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SENSITIVITY AND CULTURE IN SUBJECTS WITH PERFORATION PERITONITIS

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ABSTRACT

Background: Peritonitis is one of the pathologies that general surgeons see most frequently. Improvements in surgical procedures and antibiotics have led to a significant decrease in surgical-related mortality and morbidity. Complications range from minor infections to serious, potentially fatal conditions including septic shock and SIRS (Systemic Inflammatory Response Syndrome). The use of antibiotics against anaerobic, gram-negative, and gram-positive pathogens is also associated with good recovery. Inappropriate usage of antibiotics can lead to treatment failure and antibiotic resistance.
Aim: The purpose of this study was to evaluate the microbiologic pattern in culture of the peritoneal fluid and its sensitivity to identify patterns of antibiotic susceptibility for commonly utilized organisms.
Methods: A chest x-ray was used to diagnose 48 individuals with perforation and peritonitis in this cross-sectional investigation. Antibiotic sensitivity was identified along with the bacterial type of the peritoneal fluid that was isolated.
Results: The study's findings indicate that the duodenum was the most often perforated region, with the stomach coming in second due to peptic ulcer illness. The most often isolated microorganism was Klebsiella, which was followed by proteus, E. coli, and pseudomonas. The majority of the organisms in the peritoneal fluid exhibited cephalosporin sensitivity, which was followed by fluoroquinolones and macrolides.
Conclusion: The current study shows that, in order to limit antibiotic resistance and decrease mortality and morbidity in people with perforation by peritonitis, suitable antibiotic administration must be used in accordance with the sensitivity pattern.
Keywords: perforation, peritonitis, microorganism, culture, antimicrobials, and peritoneal fluid

INTRODUCTION

Peritonitis is one of the pathologies that general surgeons see most often. Acute pancreatitis, appendicular perforation with subsequent complications from an appendicular abscess, traumatic bowel perforations, and simple duodenal perforations are all examples of peritonitis. The mortality rate from peritonitis is high—nearly 20%. Despite advances in antimicrobial medication, surgical tools, and intensive care, managing peritonitis remains a hard task for surgeons. In acute abdominal emergencies, the reported incidence of complications from peritonitis varies; generally, higher problems are observed in persons older than 60 years. The population's life expectancy has increased dramatically due to medical advancements, and this has improved surgical outcomes for older patients.1.

The strategy that preserves the lives of patients with secondary peritonitis is an accurate, prompt diagnosis combined with appropriate surgical exploration. Prior to managing these patients, it is important to evaluate the surgical control of peritonitis as a crucial component of determining the subjects' survival. Sepsis can be managed

with the aid of intensive care units. Nonetheless, there is a direct correlation between the fatality rates and the amount of time that passes after surgery before hollow viscous perforation occurs.2.

Because there is a high chance of peritoneal cavity infection by bacteria such as enterococci, Proteus, Klebsiella, E. Coli, and Enterobacteriaceae, peritonitis can result in dangerous and sometimes fatal consequences. Serious illnesses such as SIRS (Systemic Inflammatory Response Syndrome) can arise from direct action or endotoxin release. In 1930, Altheimer discovered the first set of organisms from the peritoneal cavity that explain the pathogenesis of intra-abdominal sepsis. The use of antibiotics and recent developments have made it possible to control the development of sepsis in patients suffering from peritonitis. The use of antibiotics has reduced the participants' mortality and morbidity by lowering the formation of abscesses.3

The use of the right antibiotics to lower the risk of infection and the correction of the underlying etiology to prevent the incidence of SIRS after treatment are two new approaches to managing peritonitis. Using a combination of medicines that target gram-positive, gram-negative, and anaerobe bacteria will help reduce sepsis. The issue with using antibiotics is that if they are used improperly, resistance may develop, making therapy unsuccessful.4 In order to enhance outcomes for these subjects, the current study evaluated the peritoneal fluid of patients who had peritonitis after hollow viscous perforation. This evaluation included the identification of implicated organisms and their sensitivity pattern.

MATERIALS AND METHODS

The current cross-sectional clinical study was carried out to evaluate the microbiologic pattern in culture and sensitivity of the peritoneal fluid to identify patterns of antibiotic sensitivity for commonly used organisms. The study was carried out at... from.. to. with approval from the relevant ethical committee. The participants who presented to the institution's emergency room with peritonitis owing to perforation made up the study population. Subjects who met the following requirements were eligible to participate in the study: they had to be at least eighteen years old, have a verified X-ray chest perforation and peritonitis diagnosis, and be willing to participate. Subjects with primary peritonitis, those with peritonitis related to trauma, and those unwilling to engage in the study were the exclusion criteria.

48 participants, of both sexes, who had preoperative evaluations in the emergency department with peritonitis characteristics were included in the study. After a thorough history and physical examination were recorded, all research participants had a chest X-ray obtained to confirm the diagnosis. The individuals were eventually enrolled in the trial when the X-ray revealed pneumoperitoneum and they met the inclusion criteria. Following final inclusion, regular electrocardiograms or echocardiograms, as applicable, were performed on all of the individuals. Intravenous fluids were used in resuscitation once the patient's vital signs had stabilized. Emergency laparotomy was performed after obtaining each subject's informed consent.

An intra-abdominal incision was created during the procedure, and peritoneal fluid was removed and examined for culture and sensitivity. Following surgery, the abdomen was thoroughly lavaged, and closure was performed. All of the individuals received intraoperative fluids, antibiotics, antacids, and analgesics after surgery. Cefotaxime and metronidazole were prescribed as antibiotics. After employing the diffusion method with cotrimoxazole, ceftriaxone, ciprofloxacin, amikacin, and ampicillin, culture reports were obtained. Based on the microorganisms' sensitivity pattern seen in the culture, antibiotic therapy was then initiated.

Using SPSS software version 21 (Chicago, IL, USA) for statistical assessment and one-way ANOVA and t-test for result formulation, the gathered data were examined. The data were presented as a mean, standard deviation, percentage, and number. The level of significance was kept at $p<0.05$.

RESULTS

The current cross-sectional clinical study was carried out to evaluate the microbiologic pattern in culture and sensitivity of the peritoneal fluid to identify patterns of antibiotic sensitivity for commonly used organisms. 48 participants, of both sexes, who had preoperative evaluations in the emergency department with peritonitis characteristics were included in the study. The age range of the study participants was 21-58 years, with a mean age of 36.21±4.22 years. Table 1 contains a list of the study individuals' demographic details.

In the current study, there were 10.41% (n=5) females and 89.58% (n=43) males. The bulk of the study participants were between the ages of 31 and 40, comprising 39.58% (n=19) of the sample, followed by 22.91% (n=11) of the sample in the 21–30 age range, 18.75% (n=9) of the sample in the >50 age range, and 16.66% (n=8) of the sample in the 41–50 age range. In terms of the perforation site, the duodenal site showed the highest percentage of perforations (41.66%; n = 20 subjects), which was followed by the gastric site (35.41%; n = 17 study subjects), the ileac site (12.5%; n = 6 subjects), the jejunum site (4.16%; n = 2) study subjects, and the colon site (6.25%; n = 3 subjects) (Table 1).

Upon evaluating the organisms extracted from the peritoneal fluid of the study participants, it was observed that pseudomonas, proteus, and klebsiella were all absent in 2.08% (n=1) of the subjects, klebsiella was present in 45.83% (n=22) of the subjects, and E. coli was present in 35.41% (n=17) of the study participants (Table 2).

Two participants had no development in the colon, one in the jejunum, one in the ileum, sixteen in the stomach, and twenty in the duodenum following perforations. 3 klebsiella together with E. coli, 1 pseudomonas and proteus, 6 klebsiella, and 9 E. coli were observed in the duodenum. Two klebsiella with E. coli, nine klebsiella, and five E. coli were observed in the stomach; in the ileum, there were two pseudomonas, one klebsiella, and two E. coli. One pseudomonas and one klebsiella were observed in the jejunum, and one klebsiella together with E. coli, klebsiella, and E. coli was observed in the colon (Table 3).

On assessing the sensitivity and culture, it was seen that for sensitivity pattern for E. coli showed that doe amikacin, cotrimoxazole, ceftriaxone, ciproflox, and ampicillin was seen in 12, 1, 13, 14, and 2 respectively, for klebsiella, it was 15, 2, 18, 13, and 1 respectively. For proteus, 1 was seen for ceftriaxone, and for pseudomonas, it was 1 for each amikacin, cotrimoxazole, ceftriaxone, and ciproflox respectively as shown in Table 4.

DISCUSSION

The current cross-sectional clinical study was carried out to evaluate the microbiologic pattern in culture and sensitivity of the peritoneal fluid to identify patterns of antibiotic sensitivity for commonly used organisms. 48 participants, of both sexes, who had preoperative evaluations in the emergency department with peritonitis characteristics were included in the study. The age range of the study participants was 21-58 years, with a mean age of 36.21±4.22 years. In the current study, there were 10.41% (n=5) females and 89.58% (n=43) males.

The bulk of the study participants were between the ages of 31 and 40, comprising 39.58% (n=19) of the sample, followed by 22.91% (n=11) of the sample in the 21–30 age range, 18.75% (n=9) of the sample in the >50 age range, and 16.66% (n=8) of the sample in the 41–50 age range. In terms of the perforation site, the duodenal site showed the highest percentage of perforations (41.66%; n = 20 subjects), followed by the gastric site (35.41%; n = 17 study subjects), the ileac site (12.5%; n = 6 subjects), the jejunum site (4.16%; n = 2) study subjects, and the colon perforation (6.25%; n = 3 subjects).

These results were in line with those of Srivastava R et al. (2018) and Weinstein RA et al. (2001), whose authors evaluated similar disease features and demographics as those of the current study. The organisms isolated from the peritoneal fluid of the study subjects were also evaluated. It was observed that in 12.5% (n=6) of the study subjects, pseudomonas, proteus, and klebsiella were observed to be growing, in 2.08% (n=1) of the study subjects, in 45.83% (n=22) of the study subjects, and in 35.41% (n=17) of the study subjects.

Two participants had no development in the colon, one in the jejunum, one in the ileum, sixteen in the stomach, and twenty in the duodenum following perforations. 3 klebsiella together with E. coli, 1 pseudomonas and proteus, 6

klebsiella, and 9 E. coli were observed in the duodenum. Two klebsiella with E. coli, nine klebsiella, and five E. coli were observed in the stomach; in the ileum, there were two pseudomonas, one klebsiella, and two E. coli. One pseudomonas and one klebsiella were observed in the jejunum, and one klebsiella, klebsiella, and E. coli were observed in the colon. These findings corroborated those of investigations conducted in 2000 by Rigberg D et al7 and in 2013 by Mutiibwa D et al8 that identified comparable organisms from the peritoneal fluid and the comparative sites.

After evaluating the sensitivity and culture, it was seen that the sensitivity pattern for E. Coli revealed that the doses of ampicillin, ciproflox, ceftriaxone, amikacin, and cotrimoxazole were 12, 1, 13, 14, and 2, respectively; for Klebsiella, the corresponding values were 15, 2, 18, 13, and 1. Ceftriaxone was observed to have a 1 for proteus, and a 1 for each of amikacin, cotrimoxazole, ceftriaxone, and ciproflox in the case of pseudomonas.

These results were similar to the results by the studies of Nishida K et al[9] in 2000 and Strobel O et al[10] in 2011 where authors showed similar culture and sensitivity as in the present study.

CONCLUSION

Within its limitations, the present study concludes that accurate use of antibiotics depending on the culture and sensitivity is vital in subjects with peritonitis and perforation to reduce mortality and morbidity and prevent the emergence of resistance. However, the present study had a few limitations including small sample size, cross-section nature, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion.

REFERENCES

1. Sabiston Textbook of Surgery, 19th Edition, 2017:1088-114.
2. Maingot's Abdominal Surgery, 10th Edition. 2012:633-50.
3. Schwartz's Principle of Surgery, 10th Edition, 2019:1035-99.
4. Boueil A, Guegan HA, Colot JB, Ortenzio EC, Guerrier G. Peritoneal fluid culture and antibiotic treatment in patients with perforated appendix in a pacific island. Asian J Surg. 2015;28:1-5.
5. Srivastava R, Singh RK. Clinical evaluation of the patient with perforation peritonitis and their peritoneal fluid analysis for culture and sensitivity. Int Surg J 2018;5:2299-303.

6. Weinstein RA. Controlling antimicrobial resistance in hospitals: infection control and use of antibiotics. Emerg Infect Dis. 2001;7:188-92.
7. Rigberg D, Cole M, Hiyama D, McFadden D. Surgery in nineties. Am Surg 2000;66:813-6.
8. Mutiibwa D, Tumusiime G. Aerobic bacterial causes of secondary peritonitis and their sensitivity pattern in non-traumatic small bowel perforation. East cent Afr J Surg 2013;18:34-9.
9. Nishida K, Ohinaga K, Miyazawa Y. Emergency abdominal surgery in patients aged 80 years and older. Surg Today 2000;30:22-7.
10. Strobel O, Werner J, Büchler MW. Surgical therapy of peritonitis. Chirurg. 2011;82:242-8.

Characteristics	**Percentage (%)**	**Number (n)**
Mean age (years)	36.21±4.22	
Age Range (years)		
21-30	22.91	11
31-40	39.58	19
41-50	16.66	8
>50	18.75	9
Gender		
Females	10.41	5
Males	89.58	43
Perforation site		
Duodenum	41.66	20
Gastric	35.41	17
Ileac	12.5	6
Jejunum	4.16	2
Colon	6.25	3

Table 1: Demographic and disease characteristics of the study subjects

Organisms	**Percentage (%)**	**Number (n)**
No growth	12.5	6
Pseudomonas	2.08	1
Proteus	2.08	1
Klebsiella with E. coli	2.08	1
Klebsiella	45.83	22
E. coli	35.41	17

Table 2: Organisms isolated from the peritoneal fluid in the study subjects

Perforation	**Colon**	**Jejunum**	**Ileac**	**Gastric**	**Duodenum**
No growth	2	1	6	16	20
Klebsiella with E. coli	1		1	2	3
Pseudomonas		1	2		1
Proteus					1
Klebsiella	1	1	1	9	6
E. coli	1		2	5	9

Table 3: Distribution of organisms isolated from the peritoneal fluid at different sites in the study subjects

Antibiotic	**Pseudomonas (n=4)**	**Proteus (n=1)**	**Klebsiella (n=18)**	**E. Coli (n=17)**
Amikacin	1		15	12
Cotrimoxazole	1		2	1
Ceftriaxone	1	1	18	13
Ciproflox	1		13	14
Ampicillin			1	2

Table 4: Culture and sensitivity of organisms isolated from the peritoneal fluid in the study subjects