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A COMPARATIVE STUDY REGARDING USAGE OF METRONIDAZOLE VERSUS NORMAL SALINE IN OPERATED CASES OF PERITONITIS

General Surgery

Dr. M. Sairam Prasad — Associate Professor Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru - 534005 West Godavari District, Andhra Pradesh, India

Dr. K. Visweswara Rao* — Associate Professor Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru - 534005 West Godavari District, Andhra Pradesh, India *Corresponding Author

Dr. R. Pavan Kumar — Postgraduate Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru - 534005 West Godavari District, Andhra Pradesh, India

ABSTRACT

Peritonitis is a fairly common and challenging disease we come across in the surgical practice. Operative treatment and intra operative peritoneal lavage are the main stay of the treatment. The objectives of this study is to compare the outcome in terms of surgical wound infection, intra abdominal abscess, sepsis and hospital stay in saline peritoneal lavage group and metronidazole peritoneal lavage group in operated cases of peritonitis. A Comparative Study was done at ASRAM General Hospital, Eluru, Andhra Pradesh, during the period from November 2011 to October 2013. A total of 100 patients were studied, who were randomly divided in to two groups receiving Saline IOPL and Metronidazole IOPL. Outcomes were compared between the two groups. There was a reduction in incidence of wound infection in metronidazole IOPL group by 14%, sepsis was reduced by 10%, intra abdominal abscess by 2%. Mortality was increased by 2% in the metronidazole lavage group. Mean hospital stay was lesser in the metronidazole lavage group by 1.8 days. However, none of these findings were found to be statistically significant. Further studies are needed with larger sample size to assess the statistical significance of these findings.

KEYWORDS

Peritoneal Lavage, Metronidazole, Saline.

1. Introduction:

Peritonitis is defined as inflammation of the serosal membrane that lines the abdominal cavity and the organs contained therein. Peritonitis usually occurs secondary to contamination of the peritoneal cavity by the gastro intestinal contents, either due to perforation of the hollow viscera or due to translocation of bacteria through the wall of ischemic gut. Surgical closure of the perforation and intra operative peritoneal lavage has been the cornerstone in the management of patients with peritonitis. Different types of fluids have been used for peritoneal lavage in peritonitis patients. These include,

Sterile water, Warm saline, Aqueous povidone iodine, Saline with antibiotics. Peritoneal lavage reduces the bacterial load, thereby reducing the incidence of post operative surgical site infection and sepsis. Addition of antibiotics like Metronidazole, Tetracyclin, Netilmycin to the lavage fluid is being widely practiced in the treatment of peritonitis patients. Some studies have shown that there is no distinct advantage of adding antibiotics to the lavage fluid as therapeutic levels of the antibiotic is attained in the peritoneal fluid with intravenous injections. In this study peritonitis patients were divided into two groups randomly.

2. Aims and Objectives:

To compare the outcome in terms of, a) Surgical wound infection b) Intra abdominal abscess c) Sepsis d) Hospital stay e) Mortality in saline peritoneal lavage group and metronidazole peritoneal lavage group in operated cases of peritonitis

3. Materials and methods:

This comparative study of peritoneal lavage using Saline v/s Metronidazole is based on 100 cases of peritonitis operated at ASRAM Hospital attached to Alluri Sitarama Raju Academy of Medical Sciences and Research Institute, Eluru,West Godavari during the period from November 2011 to October 2013.

4. Inclusion criteria:

All cases of peritonitis who underwent laparotomy.

5.Exclusion criteria:

- Patients older than 60 yrs
- Patients younger than 15 years of age.
- HIV Positive patients

Patients coming with clinical features of peritonitis were assessed by thorough clinical examination. Diagnosis was confirmed by erect x ray of the abdomen in most of the cases with the evidence of free gas under the diaphragm. USG abdomen was done in some cases. Investigations like Haemoglobin, Total count, Differential count, Blood urea, Serum creatinine were done. Cases were randomly divided into two groups, each receiving plain Saline peritoneal lavage or Saline with Metronidazole lavage. Plain saline lavage group received intraoperative peritoneal lavage with 2L of saline. Metronidazole lavage group received intra-operative peritoneal lavage using 2L of saline mixed with 200ml of Metronidazole. Cases were followed up till the discharge or death of the patient. Post operative complications-wound infection, intraabdominal abscess, sepsis, fecal fistula and death were noted. Post operative hospital stay noted. Data was tabulated. Results of the two groups in terms of wound infection, intra abdominal abscess, sepsis, fecal fistula, mortality and post operative hospital stay were compared using standard statistical tests. Results expressed as graphs and charts. Results are compared with other similar studies done in the past.

6. Results:

100 cases of peritonitis were studied. 50 cases received Plain Saline peritoneal lavage and 50 received lavage using Saline and Metronidazole. Cases studied were in the age group of 15 to 60 yrs. Highest number of cases were in the age group of 21 to 30 years (32%). Lowest number was in the age group of 15-20years (2%). Majority of cases were Males (86%). Males to Female ratio - 6.14:1

Cause of peritonitis

The frequency of cause of peritonitis was as follows :

Cause	No. Of cases	Percentage
Duodenal ulcer perforation	60	60 %
Ileal perforation	21	21 %
Appendicular perforation	9	9 %
Gastric perforation	5	5 %
Ischemic bowel	3	3 %
Traumatic jejunal perforation	1	1 %
Perforated duodenal diverticulum	1	1 %

The most common cause of peritonitis in this study was duodenal ulcer perforation (60%), followed by ileal (21%) and appendicular perforation (9%). Other causes were gastric perforation, ischemic bowel, traumatic jejunal perforation and perforated duodenal

diverticulum. In most of the patients perforation was closed primarily (78%). Out of which 60% were duodenal perforations, 12% were ileal perforations, 5% were gastric perforations and 1% was jejunal perforations. Resection and anastamosis of bowel was performed in 11% of cases. (8 % ileal perforations, 3% ischemic bowels).Appendicectomy was done in 9% of cases. One patient with ileal perforationunderwent ileostomy (1%). One patient underwent diverticulectomy (1%) for duodenaldiverticular perforation.

In the saline lavage group incidence of wound infection was 40%. Sepsis was present in 28% of patients. 12% of the patients had intra abdominal abscess. 6% of patients developed fecal fistula during the post operative period. Mortality was 8% in this group.

Outcomes in Metronidazole lavage group

Parameter	No. Of cases	Total cases	Percentage
Wound infection	13	50	26 %
Sepsis	9	50	18 %
Intra abdominal abscess	5	50	10 %
Fecal fistula	3	50	6
Death	5	50	10

In the metronidazole lavage group incidence of wound infection was 26%. Sepsis was present in 18% of patients. 10% of the patients had intra abdominal abscess. 6% of patients developed fecal fistula during the post operative period. Mortality was 10% in this group. There was a 14% (P value-0.2) reduction in the incidence of wound infection in metronidazole lavage group when compared to saline lavage group. Incidence of intra abdominal abscess reduced by 2% (P value-1) in metronidazole lavage group. 10% (P value-0.3)reduction was seen in the incidence of sepsis in patients receiving metronidazole peritoneal lavage. There was no difference in the incidence of fecal fistula in either groups (P value-0.6). Mortality was higher in metronidazole lavage group by 2% (P value-1). Chi square test did not show any statistical significance of these apparent advantages of metronidazole lavage over saline lavage.

The shortest post operative hospital stay was 2 days where the patient died on third post operative day. The earliest discharge was after 7 days of hospital stay. The longest stay was 39 days postoperatively. Mean postoperative hospital stay in saline lavage group was 15.04 days and 13.22 days in metronidazole lavage group. However the difference was not statistically significant

7. Discussion:

The treatment of peritonitis is associated with a high morbidity and mortality. The usual treatment of the peritonitis consists of fluid replacement, nasogastric suction, IV antibiotics and surgical intervention. Surgery consists of laparotomy, suction of the fluid, which has collected in the peritoneal cavity and definitive procedure for the pathology of the peritonitis (closure of perforation, closure by-pass, resection and anastomosis or appendicectomy etc.). This is followed by peritoneal lavage and then the abdomen is closed with drain/drains. 100 patients were included in this study. Patients were randomly assigned into two groups, Saline lavage group and metronidazole lavage group. Patients in saline lavage group received intra operative peritoneal lavage (IOPL) with warm normal saline, while patients in metronidazole lavage group received IOPL with saline and metronidazole. Results were compared between the two groups.

Age In this study it was found that maximum number of cases was in the age group of 21 to 30 years. Least number of cases were in the age group of < 20 years. Mean age of patients in this study was 37.25years.This is comparable to the age distribution found in the study conducted by Sheeraz Khan et al[1] where maximum patients were in the age group of 31-40 years and the mean age was 37 years. There was a male preponderance of cases in the present study, which was consistent with the values obtained by other studies (sheeraz khan et al[1]) Male to female ratio was 6.14:1 Gastro duodenal perforations were the leading cause of peritonitis in the present study, followed by ileal perforation and appendicular perforation. Bowel ischemia, jejunal perforation and perforation of duodenal diverticulum were the less common causes of peritonitis

Wound infection In the present study there was 14% reduction in incidence of wound infection in the metronidazole lavage group. However this difference is not statistically significant (P value 0.2). Similarly, Sheeraz Khan et al [1] reported 20% reduction in incidence of wound infection, when superoxide solution was used for IOPL. On contrary, Schein et al[2] did not find any difference in incidence of wound infection when Chloramphenicol was used for IOPL.

Intra abdominal abscess

There was a 2% reduction in the incidence of post operative intra abdominal abscess in the metronidazole IOPL group. However this is not statistically significant. (P-value: 1). R. Fowler[3] in 1974, reported 16% reduction in the incidence of intra abdominal abscess when Cephaloridine was used for IOPL

Sepsis

In this study there was 10% reduction in the incidence of systemic sepsis in the metronidazole IOPL group. Statistically significant difference was not found in theincidence of sepsis between either groups.

Fecal fistula

Study did not find any difference in the incidence of postoperative fecal fistula in saline lavage group or metronidazole lavage group. In contrast to this study, Sheeraz Khan et al[1] (2009) reported 2.5% reduction in the incidence of fecal fistula in the study group, when superoxide solution was used for IOPL. This was not significant statistically.

Mortality

Mortality was 2% higher in the metronidazole IOPL group in this study, but thedifference is not statistically significant. Schein[2] (1990) found no significant difference in mortality of patients treated with or without intraperitoneal lavage with chloramphenicol. Rambo (1972) also found no difference in the number of deaths when intraperitoneal irrigation with Cephalothin was used. On the contrary Mc Kenna et al (1970) and Bhushan et al (1975) found significant reduction in mortality in patients treated with antibiotic lavage.

Post operative hospital stay

Mean post operative hospital stay was 15 days in saline lavage group and 13.22 days in metronidazole lavage group. This improvement in the hospital stay is not statistically significant (p 0.17). Sheeraz Khan et al (2009) reported reduction in hospital stay by 1.5 days, which was not statistically significant. On the contrary Vallance et al. (1985) found no improvement in the duration of hospital stay of patients treated with intraperitoneal lavage with chlorhexidine gluconate or povidone iodine when compared with those who received only saline lavage

8. Conclusion:

Addition of Metronidazole to normal saline for intraoperative peritoneal lavage has beneficial effects in terms of reduction in incidence of wound infection, intra abdominal abscess, systemic sepsis and post operative hospital stay. However these are statistically not significant. Further studies with larger sample size are needed to accurately assess the statistical significance of the beneficial role of Metronidazole intra-operative peritoneal lavage in treatment of patients with peritonitis.

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