



A FALLACY OF RADIOLOGICAL INVESTIGATION i.e X-RAY ABDOMEN IN DIAGNOSING ENTERIC PERFORATION.

General Surgery

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ABSTRACT

Background – Typhoid fever perforation caused by *Salmonella typhi* is still prevalent in the developing countries. Intestinal perforation has been associated with a high rate of mortality and morbidity. In the literature, the perforation rates vary between 0.8% and 18%. Its management poses diagnostic challenges to general surgeons. **Material And Method:** In a span of one year, out of 18 patients with enteric perforation, X-ray abdomen of 7 patients were inconclusive for the perforation. Based on the clinical diagnosis, an exploratory laparotomy was done and ileal perforation was noticed at the antimesenteric border followed by loop ileostomy. **Result-** X-Ray abdomen erect or supine view cannot be relied upon completely for the diagnosis of perforation peritonitis due to enteric fever. **Conclusion:** Clinical diagnosis always takes precedence over radiological investigation. Hence, the surgeon's hand acts like a telescopic hand.

KEYWORDS

Acute abdomen, Perforation, Peritonitis, Typhoid.

INTRODUCTION –

Enteric perforation was the fifth most common cause of abdominal surgical emergencies, with rates ranging from 0.8 to 18 percent [1] and [2]. The reason behind the increase in perforation rate was late diagnosis and misuse of antibiotics, which gave rise to the emergence of resistance against the virulent strain. The organism responsible for enteric perforation was mainly *Salmonella typhi*, followed by *Salmonella paratyphi A* and *B*. Patients frequently present to a casualty department with fever, vomiting, and abdominal pain. Based on the clinical examination, a radiological investigation was advised, i.e X-ray abdomen erect view. Getting gas under both domes of the diaphragm was suggestive of perforation, which was supported by the USG abdomen by showing free intraperitoneal fluid [3]. But it's not always necessary to have a pneumoperitoneum for perforation. Therefore, the absence of pneumoperitoneum on an X-ray abdomen does not exclude the diagnosis. The gold standard of treatment was surgical intervention [4], [9]. Delaying the diagnosis and not providing surgical treatment on time leads to an increase in the mortality rate, which ranges from 9-22% in the developing world [9], [11].

Aim And Objective of this study are to emphasize the importance of clinical skill, as knowledge of clinical skill helps to save a patient's life and avoid unnecessary complications.

MATERIAL AND METHOD-

A prospective study had been carried out after obtaining clearance from the institutional ethical committee. Over a one-year period December 2021-November 2022, 18 symptomatic patients attending the casualty were studied.

The Sample size was calculated by using a formula $N = z^2 \times p \times (1-p) / e^2$ where 95% of confidence level and 16.50% of margin of error were taken into an account.

Inclusion criteria – (i) Age group- 10-70 years. (ii) All patients who were operated on for enteric perforation during the study period were included in the study.

Exclusion criteria -Patients who failed to consent.

Follow up -6months post discharge.

RESULT-

A) Demographic Strata-

There was a male preponderance (Table 1) whereas the younger generations were more commonly affected (Table 2). 100% of patients were from rural areas.

Table 1- Distribution On The Basis Of Gender

Gender	Frequency	Percentage
Male	13	72
Female	5	28

Table2- Age Distribution

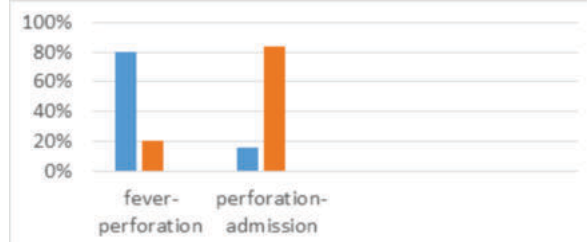
Age distribution	Frequency	Percentage
10-20	8	47
21-30	5	3
31-40	1	0.05
41-50	1	0.05
51-60	2	1
61-70	1	0.05

B) Clinical diagnosis -

All 18 patients had complaints of fever followed by abdominal pain. A minuscule percentage had jaundice (Table 3)

Table 3- Predominance Of Symptoms

Symptoms	Frequency n=18	Percentage %
Fever	18	100
Abdominal pain	18	100
Vomiting	16	90
Constipation	14	80
Diarrhea	13	76
Dehydration	14	80
Jaundice	1	0.5

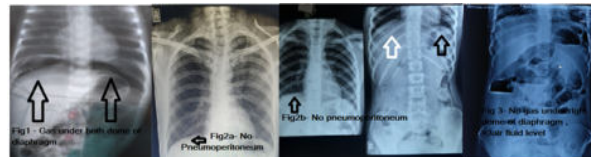


Graph 1- Interval between development of symptom, perforation rate and hospital admission.

- Out of 18, 7 patients have abdominal pain localized to the right iliac fossa, rebound tenderness at the right iliac fossa, localized guarding and rigidity.
- As shown in Graph 1, 80% of patients had fever to perforation lasting 14 days, while 84% had perforation lasting more than 24 hours.

C) Radiological diagnosis-

X-ray of the abdomen revealed gas under the right dome of the diaphragm—62% (Fig 1), no pneumoperitoneum—38% (Fig 2a, 2b)—rather, an intestinal obstruction (Fig 3).

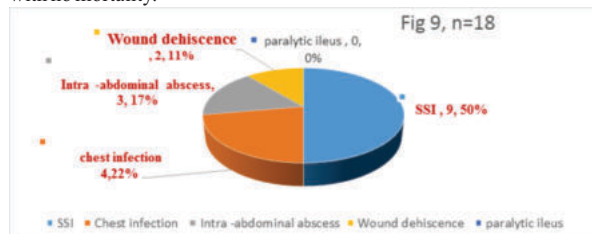


D) Intra-operative Finding -

In all 18 patients, the site of perforation was the ileum (Fig. 4) within 20–25 cm from the ileocaecal region (n=18) which are single in number. The perforation is located at the antimesenteric border and has a median size of 9 mm (5–22 mm). Dirty yellow, purulent exudate with flecks of 500–1000ml were present (Fig5). However, in the case of localized perforation, approximately 100 mL of exudates were sucked out. A biopsy from the perforated margin was taken with the No. 11 blade and sent for histopathological analysis, which revealed chronic inflammation with edematous tissue, infiltration of neutrophils, lymphocytes, plasma cells, and macrophages. All of the cases of enteric perforation were treated by exteriorization of the perforation (Fig. 6). Primary closure can be a modality of treatment in a single perforation, but in this study, a loop ileostomy was made (Fig. 7) due to edematous bowel along with surrounding tissue and the chances of impending perforation.



E) Post-operative complications- 50% of patient had surgical site infection followed by chest infection and intra-abdominal abscess. 2 patients suffered from wound dehiscence (Fig 8). Patients were treated with broad spectrum antibiotics, chest physiotherapy and daily dressing. Post-operative recovery period – 10–32 days (mean 20±3.5) with no mortality.



F) Follow-up: The ileostomy was reversed in 4–6 weeks from the site of the ileostomy. In 1 patient, dense adhesions were present at the ileostomy site, for which reversal is done from the mid-line laparotomy site (Fig 9)

DISCUSSION -

Enteric perforation was the most lethal complication of typhoid fever, with higher mortality and morbidity rates in almost every part of the world [5]. A review of the literature suggests that in West Africa the rate of perforation was high, i.e., 10–33%, as compared to the rest of the world at 0.6–4.9% [6], [7]. In our study, the incidence of enteric perforation in Barabanki district was found to be 0.6%.

In the present study, the younger populations were the ones who got the perforation, which goes in favour of the prospective analysis done by Tade AO et al. [8]. The reason behind the rate of infection affecting the first and second decades of life was the consumption of unhygienic food, the use of public toilets and toilets at schools, the non-maintenance of personal hygiene, and not following the rule of sanitization. The faeco-oral route was the method of transmission of the Salmonella typhi infection. In comparison to the other studies, this

study too showed a male preponderance [7], [8].

As shown by other writers in this study, patients also presented with fever and abdominal pain, but only 0.5% had jaundice. On examining the patient, we found 11 patients with guarding and board like rigidity all over the abdomen, which was a classical depiction of perforation peritonitis. In the rest of the 7 patients, there was localized pain at the right iliac fossa, rebound tenderness with guarding. As a result, X-ray abdominal erect and lateral views are frequently recommended. In Chalya et al., only 74.7% of the X-ray abdomen in erect view of the patient showed gas under both domes of the diaphragm, which was a hallmark to confirm the diagnosis of perforation. In our study, in 62% of cases, pneumoperitoneum was the finding on the X-ray abdomen, whereas in 38% of cases, there was no gas under the right dome of the diaphragm, and in 1 patient, a feature of intestinal obstruction, i.e., ≥ 3 air fluid level, had been found. The diagnostic fallacy of the X-ray abdomen creates confusion among the surgeons about whether to open up. This is where clinical skill comes into play. Knowledge of clinical skill cleared up the dilemma, and on time, surgical intervention was done and the life of the patient was saved. Therefore, no mortality rate was observed in this scenario. Recommended surgical interventions in the literature for perforation were single layer closure, double layer closure, resection and anastomosis, and exteriorization of the perforation, where in this study all 18 patients had exteriorization done [9]. The most common complication encountered post-operatively was surgical site infection, followed by sepsis, pelvic abscess, liver abscess, pneumonia, wound dehiscence, paralytic ileus, and ultimately mortality. All these complications were encountered except for paralytic ileus [10], [11]. Complications were treated with third-generation cephalosporin, anaerobic coverage, and daily surgical site dressing. Finally all patients were discharged in 20±3.5 with no death.

CONCLUSION-

Enteric perforation, being endemic in our setting, carries a high rate of mortality with it. Hence, timely diagnosis and surgical intervention were required to avoid post-operative complications and save the lives of the younger generation, as they were the ones most affected by it. Delay in diagnosis will lead to delayed surgical intervention, multiple perforations, massive peritoneal collection, an edematous bowel loop, and post-operative complications. Therefore, to prevent the ugly demise of clinical skill and overindulgence in radiology, it's always better to be on the safe side by developing sound clinical skills. As in the rural areas, there is no facility for computed tomography yet, and not all patients with perforation can be taken for a CT scan to confirm the diagnosis. As a result, it's time to transform a surgeon's hand into a telescopic hand, so that the surgeon can reach a diagnosis and make an early decision about surgical intervention using traditional methods such as inspection, palpation, percussion, and auscultation. Lastly, awareness about sanitization, personal hygiene maintenance, safe drinking water, and typhoid vaccination plays an important role as a preventive measure.

Footnotes-

Conflict of interest- No conflict of interest.

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