

A Study on Causes and Complications of Acute Peritonitis

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Abstract

Introduction: Peritoneum becomes inflamed secondary to bacterial invasion or chemical insult. Pathogenic organisms reach the peritoneal cavity through viscus perforation, through intraperitoneal visceral suppuration, from abdominal wound, through the blood, lymphatics or via open ends of fallopian tubes. Chemical peritonitis results from blood, bile gastric fluids, or foreign bodies left after surgery like glove lubricant such as talc, cellulose fibres from gauze pads, drapes and gown. Peritonitis may be acute or chronic, septic or aseptic, primary or secondary, localized or generalized. *Methodology:* Cases clinically diagnosed as peritonitis underwent X-ray erect abdomen, and blood investigations like CBC, Blood urea, serum creatinine, urine routine and microscopy. Serum amylase and widal test was done if pancreatitis or enteric fever was suspected respectively. After stabilization, patients were taken up for surgery. Laparotomy was done under general anaesthesia or epidural anaesthesia. *Results:* Duodenal ulcer perforations were closed using omental patch (Grahms patch). All appendicular perforation cases underwent appendectomy. All cases of gastric perforation were closed with simple closure only. Jejunal and ileal perforations were closed with simple closure only. One case of sealed ileal perforation was treated with peritoneal toilet. One case of colonic perforation underwent resection of gangrenous part and transverse colostomy. All cases underwent peritoneal lavage and drainage after

surgery. *Conclusion:* Wound infection is a most common postoperative complication.

Keywords: Peritonitis; Peritoneal Lavage; E.Coli.

Introduction

Peritoneum is the largest serous smooth membrane of human body with surface area of about 2m², approximately to surface area of skin [1].

Peritonitis is defined as inflammation of a portion or all of the parietal and visceral peritoneum. It is one of most common surgical emergencies which present to surgery department.

Peritoneum becomes inflamed secondary to bacterial invasion or chemical insult. Pathogenic organisms reach the peritoneal cavity through viscus perforation, through intraperitoneal visceral suppuration, from abdominal wound, through the blood, lymphatics or via open ends of fallopian tubes. Chemical peritonitis results from blood, bile gastric fluids, or foreign bodies left after surgery like glove lubricant such as talc, cellulose fibres from gauze pads, drapes and gown.

Peritonitis may be acute or chronic, septic or aseptic, primary or secondary, localized or generalized. Diagnosis of peritonitis is made largely by clinical evaluation. Routine investigations add little information in evaluation [2,3].

Once diagnosis is confirmed patients general condition is improved so that he/she can with stand surgery.

Till beginning of 21st century peritonitis was considered as fatal condition. Despite spectacular advances in understanding pathogenesis of disease, in diagnostic modalities discovery of broad spectrum

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antibiotics, invention of modern advance equipments like ventilators, advancement of knowledge in surgical and anaesthesiology field, peritonitis still poses major problem for surgeons as far as morbidity and mortality is concerned [4,5].

Changes in life style like reduced physical activity, excessive intake of high calorie diet, smoking, alcoholism and drugs have added to the problem [6].

Methodology

In study, all the 50 cases that were provisionally diagnosed with acute peritonitis and subjected to relevant investigations and underwent surgery were included.

Cases clinically diagnosed as peritonitis underwent X-ray erect abdomen, and blood investigations like CBC, Blood urea, serum creatinine, urine routine and microscopy. Serum amylase and widal test was done if pancreatitis or enteric fever was suspected respectively.

After stabilization, patients were taken up for surgery. Laparotomy was done under general anaesthesia or epidural anaesthesia.

Postoperatively patients were followed till discharge from hospital and reviewed in OPD for 1 month.

Mortality in this study refers to death of the patient in the hospital during same admission as episode of peritonitis.

Results

The most frequent operative finding was duodenal perforation seen in about 56% of the cases. This was followed by appendicular perforation seen in 16% and ileal perforation seen in 8% of cases. Of the 4 cases of ileal perforation 1 was due to tuberculosis, 2 were due to enteric fever and 1 was secondary to stab injury.

Peritonitis secondary to intestinal gangrene was found in 8% of cases. 2 cases were secondary to strangulated hernia, 1 case was secondary to volvulus and strangulation around fibrotic bands and 1 case was secondary to volvulus around Meckles diverticulum.

3 cases showed jejunal perforation all of them were due to blunt injury abdomen. 2 cases showed gastric ulcer perforation which were prepyloric in site, none of which were found to be of malignant origin on histopathology. Colonic perforation was seen in 1 case which was secondary to carcinoma colon.

30% of patients had anemia which included seven patients of duodenal perforation, one patient of ileal perforation and 2 patients of appendicular perforation. 50% of appendicular perforation had leucocytosis.

Around 64.3% of patients of duodenal perforation showed gas under right dome of diaphragm .

Only one patient of ileal perforation showed gas under diaphragm while most of patients of ileal perforation had dilated bowel loops with multiple air fluid levels.

Six patients of appendicular perforation i.e. 75% had normal X-ray findings while nine patients i.e.32% of duodenal perforation had normal X-ray.

One case of colonic perforation showed multiple air fluid levels. All cases of gastric perforation had gas under diaphragm.

Most of the cases show findings of peritonitis on x-ray i.e. obliteration of psoas shadow and preperitoneal fat lines and generalized haze.

Four quadrant aspirations were done in all cases. Peritoneal tap was positive in all cases of peritonitis.

Peritoneal aspirate was found to be purulent in 36% of cases. In 8 patients of duodenal perforation and 6 patients of appendicular perforation tap was purulent.

43% of duodenal perforation patients had bilious aspirate, while purulent aspirate was predominant in appendicular perforation. Ileal perforation patients mainly had seropurulent and feculent aspirate.

Table 1: Cause of peritonitis

Pathology	No. of Cases	Percentage
Duodenal perforation	28	56
Appendicular perforation	8	16
Ileal perforation	4	8
Gastric perforation	2	4
Jejunal perforation	3	6
Intestinal gangrene	4	8
Colonic perforation	1	2
Total	50	100

Table 2: Laboratory investigations

Laboratory investigations	Duodenal perforation		Appendicular perforation		Ileal perforation		Others		Total	
	No	%	No	%	No	%	No	%	No	%
Anemia	7	25	2	25	1	22	5	50	15	30
Leucocytosis	4	14.3	4	50	1	11.1	3	30	12	24
Leucopenia	5	18	0	0	1	22.2	2	20	8	16

Table 3: Radiological Investigation

Laboratory investigation	Duodenal perforation		Appendicular perforation		Ileal perforation	
	No	%	No	%	No	%
Air under the diaphragm	18	64.3	1	12	1	22
Dilated loops, Multiple air fluid levels	1	3.5	1	12	3	75

Table 4: Peritoneal aspirate

Laboratory investigations	Duodenal perforation		Appendicular perforation		Ileal perforation		Others		Total	
	No	%	No	%	No	%	No	%	No	%
Seropurulent	8	28	1	12.5	3	75	2	20	14	28
Purulent	8	29	6	75	0	0	4	40	18	36
Bilious	12	43	0	0	0	0	1	10	13	26
Hemorrhagic	0	0	0	0	0	0	0	0	0	0
Feculent	0	0	1	12.5	1	25	3	30	5	10
Total	28	100	8	100	4	100	10	100	50	100

Table 5: Results of culture of peritoneal fluid

Laboratory investigations	Duodenal perforation		Appendicular perforation		Ileal perforation		Others		Total	
	No	%	No	%	No	%	No	%	No	%
Sterile	9	33	0	0	1	25	3	30	13	26
E.coli	8	28.9	5	62.5	2	50	2	20	17	34
Mixed	2	8.1	2	25	0	0	1	10	5	10
B. fragilis	3	10	1	12.5	1	25	2	20	7	14
Staphylococcus	3	10	0	0	0	0	1	10	4	8
Pseudomonas	3	10	0	0	0	0	0	0	3	6
Klebsiella	0	0	0	0	0	0	1	10	1	2
Total	28	100	8	100	4	100	10	100	50	100

Table 6: Operative Procedure adopted

Operative procedure	No. of Cases	Percentage
Closure with omental graft (Grahams patch)	28	56
Simple closure of perforation	8	16
Peritoneal toilet only	1	2
Resection and anastomosis	4	8
Transverse colostomy	1	2
Appendectomy	8	16
Total	50	100

Table 7: Postoperative complications – Local

Laboratory investigations	Duodenal perforation		Appendicular perforation		Ileal perforation		Others		Total	
	No	%	No	%	No	%	No	%	No	%
Wound infection	4	14.4	1	12.5	0	0	0	0	5	10
Fecal fistula	0	0	0	0	2	50	1	10	3	6
Pelvic abscess	2	7	0	0	0	0	0	0	2	4
Duodenal fistula	1	3.6	0	0	0	0	0	0	1	2
Burst abdomen	0	0	0	0	0	0	1	10	1	2
Paralytic ileus	0	0	0	0	0	0	1	10	1	2
Total	7	25	1	12.5	2	50	3	30	13	26

E.coli was predominant organism in the aspirate culture i.e. 34% of cases. It was most common – organism cultured in all duodenal, ileal and appendicular perforation.

In 26% cases aspirate was sterile and 14% of cases had bacteroides fragilis present in the peritoneal tap.

Duodenal ulcer perforations were closed using omental patch (Graham's patch). All appendicular perforation cases underwent appendectomy. All cases of gastric perforation were closed with simple closure only. Jejunal and ileal perforations were closed with simple closure only. One case of sealed ileal perforation was treated with peritoneal toilet. One case of colonic perforation underwent resection of gangrenous part and transverse colostomy. All cases underwent peritoneal lavage and drainage after surgery.

Wound infection was commonest complication seen in 10% of cases, four cases of duodenal perforation and one case of appendicular perforation developed wound infection. It was treated by antibiotics and regular dressings. Fecal fistula was seen in 3 cases, 2 cases were seen in ileal perforation and both patients expired. Two cases of duodenal perforation developed pelvic abscess. Prolonged paralytic ileus was present in 1 case. It was treated by nasogastric aspiration and maintaining electrolytes. One case of intestinal gangrene developed burst abdomen. One patient developed duodenal fistula and was treated with re-laparotomy and closure.

Discussion

In the present series, 56% of cases of peritonitis were due to duodenal perforation, 16% were due to appendicular perforation, 8% were due to ileal perforation, 8% were due to intestinal gangrene, 6% were due to jejunal perforation, 4% were due to gastric perforation and 2% were due to colonic perforation.

In a study by LA Desa [7], 32.29% cases were of duodenal ulcer perforation, 27.33% were ileal perforation and 18% were appendicular perforation.

Kachroo reported [8] 16.7% incidence of duodenal perforation, 41% incidence of appendicular perforation and 13.3% of ileal perforation.

In our study 30% patients were anaemic, 24% of patients had leucocytosis while leucopenia were seen in 16% of cases.

Kachroo [8] reported that majority of patients in his series had leucocytosis with low hemoglobin levels.

The white cell count may be low or elevated in acutely ill patients.

On erect abdominal X-ray 64% of duodenal perforation cases showed gas under diaphragm, 3.5% had multiple dilated bowel loops. 3 patients of duodenal perforation had both dilated bowel loops with air fluid levels and gas under right dome of diaphragm.

LA Desa [7] recorded 72.72% incidence of air under diaphragm in duodenal perforation cases. Kachroo [8] reported gas under diaphragm in 13 out of 15 cases of duodenal perforation, i.e., in 86.6% cases.

In above study peritoneal tap was positive in all cases.

The aspirate was purulent in 36% of cases while it was seropurulent in 28% cases and bilious in 26% cases.

A study conducted to evaluate diagnostic abdominal paracentesis by SRS Rao [9] found peritoneal tap to be positive in all cases of peritonitis and right lower quadrant was always found to be positive. It was found to be positive in 95.3% cases of visceral perforation, 100% cases of intestinal obstruction with gangrene, 100% in cases of traumatic intraperitoneal hemorrhage.

E.coli was found in 34% of cases of peritoneal aspirate culture.

Culture yielded no growth in 26% of cases. Mixed growth of organisms was obtained in 10% of cases.

Bacteroides fragilis was most common anaerobe cultured in 14% of cases. Culture was positive for staphylococcus, pseudomonas and klebsiella in 8%, 6% and 2% of cases respectively.

Duodenal perforation aspirate was sterile in 33% cases, while E.coli was Predominant in rest of positive cultures.

LA Desa [7] study found most common aerobic organisms are E. coli, Klebsiella and proteus. Staphylococcus aureus and pseudomonas were less commonly grown.

MD Tripathi [10] series reported 15% of sterile aspirate, E. coli was most common organism in 45% of cases and mixed infection was seen in 15% of the cases. Pseudomonas, klebsiella, proteus and staphylococcus were present in 8.75%, 8.75%, 5% and 2.5% of their cases respectively.

28 patients of duodenal perforation cases underwent surgery in form of closure with omental patch (Graham's patch).

In one case of sealed ileal perforation, only

peritoneal toilet was done.

In cases of appendicular perforations, appendectomy was done.

Simple closure of perforation was done in eight cases, three cases were of ileal perforation, three were of jejunal perforation, and two were of gastric perforation.

Resection and anastomosis was done in total four cases. All four patients were of intestinal gangrene.

Patients were observed till discharge from Hospital. Wound infection was commonest complication found in 10% of cases. Three patients developed fecal fistula. two patients were of ileal perforation, one case was of volvulus of intestine around fibrotic band.

Pelvic abscess, duodenal fistula, burst abdomen and prolonged paralytic ileus was present in 4%, 2%, 2% and 2% of patients respectively.

In a study by LA Desa [7], wound infection, was commonest complication.

R.Kachroo reported wound infection, paralytic ileus, and fecal fistula and burst abdomen in 20%, 12%, 2% and 1.1% of patients respectively.

Conclusion

Duodenal ulcer perforation is the commonest cause of peritonitis followed by appendicular perforation.

Most of duodenal perforations can be detected by erect abdominal X-ray. Peritoneal tap was positive in all cases of peritonitis.

E coli were the most common organism found on peritoneal aspirate culture. Around one fourth of cases had sterile culture.

References

1. Dunn DL, Barke RA, Ahrenholz DH. The adjuvant effect of peritoneal fluid in experimental peritonitis. *Ann Surg* 1984;199:37.
2. Andrus C, Doering M, Herrmann VM. Planned reoperation for generalized intra abdominal infection. *Am J Surg* 1986; 152: 682-686.
3. Lst M, Kutz L, Stein TA. Effect of PEEP on the rate of thoracic duct lymph flow and clearance of bacteria from peritoneal cavity. *Am J Surg* 1983;145:126.
4. DeSouza GE, Ferriera SH. Blockade by antimacrophage serum of the migration of PMN neutrophils into the inflamed peritoneal cavity. *Agents Actions* 1955;17:87.
5. Raftery AT. Effect of peritoneal trauma on peritoneal fibrinolytic activity and intraperitoneal adhesion formation. *EurSurg Res* 1981;7:151.
6. Rotstein OD, Prutte TL, Simmons RL. Mechanisms of microbial synergy in polymicrobial surgical infections. *Rev Infec Dis* 1985;7:151.
7. Desa LA, Mehta SJ, Nadkarni KM, Bhalerao RA. Peritonitis: A study of factors contributing to mortality. *Indian J Surg* 1983;45:593-604.
8. Kachroo R, Ahmad MN, Zargar HV. Peritonitis -An analysis of 90 cases. *Indian J Surg* 1984;46:203-209.
9. Rao SR, Parekh BR, Raina V. Evaluations of diagnostic abdominal paracentesis in acute surgical conditions of abdomen. *Indian J Surg* 1977;39:285-290.
10. Tripathi MD, Nagar AM, Srivastava RD. Peritonitis – study of factors contributing to mortality. *Indian J Surg* 1993;55(7):342-349.