SciMedCentral

Journal of Surgery & Transplantation Science

Research Article

Perforation Peritonitis: An Observational Study at Tertiary Centers in Central Nepal

Vikal Chandra Shakya[1]*, Anir Ram Moh Shrestha[1], Anang Pangeni[1], Bikram Byanjankar[1], Rabin Pandit[1], Anuj Jung Rayamajhi[2], Prajwal Bhattarai[2], Rupesh Yadav[2], Subhash Paudel[2], Lokesh Raj Sharma[3], and Rabin Koirala[4]

[1]Department of Surgery, Civil Service Hospital of Nepal, Nepal
[2]Department of Anesthesia and Intensive Support, Civil Service Hospital of Nepal, Nepal
[3]Department of Surgery, Helping Hands Hospital, Nepal
[4]Department of Anesthesiology, Washington University School of Medicine, USA

*Corresponding author
Vikal Chandra Shakya, Department of Surgery, Civil Service Hospital of Nepal, Kathmandu, Nepal, Tel: 977-9842-173-106; Email: vikalcsh@yahoo.com

Submitted: 09 January 2018

Accepted: 24 January 2018

Published: 31 January 2018

ISSN: 2379-0911

Keywords

- Perforation peritonitis
- Nepal
- Mortality
- Morbidity

Abstract

Spectrum of perforation peritonitis in the Nepalese setting hasn't been well documented. This study helps us to understand the different spectrum of this entity as we encounter them in our set-up. This study is a prospective descriptive study in patients presenting with a diagnosis of perforation peritonitis who underwent operative intervention from January 2010 to December 2016 at tertiary centers in central Nepal. A total of 500 patients were included in the study. The mean age of presentation was 37.02 + 19.87 years (range 2-94 years). The most common cause was, duodenal perforation, 201 cases (40.2%); followed by appendicular, 185 patients (37%). The morbidity rate was 37.2%. The mortality rate was 8.2%. 1.8% patients left against our medical advice. The scenario of perforation peritonitis is different in our setting, the most common cause being due to acid-peptic disease, then appendicular perforation and small bowel perforations. The morbidity rate and mortality rate is comparable to other series.

ABBREVIATIONS

PL: Peritoneal Lavage; ECG: Electrocardiography; COAD: Chronic Obstructive Airway disease; Ex Lap: Exploratory Laparotomy; DIC: Disseminated Intravascular Coagulation; MODS: Multiorgan Dysfunction Syndrome

INTRODUCTION

Perforation peritonitis is a relatively common surgical emergency, which is associated with a high morbidity and mortality [1]. Though advances in surgical and intensive management, results have not uniformly improved even in the last decade [2]. Peritonitis can be classified as primary, secondary or tertiary [3]; multisystem organ failure leading to death have been reported in all series [4,5]. While there have been some studies from the Indian subcontinent that highlight the differences from western studies, comprehensive data from our region regarding secondary perforation peritonitis are lacking [2,4,6-8]. Though there have been some studies and sporadic case reports from Nepal as well, spectrum of perforation peritonitis in our setting hasn't been well documented [9-16]. This study helps us to understand the different spectrum of this entity as we encounter them in our region, and to analyze the morbidity and outcome in these patients.

MATERIALS AND METHODS

This study was a prospective descriptive study in patients presenting to Surgery Department of Civil Service Hospital of Nepal, Kathmandu, Nepal and Helping Hands Hospital, Kathmandu, Nepal with a diagnosis of perforation peritonitis from January 2010 to December 2016. All patients resulting from perforation in the gastrointestinal tract was included in the study. Peritonitis secondary to anastomotic dehiscence / leak or peritonitis in postoperative patients was not included in the study. All patients following a diagnosis of peritonitis underwent adequate resuscitation and definitive treatment. A detailed clinical history, examination and relevant investigations (including hemoglobin, blood sugar, blood urea, serum creatinine, serum amylase, ECG, chest X-ray, abdominal X-ray etc.) were carried out. Based on history and physical examination, a provisional diagnosis of intestinal perforation was made which was confirmed by investigations including X-ray chest for pneumoperitoneum and abdominal X-ray for air fluid levels. Only when the diagnosis was elusive, e.g. presence of bleeding per rectum, a mass on abdominal palpation, suspected malignancy, trauma with suspicion of solid organ injury, and acute episode superimposed on chronic illness, equivocal signs on clinical examination, without evidence of pneumoperitoneum on X-ray, was a CT-scan done. All patients were resuscitated after passage of two 16-gauge cannulas, nasogastric tube and Foley's catheter. All patients received 2-3li of Ringer's lactate and third generation cephalosporins (ceftriaxone) or quinolones (ofloxacin) and metronidazole. With the confirmation of the initial diagnosis of intestinal perforation, the patients were subjected to emergency laparotomy. The operating decision was taken by the senior resident/consultant on duty. Perforations in the gastrointestinal

tract were treated either with primary double-layered closure, segmental resection and anastomosis or loop ileostomy, depending upon the operative findings and general status of the patients. Intra-operative findings (nature of exudates- clear, purulent, fecal, and origin of source of infection etc.) were recorded. Intra-operative peritoneal lavage was done adequately with at least 2li of warm normal saline, the sources of infection were eliminated, and the lavage fluid was completely aspirated along with the purulent exudates, fecal debris, food particles, and blood. Pelvic regions, paracolic gutters and subphrenic spaces were opened and debrided. Appropriate numbers of abdominal drains were inserted according to the site of origin of infection and severity of peritonitis. Abdomen was closed either as mass closure or in layers depending upon the operator's choice. Patients were monitored post-operatively for recovery and early detection and management of complications. Intravenous ciprofloxacin (10 mg/Kg body weight/day in 2 divided doses) and metronidazole (15 mg/Kg body weight stat followed by 7.5 mg/Kg body weight every 8 hourly) were infused initially and later switched to oral medication. Postoperative follow up was done clinically; however relevant investigations were done as desired. Data from filled performa was entered in a computer and analyzed using SPSS software for Windows. The study was given an approval by the Institutional Ethical Review Committee (ERC).

RESULTS

A total of 500 patients were included in the study. They were predominantly males (358 males, 142 females); the male: female ratio was 2.5:1. Maximum patients belonged to age group 41-50 years, followed by 11-20 years; the mean age of presentation was 37.02 + 19.87 years (range 2-94 years). The mean age of presentation of female patients was 36.09 + 20.03 years (range 3-86 years) and of male patients were 37.43 + 19.83 years (range 2-94 years). Presenting symptoms included abdominal pain (99.2%), vomiting (65.4%), abdominal distension (54.5%), fever (32%) and absolute constipation (80%) (Table 1). Fifty seven patients (11.4%) presented in shock. 498 patients underwent emergency laparotomy after diagnosis and resuscitation. The mean duration of presentation was 4.25 + 4.57 days (range 1-60 days). Only 107 patients (21.4%) presented in first 24 hours. One-hundred and eight patients (21.6%) presented after 3-5 days; 43.6% patients presented after 3 days of onset of the symptoms. In the investigations, the most frequent abnormality was leukocytosis. Gas under diaphragm was seen in 265 (53%) of patients. CT scan was done in 121 (24.2%) of patients. The most common co-morbidity associated was hypertension followed by respiratory diseases, especially COAD.

In 201 (40.2%) cases, duodenal perforation was the underlying cause for peritonitis which was the most common (Table 2). The second most common site of perforation was appendix, found in 185 (37%) patients. Three hundred sixty-seven (73.4%) cases were found to have generalized peritonitis while the remaining 133 patients (26.6%) had localized peritonitis. Fecal exudates was seen in 29 (5.88%) patients while 370 (74%) had purulent exudates. The most commonly performed procedure in our series was omental patch repair for ulcer perforation which was carried out in 187 (37.4%) patients, followed by laparotomy and appendectomy in 125 (25%) patients. Two patients were managed conservatively, one who had a colonic perforation due to colonoscopy, and another a small appendicular abscess which immediately resolved with an aspiration.

Table 1: Preoperative data.

1	**Signs and Symptoms**	**Frequency**	**%**
	Pain Abdomen	496	99.2
	Vomiting	327	65.4
	Distension	273	54.6
	Constipation	126	25.2
	Fever	160	32
	Diarrhea	28	5.6
	Tachypnoea	106	21.2
	Tachycardia	70	14
	Hypotension	57	11.4
	Oliguria	48	9.6
2	**Duration of Complaints**	**Frequency**	**%**
	<24 hrs	107	21.4
	24-48 hrs	81	16.2
	48-72 hrs	98	19.6
	72-120 hrs	108	21.6
	5-7 days	57	11.4
	7-10 days	28	5.6
	>10 days	25	5
3	**Abnormalities**	**Frequency**	**%**
	Anemia (Hb <10 gm%)	86	17.2
	Metabolic acidosis (ph<7.35)	45	9
	Leukocytosis (>11000 cells/mm3)	486	97.2
	Leukopenia(<4000 cells/mm3)	20	4
	Hyponatremia (Na < 130 mEq/L)	104	20.8
	Hypernatremia (Na < 130 mEq/L)	58	11.6
	Hypokalemia (K < 2.7 mEq/L)	63	12.6
	Hyperkalemia (K < 2.7 mEq/L)	46	9.2
	Increased Urea (> 167 mg/dl)	107	21.4
	Increased Creatinine (< 1.7 mg/dl)	100	20
	Pneumoperitoneum on Chest X-Ray	265	53
	Air fluid levels on abdominal X-Ray	26	5.2
4	**Comorbid Conditions**	**Frequency(n=26)**	**%**
	Hypertension	38	7.6
	Respiratory	26	5.2
	Cardiac	15	
	Renal	9	1.8
	Malignancy	4	0.8
	Diabetes Mellitus	7	1.4
	Liver dysfunction	8	1.6
	HIV/HCV/HBsAg positive	15	3

Postoperative complications were encountered in 186 cases (37.2%) (Table 3). The mean hospital stay was 8.93+6.63 days (range 4 to 57 days). Forty-five patients were treated in the intensive care unit for a mean period of 10.95+4.53 days (range 1-39 days). Forty-one patients (8.2%) succumbed to death. Maximum mortality occurred in patients with duodenal perforation peritonitis, which constituted 53.6% of all mortalities. The predominant cause of mortality was septicemia followed by pneumonia and renal failure. Four hundred fifty patients (90%) recovered and were discharged from the hospital, nine (1.8%)

Table 2: Operative data.

1	**Site**	**Frequency**	**%**
	Duodenal	207	41.4
	Appendicular	185	37
	Jejunal	56	11.2
	Ileal	48	9.6
	Gastric	9	1.8
	Colonic	8	1.6
	Gall Bladder	3	0.6
	Meckel's	1	0.2
	Appendicular and ileal both	1	0.2
2	**Etiology**	**Frequency**	**%**
	Acid-peptic disease	190	38
	Infective (Appendicular)	185	37
	Traumatic (Blunt and penetrating)	71	14.2
	Enteric	19	3.8
	Non-specific bowel ulceration	8	1.6
	Septic abortion	8	1.6
	Malignancy	4	0.8
	Tubercular	2	0.4
	Crohn's disease	2	0.4
	Intussusception	2	0.4
	Strangulated and perforated bowel due to en-masse reduction from hernia	2	0.4
	Diverticulosis	1	0.2
	Strangulated and perforated bowel due to volvulus	1	0.2
	Colonoscopic perforation	1	0.2
	Unknown	5	1
3	**Operation Performed**	**Frequency**	**%**
	Ex lap + PL + Omental Patch	187	37.4
	Laparoscopic Omental Patch	3	0.6
	Ex lap + PL + Primary Closure of bowel perforations	80	16
	Ex lap + PL + Appendectomy	125	25
	Emergency Appendectomy (via gridiron incision) + PL	37	7.4
	Ex lap + PL + Resection and End to End Anastomosis	40	8
	Extraperitoneal Drainage of Appendicular Abscess	23	4.6
	Ex lap + PL + Ileostomy	15	3
	Ex lap + PL +Right hemicolectomy	5	1
	Ex lap + PL + Colostomy	2	0.4
	Ex lap + PL + Cholecystectomy	3	0.6
	Ex. Lap + PL + Distal gastrectomy	1	0.2
	Conservative	2	0.4
	Flank drain insertion	21	4.2

Table 3: Morbidity, Mortality and Outcome.

1	**Re-do Surgeries**	**Frequency**	**%**
	Re-exploration	53	10.6
	Tension suturing	18	3.6
2	**Post Operative Complications**	**Frequency**	**%**
	Pneumonia	115	23
	Wound Infection	90	18
	Septicemia	59	11.8
	Electrolyte abnormalities	34	6.8
	Acute Renal Failure	28	5.6
	Intraabdominal collections	26	5.2
	Anemia	25	5
	Shock	20	4
	Burst abdomen	18	3.6
	Anastomotic Leakage	13	2.6
	DIC	12	2.4
	Fecal fistula	10	2
	Metabolic Acidosis	10	2
	Cardiac Arrest	10	2
	Alcohol Withdrawal	9	1.8
	Myocardial Infarction	5	1
	ARDS	4	0.8
	Arrythmia	4	0.8
	Acute Liver Failure	4	0.8
	MODS	2	0.4
	Bed Sores	2	0.4
	Total	186	37.2
3	**Causes of Mortality**	**Frequency**	**%**
	Septicemia	38	92.68
	Respiratory complications	32	78
	Arrythmia, Cardiogenic shock	13	31.7
	Acute renal failure	12	29.26
	Metabolic Acidosis	9	21.95
	DIC	8	19.51
4	**Outcome**	**Frequency**	**%**
	Mortality	41	8.2
	Recovery	450	90
	Left against medical advice	9	1.8
5	**Mortality According to Site of Perforation**	**Frequency**	
	Duodenal ulcer perforation	22	53.6
	Gastric Perforation	1	2.4
	Jejunum	7	17
	Ileal	8	19.5
	Appendicular	2	4.8
	Colonic	1	2.4
	Gallbladder	1	2.4
	Total	41	8.2

left against our medical advice, mainly because of lack of money during the treatment and their personal or social causes.

DISCUSSION

Generalized peritonitis remains a significant cause of morbidity and mortality [6]. The male-female ratio was 2.5:1 in this study, which is similar to the trend worldwide, which show a male preponderance [17,18]. In a similar study conducted in another hospital in eastern Nepal in 2001, the mean age of patients was 37.4 years and majority of patients (21.7%) belonged to age group of 30-40 years though this data included tertiary peritonitis as well [10]. There was male preponderance (81.4%) with male to female ratio of 4.4:1. Majority of the patients (89; 71.7%) presented after 24 hours of onset of symptoms. The mean age hasn't changed much in the present study, but a change has been seen in the male-female ratio. It has changed from 4.4:1 to 2.5:1; which means that more and more females are being brought to the hospital. In the present study, 78.6% of patients have been brought to the hospital after 24 hours; this may be due to many small hospitals and clinics that treat them conservatively and when the conservative management fails, they are referred late. The most common cause in that study was duodenal perforation followed by appendicular perforation and traumatic perforations. In another study of 145 patients with duodenal perforation peritonitis done in 2002-2004, there were 124 (85.52 %) males and 21 (14.48 %) females [11]. Mortality rate was 6.9%; mortality rate in our patient cohort is 11.5%. The mean age in duodenal perforation remains similar: 48.15 years versus 45.99 years in the present study. In a study in western Nepal, the commonest cause of peritonitis was also duodenal perforation, followed by small bowel perforations and perforated appendicitis [12].

The perforations of proximal gastrointestinal tract were about 2.5 times common as perforations of distal gastrointestinal tract; this is in concordance with earlier studies from India [2], but is in sharp contrast to studies from developed countries, which reported distal perforations to be more common [19-21]. Though there have been some resemblance in some aspects, there are discrepancies in other aspects as well. In another study in India by Khanna et al, he found that over half of cases were due to typhoid perforation [20]. In a study from Pakistan also, the most common cause was typhoid perforation, which was found in 134 (43%) cases; this was followed by peptic ulcer disease in 56 (18%) cases [21]. These figures show the importance of infection and infestation in the third world. Meanwhile, in a study from America, Noon et al reported 430 patients of gastrointestinal perforation and found 210 cases to be due to penetrating trauma, 92 due to appendicitis and 68 due to peptic ulcer [22]. This shows the prevalence of trauma in the affluent countries. But the scenario is different in our context, the most common cause being acid-peptic disease. In a study in western Nepal, the commonest cause of peritonitis was also duodenal perforation, followed by small bowel perforations and perforated appendicitis [12]. The treatment of secondary peritonitis has also gradually changed with the advent of minimally invasive surgical techniques. Some authors have started adopted laparoscopy as preferred surgical approach for the management of secondary peritonitis [23]. We have also started laparoscopy in peritonitis patients, which has been successful in 3 patients with duodenal perforation peritonitis recently. Regarding gastro duodenal perforation, duodenal-to-gastric ulcer ratio is 30.6:1 in the present study, compared to study by Dorairajan et al., who reported a ratio of 15:1 in India [2]. This means that gastric ulcer perforations are extremely uncommon in our country. Contrary to this the ratio was 4:1 in studies from United Kingdom and United States [24,25].

There were 41(8.2%) deaths which is comparable with other published series [25-29]. The main cause of death in the present series of patients was septicemia present in 92.68% of patients with mortality. The major cause of postoperative morbidity were respiratory complications (23%), wound infection (18%), septicemia (11.8%) and electrolyte abnormalities (6.8%).

CONCLUSION

The spectrum of perforation peritonitis in our setup continues to be different from its western counterpart and even some studies in the Indian subcontinent and Nepal with duodenal ulcer perforation and perforating appendicitis being major causes.

REFERENCES

1. Adesunkanmi ARK, Badmus TA, Fadiora FO, Agbakwuru EA. Generalized peritonitis secondary to typhoid ileal perforation: Assessment of severity using modified APACHE II score. Indian J Surg. 2005; 67: 29-33.
2. Dorairajan LN, Gupta S, Deo SV, Chumber S, Sharma Lk. Peritonitis in India--a decade's experience. Trop Gastroenterol. 1995; 16: 33-38.
3. Ordoñez CA, Puyana JC. Management of peritonitis in the critically ill patient. Surg Clin North Am. 2006; 86: 1323-1349.
4. Gupta S, Kaushik R. Peritonitis - the Eastern experience. World J Emerg Surg. 2006; 1: 13.
5. Eid HO, Hefny AF, Joshi S, Abu-Zidan FM. Non-traumatic perforation of the small bowel. Afr Health Sci. 2008; 8: 36-39.
6. Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India--review of 504 consecutive cases. World J Emerg Surg. 2006; 1: 26.
7. Afridi SP, Malik F, Ur-Rahman S, Shamim S, Samo KA. Spectrum of perforation peritonitis in Pakistan: 300 cases Eastern experience. World J Emerg Surg. 2008; 3: 31.
8. Agarwal N, Saha S, Srivastava A, Chumber S, Dhar A, Garg S. Peritonitis: 10 years' experience in a single surgical unit. Trop Gastroenterol. 2007; 28: 117-120.
9. Gupta BS, Talukdar RN, Neupane HC. Cases of perforated duodenal ulcer treated in College of Medical Sciences, Bharatpur over a period of one year. Kathmandu Univ Med J (KUMJ). 2003; 1: 166-169.
10. Agrawal CS, Niranjan M, Adhikary S, Karki BS, Pandey R, Chalise PR. Quality assurance in the management of peritonitis: a prospective study. Nepal Med Coll J. 2009; 11: 83-87.
11. Subedi SK, Afaq A, Adhikary S, Niraula SR, Agrawal CS. Factors influencing mortality in perforated duodenal ulcer following emergency surgical repair. JNMA J Nepal Med Assoc. 2007; 46: 31-35.
12. Khan S, Khan IU, Aslam S, Haque A. Retrospective analysis of abdominal surgeries at Nepalgunj Medical College (NGMC), Nepalgunj, Nepal: 2 years experience. Kathmandu Univ Med J (KUMJ). 2004; 2: 336-343
13. Yadav RP, Agrawal CS, Gupta RK, Rajbansi S, Bajracharya A, Adhikary

S. Perforated duodenal ulcer in a young child: an uncommon condition. JNMA J Nepal Med Assoc. 2009; 48: 165-7.

14. Karki S, Karak AK, Sinha AK, Kumar B, Upadhyaya P, Pandey SR, et al. Crohn disease in Nepal: true rarity or gross underdiagnosis?. BMJ Case Reports. 2009.

15. Karmacharya B, Sharma VK. Results of typhoid perforation management: our experience in Bir Hospital, Nepal. Kathmandu Univ Med J (KUMJ). 2006; 4: 22-24.

16. Shrestha ML, Maskey CP, Khanal M, Bhattarai BK. Retrospective study of generalised perforation peritonitis in TU teaching hospital. JNMA J Nepal Med Assoc. 1993; 31: 62-68.

17. Langell JT, Mulvihill SJ. Gastrointestinal perforation and the acute abdomen. Med Clin North Am. 2008; 92: 599-625.

18. Wani RA, Parray FQ, Bhat NA, Wani MA, Bhat TH, Farzana F. Nontraumatic terminal ileal perforation. World J Emerg Surg. 2006 Mar 24; 1: 7.

19. Washington BC, Villalba MR, Lauter CB. Cefamendole-erythromycin-heparin peritoneal irrigation. An adjunct to the surgical treatment of diffuse bacterial peritonitis. Surgery. 1983; 94: 576-581.

20. Nomikos IN, Katsouyanni K, Papaioannou AN. Washing with or without chloramphenicol in the treatment of peritonitis: a prospective, clinical trial. Surgery. 1986; 99: 20-25.

21. Shinagawa N, Muramoto M, Sakurai S, Fukui T, Hori K, Taniguchi M, et al. A bacteriological study of perforated duodenal ulcers. Jpn J Surg. 1991; 21: 1-7.

22. Khanna AK, Misra MK. Typhoid perforation of the gut. Postgrad Med J. 1984; 60: 523-525.

23. Memon AA, Siddiqui FG, Abro AH, Agha AH, Lubna S, Memon AS. An audit of secondary peritonitis at a tertiary care university hospital of Sindh, Pakistan. World J Emerg Surg. 2012; 7: 6.

24. Noon GP, Beall AC, Jorden GL. Clinical evaluation of peritoneal irrigation with antibiotic solution. Surgery. 1967; 67: 73.

25. Ramachandran CS, Agarwal S, Dip DG, Arora V. Laparoscopic surgical management of perforative peritonitis in enteric fever: a preliminary study. Surg Laparosc Endosc Percutan Tech. 2004; 14: 122-124.

26. Crawford E, Ellis H. Generalised peritonitis the changing spectrum. A report of 100 consecutive cases. Br J Clin Pract. 1985; 39: 177-178.

27. Peoples JB. Candida and perforated peptic ulcers. Surgery. 1986; 100: 758-764.

28. Bohnen J, Boulanger M, Meakins JL, McLean AP. Prognosis in generalized peritonitis. Relation to cause and risk factors. Arch Surg. 1983; 118: 285-290.

29. Nadkarni KM, Shetty SD, Kagzi RS, Pinto AC, Bhalerao RA. Small-bowel perforations. A study of 32 cases. Arch Surg. 1981; 116: 53-57.

Cite this article

Shakya VC , Moh Shrestha AR, Pangeni A, Byanjankar B, Pandit R, et al. (2018) Perforation Peritonitis: An Observational Study at Tertiary Centers in Central Nepal. J Surg Transplant Sci 6(1): 1063.