Management of Typhoid Ileal Perforation: A Surgical Experience of 28 Cases

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Abstract:

Background: Typhoid fever is an endemic disease in Iraq. Many patients presented with an acute surgical abdomen due to ileal perforation which is a serious complication of Typhoid fever The outcome of management is determined by the promptness of the appropriate surgical operation**.**

Objectives: Early surgical treatment of typhoid ileal perforation, decrease morbidity and mortality**.**

Patients and Methods*:* Twenty eight Typhoid ileal perforation patients had been collected in AL-Kut General Hospital & Fourth surgical unit at Al-Yarmouk Teaching Hospital. Ten years period between Jan. 1999- Dec. 2008, all patients were admitted to the emergency room (E.R.) as acute abdomen. Typhoid ileal perforation expected clinically & proved by investigation such as plain abdominal x-ray, ultrasound & operative laparotomy findings. For patients who have single ileal perforation, wound debredement of the perforation edges and closed by single layer interrupted transverse suturing by vicryle 2/0. For patients with multiple ileal perforations, resection of the affected ileal part with end to end anastomosis, the excised tissue were send for histopathological examination. Irrigation of the abdominal cavity with Normal Saline and tube drains was used in all operations. Post-operative complications were studied.

Results: 18 (64.3%) were males. 10 (35.7%) were females, age ranges (17-41), mean age (25.6).Step ladder fever, abdominal pain and distention were the most clinical manifestation in the majority of the patients. Constipation, vomiting and diarrhea, were in some other patients. Widal test titer more than 1/320 in 12 (42.8%) patients, plain abdominal x-rays were positive in 21 (75%) patients, abdominopelvic ultrasound, had been done in 11(39.3%), all of them showed free soiled pelvic collection. In exploratory laparotomy, 28 (100%) patients were found to have peritoneal cavity collection, in 23 (82 %) patients had single ileal perforation and 5 (18%) patients had multiple perforation. The site of perforation was within 10-50cm distance from the ileocaecal junction, mean distance 21cm. The postoperative complications were prolonged paralytic ileus (> 3days) 75%; wound infection 67.85%, wound dehiscence (21.4%), fecal fistula (10.7%) and residual abdominal abscesses (7.1%) and death (21.4%).Total postoperative complications were found in19 (67.85%) patients, and 9(32.14%) patients were free from postoperative complications. Postoperative complications were inversely related with the time of presentation (25%) in early hospital presentation (within 1 day) and 100% in late (> 5 days) hospital presentation.

Conclusions: Typhoid ileal perforation is a serious complication, carries high risk of morbidity and mortality rate. Early surgical repair is the ideal treatment of typhoid ileal perforation. Resuscitation and surgical treatment, if carried within first 24 hours duration decrease morbidity and mortality rate.

Keywords: Typhoid fever, ileal perforation, acute abdomen, postoperative complications.

Introduction:

Typhoid fever is endemic disease in many developing countries [1] It is caused primarily by the gram-negative bacillus *Salmonella enteritidis* serovar Typhi [2], that includes bacterial phase with fever and chills in the first week, abdominal pain, rashes, prostrations and hepatospleenomegally in the 2nd week, intestinal bleeding and ileal perforation in the 3rd week. Salmonella typhi is the positive pathogenic bacteria.

There are longitudinal ulcerations of the small bowel in the antimesentric border within 50cm distance from the ileocaecal junction [3]. Intestinal bleeding and ileal perforations are the most lethal complications in the typhoid fever[4]. Ileal perforation is a serious complication of the typhoid fever in the developing countries [5] and if not treated surgically death is 100 % [6].

It forms 45% of perforation peritonitis condition and it is in the top of the list of the causes of small bowel perforations like Tuberculosis, Traumatic, Malignancy, and Strangulation of bowel [7].

Aggressive resuscitation with a combined antibiotic regimen in the preoperative period, fluids, selected operative procedure and metabolic support decrease the morbidity and mortality of typhoid enteric perforation [8].

The overall frequency of intestinal perforation in typhoid fever was 3% with an overall mortality rate of 1- 39.6%.[9] Late presentation, delay in operation, multiple perforations, and drainage of copious quantities of pus adversely affected the mortality rate [10] and 9-43% in other study[11] is recorded in spite of therapeutic progression [12]. If the patient arrives early, mortality can be decrease to as low as 10%, or even 3%[12]. A patient's prognosis will depend on the interval between the onset of illness, and perforation[13].

The surgical treatment was controversial since the late 1880s. Around the turn of the century, surgery became the established mode of therapy, with a mortality of70%.Not only surgical intervention sharply reduced mortality from 70%-100% to about 30%, but also improves the prognosis as documented in previous studies.[11] and validated by this study. It offers a great hope to survive [14]. Many surgical options have been used. Excision of the edge of the ileal perforation and simple transverse closure, either in a single layer or in two layers and peritoneal irrigation, have been widely practiced by many workers [15, 16]. Postoperative complications were wound infection, wound dehiscence, residual intra-abdominal abscesses, fecal fistula and death[13, 16].

Table-1: Results of some author and the results of this study:

Authors	Hospital stay(days)	% Wound infection	% Fecal fistula	% Wound Dehiscence	% Intra abdominal abscess	% Chest infection	% Incisional hernias	% Total complications	% Mortality
Ameh, Dogo[2]	26-50 mean 27	100		11.1					62
Ahmet Yaramis[10]									39.6
ARK. Adesunkanme[11]	15-35	66	8	34	8				28
Koame J. etal [14]	8-52 mean (30)		17.2					88.1	34
Amaral J. [16]									31
Najeeb S J. [17]	Average 13.3	36		7.1					3.6
AbdulGhaffar[18]		68	13.4	27.3	9.1				13.36
Adesunanme and B.Tajudeen[19]	1-75 days mean21±14	71.3		27.6	12.5	12.5			17.8
Present study	13-43 mean (21)	67.85	10.7	21.4	7.1	32.1	39.3	67.8	21.4

Patients and Methods:

A case-series study of twenty eight patients with typhoid ileal perforation, carried out in 10 years period between Jan.1999- Dec.2008 in Al-Kut General Hospital and in the 4th surgical unit of Al-Yarmouk Teaching Hospital. The standard criteria of rebound tenderness, abdominal rigidity, the presence of free intraperitoneal gas upon radiography, fecal or purulent fluid upon paracentesis, in patients with history of typhoid fever 2-3 weeks, positive Widal test and intraoperative findings (anti-mesenteric perforation of the distal ileum and histological evidence of typhoid inflammation in the tissue obtained from the edge of the perforation), were used to consider the diagnosis of typhoid ileal perforation.

Patients with generalized peritonitis due to other causes (intestinal tuberculosis, traumatic perforation, perforated appendicitis, duodenal ulcer perforation) were excluded from this study.

Most of the patients referred from medical unites or clinics, for surgical consultations. In the ER resuscitation with I.V crystalloid and colloid fluids, insertion of nasogastric tube used to decompress the stomach, Foley's urethral catheterization for monitoring urine output. This resuscitation and correction of dehydration takes about 2-6hrs, 3rd generation cephalosporin like Ceftrixon 2g.single dose and Metronidazol 750 mg every 8 hours were used. Investigations; like complete blood picture, ESR, Widal test, blood sugar, blood urea, serum creatinin, serum electrolytes, plain x-ray of abdomen and chest to detect free air under diaphragm and abdominopelvic ultrasound to detect pelvic collection. Investigation for Blood and Stool culture were not requested.

Emergency operation performed within 6 hours from admission. Under general anesthesia, exploratory laparotomy through midline incision, for undiagnosed acute abdomen and right paramedian incision for diagnosed typhoid perforation.

Wound debridement of the edge of the ileal perforation which was sending for histopathology, transverse single interrupted closure by vicryl 2/0 for single perforation, or segmental resection with end-end anastomosis, for cases with multiple perforations.

The peritoneal fluids was removed by suction and the amount was measured, the peritoneal cavity was irrigated with 5–6 liters of warm normal saline until the irrigation fluid become clear, then two drains were left in the peritoneal cavity, the abdominal wall was closed with continuous, number one non-absorbable suture material; then interrupted skin closure of the wound.

Table 2: Age of the patients

Age in years	No. patients	%
17-20	7	25
21-30	15	53.6
31-40	5	17.8
41	1	3.6
Total	28	100

Results:

Twenty eight patients of typhoid ileal perforation, 18 (64.3%) males and 10(35.6%) females; age ranges 17-41 years with mean age (25.6). Most of the patients were in their 3rd decade of the life (Tab-2).

All patients had fever, severe abdominal pain and distention. Five (17.8%) patients had Diarrhea, 9 (32.1%) patients had vomiting and 3 (10.7%) patients had constipation.(Table-3)

The laboratory findings shows leucopenia 12 (42.8%), leukocytosis 10(38.6%) and WBC normal in 6 (21.4%), anemia 18(64.3%), 12(42.8%) patients

have pre-operative Widal test positive and 13(45%) patients send for Widal test in the post-operative period,24(85.7%) patients tissue biopsy taken from the edges of perforation send for histopathological examination. (Tab-4)

Table-3: Symptoms, clinical signs in the presented patients

Variable	No. Patients	%
Symptoms		
Abdominal pain	28	100
Vomiting	9	32.1
Diarrhea	5	17.8
Constipation	3	10.7
Signs		
High fever(>38°C)	28	100
Abdominal distention	28	100
Abdominal rigidity	28	100

Table-4: Laboratory findings in the presented patients

Laboratory findings	No. Patients	%
Air-fluid levels	27	96.4
Gas under diaphragm	21	75
Leukopenia	12	42.8
Leukocytosis	10	35.7
Normal WBC	6	21.4
Anemia	18	64.3
Widal test (pre-operative)	12	42.8
Widal test(post-operative)	13	45
Tissue biopsy	24	85.7

For all 28 (100%) patients emergency surgery was done under general anesthesia at night. The laparotomy was through midline incision for 16 (57%) patients with undiagnosed acute abdomen and right lower paramedian incision for 12(42.8%) patients with history of typhoid fever and positive Widal test. Single perforation found in 23(82.2%) patients. Five (17.8%) patients the perforations were multiple.

All ileal perforation sites were within 10-50cm from the ileocaecal junction. All of the patients 28 (100%) shows severe peritonitis, the peritoneal fluid contains pus, bile, fecal materials, in 19(67.8%) patients, the amount was 500-1000 ml, and in 9(32.1%) patients, the suctioned peritoneal fluid amount was more than 1000 ml.Table-5 shows the operative findings and management of perforation.

Table-5: Operative findings

Findings	No. patients	%	operation
Single perforation	23	82.2	suturing
Multiple perforation	5	17.8	resection+ end-end anastomosis
Pus less than 1 lit.	19	67.85	
Pus more than 1 lit.	9	32.1	

Table- 6: Postoperative complications.

Complications	No. patient	%
Prolonged paralytic illus > 3days	21	75
Wound infection	19	67.85
Wound dehiscence	6	21.4
Intra-abdominal abscesses	2	7.1
Fecal fistula	3	10.7
Chest infection	9	32.1
Death	6	21.4
Late Complications		
Incisional hernia	11	39.3
Intestinal obstruction	9	32.1

The postoperative complications including prolonged paralytic illus. for more than 3 days in 21(75%), 19(67.85%) patients had wound infection, 9(32.1%)patients had chest infection, (pneumonia, atelectasis and plural effusion), 6(21.4%) patients had wound dehiscence, 2 (7.1%) patients intra-abdominal abscesses, 3(10.7%)fecal fistula and death 6(21.4%) Hospital stay range 13-43and the mean were (21) days

Late complications like incisional hernia happens in 11(39.3%) patients and intestinal obstruction in 9(32.1%). (Table-6)

Most of patients were delayed in their presentation, because of special circumstances or ignorance, the time of early hospital presentation after the onset of acute abdomen, has good relationship with post operative out come,(table-7)

Table-7: Relationship of early hospital presentation after the onset of acute abdomen with postoperative complications:

Duration of acute abdomen	Patients		Complications		No complications	
	No.	%	No.	%	No.	%
1 day	4	14.3	1	25	3	75
2 days	16	57.2	11	68.7	5	31.2
2-5 days	5	17.8	4	80	1	20
> 5 days	3	10.7	3	100	0	0
Total	28	100	19	67.85	9	32.14

Table-8: Causes of Mortality in 6 patients, showing the relation to the presentation and operative findings.

Case No.	Age (years)	Sex	Presentation after Acute Abdomen (days)	Pus Evacuated (ml)	No. of Perforations	Septicemia (wound infection)	Fecal Fistula
1	36	Male	3 days	1125 ml	2	+ ve	+ ve
2	31	Male	3 days	1050ml	Single	+ ve	+ ve
3	41	Female	7days	1550	5	+ ve	+ ve
4	28	Male	2days	1000	2	+ ve	- ve
5	20	Female	4 days	1100	Single	+ ve	- ve
6	19	Male	5 days	1300	Single	+ ve	- ve

Discussion:

Even though little is known about risk factors for enteric perforation in patients with typhoid fever, most surgeons agree that elimination of peritoneal soilage and endotoxaemia [2] by surgery offers the best hope of survival**.** A typhoidal perforation is unique in that it virtually never seals itself off by surrounding omentum or fibrous tissue, the perforation remains open and continues to flood the peritoneal cavity until surgically repaired or until the patient succumbs[20] (due to edematous and wide diameter (0.5-2.5 cm.) perforation in unhealthy terminal ileum with severe peritonitis, as shown in the operative observations of this study).

Surgical treatment is universally agreed for typhoid ileal perforation [21] Ileal perforation happens usually in the 3rd week of the disease.

Typhoid ileal perforation in this study male is more affected and at high risk, which is similar to other studies[4, 22].

The surgical procedures are described by other studies either primary closure (single or double layers) wedge resection, sleeve resection, or resection with end to end anastomosis of the affected segment of the ileum, simple closures and drainage, temporally lateral ileostomy of the healthy gut, terminal ileostomy, ileostomy through the site of the perforation, closure of the perforation with ileo-transverse colostomy and exteriorized anastomosis[23].

There is no standard operation for typhoid perforation, what is standard is to keep peritoneal cavity and wound clean.[11]

All surgical procedures have had a high risk of complications; for example, a 67.85% wound infection rate and a 21.1% wound dehiscence rate in this study, in accordance with previous studies [13, 15]. Mortality is related to toxemia, septic shock and multiple organ failure [11].

These uncontrollable factors make the evaluation of the result of any surgical procedure for this condition difficult. But a swift, effective procedure aimed to halt contamination and remove the existing collection is achieved by laparotomy, excision, simple closure of the perforation, peritoneal irrigation and closure of the abdominal wall had been found effective in this study.

Blood and tissue culture unfortunately were not requested; because most of the patients were presented at the night when the complicated laboratory investigations were not available, while

tissue biopsy was taken to prove typhoid inflammation. The histopathology revealed invasion and destruction of the intestinal epithelium with *S.* Typhi Sections of Peyer's patches with mild-to-moderate increases in neutrophil counts and markedly increased numbers of mononuclear cells (what is called typhoid cell). The lack of infiltrating neutrophils and the presence of a predominate mononuclear cell infiltrate within the intestine are characteristic of typhoid fever infections[24]. Clinical data, investigations and operative findings were similar to other studies [22,23].

The prognosis of typhoid ileal perforation remains poor[11], we found the size and number of perforations and this can further be worsened by late presentation, especially in a rural and semi-urban community like ours. These factors have been found to have a significant effect on the morbidity and mortality as demonstrated in this study (table-5 and table-7) with an overall mortality of 21.4%, (table-8) explains the cause of death, fecal fistula was developed in 3(10.7%) patients, all of them were died . 23(82.2%) patients have single typhoid perforation, only 3(13%) of them died, while 5 (17.8%) patients have multiple typhoid perforations, 3(60%) patients died, this indicate the high risk of multiple ileal perforation. while all the 6 died patients have share in delayed presentation and septicemia, all of them have more than 1000ml of pus fluid suctioned, which indicate severe peritonitis.

We found, as previously reported, that the survivors were faced with overwhelming wound infection in 19 (67.85%) patients and a high incidence of wound dehiscence 6(21.4%).chest problems 9(32.1%), incisional hernias 11(39.3%), and fecal fistula in 3(10.7%) patients.

Late presentation and delay in operation were associated with high mortality and a high incidence of fecal fistula [25, 26], whereas an early presentation was associated with the development of other trivial complications. [27]. (Table-6).

The need for adequate resuscitation resulted in a delay before operation in some of our patients who had presented in a poor state, which was also found to affect the outcome adversely. [28, 29].

The postoperative complications are similar to the Hospital NawabShah[18] (Pakistani study) and nearly similar to Nigerian study[11].

Because of this high morbidity and mortality; Typhoid ileal perforation consider as an extensive and continuing disease and should be handled with good care of experts.

Typhoid ileal perforation has a high risk of morbidity and mortality. Surgical treatment of the typhoid ileal perforation is the ideal treatment. Resuscitation and surgical treatment, if carried within 24 hours duration decrease morbidity and mortality rate.

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