

Original Research Article

CLINICAL PROFILE, MANAGEMENT AND OUTCOME IN PERFORATION PERITONITIS - OUR EXPERIENCE FROM A TERTIARY CARE CENTRE IN SUB-HIMALAYAN REGION

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ABSTRACT

Background: Perforation peritonitis is the most common surgical emergency in general surgical practice (1). It is a serious condition with a mortality rate of up to 20%. The mortality of perforation peritonitis is highly dependent on early approach to the hospital, quick diagnosis, initial resuscitation, optimization and prompt surgical treatment as it correlates with the duration and degree of peritoneal contamination, the patient's age, the general health of the patient and the nature of the underlying aetiology (7). This study will be conducted to identify the various clinical presentations, aetiology, management and postoperative complications that can occur in perforation peritonitis.

Materials and Methods: Prospective observation study and hospital – based study.

Results: Duration of onset of pain at the time of presentation is a strong predictor of post-operative need for ICU admission, need of inotrope support, post-operative complications and mortality in our patients. It is inferred from our study that pre- operative hypotension and shock is a strong predictor of mortality (p = 0.049). It is also seen that shock and tachycardia at presentation is a strong indicator for need for ICU admission in the post-operative period with p value of 0.003 and 0.002 respectively. Leucocytosis and coagulopathy are strong indicators of need for inotrope support as the p value are 0.039 and 0.011 respectively. Total leucocyte counts more than 11000 and INR > 1.2 are significant risk factors for the need of inotrope support.

Conclusion: It is concluded from the above study that patient presenting early to the hospital have better prognosis with few post-operative complications. Patients presenting to hospital in shock, coagulopathy, tachycardia and have more chances of mortality and post-operative complications.

Keywords: Hyperglycemia, pre- diabetes, Diabetes Mellitus, HAART regimen.

INTRODUCTION

Perforation peritonitis is the most common surgical emergency in general surgical practice.^[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] Various etiological conditions include peptic ulcer 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, iatrogenic perforation.^[3] Peritonitis is the inflammation of peritoneum and is most commonly caused by localized or generalized infection.^[4] Peritonitis can be of primary, secondary or tertiary types. Acute, primary or spontaneous peritonitis results from bacterial, chlamydial, fungal, or mycobacterial infection in the absence of perforation of gastrointestinal (GI) tract. Whereas secondary peritonitis occurs in setting of GI

perforations amenable to surgical therapy, and tertiary peritonitis develops following treatment of secondary peritonitis either due to failure of host inflammatory response or due to super infection.^[5] The signs and symptoms of almost all cases of perforation peritonitis are typical and clinical diagnosis of peritonitis can be made in all patients. X-ray chest and abdomen, ultrasound whole abdomen and CT scan are the investigations that can confirm the diagnosis. Peritonitis usually presents as an acute abdomen. Local findings include generalised abdominal tenderness, guarding, rigidity, abdominal distension, decreased bowel sounds. Systemic findings include fever with chills or rigor, restlessness, tachycardia, tachypnoea, dehydration, oliguria, disorientation and ultimately shock.^[6] The mortality of perforation peritonitis is highly dependent on early approach to the hospital, quick diagnosis, initial resuscitation, optimization and prompt surgical treatment as it correlates with the duration and degree of peritoneal contamination, the patient's age, the general health of the patient and the nature of the underlying aetiology.^[7] This study will be conducted to identify the various clinical presentations, aetiology, management and postoperative complications that can occur in perforation peritonitis.

Aims and Objectives

1. To evaluate the clinical profile – Symptoms, abdominal findings, biochemical parameters in patients diagnosed with perforation peritonitis.
2. To assess the post-operative outcomes (morbidity – Duration of ICU stay, Anastomotic Leak, Surgical Site Infection and mortality) in patients with perforation peritonitis.

MATERIALS AND METHODS

The study was conducted in the Department of General Surgery, Himalayan Institute of Medical Sciences (HIMS), Swami Rama Himalayan University, Dehradun over a period of 12 months. Subjects were recruited from patients with a primary diagnosis of perforation peritonitis after obtaining written and informed consent and ethical clearance certificate from ethics committee.

Type of Study

Present study is a prospective observational study and hospital based study.

Sample Size

Total 30 patients diagnosed with perforation peritonitis were included in the study.

Inclusion Criteria

1. All cases diagnosed with perforation peritonitis of any part of gastrointestinal tract at the time of clinical examination, radiological imaging and surgery.
2. Patients above 18 years of age.

Exclusion Criteria

1. Traumatic perforation peritonitis.
2. Iatrogenic perforation peritonitis.
3. Perforation peritonitis due to ischemic pathologies.

Study Protocol

A detailed history was taken of all patients. Past illness particularly relating to dyspepsia, fever, bowel habits, any chronic illness and history of on counter medication (NSAIDS), was asked for personal history especially for dietary habits and addictions like smoking and alcohol were recorded. A general examination of patient was carried out to detect any signs of dehydration, a record of pulse, blood pressure, respiration, and temperature was kept. Local examination of abdomen was done to look for signs of peritonitis such as abdominal distension, rigidity, guarding, tenderness, bowel sounds. Routine examination of blood was done for hemoglobin, Total leucocyte count, blood sugar, Serum Creatinine, urea, INR, Arterial blood gas analysis. On the basis of clinical findings & investigations, decision for operative line of treatment was taken. The procedures adopted in the management were omental patch closure mainly; simple closure, open appendectomy, resection anastomosis, laparoscopic appendectomy laparoscopic omental patch closure, Cellan- Jones repair, Graham's patch repair, Modified Graham's patch repair was carried out accordingly. Patients to be followed up in the post-operative period to know the post-operative complications, mortality and morbidity rates. After satisfactory improvement patients were discharged from the hospital. If patients died in the ward, the possible cause of death established. The data was analyzed by statistical methods.

RESULTS

In this study, it is observed that most of the patients who came with perforation were in the age group of 18-40 years (40%) as compared to 41-60 years (30%), > 60 years (30%). In this study male gender preponderance was observed over females with males (73.3%) as compared to females (26.7%). It is noted that diabetes mellitus is the most common comorbidity (20%) followed by Hypertension (16.7%), Typhoid (6.7%), Ulcerative colitis (3.3%), Rheumatoid arthritis (3.3%), Chronic liver disease (3.3%) and COPD (3.3%). In this study it is observed that 16.7% patients were Chronic NSAID users and 3.3% of the population were chronic steroid user. It is observed in our study that 11 patients (36.7%) had history of either ethanol abuse or nicotine abuse each with 9 patients (30%) had history of both ethanol and nicotine abuse. Pneumoperitoneum was seen in 24 (80%) of our patients and no pneumoperitoneum was observed in 6(20%) patients. Prepyloric perforation is the most common site of perforation (43.33%) followed by

Ileal (20%), Jejunal (13.3%), Appendicular and Colonic (10%) and duodenal (3.33%). The Surgical Site Infection is seen as the most common complication as in 21 patients (70 %) followed by Pleural effusion in 12 patients (40%), Acute kidney injury and Septic Shock in 5 patients each (16.67%), Anastomotic leak in 4 patients (13.3%) and Parastomal abscess in 1 patient (3.33%). It is observed that 4 (13.3%) patients had anastomotic leak post operatively compared to 86.7% patient who did not have anastomotic leak. In this study mortality was observed in 16.7% of patients. 13(43.3%) patients presented within 48 hours from the onset of pain abdomen to the emergency followed by 10(33.3%) between 48-72 hours. 7(23.3%) patients came to the Emergency after 72 hours of onset of Pain abdomen. 9 (30%) patients were found to have normal TLC, 2 (7%) patients had low TLC whereas majority 19 (63%) were found to have leucocytosis. It is seen that 12(40%) patients with perforation peritonitis presented with low albumin of <2.5 g/dl in comparison with 12(40%) patients who had borderline low albumin levels (2.5 – 3.5 g/dl) and 6 (20%) patients had normal albumin levels (>3.5 g/dl). In this study, we can see that out of 12 patients who presented with albumin < 2.5 g/dl, 2 patients (16.67%) had anastomotic leak in the post-operative period. 12 patients who presented with albumin levels 2.5 – 3.5 g/dl, 2 patients (16.67%) had anastomotic leak. It is seen that 6 patients who came with albumin levels > 3.5 g/dl, no patient had anastomotic leak. Duration of pain at the time of presentation is a major prognostic factor with respect to morbidity and mortality. Out of 13 patients which presented early (< 48 hours) 7 patients needed ICU admission and 6

patients who did not needed ICU admission while out of 10 patients which presented between 48-72 hours, 8 patients needed ICU admission. Out of the 7 patients presented after 72 hours, 4 needed ICU admission. Post-Operative complications were more in patient presenting after 48 hours. (p = 0.284). Out of 13 patients presenting within 48 hours, only 1 needed inotrope support as compared to 7 patients who presented after 48 hours who needed inotrope support. (p = 0.053). With respect to mortality, there was no mortality among 13 patients which presented within 48 hours of onset of pain as compared to 5 deaths in patients presenting after 48 hours. In this study, we can see that patients presenting with Systolic Blood Pressure (BP < 90 mm hg) have higher mortality rates than patients presenting with normal Systolic Blood Pressure. Thus, it can be inferred that Systolic Blood Pressure is a strong indicator of mortality. (p = 0.049). In the above analysis, we can see that patients presenting with Systolic Blood Pressure (SBP < 90 mm hg) and Heart Rate (HR > 100 bpm) have higher chances of mortality than patients presenting with normal blood pressure and normal heart rate. Thus, it can be inferred that Shock (p = 0.003) and Tachycardia (p = 0.002) are strong indicators of need for ICU admission in patients of perforation peritonitis. In this study, it is observed that patient presenting with high Total Leucocyte Count (TLC > 11,000) and INR > 1.2, have high chances of need for inotrope support than patients presenting with normal TLC and INR. Thus, it can be inferred that high TLC count (p = 0.039) and Pre-operative coagulopathy (p = 0.011) are strong indicators of Need for Inotrope Support.

Table 1: Incidence of Anastomotic leaks in patients with low albumin

Anastomotic Leak	Albumin Levels		
	< 2.5	2.5 – 3.5	> 3.5
Yes	2	2	0
No	10	10	6
Total	12	12	6

Table 2: Factors effecting mortality in patients of perforation

Parameters	Mortality		P value
	Yes	No	
SBP	78.40 ± 8.53	92.80 ± 15.41	0.049
DBP	54.00 ± 5.47	59.60 ± 9.34	0.209
HR	120.80 ± 16.76	109.56 ± 14.79	0.140
TLC	15.00 ± 3.39	12.44 ± 7.84	0.485
INR	1.56 ± 0.65	1.40 ± 0.54	0.612
Duration Of Onset of Pain (hrs.)	91.20 ± 31.29	53.76 ± 55.9	0.162

Table 3: Factors effecting Need for ICU admission

Parameters	Need For ICU Admission		P value
	Yes	No	
SBP	84.32 ± 13.43	100.91 ± 13.00	0.003
DBP	55.79 ± 9.61	63.64 ± 5.04	0.018
HR	117.58 ± 11.00	100.82 ± 16.62	0.002
TLC	14.00 ± 8.61	10.91 ± 3.85	0.272
INR	1.63 ± 0.68	1.36 ± 0.50	0.268
Duration Of Onset of Pain (hrs.)	69.82 ± 73.73	54.32 ± 39.87	0.459

Table 4: Factors effecting Need for Inotrope Support

Parameters	Need Of Inotrope Support		P value
	Yes	No	
SBP	81.50 ± 12.45	93.63 ± 15.28	0.054
DBP	58.75 ± 6.40	58.64 ± 9.90	0.976
HR	115 ± 5.47	110 ± 17.63	0.423
TLC	17.38 ± 10.11	11.23 ± 5.40	0.039
INR	2.00 ± 0.75	1.36 ± 0.49	0.011
Duration Of Onset of Pain (hrs.)	66 ± 35.71	57.82 ± 60.01	0.721

DISCUSSION

In our study it is seen that males are effected more than females. Out of total 30 patients, 22 patients were males (73.3%) and 8 patients were females (26.7%). In the study done by Urvashi Saksena et al (8), it was seen that males were affected more than females. It is observed that the peak incidence in our study is in 2nd – 4th decade of life. Age wise distribution shows that majority of the patients presenting with perforation peritonitis are between 18 – 40 years (40%) followed by 41-60 years (30%) and more than 60 years (30%). In the study done by Urvashi Saksena, it was seen that the peak incidence was seen in 2nd and 3rd decades of life. The most common perforation peritonitis noticed in our study was Pre-Pyloric Perforation (43.3%) followed by ileal perforation (20%), jejunal (13.33%), Appendicular and Colonic perforation (10% each) and duodenal perforation (3.33%). In the study by Yadav D et al, the most common cause and site of perforation peritonitis noticed was perforated duodenal ulcer (26.4 %) and ileal typhoid perforation (26.4 %), each followed by small bowel tuberculosis (10.3 %) and stomach perforation (9.2 %), perforation due to acute appendicitis (5 %). The highest number of perforations was seen in ileum (39.1 %), duodenum (26.4 %), stomach (11.5 %), appendix (3.5 %), jejunum (4.6 %), and colon (3.5 %). Among all the patients presented with perforation peritonitis, the most common comorbidity was Diabetes mellitus (20%), followed by

Hypertension (16.7%), Typhoid (6.7%), Chronic obstructive pulmonary disease, chronic liver disease, rheumatoid arthritis, ulcerative colitis (3.3% each). Diabetes mellitus was found to be a significant factor in the wound healing with more incidence of surgical site infections in patients with diabetes mellitus (83.3%). Poor control of blood sugar levels causes delay in wound healing and the patient is more prone to wound infections. In the study done by Hassan M AL Bisher et al,^[9] the most common diseases associated with secondary peritonitis are hypertension (24.5%), diabetes mellitus (20.4%), abdominal masses (6.1%), and inflammatory bowel diseases (2%). Chronic NSAIDs use is a major risk factor for the occurrence of peptic ulcers which further complicates if left untreated and leads to prepyloric and duodenal perforation. In our study, out of total 30 patients, 5(16.67%) were chronic NSAID users for some chronic ailment such as back pain, joint pains etc. In the study done by Neupane S et al (10) in 2022, 15% patients had history of chronic NSAID consumption. In this study, we can see that out of 12 patients who presented with albumin < 2.5 g/dl, 2 patients (16.67%) had anastomotic leak in the post-operative period. 12 patients who presented with albumin levels 2.5 – 3.5 g/dl, 2 patients (16.67%) had anastomotic leak. It is seen that 6 patients who came with albumin levels > 3.5 g/dl, no patient had anastomotic leak. Surgical Site infection is the most common post-operative complication seen in our study accounting for 21 (70%) of the patients followed by Pleural effusion 12 (40%) patients, Acute Kidney Injury and septic

shock 5 (16.67% each), Anastomotic Leak 4 (13.3%), Parastomal abscess 1 (3.33%). In the study done by Neupane S et al post-operative 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%). Duration of pain at the time of presentation is a major prognostic factor with respect to morbidity and mortality. Out of 13 patients which presented early (< 48 hours) 7 patients needed ICU admission and 6 patients who did not needed ICU admission while out of 10 patients which presented between 48-72 hours, 8 patients needed ICU admission. Out of the 7 patients presented after 72 hours, 4 needed ICU admission. Post-Operative complications were more in patient presenting after 48 hours. ($p = 0.284$). Out of 13 patients presenting within 48 hours, only 1 needed inotrope support as compared to 7 patients who presented after 48 hours who needed inotrope support. ($p = 0.053$). With respect to mortality, there was no mortality among 13 patients which presented within 48 hours of onset of pain as compared to 5 deaths in patients presenting after 48 hours. In the study done by Bhandari T et al,^[11] patients were divided into two groups based on the time of surgery i.e. Early (< 6 hours) and late (≥ 6 hours) intervention groups. All perioperative outcome of surgery were analysed. Late intervention patients were more likely to develop complications (34.3 and 17.8%, $P < 0.05$) and mortality (14 and 6%, $P < 0.05$) in comparison to early intervention patients and had significantly higher median time to resumption of normal diet (5 and 2.8 days), length of hospital stay (15 and 9 days) and length of ICU stay (8 and 4 days) ($P < 0.05$). In our study, we can see that patients presenting with Systolic Blood Pressure (SBP < 90 mm hg) and Heart Rate (HR > 100 bpm) have high chances of mortality than patients presenting with normal blood pressure and normal heart rate. Thus, it can be inferred that Shock ($p = 0.003$) and Tachycardia ($p = 0.002$) are strong indicators of need for ICU admission in patients of perforation peritonitis. In the study done by Rai et al in 2022 tachycardia at the time of presentation significantly effects the post-operative prognosis of the patient presenting with perforation in the emergency. Out of 26 patients presented to emergency with tachycardia (HR > 100 bpm), 19 needed ICU admission. ($p=0.005$). The association between need for ICU admission and lower systolic blood pressure ($p = 0.029$) was significant. In our study, mortality rate was found to be 16.7% which is similar to many previous studies in which mortality rate has been observed up to 20%. In our study it is seen that Hypotension is a strong indicator of post-operative mortality in the patients with p value of 0.049. In the study done by Rai et al in 2022 tachycardia at the time of admission ($p = 0.020$), hypotension ($p = <0.001$), International Normalized Ratio (INR) ≥ 1.5 ($p = <0.001$), the mean albumin level of 2.89 with p value of 0.027, were significant

associate factors of mortality. In other study done by Kamble RS et al in 2016 it is found that late admission to the hospital tachycardia, tachypnoea, hypotension, anaemia, renal failure, septicaemia, amount of contamination, size and number of perforations are the factors significantly predicting death (each significant at 5%). Thus, it can be inferred that Shock, tachycardia, coagulopathy and raised TLC at the time of presentation are the strong indicators of morbidity and mortality in the patient of perforation peritonitis.

CONCLUSION

This study highlights high prevalence of perforation peritonitis in the male gender as compared to the female. The male dominance can be due to more substance abuse and more use of NSAIDs among the male population. Majority of the patients of perforation peritonitis were in the 2nd – 4th decade of life. Substance abuse either in the form of Nicotine/ethanol or in combination of ethanol and nicotine was found to be a major risk factor. The most common perforation was pre-pyloric perforation which is due to high incidence of peptic ulcers in the population. Diabetes mellitus is the most common comorbidity found in our study followed by hypertension. Surgical site infection is found to be the most common post-operative complication followed by pleural effusion, Acute kidney injury, Septic shock, Anastomotic leak in decreasing order. It is observed that patients presenting with low albumin levels have higher chances of anastomotic leak compared to patients presenting with normal albumin levels. Duration of onset of pain at the time of presentation is a strong predictor of post-operative need for ICU admission, need of inotrope support, post-operative complications and mortality in our patients. Patients presenting within 48 hours of onset of pain had better prognosis with shorter hospital stay, less complications and less chances of mortality. It is inferred from our study that pre-operative hypotension and shock is a strong predictor of mortality ($p = 0.049$). It is also seen from previous studies that patients presenting with shock, had higher mortality than patients presenting with normal blood pressure. It is also seen that shock and tachycardia at presentation is a strong indicator for need for ICU admission in the post-operative period with p value of 0.003 and 0.002 respectively. Leucocytosis and coagulopathy are strong indicators of need for inotrope support as the p value are 0.039 and 0.011 respectively. Total leucocyte counts more than 11000 and INR > 1.2 are significant risk factors for the need of inotrope support. Thus, it can be inferred that Shock, tachycardia, coagulopathy and raised TLC at the time of presentation are the strong indicators of morbidity and mortality in the patient of perforation peritonitis.

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