



Cross-sectional Study

Clinical profile and management of perforation peritonitis in Bharatpur hospital, Nepal: A prospective study

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ABSTRACT

Introduction: The most common surgical emergency in general surgery is perforation peritonitis. It is a serious condition with a mortality rate of up to 20%, and it is the third most common cause of surgical abdomen after appendicitis and intestinal obstruction. The aim of this study to discuss clinical profile and management of perforation peritonitis in a hospital in central Nepal.

Methods: This prospective study was done for one year at Bharatpur Hospital, Chitwan Nepal. In our study, only patient above 15 years were included and those who were not fit for anesthesia and surgery were excluded. Most of the patient were diagnosed clinically supported by lab investigations and imaging like X-ray and ultrasonography of abdomen. The variables analyzed were the risk factors of the patient like smoking, alcohol, liver disease and previous abdominal surgeries.

Results: The majority of the patients were in the age group 50–59 years in male and 40–49 years in female. Among sixty cases, 31 were female and 29 were male with Female: Male ratio of 1.06:1. The most common cause of perforation found was peptic ulcer compromising 88.3% (53 cases) followed by appendicular perforation accounting 8.3% (5 cases). Similarly, Tubercular perforation was found in 3.3%. Smoking was most common risk factor accounting 88.3%, followed by alcohol consumption (48.33%) while, 15% of patients had positive history of NSAIDs consumption. On imaging, 38.33% patient had air fluid level on X-ray and 78.33% had gas under diaphragm. On blood investigation, leukocytosis was found in 53.33% of patients, hyponatremia in 10% of patients and hypokalemia in 18.33% of patients. While on urine examination, albumin was found in 5% of patients. The repair of perforation along with omentopexy was done in 73.3% of patients while only repair was done in 15% of patients. Only 8.3% opted for appendectomy while a very few patients (3.3%) went for resection with anastomosis. The Postoperative complications found were wound infection (43.3%), paralytic ileus (18.33%), sepsis (15%), followed by electrolyte imbalance (11.6%), postoperative bowel obstruction (6.6%) and burst abdomen (1.6%). While, there were only 3 cases of mortality.

Conclusions: Perforation peritonitis is a frequently encountered surgical emergency. Various factors like age, sex, duration, site of perforation, extent of peritonitis and delay in surgical intervention are associated with morbidity and mortality. A successful management depends upon early surgical intervention, source control and exclusive intraoperative peritoneal lavage.

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1. Introduction

The most common surgical emergency in general surgery is perforation peritonitis [1]. It is a serious condition with a mortality rate of up to 20%, and it is the third most common cause of surgical abdomen after appendicitis and intestinal obstruction [2]. Peptic perforation, appendicular perforations, typhoid, intestinal tuberculosis, Meckel's diverticulum, diverticulitis, trauma, gastrointestinal carcinomas, foreign body ingestion, gall bladder perforation secondary to gall stones, perforation due to obstruction, and iatrogenic perforation are some of the etiological conditions [3]. Because the signs and symptoms are typical, a clinical diagnosis of peritonitis is usually possible. The mainstay of treatment is adequate resuscitation, antibiotics, and surgical intervention to treat the underlying pathologic process, eliminate the source of bacterial contamination, reduce the degree of bacterial contamination in the peritoneal cavity, and prevent recurrent or residual infection [4,5]. Incidence, perforation site, and age are all varied in the developing world, and new trends are emerging. In the developing world, the etiological spectrum differs from that in the developed world [6]. Recent studies in South Asia and studies from Nepal have described about the clinical profile and management of perforation peritonitis [3, 6–8]. Despite advances in surgical technique, antibiotic medication, and perioperative care, perforated peritonitis still has a significant morbidity and fatality rate [8]. The aim of this study to discuss clinical profile and management of perforation peritonitis in a hospital in central Nepal.

2. Methods

A prospective observational study was done for one year from February 2019 to January 2020 at Bharatpur Hospital, Chitwan, Nepal among the patient diagnosed with perforation peritonitis. The approval for the study was taken from Institutional Review Board (IRB) of National Academy of Medical Science (NAMS) (Reference no. GP-84). This paper was registered in Research Registry (researchregistry8025). This study is reported according to STROCCS criteria [9].

2.1. Inclusion and exclusion criteria

The patient with the diagnosis of the peritonitis complicated with perforation managed with surgical procedures were included in our study. The patient above 15 years were included while those patients that were not fit for anesthesia and surgery were not taken into study. Most of the patient were diagnosed clinically at the set-up, supported by lab investigations and imaging like X-ray and ultrasonography of abdomen.

2.2. Variables

A standard structured questionnaire was filled by interviewing the patient (if possible) and family members/relatives after taking informed written consent. The questionnaire documented the patient's age, sex, weight, duration of symptoms, presenting symptoms, diagnosis, distribution according to the cause, signs of disease, Risk factors, Investigations done, Surgical Procedure done, postoperative complication and mortality and duration of hospital stay. The risk factors of the patient like smoking, alcohol, liver disease and previous abdominal surgeries were analyzed too.

2.3. Statistical analysis

Statistical analysis was performed using SPSS version 23.0. The descriptive data were reported in count and percent for categorical data, and mean and standard deviation or median and interquartile range for continuous data. A p value < 0.05 was considered statistically significant.

3. Results

This prospective study was done in patients admitted and operated in Bharatpur hospital who underwent exploratory laparotomy on emergency basis with peritonitis as result of perforations of any part of Gastro-intestinal (GI) tract were included in the study.

The majority of the patients were in between 50 and 59 years in male and 40–49 years in female. Among 60 cases, 31 were female and 29 were male with Female: Male ratio of 1.06:1. The maximum age was 77 years and minimum were 18 years. As age increases from 20 to 59 age group, the percentage of population increases from 1.6% to 31.6% afterwards slight low (Table 1).

The most common cause of perforation was peptic ulcer compromising 88.3% (53 cases) followed by appendicular perforation accounting 8.3% (5 cases) while Tubercular perforation was found in 3.3%. Malignant perforation and ischemic bowel disease was not present in any patient (Table 2). Fever (95%), Nausea (66.6%), vomiting (83.3%), abdominal distension (33.3%) were the symptoms present (Table 3). On examination, 95% had absent bowel sound. The common sign present were tenderness (96.6%), rigidity (78.3%), obliteration of liver dullness (73.3%) and abdominal distension (33.33%) (Table 4). The common risk factor was smoking (88.3%) followed by alcohol consumption (48.33%) while 15% of patients had positive history of NSAID consumption (Table 5). After admission, all patients were evaluated by blood investigations, urine examination and X-ray. 38.33% patient had air fluid level on X-ray while Pneumoperitoneum (gas under diaphragm in X-ray) was present in 78.33%. On blood investigation, leukocytosis (53.33%), hyponatremia (10%) and hypokalemia (18.33%). On urine analysis, Urine albumin was present in 5% patient while sugar was absent in urine in all patients (Table 6). After proper evaluation all patient went for surgical procedure. The repair was done on the basis of surgeon experience and operative findings. The repair of perforation along with omentopexy was done in 73.3% while only repair was done in 15%. Similarly, appendectomy was opted in 8.3% of patients. A very few patients (3.3%) went for resection with anastomosis (Table 7).

The postoperative complications recorded were wound infection (43.3% patients), paralytic ileus (18.33%), sepsis (15%), followed by electrolyte imbalance (11.6%), postoperative bowel obstruction (6.6%) and burst abdomen (1.6%). Some patients had more than one complication. There were total number of 3 cases of mortalities. The first case was male. The day of mortality was 13th day while cause of mortality was sepsis as well as electrolyte imbalance and post operative bowel obstruction. The second case was also male, day of mortality was 18th hospital admission day, cause of mortality was sepsis with paralytic ileus with electrolyte imbalance. Third case was female, day of mortality was 32nd day of hospital admission, cause of mortality was sepsis followed by burst abdomen as well as wound infection (Table 8). Four (23.3%) cases were discharge with normal, 43(71.6%) cases discharge with complication. The mean hospital stay was 15.50 ± 7.83 days (Table 9).

Table 1
Age and sex distribution.

AGE	MALE	FEMALE	TOTAL
<20	0	1	1(1.6%)
20–29	1	1	2(3.3%)
30–39	1	5	6(10%)
40–49	4	11	15(25%)
50–59	10	9	19(31.6%)
60–69	6	2	8(13.3%)
70–79	7	2	9(15%)
80–89	0	0	0
TOTAL	29	31	60

Table 2
Distribution according to cause.

CAUSES	NUMBER OF CASES
Peptic Ulcer Perforation	52(88.3%)
Appendicular Perforation	5(8.33%)
Tubercular Perforation	2(3.33%)
Malignant Perforation	0(0%)
Ischemic Bowel Disease	0(0%)
Total	60(100%)

Table 3
Clinical presentation (symptoms).

Symptoms	Number of cases	Percentage (%)
Abdominal pain	60	100
Abdominal distension	20	33.3
Nausea	40	66.6
Vomiting	50	83.3
Fever	57	95
Altered Bowel Habit	60	100

Table 4
Signs of the disease.

SIGNS	Number of Patients	Percentage
Tenderness	58	96.6
Rigidity	47	78.3
Abdominal Tenderness	20	33.3
Obliteration of liver dullness	44	73.3
Bowel sounds(absent)-In auscultation	57	95

Table 5
Distribution as per risk factors.

RISK FACTOR	Number of Patients
Smoking	53(88.3%)
Alcohol	29(48.3%)
NSAIDS use	9(15%)
Liver disease	0
Previous Abdominal Surgeries	0

Table 6
Distribution as per investigations.

INVESTIGATIONS	NUMBER OF CASES	PERCENTAGE
Leukocytosis	32	53.3
Pneumoperitoneum (gas under diaphragm on X-ray)	47	78.3
Air Fluid Level on X-ray	23	38.3
Hyponatremia (Na<125)	6	10
Hypokalemia (K < 3)	11	18.3
Urine Albumin (mcg/l)	3	5
Urine Sugar	0	0

Table 7
Distribution as per surgical procedures.

Surgical Procedures	Number of cases (%)	Outcome
Repair of Perforation	9(15%)	Discharge with normal
Repair of Perforation + Omentopexy	44(73.3%)	41 cases discharge with complication, Mortality- 3 cases
Resection with anastomosis	2(3.3%)	Discharge with complication
Appendectomy	5(8.3%)	Discharge with normal

4. Discussion

Perforation peritonitis is a frequently encountered surgical emergency. Various factors like age, sex, duration, site of perforation, extent of peritonitis and delay in surgical intervention are associated with morbidity and mortality. A successful management depends upon early surgical intervention, source control and exclusive intraoperative peritoneal lavage. This prospective observational study was hospital based and included patients admitted and operated in Bharatpur hospital. A total of 60 patients admitted with particular criteria fixed during the study period were selected randomly. Spectrum of etiology, clinical presentation, management, complications and mortality were studied.

In the present study, the patient who underwent laparotomy were grouped according to age. Current study showed the incidence of perforation peritonitis to be more common in 4th and 5th decade of life with mean age of 48.43 years. The maximum age was 77 years and minimum age was 18 years. The findings were similar to the study done by Jain et al. [10] where the most common incidence was 4th and 5th decade with mean age of 39.18 years. However, the present study is in contrast with the study done by Kallely et al. where the maximum incidence of perforation peritonitis was on 2nd and 3rd decade of life [3]. The current study showed female preponderance where male to female ratio is 1:1.06 which was found to be contrast with the study done by Shakya et al. that showed the male preponderance in perforation peritonitis with ratio of male: female as 2.5:1 [7].

In the present study, pain abdomen, vomiting, fever were the predominant symptoms. Tenderness, guarding, rigidity, obliteration of the liver dullness were the predominant signs. 100% of the patients presented with a symptoms of severe abdominal pain and altered bowel habit, classical feature of peritonitis followed by fever, nausea and vomiting and abdominal distension which is comparable to study conducted in the Pakistan where majority of the patients 78%, present with the history of pain in abdomen, abdominal distention 45%, altered bowel habit 26.6%, nausea vomiting 21%, Fever 20%(total number of patient included in study was 300) [11]. And another study done by Somani et al., has also similar finding as of current study, where abdominal pain, obstipation, abdominal distension, fever and vomiting were major symptoms [12]. In the present study most common diagnostic findings on investigations was pneumoperitoneum (gas under diaphragm on X-Ray) which is comparable to the study done by Bansal et al. [13] where out of the 1723 patients of documented perforation on intraoperative finding, 89.2% patients showed pneumoperitoneum on preoperative plain radiography.

In the present study the most common cause of perforation was peptic ulcer out of which 44 cases were duodenal ulcer disease (73.3%) and 9 (15%) were gastric ulcer disease followed by appendicular perforation accounting 8.3% (5 cases). Tubercular perforation (tissue biopsy sent in ileal perforation confirmed the diagnosis) was found in 3.3%. The finding is similar finding when compared with the study done at Government college and hospital, Chandigarh which showed, the most common cause of perforation in that series was perforated duodenal ulcer 289 cases (90%) followed by appendicitis 59 cases (12%), typhoid fever 41 cases (45%) and tuberculosis 20 cases(22%) out of total 504 cases [14]. The present study where peptic ulcer is most common cause of perforation differ from the studies done by Khanna et al. which showed typhoid perforation was more common [15]. Moreover, the order of site of perforation in this study is duodenum, gastric, appendix, ileum which is comparable to the study done by Agrawal CS et al. where perforation at duodenum (37.09%) was higher followed by appendix and small bowel perforation [16]. Similarly, Agrawal et al. showed higher number of perforations in ileum (36.9%) followed by duodenum (17.3%) and appendix (14%) which is in contrast to the present study [17]. In the present study all cases were admitted and managed with surgical procedures, antimicrobial therapy and intensive care support. Repair of perforation with omentopexy was done in all cases of duodenal ulcer perforation. These findings are comparable

Table 8
POST-OPERATIVE complication and mortality according to age and sex.

AGE (Number of cases)	Wound Infection M/F	Paralytic Ileus M/F	Sepsis M/F	Electrolyte Imbalance M/F	Post Operative Bowel Obstruction M/F	Burst Abdomen M/F	Mortality M/F
<20 [1]	0	0	0	0	0	0	0
20-29 [2]	0	0	0	0	0	0	0
30-39 [6]	0/2	1/0	0	0/1	0	0	0
40-49 [15]	2/5	1/3	0	0/1	0	0	0
50-59 [19]	7/3	3/0	3/0	2/0	1/0	0	1/0(Sepsis)
60-69 [8]	1/2	0/1	0/2	0/1	0/1	0	0
70-79 [9]	3/1	1/1	1/3	1/1	0/2	0/1	2(1/0-sepsis, 0/1-burst abdomen)
>80 (0)	0	0	0	0	0	0	0
Total	26(43.3%)	11(18.3%)	9 (15%)	7(11.6%)	4(6.6%)	1(1.6%)	3(5%)

Table 9
Duration of hospital stay.

Number of days	Number of Patients	Percentage
1–10 days	22	36.6%
11–15 days	13	21.6%
16–20 days	10	16.6%
21–25 days	8	13.3%
>25 days	4	6.6%

to study done by Gupta et al. [18] that showed simple closure with omental patch has good outcome except in large duodenal perforations (>3 cm in size). Simple closure was done in all seven cases of perforation while resection and anastomoses was done for five cases which is the similar modality of operative procedure mentioned in the study published on Journal of gastrointestinal surgery. The study showed resection and anastomoses is the treatment of choice in intestinal tubercular perforation rather than primary closure due to high mortality rate (25%) [19].

5. Outcome

The most common cause of post operative complication was wound infection followed by paralytic ileus and sepsis which is comparable to study done by Nabi et al. [20] This study showed that most common postoperative complications was wound infection(18.4%), followed by wound dehiscence (3.9%), respiratory complications (10.5%), septicemia (5.2%), and abdominal collection (3.9%).The incidence of wound infection is high in present study which is in contrast to the study done by Shah et al. where wound infection accounts for only 26% [21]. The high rate of surgical site infection in current study may be attributed to contamination of laparotomy wound during the surgical procedure and low nutritional status of the patients. Though the incidence of wound infection was much higher in present study than comparative study, these are preventable and should be detected early and treated aggressively. Despite high incidence of wound infection, the incidence of burst abdomen was relatively low in the present study which is in contrast to the study conducted at the Department of Surgery, Maulana Azad Medical College and associated Lok Nayak Hospital, Delhi, whose most common postoperative complication was wound infection (31.25%) and the incidence of burst abdomen was 13.75% [22]. The mortality rate was 5% in current study, the main cause of death in the present study was due to septicemia along with other associated factors like electrolyte imbalances, paralytic ileus and burst abdomen. Therefore, contamination is a crucial consideration in patient with peritonitis and mortality is a result of delayed presentation, electrolyte disbalances, elderly population, delayed in initiating treatment in emergency room and delayed in surgical treatment and less availability of intensive care unit. In contrast to present study the mortality rate was significantly low in study done by Kallely et al. where mortality was only 3.3% [3]. The cause of mortality

was septicemia. Assuming that the patient with peptic ulcer perforation are septic on admission, the determinants of mortality and sepsis should hold true for perforation peritonitis as well. It is necessary to recognize patients at high risk preoperatively and prepare for an intensive post operative management strategy. This becomes more significant in our setup, where the intensive care facility are limited and overwhelmed by the number of patients.

The treatment approach requires both knowledge of the signs and symptoms of peritonitis to aid diagnosis and an understanding of common causes to assist the surgeon in appropriate surgical care. Hence adequate preoperative resuscitation (with fluids, etc.), correction of electrolyte imbalances followed by an early surgical intervention, to remove the source of infection and stop further contamination, antimicrobial coverage is imperative for good outcomes minimizing morbidity and mortality.

There are several limitations to our study. First, the sample size was small. Second, there were some possibly unknown risk factors that we were unable to measure. In the analysis, association between the variables were not conducted. Despite, these limitations, our study improves the understanding of risk factors and complication in perforation peritonitis patients.

6. Conclusion

In this study lower gastrointestinal tract perforations predominate, upper gastrointestinal tract perforations. The most common age group affected is 50 years and above. Duodenal ulcer perforations were more common in the age group of 50 years and above. As higher age more than 50, possibility of mortality increases. Most common presenting complain was pain abdomen followed by altered bowel habit and fever. Laparotomy with closure of the perforation with omental patch is the commonest operative management for perforated duodenal ulcer. The most common postoperative complication observed was wound infection.

Ethical approval

Study was approved by the ethics committees of the Institutional Review Board (IRB) of National Academy of Medical Science.

Sources of funding

The authors declare that this study had no funding source.

Author contribution

SN and DPK: Initiated the research, wrote the research proposal, conducted the research, did data entry and analysis, and wrote the manuscript. SN and SS: Involved in the write-up of the methodology of the proposal and research work. SN: Contributed in analysis of data. SN

and KY Wrote and edited the manuscript. DPK: Reviewed the manuscript. The authors read and approved the final manuscript.

Registration of research studies

Name of the registry: Research Registry.

Unique Identifying number or registration ID: researchregistry8025.

Hyperlink to your specific registration (must be publicly accessible and will be checked): <https://www.researchregistry.com/browse-the-registry#home/>

Guarantor

Dr. Dinesh Prasad Koirala.

Consent

Written informed consent was obtained from the patient for publication of this study and accompanying images.

Provenance and peer review

Not commissioned, externally peer reviewed.

Declaration of competing interest

No potential conflict of interest relevant to this article was reported.

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Appendix A. Supplementary data

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