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FACTORS AFFECTING THE SURGICAL OUTCOME IN TYPHOID INTESTINAL PERFORATION IN CHILDREN

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ABSTRACT

BACKGROUND: *Typhoid intestinal perforation is a catastrophic condition causing high morbidity and mortality in children. The purpose of this study was to share our experience regarding the factors affecting the surgical outcome in our setup.*
METHODOLOGY: *This observational (prospective) study consists of cases of typhoid intestinal perforation who have been operated at the department of pediatric surgery at Liaquat University of Medical and Health Sciences as well as private practice from January 2007 to may 2010. were reviewed with respect to age, sex, duration of illness, number of intestinal perforation , contamination of peritoneal cavity (mild when purulent fluid or feculent <10ml/kg body weight, moderate 10-15ml/kg body weight and sever >15ml/kg body weight) along with surgical procedures and its outcome.*
RESULTS: *This study consists of 63 patients, male 47 and female 16 with male: female ratio 2.9:1. Age of patients ranges from 2-12 years with mean of 6.6 years. Common clinical features were fever, abdominal distension, constipation and tenderness. Thirty-four patients had single perforation, 8 had two and 21 had multiple perforations. Significant peritoneal contamination had been observed in multiple perforation groups and had P-value 0.002. Forty-six percent patients reported in 2nd week of illness, duration of illness versus severity of contamination had significant p-value 0.001. Surgical options opted were primary closure of perforation, ileostomy and resection and anastomosis. Surgery versus perforation had p-value 0.001. Post operative complications recorded in 30 patients, most frequent were superficial wound infection (12), faecal fistula (6) and wound dehiscence in 4 patients. Mortality observed in this study was 9.5%.*
CONCLUSION: *Most significant factors for high morbidity and mortality in typhoid intestinal perforation observed were severe contamination and multiple perforations in*

KEY WORDS: Typhoid ileal perforation, Children, Complications, Surgical options

INTRODUCTION:
Complicated typhoid fever causing intestinal perforation is a challenge to pediatric surgeon due to high morbidity and mortality.[1] Typhoid fever is serious global health problem with an estimated annual incidence of 0.54% which is caused by gram negative bacillus salmonella typhi and para typhi.[2] Most serious gastro intestinal complications by typhoid fever are hemorrhage and intestinal perforation due to necrosis of pyers patches at terminal ileum. The incidence of typhoid ileal perforation (TIP) is variable in different part of world;15-33% in west Africa,1-3% in Egypt and Iran while in Pakistan no data is available.[3] The mortality of typhoid ileal perforation (TIP) remains high in under developed countries ranging from 5.2 to 80%. [4] The morbidity and mortality is affected in under developed countries due to late referral, long duration of illness, delay in surgical procedure, number of perforations, malnutrition, severe peritoneal contamination and surgical procedure has also impact on out come of surgery.[5] The purpose of this study was to share our experience regarding the factors affecting the surgical out come in our setup.

MATERIAL AND METHODS:
This prospective observational study consists of 63 patients , who were operated for typhoid ileal perforation (TIP) between January 2007 to May 2010, in Department of Pediatric Surgery at Liaquat University hospital as well as in private practice were reviewed with respect to age, sex, duration of illness, number of intestinal perforation

, contamination of peritoneal cavity (mild when purulent fluid or feculent <10ml/kg body weight, moderate 10-15ml/kg body weight and sever >15ml/kg body weight) along with surgical procedures and its outcome.

Diagnosis of TIP has been made on detailed history, physical examination and x-ray abdomen, which was further confirmed on intra operative findings; typical ante mesenteric perforation of ileum, purulent exudates, friable boils loops matted together with fibrous peels, marked peritoneal reaction on serosal aspect of perforated bowel. Occasionally blood for culture and tissue from perforation site for histopathology has been taken for diagnosis. All the patients had complete blood count, urea, creatinine and serum electrolytes. Widal test, ultrasound abdomen and peritoneal fluid for culture and sensitivity has been recorded in few cases.

All the patients were admitted in emergency. After resuscitation surgery was performed upon them. Antibiotics started were Ceftriaxone, Metronidazole and Amikacin. Surgical options opted were primary closure; when contamination was mild to moderate with single or two perforations and with healthy looking terminal ileum. ileostomy was made when there was severe contamination with any type of perforation,, toxic looking patient and friable matted loops or distance between perforation was more than 15 cm so distal primary closure and proximal ileostomy, resection and anastomosis was made when perforation were multiple with mild to moderate contamination, or one or two perforation with compromised adjacent intestine. All the patients had vigorous peritoneal cavity wash with normal saline (50-100ml/gk). Post operative two weeks antibiotics were continued and complications managed accordingly. Statistical analysis of above mentioned parameters was made by using SPSS version 17.

TABLE I

SEVERITY OF CONTAMINATION VERSUS DURATION OF ILLNESS

P value .001

		Duration			Total
		1-7	8-14	15-21	
Severity of contamination	mild	17	6	2	31
	moderate	3	14	5	19
	severe	3	9	4	13
	Total	23	29	11	63

TABLE II

SEVERITY OF CONTAMINATION VERSUS NUMBER OF PERFORATIONS

P value .002

		Number of perforation			Total
		one	two	many	
Severity of contamination	mild	19	4	2	25
	moderate	11	3	8	22
	severe	4	1	11	16
	Total	34	8	21	63

TABLE III

SURGICAL PROCEDURE VESUS NUMBER OF PERFORATIONS

P VALUE .001

		Surgical procedures			Total
		Primary closure	Ileostomy	Resection and anastomosis	
Number of perforation	one	29	4	1	34
	Two	7	1	0	8
	many	0	11	10	21
	Total	36	16	11	63

RESULTS:

This study consist of 63 patients, males 47 and females 16 with male: female ratio 2.9:1. Ages of patients range from 2-12 years with mean age of 6.6 years and standard deviation 3.0. Thirty (47.6%) patients were within age of 5-9 years. Clinical features recorded were fever, distension of abdomen, constipation, vomiting, pain and tenderness. Duration of illness ranges from 4-21 days with mean of 9.9 days and standard deviation 4.4. Most of the patients were referred from periphery to tertiary care hospital due to failure of treatment and poverty. So it is difficult to say the exact time of typhoid ileal perforation, but from medical record it is assessed that 23 (36.5%) in 1st week, 29(46%) in 2nd week and 11(17.5%) in 3rd week of illness had got perforation. X-ray abdomen was done in all cases, only % had free gas under diaphragm. Main laboratory changes observed were raised urea due to dehydration, hypokalemia and anemia. Widal test was performed in 50% of cases which was positive in 30% of cases only. Fifty eight percent patients had surgery within 24 hour after arrival in hospital and 42% after 24 hours. All the patients were resuscitated by correcting the dehydration and anemia Thirty-four patients had single perforation, 8 had two perforation and 21 had multiple perforations while maximum perforation in a patient were twenty. Perforation had significant P-value in relation to duration of illness P-value 0.001and severity of contamination P-value 0.002 as shown in Table I and II. Surgical option opted were primary closure, ileostomy and resection and anastomosis, there relation to number of perforation had significant P-value 0.001 value shown in Table III. Mild to moderate adhesion of intestine was observed in 42 cases. Mean distance from ICJ to perforation was 34 cm which has no effect on outcome. Post operative

TABLE IV.
COMPLICATIONS IN DIFFERENT VARIABLES

Complications	Severity of Contamination				Number. of Perforations		Duration of illness in days			Surgical procedures		
Patients# 30	**Mild**	**Mod**	**Severe**	**one**	**Two**	**multiple**	**1-7**	**8-14**	**15-21 closure**	**Primary**	**Ileostomy**	**Resection and anastomosis**
Superficial Wound infection	3	6	3	7	2	3	1	10	1	8	3	1
Faecal fistula	2	3	2	2	1	4	3	3	1	3	2	2
Wound dehiscence	2	-	2	1	-	3	3	1	—	1	2	1
Intestinal obstruction	-	-	2	1	-	1	-	1	1	-	2	-
Hepatitis	-	-	1	-	-	1	-	1	-	-	1	-
Sepsis	-	2	-	-	-	2	-	1	1	-	-	2
Pneumonia	-	1	-	-	-	1	-	1	-	-	-	1
Empyema thoraces	-	1	-	-	-	1	-	1	-	-	-	1

complications were observed in 30 patients their relation to other variables is shown in Table IV. Six (9.5%) patient expired in this study mostly from multiple perforation and moderate to severe contamination group.

Discussion: Typhoid ileal perforation (TIP) is frequently seen in under developed countries as a severe gastrointestinal complication of typhoid fever.[1,6] It presents a challenge to surgeon in that perforation leads to high morbidity and mortality, but development of perforation is also un predictable. Contaminated food and water is main source of salmonella typhi causing typhoid fever in children. The prevalence of typhoid intestinal perforation had previously been reported as an indication of endemicity of typhoid fever in any locality.[7]

TIP generally occurs in 2nd to 3rd week of illness, this is because of mechanism of perforation in peyers patches of terminal ileum[8] but in developing countries cases are reported within first week of illness,[9] reason behind this is supposed to be low immune power, change in virulence of bacteria, hypersensitivity to peyers patches and ileal contents of bacteria. In this study 63.5% perforation recorded in 2nd and 3rd week of illness, which is similar to Atamanalp et al [8] and contrast to Uba et al.[9]

It is commonly seen in males after the age 4 years, possible reasons for this is, that males spend more time out of house and often eat at outside.[10] It has been observed that perforation rate increases with age as describe by Emeh et al [11]such as 1.7%, 12.45% and 29.3% with ages of 1-4 years,5-9 years and 10-12 years respectively ,while in our study these are-21(33.3%),30(47.6%) and 12 (19%) respectively with same age group which does not match the results of Emeh et al. Rehman et al[12] stated that mortality increase in less than 5 years age ,while Adesunkanmi et al[13] does not favour this statement. In this study morbidity and mortality has no relation to specific age group, which is similar to previous author

For the accurate diagnosis of TIP blood C/S, Urine C/S, stool C/S or bone marrow are required. But patients with perforation in developing countries present late and partially treated with antibiotics and yield of blood culture is 3-34%. [14] Typhoid ileal perforation is mostly diagnosed on history clinical examination and operative findings such as typical perforation on antimesenteric border, purulent collection and adhesion of bowel loops with friable pussy flecks, [15] in this study almost of the cases are diagnosed on this pattern.

Pre operative correcting of dehydration and anemia and antibiotics are essential for good surgical outcome. Non operative management of TIP was considered as best treatment in previous days, but nowadays surgical intervention is a standard treatment for TIP.[2,16]

One of the many factors affecting the surgical outcome in TIP is time interval between duration of illness and surgical intervention. Early surgery can minimize the complications while delayed surgery leads to severe peritonitis and septic shock. Delayed referral or long duration of illness in this study was due to poverty, lack of seeking medical advice and low index of suspicion of typhoid fever. In this study 7 patients had complication who presented within 1st week of illness, 23 patients had complication those presented in 2nd and 3rd week of illness. Our results correlates to previous studies.[4,12,13]

Contamination of peritoneal cavity is a critical prognostic factor for TIP. In this study most of the complication occurred in group of moderate and severe contamination patients which is comparable to previous studies [2,17],

In TIP number of ileal perforation has influence on prognosis. Beniwal et al [18] agreed that number of perforation had effect on surgical outcome. Adesunkanmi et al[13]suggested high incidence of residual abscess in single perforation, kaybal et al [19] reported better outcome in single perforation and worse prognosis in multiple perforations while Rehman [12]does not favor correlation of perforation to morbidity and mortality. In this study we have major complications in multiple perforation groups as shown in Table IV which justify the statement of Beniwal[18] and kaybal [19] and do not correlate to Rehman .[12]

Generally perforation occurs from 0-80 cm proximal to ileocaecal junction.[4,17] Still now no evidence has been found to have correlation to location of perforation to surgical outcome. In this study distance ranges 12-60cm with mean of 34 cm. but no relation found as described by previous studies.

Multiple surgical option have been opted such as; primary closure with or without omental patch, wedge resection and anastomosis, ileostomy, exteriorization of perforation, distal primary closure with exteriorization of proximal perforation.[20] All these options depend upon number of perforation, contamination and condition of

ileum. We performed primary closure, ileostomy and resection and anastomosis, morbidity and mortality do not differ in different surgical procedures in our study, which is similar to Rehman .[12] Primary closure is the best option in single perforation as suggested by previous studies [17, 18,] same have been done by us, even the complication are highest in primary closure group.

Most frequent post operative complications reported were wound infection and faecal fistula. [21] Faecal fistula is a catastrophic condition in children causing high mortality. Fistula almost always need re exploration and surgical option opted are ileostomy or exteriorization on loop, which are time saving and life saving. Main causes reported for fistulas were negative nitrogen balance and lack of healing at anastomosis site.[22] In this study wound infection maximally occurred in primary closure group. Faecal fistula had occurred in multiple perforation patients, while in surgical procedures it has almost equal contribution as shown in Table IV. Death reported in this study was in 6(9.5%) most of the patients had faecal fistula with multiple perforation and contamination. Our mortality rate is comparable to previous study [16] and contrast to others .[12, 18, 23]

CONCLUSION:

Typhoid intestinal perforation is a catastrophic illness. Most significant factor affecting the surgical outcome was long duration of illness, multiple perforations and severe contamination. Early diagnosis and early surgery may help in reducing the morbidity and mortality in typhoid intestinal perforation in children

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