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A Retrospective Review of Ileal Perforation in Children – 5 Years Audit from Tertiary Care Centre.

Ravindernaik Noonavath[1], Anju verma[2], Simmi K Ratan[3]

1Assistant Professor, Department of General Surgery, Government Medical College, Khammam,Telangana, India

2Assistant Professor, Department of Pediatric Surgery, SGPGI, Lucknow.

3Professor and Head, Department of Pediatric Surgery, Maulana Azad Medical College (M.A.M.C) NEW DELHI.

Corresponding Author:

Ravindernaik Noonavath,

Assistant Professor, Department of General Surgery, Government Medical College, Khammam,Telangana, India

Email ID : *nravindernaik6@gmail.com*

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ABSTRACT

Background: Peritonitis is one of the commonest causes for emergency surgeries conducted in surgical practice for a case of acute abdomen. Significance lies in association with high mortality and morbidity if not diagnosed and treated in time. Its frequency is more in developing countries, where medical facilities may not be readily available. The choice of procedure for source control depends on the patient's condition as well as the surgeon preference.

Material and Methods: A retrospective study was conducted and data collected for period of 5 years from June 2015 to May 2019 of children up to 12 years. A total of 56 patients presented in this period with ileal perforation. After resuscitation all patients underwent exploratory laparotomy and operative findings including site and number of perforations, status of peritoneal cavity noted. Managed with Primary repair or diversion stoma or resection & anastomosis as per intraoperative finding.

Histopathological report was reviewed following surgery in all cases.

Result: A total of 56 patients with Ileal perforation were included in the study of which 29 were males and 27 were females accounting for 51.7 percent and 48.2 percent respectively. Pain abdomen, vomiting and fever were the most common presenting complaints. Simple closure of the perforation and diverting ileostomy were the mainstay of the surgical management. Histopathological examination was nonspecific in 78.57% cases followed by tubercular (14.28%) and enteric fever (7.14%).

Conclusion:Patients with ileal perforations are routinely seen in surgical emergencies and their demography, clinical profile, and intraoperative findings may guide the choice of procedure to be performed. The common pathology of Ileal perforation is Typhoid or Enteric fever, Non-specific ulcer, Tuberculosis and others. Nonspecific inflammation was the predominant cause in our study with operative findings similar to that of typhoid fever but no laboratory evidence of the disease was found.

Keywords: *Ileal perforation, Tuberculosis, Enteric fever*.

INTRODUCTION

Perforation of the bowel especially ileal perforation is a serious condition and is of significance because of its association with high mortality and morbidity. Perforation of ileum is a cause for peritonitis, anticipated by exacerbation of abdominal pain, distension, vomiting along with tenderness, rigidity and guarding. However, some patients in toxic state, there may be occult clinical features with resultant delay in diagnosis and prompt surgical intervention [1]. Typhoid is the most common cause for this dreaded complication while tuberculosis, trauma, and nonspecific enteritis follow close suit [2]. A "non-specific" etiology is attributed to small bowel perforations when the perforation cannot be classified on the basis of clinical symptoms, gross examination, serology, culture and histopathological examination into any disease state such as enteric fever, tuberculosis or malignancy. These ulcers are usually single and commonly involve terminal ileum [3].

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The standard source control for secondary peritonitis due to ileal or any hollow viscus perforation is resuscitation followed by exploratory laparotomy. The measures for source control include primary closure, diverting stoma, resection and anastomosis of bowel, depending on the site of perforation, severity of peritonitis and general condition of the patient. Though diversion stoma is a lifesaving procedure in some cases, it may result in significant number of complications also.

The present study was taken to review our experience of clinic-pathological profile and management of terminal ileal perforation over past 5 years.

MATERIAL AND METHODS:

A retrospective study was conducted in Department of Pediatric Surgery, Maulana Azad Medical College, Delhi, a tertiary health care center in India for a period of 5 years from June 2015 to May 2019. A total of 56 patients were identified in this period with ileal perforation. All patients were thoroughly evaluated with detailed history, clinical examination, and blood investigations including complete blood picture, ESR, widal test, blood culture, serum urea, creatinine, serum electrolytes, abdominal and chest radiography. The procedure was explained to the parents and written consent was taken regarding the surgical procedure. All the cases were managed with proper preoperative resuscitation including intravenous fluid, antibiotics, analgesic, nasogastric tube for bowel decompression, urethral catheterization for urine output measurement.

All patients underwent exploratory laparotomy. The intraoperative findings including site and number of perforations, extent of peritonitis, bowel condition and status of lymph nodes were recorded. Proper peritoneal lavage given and edge biopsy was taken in all cases. Primary repair, resection and anastomosis or diverting ileostomy was created as per the standard methods on the basis of intra-operative findings. Patients were monitored postoperatively and their histopathology reports were noted.

RESULTS:

A total of 56 patients with Ileal perforation were included in the study of which 29 were males and 27 were females accounting for 51.7 % and 48.2 % respectively. The mean age was 5.6 years. The most common symptom was pain abdomen which was present in all the patients (100%). The next common symptom was vomiting seen in 34 patients (60%) followed by fever seen in 31 patients (55%). On examination, generalized tenderness was present in 52 patients (92.8 %). Guarding and rigidity was found in 25 out of 56 patients (44.6%). Bowel sounds was absent in 23 patients (41%). Air under diaphragm on erect X-ray abdomen was found in 45 patients (80.4%) [Table 1].

Table 1: Clinical profile of patients

S.No	Clinical feature	No. of patients (%)
1	Pain abdomen	56(100)
2	Vomiting	34(60)
3	Fever	31(55)
4	Rigidity	25(44.6)
5	Abdomen tenderness	52(92.8)
6	Abdomen distension	17(30)

Blood investigations showed that 42.8% patients had total leucocyte counts more than 11,000/mm3 whereas widal test was positive in only 4 (7.14%) patients. Two (3.6%) patients were on antitubercular treatment, one from 2 months and other from 6 months. Five (8.9%) patients had history of trauma.

On exploration, most common site of perforation was distal ileum (64%) i.e. within 20 cm of ileocaecal junction (Fig-2 & Fig-3). Mesenteric lymphadenopathy was found in 16 patients (28.6%). In cases with traumatic perforations and cases with contained contamination (n=20, 35.7%), a primary closure was done, resection and anastomosis (n=9, 16.07%) was done with less contaminated peritoneal cavity and diverting ileostomy (n=20, 35.7%) was done in grossly contaminated peritoneal cavity. Proximal loop ileostomy with primary repair of ileal perforation (n= 7, 12.5%) for perforation located close to Ileocaecal junction.

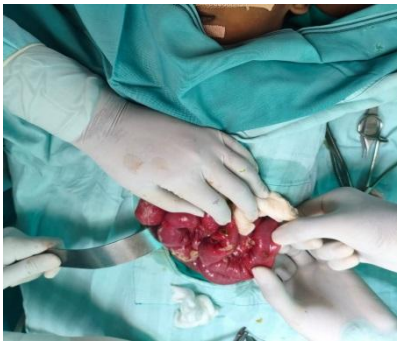

Figure-2: Ileal perforation in 2yr old child

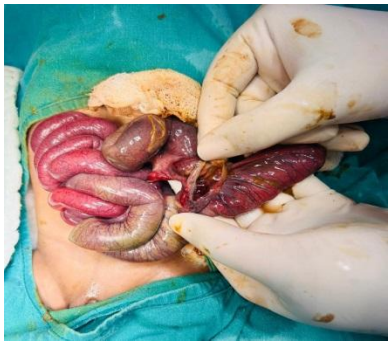

Figure-3: Ileal perforation in Newborn baby

All patients were given empirical antibiotics initially in post-operative period followed by based on culture and sensitivity report of the peritoneal fluid. Patients were followed up in the post-operative period for the complications. 13 out of 56 patients had a wound infection (23.21%), 10 patients (17.85%) had sepsis continuing post operatively, manifested by fever and increased leukocyte count. Lower respiratory infection was seen in 8 patients (14.28%) manifested by cough and crepitations. Wound dehiscence was seen in 5 patients (8.92%). Four patients had an anastomotic leak from the repair site (7.14%) all of them required re-laparotomy [Table 2].

Table 2: Complication & discharge

COMPLICATION	No. (%)	DISCHARGRE
Wound infection	13(23.21)	POD 5
Sepsis	10(17.85)	POD 5
LRTI	8(14.28)	POD 7
Wound dehiscence	5(8.92)	POD 8-10
Anastomotic leak	4(7.14)	POD 10-12

All patients with uneventful post-operative period discharged after 4-5 days and patients with complications were discharged between 8-12 post-operative day (POD). Histopathological report was reviewed following surgery, 45 cases (78.57%) had nonspecific inflammation, 8 cases (14.28%) tubercular inflammation and 4 cases had (7.14%) typhoid perforation (Figure 3). Full antitubercular treatment (ATT) given to the tuberculosis positive patients.

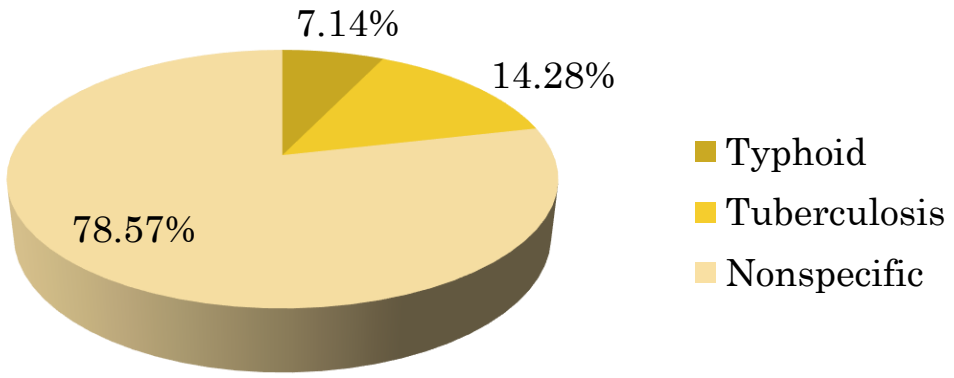

Figure 3: Histopathological findings

DISCUSSION:

Ileal perforation is a common cause for obscure peritonitis in developing and underdeveloped world. Though ileal perforation is commonly encountered sometimes it present a diagnostic dilemma to the surgeon. Peritonitis is caused by the introduction of infection into the sterile peritoneal cavity via perforated bowel. The common etiology of Ileal perforation in children are typhoid, nonspecific ulcer, obstruction and tuberculosis while adults can have added trauma, NSAIDs and malignancy also as cause of ileal perforation. Trauma accounts for about 1% of perforation in children [4]. While in adults, in around 10% of ileal perforation trauma is the cause [5].

Though surgery is accepted as the definite treatment, the choice of exact surgical procedure remains controversial and depends on status of contamination of peritoneal cavity along with general condition of patient. Most series report simple closure of the perforation or resection and anastomosis as choice of procedure. These procedures though seem appealing are not free of complications especially in an emergency setup.

Among all the complications reported, faecal fistula is the most devastating and sometime can be life threatening. The rate of its occurrence has been reported to be around 12% with high mortality rate [6]. Due to this dreadful complication, a shift in favour of diverting ileostomy has been observed. Ileostomy is a lifesaving procedure, particularly in those cases with generalized peritonitis of long duration and patient with low general condition.

In most of the studies, male patients contributed more than 75% of total cases [7-10], However, we found ratio of 1.07:1 which is almost similar as found by *Abantanga FA et al* i.e. 1.3:1[11]. Park et al. also found that there was no relation between sex and complications [12].

The majority of the patients in the present study and previous similar studies presented with pain abdomen, vomiting, and fever. Pain abdomen was present in all cases (100%) and this was also shown in studies by Khalid S et al. [13]. Fever was present in all cases of typhoid perforation peritonitis and they presented mostly in third week. Air under diaphragm was seen in 80.4% of our cases, similar results were obtained by Poornima R et al. they found pneumoperitomeum in 87.5% of their patients [14]. Other reports of gas under the diaphragm as a result of gut perforation due to enteric fever is found to range from 60 to 70% [15,16]. Although the presence of gas under the diaphragm is pathognomonic for a gut perforation, its absence does not exclude a perforation in the presence of a febrile illness due to enteric fever and a sudden onset of severe abdominal pain.

The surgical procedures were carried out with the idea of simple operation to save the lives of the children and so that not to keep them under anaesthesia for a long period. In children with trauma there was no difficulty in decision as the tissues were healthy and patients present in good clinical state, so primary repair was done in all of them.

For rest of the cases degree of fecal contamination, clinical status of patient and location of perforation were main deciding factors for the type of surgical repair. Cases with minimum peritoneal contamination with location away from ileocaecal junction, simple closure of perforation in two layers done or resection and anastomosis after excision of edges as seen in other studies [17,18]. In cases with moderate to gross peritoneal contamination with bad clinical state, diverting ileostomy alone or primary repair of perforation with proximal ileostomy done (if near to ileocaecal junction). Primary closure was done in 37.5%, diverting ileostomy in 35.7%, resection & anastomosis in 16.07% and Proximal loop ileostomy with primary repair of ileal perforation done in 12.5%. While in a study by Jain B K et al., Primary repair was the most frequent procedure (44.0%), followed by ileostomy (25.5%) and resection-anastomosis (19.3%) [19].

In our study, we found wound infection in 23.21%, wound dehiscence in 8.92% anastomotic leak in 7.14% of patients. Larger series from literature show wound infection in 68%, wound dehiscence in 27% and enterocutaneous fistulae in 13%. [20,21]. Fortunately, none of the child had enterocutaneous fistula in our series, may be diverting ileostomy has the advantage of avoiding sutures in septic tissues and the subsequent risk of suture dehiscence of repair or anastomosis.

In our study, histopathological finding was nonspecific in 78.57%, tubercular in 14.28% and typhoid in 7.14%. While a study by Kappikeri VS et al., 42.1% showed acute enteritis, 7.89% were suggestive of tuberculosis and 50% showed non-specific inflammations [22]. Wani et al. reported enteric fever (62%), nonspecific (26%), obstruction (6%), tuberculosis (6%) and radiation enteritis (1%) in their study [23]. A retrospective study by Jain B K et al. involved analysis of 192 patients treated for nontraumatic perforation of small intestine; common cause of non-traumatic perforation of small intestine was typhoid (46.4%), followed by non-specific inflammation (39.2%), tuberculosis (12.8%) and malignant neoplasm (1.6%) [19]. In a study by Gurjit Singh et al., histopathological study did not reveal any specific findings (included nontraumatic cases only) [24].

Most of these studies were not specific for children. Studies documented for children have enteric fever as the main pathology or they studied cases of enteric fever only, though we found nonspecific inflammation as most common histopathological finding.

CONCLUSION:

Ileal perforation has high morbidity and mortality if not treated promptly and intime. Management protocol remains same for typhoid or non-specific perforation. Primary physician must have a high index of suspicion and should refer earliest to the nearest available treatment facility as early diagnosis and treatment avoids extensive procedures and is associated with reduced mortality and surgery related morbidity. Nonspecific inflammation of the terminal ileum was predominant cause in our study with operative findings were similar to that of typhoid ulcer. Koch's abdomen is sometime difficult to diagnose and often diagnosed till an acute abdomen is presented with. Irrespective of surgery, all patients of abdominal tuberculosis require a full course of ATT. Nonspecific inflammation and tuberculosis are other causes in developing countries apart from typhoid perforation.

Temporary diverting ileostomy in moribund cases of peritonitis due to ileal perforation is a lifesaving procedure. Apart from reducing mortality, it plays role in decreasing the incidence of complications like anastomotic leak and faecal fistula. It is essential that a surgeon should be well versed in all the techniques of source control in such cases and choose the appropriate source control measure either primary repair or other techniques

REFERENCES

1. Karmacharya B, Sharma VK. Results of typhoid perforation management: Our experience in Bir Hospital, Nepal. Kathmandu Univ Med J (KUMJ) 2006; 4:22-4.
2. T. Hussain, S. N. Alam, and M. Salim, "Outcome of ileostomy in cases of small bowel perforation," Pakistan Journal of Surgery, vol. 21, pp. 65–71, 2005.
3. Chulakamontri T, Wattanasrichaigoon S, Hutachoke T, Wanishayathanakorn A, Pornchareonpong S. Nontraumatic perforations of the small intestine. J Med Assoc Thai. 1996;79:762-6.
4. Baeza-Herrera C, García-Cabello LM, Gardida-Chavarria R et al., Traumatic perforation of the small intestine in childhood. Gac Med Mex 136:547–553, 2000.
5. Mittal S, Singh H, Munghate A, Singh G, Garg A, Sharma J. A comparative study between the outcome of primary repair versus loop ileostomy in ileal perforation. Surg Res Pract. 2014 Mar 27;2014.
6. A.A. Khan, I. R. Kha, U. Najeeb, and A. J. Shaikh, "Comparison between primary repair and exteriorization in cases of typhoid perforation," Annals of King Edward Medical College, vol. 11, no. 3, pp. 226–227, 2005.
7. R. S. Jhobta, A. K. Attri, R. Kaushik, R. Sharma, and A. Jhobta, "Spectrum of perforation peritonitis in India—review of 504 consecutive cases," World Journal of Emergency Surgery, vol. 1 article 26, 2006.
8. V. Patil, A. Vijayakumar, M. B. Ajitha, and S. L. Kumar, "Comparison between tube ileostomy and loop ileostomy as a diversion procedure," ISRN Surgery, vol. 2012, Article ID 547523, 5 pages, 2012.
9. M. Z. Ali, K.Munir, A. Zaffar, and M. I. Anwar, "Surgical audit of emergency ileostomies," Journal of Rawalpindi Medical College, vol. 16, no. 1, pp. 45–47, 2012.
10. P. Batra, D. Gupta, S. Rao, R. Narang, and R. Batra, "Spectrum of gastrointestinal perforation peritonitis in rural central India," Journal of Mahatma Gandhi Institute of Medical Sciences, vol. 18, no. 1, pp. 44–48, 2013.
11. Abantanga F A, Nimako B, Amoah M. The range of abdominal surgical emergencies in children older than 1 year at the komfo anokye teaching hospital, Kumasi, Ghana. Ann Afr Med 2009; 8:236-42.
12. J. J. Park, A. Del Pino, C. P. Orsay et al., "Stoma complications: the cook county hospital experience," Diseases of the Colon and Rectum, vol. 42, no. 12, pp. 1575–1580, 1999.
13. Khalid S, Burhanulhuq, Bhatti A. Non-traumatic spontaneous Ileal perforation: experience with 125 cases. J Ayub Med Coll Abbottabad. 2014;26(4).
14. Poornima R, Venkatesh KL, Goutham MV, Nirmala, Hassan N. Clinicopathological study of Ileal perforation: study in tertiary center. Int Surg J 2017; 4:543-9.
15. Rahman GA, Abubakar AM, Johnson A-WBR, et al. Typhoid ileal perforation in Nigerian children: an analysis of 106 operative cases. Pediatr Surg Int 17:628-630, 2001.
16. Hosoglu S, Aldenir M, Akalin S, et al. Risk factors for enteric perforation in patients with typhoid fever. Am J Epidemiol 160:46-50, 2004.
17. Oheneh-Yeboah M. Postoperative complications after surgery for typhoid ileal perforation in adults in Kumasi. West Afr J Med. 2007; 26:32–6.
18. Nuhu A, Gali B, Dawha S. Postoperative complications of typhoid ileal perforation in children in Azare, Nigeria. Internet Journal of Surgery. 2009; 21:17.
19. Jain BK, Arora H, Srivastava UK, Mohanty D, Garg PK; Insight into the management of nontraumatic perforation of the small intestine. The Journal of Infection in Developing Countries, 2010; 4(10):650-4.

20. Ansari AG, Naqvi SQ, Ghumro AA, Jamali AH, Talpur AA. Management of typhoid ileal perforation: A surgical experience of 44 cases. Gomal J Med Sci. 2009; 7:27–30.

21. Adesunkanmi AR, Ajao OG. The prognostic factors in typhoid ileal perforation: A prospective study of 50 patients. J R Coll Surg Edinb. 1997; 42:395–9.

22. Kappikeri VS, Ingalalli Vinayak V. Analysis of Outcome of Surgical Management in Ileal Perforation with and without Ileostomy. Sch. J. App. Med. Sci., April 2016; 4(4B):1199-1207.

23. Wani RA, Parray FQ, Bhat NA, Wani MA, Bhat TH, Farzana F; Nontraumatic terminal Heal perforation. World J Emerg Sung., 2006; 1:7.

24. Singh G, Dogra BB, Jindal N, Rejintal S; Non-traumatic ileal perforation: a retrospective study. J Family Med Prim Care. 2014; 3:132–135.