Research article

Spectrum of perforation peritonitis in Pakistan: 300 cases Eastern experience

Shahida Parveen Afridi*1,2, Faiza Malik1,2, Shafiq Ur-Rahman1,2, Shahid Shamim1,2 and Khursheed A Samo1,2

Address: 1Department of General Surgery, Dow University of Health Sciences and Civil Hospital, Karachi, Pakistan and 2House No 4/874, Shah Faisal Colony No 4, Karachi, Pakistan
Email: Shahida Parveen Afridi* - drshahishakeel@yahoo.com; Faiza Malik - phyzamalik@hotmail.com; Shafiq Ur-Rahman - surgeonshafiq@hotmail.com; Shahid Shamim - doctsaab@yahoo.co.uk; Khursheed A Samo - surg_samo@yahoo.c.uk
* Corresponding author

Abstract

Background: Perforation peritonitis is the most common surgical emergency encountered by the surgeons all over the world as well in Pakistan. The spectrum of etiology of perforation peritonitis in tropical countries continues to differ from its western counter part. This study was conducted at Dow University of health sciences and Civil Hospital Karachi (DUHS & CHK) Pakistan, designed to highlight the spectrum of perforation peritonitis in the East and to improve its outcome.

Methods: A prospective study includes three hundred consecutive patients of perforation peritonitis studied in terms of clinical presentations, Causes, site of perforation, surgical treatment, post operative complications and mortality, at (DUHS&CHK) Pakistan, from 1st September 2005 – 1st March 2008, over a period of two and half years. All patients were resuscitated underwent emergency exploratory laparotomy. On laparotomy cause of perforation peritonitis was found and controlled.

Results: The most common cause of perforation peritonitis noticed in our series was acid peptic disease 45%, perforated duodenal ulcer (43.6%) and gastric ulcer 1.3%. followed by small bowel tuberculosis (21%) and typhoid (17%). large bowel perforation due to tuberculosis 5%, malignancy 2.6% and volvulus 0.3%. Perforation due to acute appendicitis (5%). Highest number of perforations has seen in the duodenum 43.6%, ileum37.6%, and colon 8%, appendix 5%, jejunum 3.3%, and stomach 2.3%. Overall mortality was (10.6%).

Conclusion: The spectrum of perforation peritonitis in Pakistan continuously differs from western country. Highest number of perforations noticed in the upper part of the gastrointestinal tract as compared to the western countries where the perforations seen mostly in the distal part. Most common cause of perforation peritonitis is perforated duodenal ulcer, followed by small bowel tuberculosis and typhoid perforation. Majority of the large bowel perforations are also tubercular. Malignant perforations are least common in our setup.

Published: 8 November 2008
Received: 12 August 2008
Accepted: 8 November 2008

World Journal of Emergency Surgery 2008, 3:31 doi:10.1186/1749-7922-3-31
This article is available from: http://www.wjes.org/content/3/1/31
© 2008 Afridi et al; licensee BioMed Central Ltd.
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
Background
Peritonitis due to perforation of the gastrointestinal tract is the most common surgical emergency all over the world [1]. The spectrum of etiology of perforation differs from its western counterpart [2]. Majority of the patients present late, with purulent peritonitis and septicemia [3]. Surgical treatment of perforation peritonitis is highly demanding and very complex, combination of improved surgical technique, anti microbial therapy and intensive care support has improved the outcome of such cases [4]. Objective of this study Was to highlight the clinical presentation, causes of perforation, site, surgical treatment, postoperative complications and mortality at (DUHS&CHK) Pakistan, which is a tertiary care hospital.

Patients and methods
This was a prospective study include three hundred consecutive patients of perforation peritonitis Conducted in the Department of general surgery Dow University of Health Sciences and civil Hospital Karachi (DUHS&CHK) Pakistan over a period of two and half years from 1st September 2005 – 1st March 2008, over a period of two and half years.

Inclusion criteria
All cases of peritonitis due to perforation of the gastrointestinal tract were included in this study.

Exclusion criteria
All cases of primary peritonitis, trauma, corrosive and postoperative peritonitis due to anastomosis leakage were excluded from the study.

All patients were studied in terms of clinical presentation, cause of perforation, site of perforation, treatment; redo surgery, postoperative complications and mortality. After establishing the clinical diagnosis of perforation peritonitis, all patients were resuscitated and prepared for exploratory laparotomy. All these patients under went emergency exploratory laparotomy. After opening the abdominal source of peritonitis was found and controlled. With adequate procedure. Abdomen was washed with 8–10 liters of warm normal saline, drain placed in the abdominal cavity, and abdomen closed with prolene 1. All patients followed in the ward or ICU (intensive care unit) post operatively with the cover of broad spectrum antibiotic along with fluid and electrolyte balance. Drug regimen was not uniform in all patients. Data was collected and recorded on a pre designed research proforma made for this study and spss 10 version used to analyze the data.

Results
Pre operative data
Total 300 patients were studied. Mean age was 40.5 years (ranges from 13–80 years) standard deviation was 15.6. Majority of patients were males 205, Females 95. Male female ratio was 2.1:1. 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%, shock 20% due to septicemia. Clinical presentation of the patients varied according to the site and cause of perforation. Patients of duodenal ulcer perforation usually had a short history of pain originate in the epigastric region or upper abdomen. 15% patients give the positive history of NSAID.

Patients of ileocaecal tuberculosis, mostly present with the history of pain in abdomen, abdominal distention, altered bowel habit and nausea vomiting. Patients with small bowel typhoid perforation also present with the history of pain in the abdomen along with prolonged history of fever. Patients of perforated appendix present with the typical history of pain starting in the peri umbilical region than shift to the right iliac fossa, or originate directly in the right iliac fossa than spread all over the abdomen. Only 70% patients had an evidence of Pneumo peritoneum on chest X-Ray in erect posture. Multiple air fluid levels on abdominal X-ray in erect position 30%. Electrolyte imbalance, hypokalemia 60%, hyponatremia 45%, raised blood urea and Creatinine 9%.

The time taken for resuscitation, diagnosis and optimizing the patient for surgery was less than 12 hours in 70% while more than 12 hours in 30%. (Table 1)

Operative data
Perforated duodenal ulcer due to acid peptic disease was the most common cause of perforation peritonitis noticed in 43.6%, followed by small bowel perforation due to tuberculosis 21% and small bowel typhoid perforations 17%. 11% tubercular perforations noticed during anti tuberculosis treatment. Total number of perforation has seen in the colon 8%, due to tuberculosis 5%, malignancy 2.6% rare cause of perforation peritonitis in our setup. Volvulus 0.3%. Perforated appendix 5%. (Table 2)

Highest number of perforations noticed in the small bowel, duodenum 43.6%, ileum 37.6, and jejunum 3.3%. Stomach 2.3%. Large bowel perforations, colon 8%, appendix 5%, caecum 0.6% and rectum 0.3%. (Table 2)

All Peptic ulcer perforation managed by an Omentopexy 45%, duodenal 43.6% and stomach 1.3%. Small bowel perforations managed by only stoma 16%, primary repair 15%, Patients of ileocaecal tuberculosis treated by limited right Hemicolecotomy 10% because of the benign nature of the disease, three patients present with multiple perforation in the ileum, caecum, and ascending colon managed only by stoma, diagnosis was based on the clinical ground and per operative findings later on confirmed by histopathology. Resection & anastomosis 6% in patients
present with multiple small bowel perforation. Appendicectomy 5%. Carcinoma left colon present with perforation of descending colon managed by left Hemicolectomy in 1.3% of cases with covering stoma. Malignant gastric ulcer managed by gastrectomy 0.6%. Carcinoma rectum 0.3%, managed by stoma in emergency later on managed by anterior resection site of perforation was on the anterior surface of rectum in its upper one third. Re do surgery was performed in those patients who developed wound dehiscence and abdominal Collection. Tension suturing 26% and abdominal washout 11.3%. (Table 2)

Postoperative complications
Postoperative complications recorded are, wound infection 42%, wound dehiscence 26%, respiratory complications 20%, and septicemia 20%, abdominal collection 11.3%. Patients of typhoid ileal perforation and ileocaecal tuberculosis managed by resection anastomosis in emergency had an anastomosis leak in 1.6%. Over all mortality was 10.6%. Postoperative complication noticed mostly in patients present late with fecal peritonitis, septicemia and associated co morbid. (Table 3)

Discussion
Perforation peritonitis is the most common surgical emergency noticed in the younger age group [5]. as noticed in our study, mean age was 40.5 years. Majority of the patients in our study were male 68.3%, and female 31.7%. Another study also showed more male patient of perforation peritonitis with male female ratio 3:1 [6]. Perforation of the proximal part of the gastrointestinal tract were more common [7], which is in contrast to the studies from western countries where perforations are common in the distal part [8]. Duodenal ulcer Perforation was the most common perforation noticed in our study. Another study conducted by Gupta S and Kaushik R shows the same result

Table 1: Preoperative data

| S no | Variable                               | no  | %    |
|------|----------------------------------------|-----|------|
| 1    | Clinical presentation                   |     |      |
|      | Abdominal pain                         | 235 | 78.3 |
|      | Abdominal distention                   | 135 | 45.0 |
|      | Altered bowel habit                    | 80  | 26.6 |
|      | Nausea vomiting                        | 64  | 21.3 |
|      | Fever                                  | 60  | 20.0 |
|      | Septicemia                             | 60  | 20.0 |
|      | Positive H/O NSAIDs                    | 45  | 15.0 |
| 2    | Positive findings on investigations     |     |      |
|      | Pneumoperitoneum                       | 212 | 70.6 |
|      | Air fluid level                        | 90  | 30.0 |
|      | Hypokalemia                            | 180 | 60.0 |
|      | Hyponatremia                           | 135 | 45.0 |
|      | Raised blood urea&creatinine           | 27  | 09.0 |
| 3    | Time for resuscitation                 |     |      |
|      | More than 12 hours                     | 210 | 70.0 |
|      | Less than 12 hours                     | 90  | 30.0 |
| 4    | Associated co morbid                   |     |      |
|      | Family H/O Tuberculosis                | 90  | 30.0 |
|      | Pulmonary tuberculosis                 | 60  | 20.0 |
|      | Renal problem                          | 62  | 20.6 |
|      | Diabetes mellitus                      | 45  | 15.0 |
|      | Malignancy                             | 33  | 11.0 |
|      | Hypertension                           | 30  | 10.0 |

Table 2: Operative data

| S no | Variable                                | no  | %    |
|------|-----------------------------------------|-----|------|
| 1    | Causes of perforation                   |     |      |
|      | Acid peptic disease                     |     |      |
|      | Duodenum                                | 131 | 43.6 |
|      | Stomach                                 | 7   | 2.3  |
|      | Acid peptic disease                     | 4   | 1.3  |
|      | Fungal infection                        | 1   | 0.3  |
|      | Malignancy                              | 2   | 0.6  |
|      | Small bowel                             | 120 | 40.0 |
|      | Tuberculosis                            | 63  | 21.0 |
|      | Typhoid                                 | 51  | 17.0 |
|      | Unknown                                 | 06  | 02.0 |
|      | Colon                                   | 24  | 08.0 |
|      | Tuberculosis                            | 15  | 05.0 |
|      | Malignancy                              | 08  | 02.6 |
|      | Volvulus                                | 01  | 00.3 |
|      | Acute appendicitis                      | 15  | 05.0 |
| 2    | Site of perforation                     |     |      |
|      | Duodenum                                | 131 | 43.6 |
|      | Ileum                                   | 113 | 37.6 |
|      | Jejunum                                 | 10  | 03.3 |
|      | Stomach                                 | 07  | 02.3 |
|      | Colon                                   | 24  | 08.0 |
|      | Appendix                                | 15  | 05.0 |
|      | Caecum                                  | 02  | 00.6 |
|      | Rectum                                  | 01  | 00.3 |
| 3    | Surgical procedure                      |     |      |
|      | Omentopexy                              | 135 | 45.0 |
|      | Stoma                                   | 48  | 16.0 |
|      | Primary repair                          | 47  | 15.6 |
|      | Right hemicolecoty                      | 30  | 10.0 |
|      | Resection & anastomosis                 | 18  | 06.0 |
|      | Appendicectomy                          | 15  | 05.0 |
|      | Left hemicolecoty                       | 04  | 01.3 |
|      | Gastrectomy                             | 02  | 00.6 |
|      | Anterior resection                      | 01  | 00.3 |
| 4    | Re do surgery                           |     |      |
|      | Tension suturing                        | 78  | 26.0 |
|      | Abdominal washout                       | 34  | 11.3 |
Causes of ileal perforations noticed in our study were tuberculosis and typhoid. Primary intestinal tuberculosis is uncommon in European and North American countries today [16]. Tuberculosis is a disease that can affect any part of the body at any age in Eastern countries, most common site of extra pulmonary tuberculosis is the ileocaecal region and terminal ileum [17]. It can be fatal even in the young and fit [18]. Tubercular Ileal perforations present alone or in combination with Caecum. Ileocaecal tuberculosis presents as a mass in right lower quadrant, or obstruction due to stricture in ulcerative type of tuberculosis with perforation peritonitis [19]. The most common complication of small bowel tuberculosis was obstruction due to the narrowing of the lumen by hyper plastic Ileo-caecal tuberculosis or stricture of small intestine and perforation in ulcerative type of tuberculosis, which are commonly multiple [20]. Perforation peritonitis may present during the anti tuberculosis treatment [21] as seen in our study, 11% patients present with perforation during anti tuberculosis treatment. Management of tubercular perforation of ileum depends upon the condition of the gut, general condition of the patient and number of perforation.

Ileocaecal tuberculosis by right hemicolecetomy with or without stoma, perforation along with multiple stricture resection anastomosis with a covering stoma or only stoma [22,23]. Typhoid enteric perforations managed by either primary repair or only stoma depend upon the condition of the gut and general condition of the patient and also managed laproscopically [24]. Primary repair of the typhoid perforation is a safe and effective treatment [25], as seen in our study 15% patients managed by primary repair.

Colorectal perforation is a rare cause of perforation peritonitis seen in 8.3% patients. Malignancy is a rare cause of perforation peritonitis in our setup, peritonitis due to malignancy was seen only in 2.6% of cases as compared to the western counter part [26]. Rectal perforation have high morbidity and mortality and its treatment options are based on the surgeons personal experience, patients general condition, age of the patients and degree of peritonitis. Primary anastomosis and protective ileostomy is a superior treatment to Hartman procedure in acute left sided colon perforation in the absence of fecal peritonitis [27]. Perforation peritonitis have a high mortality, the over all mortality ranges between 6–27% [9,28] High mortality was depend upon the site and cause of perforation. The death rate from perforated duodenal ulcer was 32.2% and from perforated gastric ulcer was 20.1% [12]. Different studies show the different mortality, gastric perforation 36% [29], enteric perforation 17.7% [30], colorectal perforation 17.5% [31]. Our mortality was comparatively low 10.6%, might be due to the formation of only stoma in emergency in patients with serious illness and omentopexy in all patients present with gastro duodenal perforation due to acid peptic disease. Factors contributing to the high mortality and postoperative complications are advanced age, late presentation, delay in the treatment, septicemia and associated co morbid, Respiratory complications are the known risk factors for the high mortality [32]. Re look laparotomies and abdominal washout had a definite role to play in perforation peritonitis [33], as seen in our study 37.3% patients go through redo surgery. Abdominal washout and tension suturing, factors contributing to redo surgery were persistent septicemia due to abdominal collection, inter loop abscess, anastomosis leakage and burst abdomen.

**Conclusion**

To conclude Spectrum of perforation peritonitis in Eastern country Pakistan continues to differ from western country. Perforations are seen mostly in the small bowel rather than the large bowel. Majority of perforations noticed in the duodenum due to acid peptic disease followed by small bowel tuberculosis and typhoid. Majority of the perforations in the large bowel are due to tuberculosis and perforated appendix. Malignancy was the least common cause of perforation peritonitis in our set up. Aggressive resuscitation and early minimum surgery required to avoid the high morbidity and mortality. Major

| S no | Complications         | no | %    |
|------|-----------------------|----|------|
| 1    | Wound infection       | 126| 42.0 |
| 2    | Wound dehiscence      | 78 | 26.0 |
| 3    | Respiratory complication | 60 | 20.0 |
| 4    | Sepsis                 | 60 | 20.0 |
| 5    | Abdominal collection   | 34 | 11.3 |
| 6    | Anastomosis leak       | 05 | 01.6 |
| 7    | Mortality              | 32 | 10.6 |
complications noticed are the Wound infection and wound dehiscence. Over all mortality was 10.6%.

Competing interests
The authors declare that they have no competing interests.

Authors’ contributions
SA participated in designing and righting of this study and coordination with the other authors during this study, FM help in data collection, SR supervise this study, SS participated in the sequence and alignment, and KS carried out all investigations in emergency. Surgical procedure performed on these patients in emergency by the team of the department of general surgery surgical unit III. All authors approved the final manuscript.

Acknowledgements
I am thankful to Dr Bader Faiyaz Zuberi for critical review of manuscript.

References
1. Ramakrishnan K, Salinas RC: Peptic Ulcer disease. Am Fam Physician 2007, 1(7697):1005-12.
2. Sharma L, Gupta S, Soin AS, Sikora S, Kapoor V: Generalized peritonitis in India. The Tropical Spectrum. Jpn J Surg 1991, 21(3):272-7.
3. Ersumo T, W/MESKEL y, Kotisso B: Perforated peptic ulcer in Tikur Anbessa Hospital; a review of 74 cases. Ethiop J Med 2005, 43(1):9-13.
4. Bosscha K, van Vroonhoven TJ, Werken C van der: Surgical management of severe secondary peritonitis. Br J Surg 1999, 86(11):1371-7.
5. Adesunkanmi AK, 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.
6. Adesunkanmi , Abdul Rashid K, Badmus , Tajudeen A, Olukayode O: Causes and determinants of outcome of intestinal perforations in a semi urban African community. Surgical practice 2003, 7(4):116-123.
7. Agarwall N, Saha S, Srivastava A, Chumber S, Dhar A, Garg S: Peritonitis 10 years experience in a single surgical unit. Trop Gastroenterol 2007, 28(3):17-20.
8. Malangoni MA, Inui T: Peritonitis the western experience. World J Emerg Surg 2006, 1:25.
9. Gupta S, Kaushik R: Peritonitis – the Eastern experience. World J Emerg Surg 2006, Apr 26; PMID 16759427
10. Siu VYT, Leong HT, Law BK, Chau CH, Li AC, Fung KH, Tai YP, Li MK: Laproscopic repair for perforated peptic ulcer. A randomized controlled trial. Ann Surg 2002, 235(3):313-319.
11. Jhobta RS Singh, Ateeti AK Kumar, Kaushik R, Sharma R, Jhobta A: Spectrum of perforation peritonitis in India-review of 504 consecutive cases. World Journal of Emergency Surgery 2006, 1:26.
12. Velyey NA, Merrell RC: Differentiated approach to surgical treatment of patients with perforated duodenal ulcer. Chirurgia (Bucur) 2004, 99(2):19-23.
13. Konvinger J, Botttinger P, Redekke J, Butters M: Laproscopic repair of perforated gastroduodenal ulcer by running suture. Langenbecks Arch Surg 2004, 389(1):11-6.
14. Ohene-Yeboah M, Togbe B: Perforated gastric and duodenal ulcers in an urban African population. West Afr J Med 2006, 25(5):205-211.
15. Roviello Franco, Rossi Simone, Marrelli Daniele, De Manzioni Giovanni, Pedrazzani Corrado, Morgagni Paolo, Corso Giovanni, Pinto Enrico: Perforated gastric carcinoma: a report of 10 cases and review of the literature. World J Surg Oncol 2006, 4:19.
16. Sefr R, Rotterova P, Konecny J: Perforation peritonitis in primary intestinal Tuberculosis. Case report. Dig Surg 2001, 18(4):475-479.
17. Collado C, Stirmann J, Ganne N, Trinchet JC, Crasped P, Barrat C, Benichou J, Lhote F, Malbec D, Martin A, Prevot S, Fain O: Gastrointestinal tuberculosis: 17 cases collected in 4 hospitals in the northeastern suburb of Paris. Gastroenterol clin bin 2005, 9(4):419-24.
18. Muquit S, Shah M, Abayajeewa K: Acase of milliary tuberculosis presenting with bowel perforation: Newham University Hos-
19. Sharma MP, Bhatia Vikram: Abdominal tuberculosis review Article. Indian J Med Res 2004, 120:305-315.
20. Erdman Seward: Hyper plastic tuberculosis of the intestine. Ann Surg 1920, 71(5):637-644.
21. Kasahara K, Fukuoaka K, Okauma H, Mikasa K, Narita N, Kimura H: Tuberculous peritonitis developing during chemotherapy for pulmonary and intestinal tuberculosis. respirology 2005, 10(9):257-60.
22. Ara C, Sogutlu G, Yildiz R, Kocak O, Isik B, Yilmaz S, Kirimlioglu V: Spontaneous small bowel perforation due to intestinal tuberculosis should not be repaired by simple closure. J Gastrointest Surg 2005, 9(4):514-7. PMID: 15797233.
23. Ramesh J, Banaik GS, Ormerod LP: Abdominal tuberculosis in a district general hospital. A retrospective review of 86 cases. 0/M 2008, 10(3):189-193.
24. Saxe JM, Cropsey R: Is Operative management effective in treatment of perforated typhoid? Am J Surg 2005, 189(3):342-44.
25. Ramachandran CS, Agarwal S, Dip DG, Arora V: Laproscopic surgical management of perforative peritonitis in enteric fever: a preliminary study. surg L aprocs Endosc Pectucan Tech 2004, 14(3):122-4.
26. Di Venere B, Testini M, Minielli S, Piccinni G, Lissidini G, Carbone F, Bonomo GM: Rectal perforation. Personal experience and literature review. Minerva Chir 2002, 57(3):357-62.
27. Breitenstein S, Kraus A, Hahnel D, Decurtins M, Clavien PA, Demartines N: Emergency left colon resection for acute perforation: Primary anastomosis or Hartmann’s procedure? A case matched control study. World J Surg 2007, 31(1):17-24.
28. Ohene-yeboah M: Postoperative complications after surgery for typhoid ileal perforation in Adults in Kumasi. West Afr J Med 2007, 26(1):32-6.
29. Ozman MM, Zulfurkolugil B, Kece C, Aslar AK, Ozalp N, Koc M: Factors influencing mortality in spontaneous gastric tumor perforations. The journal of international Medical research 2002, 30(2):180-184.
30. Capoor MR, Nair D, Chintamani MS, Khanna, Aggarwal , Bhatnagar D: Role of Enteric fever in ileal perforation. Indian journal of Medical microbiology 2006, 24:54-57.
31. Shinkawa H, Yasuhara H, Naka S, Yanagie H, Nojiri T, Furuya Y, Arikiand K, Niwa H: Factors affecting the early mortality of patients with non traumatic colorectal perforation. Surg today 2003, 33:9-17.
32. Lucciello A, Floris G, Altana ML, Pisanu A, Cois A, Carci SL: Surgery for perforated peptic ulcer in the elderly. Evaluation of factors influencing prognosis hepatogastroenterology 2003, 50(54):19568.
33. Subramanyam SG, Sunder N, Saleem KM, Kilpadi AB: Peritonitis in patients over the age of 50 years: 98 cases managed surgically. Trop Doct 2005, 35(4):247-50.

Publish with BioMed Central and every scientist can read your work free of charge

*BioMed Central will be the most significant development for disseminating the results of biomedical research in our lifetime.*
Sir Paul Nurse, Cancer Research UK

Your research papers will be:
- available free of charge to the entire biomedical community
- peer reviewed and published immediately upon acceptance
- cited in PubMed and archived on PubMed Central
- yours — you keep the copyright

Submit your manuscript here:
http://www.biomedcentral.com/info/publishing_adv.asp