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RELATION OF CULTURE POSITIVITY AND DURATION OF PERFORATION IN CASES OF GASTRIC AND DUODENAL PERFORATION

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ABSTRACT

Aims: the aim of the study was to study the bacteriological profile of the peritoneal fluid in cases of gastric and duodenal perforation and correlate it with perforation-operative procedure interval and the associated morbidity and mortality associated with the perforation based on the operative interval. **Methods:** It is a cross sectional observation study ranging from January 2015 to July 2016, which was conducted in Victoria Hospital, Bangalore. The data was analyzed using rates, ratios proportions and percentages. The sample includes 64 cases of secondary peritonitis, resulting from gastric and duodenal perforation, where peritoneal fluid samples collected preoperatively, before the administration of an antibiotic dose was analyzed for bacteriological culture. Postoperatively complications were managed according to the associated pathology. **Results:** The sample size (n) was of 64 patients. 58 of the patients had a gastric perforation and 6 presented with a duodenal perforation. 18 patients yielded a positive growth of bacteria on peritoneal fluid culture. Majority of the patients who yielded a positive peritoneal culture presented 4 days after the onset of symptoms suggestive of gastric perforation. 22 of the patients who presented 3 days after onset of symptoms suggestive of perforation were in shock and required resuscitation, resulting in a delay in surgery. 7 of the patients who developed operative site wound infection, which resulted in prolonging the hospital stay from the usual 5 days to 1-2 weeks, presented 3 days after onset of symptoms. The patients who developed operative site wound infection yielded a peritoneal bacterial growth preoperatively. **Conclusion:** Majority of the cases of gastric perforation yielded sterile peritoneal fluid cultures. The incidence of secondary infection to the peritoneal fluid increases after the third day, which in turn results in a higher incidence of post operative complications. Patients who presented three days after onset of symptoms suggestive of gastric perforation increased the chances of intraoperative and postoperative morbidity and mortality. The associated mortality and morbidity of patients presenting with peptic ulcer perforation can be curtailed by earliest possible surgical intervention.

KEYWORDS: peptic ulcer perforation, gastric perforation, duodenal perforation, secondary peritonitis, peritoneal culture.

BACKGROUND

Surgical peritonitis continues to remain as one of the commonest problems faced by surgeons. May it be a duodenal perforation, a traumatic perforation or a case of acute pancreatitis complicated by a pancreatic abscess, it still remains a major cause of morbidity and mortality.

Secondary Peritonitis occurs subsequent to contamination of the abdominal cavity due to perforation or severe inflammation and infection of an intra abdominal organ. Effective therapy includes a multimodality approach, which requires source control with regard to the diseased organ, debridement of necrotic infected tissue and debris and administration of antimicrobial agents directed against aerobes and anaerobes. A broad spectrum antibiotic regimen is usually chosen because in most patients the precise diagnosis cannot be established until exploratory laparotomy is performed. A combination of agents or a single agent with broad-spectrum coverage is used. Effective source control and antibiotic therapy results in decreasing the morbidity and a mortality rate to approximately 5% to 6%.[1]

Peptic ulcer perforation is one of the most dramatic complications of peptic ulcer disease and in spite of the modern management it is still a life threatening event in life. It is one of the most common acute abdominal emergencies faced by surgeons, which in usual circumstances can be easily diagnosed and treated.

AIMS AND OBJECTIVES

This study aims to identify the rate of positive peritoneal cultures in cases of duodenal and gastric perforation and

the interval after which the peritoneal cultures are found to be positive post peptic ulcer perforation. This study also intends to analyze whether poly microbial infection, culture positive peritoneal fluids and increased Perforation Operative interval increases the mortality.

MATERIALS AND METHODS

The study is a cross sectional study, conducted in the Department of General Surgery, Victoria Hospital, Bangalore from November 2014 to October 2016. The data was analyzed using rates, ratios proportions and percentages. The sample includes 64 cases of secondary peritonitis, resulting from gastric and duodenal perforation, where peritoneal fluid samples collected preoperatively, before administration of an antibiotic dose was analyzed for bacteriological culture and sensitivity. Postoperatively complications were managed according to the associated pathology.

RESULTS

The sample size (n) was of 64 patients. 58 of the patients had a gastric perforation and 6 presented with a duodenal perforation. 18 patients yielded a positive growth of bacteria on peritoneal fluid culture. Majority of the patients who yielded a positive peritoneal culture presented 3 days after the onset of symptoms suggestive of gastric perforation. The most common bacteria identified was *Escherichia coli*, which accounted for 10 cases and *Acinetobacter species* was identified in 4 cases. 22 of the patients who presented 3 days after onset of symptoms suggestive of perforation were in hypovolemic shock and 6 were found to be in sepsis. This resulted in a delay in the surgery as the patient had to be resuscitated and intensive care and monitoring was required in 3 patients. 7 patients postoperatively developed operative site wound infection, which resulted in prolonging the hospital stay from the usual 5 days to 1-2 weeks. All the patients who developed postoperative wound site infection presented 3 days after onset of symptoms. The patients who developed operative site wound infection yielded a peritoneal bacterial growth preoperatively.

DISCUSSION

Peritonitis due to hollow viscus perforation is a commonly encountered condition in surgical departments. A substantial number of patients present with late due to lack of proper medical facilities in rural areas, inadequate transport facilities and poor socioeconomic conditions. In cases of bowel perforation, the contaminating organisms are diverse and the infection is frequently polymicrobial. The composition of microorganisms in abdominal fluid obtained from patients following perforation varies, depending on the location of the perforation.

It has been observed that detection of organisms from peritoneal fluid goes on increasing as we progress to the aboral end. This is expected as the proximal gastrointestinal tract contains fewer organisms. But this scenario changes if there is a delay in surgical intervention as secondary infection sets in and a complex polymicrobial infection sets in which alters the mortality.[2]

This goes in accordance with our study that resulted in positive yield in bacterial cultures observed in 18 cases all of which presented 3 days after the onset of symptoms suggestive of perforation, whereas patients who presented in the earlier period produced negative bacterial cultures.

This suggests that the time interval between the perforation and surgical intervention is an important period wherein morbidity and mortality could be reduced by decreasing the incidence of sepsis. The commonest organisms isolated from upper gastrointestinal tract were *Escherichia Coli* and *Klebsiella* whereas 21 cases showed a polymicrobial infection in a study conducted in Pune.[3]

Some series have a very high isolation of *Bacteroides* group predominantly in the colonic perforation group however this series had a predominant upper gastrointestinal perforations.[4]

In our study, Culture of peritoneal fluid revealed a total of 18 positive cultures and 46 negative cultures out of which morbidity was seen in 7. But as our study group included patients with peptic ulcer perforation only and did not included other sited of hollow viscus perforation, the most common organism identified was *Escherichia coli* followed by *Acinetobacter species*. Making us conclude that, Escherichia coli still remains as the most common organism identified in peritoneal cultures.

The other significant factor is the time of presentation to the tertiary care center after the commencement of symptoms. A delay in presentation tends to affect the mortality due to various factors out of which a mono to polymicrobial conversion occurs significantly. The statistical analysis shows that irrespective of operative interval after perforation, mortality is high in culture positive cases as compared to culture negative cases.[5]

CONCLUSION

Majority of the cases of gastric perforation yields sterile peritoneal fluid cultures. The incidence of secondary infection to the peritoneal fluid increases after the third day, which in turn results in a higher incidence of postoperative complications. Patients who presented three days after onset of symptoms suggestive of gastric perforation increased the chances of intraoperative and postoperative morbidity and mortality.

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