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A PROSPECTIVE STUDY ON THE SPECTRUM OF PERFORATION PERITONITIS IN A TERTIARY CARE HOSPITAL WITH EMPHASIS TO PROGNOSTIC FACTORS

General Surgery

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ABSTRACT

Background: Peritonitis due to hollow viscus perforation is a commonly encountered entity in surgical practise. Peritonitis is often caused by introduction of infection into the otherwise sterile peritoneal cavity due to bowel perforation, introduction of irritative chemical like gastric acid, from a perforated peptic ulcer.

Materials & Methods: A prospective observational study was carried out on 105 patients who presented to the surgical OPD and Casualty of IMS & SUM Hospital between July 2014 to July 2016. After obtaining an exhaustive history a thorough clinical examination done, followed by required investigations and posted for surgery. All post-operative findings were recorded under specific parameters.

Results & Conclusions: Hollow viscus perforation is most commonly encountered in males belonging to the lower socio-economic strata. Chronic duodenal ulcer is the most common cause of bowel perforation with patients presenting commonly within 24-72 hours. Graham's omental patch is the most commonly performed procedure with lower respiratory tract infection being the most common cause of mortality.

KEYWORDS

Hollow Viscus Perforation, Peritonitis, Omental Patch.

Introduction:

Peritonitis due to hollow viscus perforation is a commonly encountered entity in surgical practise. It is defined as the inflammation of the serosal membrane that lines the abdominal cavity & the organs contained therein. Peritonitis is often caused by introduction of infection into the otherwise sterile peritoneal cavity due to bowel perforation, introduction of irritative chemical like gastric acid, from a perforated peptic ulcer.

Peritonitis due to perforation of the G.I. tract is one of the most common surgical emergencies in the world. The spectrum of etiology of perforation in industrialized nations is different from those in poorer nations. In contrast to western countries where lower gastro-intestinal tract perforations predominate, upper gastro-intestinal tract perforations constitute majority of cases in the Indian sub-continent.

Perforation of hollow viscus leads to contamination of peritoneal cavity. This can lead to a cascade of infective processes, sepsis, DIC, multiple organ dysfunction syndrome (MODS) and death in presence of irreversible damage to the vital organs. Peritonitis secondary to hollow viscus perforation requires emergency surgical intervention and is associated with significant morbidity and mortality.

G.I. tract perforations in our region generally occur as a result of chronic inflammation due to *Helicobacter pylori*, NSAIDs overuse, excessive smoking, alcohol/ coffee consumption[1]. Other causes include appendicitis, diverticulitis, typhoid and malignancies. Instrumentation and blunt/ penetrating abdominal trauma also account for large number of cases of perforation peritonitis[2]. Crohn's disease and even less commonly Ulcerative colitis are rare causes of perforation[3].

Diagnosis is usually made clinically and confirmed by the presence of pneumo-peritoneum on radiographs. With the advancements in surgical field and ICU facilities the treatment has swung towards operative approach compared to conservative approach[4].

Operative management consists of the time tested practice of omental patch closure, performed via both open or laparoscopic approach.

Ileial perforations is a common surgical entity encountered in tropical countries. This is associated to the fact of high incidence of enteric fever and tuberculosis in tropical countries. Mortality rate in ileal perforation is high in developing countries, despite improvement in critical care & timely surgical intervention[5].

Now a days operative management of perforation peritonitis consists of simple closure of perforation with omental patch followed by thorough peritoneal lavage and also resection & anastomosis if needed specially in small bowel perforations[7].

Despite advances in surgical techniques, antimicrobial therapy and ICU support, management of peritonitis continues to be highly demanding, difficult and complex[8].

Aims and Objectives:

1) To find out incidence of acute diffuse peritonitis in relation to different ages, sex and socio-economic status.
2) Analysis of various etiological factors and patho-physiology.
3) Evaluation of reliability of investigations and their usefulness.
4) Study of bacteriological profile of peritoneal fluid in peritonitis and its effect on morbidity and mortality.

Materials and Method:

A prospective observational study was carried out on 105 patients who presented to the surgical OPD and Casualty of IMS & SUM Hospital between July 2014 to July 2016. All patients admitted under the study were put to detailed history taking with emphasis on history of acid peptic disease, prolonged NSAID use, consumption of alcohol and cigarettes, history of abdominal trauma and any other associated disease.

Inclusion Criteria: all patients admitted with diagnosis of perforation peritonitis.

Exclusion criteria: all cases of primary peritonitis; patients with perforation of esophagus, biliary tree, bladder and reproductive organs; patients not undergoing surgery.

A complete clinical examination was done. After stabilizing the patients hemodynamically, broad spectrum antibiotics usually a combination of 3rd generation cephalosporin with metronidazole was administered. Blood was transfused whenever needed. All routine blood investigations were done which include hemogram, blood grouping, renal function test, serum electrolytes, X-ray chest and ECG. Special investigations in form of erect X-ray abdomen showing

diaphragmatic domes. USG abdomen and contrast enhanced CT scan of abdomen were done in doubtful cases and for confirming diagnosis. During surgery, the source of contamination was sought for and appropriate procedure was performed. A note of site, size, number of perforation is made. Amount of peritoneal contamination, bacteriology of contaminant is sought. Biopsy is taken from ulcer edges wherever needed.

The various procedures adopted in management were omental patch closure, simple closure, open appendectomy, resection-anastomosis and loop ileostomy/ colostomy. All cases were subjected to thorough peritoneal lavage with warm normal saline. Abdomen was closed in layers with 2 closed system drains placed in situ.

This study has been approved by the hospital ethical committee.

Observations:

Table 1: showing incidence in different age groups & age related mortality

Age groups (in years)	No. of cases	%	No. of deaths	%
20-30	11	10.5	-	-
31-40	15	14.3	-	-
41-50	32	30.5	3	9.4
51-60	22	20.9	3	13.6
61-70	20	19.1	2	10
71-80	5	4.7	3	60
Total	105	100	11	10.4

In our study of 105 cases, highest incidence of peritonitis secondary to hollow viscus perforation was in the age group of 41-50 years being 32 (30.5%) followed by 22 cases in 51-60 years age group. The youngest patient was 21years old where as the oldest patient was 78 years old. This also shows significant mortality in patients aged more than 50 years. Of the 47 patients who were above 50years age 8 died (17%). In contrast only 3 deaths(5.1%) were recorded in patients below 50 years age. Hence mortality increases with increasing age following peritonitis secondary to hollow viscus perforation.

Table 2: showing incidence in relation to sex and sex related mortality

Sex	No. of cases	%	No. of deaths	%
Male	88	83.8	10	11.3
Female	17	16.2	1	5.8
Total	105	100	11	10.4

In our study of 105 cases, 88 (83.8%) were males and 17(16.2%) were females and the mortality is also more in males (11.3%) than females (5.8%)

Table 3: showing number of cases in different socio-economic status group

Socio-economic status	No. of cases	%
Upper	9	8.6
Middle	23	21.9
Lower	73	69.5
Total	105	100

The socio-economic status of patients in this study is categorized according to their total annual income. Low socio-economic class is Rs 30,000, middle class is Rs 30,000- 1 lac and upper class is > Rs 1lac income per annum. In our study the incidence of peritonitis secondary to hollow viscus perforation is more in lower socio-economic status (69%).

Table 4: showing incidence of addictions in cases of peritonitis secondary to hollow viscus perforation

Addictions	No. of patients	%
Tobacco chewing	60	57
Alcohol	71	67.6
Smoking	65	62
More than one addictions	76	72.4

In our study hollow viscus perforation is associated with risk factors like alcohol, smoking and chewing tobacco. Alcohol is found to be most commonly associated (67.6%) though more than one substance abuse are present in majority of cases (72.4%).

Table 5: showing distribution of time interval between perforation and laparotomy and its effect on mortality

Time interval	No. of patients	%	No. of deaths	%
< 12hrs	7	6.7	-	-
12-24 hrs	20	19	1	5
24-48 hrs	27	25.7	2	7.4
48-72 hrs	38	36.2	4	10.5
3rd-5th day	10	9.5	3	30
6th-9th day	3	2.9	1	33.3
total	105	100	11	

In our study in majority(61.9%) of patients presented to hospital after 24-72 hour of symptom onset.this delay affects the ultimate outcome. There was no death within 12hr of presentation and the mortality rate increases steadily after that to attain 33.3%in presentation of 6 to 9 days duration.

Table 6: showing distribution of symptoms among patients of peritonitis secondary to hollow viscus perforation

Symptoms	No. of patients	%
Pain	103	98.1
Distension	46	43.8
Vomiting	62	59.1
Fever	27	25.7
Obstipation	25	23.8

In our study pain abdomen was the most common (98.1%) presenting symptoms of patients followed by vomiting (59.1%).

Table 7: showing distribution of signs among patients of peritonitis secondary to hollow viscus perforation

Signs	No. of patients	%
Guarding & rigidity	94	89.5
Tenderness	99	94.2
Obliteration of liver dullness	71	67.6
Free fluid	65	61.9
Paralytic ileus	46	43.8

The appearance of signs in patients of peritonitis secondary to hollow viscus perforation are different according to etiology but still abdominal tenderness is the most common (94.2%) sign found in these patients followed by guarding and rigidity of abdomen (89.5%). Paralytic ileus is the least common sign (43.8%).

Table 8: abdominal USG findings in patients with hollow viscus perforation

Abdominal USG finding	No. of patients
Abnormal USG	36
Pneumoperitoneum	30
Free fluid in peritoneum	31
Small bowel dilatation	15
Normal USG	4

USG abdomen and pelvis was done in 40 cases out of which 36 showed abnormal scan. Pneumo-peritoneum was present in 30 cases suggestive of bowel perforation. 31 cases showed free fluid in peritoneal cavity and bowel dilatation was seen in 15 patients.

Table 9: findings of abdominal CY scan in patients with hollow viscus perforation

Finding on abdominal CT	No. of patients
Extra-luminal air	40
Bowel wall discontinuity	26
Bowel wall thickening	15
Intra-peritoneal free fluid	24
Intra-peritoneal abscess	7

CT scan of abdomen was done in 40 selected cases of blunt trauma abdomen and some cases where X-ray was inconclusive. Plain CT scan was done with adjustment to lung window to differentiate between air bubble and fat. CT scan is capable to identify effectively even small amount of extraluminal air bubbles at an early stage.extra-luminal air was present in all 40 cases, bowel wall discontinuity was seen in 26 patients.

Table 10: showing anatomical sites of perforation

Site of perforation	No. of patients	%
Stomach	4	3.8
Duodenum	55	52.4
Jejunum	6	5.7
Ileum	22	20.9
Appendix	16	15.3
Large gut	2	1.9

The commonest site involved in hollow viscus perforation in our study was duodenum (52.4%) followed by ileum (20.9%) and appendix (15.3%). Duodenal ulcer perforation to gastric ulcer perforation ration is 13:1.

Table 11: showing different etiologies of hollow viscus perforation in this study

Etiology	No. of cases	%
Peptic ulcer	57	54.3
Typhoid	10	9.5
Tuberculosis	8	7.6
Trauma	11	10.5
Malignancy	2	1.9
Appendicular	16	15.2
Unknown etiology	1	1

Peptic ulcer perforation is the most common etiology for hollow viscus perforation in our study. Appendicular perforation (15.2%) followed by trauma (10.5%) and typhoid ulcer perforation (9.5%) of ileum.

Table 12: showing number of cases treated by different surgical procedures

Procedure	Nos. of patients	%	Mortality	%
Omental patch closure	55	52.4	6	10.9
Simple closure	15	14.3	1	6.6
Resection anastomosis	8	7.6	2	25
Resection only	7	6.7	2	28.5
Definitive procedure	4	3.8	0	-
Appendectomy	16	15.3	0	-

In our study omental patch closure was the most commonly performed procedure(52.4%) followed by appendectomy (15%) and simple closure(14.3%).

Discussion:

Keeping the age distribution in mind the highest number of patients encountered in our study were between 40-50 years age group followed by 50-60 years. The mean age was 38.56years in this study. This finding is comparable with Rajender Singh Jhobta et at. who studied 504 cases of perforation peritonitis in which the mean age was 36.8years.

The ratio of men to women was 5.17:1, with 53 males having perforation peritonitis. Different authors have found variable results regarding sex ratio. Ramesh Bharti et al reported sex ratio of 24:1 in their review of 50 cases.

50 cases of duodenal ulcer perforation underwent closure as described by Graham (omental patch closure). Mortality with this procedure was 10.9% which is comparable to that shown by Watkins (1984) & Ananthakrishnan (1995).

There were 11(10.4%) deaths within 30 postoperative day which is comparable with studies by Crawford E et al (1983) showing similar mortality rates. The main cause of death in the present series of patients was septicemia (59%). Thus contamination is a crucial consideration in patients with peritonitis and problem of mortality is a problem of infection.

So by early surgical intervention, we succeed in preventing further contamination by removing the source of infection though the end result will also depend upon the general host resistance & antibiotic sensitivity of the organism as shown by Nadkarni KM et al (1981).

Summary and Conclusion:

1) The most common age group affected was 40-50 years.
2) Males were affected more(84%) in comparison to women(16%).
3) Majority of cases (62%) presented to hospital after 24-72 hours of onset of symptoms.
4) Most common presenting symptom was pain abdomen while tenderness of abdomen was the commonest sign.
5) Duodenum (52%) is the commonest perforation site followed by ileum, appendix and stomach
6) Chronic duodenal ulcer(52%) was the most common cause of perforation.
7) Diagnosis is made clinically & confirmed by presence of pneumo-peritoneum (76%) on erecrt abdomen X-ray. However CT scan is most sensitive and specific for perforation peritonitis.
8) Peritoneal fluid culture showed polybacterial flora in most cases and culture positivity increased as time passes.
9) Laparotomy with closure of perforation with graham's omental patch is the commonest operative management for perforated peptic ulcer.
10) The commonest cause of mortality was lower respiratory tract infection
11) Overall mortality was 10.4%.

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