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Isolation and Susceptibility of *Acinetobacter baumanii* from Acquired Urinary Tract Infections in Perambalur Dt. Tamilnadu

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ABSTRACT

Urinary tract infection (UTI) is the most common hospital acquired infection, accounting for 40% of all hospital acquired infections. In this present study isolation and susceptibility of Acinetobacter baumanii from acquired urinary tract infections in Perambalur Dt. Tamilnadu. The UTI urine samples were collected from various hospitals and collected samples were inoculated on MacConkey agar and blood agar for isolation of UTI bacterial pathogens. An isolated Acinetobacter baumanii bacterium was identified based on morphological and biochemical characteristic. The antibiotic sensitivity of isolated Acinetobacter baumanii bacterium to the commercial antibiotic tests was analyzed by disc diffusion method. Six different UTI bacterial isolates were observed after 24 hrs incubation from collected samples such as Escherichia coli, Klebsiella pneumonia, Staphylococcus aureus, Enterococcus faecalis, Protues mirabilis and Acinetobacter baumanii. Acinetobacter baumanii was grow on MacConkey agar appearing as a non lactose fermented and catalase positive, non-motile, Gram negative coccobacilli and oxidase test negative. The Piperacillin/Tazobactam (100mcg) has maximum antibacterial activity against Acinetobacter baumanii when compared to other antibiotics.

KEYWORDS : Antibacterial activity, urinary tract infections, Acinetobacter baumanii

INTRODUCTION

Acinetobacter baumannii, a non-glucose fermenting Gram negative bacillus, has emerged in the last three decades as a major etiological agent of acquired hospital UTI infections giving rise to significant morbidity and mortality particularly in immunocompromised patients (Victor *et al.,* 2014). . The major characteristics of this infection include pneumonia, bacteriemia, meningitis, urinary tract infection, and surgical site infection (Visca *et al.,* 2011; Wisplinghoff *et al.,* 2004). The usages of medical devices, such as vascular catheters or endotracheal tube for airway failure become the most frequent sources of Acinetobacter infections (Abbo *et al.,* 2007: Cisneros and Rodriguez-Bano, 2002). Carbapenems remain the treatment of choice if isolates retain susceptibility to this antimicrobial class (Maragakis and Perl, 2008). Unfortunately, carbapenem-resistant *Acinetobacter* isolates are increasingly reported worldwide. Sulbactam, a β lactamase inhibitor, has been used to successfully treat 14 patients with multi-drug *Acinetobacter ventilator* associated pneumonia (Wood *et al,* 2002); while tigecycline, a relatively new glycylcycline agent has been reported to have antimicrobial activity against multi-drug resistant Acinetobacter species (Pachon-Ibanez *et al.,* 2004; Seifert *et al.,* 2006). Other therapeutic options include aminoglycoside agents like tobramycin and amikacin if susceptibility is retained (Maragakis and Perl, 2008). The susceptibility level of major group antibiotics used for treatment decreased rapidly and implicated in limited selection of empirical antibiotic therapy (Gonlugur *et al.,* 2004). In the present study isolation and susceptibility of *A. baumanii* from acquired urinary tract infections in Perambalur Dt. Tamilnadu.

MATERIALS AND METHODS

The urine samples were collected from Government Hospital at Perambalur. The collected specimens were stored on specific aseptic container, for further study. The specimens were inoculated on MacConkey agar and blood agar and incubated at 35-37°C for 18-24 Hrs. *Acinetobacter* species grew on MacConkey agar appearing as a non lactose fermenter. All Gram-negative coccobacilli isolates were tested for catalase and motility. All catalase positive, non-motile Gram negative coccobacilli were subjected to an oxidase test. The antibiotic sensitivity of isolated bacterial species to the commercial antibiotic tests was analyzed by disc diffusion method. Antibacterial activity test was carried out following the modification of the method originally described by Bauer *et al.,* (1996). The obtained results in the present investigation were subject to statistical analysis.

RESULTS AND DISCUSSION

Six different UTI bacterial isolates were observed after 24 hrs incubation from collected samples the results were shown in Table 1. The *Escherichia coli* maximum level was observed in collected UTI sample compare than other bacterial isolates. The *Klebsiella pneumonia, Staphylococcus aureus* and *Enterococcus faecalis* infected range are 14.42 to 17.31 %. *Protues mirabilis* and *Acinetobacter baumanii* were noted 2.88 % only. Strains of *Escherichia coli* with specific attachment factors for transitional epithelium of the bladder and ureters account for 75 to 95% of cases. The remaining gram-negative urinary pathogens are usually other enterobacteria, typically *Klebsiella* or *Proteus mirabilis*, and occasionally *Pseudomonas aeruginosa*. Among gram-positive bacteria, *Staphylococcus saprophyticus* is isolated in 5 to 10% of bacterial UTIs (Hooton *et al.,* 2013). In the present study isolated UTI *Acinetobacter baumanii* was grow on MacConkey agar appearing as a non lactose fermenter and catalase positive, non-motile, Gram negative coccobacilli and oxidase test negative (Table 2). These findings were similar with other result where *A. baumanii* was recovered from 45% - 50% patients (Gonlugur *et al.,* 2004). This organism also responsible for wound infection in 22.6% which much the same with the study that conducted in Saudi Arabia and Turkey, where the isolation rate was 22.3% and 27.5%. Bacteriemia caused by *A. baumanii* was found in 3.6% isolates and much alike with the previous study (Joshi *et al.,* 2006). The last decades, there were increase hospital acquired infections by MDR-*A. baumanii* globally including Indonesia (Dent *et al.,* 2010). The commercial antibiotics were tested against *Acinetobacter baumanii* the results were represented in Table - 3. The Piperacillin/Tazobactam (100mcg) has maximum antibacterial activity against *Acinetobacter baumanii* when compared to other antibiotics. The growing prevalence of carbapenem resistance in this study was accordance with the other study in Turkey (Turkpglu and Iskit, 2008).

CONCLUSION

In this study six different bacteria were isolated from acquired urinary tract infections. The results indicated the *Escherichia coli* maximum level was compared than other bacterial isolates. *Acinetobacter baumanii* was grow on MacConkey agar appearing as a non lactose fermented and catalase positive, non-motile, Gram negative coccobacilli and oxidase test negative. The Piperacillin/Tazobactam (100mcg) has maximum antibacterial activity against *Acinetobacter baumanii* when compared to other antibiotics.

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Table 1 Isolation of UTI pathogenic bacteria from urine sample

S. No.	Isolated Bacteria	Percentage (%)
1	Escherichia coli	29.81
2	Klebsiella pneumoniae	17.31
3	Staphylococcus aureus	16.35
4	Enterococcus faecalis	14.42
5	Protues mirabilis	2.88
6	Acinetobacter baumanii	2.88
7	No growth	16.35
8	No. of samples	97

Table 2 Identification of isolated *Acinetobacter baumanii*

S. No.	Biochemical Test	Observation
1	ONPG	-
2	Lysine Utilization	-
3	Ornithine Utilization	-
4	Urease	-
5	Phenylalanine Deamination	-
6	nitrate reduction	-
7	H_2S Production	-
8	Citrate utilization	+
9	Voges Proskauer's	-
10	Methyl Red	+
11	Indole	-
12	Malonate utilization	-
13	Esculin hydrolysis	-
14	Arabinose	+
15	Xylose	+
16	Adonitol	-
17	Rhamnose	-
18	Cellobiose	-
19	Melibiose	-
20	Saccharose	-
21	Raffinose	-
22	Trehalose	-
23	Glucose	+
24	Lactose	-
25	Oxidase	-
26	Catalase	-

+ indicate present; - indicate absent

Table 3 Antibiotic sensitivity test using commercial antibiotics

S. No.	Antibiotics	Code	Zone of Inhibition (mm in diameter)
1	Amikacin (30mcg)	AK	15
2	Amoxyclav (Amoxycillin/ Clavulanic acid) (30mcg)	AMC	-
3	Ampicillin (10mcg)	AMP	-
4	Azithromycin (15mcg)	AZM	-
5	Cefaclor	CF	12
6	Cefepime (30mcg)	CPM	13
7	Cefixime (5mcg)	CFM	-
8	Cefoperazone/Sulbactam (75/10mcg)	CFS	15
9	Cefotaxime (Cephotaxime) (30mcg)	CTX	11
10	Ceftazidime	CAZ	-
11	Ceftriaxone (30mcg)	CTR	-
12	Ciprofloxacin (5mcg)	CIP	11
13	Co-Trimoxazole (Trimethoprim/Sulphamethoxazole) (23.75mcg)	COT	-
14	Doxycycline Hydrochloride (30mcg)	DO	12
15	Erythromycin (15mcg)	E	-
16	Gatifloxacin (5mcg)	GAT	12
17	Gentamicin (10mcg)	GEN	14
18	Levofloxacin (5mcg)	LE	12
19	Linezolid (30mcg)	LZ	-
20	Lomefloxacin	LOM	-
21	Moxifloxacin (5mcg)	MO	11
22	Mupirocin (200mcg)	MUP	14
23	Netillin (Netilmicin Sulphate) (30mcg)	NET	14
24	Norfloxacin (10mcg)	NX	-
25	Ofloxacin (5mcg)	OF	11
26	Pefloxacin	PF	-
27	Piperacillin/Tazobactam (100mcg)	PIT	16
28	Sisomicin	SS	13
29	Trimethoprim (5mcg)	TR	-
30	Ulifloxacin (Prulifloxacin)	PRU	-

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