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Original Research Article

Clinical evaluation of patient with perforation peritonitis and their peritoneal fluid analysis for culture and sensitivity

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ABSTRACT

Background: Perforation peritonitis is one of the most common emergency that is encountered by surgical unit in emergency department and timely management of it can prevent morbidity and mortality, its important to reach the diagnosis earliest and intervene immediately. we find that understanding the peritoneal fluid obtained on exploratory laparotomy and knowing its culture and sensitivity and treating with appropriate antibiotic has a significant role in better management and early recovery of such patients.
Methods: This study comprises of 100 consecutive cases of acute perforation peritonitis on whom exploratory laparotomy was done. In a study period from 1/4/2016 to 13/7/2017 conducted by department of General surgery Government medical college Haldwani-Nanital. Diagnosis was made on basis of clinical and radiological examination. Peritoneal fluid sample was obtained after opening the peritoneum and sent for peritoneal fluid analysis to microbiology department to get culture and sensitivity.
Results: Male to female ratio was 3:1 and the most common age group involved was between 20 to 40 years. The most common site of perforation was found to be duodenum amounting to 55% of cases followed by ileal perforation found in 20% cases, gastric perforation was found in 10 % of case. Most common microorganism among Gram negative organism was Klebsella found in 52% cases followed by *E. coil* in 36% cases, both were found together in 5% cases in rest of the cases proteus and pseudomonas were found. Sensitivity was found to ceftrioxone,ciprofloxacillin and amikacin in more than 87% of gram negative organism while resistance was seen to amplicillin and clotrimoxazole other antibiotics that showed sensitivity to microorganism were Linizoild and minocycline in 76% cases. Around 8% fluid showed presence of methecillin resistant or sensitive Staphylococcus aureus and both were sensitive to linizoilid and minocycline and resistant to penicillin, erythromycin and cephxatin.
Conclusions: Peptic ulcer perforation is found to be most common site of perforation where second part of the duodenum supersedes Gastric perforation ratio been 5:1 jointly they are responsible for 65% of perforations. Second most common cause of perforation was due to enteric fever causing ilial perforation which was seen in 20% of the cases. Most common microorganism found is Klebsella and *E. coli* found in almost 81% of the case and were found to be sensitive to ceftrioxone, amikacin, linizoild and minocycline in almost all the cases.

Keywords: Exploratory laparotomy, Microorganism, Perforation peritonitis, Peritoneal fluid analysis

INTRODUCTION

Peritonitis due to intestinal perforation is a common case encountered in emergency department. Peritonitis is defined as inflammation of serosal membrane that lines the abdominal cavity and the organs contained in the abdominal cavity. Peritonitis has following stages

- Stage of chemical peritonitis-once perforation occur intestinal content escape into the peritoneal cavity

leading to severe pain, vomiting tenderness guarding, rigidity, trachycardia, sweating.

- Stage of reaction-peritoneum secretes lot of fluid to neutralize the escaped content and so temporarily the pain reduces, and the patient feels better.
- Stage of diffuse bacterial peritonitis- after about six hours, bacteria from GIT migrate from the site of perforation causing diffuse peritonitis.[1-3]

In other way peritonitis can be classified as a primary peritonitis due to haematogenous dissemination. secondary peritonitis due to perforation or trauma and tertiary peritonitis due to persistent or recurrent infection after adequate initial therapy. Perforation could be diagnosed in most of the cases by its clinical presentation which include pain abdomen, vomiting, constipation, fever, guarding, rigidity, tenderness and distension of abdomen. Diagnosis could be confirmed by doing X-ray of the abdomen taken in erect position which in most of the cases (around 87%) will show gas under right side of the diaphragm in few cases gas is not elicited that could be due to sealed perforation in such cases ultrasonography is advisable to look for pneumoperitoneum.[4-6]

It seems that, performing Ultrasound in patients with suspected perforated viscus can accurately identify presence of intra-peritoneal echogenic or "dirty" free fluid as well as evidence of free air, and may expedite patient management. Exploratory laparotomy is only treatment that is mandatory in all the cases of perforation peritonitis though now a days endoscopic and laproscopic procedures are been tried but mainstay treatment is exploratory laparotomy. Abdominal cavity is approached through a mid line incision.

As soon as peritoneum is opened in few cases a gas will be heard escaping the cavity. The nature of peritoneal fluid will indicate the site of perforation, in most cases of gastric, duodenal and jejuna perforation it is bilious in nature while fecal content indicates low ileal or colonic perforation. This fluid around 10ml is aspirated in sterile syringe and sent for analysis, if there is delay in sending the sample it shall be preserved in refrigerator.

After cleaning the abdominal cavity with luke warm saline till the return fluid is clear the site of perforation is identified and managed, finally closing the abdominal cavity. The objective of this study was to study the presentation, evaluation and peritoneal fluid analysis of the cases of perforation peritonitis and to understand the most common microorganism that is isolated in the culture fluid and to know its sensitivity so that proper antibiotics could be started in time.

Most common microorganism among Gram negative organism was Klebsella found in 52% cases followed by *E. coil* in 36% cases, both were found together in 5% cases in rest of the cases proteus and pseudomonas were found.

Sensitivity was found to ceftrioxone, ciprofloxacillin and amikacin in more than 87% of gram negative organism while resistance was seen to amplicillin and clotrimoxazole other antibiotics that showed sensitivity to microorganism were Linizoild and minocycline in 76% cases. Around 8% fluid showed presence of methecillin resistant or sensitive Staphylococcus aureus and both were sensitive to linizoilid and minocycline and resistant to penicillin, erythromycin and cephxatin.[7,8]

METHODS

It was a prospective and descriptive study. This study comprises of 100 consecutive cases of acute perforation peritonitis on whom exploratory laparotomy was done. In a study period from 1st April 2016 to 13th July 2017 conducted by Department of General surgery Government Medical College Haldwani-Nanital. A pre tested Performa was used to collect the relevant information of the patients. Diagnosis was made on basis of clinical and radiological examination. Peritoneal fluid sample was obtained after opening the peritoneum and sent for peritoneal fluid analysis to microbiology department to get culture and sensitivity.

Inclusion criteria

All diagnosed cases of perforation peritonitis on whom exploratory laparotomy was performed.

Exclusion criteria

All cases who were diagnosed having perforation peritonitis but exploratory laparotomy could not be performed due to various reasons.

RESULTS

Male: Female Ratio 3:1. Among 100 cases that were studied it was found that out of 100 patients 75 were Males and 25 patients were females. More involvement of males is due to excessive smoking and alcohol` intake leading to peptic ulcer causing gastric and duodenal perforation (Figure 1).

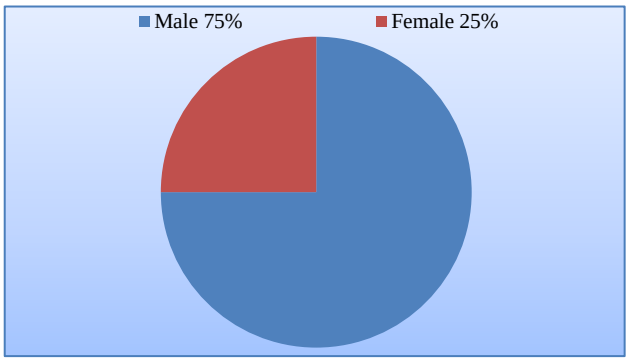

Figure 1: Male to female ratio.

Site of perforation- commonest site of perforation was second part of duodenum 55 % followed by ilieum 20% this is due to perforation of peptic ulcer that is commonly due to excessive smoking, Alcohol intake and improper NSAID consumption. Ileal perforation that was seen in 20% of the cases was mostly due to enteric fever and few cases had ileoceacal tuberculosis, other sites which are not common are jejunum and colon. Appendicular perforation was seen in 5% of the cases (Figure 2).

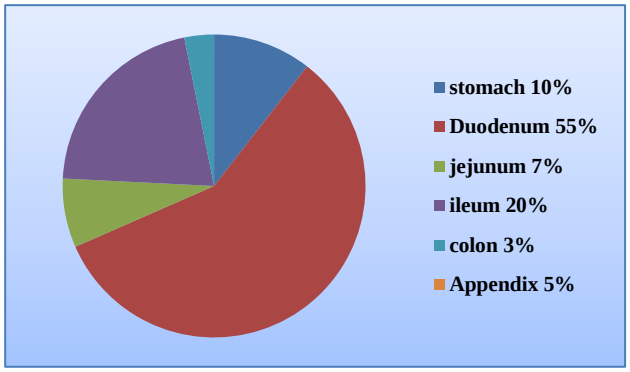

Figure 2: Site of perforation seen on exploratory laparotomy.

Most of the growths were monomicrobial around 80%, Commonest mono microbe isolated was *E coli* and klebsella.

In 3 % of the cases ploymicrobial growth was seen, in 17% of the cases no growth could be detected, either these patients came late and had received antibiotic treatment or came on first day and proper antibiotic treatment was given earliest (Figure 3).

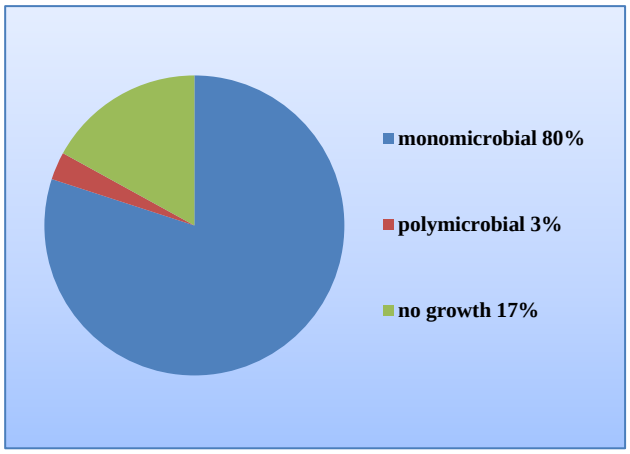

Figure 3: Type of growth seen in peritoneal fluid culture.

Most common microorganism isolated was klebsella 52% and *E. coli* 36% and other rare are proteus, B fragilis, pseudomonas, methecillin resistant *Staphylococcus aureus* and methecillin sensitive *Staplylococcus aureus*. Both *E. coli* and Klebsella was found together in 5% of the cases (Figure 4).

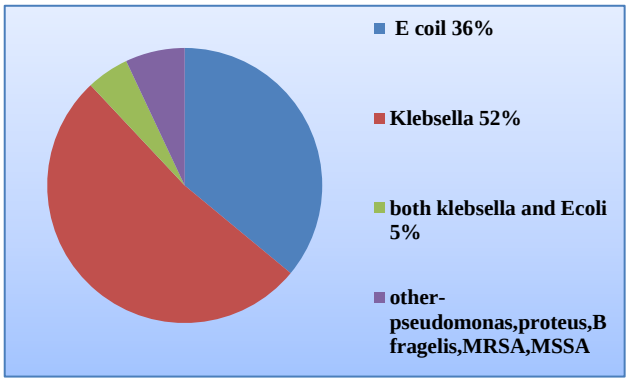

Figure 4: Microorganism detected in culture fluid analysis of peritoneal fluid.

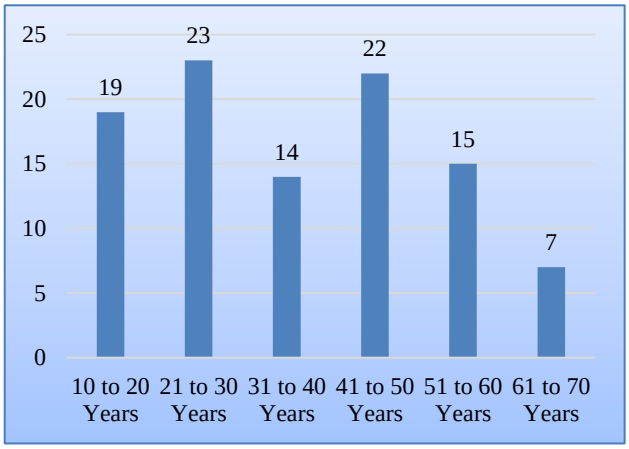

Figure 5: Age distribution of patients who were diagnosed having perforation peritonitis.

Age distribution of patients who were included in study group showed that most common age group who were diagnosed to have perforation peritonitis were between 20 to 50 years were peak was seen between 20 to 30 years and 40 to 50 years. Involvement of pediatric age group was also significant found in 19% of the cases. Mean being 36.2 years, so its middle age group that is commonly effected (Figure 5).

Table 1: Sign and symptom seen in patient with perforation peritonitis in present study group.

Pain abdomen	100
Vomiting	59
Diarrhoea	23
Obstipation	8
distension	37
fever	52
Tachycardia	58
Hypotension	22
Tenderness	100
Rigidity	100
Oblitration of liver dullness	34

The commonest symptoms that was found in patient of perforation peritonitis are vomiting in 59% of cases, diarrhea (23%), obstipation (8%), fever (52%), pain abdomen (100%) and signs being Distension of abdomen (37%), tachycardia (58%), Hypotension (22%), tenderness (100%), rigidity (100%), obliteration of liver dullness (34%) (Table 1).

DISCUSSION

Secondary peritonitis caused by perforation of hollow viscus is common in emergency department of any hospital. As it has a high mortality rates if timely intervention is not provided to the patient or if patient fails to report early, so it needs through discussion to provide best possible treatment.[9] Males to female ratio clearly defines that it is more prevalent in males probably due to alcohol intake, smoking and other drug abuse that leads to peptic ulcers which is prone for perforation, in our study male to female ratio is found to be 3:1 (Figure 1) and this ratio is slightly higher in our study when compared to other standard literature. Age group that is commonly seen in patients presenting with perforation peritonitis in our study was between 20 to 50 years with a peak in between 20 to 30 years (Table 1). With mean age of presentation 36.2 years. In study conducted by Gupta et al [10] the mean age of presentation was found to be 32 years lesser than our study .Clinical evaluation and X-ray abdomen is sufficient in most of the cases to diagnose perforation peritonitis while in few cases help of ultrasonography and CT scan is taken Site of perforation peritonitis was found in present study to be maximum in second part of duodenum (55%) followed by ileaum (20%), stomach (10%), jejunum (7%), appendix (3%) and least in colon (3%) (Figure 2). Noon et al from Texas studied 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.[11] Khanna et al from Varanasi studied 204 consecutive cases of gastrointestinal perforation and found that over half (108 cases) were due to typhoid.[12] They also had perforations due to duodenal ulcer (58), appendicitis (9), amoebiasis (8) and tuberculosis (4). These figures show the importance of infection and infestation in the third world which is also reflected in the high incidence of typhoid induced perforation. If we compare the incidence of peptic ulcer perforation, in present study authors found it to be duodenal to gastric ulcer perforeation approx 5:1. In other studies it was around 7:1. In present study peritoneal fluid analysis showed monomicrobial growth in 80% cases while polymicrobial in 3% cases in 17% cases no growth could be detected, most of the culture negative cases presented to us within one or two days of initial symptom of perforation (Figure 3).

Dr Alexia et al in their study found that most common microorganism among Gram negative organism was Klebsella found in 52% cases followed by *E. coil* in 36% cases, both were found together in 5% cases, in rest of the cases Proteus and Pseudomonas were found.[13] In present study sensitivity was found to ceftrioxone, ciprofloxacillin and amikacin in more than 87% of gram negative organism while resistance was seen to amplicillin and clotrimoxazole other antibiotics that showed sensitivity to microorganism were Linizoild and minocycline in 76% cases. Around 8% fluid showed presence of methecillin resistant or sensitive Staphylococcus aureus and both were sensitive to linizoilid and minocycline and resistant to penicillin, erythromycin and cephxatin (Figure 4). Multibora D et al concluded that perforation most commonly seen in duodenum followed by stomach.[14] Secondary peritonitis caused in these cases was most commonly due to Klebsella followed by *E. coli* and rarely by mixed flora and proteus and pseudomonas. Both Klebsella and Proteus was found to be sensitive to cephalosporine group of drugs followed by quinolones and macrolide antibiotics.[15]

CONCLUSION

Secondary peritonitis is seen mostly due to hollow viscous perforation. Male predominates with M:F ratio 3:1. Most common age group effected is between 20 to 50 years. Peptic ulcer perforation is found to be most common site of perforation where second part of the duodenum supersedes Gastric perforation ratio been 5:1 jointly they are responsible for 65% of perforations. Second most common cause of perforation was due to enteric fever causing ilial perforation which was seen in 20% of the cases other rare cause been jejunal, colonic and appendicular perforations. Peritoneal fluid analysis revealed that mostly monmicrobes were isolated than poly microbes, most common microorganism found is Klebsella and *E. coli* found in almost 81% of the case other microbes found were proteus, pseudomonas, B fragilis and methecillin resistant or sensitive staphylococcus aureus. Klebsella and *E coli* were found to be sensitive to ceftrioxone, amikacin, linizoild and minocycline in almost all the cases while resistance was found to penicillin, erythromycin, cephoxitin, cotrimoxazole. Pseudomonas species was found to be sensitive to ceftazidime and polymixin B.

So, it will be good choice if any patient of perforation peritonitis at initial stages are given broad spectrum antibiotics including ceftrioxone, ampilcillin and metronidazole other options are linizoild and minocycline,

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