EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 9
Issue: 1
88-93
Year: 2022

PREVALENCE OF *ACINETOBACTER* SPECIES CAUSING HOSPITAL ACQUIRED PNEUMONIA IN INTENSIVE CARE UNIT AND ANTIBIOGRAM IN KHARTOUM STATE.

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Article Received on 10/11/2021 **Article Revised on 01/12/2021** **Article Accepted on 22/12/2021**

ABSTRACT
Background: *Acinetobacter* is a gram-negative coccobacillus that recently emerged as important nosocomial pathogen. *Acinetobacter* is non-motile, encapsulated, and non-fermentative bacteria, it belongs to the family *Neisseriaceae*, it can cause either community acquired or hospital acquired pneumonia (HAP). However; it is usually seen more often as late-onset hospital acquired infection (After 4 days of hospitalization), specially; hospital acquired pneumonia which is remains a problem for public health and there is also an emergence of multidrug-resistant strains that is worsening the impact of this disease. In order to fight this situation, we need a rapid diagnosing and antibiotics bio gram of this fatal situation to allow a prompt initiation of correct patient managements. **Method:** These was a hospital-based, active surveillance diagnostic study on hospital-acquired pneumonia in adults hospitalized patients in intensive care units in Khartoum stat 2017. Alshaab Teaching Hospital, Omdurman Teaching and Fedail Hospital were selected for sampling and data collection for this study. **Results**: This study was involved 100 ICU pneumonic patients, from them 66%were male and 34% were females. Provenances of *Acinetobacter* causing Pannonia in ICU admitted patients were 22 (22%). **Conclusion:** We noticed that in Khartoum state hospitals the prevalence of *Acintobacter* causing pneumonic infection in ICU pts was (22%) due to the *Acintobacter* is multidrug resistance organism in Khartoum state.

KEYWARDS: *Acintobacter*, ICU, Multidrug resistant.

INTRODUCTION
Acinetobacter is a gram-negative coccobacillus that recently emerged as important nosocomial pathogen. *Acinetobacter* is non-motile, encapsulated, and non-fermentative bacteria (Chastre J, *et al*., 2000), it belongs to the family *Neisseriaceae*, and it may frequently misidentify as *Neisseria* or *Mirabella* species on gram staining (Joyce MA and Woods CW., 2004), although the negative oxidase reaction is useful in distinguishing *Acinetobacter* from other gram-negative organisms that share the same family, furthermore; it is indol negative and catalase positive. *Acinetobacter* is ubiquitous in the outside environment and had been isolated from hospital personnel, and hospital equipment's (Chastre J, *et al*., 2000; Forster DH *et al*., 1998). One of the most striking features of *Acinetobacter* species is their extraordinary ability to develop multiple drug resistance (MDR) mechanisms against several major antibiotic classes, the precise mechanisms that explain how multiple-drug resistance occurs are not fully known. However; recent studies had shown that MDR *Acinetobacter* can produce a great diversity of chromosomal and plasmid-mediated enzymes that produce aminoglycoside modifying enzymes to neutralize aminoglycosides and thus become resistant to this class of antimicrobial agents (Miller GH, *et al*., 1997). *Acinetobacter* can cause either community acquired or hospital acquired pneumonia (HAP).[18-20] However; it is usually seen more often as late-onset HAP (After 4 days of hospitalization),early-onset HAP can also occur particularly in patients who received prior antimicrobial therapy 80 or recent hospitalization within 90 days before the onset of pneumonia (Trouillet JL *et al*., 1998). There is no doubt that the global *Acinetobacter* causing hospital acquired pneumonia epidemic remains a problem for public health, and there is also an emergence of multidrug-resistant strains that is worsening the impact of this disease. In order to fight this situation, we need a rapid diagnosing and antibiotics bio graph of this fatal situation to allow a prompt initiation of correct patient managements. The impact of

this organism causing hospital acquired pneumonia was and will increase coming days due to the inappropriate isolation and the limitation of antibiotics in used, increasing the chance of nosocomial spreading and patients morbidity and mortality.

MATERIAL AND METHODS

This was a hospital-based, active surveillance diagnostic study on hospital-acquired pneumonia in adult's hospitalized patients in intensive care units in Khartoum stat 2017, the study was conducted in Alshaab Teaching Hospital, Omdurman Teaching and Fedail Hospital in which all specimen and data were collected. Suspected pneumonic patients attending to the above-mentioned hospitals were subjected to sputum samples or broncho alveolar lavage according to the patient's clinical status. The sample size was optimized as 100 samples, were the inclusion criteria was involve only Pneumonic patients admitted to the intensive care unit. collected samples were subjected to macroscopic examination, then liquefaction was carried out using normal slain and then microscopical examination was take place by gram stain to evaluated the samples quality, then the qualified samples were cultured on sterile chocolate blood agar and incubate in 10% carbon dioxide, blood agar and Macconky agar were incubated aerobically for an overnight in incubator at 37c, after overnight incaution the colonial morphology was examined and farther grams stain was take place, after that all gram negative bacilli or cocobacilli were selected for farther biochemical test including indol, citrate, methyl red and vogus presqua, urease test and kliglar iron agar, finally analytical profile index API 20 E was objected as a confirmatory test. Analytic profile index API 20 E was used as a standardized identification system for *Enterobacteriaceae* using 21 miniaturized biochemical tests and a data base, the tests strep were inoculated with a bacterial suspension, color changes that are either spontaneous or revealed by the addition of reagents were recorded and road based on the index data base (API book), briefly; the determination of fermentative or oxidative metabolism API M Medium (Ref. 50 120), test for motility of facultative anaerobic bacteria by Prepare an incubation box (tray and lid), about 5 ml of distilled water or dematerialized water was distributed into the honeycombed wells of the tray to create a humid atmosphere, the strain reference was recorded on the elongated flap of the tray misplaced during the procedure, then the strip was removed from its packaging and place in the incubation box, after that prepared the inoculums were firstly opened and ampoule of 0.85 % API NaCl Medium (5 ml) or an ampoule of API suspension Medium (5 ml) which used as indicated were pipette onto sterile test tube, then single well isolated colony was removed from the suggested isolation after which; a carefully emulsified to achieve a homogeneous bacterial suspension was take place immediately after preparation, then the strip was inoculated using the same pipette that used before, then all tube were filled bacterial suspension, filled the strep was closed within the incubation box and incubated at 36°C ± 2°C for 18-24 hours. After the incubation period the stripe **was** road by referring to the reading table. The antimicrobial sensitivity was subjected to all isolated organism using disc diffusion method to provide an up-to-date anti bio gram. The standard disc diffusion method was used (Kirby-Bauer). The antibiotic discs used were from Himedia (Himedia Laboratories Pvt. Ltd, Mumbai 400086- India). The following antibiotics were used: penicillin G (10 mg), amoxicillin (10mg), Amoxoklam, first generation cephalosporin Cefazolin, Cephalexin, second generation cephalosporin, Cefoxitin, Cefaclor, Cefuroxime, Thared generation cephalosporin, Ceftrixone, cefotaxime, ceftazidime, cefepime, ciprofloxacin (5mg), Norfloxacin (20mg) Ofloxacin, Amikacin (30mg), Gentamicin (10mg), Meropenem (10mg), Imipenem (10mg), The discs of the antibiotics were placed in the diagnostic susceptibility test agar (Muller Hinton Agar). The distance between the two adjacent discs was at least 20 mm.and from the edge of the plate was 15 mm. the media were incubated aerobically for 24 hours in 37°C.After 24 hours of incubation the diameter of the zone inhibition was measured and compared with the published tables of the control strains according to (CLSI guidelines, 2010).

RESULT

This study was involved a 100 ICU pneumonic patients, from them 66%were male and 34% were females, table (1), the participants age group was ranged in-betweens 2 – 84 years old, 11(11%) patients were 2 – 12 years old, 18 (18%)patients in age group between 13 – 33, 25 (25%)patients in age group between 24 – 34, 10(10%) patients in age group between 35 – 40 and 36(36%) patients were in between 41 – 84 years old as shown in table (2). Provenances of *Acinetobacter* causing Pannonia in ICU admitted patients was 22 (22%), distribution in age group as (1%) of 2 – 12 years old, (4%) in 13 – 23 years old,(11%) in the age group of 24 – 34, wail the group of 35 – 40 was record (0.0%) and the age group 41 – 84 years old was (6%) as indicated in table (3). The gram negative *Acintobacter* bacteria is showing high resistances to penicillin G (10 mg), amoxicillin, Amoxoklam, first generation cephalosporin Cefazolin, Cephalexin, second generation cephalosporin, Cefoxitin, Cefaclor, Cefuroxime, third generation cephalosporin, Ceftrixone, Cefotaxime, Ceftazidime, Cefepime, Ciprofloxacin, Norfloxacin, Ofloxacin, Gentamicin, Meropenem, Imipenem. Among the isolate 22% (22 isolate) were multi drug resistance (MDR).

Table 1: the frequency of infection among gender.

Gender	Frequency	Percent
Male	66	66%
Female	34	34%
Total	100	100%

Table 2: show the percentage of Age Group.

Age Group		Frequency	Percent
	2 - 12	11	11.0%
	13 - 23	18	18.0%
	24 - 34	25	25.0%
	35 - 40	10	10.0%
	41 - 84	36	36.0%
	Total	100	100.0%

Table 3: The relation between the Age Group and the infection.

			Result		Total
			NEGATIVE	POSITIVE	
Age Group	2 - 12	Count	10	1	11
		% of Total	10.0%	1.0%	11.0%
	13 - 23	Count	14	4	18
		% of Total	14.0%	4.0%	18.0%
	24 - 34	Count	14	11	25
		% of Total	14.0%	11.0%	25.0%
	35 - 40	Count	10	0	10
		% of Total	10.0%	0.0%	10.0%
	41 - 84	Count	30	6	36
		% of Total	30.0%	6.0%	36.0%
Total		Count	78	22	100
		% of Total	78.0%	22.0%	100.0%

P-value = 0.021

Table 4: shows frequency and percentage of pneumonic infection by acintobacter.

			Result		Total
			NEGATIVE	POSITIVE	
Gender	Male	Count	49	17	66
		% of Total	49.0%	17.0%	66.0%
	Female	Count	29	5	34
		% of Total	29.0%	5.0%	34.0%
Total		Count	78	22	100
		% of Total	78.0%	22.0%	100%

Table 6: the percentage of pneumonic infection causing by other bacteria.

Other bacteria		Frequency	Percent
	Klibsilla pneumoniae	3	3.8
	E.coli	30	38.5
	Staph aures	40	51.3
	Klibsilla oxytoca	5	6.4
	Total	78	100.0

DISCUSSION

This observation study was to determine the prevalence of *acintobacter* species causing pneumonic infection in patient admitted to intensive care unit and age group from 2 to 84 years old, data analysis showed that the 22% of patients had pneumonic infection causing by *Acintobacter* while the other 78% of patients was due to *Klibsilla pneumoniae* (3.8%), *E.coli* (38.5%), *Staph aureus* (51.3%) and *Klibsilla oxytoca* (6.4%). Also this study showed that there is no association between the gender and pneumonic infection by *Acintobacter* male (66%), Female (34%). Similar result was obtained from study done in India by Bhattacharyya, S. *et al in* early 2013 which revealed that (22%) HAP belonged to *Acintobacter species*, *Klibsilla pneumoniae* (30%) and (14%), *Staphylococcus aureus* Also another study conducted in Ugandan by Agaba P *et al* in 2014, showed an opposite results that all isolated strain was multidrug resistance *Acintobacter* species (MDR) which is due that *Acintobacter spices was* colonized in ICU ventilator machines, for that, we need to add the new antibiotic to the antibiogram protocol in Sudan.

Conclusions and recommendation: We noticed that in Khartoum state hospitals the prevalence of *Acintobacter* causing pneumonic infection in ICU pts was (22%) due to the *Acintobacter* is multidrug resistance organism in Khartoum state. ***Ac****intobacter* infection should be

included in the nosocomial infection in Khartoum state fact sheet. The routine microbiology method based diagnosis shows a low specify for that the API method based diagnosis test is very much high and considered one of the best confirmatory method, we need to add two new antibiotic which is Colistin and Lovofloxacin in the antibiotic testing and treatments protocol for all ICU infection.

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