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A CROSS SECTIONAL STUDY ON THE RATIO OF MULTI DRUG RESISTANCE (MDR) AND EXTENSIVELY DRUG RESISTANT (XDR) BACTERIA IN TRACHEAL ASPIRATES (TA)

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Abstract:

Objective: *The Multi Drug Resistance (MDR) and Extensively Drug Resistant (XDR) bacteria are usual troubles in the universe mostly in ICUs. We aimed in this study to evaluate antibiotic vulnerability form and rate of bacteria detached to Tracheal Aspirates (TA) of patients in ICU and categorize these in any of the two groups.* ***Study design:*** *A reflective type of cross-sectional study.* ***Place and duration:*** *This analysis was conducted in the ICU of Holy Family Hospital, Rawalpindi with duration of 01 years from December, 2017 to November, 2018.* ***Methodology:*** *It was a reflective type of study of laboratory records of TA attained from the ICU patients presented for compassion. The Tracheal Aspirates (TA) cases with positive compassion were examined through SPSS 21 by One-way ANOVA procedure for every antibiotic for the treatment of various types of bacteria.The tests were gotten in the sterilize general packages were sophisticated for Blood and Mac Conkey Agar and heated up in the late-night at a temperature of 37 degree centigrade aerobically. The separated bacteria were Gram stained and more treatment was consequently processed. Gram-positive cocci were separated in Streptococci or Staphylococci because of Catalase examination facts. On wise the Staphylococci were classified into Staphylococci epidermis and Staphylococci aureus because of DNA and coagulase analyzations and compassion into Novobiocin disc which is 5.0 µg.* ***Results:*** *Cases with positive and non-productive growth cases from the total of 98 cases were 79 and 19 respectively while 5 cases out of 79 produced two categories of bacteria. From 84 cases which existed for study out of which cases with Gram negative rods and Gram-positive cocci were 61 and 8 respectively. 15 were having fungal growth. The quarantines were categorized into Multi Drug Resistance (MDR), Extensively Drug Resistant (XDR)and having common compassion form.* ***Conclusions:*** *Maximum quarantines were associated with XDR and Minimum with MDR while some with common compassion form with the percentage of 56.5 %, 37.6% and 5.8% respectively. This condition is frightening for the avoidance of illness and treatment of patients in hospitals.*

Key Words: *Pseudomonas aeruginosa, Drug resistance, Intensive care units, Acinetobacter baumannii, Antibiotic, MDR, XDR, Tracheal Aspirates (TA).*

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INTRODUCTION:

It was produced as a main public health problem because the pathogenic organisms are increasing endurance of different antimicrobial representatives. Extensively Drug Resistant (XDR) and Multi Drug Resistance (MDR) bacteria were involved progressively in HAIs during the last year [1]. XDR is conflict of bacterial isolates by one or more representatives in every excluding two antimicrobial types or less than two while MDR is the developed conflict by minimum one representative in three or more antimicrobial types [2]. One usual symptoms of illness in the cases which are admitted for treatment is ETT significantly in ICUs where insensitive interferences are mutual [3]. Maximum frequency of breathing annexation with hospital traumas in trachea for ventilation cases into the ICU was analyzed, therefore raising the consequence of pneumonia with 6 to 20 times [4]. The existence of a machine like ETT and illness through an XDR and MDR bacteria can take part into main disease and death rate of patients [5,6]. The aim of our analysis was to find out the rate of antibiotic sensitivity form of bacterial separated from Tracheal Aspirates (TA) of cases in ICU and categorize them in one of the two groups that are Extensively Drug Resistant (XDR) and Multi Drug Resistance (MDR).

MATHODOLOGY:

It was expressively reflective cross-sectional study of lab records of Tracheal Aspirates (TA) tests and samplings of patients which are hospitalized in the ICU of Holy Family Hospital, Rawalpindi Pakistan for the period of 01 year. Same samplings of the patients were not entitled in this analysis. The existence of a quarantine and antibiotic sensitivity form of 98 cases of TA was examined. This information was examined through SPSS 20 by one-way ANOVA analyses of every antibiotic for various types of bacteria where value of P was thought suggestively to be equal to or less than 0.05. The tests were gotten in the sterilize general packages were sophisticated for Blood and Mac Conkey Agar and heated up in the late-night at a temperature of 37 degree centigrade aerobically. The separated bacteria were Gram stained and more treatment was consequently processed. Gram-positive cocci were separated in Streptococci or Staphylococci because of Catalase examination facts. On wise the Staphylococci were classified into Staphylococci epidermis and Staphylococci aureus because of DNA and coagulase analyzations and compassion into Novobiocin disc which is 5.0 µg. More on the staphylococci were analyzed because of their hemolytic features on blood agar. Prolex™ Strep offers a unique method for grouping beta hemolytic Streptococci by Pro-lab treatments Merseyside UK through Streptococcal Grouping Latex kit as per guidelines of company. The D-group streptococci were more analyzed by Bile Esculin Agar where OXOID CM0888. Through the Systematic Profile Index the Gram-negative Bacilli were recognized in a study Biomerieux Marcy-I' Etoile in France [7]. As per instructions of Kirby Bauer Methods of CL-SI in the year 2012 antimicrobial sensitivity analyzation was presented [8]. For the Gram-Negative bacteria and Gram-Positive Bacteria, a group of 13 medicines and a group of 12 medicines respectively were directed.

RESULTS:

Patients with positive and non-productive growth cases from the total of 98 patients, were 79 and 19 respectively while 5 cases out of 79 produced two categories of bacteria. From 84 patients which existed for study out of which cases with Gram negative rods and Gram-positive cocci were 61 and 8 respectively. 15 were having fungal growth. The quarantines were categorized into Multi Drug Resistance (MDR), Extensively Drug Resistant (XDR) and having common compassion form. Details are shown in the following table no 01:

Table No 01: Isolate frequency in Tracheal Aspirate samples

Total Samples	Total Organisms	Two Types of Growth	Bacteria		Fungi	No Growth
			GPC	GNR		
98	84	5	61 (72.6%)	8 (9.5%)	15 (17.8%)	19 (19.4%)

Acinetobacter baumannii and Pseudomonas aeruginosa were the most usual quarantines with the percentage of 30.9 % and 17.9 % respectively in ratio and maximum of these were XDR. All other quarantines are stated in state of their ratios. MDR, XDR and all non-MDR bacteria were having percentage of ratio as 37.6 %, 56.5 % and 5.8 % respectively in all bacterial quarantines as shown below in table 02.

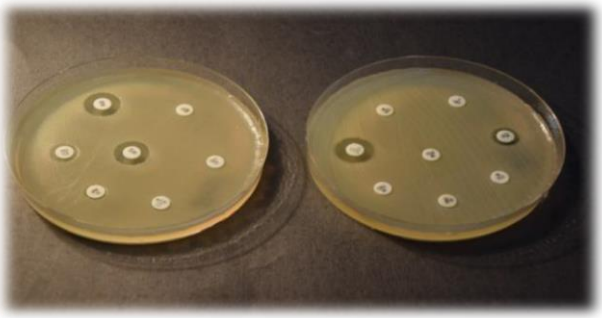


Fig 01: Antibiotic susceptibility pattern of one of the XDR Acinetobacter baumannii isolate

Table No 02: Frequencies of MDR, XDR and non-MDR bacteria

Types of bacteria	Frequency
MDR	37.60 %
XDR	56.5 %
Non-MDR	05.8 %

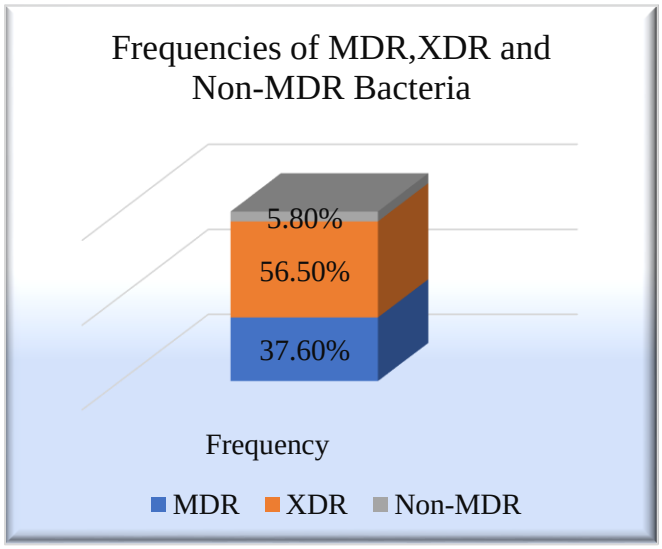
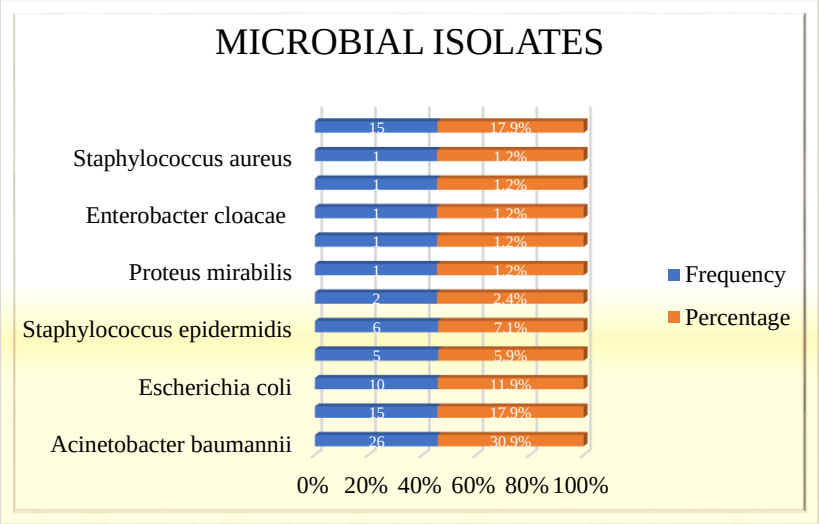


Table No 03: Distribution of Microbial Isolates from Tracheal Aspirates of ICU Patients.

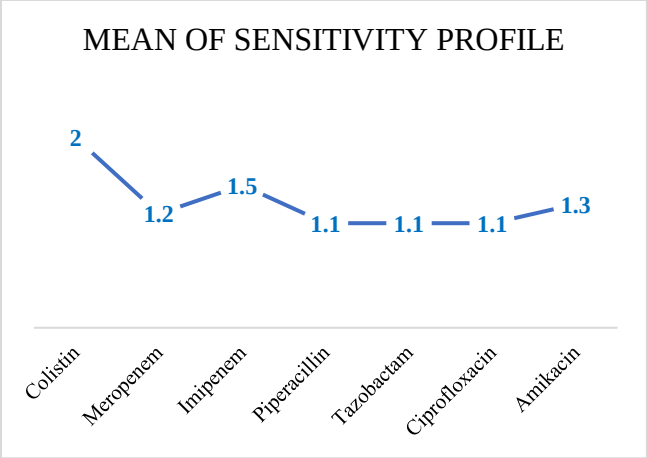
Type of Organism	Frequency	Percentage
Acinetobacter baumannii	26	30.9%
Pseudomonas aeruginosa	15	17.9%
Escherichia coli	10	11.9%
Klebsiella pneumoniae	5	5.9%
Staphylococcus epidermidis	6	7.1%
Citrobacter freundii	2	2.4%
Proteus mirabilis	1	1.2%
Serratia marcescens	1	1.2%
Enterobacter cloacae	1	1.2%
Enterococcus faecalis	1	1.2%
Staphylococcus aureus	1	1.2%
Candida albicans	15	17.9%



Features of study for Gram Negative Quarantines; the effectiveness of 6 most useful medicines was evaluated through One-way ANOVA examination which was conducted by applying medicine's sensitivity frequency in the group and other groups. This presented the variations between the groups were constant where value of P was less or equal to 0.05. Afterward, the Tukey's post hoc matching was conducted and the graph clearly presented that Colistin was the more useful medicine for Gram Negative quarantines.

Table No 04: Effectiveness of drugs among negative isolates

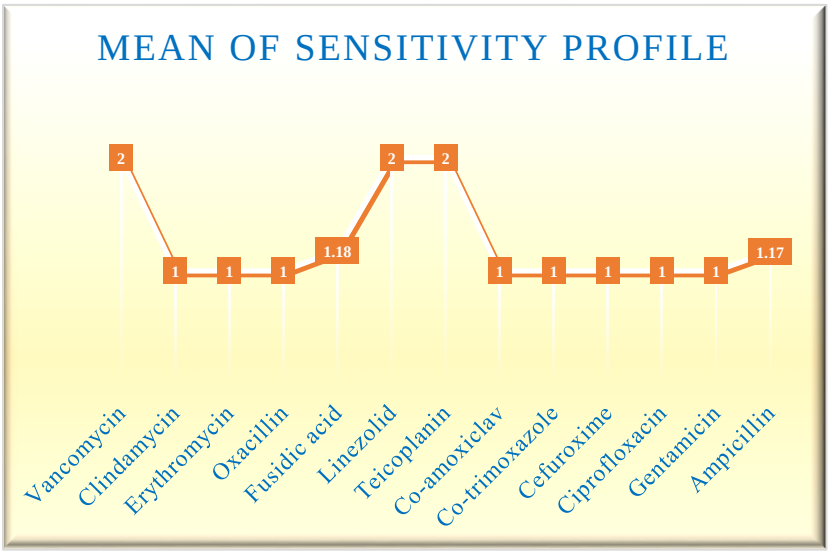
Medicine	Mean of Sensitivity Profile
Colistin	2
Meropenem	1.2
Imipenem	1.5
Piperacillin	1.1
Tazobactam	1.1
Ciprofloxacin	1.1
Amikacin	1.3



Features of study for Gram Positive Quarantines; the effectiveness of 6 most useful medicines was evaluated through One-way ANOVA examination which was conducted by applying medicine's sensitivity frequency in the group and other groups. This presented the variations between the groups were constant where value of P was less or equal to 0.05.

Table No 05: Effectiveness of Drugs Among Positive Isolates

Medicine	Mean of Sensitivity Profile
Vancomycin	2
Clindamycin	1
Erythromycin	1
Oxacillin	1
Fusidic acid	1.18
Linezolid	2
Teicoplanin	2
Co-amoxiclav	1
Co-trimoxazole	1
Cefuroxime	1
Ciprofloxacin	1
Gentamicin	1
Ampicillin	1.17



Afterward, the Tukey's post hoc matching was conducted and the graph clearly presented that Linezolid, Vancomycin and Teicoplanin were the more useful medicine for Gram Positive quarantines. Ampicillin was

effective for just Enterococcus. The Oxacillin endurance because many of the quarantines were Coagulase negative Staphylococci that are commonly defiant to penicillinase defiant group of antibiotic medicines versus Staphylococcus aureus.

Table No 06: Panel of antibiotics used for Gram -ve and Gram +ve organisms

Gram Negative Panel	**Gram Positive Panel**
Ampicillin	Ampicillin
Amoxicillin – Clavulanic Acid	Cefoxitin (marker for Flucloxacillin)
Cefuroxime	Co-trimoxazole
Cefotaxime	Cefuroxime
Ceftriaxone	Erythromycin
Cefoxitin (marker for ESBL production)	Clindamycin
Co-trimoxazole	Ciprofloxacin
Ciprofloxacin	Gentamicin
Gentamicin	Fusidic Acid
Amikacin	Vancomycin
Imipenem	Teicoplanin
Meropenem	Linezolid
Colistin	

DISCUSSION:

Antimicrobial endurance is developing as a most serious matter in hospital managements equally to avoidance and treatment of critical ailments of patients [9]. Each of Gram negative and Gram-positive organisms are indulged to the medicine endurance [10]. Through this history we were acknowledged to observe the ratio of Multi Drug Resistance (MDR)and Extensively Drug Resistant (XDR) equally in categories of organisms separated of Tracheal Aspirates (TA) cases of ICU in our Hospital. The samplings of the RT as TA and Sputum can be treated through oral flora. Though, TA is gathered in aseptic terms processing clarification and clinical association simplest [11]. This test was gotten from the most affected, immunocompromised and hampered strength of patients. We settled to make a complete attention to TA as this was the very usual test that was collected through cases of ICU in our hospital. A last analysis on TA stated their Quarantines were Gram negative with the percentage of 88.0 %, Pseudomonas aeruginosa was the most enhanced [12]. Above than 2/3 of the quarantines were Gram negative bacteria. Pseudomonas aeruginosa and Acinetobacter baumannii were the most usual. An else analysis held in Iran on the prevention of organisms in ETT of cases presented the most preventive bacteria for being the Enterobacter types. Acinetobacter baumannii is a significant nosocomial pathogen to the patients which are admitted in the hospital. It is an obstinate colonizer because of its performance of getting biofilm which is a significantly being virulent influence for systematically related illnesses [13,14]. It was observed to be the most tough with antibiotics and affects eruptional to diagnose the HAIs of ICUs [15]. By our analysis, the quarantines were categorized as MDR and XDR with the percentage of 37.0 % and 56.0 % respectively.

This is a matter of maximum anxiety and a molecular analysis is necessary to observe the fact of this variation in antibiotic sensitivity form. Same study was stated by two groups of analyzers in South Korea and North America regarding the rising endurance of Acinetobacter baumannii in hospital surroundings being a cause for complications in diagnosing the HAIs [16,17]. By our analysis, the Vancomycin, Linezolid and Teicoplanin were the more useful medicines for the Gram-positive quarantines as the same as last study stating the three medicines as the more effective between enterococcal quarantines [18]. The patients because of Gram positive bacteria specially Staphylococcus aureus might be observed with a Gram stain study of TA that had a negative observative frequency and attentiveness is almost maximum with the percentage of 92.8 % and 97.8 % respectively [19]. The outcome must be discussed to the concerning doctor so that a gram-positive

preventive precaution must be taken as soon as possible.

CONCLUSION:

Maximum quarantines were associated with Extensively Drug Resistant (XDR) and Minimum with Multi Drug Resistance (MDR)while some with common compassion form with the percentage of 56.5 %, 37.6% and 5.8% respectively. This condition is frightening for the avoidance of illness and treatment of patients in hospitals. Its outcomes lesser RTI in admitted patients of hospital are on the raise and maximum of the quarantines refer to MDR and XDR classification specially through gram negative bacteria. This condition is necessary not just for the treatment but almost for the prevalence of the HAIs. Recognized procedures for the medical treatment based on experience required to be started to deliver passable antibiotic prevalence for these cases. Moreover, the affected prevalence actions are required to prevent the blowout of these bacteria generally in the hospital and among the patients individually.

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