years (n=44)	< 45 years (n=31)	>45 years (n=44)
	19	**14**	**34.00 (8)**	**53.60 (5)**	**34.09+5.62**	**52.97+4.02**

doesn't observed statistically significant effect on outcome in both treatment groups of patients.

There were 40% (30 out of 75 patients) patients with postoperative wound infection in group A and mean duration of wound discharge was 2.76±1.38 days. In group B patients the wound infection was 24% (18 out of 75 patients) and mean duration of wound discharge was 2.94±1.39 days. The p value p=0.036 (Table II) shown statistically significant association between wound infection and two surgical procedures. This study observed that those patients underwent for ileostomy (group B) experienced less postoperative complication (wound infection) than primary repair (group A) and similar results observed in another study in Benin[7].

TABLE II: FREQUENCY AND ASSOCIATION OF WOUND INFECTION WITH STUDY GROUPS (n=150)

	Study Group		Total	P-Values
	(Group A) Primary Repair (n=75)	(Group B) Ileostomy		
Yes (n=77)	30	18	48	0.036*
No (n=73)	45	57	102	
Total??	75	75	150	

Later stratification with respect to gender done to observe effect modifiers if exist and the results shown that there is no significant association of wound infection and male gender in two treatment groups (Table IV) with p value of p=0.100 (female gender p=0.212, age ≤45 years p=0.225, and age >45 years p=0.089). Further stratification with respect to age done (Table V) to observe effect modifiers if exist and the results shown that there is no significant association of wound infection and age >45 in two treatment groups (p=0.159).

The acceptance of cosmesis was 80% (60 out of 75 patients) in patients of group A and 93.3% (70 out of 75 patients) in patients of group B. There was statistically significant association (p=0.016) between acceptance of cosmesis and both surgical procedures (Table III). Moreover, this study found statistically significant association in acceptance of cosmesis and female gender in both groups of study and p value was p=0.044 Table VI(I). Additionally, this study didn't found statistically significant association in acceptance of cosmesis among male gender patients in both groups of study and p value was p=0.156 Table VI(II).

TABLE III: FREQUENCY AND ASSOCIATION OF ACCEPTABLE COSMESIS WITH STUDY GROUPS (n=150)

	Study Group		Total	P-Values
	Primary Repair (n=75)	Ileostomy (n=75)		
Yes (n=77)	60	70	130	0.016*
No (n=73)	15	5	20	
Total	75	75	150	

TABLE IV: FREQUENCY AND ASSOCIATION OF WOUND INFECTION WITH STUDY GROUPS ACCORDING TO MALE GENDER (n=99)

	Study Group		Total	P-Values
	Primary Repair (n=47)	Ileostomy (n=52)		
Yes (n=30)	18	12	30	0.100***
No (n=69)	29	40	69	
Total	47	52	99	

TABLE V: FREQUENCY AND ASSOCIATION OF WOUND INFECTION WITH STUDY GROUPS ACCORDING TO AGE > 45 YEARS (n=73)

	Study Group		Total	P-Values
	Primary Repair (n=29)	Ileostomy (n=44)		
Yes (n=67)	25	42	67	0.159**
No (n=6)	4	2	6	
Total	29	44	73	

TABLE VI(I): FREQUENCY AND ASSOCIATION OF ACCEPTABLE COSMESIS WITH STUDY GROUPS ACCORDING TO FEMALE GENDER (n=51)

	Study Group		Total	P-Values
	Primary Repair (n=29)	Ileostomy (n=44)		
Yes (n=43)	21	22	43	0.044*
No (n=8)	7	1	8	
Total	28	23	51	

TABLE VI(II): FREQUENCY AND ASSOCIATION OF ACCEPTABLE COSMESIS WITH STUDY GROUPS ACCORDING TO MALE GENDER (n=99)

	Study Group		Total	P-Values
	Primary Repair (n=47)	Ileostomy (n= 52)		
Yes(n=87)	39	48	87	0.156**
No (n=12)	8	4	12	
Total	47	52	99	

DISCUSSION

Typhoid perforation is considered a public health issues across the world due to complication of peritonitis and its one of the major cause of high mortality and morbidity in developing countries[9]. Research shown that early intervention of preoperative resuscitation of typhoid perforation patients could improve the survival[10]. This study confirmed findings of previous studies that ileal perforation and intestinal bleeding are two major lethal complications among typhoid perforation patients and these arises from necrosis Pyre's patches in the terminal ileum[10]. Two important prognostic factors in typhoid fever patients are symptoms and presentation time in hospital and current study checked method of treatment with hospital stay duration[11].

Current study highlighted the importance of typhoid disease which is still the major cause of small bowl perforation and likewise another study observed that it accounts for 36.67% abdominal perforation cases globally[1]. Additionally, about 35% cases are due to unknown reasons and during histo-pathological examination it showed nonspecific inflammation[1]. Another study observed that about 56.6% causes of ileal perforation are nonspecific, about 25% are due to typhoid perforation and 9.30% cases are due to tubercular perforation[14]. In this study higher number of male patients who underwent for two types of treatment methods to repair ileal perforation and likewise another studies found the similar results[14,15] Table I. Current study done stratification with respect to gender to observe effect modifiers if exist and the results shown that there is no significant association of wound discharge with gender in two treatment groups Table IV with p value of p=0.100 (female gender p=0.212, age ≤45 years p=0.225, and age >45 years p=0.089. This study found higher morbidity in those patients who underwent for ileostomy procedure than primary repair regardless of gender effect and likewise similar finding were observed in another study[14]. In this study commonest postoperative complications was wound infection regardless of gender effect and likewise similar results found in another study[14].

In this study further stratification with respect to age group (age <45 and >45 years) done to observe effect modifiers if exist and results shown that there was no statistically significant association of wound infection and age in two treatment groups Table V with p value of p=0.159. Another study reported that the effected age group of typhoid disease is 28 years and Typhoid ileal perforation effects younger adults in second and third decades of life[17]. Furthermore, in current study higher number of younger patients underwent for primary repair method which provoked the further research on age group despite statistically insignificant results. The two other important factors which influence the prognosis in typhoid ileal perforation are number and location of the perforation[17]. Thus, there is need of further research on topic to see age effects in different environment. Moreover, the cosmesis acceptance is higher in patients underwent for ileostomy procedure than primary repair and comparatively duration of hospital stay is also shorter in ileostomy procedure patients Table III. Further stratification in term of gender observed that female acceptance of comesis is higher than male gender Table VI.

Moreover, this study observed higher morbidity and mortality following surgical treatment of typhoid ileal perforation and another study found similar findings in developing countris[18]. Researchers observed that the loop ileostomy procedure is better option of treatment followed by second operation in cases of gross peritonitis with copious amount of pus and fecal matter, multiple perforations within 10cm of ileo-ceacal valve and delay in the operation[3]. This procedure can be done 6-8 weeks after first surgery but it has own risk factors and it could be psychological and social trauma to the patients[3].

Literature shows that the primary repair is better option than ileostomy in perforation cases because of low cost and less complications[16]. The mortality rate is less in primary surgical repair than loop ileostomy, 20% and 31% respectively[16]. This study found that ileostomy is a better procedure with less postoperative complications despite higher cost in ileal perforation cases and likewise another studies found similar results in developing country[3,19]. Furthermore, this study observed that ileostomy and ileo-transverse bypass must be considered treatment option in patients who present with unhealthy gut and ileostomy is a lifesaving if it practice wisely and similar results

found in previous study[16]. This study reported that ileostomy repair method has good prognosis rates in patients of ileal perforation and statistically significant association found between wound discharge and treatment procedure Table II as previous study[12].
Researchers observed that the number of perforation affects the mortality in typhoid ileal perforation cases[17]. On contrary another study observed in his study that number of perforations does not significantly affect the outcome and mortality rate in typhoid ileal perforation but commonest influencing factor is time of surgery after perforation[18]. Higher morbidity and mortality observed in patients who underwent for surgery after 24 hours of perforation[18]. The ileal perforation relevant peritonitis is commonest surgical emergency in tropical regions and its 5th commonest cause of abdominal emergencies in tropical regions like Indian subcontinent[19]. Typhoid ileal perforation has sudden onset and speedy straight forward course with high mortality rate in case of not treated and still difficult to cope despite recent advances in medical sciences[19]. Another study observed less number of postoperative complications in ileostomy procedure, the anastomotic leakage which needs reoperation was 7% in ileostomy procedure gross fecal contamination was 26.7% in primary repair cases and it confirms the findings of current study[19].

CONCLUSION

This study found that those patients underwent for ileostomy treatment had better outcome than primary repair treatment method and significant difference found in terms of wound infection and acceptable comesis with two type of treatment methods. Moreover, ileostomy procedure is more beneficial in typhoid ileal perforation patients because of less complication. However, ileostomy-related complications increase the postoperative stay of the patient. Though, these complications can be reduced, if not outright eliminated, by proper fashioning of the stoma and care of the stoma. Moreover, comesis acceptance is higher in patients those underwent for ileostomy procedure than primary repair method especially in women.

Ethical permission: College of Physicians & Surgeons Pakistan, REU permission letter No. CPSP/ REU/SGR-20140001-6608, dated 10-09-2015.

Conflict of Interest: The author and researcher has no conflict of interest and all ethical procedures followed as per guidelines of College of Physicians and Surgeons Pakistan (CPSP) and Bolan Medical Complex Hospital Quetta (BMCH). Moreover, informed consent was obtained from all patients for being included in the study.

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AUTHOR CONTRIBUTIONS

Mengal MA: Presented the Idea, Wrote the manuscript
Muhammad D: Supervised the project
Bazai AK: Conceived the study
Mengal MA: Critical feedback & shape of research
Mengal H: Analytical calculations, writing of manuscript

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