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EVALUATION OF THE PERFORATION PERITONITIS MICROBIOLOGICAL PROFILE WITH RESPECT TO THE ANATOMICAL SITE OF PERFORATION

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ABSTRACT

Introduction: Peritonitis is an inflammation of the serosal membrane that borders the abdominal cavity and its organs. Peritonitis is most commonly caused by an infection entering the ordinarily sterile peritoneal environment through intestinal perforation, such as a ruptured appendix or colonic diverticulum. Complicated intra-abdominal infections are life-threatening illnesses that require immediate source control and antibiotic therapy. Knowing the microbial dispersion by anatomical site of perforation is critical, because knowing the geographical distribution and features of bacteria will allow for the best empirical antibiotic choice. It can be produced via culturing of intraoperatively acquired peritoneal fluid. The purpose of this study is too evaluated of the perforation peritonitis microbiological profile with respect to the anatomical site of perforation.

Material and method: Patients suspected of having perforation peritonitis received imaging with X-ray abdomen supine and chest posteroanterior erect film with both domes of diaphragm to confirm the diagnosis after a complete history and physical examination. The CT abdomen was performed based on the case's merits. As per the patients requirement routine laboratory investigations were done including random blood sugar, renal function tests, hemogram, arterial blood gas analysis etc. Patients were taken up for emergency exploratory laparotomy through a vertical midline incision after receiving broad spectrum antibiotic therapy. In respect to the site of perforation, intraoperative results were noted. The collected specimen was used for direct gram staining and inoculated on blood agar and MacConkey agar. The inoculated plates were incubated overnight at 35^0C. After the incubation the bacterial identification was done by conventional biochemical tests.

Result: 60 patients were studied. The mean age of the patients in this study was 33.76±14.7 years.(Table 1). The male:female ratio was 6.14:1. The most common site of perforation was stomach (n=26) (43.33%) followed by Appendix (n=14) (23.33%) and least was Ileum (n=9) (15%). Among 60 cases of perforation peritonitis. Out of culture positives, E. coli was isolated in maximum cases, Acinetobacter spp. was least.

Conclusion: In the peritoneal fluid culture of patients with perforation peritonitis and E. coli was the most common organism isolated in all sites of perforation peritonitis. The antibiotic sensitivity profile showed the increasing resistance against third generation cephalosporins, which have been commonly in use empirically. However Aminoglycosides still have a significant sensitivity profile. Piperacillin and tazobactum, meropenem and colistin also showed a significant antimicrobial activity against organisms isolated from cases of perforation peritonitis.

Keyword: Peritonitis, E. coli, antibiotic sensitivity.

INTRODUCTION

Peritonitis is an inflammation of the serosal membrane that borders the abdominal cavity and its organs. Peritonitis is most commonly caused by an infection entering the ordinarily sterile peritoneal environment through intestinal perforation, such as a ruptured appendix or colonic diverticulum[i]. Primary, secondary, and tertiary peritonitis are the three kinds of peritonitis[ii]. Complicated intra-abdominal infections are life-threatening illnesses that require immediate source control and antibiotic therapy[iii]. Intra-abdominal infections, which vary from localized to extensive peritonitis, are one of the most common clinical issues in surgical practice[iv]. In India's tertiary care hospitals, it is one of the most common surgical emergencies with the majority of patients arriving late in the disease's course. The anatomical site of perforation, which impacts the source of infection, has a substantial impact on the death rates of intraabdominal infections. Several studies have

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found that gastroduodenal perforation has a mortality rate of 3-28 percent, small bowel perforation has a mortality rate of 20-38 percent, and large intestine perforation has a mortality rate of 20-45 percent[v]. Resuscitation of the patient, removal of the source of contamination as soon as feasible, and proper antibiotic therapy are the most widely acknowledged treatment protocols for patients with secondary peritonitis caused by hollow viscus perforation[vi]. Peritonitis caused by hollow viscous perforation is typically caused by polymicrobial and various contaminating microorganisms[vii]. Gram negative bacilli and anaerobic bacteria were the most common pathogens[viii]. Patients with sepsis have a mortality rate of 15–25 percent, with certain cases when gram-positive Cocci are present, reaching 18–55 percent. These are also linked to an increased risk of early death[ix,x]. Peritonitis-related sepsis is linked to a more severe course of the disease, resulting in higher sepsis severity ratings[xi]. The cause of peritonitis and the effects of antimicrobial treatment are the key factors influencing the severity and outcome of peritonitis. State-of-the-art critical care medicine, such as fluid resuscitation, vasopressor therapy, and surgical or interventional source control, can help to reduce mortality and morbidity in sepsis or severe peritonitis. Early empiric antibiotic treatment and surgical source management have been demonstrated to minimise mortality[xii]. Appropriate antibiotic treatment, particularly empiric treatment, is becoming increasingly difficult due to rising microorganism resistance[xiii]. Several researches on the use of antibiotics in patients with sepsis or peritonitis have been published in the past[xiv,xv]. Knowing the microbial dispersion by anatomical site of perforation is critical, because knowing the geographical distribution and features of bacteria will allow for the best empirical antibiotic choice. It can be produced via culturing of intraoperatively acquired peritoneal fluid. The purpose of this study is too evaluated of the perforation peritonitis microbiological profile with respect to the anatomical site of perforation.

Material and methods:

This was a cross section study conducted in Department of surgery and microbiology of DMMC, Nagpur. Total 60 patients presenting with perforation peritonitis were included in this study. Patients with immunocompromised states and diabetes, penetrating abdominal injuries and many anatomical sources of infection, perforation, gynaecological aetiology of perforation peritonitis, preoperative management placement of an intrabdominal drain in patients with age less than 20 years old were excluded in this study. Patients suspected of having perforation peritonitis received imaging with X-ray abdomen supine and chest posteroanterior erect film with both domes of diaphragm to confirm the diagnosis after a complete history and physical examination. The CT abdomen was performed based on the case's merits. As per the patients requirement routine laboratory investigations were done including random blood sugar, renal function tests, hemogram, arterial blood gas analysis etc. Patients were taken up for emergency exploratory laparotomy through a vertical midline incision after receiving broad spectrum antibiotic therapy. As soon as the peritoneum was opened during laparotomy, peritoneal fluid (10ml) was obtained and sent to the microbiology laboratory for culture and sensitivity. In respect to the site of perforation, intraoperative results were noted. The collected specimen was used for direct gram staining and inoculated on blood agar and MacConkey agar. The inoculated plates were incubated overnight at 35^0C. After the incubation the bacterial identification was done by conventional biochemical tests. The disc diffusion method was used to test antimicrobial susceptibility. Obtained results were analysed using SPSS (version 17) software.

Result:

60 patients were studied. The mean age of the patients in this study was 33.76±14.7 years.(Table 1). The male:female ratio was 6.14:1

Table no 1: Age distribution.

age group	frequency	percentage
20-30	23	38.33
31-40	17	28.33
41-50	8	13.33
51-60	3	5.00
61-70	9	15.00
total	60	100.00

The most common site of perforation was stomach (n=26) (43.33%) followed by Appendix (n=14) (23.33%) and least was Ileum (n=9) (15%) (Table 3).

Anatomical site of perforation	frequency	percentage
Stomach	26	43.33
Duodenum	9	15.00
Ileum	4	6.67
Appendix	14	23.33
Rectum	7	11.67
total	60	100.00

Among 60 cases of perforation peritonitis. Out of culture positives, E. coli was isolated in maximum cases, Acinetobacter spp. was least(Table 4).

aerobic culture	frequency	percentage
E.coli	40	66.67
Klebsiella spp	15	25.00
Acinetobacter spp.	5	8.33
total	60	100.00

DISCUSSION:

The mean age of the patients in this study was 33.76±14.7 years, similar to other studies which have been done in India. The male:female ratio was 6.14:1, similar to that observed in other studies. In gastric perforation, culture positivity and E. coli was the most common organism isolated similar to that observed by Vishnu et al. The high percentage of culture negativity in gastric perforation can be attributed to high acidity of stomach due to which most microorganisms have survival difficulty. In our study, no strict anerobic organism was isolated from any site of perforation peritonitis. In a study by Vishnu et al[xvi], no anaerobic organism was isolated in 18 cases of lower GI perforation tested for them. In a study by Jang et al[xvii], strict anaerobic organisms. This low yield of strict anerobes can be attributed to fastidious nature of anerobic organisms, the strict conditions needed for anaerobic culture. In a study by Punamiya et al, E. coli was most common organism isolated maximum sensitivity was found to piperacillin and tazobactum (51%) followed by cefotaxime (49%) and cefoperazone (48%) and ceftazidime (25%) which was similar to this study[xviii]. In this study, there has been significant resistance to third generation cephalosporins compared to other studies. It is probably because the rest of the studies are done before the year 2000 and there has been rampant use of third generation cephalosporins during that time leading to the development of resistance. But similar sensitivity pattern like other studies was observed to Aminoglycosides like gentamycin and amikacin in this study.

Conclusion:

In the peritoneal fluid culture of patients with perforation peritonitis and E. coli was the most common organism isolated in all sites of perforation peritonitis. The antibiotic sensitivity profile showed the increasing resistance against third generation cephalosporins, which have been commonly in use empirically. However Aminoglycosides still have a significant sensitivity profile. Piperacillin and tazobactum, meropenem and colistin also showed a significant antimicrobial activity against organisms isolated from cases of perforation peritonitis.

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