

**BACTERIOLOGICAL PROFILE OF SURGICAL PERITONITIS: A PROSPECTIVE OBSERVATIONAL STUDY**Manju Singh<sup>1</sup>, Gambheer Singh<sup>2</sup>, Amit Agrawal<sup>3</sup>, Sandeep Chandrakar<sup>4</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** Peritonitis is defined as inflammation of peritoneum that lines the abdominal cavity and the organs contained therein. In Surgical practice we most often encounter cases of peritonitis which are mostly secondary to hollow viscous perforation. Purpose of our study is to find out which type of peritonitis is more common in our institute, which is the most common bacteria isolated from peritoneal fluid and which antibiotic is it most sensitive to. We studied 104 cases of age group 16 and above of both sex who presented with clinical features of peritonitis. Peritoneal fluid was obtained and sent for culture and sensitivity. Peritoneal fluid culture was positive in 55.76% cases. The incidence of culture positivity increased with duration of presentation. Gastro duodenal perforation was the most common etiological factor for peritonitis found in 42.86% cases followed by ileal perforation. E. coli was the most common bacteria isolated in study group followed by klebsiella. Most of the cultures were monomicrobial. E. coli was sensitive to amikacin, imipenem and meropenem (100%). So in our study Gram negative infection is more common in surgical peritonitis. Identification of bacteria and its sensitivity to the antibiotics is helpful to avoid injudicious use of antibiotics in surgical peritonitis. Proper choice of antibiotics along with surgical management and proper resuscitation in cases of surgical peritonitis can reduce mortality and morbidity associated with these high risk cases.

**KEYWORDS:** Peritonitis, Gastroduodenal perforation, Gram negative infection- E. coli.

**INTRODUCTION:** Mankind knows peritonitis as a disease from the days of Hippocrates. In 400 BC he described Hippocratic facies which is a well-known term. Peritonitis is classified as:

1. **Primary:** From haematogenous dissemination, usually in the setting of immunocompromised patient and in absence of identifiable local cause;
2. **Secondary:** Related to a pathological process in a visceral organ such as perforation or trauma and
3. **Tertiary:** Persistent or recurrent infection after adequate initial therapy.

Primary peritonitis results from bacterial, chlamydial, fungal or mycobacterial infections. It is a pure infection by a single organism streptococcus, pneumococcus or hemophilus bacteria.<sup>[1]</sup> Secondary peritonitis occur usually in setting of hollow viscus perforation.<sup>[2]</sup>

The number of bacteria is low within the GIT until the distal small bowel is reached, while high concentration is found in the colon. The commonest organism isolated is E. coli, aerobic and anaerobic streptococci and bacteroids.<sup>[2,3]</sup>

With the aim of identification of most common organism isolated in surgical peritonitis, this prospective study was conducted in a group of 104 patients. Identification of such organism and its sensitivity to specific drugs would be helpful in better management of cases of surgical peritonitis and will reduce the morbidity and mortality in these patients.<sup>[4,5]</sup>

## ORIGINAL ARTICLE

### OBJECTIVES OF STUDY:

1. To find out the most common bacteria isolated from peritoneal fluid.
2. To study the culture and sensitivity of peritoneal fluid in surgical peritonitis.

**MATERIAL AND METHODS:** A prospective observational study of 104 patients performed in Dr. BRAM hospital and Pt. J. N. M. Medical College Raipur from December 2012 to October 2014. Patients of age 16 and above of both sex with clinical features of surgical peritonitis were included in this study. Thorough clinical examination of patient and sample collection of peritoneal fluid was done with all aseptic precautions and sent to Pathology Lab as early as possible. Surgical intervention is performed as required.

**OBSERVATION:** Our study showed maximum number of cases with peritonitis in age group of 16-24 years (20.19%) with male preponderance (83.65%). All cases were of secondary peritonitis. Most common etiology was hollow viscus perforation in which gastro duodenal perforation was most common found (61.53%) followed by ileal perforation (11.53%) as shown in Table 1. Out of 104 cases only 58 cases were culture positive (55.76%) in which 52 patients were male and 6 were female. Monomicrobial culture is predominant that was seen in 51 out of 58 cases (87.93%) and poly microbial was found in 7 out of 58 cases (12.6%). Most common organism isolated in both the groups was E. coli (51.72%) followed by klebsiella (29.31%) as shown in Table 2. In present study E. coli was sensitive to amikacin, imipenem and meropenem in all cases (100%) as shown in Table 3.

Site of pathology	Male	Female	Total	Percentage
Gastroduodenal	58	06	64	61.53%
Jejunal	04	01	5	4.80%
Ileal	20	03	23	22.11%
Appendicular	02	0	02	1.92%
Colon	02	03	05	4.80%
Rectal	0	01	01	0.96%
Miscellaneous	01	03	04	3.84%
<b>Total</b>	<b>87</b>	<b>17</b>	<b>104</b>	<b>100%</b>

Table 1: Distribution according to site of perforation in surgical peritonitis

Site of pathology	Isolated organism						Total
	E.coli	Klebsiella	Pseudomonas	Acinobacter	E.coli + Pseudomonas	E.coli + Klebsiella	
Gastric	22	13	1			1	37/58
Jejuna			1				1/5
Ileal	6	3	1	1	1		12/23
Appendicular	1						1/2
Colon		1			2	2	5/5
Rectal	1						
miscellaneous					1		1/1
<b>Total</b>	<b>30</b>	<b>17</b>	<b>3</b>		<b>4</b>	<b>3</b>	<b>58/104</b>

Table 2: Isolated organism in different pathology of peritonitis

Organism	Ampicillin	Amoxyclav	ciprofloxacin	Piperacillin/tazobactam	Cefotaxime	Cefoperazone	ceftriaxone	Amikacin	Gentamycin	Imipenam	Meropenam	Vancomycin	linezolid	doxycycline	chloramphenicol	cotrimoxazole	Clindamycin
E. coli	8	10	7	20	R	R	-	37	15	37	37	-	-	4	5	10	4
Klebsiella	R	R	R	14	R	10	-	18	7	19	17	3	-	-	-	-	-
Pseudomonas	-	-	R	2	-	5	-	2	1	7	7	2	-	1	-	-	-
acinobacter	1	R	R	-	1	-	-	1	1	1	1	-	1	-	-	R	-

Table 3: Antibiotic sensitivity of isolated organism

**DISCUSSION:** This study was an attempt to explore the associated bacteria for surgical peritonitis. We found peritonitis is commonly found in age group of 16-24 yr. Various studies reported that peritonitis is more common in 2<sup>nd</sup> and 3<sup>rd</sup> decade of life due to increased incidence of acid peptic disease and its complication in this age group.<sup>[6,7,8]</sup> Male preponderance is comparable to many other studies as smoking, alcoholism, stress and dietary factors more prevalent in male sex.<sup>[9,10]</sup> Most common cause of surgical peritonitis was gastro duodenal perforation which is usually found in 1<sup>st</sup> part of duodenum and around pylorus of stomach which is comparable with other studies.<sup>[11,12]</sup> Newer drug treatment of the peptic ulcers have led a dramatic decrease in number of elective surgeries, however the number of patients undergoing surgical interventions for complications such as perforation have increased.<sup>[13]</sup>

Incidence of colorectal perforation is 5.76% which is quite low as shown in other studies. Perforation secondary to colonic neoplasm accounts for majority of such cases.<sup>[12,14,15]</sup> Peritoneal fluid culture positivity was least in gastric perforations i.e. only 58.62%. In colorectal perforation culture positivity was greatest (100%). It can be reasoned that initially in gastro duodenal perforations there is chemical peritonitis and bacterial peritonitis appear after 72 hours while in colorectal perforations bacterial peritonitis develops at onset as maximum bacterial load is present in luminal content of colon.<sup>[16]</sup>

We recorded most cultures to be mono-microbial. Poly-microbial cultures were less in comparison to other studies because poly-microbial infection is more common in postoperative peritonitis and in present study only two cases were of postoperative peritonitis.<sup>[10,17]</sup>

Most common organism isolated was E.coli as this is the dominant pathogenic isolate from enteric content, klebsiella was second most common pathogen.<sup>[18,19]</sup>

Drug sensitivity for E. coli was seen with amikacin, imipenem and meropenem in 100% of cases. It is proved in various studies the "Gold standard" in treatment of gram negative infections is aminoglycosides and carbapenem group of antimicrobials. Aminoglycosides are frequently underdosed due to fear of nephrotoxicity or because of underestimation of the expanded volume of

## ORIGINAL ARTICLE

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distribution in critically ill patients with intra-abdominal sepsis.<sup>[20]</sup> Drug sensitivity may also vary in different studies depending upon inclusion of drugs in culture sensitivity reports.

**CONCLUSION:** Peritonitis is commonly encountered problem in surgical practice. Gram negative and mono-microbial infection is more common in surgical peritonitis in preoperative cases. E. coli is the most common organism isolated and aminoglycosides and carbapenem group of antimicrobials are important antibiotics that should be given in surgical peritonitis as empirical therapy. Injudicious use of antibiotics can cause emergence of resistant strains, so it is important for a surgeon to identify the organism and specific antibiotics for management of peritonitis to reduce morbidity and mortality in these cases.

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## ORIGINAL ARTICLE

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