Surgical Management of Suspected Enteric Ileal Perforations in Children

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ABSTRACT

Objective — *To find the outcome of protocol adopted for suspected enteric ileal perforations in children.*

Study design — *Descriptive case series.*

Place & Duration of study — *Department of Paediatric Surgery National Institute of Child Health (NICH) Karachi, from December 2010 to November 2011.*

Methodology — *A total of 23 patients were managed during the study period. The protocol varied depending upon condition of the child at presentation. Tube laparostomy was done as initial procedure in patients who were judged unfit for surgery within 24 hours of admission based upon need of resuscitation. Once optimized, children underwent surgery. Procedure was tailored according to the operative findings and included either primary repair of the perforation or stoma formation (exteriorization of perforation - Ileostomy).*

Results — *There were 16 male and 7 female patients. Age ranged from 3-13 year (mean 7.82, + 2.94 year). Duration of symptoms ranged from 7-45 days (mean 15.56, + 9.39 days). Free intraperitoneal gas under diaphragm on x-ray abdomen was found in 19 patients. Initial tube laparostomy was done in 12 cases. Laparotomy was performed in our hospital in 21 patients while one child had surgery done elsewhere and referred with stoma already made. A single perforation found at antimesenteric border of distal ileum in 20 cases. Primary closure of perforation was done in 5 patients. Ileostomy was made in 16, of whom 11 had reversal in 2 to 5 months time.*

The patient who had surgery done outside, developed burst abdomen and was re-explored. More perforations were found in proximal ileum and stoma was refashioned. This patient died later. Two patients in whom stoma was made expired in early postoperative period. In one patient only tube laparostomy was performed. He died before any definitive procedure. Overall mortality was 17.3% (n 4).

Conclusions — *Patients with enteric perforation had varied presentation. The surgical procedure has to be tailored according to the condition of the child. Mortality remained significant in this condition.*

Key words — *Enteric ileal perforation, Ilesotomy, Tube laparostomy.*

INTRODUCTION:

Enteric fever is still prevalent in underdeveloped countries. Children are not an uncommon victim of this condition.[1,2] Enteric fever is a medical condition but it is feared with dreadful surgical complication, the gut perforations.[3] By the time this complication occurs, the patient is already too sick. Thus high mortality is expected in these patients.[4] The surgical approach to these patients is still controversial. There is consensus as to decrease the load of faecal peritonitis but how to handle the inflamed gut is controversial.[5,6]

The surgical options include tube laparostomy, stoma formation, exteriorization of perforation, repair of perforations (various techniques adopted), resection – anastomosis, by-pass procedure, T tube placement

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Few randomized controlled trials are also reported but no uniform approach is adopted by the treating surgeons.[9]

Enteric perforations, though uncommon, are tricky to manage. Various surgical options have been tried to deal with this condition but still search for an approach that can save most of these patients is on. While many studies can be found in adult patients, for paediatric patients a guide is usually obtained from studies on adult population. This study was conducted to analyze our approach to patients with ileal perfoartions.

METHODOLOGY:

A descriptive case series was conducted at the Department of Paediatric Surgery, National Institute of Child Health Karachi, from December 2010 to November 2011, on all the patients in whom enteric ileal perforation was suspected based upon clinical presentation of high grade fever of more than one week duration with signs of peritonitis, who on exploration found to have ileal perforation on antimesenteric border. Blood cultures were not done as patients already had received antibiotics when presented.[10] Other cases of ileal perforations due to trauma, tuberculosis, volvulus of gut, Meckel's diverticulitis etc, were excluded.

In all patients complete blood count, serum electrolytes, blood urea and creatinine were performed. All patients received intravenous antibiotics including ceftriaxone, metronidazole and amikacin. The protocol of management varied depending upon condition of the child at presentation. Tube laparostomy was done as initial procedure, in patients who were judged unfit for laparotomy within 24 hours of admission. Once optimized with fluid hydration with adequate urine output (at least 1cc/kg/hour and correction of electrolyte imbalance), children underwent surgical procedure which was tailored according to the operative findings. It included either primary repair of the perforation (when gross peritoneal faecal contamination was not present and gut was minimally oedematous as judged clinically by the surgeon) or exteriorization of perforation (Ileostomy). All patients were managed postoperatively in ICU.

Data was analyzed using descriptive statistics like percentages, mean and standard deviations for variables like age, duration of symptoms etc.

RESULTS:

A total of 23 patients were managed during the study period. There were 16 males and 7 females. Age ranged from 3-13 year (mean 7.82,+ 2.94 year). Duration of symptoms ranged from 7-45 days (mean 15.56, + 9.39 days). Twenty two patients had all surgeries done at our hospital while one had laparotomy in another hospital and referred in moribund condition on the following day. Pneumoperitoneum was noted in 19 cases on x-ray abdomen. Tube laparostomy was performed as an initial procedure to decompress the peritoneal cavity and decrease faecal contamination in 12 cases. Laparotomy was performed in 21 patients in our hospital.

In 20 cases single perforation was found at antimesenteric border of distal ileum. One patient had multiple distal ileal perforations. Primary closure of perforation was done in 5 patients. Four of these patients had uneventful postoperative course and were later discharged. In one patient burst abdomen occurred and ilesotomy was made. One patient developed sub-acute intestinal obstruction in follow up after discharge and responded to non-operative management.

In 16 patients ileostomy was made. One patient with tube laparostomy died before laparotomy. One patient who had laparotomy performed elsewhere developed burst abdomen and was re-explored. More perforations were found in proximal ileum and stoma re-sited. This patient died in early postoperative period. Complications of surgical procedures are given in table I.

Table I: Complications

Early Complications	No. of Patients*
Wound infection	3
Wound dehiscence	2
Burst abdomen	3
Pelvic collection	1
Enterocutaneous fistula	1
*More than one complication occurred in patients	

Two more patients who had initial tube laparostomy and later stoma formation, died of sepsis. One patient died following discharge from hospital. A total of 4 (17.3%) patients, all males, expired in this series. All deaths occurred in patients who had stoma formation. Till date in eleven patients (78.5%) reversal of stoma has been performed after 2 to 5 months of initial surgery. One patient was lost to follow up. A flow chart was developed based upon outcome of this series (Fig I).

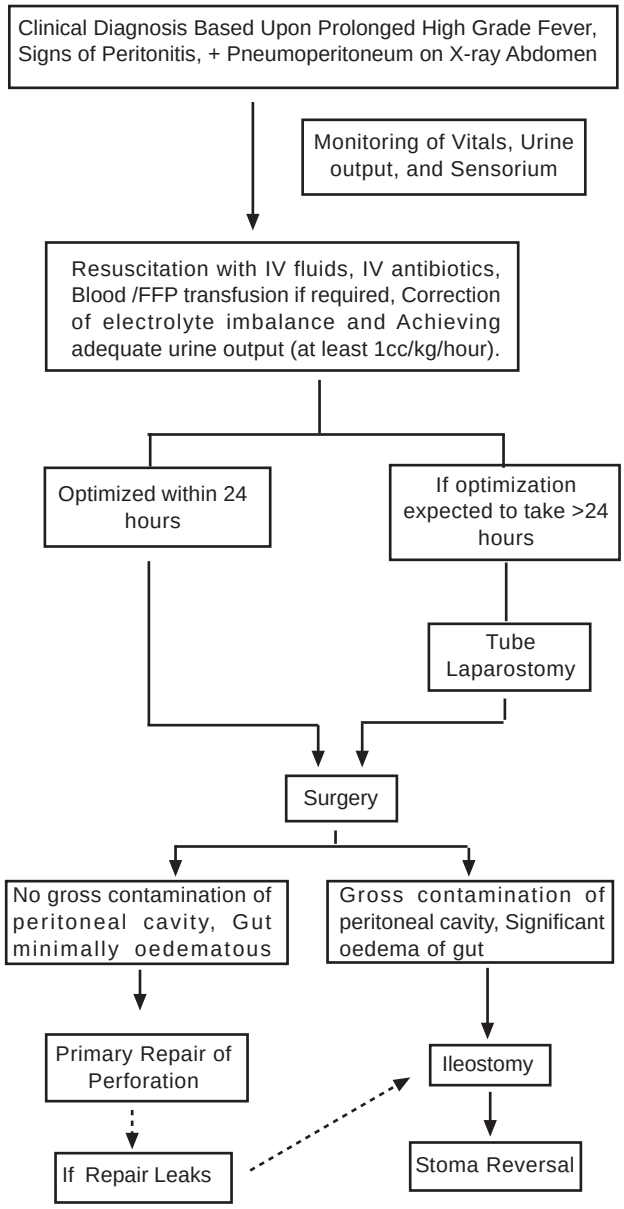

Fig: Flow Chart

DISCUSSION:

Ileal perforations secondary to enteric fever are not uncommon. Delay in seeking treatment is another important issue that adds to morbidity. Incomplete and inappropriate treatment in early stages of enteric fever contribute to severity of disease.[11,12] Most of the patients when received in emergency room, were toxic as noted in present series. High grade fever, dehydration and oliguria were presenting features in all the patients. Rehydration took priority over any other intervention. Following establishment of adequate urine output(at least 1cc/kg/hour) after fluid boluses laparotomy was performed. In this series tube laparostomy (TL) was performed as a bridging procedure prior to laparotomy. It has the advantage of decompressing abdomen thus help in draining intraperitoneal air and faecal load. It also helped in improving venous return as abdominal compartment pressure decreased. It usually takes up to 24 hours before patient actually showed improvement.

Most of the patients at presentation had deranged electrolytes and raised urea level. The situation is different from a patient with traumatic gut perforation. In enteric fever the disease is prolonged and attainment of normal electrolytes and urea level takes time. The surgery must be delayed till adequate optimization is achieved.[13,14] All the patients in this series were anaemic at presentation and required pack cells transfusion.

The primary closure is not an option in all the cases though some authors have reported primary closure of perforation as procedure of choice. In some patients the gut is inflamed to the extent that it does not hold sutures and cut through easily. Freshening of margins increase the size of perforation and layered closure is even more difficult. Resection-anastomosis is also feared with disruption.[15,16] Omental patch application has also been described to augment repair.[17] Exteriorization of perforation or proximal diversion in the form of ileostomy, are more appropriate in this situation.[18] This was our choice of procedure. No single approach thus can be applied to all the patents with enteric perforation. Surgical approach must be tailored according to the condition of the patient and protocol must be flexible as adopted in this series.

Complications in postoperative period add to morbidity and mortality. In this series, three patients developed burst abdomen. These patients were anaemic and hypoproteinemic and with added intraperitoneal sepsis the chances of wound infection and burst abdomen were increased. Though copious peritoneal lavage with normal saline is a standard measure at operation, still infected pelvic and subhepatic collections occur frequently.[19] In patients with ileostomy the stoma discharge results in skin excoriations and secondary infections. Stoma management is more challenging in these patients thus early reversal is advised. In this series stoma reversal was already done in more than 78% of the patients.

There are few limitations of this study. The number of patients is too small and randomization is not done thus definitive recommendations as to choice of surgical procedure, can not be made. The definitive diagnosis of typhoid fever of which ileal

perforation is a complication, made on observation of clinical and surgical findings and isolation of salmonella typhi was not done. Thus it is still debatable whether to group all these patients under enteric fever. In literature researchers used clinical judgement (with typical history of fever, peritonitis and findings of ileal perforation at surgery) as sole criteria in favour of enteric perforation. Same is followed in this series.

CONCLUSIONS:

The protocol followed in this series was kept flexible and changed according to the condition of patients. Both primary repair of perforation and ileostomy and exteriorization procedure (ilesotomy) were used. The mortality remained significant and morbidity was prolonged.

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