Spectrum of Perforation Peritonitis Cases at VCSGGMS and RI- Hill Area of Uttarakhand (Institutional Experience of Single Unit)

Keshri Amit[1], Khem Pal Singh[2], Anil Kumar[1], Sanjeev Prakash[3]

ABSTRACT

Introduction: Perforation peritonitis cases form a common surgical emergency in our region and require intensive efforts and man-power during their management and rehabilitation.

Material and Methods: All operated cases of hollow viscus perforation peritonitis at our Institute, from April 2015 to December 2016, numbering 180, were analysed and modes of managenent / outcomes noted; also, previous years' records (2005 to 2016, of total 1200 operated cases) were compared along with.

Results: Gastro-duodenal perforation peritonitis cases, related to analgesic abuse / PUD / alcoholism / poor dietary practices, formed the major group; followed by ileal / jejunal perforation cases, associated with tubercular / typhoid infections; appendicular and rest of bowel sites perforations were significant other causes. Males outnumbered females; most were in the age-group of "21 to 50" years; mortality was higher in the elderly.

Conclusion: Active and vigorous resuscitation, with appropriate imaging studies, coupled with early operative intervention and good post-operative care, can help reduce morbidity and mortality. Patient education, improving dietary practices and hygiene, early diagnosis and appropriate drug regimens, can reduce incidence of cases of perforation peritonitis.

Keywords: Perforation, peritonitis, duodenum, emergency surgery, exploratory laparotomy.

INTRODUCTION

Hollow-viscus perforation-peritonitis cases form the major group of surgical emergency patients admitted[1-3] requiring immediate intervention and subsequent operative management at our institution. Despite the availability of potent medications, including proton pump inhibitors (PPIs) and appropriate antibiotics against the causative organisms[5-8], the incidence and prevalence of such cases remains high and results in a great economic burden upon the patient. Indeed, morbidity and mortality rates are higher among patients with various co-morbid factors or those presenting late to higher-level care centers. Diet and hygiene practices play a vital role in the causation of such cases.[9]

We aim to outline the etiology, management and outcome among the patients of hollow-viscus perforation-peritonitis presenting at our Institution, a tertiary health care facility in hill area of Uttarakhand.

MATERIAL AND METHODS

This concurrent observational study has been conducted at Dept. Of Surgery, VCSGGMS and RI and HNBS Base Teaching Hospital, Srikot, Uttarakhand. Data was collected from review of case files and exploratory-laparotomy findings of all patients having undergone operative intervention for management of hollow-viscus perforation-peritonitis of the gastro-intestinal tract, between April 2015 and December 2016; traumatic / iatrogenic / anastomotic-leak cases causing peritonitis were excluded. The total number of cases during the said period numbered 180. Note was made of pre-operative status of the patients, site / etiology of the gastro-intestinal tract perforation, and outcomes, besides demography, lab parameters, etc.

The cases, after adequate resuscitation and preparation, were appropriately managed surgically, as dictated by the site / etiology of perforation, in keeping with the current standards of care, and then followed up till discharge from the hospital; subsequently, examined again on review visits. Patients having undergone stoma formation or prolonged antibiotic course were re-evaluated at the next admission / visit also and second outcomes and complications assessed as well.

The previous years' records of operated cases of perforation peritonitis at our Institute, between 2005 to 2016, of a total of 1200 patients, were also compared. Ethical approval was taken from the IRB before the start of the study.

STATISTICAL ANALYSIS

LibreOffice and Google were used for statistical analyses and data collection and manipulation - mean, percentages, etc. were used for data interpretation

RESULTS

In our study group, male patients out-numbered females (M:F = 148:32 ≈ 4.625) and most patients belonged to the economically productive age-group of "21 to 50 years age" (≈ 57.8%) (Table-1); both findings consistent with other studies in the sub-continent. But, unlike them, there was a much higher proportion of cases related to gastro-duodenal perforation leading to peritonitis (146 of 180 cases = 81.1%; 120 duodenal and 26 gastric); jejunal / ileal perforations came a distant second, followed by appendicular perforations and others (Table-2).

Most cases of gastric perforation were a result of NSAID / analgesic abuse; while duodenal perforations were mostly sequelae of peptic ulcer disease (Table-2). Anterior wall perforations of duodenum predominated (D1 – first part of duodenum). None of the patients of PUD had undergone a prior UGIE study nor had been on any anti-H.pylori treatment regimen; they were only being treated intermittently with PPIs,

[1]Assistant Professor, [2]Associate Professor, [3]Senior Resident, Department of Surgery, VCSGGMS and RI and Base Hospital, Srikot, Srinagar, Pauri Garhwal, Uttarakhand – 246178, India

Corresponding author: Dr. Keshri Amit, Assistant Professor – Surgery, VCSGGMS and RI and Base Hospital, Srikot, Srinagar, Pauri Garhwal, Uttarakhand – 246178, India

How to cite this article: Keshri Amit, Khem Pal Singh, Anil Kumar, Sanjeev Prakash. Spectrum of perforation peritonitis cases at VCSGGMS and RI- hill area of Uttarakhand (Institutional experience of single unit). International Journal of Contemporary Medical Research 2016;3(12):3584-3588.

antacids, etc. by their local physicians, with partial relief of symptoms. More-so, many patients with PUD related / unrelated upper-abdominal pain were abusing NSAIDS, resulting in ulcer perforations, and other related complications.

Edge of all cases of gastric and suspected cases of duodenal perforations were excised and sent for HPE. One case of gastric perforation, situated on the greater curvature side, later proved to be of malignant pathology.

Tubercular ileal / jejunal ulcer perforations, with their ambiguous and delayed presentations, proved difficult to diagnose and manage, with slow recovery and high mortality (50% of the deaths in our study group) (Tables-2 and 3); besides their low nutritional built, stoma formation added an element of psychological trauma. Some had taken a partial course of anti-tubercular chemotherapy or a complete course in the distant past (>10years), exposing them to the risks of abdominal tuberculosis and sequelae. Most cases did not have active pulmonary tuberculosis at the time of presentation, nor re-activation during convalescence.

Patients with typhoid ulcer perforations (jejunal / ileal, possibly other sites) usually had a prodrome of fever lasting ≈5 to 20 days, with inadequate drug treatment, before experiencing the episode of acute abdomen.

Interestingly, we had a case of esophageal perforation; a result of forceful vomiting by an alcoholic just after an episode of binge drinking (Boerhaave's syndrome). The full-thickness tear was confined to the left-lateral side of the distal-most part of abdominal esophagus, thus having a favourable effect on the outcome. The perforated Meckel's revealed (ectopic) gastric mucosal tissue at its tip on HPE.

Cases of appendicular perforation were mostly result of intra-luminal impaction and obstruction by fecolith / lymphatic follicles hyperplasia, followed by appendicular gangrene and perforation. Two cases of spontaneous cecal perforation were encountered; one had amebic etiology, as indicated by HPE of excised surrounding tissue. A case of ascending colon carcinoma was complicated with perforation; the other colonic and sigmoid / rectal perforations were mainly associated with complications of diverticular pathology.

Review of previous years' records (Table-4) also highlighted the high incidence of gastro-duodenal perforation peritonitis at our center (1006 of total 1200 patients = 83.8% average overall; also, ≈ 80% yearly) and thereby, a higher prevalence of peptic ulcer disease among the catchment population, along with NSAID use / abuse. The next most-common groups were of ileal / jejunal (10.75%), appendicular (≈ 3.83%) and other perforations in that order. Young working males (M:F = 990:210 ≈ 4.7) (730 = 60.8% patients in "21 to 50 year age" group) formed the bulk of our operative workload, followed by elderly (33.5%) and thereafter, younger / pediatric (5.7%) individuals.

Overall, 36 patients died among those operated for perforation peritonitis, with more or less, a steady input of patients in the recent years at our institution.

Most patients were received in shock (mainly, hypovolemic / septic) and required active intensive resuscitation before operative intervention (Table-3). Complication rates and mortality was more among the elderly, reflecting higher rate of co-morbidities. Alcohol abuse, delay in seeking prompt and appropriate medical advice, and poor nutrition, improper hygiene and sub-standard living conditions among the rural mountain populations contributed; also to the higher pulmonary complications in post-operative recovery period. Majority of the patients could be diagnosed on a plain X-ray view (of abdomen / chest), revealing free gas under the dome(s) of diaphragm; the diagnostic difficulties could be resolved by a high index of clinical suspiscion, coupled with further imaging studies (USG / CECT / Plain CT of the abdomen, etc.). Thorough peritoneal toileting was done in all cases on exploratory laparotomy; despite meticulous intra-operative techniques and supportive post-operative management, including regular aseptic / anti-septic dressings and stoma care, ≈ 33.9% patients developed wound infections, and ≈ 3.3% had severe sepsis ± MODS, culminating in death of 8 patients.

DISCUSSION

Cases of perforation peritonitis form a common surgical emergency; most studies in tropics show a male preponderance[1-3] in the working-class age group. Imaging studies, including X-ray / USG / (CE)CT of abdomen, along with clinical examination form the basis of diagnosis. Most patients need operative intervention after resuscitation and treatment of shock, followed with definitive treatment of the lesion as dictated by the site and general condition of the patient.

Patients with gastro-duodenal perforation peritonitis[4] usually present with severe epigastric pain, in shock, who are usually diagnosed on the basis of an erect upright abdominal / chest radiograph, showing free gas under the dome of diaphragm. Helicobacter Pylori[5] has been implicated in the causation of both duodenal and gastric ulcers and thereby perforation, while NSAIDS also play a dominant role in formation of gastric ulcers; most benign ulcers present on the lesser curvature.[1] Appropriate management includes active resuscitation and treatment of shock, with Graham's omental patch repair of the site of perforation.[4] There is now widespread availability of PPIs and other anti-ulcer drugs and effective H. Pylori regimens available, and that has resulted in a modest decline in the prevalence of gastro-duodenal ulcers, but still the incidence of cases of gastro-duodenal perforation peritonitis remains high[6-8]

Boerhaave's syndrome or effort rupture of the esophagus most commonly results from the full thickness tear in the left postero-

Age Group vs. Outcome	Males		Females		Total		
	Survived	Died	Survived	Died	Survived	Died	Both
<20yrs	8	1	2	0	10	1	11 (6.11%)
21-50yrs	86	2	15	1	101	3	104 (57.78%)
>50yrs	48	3	13	1	61	4	65 (36.11%)
Overall	142	6	30	2	172	8 (4.44%)	180
	148 (82.22%)		32 (17.78%)		N= 180		

Table-1: Age and Sex Wise Distribution of Patients Included in Study (April'15 - Dec'16).

Site (n)	Sex-Wise		Location	Etiology	Management / Treatment
	M	F			
Esophageal (1)	1	0	Esophago-gastric junction = 1	Boerhaave syndrome = 1	Primary Repair = 1
Gstric (26)	18	8	Lesser Curvature + Ant. Wall = 25	PUD = 5; Analgesic / NSAID = 20	Graham Repair = 90; Modified Graham = 36;
			Greater Curvature = 1	Malignant on HPE = 1	Distal Gastrectomy + GJ = 1;
Duodenal (120)	108	12	Ant. Wall = 117	PUD = 109;	Modified Graham's + FJ = 5;
			Post. Wall = 3	Analgesic / NSAID= 11	Graham's + FJ = 14
Jejunal / Ileal (17)	11	6	Jejunal + Prox. Ileal= 4	Tubercular = 10; Typhoid = 4; ?Etiology = 3	Stoma = 9;
			Mid + Distal Ileal = 13	(Single = 6; Multiple = 11)	Primary Repair = 2; R and A = 4; R and A + Ileostomy = 2
Meckel's (1)	1	0	At tip = 1	Ectopic Gastric Mucosa on HPE = 1	Wedge Resection = 1
Appendicular (7)	5	2	Tip / Distal = 5	Appendicitis = 7	Appendectomy = 5; LRH = 2
			Gangrenous Base = 2		
Cecal (2)	1	1	Cecum = 2	Amebic Ulcer = 1; Etiology = 1	Primary Repair + Prox. Ileostomy = 1; LRH = 1
Colonic (4)	2	2	Ascending = 1 Transverse = 0 Descending = 3	Carcinoma = 1 (Asc); Diverticulitis = 3	Right Hemicolectomy + Ileostomy = 1; Colostomy = 3
Sigmoid / Rectal (2)	1	1	Sigmoid Colon = 1 Rectum = 1	Diverticulitis = 1; ?Etiology = 1	Hartmann's Procedure = 2
Overall (N) (∑n = 180)	148	32	Died = 8; Malignant / Carcinoma = 2; Stoma (Ileostomy = 13; Colostomy = 5)		

Table-2: Site of Perforation / Etiology of Peritonitis (April'15 - Dec'16).

lateral aspect of the distal esophageal wall due to sudden increase in tne intra-esophageal pressure[9]; warrants prompt surgical repair of the perforation.

Distal ileum is a common site of small bowel perforation; enteric fever and abdominal tuberculosis being the leading causes.[10,7,8] Prolonged fever accompanies the sudden abdominal pain. Gangrene of a bowel segment with sometimes multiple perforation is found on laparotomy; primary repair or resection of the diseased segment with or without enterostomy is required in such cases, accompanied with directed and sometimes prolonged chemotherapy.

A Meckel's diverticulum usually presents due to complications – bleed, obstruction, diverticulitis and perforation being common modes. Surgical resection is required; options include – diverticulectomy or wedge-resection or segmental bowel resection with primary anastomosis.[4]

Appendicular perforation is usually a complication of appendicitis[4], usually with pain in the right lower quadrant of abdomen, after the perforation has been walled off by the surrounding intra-abdominal structures including omentum, to create an abscess or phlegmon. Open appendectomy is preferred, with delayed primary or secondary closure of the wound.

Amebic colitis[11] is a rare cause of perforation peritonitis in the tropics, with an incidence of perforation ≈2% and a high mortality rate.

Colonic diverticulosis[4] are typically "pseudo-diverticulaa", found mostly in sigmoid colon. Diverticulitis rarely results in free rupture into the peritoneum, with peritonitis localised to the left iliac fossa. Such patients require an immediate laparotomy, resection of the involved bowel segment and diversion. Entero-enteric fistulae, bleed, obstruction, peri-colic abscess are the other complications. Colo-rectal perforations are otherwise uncommon[11] and carry a high morbidity and mortality; those secondary to colonic neoplasms account for the majority of such cases. The perforation may occur at the site of malignancy itself or proximally, as a "blow out" of the preceeding segment of large bowel due to obstruction from the lesion.

CONCLUSION

Our observations indicate a high admission rate of perforation peritonitis cases at our center, most of which were of duodeno-gastric type, followed by ileo-jejunal and appendicular types, indirectly pointing to sub-standard living conditions of specially the rural hill population and unclean dietary and hygiene practices, all a result of poverty, promoting infection with H. Pylori, Salmonella spp., M. Tuberculae, E. Coli, etc. and widespread prevalence of alcoholism, addiction to tobacco and other substance abuse, and delay in seeking appropriate treatment. Unsupervised and

Site (n) (∑n = 180 = N)	Features on Presentation										Post-operative Complications and Outcomes					
	Presentation		Shock	Multi-Organ Failure ± Shock	Free gas under dome of diaphragm	USG Diagnosis Required (free fluid intra-perito-neally)	Generalised Peritoneal Contamination on Exp. Lap.	Co-morbid Factors (Alcoholic /Smoker / DM / Htn / etc.)	Pulmonary / Renal / Other Complications	Wound Infection		Severe Sepsis ± MODS	Need for Re-laparotomy (Fecal Fistula / Intra-Ab-dominal Abscess / Leaks)	Death
	<24hrs	>24hrs								Minor	Major / Dehiscence	Bed Sore / (Peri-) Stomal Complications				
Esophageal (1)	1	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0
Gastric (26)	6	20	17	5	23	2	23	16	14	12	1	0	1	0	0	1
Duodenal (120)	25	95	87	17	104	13	92	89	39	35	3	2	3	0	0	3
Jejunal / Ileal (17)	10	7	3	2	15	2	6	3	1	4	1	3	1	1	0	4
Meckel's (1)	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Appendicular (7)	2	5	2	0	2	5	4	4	1	2	0	0	0	0	0	0
Cecal (2)	0	2	1	0	1	1	1	1	0	1	0	0	0	0	0	0
Colonic (4)	0	4	1	1	2	1	2	0	2	1	1	1	1	0	0	0
Sigmoid / Rectal (2)	0	2	0	1	1	1	1	2	2	1	1	1	0	0	0	0
Overall (%)	44 (24.4%)	136 (75.5%)	112 (62.2%)	26 (14.4%)	151 (83.9%)	24 (13.3%)	131 (72.8%)	119 (66.1%)	60 (33.3%)	54 (30.0%)	7 (3.9%)	7 (3.9%)	6 (3.3%)	1 (0.6%)	0	8 (4.4%)

Table-3: Presenting Features, Complications and Outcomes (April'15 - Dec'16).

excessive usage of NSAIDS for chronic / minor ailments plays substantial role in formation of gastro-duodenal ulcers. Complications, morbidity and mortality rises with the patient's age, as co-morbid factors increase and immunity decreases.

The need of the hour is to promote healthy and clean living and eating practices among the rural populations, along with reducing substance / alcohol / tobacco abuse and advising appropriate use of prescription medications; needless to say, early diagnosis and treatment of infectious diseases and intensive management of cases of perforation peritonitis will go a long way in providing a healthy work-force in Uttarakhand.

ABBREVIATIONS

Ant. – Anterior, Post. – Posterior, (CE) CT – (Contrast Enhanced) Computed Tomography, DM – Diabetes Mellitus, Exp. Lap. – Exploratory Laparotomy, FJ – Feeding Jejunostomy, HPE – Histo-Pathological Examination, Htn – Hypertension, LRH – Limited Right Hemicolectomy, MODS – Multi Organ Dysfunction Syndrome, NSAID – Non-Steroidal Anti-Inflammatory Drugs, PPI – Proton Pump Inhibitors, PUD – Peptic Ulcer Disease, R and A – Resection and Anastomosis, UGIE – Upper Gastro-Intestinal Endoscopy, USG – Ultra SonoGram/Graphy, VCSGGMS and RI – Veer Chandra Singh Garhwali Government Medical Sciences and Research Institute

REFERENCES

1. N, Balakumar K, Jaishree GA. Epidemiology of Peptic Ulcer Disease in India. Indian J Gastroenterology. 1986; 5 (Suppl):3-6.
2. Bali RS, Verma S, Agarwal PN, Singh R, and Talwar N, Perforation Peritonitis and the Developing World, ISRN Surgery, vol. 2014, Article ID 105492, 4 pages, 2014.
3. Vinod Kumar B, Mathew AS. Clinical Study of Abdominal Hollow Visceral Perforation-Non Traumatic. Journal of Evolution of Medical and Dental Sciences. 2014;3:8366-8371.
4. Zinner MJ, Ashley SW. Maingot's Abdominal Operations. Ian S. Soriano, Daniel

Year 20xx	Sex-Wise				Age-Wise			Site-Wise									
	Total	Males	Females	Deaths	<20yrs	21-50yrs	>50yrs	Esophageal	Gastric	Duodenal	(% Gastro-Duodenal)	Jejunal / Ileal	Meckel's Diverticulum	Appendicular	Cecal	Colonic	Sigmoidal / Rectal
'05	81	68	13	3	3	57	21	0	3	67	(86.4)	7	0	4	0	0	0
'06	94	80	14	3	6	60	28	0	5	76	(86.1)	10	0	3	0	0	0
'07	97	83	14	2	6	61	30	0	6	76	(84.5)	12	0	3	0	0	0
'08	100	83	17	1	4	63	33	0	9	70	(79.0)	15	0	4	0	1	1
'09	95	82	13	2	5	57	33	0	8	70	(82.1)	14	0	3	0	0	0
'10	107	89	18	4	8	61	38	0	9	76	(79.4)	16	0	4	0	1	1
'11	102	82	20	3	4	61	37	0	7	80	(85.3)	11	0	4	0	0	0
'12	99	81	18	2	4	60	35	0	7	82	(89.9)	6	0	3	1	0	0
'13	109	84	25	2	7	64	38	0	10	81	(83.4)	10	0	5	0	2	1
'14	105	83	22	4	6	62	37	0	8	80	(83.8)	11	0	5	0	1	0
'15	110	91	19	6	9	64	37	0	12	84	(87.3)	8	0	4	1	1	0
'16	101	84	17	4	6	60	35	1	9	71	(79.2)	9	1	4	1	3	2
Overall (%)	N' = 1200	990 (82.5%)	210 (17.5%)	36 (3.0%)	68 (5.7%)	730 (60.8%)	402 (33.5%)	1	93	913	(83.8%)	129	1	46	3	9	5

Table-4: Previous Years' Records (Demography).

T. Dempsey. Benign Gastric Disorders. 12ed. P452-53. Peranteau WH, Smink DS. Meckel's Diverticulum. 12ed. P643-4. Appendix. P625-40. Nguyen TC, Frizelle FA. Diverticular disease. P649-58.

5. Joshi YK. Helicobacter Pylori Infection: Current Status. Journal of Indian Academy of Clinical Medicine. 2000;5: 148-55.
6. Dutta AK, Chacko A, Balekuduru A, et al. Indian J Gastroenterol. 2012;31:111.
7. Jhobta RS, Attri AK, 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.
8. Malik P, Yadav BL, Haldeniya K, Anuragi G, Goyal R. A 3 Year Prospective Study of 1400 Cases of Perforation Peritonitis: Asia's Largest Single Centre Study. Global J of Med Res. (I) vol XIV Issue III ver I. 2014. P 48-54.
9. Daley BJ. Peritonitis And Abdominal Sepsis: Background, Anatomy, Pathophysiology. Emedicine.medscape.com. N.p., 2017. Web. 7 Jan. 2017.
10. Agarwal N, Saha S, Srivastava A, Chumber S, Dhar A, Garg S. Peritonitis: 10 years' experience in a single surgical unit. Trop Gastroenterol. 2007;28:117-20.
11. Gupta S, Kaushik R. Peritonitis – the Eastern Experience. World J of Emergency Surgery. 2006,1:13.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 15-12-2016; **Published online**: 31-12-2016