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PERITONEAL FLUID BACTERIOLOGY IN CASES OF PERFORATIVE PERITONITIS DUE TO GASTROINTESTINAL PERFORATIONS WITH SPECIAL REFERENCE TO ITS MANAGEMENT & OUTCOME

General Surgery

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ABSTRACT

BACKGROUND: Perforative peritonitis is one of the most common surgical emergencies in India. Perforation of the intestines results in the potential for bacterial contamination resulting in peritonitis.

MATERIALS & METHODS: A total of 244 patients (July 2015-June 2017) who presented with features of peritonitis admitted to various surgical units of M.K.C.G. Medical College Hospital, Berhampur were included in this study. The following study was conducted to analyse bacteriology of peritoneal fluid, to assess antibiotic sensitivity pattern, to assess its impact on morbidity, mortality pattern in these cases.

RESULT: Males outnumbered females with a ratio 4.6:1. The most common site of perforation was first part of Duodenum (57.01%), followed by Ileum (22.95%). Peritoneal Fluid was negative for culture (37.3%) in majority of cases, culture was positive for E coli in 24.2% of cases and Enterococcus in 8.2% of cases respectively. The antibiotic sensitivity pattern for E coli, Enterococcus, Streptococcus, Staphylococcus was almost the same in my study. Majority of the isolated strains were sensitive to Cephalosporins, Quinolones, Aminoglycosides. The most common postoperative complications were wound infection, respiratory complications, Death

CONCLUSION: Perforative peritonitis is one of the common surgical emergencies in India. Studies have shown that delay in management and treatment will affect the prognosis. Empiric antimicrobial therapy is initiated and changed accordingly with peritoneal fluid culture sensitivity reports. This may reduce the incidence of post-operative complications, morbidity and mortality

KEYWORDS

Perforative peritonitis, Antibiotic Sensitivity, Complications.

INTRODUCTION:

Perforative peritonitis is one of the most common surgical emergencies in India.[1] Gastrointestinal perforations include gastro-duodenal, small bowel, appendicular and colorectal perforations. Perforation of the intestines results in the potential for bacterial contamination of the abdominal cavity resulting in peritonitis.

Perforative peritonitis is a frequently encountered surgical emergency in tropical countries like India, most commonly affecting young men as compared to the studies in the West where the mean age is between 45 and 60 years.[2]

The perforations of proximal gastrointestinal tract were six times as common as perforations of distal gastrointestinal tract as has been noted in earlier studies from India which is in sharp contrast to studies from countries like United States, Greece, and Japan which revealed that distal GIT perforations were more common.[3,4,5]

In a study conducted on 352 patients in India, the Gastroduodenal perforations constituted about 51%, small bowel about 29%, appendicular perforations about 17%.[6]

In a study conducted by Capoor et al on 47 cases, 32 % of cases were positive for E. coli (sensitive to amikacin, cephalosporins, meropenem),7% were positive for K. pneumonia (sensitive to cefaperazone-sulbactum, piperacillin-tazobactum), 20% were positive for C. freundii (sensitive to meropenem, piperacillin-tazobactum), 8% due to Enterobacter spp and 8% due to S. typhi (sensitive to amikacin, cephalosporins).[7]

Whereas, Ramakrishnaiah from India studied 352 cases and microbes isolated predominantly are E. coli and Klebsiella. These main isolates were predominantly sensitive to amikacin, ceftazidime and chloramphenicol. The overall morbidity and mortality rates were 52% and 16.5% respectively.[8]

MATERIALS AND METHODS

STUDY POPULATION (MATERIALS):

All the patients admitted in Dept.of general surgery, MKCG Medical College & Hospital with provisional diagnosis of perforative peritonitis from July 2015-June 2017 were included in the study.

INCLUSION CRITERIA:

Patients of all age groups and both sexes who attended OPD and Emergency Department in M.K.C.G. Medical College & Hospital, Berhampur with history and clinical picture suggestive of perforative peritonitis and taken up for surgery.

EXCLUSION CRITERIA:

Patients with provisional diagnosis of peritonitis due to penetrating trauma abdomen and also immunocomprised patients.

METHOD:

Any patients presenting with clinical picture suggestive of perforative peritonitis (severe pain abdomen, vomiting, rigidity and absent bowel sounds)was advised for an X-ray chest PA view & X-ray erect abdomen AP view. If, in these X-ray films free air is noticed under diaphragm then diagnosis of perforative peritonitis was made. Patients were resuscitated and posted for laparotomy. The peritoneal fluid was then cultured, antibiotic sensitivity pattern of the isolates were identified. The patients were followed in the postoperative period complications if any were noted. The data obtained was compiled, tabulated, analysed using appropriate statistical methods, conclusions were be drawn with respect to the aim of the study.

OBSERVATION AND RESULTS

A total of 244 patients of Gastrointestinal perforations (that were within exclusion and inclusion criteria) were studied from July 2015 to June 2017.

1. AGE GROUP INCIDENCE

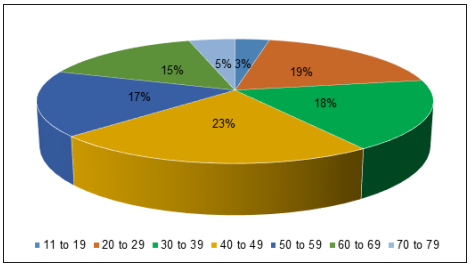

Figure 1: Age Incidence

Interpretation:
The youngest patient was 17 years (Jejunal perforation) and oldest was 79 years. (Ileal perforation). Most of the patients belonged to 40-49 years age group.

2. SEX INCIDENCE
My study comprised of 201 (82.4%) male patients and 43 (17.6%) female patients. The ratio was 4.6:1

3.SITE OF PERFORATION
Table 1: SITE OF PERFORATION

Site	Number (n=244)	Percentage
Stomach	12	5.42
Duodenum	126	57.01
Jejunum	13	5.32
Ileum	56	22.95
Appendix	30	13.57
Colon	7	2.86
Rectum	0	0

Interpretation:
Most common site of perforation was first part of Duodenum (57.01%), followed by ileum (22.95 %)

Figure 2: Multiple Ileal Perforations

4.MICROORGANISMS ISOLATED
Table 2: MICROORGANISMS ISOLATED

Microorganism	Number (n=244)	Percentage
No Growth	91	37.3
E coli	59	24.2
Klebsiella	19	7.8
Enterococcus	20	8.2
Acinetobacter	12	4.9
Staphylococcus	13	5.3
Streptococcus	11	4.5
Pseudomonas	11	4.5
Proteus	8	3.3

Interpretation:
The peritoneal fluid culture from 62.7% of patients were positive for cultures, of which the most common microbe isolated was E coli (24.2 %). Around 8.2% of cultures were positive for Enterococcus. Staphylococcus was isolated from 5.3% of cultures, Acinetobacter from 4.9% of patients. Streptococcus, Pseudomonas, Proteus accounted for 4.5%, 4.5%, 3.3% respectively.The peritoneal fluid cultures were negative in 37.3 % of patients.

5.ANTIBIOTIC SENSITIVITY PATTERN OF BACTERIA
Table 3: ANTIBIOTIC SENSITIVITY PATTERN OF BACTERIA

Microbes	Ampicillin	Aminoglycosides	Cephalosporin	Quinolones	Linezolid	Piperacillin + Tazobactum	Imipenum + Cilastatin
E Coli (n = 59)	54.23	62.7	52.2	50.8	55.9	76.2	88.1
Acinetobacter (n = 12)	25	37.5	35	50	50	75	83.3
Enterococcus (n = 20)	55	60	58	55	65	70	60
Klebsiella (n = 19)	36.8	55.2	42.1	40.7	47.3	47.3	63.1
Proteus (n = 8)	62.5	43.7	52.5	56.2	50	75	62.5
Pseudomonas (n =11)	36.3	36.3	43.6	29.5	36.3	81.8	63.6
Streptococcus (n = 11)	54.5	59.1	50.9	29.4	36.3	63.6	81.8
Staphylococcus (n = 13)	53.8	69.2	50.7	57.6	53.8	61.5	53.8

Interpretation:
Isolates of E coli were sensitive to ampicillin (54.2%), Aminoglycosides (62.7%), Cephalosporins (52.2%), Quinolones (50.8%), Linezolid (55.9%), Piperacillin (76.2%), Imipenem (88.1 %). Majority of isolates of Acinetobacter were sensitive to Piperacillin (75 %), Imipenem (88.1%). The antibiotic sensitivity pattern of Enterococcus was almost same for all the antibiotics. The Sensitivity of Pseudomonas, Streptococcus to Quinolones was less 29.5%, 29.4% respectively.

6.COMPLICATIONS
Table 4: COMPLICATIONS

Complications	Frequency	Percentage
No complication	100	40.8
Wound infection	54	22.0
Respiratory complication	36	15.1
Anastomotic Leak	10	4.1
Septicaemia	8	3.3
Abdominal collection	7	2.9
Dehiscence	7	2.9
Death	22	9.0

Interpretation:
Around 40.8% of patients who underwent surgery had uneventful recovery. Most common complication noted was surgical site Infection (22%). Death, Anastomotic leak, wound dehiscence accounted for 9%, 4.1%, 2.9 % respectively. 15% of patients had respiratory problems in the post op period.

7.BACTERIAL ASSOCIATION WITH COMPLICATIONS
Table 5: BACTERIAL ASSOCIATION WITH COMPLICATIONS

Complication	Wound Infection (n=54)	Abdominal Collection (n = 7)	Death (n = 22)	Leak (n=10)	Dehiscence (n = 7)	Respiratory complications (n = 36)	Septicaemia (n = 8)
No Growth	22 (40.7%)	-	5 (22.7%)	3 (30%)	1 (14.3%)	19 (53%)	2 (25%)
Acinetobacter	1 (1.85%)	-	3 (13.6%)	1 (10%)	1 (14.3%)	3 (8.3%)	1 (12.5%)
E Coli	10 (18.5%)	4 (57.2%)	2 (9.1%)	1 (10%)	2 (28.6%)	5 (13.8%)	2 (25%)
Enterococcus	3 (5.55%)	1 (14.3%)	1 (4.5%)	1 (10%)	-	1 (2.8%)	-
Klebsiella	4 (7.4%)	1 (14.3%)	3 (13.6%)	2 (20%)	2 (28.6%)	2 (5.5%)	1 (12.5%)
Proteus	1 (1.85%)	1 (14.3%)	2 (9.1%)	-	-	2 (5.55%)	-
Pseudomonas	3 (5.55%)	-	5 (22.7%)	1 (10%)	1 (14.3%)	2 (5.55%)	-
Staphylccocci	7 (12.96)	-	1 (4.5%)	-	-	1 (2.8%)	1 (12.5%)
Streptccocci	5 (9.25%)	-	-	1 (10%)	-	1 (2.8%)	1 (12.5%)

Interpretation:
Most of the patients with surgical site infection had negative peritoneal fluid cultures (40.7%), whereas, most common bacteria associated with wound infection was E Coli (18.5%).

Among 22 patients who died in post op period, Pseudomonas (22.7%) was isolated from majority of cases followed by Acinetobacter (13.6%) & klebsiella(13.6%)

Around 7 patients had post-operative collection in the peritoneal cavity, E coli was cultured from peritoneal fluid of 4 patients.

In patients with wound dehiscence, Klebsiella, E coli accounted for 28.6% each and Proteus, Acinetobacter together for 28.6% of cases.

The peritoneal fluid cultures of majority of patients with respiratory complications were negative (53%). E coli (13.8 %)was the most common organism cultured.

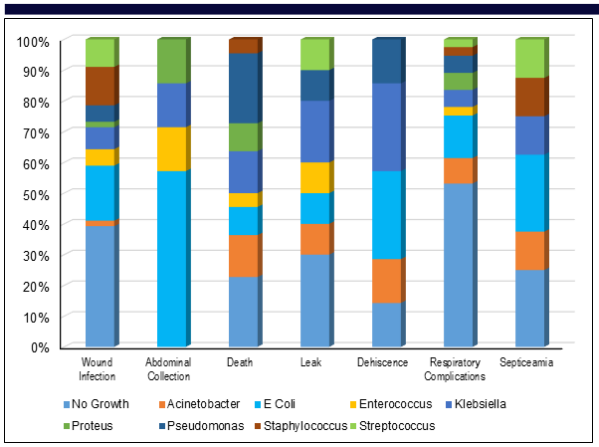

Figure 3: BACTERIAL ASSOCIATION WITH COMPLICATIONS

DISCUSSION

- The maximum incidence occurred in 40-49 years of age group.
- Males outnumbered females with a ratio 4.6:1.
- Intravenous fluids, nasogastric aspiration, broad spectrum antibiotics and correction of electrolyte imbalances before surgery were as important as the surgery itself.
- The most common site of perforation was first part of Duodenum (57.01%), followed by Ileum (22.95%) and Appendix (13.57 %).
- Peritoneal fluid was negative for culture (37.3%) in majority of cases, culture was positive for E coli in 24.2% of cases and Enterococcus in 8.2% of cases respectively.
- Graham's Omental patch (57.4%) was the most common surgery performed in the present study, followed by Primary closure of perforation (27.4%) and Resection and Anastomosis (2.8%).
- The antibiotic sensitivity pattern for E coli, Enterococcus, Streptococcus, Staphylococcus was almost the same. Majority of the isolated strains were sensitive to Cephalosporins, Quinolones, Aminoglycosides.
- Majority of strains of Pseudomonas and Proteus on other hand were sensitive to Imipenem, Piperacillin but were resistant to Ampicillin, Aminoglycosides.
- The most common postoperative complications were wound infection, respiratory complications, death.
- The bacteria that was most commonly isolated from patients with complications was E Coli followed by Klebsiella.

CONCLUSION

Perforative peritonitis is one of the common surgical emergencies in India. Studies have shown that delay in management and treatment will affect the prognosis. *Empiric* antimicrobial therapy is initiated and changed accordingly with peritoneal fluid culture sensitivity reports. My study also showed that morbidity and mortality was high with *Pseudomonas, Acinetobacter* & *Klebsiella*. . Change of antibiotics to higher spectrum is particularly important in case of these microbes which were not sensitive to commonly used antibiotics in my study. This may reduce the incidence of post-operative complications, morbidity and mortality.

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