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Incidence and prevalence of *Acinetobacter baumannii* in south Indian population

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ABSTRACT:

Back ground: *Acinetobacter baumannii* bacteremia is crucial because of the multi-resistance of the organism to antibiotics. This study aimed to determine the prevalence of *A. baumannii* isolated from blood cultures of south Indian population. **Methodology:** A study was conducted on *A. baumannii* between 2011 and 2012. The specimens (sputum, urine, wounds, blood, catheter, ulcers and others) collected from Sri Siddhartha Medical college Hospital Intensive care units, surgical wards, medical wards and Out Patient Department. Isolation and identification of *A. baumannii* were performed according to standard techniques of bacteriology in Microbiology laboratory, PG and Research Department of Microbiology MGR College Hosur, Tamilnadu. The suspected cases of all age groups from both males and females were included in the study. **Results:** Among the 842 suspected samples received at the laboratory, out of which 172 (20.42%) were found positive for *A. baumannii*. Our study showed the prevalence of *A. baumannii* in sputum was highest (29.65%) and lowest in ulcers (6.39%). Moreover, *A. baumannii* was much prevalent in age group of < 1-10years and low in age group of >80. **Conclusion:** The prevalence of *A. baumannii* in all age groups irrespective of gender suggests that strengthening of hospital hygiene measures is needed to limit the spread of pathogen and to optimize the management of antibiotics because of its innate multidrug resistant nature.

KEYWORDS: *Acinetobacter baumannii*; nosocomial; multidrug resistance; prevalence

I. INTRODUCTION:

Acinetobacter considered as commensal of low grade pathogenicity and was frequently isolated in clinical specimen (Giamarellou et al., 2008). The interests of *Acinetobacter spp.* emerged worldwide since it was the major cause of high morbidity and mortality, especially among Intensive Care Unit (ICU) patients (Bergogne–Berezin and Towner, 1996). Accordingly, *Acinetobacter spp*. was described as an important opportunistic pathogen responsible for severe nosocomial infections. In addition to its increasing occurrence and frequent incidence as nosocomial infection, *Acinetobacter spp*. became as a nosocomial pathogen on a global scale. *A. baumannii* has also been isolated from wound s of injured American and British soldiers from Afghanistan and Iraq earned the nick name 'Iraqibacter'(Paolino, 2007) The Infectious Disease Society of America (IDSA) identified *Acinetobacter baumannii* among the most common seven pathogens threatening the health – care delivery system. In other statistical studies of European hospitals, *Acinetobacter baumannii* was among 2 % - 10 % of all grams – negative bacterial infections in intensive ICU. The clinical impacts of Acinetobacter infections relay on the various risk factors. First factor, infections are related to the use of medical devices (such as endotracheal tubes, intravascular and urinary catheters). Second factor, threatened patients are exposed to broad – spectrum of antibiotics. Third factor, it is responsible for a number of systemic infections in critically ill and immune compromised patients, especially among those in ICU (Jones et al., 2006). The majority of outbreaks caused by *Acinetobacter* have involved respiratory tract infections. There are at least 30 different *Acinetobacter spp.* Which are commonly associated with human infections. Including *A. baumanni, A. calcoaceticus, A – haemolyticus, A. johnsonii, A. jujnii, A. lowffii,* and *A. radioresistens*. However , *A. baumannii* is now recognized as the most clinical isolate from nosocomial infections with epidemic potential and identified as a major cause of outbreaks or sporadic cases with high mortality rates accounting for about 8A % of reported infections worldwide (Fournier and Richet, 2006; Falagas et al . , 2007) .

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Threats and hazards of *A. baumannii* infections had been intensively raised worldwide since treatment of *A. baumannii* infection has become difficult (Giamarellou et al., 2008). Many strains are resistant to a wide range of antimicrobials, including broad – spectrum beta – lactams aminoglycosides, fluoroquinolones, carbapenems and third – generation cephalosporins, and thus recognized as the most important risk factor for multiresistant bacteria (Boo et al., 2009). The current research has been conducted to screen the population for *A. baumannii* in the region.

II. MATERIALS AND METHODS:

Source of data

The study was conducted at the Department of Microbiology, Sri Siddhartha medical college and research centre Tumkur, (Karnataka) and the Department of Microbiology, MGR College, Hosur, Tamilnadu. The study period was from 2011 to 2012. The suspected cases of all the ages from both male and female for the culture and sensitivity test.

Media

The media used for cultures as well as biochemical testing were supplied by Hi Media, India. The media such as nutrient agar, nutrient broth and triple sugar iron (TSI). Muller Hinton agar and Muller Hinton broth.

Nutrient agar medium was prepared by dissolving 11.2 g nutrient agar powder in IL. Distilled water and autoclaving for 15 minutes at 121 ° C. Clinical isolates were routinely sub cultured on nutrient agar plates and incubated at 37 ° C for 18-24 hrs. For bacterial culture maintenance nutrient agar slants were prepared by single straight line inoculation on the surface of the slope in universal bottles and then incubated at 37 ° C for 18-24 hrs.

Triple sugar iron agar (TSI) was dissolved 65 g TSI agar powder in IL distilled water, dispensed into tubes, autoclaved at 121 ° C for 15 minutes dispensed in sterile test tube and cooled in a slanted position so that deep butts are formed. Using a sterile needle, an isolated colony on plated media was inoculated by stabbing into the medium in the butt of the tube and then streak back and forth along the surface of the slant. Several colonies from each primary plate were studied separately, since mixed infections may occur. Inoculated TSI tubes were incubated with caps loosened at 37°C and examined after 18-24 hours for carbohydrate fermentation, gas production and hydrogen sulphide production. The triple sugar iron slants with a butt were prepared and the test isolates were stabbed in the butt and streaked over the slants. The tubes were incubated at 37°C for 24 hrs. The crescent shaped blackening of the medium indicates the formation of H_2S , which was recorded as positive.

Bacterial cultures maintenance

Short – duration working stocks (few weeks) were maintained on slants at room temperature (-25 °C). For long – term preservation, heavy nutrient broth media with 20 % v / v glycerol was stored at -70 ° C until nutrient agar suspension in use. Bacterial strains were revived by streaking aliquots on appropriate media and incubating at 37 ° C.

III. RESULTS AND DISCUSSION:

a) Incidence of A. baumannii

A total of 842 suspected cases were studied during the period a year i.e. from 2011 to 2012. Out of 842 samples 172 were positive for *A. baumannii* that is 20.42 % (Fig.1).

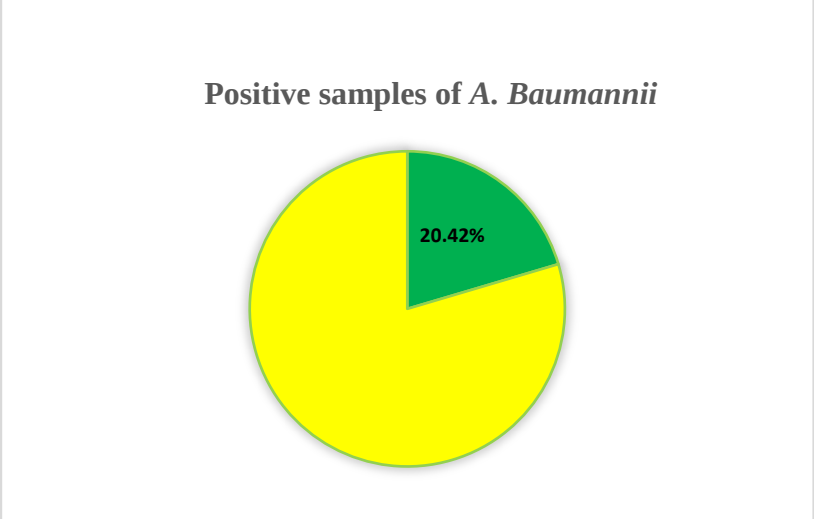

Fig. 1 Incidence of *A. baumannii*.

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In the present study it showed sputum sample was (29.65 %) followed by wound samples (15.69 %) , Urine sample (15.1196) , other samples (14.53 %) , Blood sample (10. 46 %) , Catheter (8.1396) and Ulcers (6.39 %) (Table -I). Our results are in coherence with Brink and colleagues 2007 which showed that about 30 % of *A. baumannii* are mainly from blood stream isolates. Similar types of results were observed by Dent et al, (2010) and their report shows major site of *A. baumannii* isolates are from Sputum i.e. about (31%).

b) Prevalence of A. baumannii in age and sex group

The positive cases identified during the period 2011-2012 are shown in Table-1, with the relationship of age and sex groups. The prevalence of *A. baumannii* is more in the age group of < 1 to 10 years. i.e. , (20.93 %) , followed by the age group of 11 to 20 years is 27 (15.69 %) , 21 to 30 years age group is 27 (15.69 %) , 31-40 year age group is 25 (14.53 %) , 41-50 year age group is 21 (12.20 %) , 51 to 60 year age group is 19 (11.04 %) , 61 to 70 year age group is 11 (6.39 %) 71 to 80 group is 5 (2.90 %) and > 80 years age group is 1 (0.58 %). In males the highest number of cases were recorded in the age group of < 1 to 10 years is 19 (20.65%) followed by the age group 31 to 40 i.e., is 16 (17.39%) and the age group of 11 to 20 i.e., 15 (16.30%). In females the highest number of cases were recorded in the age group of < 1 to 10 years i.e., 17 (21.5%) followed by the age group 21 to 30 years i.e., 28 (16.76%) and the age group < 1 to 10 years i.e., 27 (16.16 %). Our study was in accordance with the earlier studies carried out by Mondal et al., 1991 and Vinodkumar and Neelagund, 2004. Also, male sex was more commonly affected than female sex which was in contraction with the earlier study carried out by Christo et al., 1993.

Sources	N=172	%age
Sputum	51	29.65
Urine	26	15.11
Wounds	27	15.69
Others	25	14.53
Blood	18	10.46
Catheter	14	8.13
Ulcers	11	6.39

Table-1. Prevalence of *A. baumannii* in clinical samples.

S.No	**Age Groups (In Years)**	**Prevalence**		**Total (%) n=172**
		Male (%) n=92 (53.48%)	**Females (%) N=80 (46.51%)**	
1	<1 to 10	19(20.65%)	17(12.25%)	36(20.93%)
2	11 to 20	15(16.30%)	12(15%)	27(15.69%)
3	21 to 30	14(15.21%)	13(16.25%)	27(15.69%)
4	31 to 40	16(17.39%)	9(11.25%)	25(14.53%)
5	41 to 50	11(11.95%	10(12.5%)	21(12.20%)
6	51 to 60	8(8.69%)	11(13.75%)	19(11.04%)
7	61 to 70	5(5.43%)	6(7.5%)	11(6.39%)

8	71 to 80	3(3.26%)	2(2.5%)	5(2.90%)
9	>80	1(1.08%)	-(Nil)	1(0.58%)

Table2. Prevalence of *A. baumannii* in age and sex group from 2011-2012.

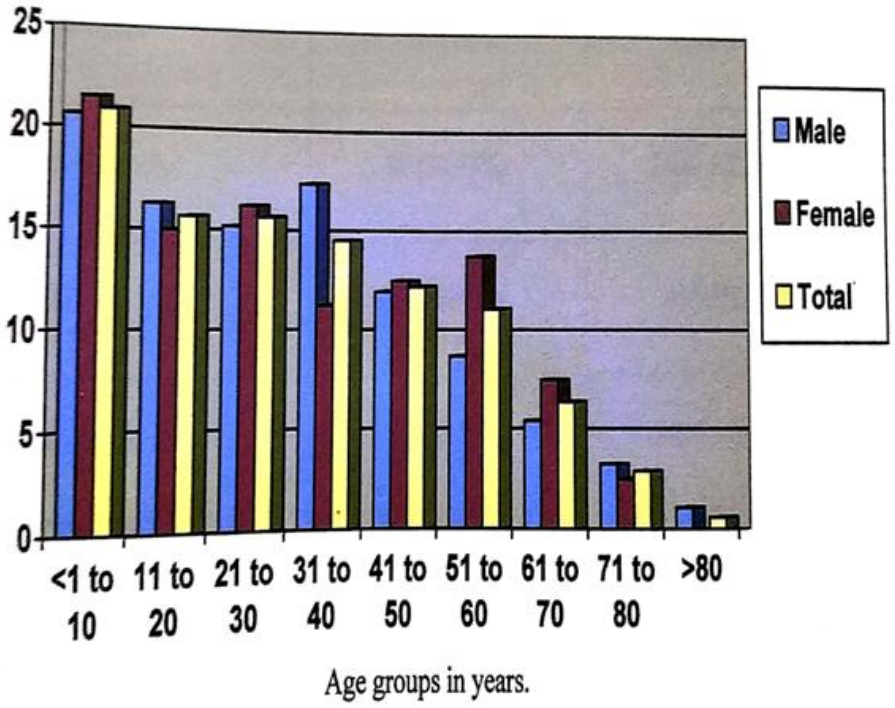

Figure 2 showing percentage between male and females

IV. CONCLUSION:

Acinetobacter baumannii is considered as commensal of low grade pathogenicity and was frequently ignored whenever isolated in clinical samples. Now *A. baumannii* is emerged as one of the major cause of morbidity and mortality especially among nosocomial infection. The prevalence of *A. baumannii* in all age groups irrespective of gender advocates that reinforcement of hospital hygiene measures is needed to limit the spread of pathogen and to improve the management of antibiotics because of its natural multidrug resistant ability.

REFERENCES:

[1]. Bergogne-Berezin, E. and Towner, K.J., 1996. Acinetobacter spp. as nosocomial pathogens: microbiological, clinical, and epidemiological features. *Clinical microbiology reviews*, *9*(2), pp.148-165.

[2]. Boo, T.W. and Crowley, B., 2009. Detection of blaOXA-58 and blaOXA-23-like genes in carbapenem-susceptible Acinetobacter clinical isolates: should we be concerned?. *Journal of medical microbiology*, *58*(6), pp.839-841.

[3]. Brink, A., Moolman, J., Da Silva, M.C. and Botha, M., 2007. Antimicrobial susceptibility profile of selected bacteraemic pathogens from private institutions in South Africa. *South African Medical Journal*, *97*(4), pp.273-279.

[4]. Christo, G.G., Shenoy, V.I.J.A.Y.A., Matthai, J., Shivananda, P.G. and Venkatesh, A., 1993. Acinetobacter sepsis in neonates. Indian pediatrics, 30(12), pp.1413-1416.

[5]. Dent et al., (2010) Biomed central bmc infectious diseases 10: 96, 1471-2334 Heast England . J Clin Microbiol, 44:3623-3627.

[6]. Falagas , M. E. , Karveli , E. A. , Kelesidis , I. and Kelesidis, T., 2007. Community – acquired Acinetosacter infections. Eur J Clin Microbiol Infect Dis, 26: 857-868.

[7]. Fournier, P.E., Richet, H. and Weinstein, R.A., 2006. The epidemiology and control of Acinetobacter baumannii in health care

facilities. *Clinical infectious diseases*, *42*(5), pp.692-699.

[8]. Giamarellou H., Antoniadou A. and Kanellakopoulou K., 2008. Acinetobacter baumannii. A universal threat to public health? International Journal of Antimicrobial Agents 32:106-119.

[9]. Jones, R.N., Sader, H.S., Fritsche, T.R. and Rhomberg, P.R., 2006. Carbapenem susceptibility discords among Acinetobacter isolates. *Clinical infectious diseases*, *42*(1), pp.158-158.

[10]. Mondal, G.P., Raghavan, M., Bhat, B.V. and Srinivasan, S., 1991. Neonatal septicaemia among inborn and outborn babies in a referral hospital. The Indian Journal of Pediatrics, 58(4), pp.529-533.

[11]. Paolino, K., Erwin, D., Padharia, V., Carrero, H., Giron, L., Burgess, R., Burger, C., Martinez, M., Arrieta, P., Wortmann, G. and Zapor, M., 2007. In vitro activity of colistin against multidrug-resistant gram-negative bacteria isolated at a major army hospital during the military campaigns in Iraq and Afghanistan. *Clinical infectious diseases*, *45*(1), pp.140-141.

[12]. Vinodkumar, C.S. and Neelagund, Y.F., 2004. Acinetobacter septicaemia in neonates.