



General Surgery

“A STUDY ON PERITONEAL FLUID CULTURE AND ITS ANTIBIOTIC SENSITIVITY IN PERFORATIVE PERITONITIS PATIENTS”

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ABSTRACT **Aims And Objectives:** 1. To study bacteriological pattern in peritoneal fluid by culture. 2. To determine antibiotic sensitivity pattern for commonly used antibiotics to the organisms grown in culture. **Materials And Methods:** Design of study: observational study. **Place of study:** Government General Hospital, Kurnool. **Study period:** January 2022 to July 2022. **Study population:** Patients presenting to Government General Hospital, Kurnool with perforative peritonitis. **Sample:** 50. **Methodology:** Patients presenting with features of perforative peritonitis were evaluated to confirm the diagnosis and under ultrasound guidance peritoneal fluid was obtained from the cases, which was sent for culture and sensitivity. Reports of culture and sensitivity were followed up. **Results:** The most common age group is >50 years and male: female ratio is 4:1. Most patients presented with duration of symptoms of 2-3 days, in the study. In the study, appendicular perforation is the most common (38%) followed by gastric perforation(30%). The most common organism grown is Klebsiella(42%) followed by no growth(36%), with Klebsiella being sensitive to amikacin in 71.4% of the cases. **Conclusion:** In this study, it is concluded that, perforation is most commonly seen in appendix. Secondary peritonitis caused in these cases is most commonly due to Klebsiella, followed by no growth, followed by Escherichia coli. Both Klebsiella and Escherichia coli are sensitive to aminoglycosides.

KEYWORDS : Peritonitis, antimicrobial sensitivity.

INTRODUCTION

- Peritonitis is defined as an inflammation of serosal membrane that lines the abdominal cavity and the organs contained therein.¹
- Peritonitis remains one of the most common problems faced by a general surgeon.⁵
- Whether it is a simple duodenal perforation, traumatic perforation or a case of appendicular perforation, it remains a major cause of morbidity and mortality.⁵
- Only in the recent decades there has been a significant improvement in treatment of peritonitis by the use of antibiotics and surgery.²
- The surgeons treating it, know the complication associated with it can be minor wound infection to dangerous septic shock or SIRS (systemic inflammatory response syndrome).⁵
- The treatment can be done easily by starting a certain line of antibiotic therapy, these usually include broad spectrum antibiotics that cover gram positive, gram negative organisms and anaerobes.²
- However the problem now is the development of resistance to these antibiotics that results in high failure rates in the treatment.

AIMS

- To select appropriate empirical antibiotic therapy for perforative peritonitis patients in GGH, Kurnool.

OBJECTIVES

- To study bacteriological pattern in peritoneal fluid by culture.
- To determine antibiotic sensitivity pattern for the commonly used antibiotics to the organisms grown in culture.

MATERIALS AND METHODS:

- Design of study: observational study.
- Place of study: Government General Hospital, Kurnool.
- Study period: January 2022 to July 2022.
- Study population: Patients presenting to Government General Hospital, Kurnool with perforative peritonitis.
- Sample: 50.

Inclusion criteria:

1. Patients presenting with features of perforative peritonitis.
2. Age more than 13yrs.

Exclusion criteria:

1. Patient presenting with primary peritonitis.
2. Peritonitis due to trauma.

METHODOLOGY

Pre Operative Evaluation

- Patients with features of perforative peritonitis presenting to casualty of GGH, Kurnool were admitted.
- Following which detailed history was taken and complete physical examination was done and diagnosis confirmed using ultrasound abdomen, chest x- ray and abdomen x-ray erect, ct abdomen [where necessary].
- Under ultrasound guidance, the peritoneal fluid was aspirated and sent for aerobic microbiological culture and sensitivity.
- Following which routine investigations like CBP, RBS, RFT, LFT, serum electrolytes and ECG were done.

Preoperative Preparation

- Patients confirmed with diagnosis of perforation peritonitis were resuscitated with intravenous fluids and antibiotics [Injection Ceftriaxone and Injection Metronidazole, most commonly, administered after ultrasound guided aspiration].
- As the patient's vitals were stabilised, he/she taken up for surgery with informed consent.

Intraoperative Procedure

- Emergency laparotomy was done, following which perforation was dealt with, by a procedure depending on its site and intra-abdominal contamination.
- Abdomen was closed after keeping abdominal drains.

Post Operative Care

- Following surgery patients were given routine postoperative care with intravenous fluids and broad spectrum antibiotics [Injection piperacillin+tazobactam / Injection meropenem and Injection metronidazole, most commonly].
- Peritoneal fluid culture reports were followed up and the isolated organisms were tested for antimicrobial sensitivity by Kirby-Bauer disc diffusion method.
- Antibiotics were changed according to the sensitivity pattern of organism grown in the culture.

OBSERVATION AND RESULTS

Age Distribution

In our study, 9 out of 50 patients (18%) are in the age group of 13 to 20 years, 12 (24%) in the age group of 21 to 30 years, 2(4%) in the age group of 31 to 40 years, 13(26%) in the age group of 41 to 50 years and 14(28%) in the age group above 50 years. *The most common age group of presentation is >50 years (28%) followed by 41 to 50yrs (26%).*

Sex Distribution

In our study, perforation is more common in males (80%) than in females (20%) with a 4:1 ratio.

Duration of Symptoms

Most patients presented with duration of symptoms being 2 to 3 days i.e. 34%, followed by more than 5 days at 24%, followed by less than or equal to 1 day at 22%, and 4 to 5 days at 20%.

Site of Perforation

In our study, the most common site of perforation is appendix (38%) followed by stomach(30%), then ileum (10%), duodenum(8%), cecum(8%), followed by sealed off perforation (4%),and colonic perforation (2%).

Cultured Organism

In about 42% of the cases , the organism cultured is *Klebsiella* followed by no growth in 36% followed by *Escherichia coli* in 18%. In 2 cases of perforation, there is growth of *Pseudomonas* and *Staphylococcus aureus*, 1 in each.

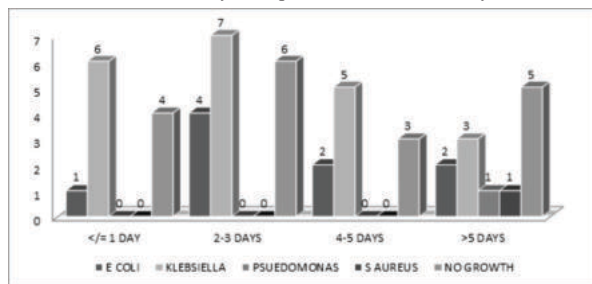
Organisms Cultured According To Site of Perforation

In our study , the most common organism isolated with appendicular perforation is *Klebsiella* at 63% followed by *Escherichia coli* at 21%. In case of gastric perforation also, it is *Klebsiella* at 46.7%, followed by no growth at 40%.

	Stomach	Duodenum	Ileum	Appendix	Cecum	Colone	Seald off
E coli	2	2	-	4	1		
Klebsiella	7		2	12			
Pseudomonas						1	
S aureus			1				
No growth	6	2	2	3	3		2

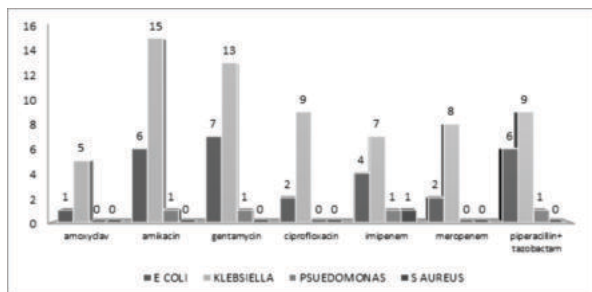
Organism And Day of Perforation

In our study, *Klebsiella* is the most commonly cultured organism when the patient presented on or before 5 days of symptoms onset.No growth is isolated most commonly if the presentation is after 5 days.



Sensitivity Pattern

In our study, *Klebsiella* (21 cases) is found sensitive to amikacin in 71% of cases, to gentamycin in 61.9% of the cases, to piperacillin and tazobactam in 42.8% of the cases, to meropenem in 38.1% of the cases. *E. coli* (9 cases) is found sensitive to gentamycin in 77.7% of cases, to amikacin in 66.7% of the cases, to piperacillin and tazobactam in 66.7% of the cases.



DISCUSSION

- Secondary peritonitis due to hollow viscus perforation is a common entity.⁷
- In our study, secondary peritonitis due to perforation is more common in males than in females, which is comparable to other studies.^{4,5} Most cases in males could be due to their irregular food habits, alcoholism and smoking.
- In our study, the most common presentation is with, 2 -3 days of

symptoms, followed by >5 days. The delay in presentation may be due to ignorance and lack of convenience to hospital care, and that our hospital is a referral centre.

- In 36% of cases, no growth seen, could be due to initial chemical peritonitis, or mishandling of sample, or due to inadvertent use of antibiotics by quacks as in delayed cases.
- In culture positive cases (32 cases) organisms are found to be sensitive to amikacin in 22 cases followed by gentamycin in 21 cases.
- According to Mutiibwa, et al (2013), majority of patients had either *Klebsiella* spp (37.9%) or *Escherichia coli* (26.4%) on peritoneal fluid culture, while 12 (13.8%) had no growth at all. Four patients (4.6%) had more than one organism cultured. Most of the organisms were susceptible to Ceftriaxone followed by Ciprofloxacin and Gentamycin.⁴
- According to Abinayavallaban, et al(2016), Secondary peritonitis caused by *Klebsiella* (46%) followed by *E. coli*(34%) is most common. Both were sensitive to cephalosporins followed by quinolones and macrolide group of antibiotics.⁵
- Surgical infection society guidelines for antibiotic treatment⁶ of established peritonitis are

Single agent

- Ampicillin+sulbactam
- Cefotetan
- Cefoxitin
- Meropenem
- Piperacillin tazobactam
- Imipenem + cilastin

Combined regimen

- Aminoglycoside+metronidazole
- Aztreonam+clindamycin
- Cefuroxime+metronidazole
- Ciprofloxacin+metronidazole
- 3rd or 4th generation cephalosporins + metronidazole

CONCLUSION

- In culture positive cases, secondary peritonitis is most commonly due to *Klebsiella* followed by *E. coli*.
- Both *Klebsiella* and *E.coli* are sensitive to aminoglycoside group of drugs.
- So, we propose an empirical treatment of aminoglycoside + metronidazole for secondary peritonitis patients at GGH, kurnool.

Limitations

- Study size is small.
- Study duration is short.
- Risk of mishandling of samples is present.
- Delayed presentations and inadvertent use of antibiotics effects the results.

Take home message.....

- Go GLOCAL' i.e., global recommendations +local data; obtain 6 monthly anti-biogram of the wards, by collecting data following global recommendations.
- Chose level I evidence (meta-analysis and systemic reviews) over level 5 (expert opinion) and strive for more research.

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Conflict of interest: none.

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