

Clinical Profile and Management of Perforation Peritonitis in a Tertiary Care Centre, Kerala, India

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ABSTRACT

Peritonitis, an inflammation of the peritoneum and peritoneal cavity, is often brought on by a localised or systemic infection. Primary and secondary peritonitis are the two types of peritonitis.^[1] Once the clinical diagnosis of peritonitis is made, rapid institution of both physiologic support and aggressive anti-infective therapy are imperative. The objective was to study the frequency of perforation peritonitis in relation to various parameters, and to study the post-operative complications and mortality. Cross-sectional study was conducted during the time period of 1 year. Findings were noted intra-operatively, patients were followed up until discharge or death. It was found that males were more affected than females, and majority was in the 21-35 years age group. Most common perforation was appendicular perforation followed by gastric and small intestine perforation. Diagnosis is made clinically and confirmed by presence of free gas under diaphragm. Mortality was 10% and the most common post-operative complication was wound infection.

KEYWORDS: peritonitis; appendicular perforation; gastric perforation

INTRODUCTION

Peritonitis, an inflammation of the peritoneum and peritoneal cavity, is often brought on by a localised or systemic infection. Primary peritonitis is brought on by bacterial, chlamydial, fungal, or micro-bacterial infection when there is no intestinal or gastro-urinary tract rupture or inflammation. Secondary peritonitis arises when there is an intestinal or gastro-urinary tract perforation or inflammation.^[1]

Common causes of secondary bacterial peritonitis include peptic ulcer disease (PUD), acute appendicitis, ileal perforations brought on by typhoid and tuberculosis, jejunal perforations induced by severe trauma, colonic perforations brought on by closed loop obstruction or malignancy, and acute appendicitis^[2]. Additional causes include inflammatory bowel disease, penetrating trauma, blunt trauma, iatrogenic factors, and foreign substances. It is one of the most frequent reasons people with acute abdominal pain visit the emergency room.

The clinical spectrum of peritonitis can range from localised aseptic inflammation to life threatening sepsis with multi-organ failure. By receiving an early diagnosis and acting quickly, perforation Peritonitis morbidity and death can be successfully decreased.

The clinical diagnosis of peritonitis is mostly determined by the physical examination and medical history of the patient.

The main symptom is always abdominal pain. The pain may be sharp or insidious, constant, severe and aggravated by movement. Most patients remain still when bending their knees and raising their heads; this eases pain and lowers strain on the abdominal wall. Anorexia and other symptoms like nausea and vomiting are frequent. The "most distinctive indication of peritonitis, to both deep and superficial touch" is pain on palpation. The patient may be tachycardic and in shock, but pyrexia is typically not noticed until several hours later. The patient's abdomen presents "board-like" rigidity, and pain prevents them from moving around. Respiratory abdominal movements are absent. Bowel sounds could be present or absent and could resemble an early ileus.

Laboratory tests are not very specific for diagnosis. These tests can be used to prepare for surgery and learn more about the patient's basal state. An erect chest x-ray is most likely the most sensitive radiological investigation for the detection of free intraperitoneal gas under diaphragm in perforations. Free air in the abdomen may occur in 80% of cases with duodenal ulcer perforation.^[3,4,5]

Once the clinical diagnosis of peritonitis is made, rapid institution of both physiologic support and aggressive anti-infective therapy are imperative.

Primary objectives in the treatment of peritonitis are –

1. Resuscitation
2. Initiation of antibiotic therapy
3. Elimination of the source of bacterial contamination^[6]
4. Reduction of the bacterial inoculum
5. Continued metabolic support.

Surgery remains an important therapeutic modality for all cases of perforation peritonitis. An exploratory laparotomy is usually performed via a midline incision and provides excellent visualization and easy access to the entire abdomen. Operative management should focus on stopping the contamination source. Closing the perforation, removing the perforated viscus, or excluding the impacted organs from the peritoneal cavity can all be used to achieve this. The secondary objective of surgical management is to lower the bacterial inoculum in an effort to avoid recurring sepsis.

Nonendoscopic perforations of the colon, duodenum, and stomach may occasionally be treated without surgery. These perforations are typically minor and have been sealed off by the retroperitoneum, omentum, or local tissue. These include minor perforations of the stomach and duodenum brought on by benign diseases like PUD. In these situations, the greater or lesser omentum may spontaneously seal the perforation. The resulting omental patch resembles a surgically made patch and might be enough treatment^[7].

The physiologic condition of the patient and the clinician's perceived risk of further deterioration are two factors that influence the medical management of patients with gastrointestinal perforation who have undergone surgical or conservative treatment.

The most important resuscitative action is rapid fluid management. Hypovolemia and shock may develop as a result of a large fluid shift from the intravascular compartment into the peritoneal cavity. The fluid deficit can be made worse by fluid loss during open abdominal surgery and postoperative open abdominal management. Restoration of normal hemodynamic parameters, normalization of urine output (0.5-1.0 ml/kg/h), and correction of acidosis are considered reasonable clinical indicators of adequate resuscitation, but these parameters can be complicated by acute or pre-existent organ system failures, especially of the heart, kidneys, or liver^[8].

AIMS AND OBJECTIVES

To study the frequency of peritonitis secondary to hollow viscus perforation in relation to age, site of perforation, symptoms and signs, and to study the post-operative complications and mortality in the of outcome of cases of perforation peritonitis.

METHODOLOGY

Study design: Cross sectional study

Study duration: July 2021 to July 2022 (1 year)

Study setting: Tertiary care centre, Govt Medical College, Kozhikode

Study population: All cases of perforation peritonitis admitted under Department of General Surgery, Government Medical College, Kozhikode, Kerala during the study period.

Inclusion criteria: Clinical/Radiologically proven cases of perforation peritonitis aged >13 years, irrespective of sex.

Exclusion criteria:

Perforation peritonitis due to penetrating trauma

Patients presenting with esophagus, pancreatobiliary tree, or genitourinary tract perforation or undergoing laparotomy for primary peritonitis.

Tertiary peritonitis (anastomotic leak and fecal fistula).

Pancreatitis.

Patients who didn't give consent for operation and patients who couldn't be operated because of poor general condition or died before operation

Sample size:

$N = 4 * p * q / d^2$, where

p= prevalence of duodenal perforation will be 35.0% in India = 35.0% q = 1-p

d= absolute error of 10.0%

$\alpha = 95\%$

The calculated minimum sample has been inflated by 10% to account for anticipated subject non-response.

Sample size calculated is 100.

Methods of data collection:

The data will be collected from the patients using a semi structured questionnaire. The socio- demographic factors will be taken by direct interview.

All patients admitted to our hospital with acute pain abdomen will be evaluated with detailed history of their illness with onset and duration of presenting symptoms. A history of any other comorbid illness and personal habits will be also taken. After a general and abdominal examination (suggesting perforation peritonitis), an X-ray abdomen upright will be obtained.

A diagnosis of gastrointestinal perforation will be made on the basis of history, clinical examination, and presence of free gas under diaphragm on abdominal X-ray. In the rest of the cases, ultrasonography [USG]/computed tomography (CT) abdomen/paracentesis (four-quadrant aspiration – 4QA) will be done to confirm the diagnosis. As soon as the diagnosis will be made, resuscitation will be started with large volume of crystalloids (blood transfusion if necessary), nasogastric suction to empty the stomach, and broad spectrum antibiotics will be administered. Following adequate resuscitation, patients underwent exploratory laparotomy by a midline incision, and based on the intraoperative findings, the further management will be decided. The operating surgeon decided the procedure to be performed. Peritoneal

cavity will be irrigated with warm normal saline (3-5 litres). Intra-abdominal drains will be placed depending on peritoneal contamination and abdomen will be closed after achieving complete hemostasis. Postoperatively, intravenous antibiotics will be given for 5–10 days after the operation. The drug regimen will be not uniform and will be based on the cause of perforation and degree of contamination. Standard postoperative care will be provided to each patient. In case of uneventful recovery, patients will be discharged from the hospital when they had a good appetite; they will be accepting orally and had good ambulation. If a patient had complication, they will be managed accordingly. All the patients will be called for follow-up 15 days after surgery and after that as per requirement.

Investigation to be done: Biochemical investigations, Chest X Ray, Abdominal X Ray erect view, USG abdomen and pelvis.

Ethical concerns:

The study will be presented to Institutional Ethics Committee (IEC) for ethical clearance, after getting clearance form IEC the study will be started. All selected subjects will be approached and personally meet & briefed about the study and an informed consent is obtained. Strict confidentiality is maintained.

RESULTS

This study included 100 patients with secondary peritonitis. More than one-third of the patients (36%) belonged to the age group 21 to 35 years. There were 10 patients below 20 years and 12 patients above 66 years. Males constituted 80% and females 20% of the study population. 63 participants had vomiting at the time of presentation, and more than half had fever. Almost all patients (94) had signs like guarding and rigidity.

Gastric perforation dominates in the age group more than 38 years whereas appendicular perforation dominates below 38 yrs. Out of 100 patients, 42 had appendicular perforation, 33 had gastric perforation and 15 had small intestinal perforation.

Diagnosis was made clinically and confirmed by presence of free gas under diaphragm in 51% of patients, rest of the cases were diagnosed by USG abdomen (all of them were appendicular perforations) and Computed Tomography. Occurrence of organ failure (AKI, Liver failure, respiratory failure) is more common among those aged more than or equal to 38 years. All those with appendicular perforation were discharged from hospital; none of them expired during the course in hospital.

Proportion of expired patients in the hospital was more among those aged more than or equal to 38 years. Proportion of expired patients was more among those with perforation in large intestine (36.4%) compared to those with perforation in the stomach (15.2%) or perforation in small intestine (7.1%). Association between site of perforation and final outcome after hospitalisation was statistically significant. Out of 100 patients admitted 10 expired during course of hospital; rest got discharged.

DISCUSSION

The purpose of my study is to study the frequency of peritonitis secondary to hollow viscus perforation in relation to age, site of perforation, symptoms and signs; to study the postoperative complications and mortality in the outcome of cases of perforation peritonitis.

80% of the patients were male. This was in line with the findings of Agarwal N⁽⁹⁾ et al, who also found that there were more men than women in their study and the ratio was 4:1.

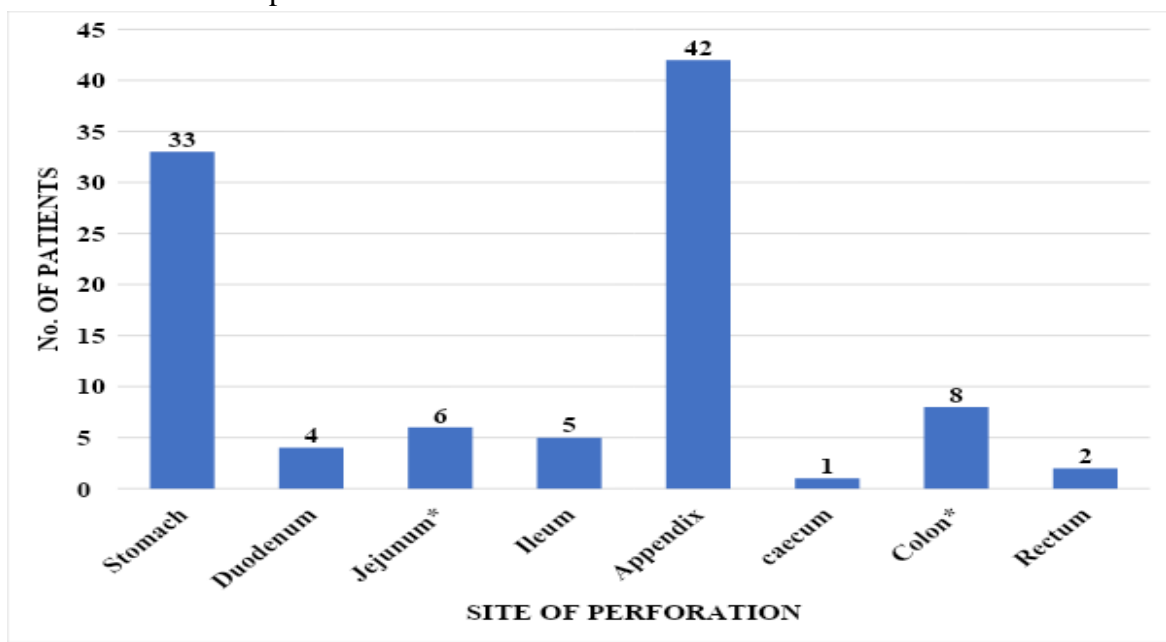
More than 80% of the patients visited the emergency department either on the day of onset of symptoms or the next day. Majority of patients present on the second day after appearance of symptoms. This is also in concordance with the study by Agarwal N. et al.⁽⁹⁾

The main symptoms of perforation peritonitis were abdominal pain, vomiting, and fever. The main signs were tenderness, guarding/rigidity, and liver obliteration dullness. In the current study, abdominal pain was experienced in every case.

Table 1 – Distribution of participants based on their age (N=84)

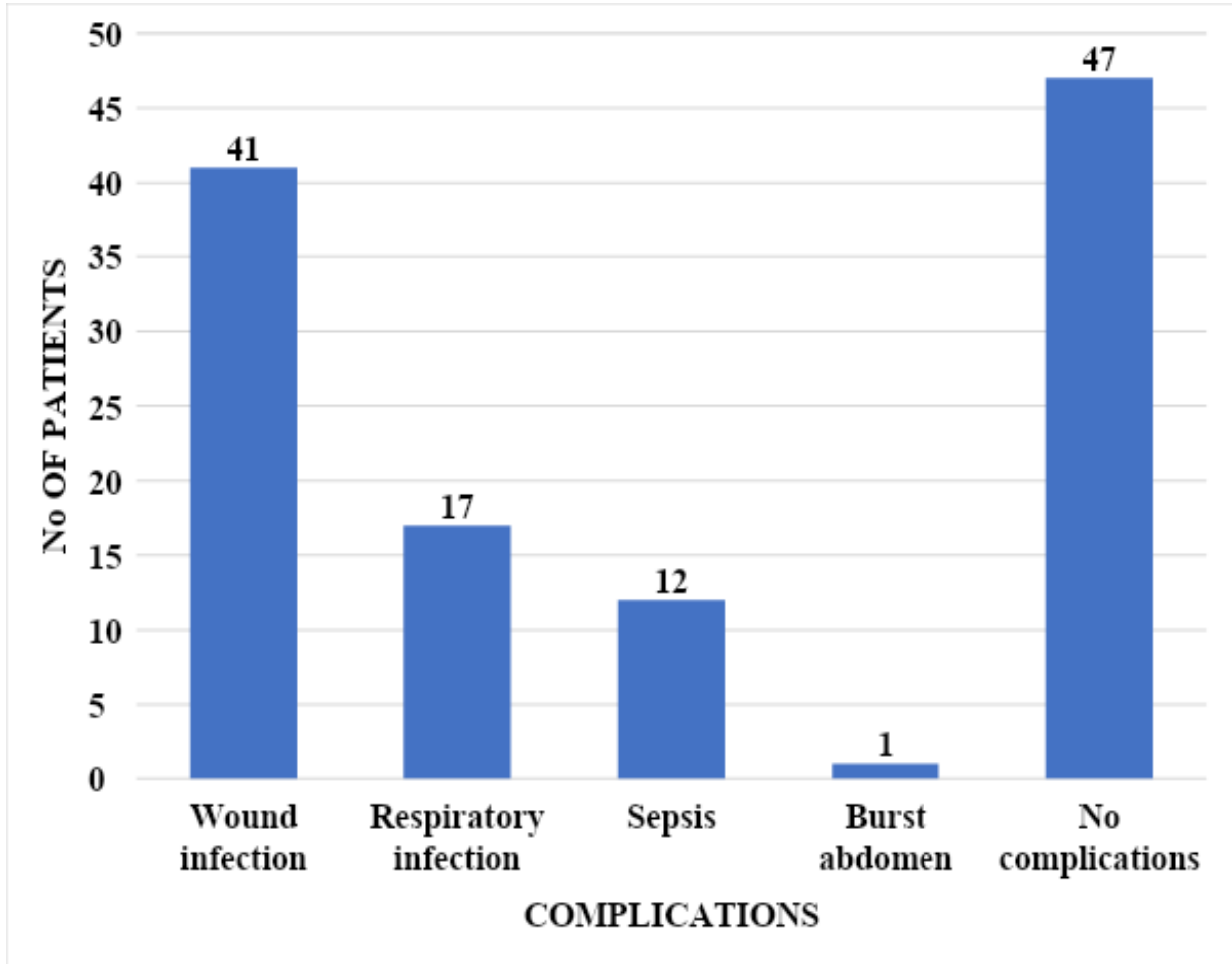
Age group (years)	Frequency	Percentage
≤ 20	10	10
21-35	36	36
36-50	23	23
51-65	19	19
>66	12	12
Total	100	100

A total of 36% of the patients in this study were in the 21-35 age range, followed by 23% in the 35-50 age group and 19% in 51-65 age group. With the exception of patients with appendicitis, the majority of the patients in his study were older than 30. This agreed with a study by Kallely et al., which found that the maximum incidence of perforation was on the second and third decade of life.



Graph 1 – Distribution of patients based on site of perforation (N=100)

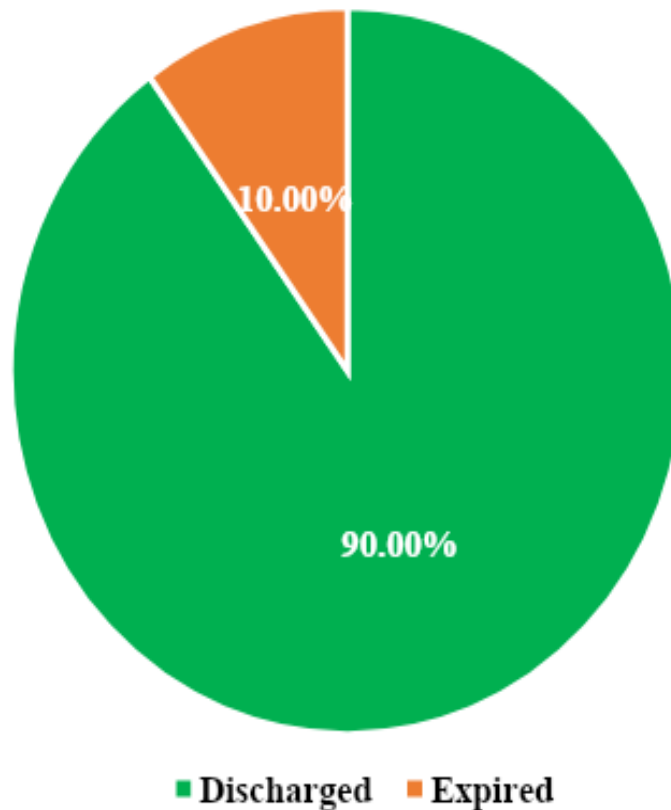
In majority of cases, clinical diagnosis was made, and the presence of pneumoperitoneum on a radiograph served as confirmation. Based on clinical and radiological findings, out of the 100 patients 42 had perforation in appendix, 33 had perforation in the stomach, and 15 patients had small intestine perforation (duodenum-4, Jejunum 6, ileum 5). 11 patients had perforation in large intestine (caecum -1, colon -8, rectum -2).



Graph 2 – Distribution of patients based on development of complications (N=100)

53% of the patients developed one or more complications of which 41 patients developed wound infection, 17 developed respiratory infection, 12 developed sepsis and only one patient had burst abdomen. This partially agreed with the study done by Nabi et al. where wound infection was the most common post operative complication(18.4%) followed by wound dehiscence (3.9%) and respiratory complications (10.5%).

Proportion of expired patients in hospital was more among those aged more than or equal to 38 years, those with comorbidities. Those with elevated TLC and those with elevated creatinine count and significant associations were there with presence of comorbidities and creatinine level.



Graph 3 – Distribution of patients based on final outcome (N=100)

10% of patients expired. Reported incidence of mortality ranges from 6.45% to 10% in different studies (CS Agrawal et al.⁽¹⁰⁾, Bohem J et al.⁽¹¹⁾) All those with perforation in appendix were discharged from hospital and none of them expired during the course in hospital. Proportion of expired patients was more among those with perforation in large intestine (36.4%) compared with those with perforation in stomach (15.2%) or perforation in small intestine (7.1%). Association between site of perforation and final outcome after hospitalisation was statistically significant (p value 0.003).

CONCLUSION

Despite improvements in surgical technique and intensive care management, peritonitis still presents a challenge to surgeons. Morbidity and mortality are influenced by a number of variables, including age, sex, duration, site of perforation, degree of peritonitis, and delay in surgical intervention. Maximum incidence of perforation was found to be in the age group of 21 to 35yrs, then comes above 66yrs. The most common site of perforation causing secondary peritonitis is appendix (37%) followed by gastric perforation (27.8%), small intestine (15).

Diagnosis is made clinically and confirmed by presence of free gas under diaphragm in 51% of patients, one- third cases are diagnosed by USG abdomen (all of them were appendicular perforations) and Computed tomography (54%).

The most common postoperative complication observed was wound infection, secondly respiratory tract infection. The overall mortality rate observed in this study is 10%.

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