



## MICROBIAL PROFILE AND ANTIBIOGRAM OF ISOLATES FROM STERILE BODY FLUIDS IN A TERTIARY CARE HOSPITAL OF JLN MEDICAL COLLEGE, AJMER, CENTRAL RAJASTHAN, INDIA: A RETROSPECTIVE STUDY

**Dr. Surbhi Mathur\***

Associate Professor, Department of Microbiology, JLNMC, Ajmer.  
\*Corresponding Author

**Dr. Priyanka Soni Gupta**

Assistant Professor Patey, Department of Microbiology, JLNMC, Ajmer.

**Prateek Kamble**

Senior Demonstrator, Department of Microbiology, JLNMC, Ajmer.

**Dr. Geeta Parihar**

Senior Professor, Department of Microbiology, JLNMC, Ajmer.

### ABSTRACT

**INTRODUCTION :** Sterile body sites if infected by micro-organisms then it can lead to severe morbidity and mortality. Therefore early diagnosis and prompt initiation of empiric treatment is necessary.

**AIM:** This study was done to evaluate causative organisms of sterile body site infections and their anti microbial sensitivity pattern in a tertiary care hospital, Ajmer.

**MATERIAL AND METHODS :** A retrospective study was done between June 2020 to Dec.2020 in Microbiology Department, J.L.N. Medical College, Ajmer. All sterile body fluids except blood & CSF specimens were processed for bacterial culture according to the standard procedures and anti microbial susceptibility test for isolated organisms were done using agar disk diffusion method as per CLSI guidelines.

**RESULTS :** Amongst 123 samples, 26 fluids Samples showed growth of micro organisms with an isolation rate of 21.1%. Isolates from different fluids were Pseudomonas sp 10 (38.46%), E.coli 6 (23%), Klebsiella sp 1 (3.84%), Acinetobacter sp 1 (3.84%), Staphylococcus aureus 4 (15.3%) and Coagulase Negative Staphylococci 5 (19.2%). Polymicrobial infection with two organisms (Pseudomonas sp and E.coli in Pleural fluid) occurred in one (3.84%) case.

Gram negative isolates were mostly sensitive to Meropenem (100%) and Gram positive isolates were highly sensitive to linezolid (100%). Pseudomonas sp and Acinetobacter sp were the most resistant pathogens to many antibiotics. About 0% of S. aureus isolate and 40% of Coagulase Negative Staphylococci in our study were Methicillin resistant.

**CONCLUSION:** Therefore, Knowledge of bacteriological and antimicrobial profile of sterile body fluid is important so that such life threatening infection can be treated effectively on an urgent basis.

### KEYWORDS :

#### INTRODUCTION :

Sterile body fluids are biological fluids that do not normally contain any microorganisms. The sterile body fluids that are frequently sent for bacteriological culture include cerebrospinal fluid (CSF), pleural, ascitic, peritoneal, synovial, and pericardial fluids along with bile. Micro organisms like bacteria, fungi, virus and parasite may invade and infect the body fluids and results in severe morbidity and mortality. The awareness of local antimicrobial susceptibility pattern and causative organisms helps the clinician to initiate early and targeted antimicrobial therapy, which, in turn, will reduce the length of stay of the patients in the hospital with less adverse effects.

So, the present study was undertaken to evaluate the microbial profile along with their antibiogram from various sterile fluids in a tertiary care hospital of JLN Medical College, Ajmer.

#### MATERIAL AND METHODS

**Source of Data** – Patient samples from the different speciality wards of the Hospital and the outpatient department of JLN medical college, hospital, Ajmer.

**Study type and duration** – A retrospective study was done between June 2020 to Dec 2020 in Microbiology Department

**INCLUSION CRITERIA** – All sterile body fluids received for aerobic culture and sensitivity from different IPDs & OPDs.

**EXCLUSION CRITERIA** - All blood samples and cerebrospinal fluid samples.

#### Processing of samples

Gram Staining was done directly from the samples. Then all these samples were processed for culture and sensitivity by

standard methods. Media used for culture were Blood agar and Mac-Conkey agar. All significant isolate were identified by standard procedure and their antimicrobial susceptibility was tested by Kirby Buer disc diffusion method and interpreted as per clinical and laboratory standard institute (CLSI 2020) recommendations.

**The routine antimicrobial sensitivity tests were put for the following antibiotics:**

#### Drugs for GPC pathogen

Penicillin (10U), Amoxiclav (20/10 ug), Cefoxitin (30ug), Erythromycin (15 ug), Clindamycin (2 ug), Gentamycin (10 ug), Ciprofloxacin (5 ug), Trimethoprim – Sulphamethoxazole (1.25/23.75 ug) and Linezolid (10ug).

#### Drugs for GNB Pathogen.

Ampicillin (10 ug), Ampicillin-Sulbactam (10/10 ug), Amoxiclav (20/10 ug), Ceftazidime (30 ug), Ceftriaxone (30 ug), Cefazolin (30 ug), Ciprofloxacin (5 ug), Piperacillin-Tazobactam (100/10 ug), Amikacin (30 ug), Gentamicin (10 ug), Tobramycin (10 ug) and Meropenem (10 ug).

#### RESULTS :

A total of 123 body fluid samples were collected from patients, which included pleural fluid, peritoneal fluid, Pericardial fluid, Ascitic fluid and bile. Among 123 samples, 26 fluids samples showed growth of organisms with an isolation rate of 21.1% (Table 1).

S.No.	Sample	Total No. Of samples	Growth	No. Growth
1	Pleural fluid	58	16(27.5%)	42(72.4%)
2	Peritoneal fluid	3	1(33.3%)	2(66.6%)
3	Pericardial fluid	1	0(0%)	1(100%)
4	Ascitic fluid	60	9(15%)	51(85%)

5	Bile	1	0(0%)	1(100%)
6	Synovial fluid	0	0(0%)	0(0%)
	Total	123	26(21.1%)	97(78.8%)

Isolates from different fluids were Pseudomonas sp. E.coli,CONS,Staphylococcus aureus ,Klebsiella pneumoniae and Acinetobacter sp (Table 2).Polymicrobial infection with two organisms (Pseudomonas sp. and E-coli in Pleural fluid)occurred in one (3.84%) case.

Table 2-Frequently Isolated Organisms From Different Samples

S. No.	Organisms	Total	Pleural fluid	Peritoneal fluid	Pericardial fluid	Ascitic fluid	Bile	Synovial fluid
1	E-coli	6	4	0	0	2	0	0
2	Klebsiella pneumoniae	1	0	0	0	1	0	0
3	Pseudomonas sp	10	8	0	0	2	0	0
4	Acinetobacter sp	1	1	0	0	0	0	0
5	Staph aureus	4	2	1	0	1	0	0
6	CONS	5	2	0	0	3	0	0

CONS – Coagulase Negative Staphylococci

Antibiotic sensitivity pattern of different isolates is shown in Table 3 and Table 4. Gram negative isolates were mostly sensitive to Meropenem (100%) and Gram positive isolates were highly sensitive to linezolid (100%).Pseudomonas Sp & Acinetobacter sp were the most resistant pathogens to many antibiotics. About 0% of S-aureus & 40% of CONS isolates in our study were methicillin resistant .

Table 3-Antibiotic Susuptibility Pattern Of Gram Negative Bacilli (%Susuptible)

S. No.	Antibiotic	Bacteria			
		E-Coli (n=6)	Klebsiella pneumoniae (n=1)	Acinetobacter sp (n=1)	Pseudomonas sp (n=10)
1	Ampicillin	3 (50%)	0 (0%)	ND	ND
2	Amp-Sulbactam	5 (83.3%)	1 (100%)	0 (0%)	ND
3	Amoxiclav	6 (100%)	0 (0%)	ND	ND
4	Ceftazidime	3 (50%)	0 (0%)	0 (0%)	7 (70%)
5	Ceftriaxone	2 (33.3%)	0 (0%)	0 (0%)	ND
6	Cefazolin	4 (66.6%)	1 (100%)	ND	ND
7	Ciprofloxacin	3 (50%)	0 (0%)	0 (0%)	6 (60%)
8	Piper-tazobactam	5 (83.3%)	1 (100%)	1 (100%)	9 (90%)
9	Amikacin	5 (83.3%)	1(100%)	1 (100%)	7 (70%)
10	Gentamycin	3 (50%)	0 (0%)	0 (0%)	5 (50%)
11	Tobramycin	3 (50%)	0 (0%)	0 (0%)	5 (50%)
12	Meropenem	6 (100%)	0 (100%)	1 (100%)	9 (90%)

ND - Not Detected.

Table 4-Antibiotic Susuptibility Pattern Of Gram Positive Cocci (%Susuptible)

S. No.	Antibiotic	Staphylococcus aureus (n=4)	Coagulase Negative Staphylococci (n=5)
1	Penicillin	2 (50%)	3 (60%)
2	Amoxiclav	4 (100%)	2 (40%)
3	Cefoxitin	4 (100%)	3 (60%)
4	Erythromycin	375%	1 (20%)
5	Clindamycin	2 (50%)	3 (60%)
6	Gentamycin	4 (100%)	2 (40%)
7	Ciprofloxacin	3 (75%)	1 (20%)
8	Trimethi-Sulphamethoxazole	2 (50%)	1 (20%)
9	Linezolid	4 (100%)	5 (100%)

**DISCUSSION:**

In this study isolation rate was 21.1% which was quite low compared to other Indian studies which showed higher isolation rate of 30% (Sharma R etal 2017) and 29.9%(Madigubba H etal 2020) Culture positivity rate was quite low & this may be due to prior exposure to antibiotics. A lower positive culture rates similar to this study has been observed in other Indian studies like Deb A etal 2014 and Kasana D etal 2015 which showed isolation rate of 14.41 % and 14.8 % respectively .

In our study Pseudomonas sp and E.coli were the commonest organisms isolated from pleural fluid samples while other study done by Sharma R etal 2017 found Acinetobacter sp & E.coli as the most common isolate . In case of Ascitic fluid and Pleural fluid, Gram negative organisms were isolated more compared to gram positive organisms similar to study done by Deb A etal 2014 . This is in contrast to few other studies where gram positive organisms accounted for maximum number of cases and staph aureus (70 %) was the most common pathogen isolated followed by CONS and other (Vishalakshi B etal 2016).

Amongst the commonly isolated GNB , it was Pseudomonas Sp, Klebsiella pneumoniae and Acinetobacter Sp. which were the most resistant one. They showed higher degree of resistance to most of the antibiotics. This high resistance level may be due to in appropriate use of commonly prescribed antibiotics as described in some studies (Sharma R etal 2017, Teklehymanot F 2017). Pseudomonas Sp and Acinetobacter Sp are important public health problem , especially in patients on broad spectrum antimicrobial therapy and requiring life support.

In our study total Staphylococcus aureus isolated were 4, out of which none was MRSA which is similar to the study done by Deb A etal 2014. Some studies reported higher isolation rate 38.5% & 51% of MRSA isolates (Sharma R etal 2017 and Kulshrestha A etal 2017). This variation might be because of variation in antibiotic usage and infection control practices in different place or variation in patient and clinical specimens. Among the Gram-positive organisms , all the S.aureus isolates were sensitive to linezolid (100%). This finding was in agreement to several studies done by Deb etal 2014 and Kasana etal 2015 .

**CONCLUSION :**

Infections of sterile body fluids are usually associated with high morbidity and Mortality & this can be prevented by early diagnosis and treatment.Regular monitoring of prevalent pathogenic organisms and their sensitivities are essential as this will help in formulating the hospital antibiotic policy and aid the clinicians in appropriate selection of antibiotic therapy in absence of a culture report thereby preventing indiscriminate use of unnecessary antibiotics and the development of antibiotic resistance.

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