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Archives of Urology and Nephrology
info@mediresonline.org

ISSN: 2836-5828 RESEARCH ARTICLE

Impact of Appropriate Antibiotics within 1hr of Patients Admission

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Received: 18 February 2023; **Accepted:** 24 February 2023; **Published:** 01 March 2023

Citation: Srirupa Biswas, Sankha Dasgupta, Moumita Majumder Bhowmick, Smriti Gupta, et.al (2023), Impact of Appropriate Antibiotics within 1hr of Patients Admission, Archives of Urology and Nephrology. 2(1). DOI: 10.58489/2836-5828/006

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Abstract

An antibiotic is a type of antimicrobial substance active against bacteria. It is the most important type of antibacterial agent for fighting bacterial infections, and antibiotic medications are widely used in the treatment and prevention of such infections.[1][2] They may either kill or inhibit the growth of bacteria. A limited number of antibiotics also possess antiprotozoal activity.[3][4] Antibiotics are not effective against viruses such as the common cold or influenza;[5] drugs that inhibit viruses are termed antiviral drugs or antivirals rather than antibiotics.

Introduction

An antibiotic is a type of antimicrobial substance active against bacteria. It is the most important type of antibacterial agent for fighting bacterial infections, and antibiotic medications are widely used in the treatment and prevention of such infections[1-2. They may either kill or inhibit the growth of bacteria. A limited number of antibiotics also possess antiprotozoal activity [3-4]. Antibiotics are not effective against viruses such as the common cold or influenza; [5] drugs which inhibit viruses are termed antiviral drugs or antivirals rather than antibiotics.

Sometimes, the term antibiotic—literally "opposing life", from the Greek roots ἀντι anti, "against" and βίος bios, "life"—is broadly used to refer to any substance used against microbes, but in the usual medical usage, antibiotics (such as penicillin) are those produced naturally (by one microorganism fighting another), whereas non-antibiotic antibacterial (such as sulfonamides and antiseptics) are fully synthetic. However, both classes have the same goal of killing or preventing the growth of microorganisms, and both are included in antimicrobial chemotherapy. "Antibacterial" include antiseptic drugs, antibacterial soaps, and chemical disinfectants, whereas antibiotics are an important class of antibacterial used more specifically in medicine [6] and sometimes in livestock feed.

Antibiotics have been used since ancient times. Many civilizations used topical application of moldy bread, with many references to its beneficial effects arising from ancient Egypt, Nubia, China, Serbia, Greece, and Rome.[7] The first person to directly document the use of molds to treat infections was John Parkinson (1567–1650). Antibiotics revolutionized medicine in the 20th century. Alexander Fleming (1881–1955) discovered modern-day penicillin in 1928, the widespread use of which proved significantly beneficial during wartime. However, the effectiveness and easy access to antibiotics has also led to their overuse[8] and some bacteria have evolved resistance to them [1][9][10][11].

The World Health Organization has classified antimicrobial resistance as a widespread "serious threat [that] is no longer a prediction for the future, it is happening right now in every region of the world and has the potential to affect anyone, of any age, in any country".[12] Global deaths attributable to antimicrobial resistance numbered 1.27 million in 2019.[13]

Review Of Literature

Sepsis Campaign Guidelines 2012 and 2015 update

- 2015 update: “broad spectrum antibiotics should be administered within 3 hours of the time of

presentation"

- 2012 Guideline: "We recommend that empiric antimicrobials be administered within 1 hr of the identification of severe sepsis. Blood cultures should be obtained before administering antibiotics when possible, but this should not delay initiation of antibiotics. The empiric drug choice should be changed as epidemic and endemic ecologies dictate (eg, H1N1, methicillin-resistant S. aureus, chloroquine-resistant malaria, penicillin-resistant pneumococci, recent ICU stay, neutropenia) (grade 1D)"
- As of 2010, only 68% of patients in the SSC registry received antibiotics within 3 hours.

Kumar et al, 2006

- The classic retrospective cohort study of 2,731 septic shock ICU patients showed a strong correlation between delay in effective antibiotic therapy and in-hospital mortality after recurrent or persistent arterial hypotension (*P* <0>
- Only 50% of the patients received effective antibiotic therapy within the first 6 hours (i.e. appropriate *in vitro* activity for the isolated pathogenic microorganism or the underlying clinical syndrome).

Gaieski et al, 2010

- A single-center cohort study of 261 patients with severe sepsis undergoing early goal-directed therapy (EGDT) time from triage and qualification for EGDT to appropriate antibiotic therapy was significantly associated with reduced mortality at the <1 xss=removed>P <0>

Puskarich et al, 2011

- A preplanned analysis of a multicenter controlled trial (3 centers) in US EDs of 291 patients with septic shock (EMSHOCK NET) found no change in mortality with hourly delayed antibiotic therapy up to 6 hours after triage or after recognition of shock.
- Antibiotic administration before recognition of shock was associated with a lower mortality as compared with antibiotic administration after recognition of shock (odds ratio = 2.35, 95%CI 1.12 to 4.53).

Ferrer et al, 2014

- Retrospective analysis of 17,990 patients with severe sepsis and septic shock from the multicenter, multinational Surviving Sepsis Campaign database (Europe, USA and South America) found an hourly increase in mortality with delay in antibiotic administration following recognition of severe sepsis, not just the onset of hypotension
- Differences were statistically significant, as we as clinically significant, beyond 2 hours

De Groot et al, 2015

- Prospective multicenter study in three Dutch Eds, 1,168 patients with sepsis (stratified into mild, moderate and severe; overall mortality of 10%) in those receiving antibiotics within 6 hours, a reduction in time to antibiotics was not found to be associated with an improvement in relevant clinical outcomes (28 mortality or LOS)

Sterling et al, 2015

- Systematic review of 11 studies that met inclusion criteria, comprising: 16,178 patients with severe sepsis/ septic shock who evaluable for antibiotic administration from emergency department triage, and 11,017 patients who were evaluable for antibiotic administration from severe sepsis/septic shock recognition
- There was no significant mortality benefit of administering antibiotics within 3 hours of ED triage or within 1 hour of shock recognition in severe sepsis and septic shock
- The authors suggest that currently recommended timing metrics as measures of quality of care are not supported by the available evidence
- Problems: 7 studies were excluded because authors did not respond to requests for information (selection bias), unclear if antibiotic choice was appropriate in these studies and less than half of patients had confirmed bacteraemia (antibiotics would not be expected to benefit non-bacterial infections or infections with bacteria that are insensitive to the chosen antibiotic)

Garnacho-Montero et al, 2015

- A prospective obsertional study of 928 patients admitted to ICU with severe sepsis/ septic shock (68% with microbiological identification)
- Findings were:

Inadequate therapy prior to ICU admission was more common in nosocomial sepsis

- Administration of appropriate empirical antimicrobial therapy early was associated with decreased mortality
- Nearly all patients (98.3 %) received at least one dose of antibiotics before ICU admission, however they were inadequate in 31% of patients
- Progression to septic shock in patients with severe sepsis was associated with inadequate antimicrobial therapy prior to ICU admission

Siriwimon Tantarattanapong et al,2021

- The current international sepsis guideline recommends that administration of intravenous broad-spectrum antibiotics should be initiated within 1 hour of emergency department (ED) arrival for sepsis patients.
- Retrospective cross-sectional study, elderly patients (age ¸65 years) diagnosed with sepsis in the ED of a tertiary referral and academic hospital from January were enrolled. Door-to-antibiotic time was defined as the time from ED arrival to antibiotic initiation. The associations of door-to-antibiotic time and each hour delay in first antibiotic initiation with in-hospital mortality were assessed.
- Six hundred patients with the median age of 78.0 (IQR: 72.0-86.0) were studied (50.8

Aims & Objective

- The mantra for timing of antibiotics for serious infections is 'hit hard, early *and* appropriately'
- Evaluate outcome of patients admitted in hospital how receive an appropriate antibiotic within 1hour of admission.
- Despite the strong biological plausibility of a need for early antibiotics in patients with serious bacterial infections the importance of antibiotic timing is controversial.

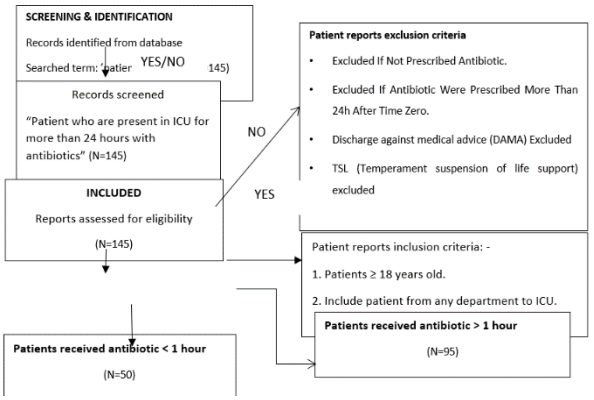
Rationale For Early Antibiotics

Early antibiotics may:

- prevent injury caused by microbial activity and toxin production
- prevent or ameliorate harmful host responses to infection
- Observational data has shown strong associations between early antibiotics and survival outcomes; however, a recent (flawed) systematic review did not find a benefit for early antibiotics.
- The Sequential Organ Failure Assessment (SOFA) score numerically quantifies the number and severity of failed organs. We examined the utility of the SOFA score for assessing outcome of patients with antibiotics at the time of *intensive care unit* (*ICU*) presentation.
- APACHE IV provided the best discrimination and

calibration abilities and was useful for quality assessment and predicting mortality in medical ICU patients with antibiotics.

Methods



- STUDY LOCATION: AMRI HOSPITAL - DHAKURIA,
- Timing of ICU admission - time noted from the patient's ICU nursing chart when the first vital parameters are noted by the nurse.
- Timing of administration of 1st dose of antibiotic will be noted from ICU nursing chart (in minutes from the timing of ICU admission).
- Antibiotic that is administered within the first one hour of admission will be noted from ICU nursing chart.
- Appropriateness of antibiotic - will be assessed from the microbiology culture and sensitivity results once available.
- Outcome measures **-** will be noted from the ICU database.
- Data will be then recorded systemically in the data collection form and finally entered in the excel sheet for analysis.
- All the data will be then analysed by statistician by appropriate statistical tests.

Search strategy

The data search was performed on July 22, 2022 till November 28, 2022 in AMRI HOSPITAL - DHAKURIA, we conducted a prospective study of adult patients in ICU ward. Records screened "Patient who are present in ICU for more than 24 hours with antibiotics". The ICU ward which was included in the study was ICU-2 with 11 beds, ICU -3 with 12 beds, ICU -7 with 9 beds and NS-ICU with 8 beds. Ethical approval was obtained from the institutional review board. Demographic, clinical, and study data were recorded from charts through the electronic medical.

Data extraction and eligibility criteria

Patients were excluded if they met any of the following criteria

1. <18>
2. pregnant or post-delivery,

3. Excluded If Not Prescribed Antibiotic.
4. Excluded If Antibiotic Were Prescribed More Than 24h After Time Zero.
5. Discharge against medical advice (DAMA) Excluded
6. TSL (Temperament suspension of life support) excluded.
7. If a pathogen sample is not sent for none of the culture test like (blood culture, urine culture or sputum culture).

Patient repots inclusion criteria: -

1. Patients ≥ 18 years old.
2. If a pathogen sample is sent for any of the culture test like (blood culture, urine culture or sputum culture).

Patient characteristics

- Patients received antibiotic < 1>
- Patients received antibiotic > 1 hour, P value

We recorded information on the selection of patients, inclusion criteria, the duration and time period of the study, the setting (intensive care units), the study design and the total number of patients received antibiotics. We also extracted data on other key study characteristics such as the set point intervals used for assessing the timing and impact of antibiotic therapy, the assessment of the appropriateness of antibiotic therapy and the study endpoints. Criteria used for the analysis of antibiotic appropriateness were based on *in vitro* susceptibility of causative pathogens in case of microbiologically-documented infections or on antibiotic therapy management guidelines in case of clinically-documented infections.

Outcome measures

The primary outcome was all-cause mortality and length of stay (ICU & hospital) at the time points reported in the study. Such as INP number, gender, age, admission status (time) cause of admission, date of admission, name of antibiotic ,use of antibiotic number hour of admission, Time of antibiotic received, ITU stay, ITU outcome, Hospital outcome, Total stay, use of mechanical ventilation, Number of day on mechanical ventilation, APACHE IV, SOFA, Co-morbidities (Hypertension, II diabetes, Renal disease, Malignancy, Lung disease, Liver disease, Cancer, Heart disease, Other comorbidities),blood culture, urine culture, sputum culture, appropriate antibiotics , mortality.

Statistical Analysis

The outcome of this study was the association of clinical outcomes of infection with early antibiotics use. For the purposes of this study, early antibiotics use was defined as the time interval from ICU triage to the administration of broad-spectrum antibiotics within one hour. Those who received antibiotic administration more than one hour from ICU triage will be classified as having late antibiotic use. Broad-spectrum antibiotics referred to antibiotics that were effective against both gram-positive and gram-negative bacteria. In the included data, broad-spectrum antibiotics referred to as beta-lactamase-inhibit penicillin combined with third-generation cephalosporins. We applied the T-test to hospital length of stay and used chi-square to determine the correlation of early antibiotics use to mortality, mechanical ventilation support, and ICU admission. ICU admission was defined as direct admission to the ICU from the ED. We also performed factor analysis regarding the timing of antibiotics administration, including patients' gender, age, vital signs at ICU triage, clinical symptoms.

The final sample size was 145 patients in the study. Continuous data are demonstrated as median with mean ± standard deviation. Categorical data are presented as numbers and percentages. Pearson's chi-squared test was performed on categorical data for the primary outcome. The chi-square test was used for the analysis and to compare mortality and antibiotic received time into intervals1 hour and received beyond the first hour. A two-sided p-value <0>

Ethical approval

Ethical approval was taken from the AMRI Ethics Committee prior to the data collection process.

Apps used for sofa calculation is MDCalc

Result

Characteristics of the study population

There was a total of 145 patients (n=145) admitted during study period. 63, 43.4% patients were admitted receive antibiotic were female and the rest 82, 56.6% male received antibiotic. Male patients received antibiotic within one hour 26, 52.0 % and male patients received more than one hour 56, 58.9%. Female patients received antibiotic within one hour is 24, 48.0% and Female patients received antibiotic more than one hour is 39,41.1%. (Figure 1). There was no significant difference in the gender of the patients as the p value is > 0.05 the P value is 0.422 The patients age group was divided into 7 groups 31-40 (patients received antibiotic within one hour 0,0.0% and patients received more than one hour 5,5.3%) ,41-50(patients received antibiotic within one hour 2,4.0% and patients received more

than one hour 6,6.3%) 51-60(patients received antibiotic within one hour 10,20.0% and patients received more than one hour 17,17.9%),61-70 (patients received antibiotic within one hour 13,26.0% and patients received more than one hour 33, 34.7%),71-80 (patients received antibiotic within one hour 17, 34.0% and patients received more than one hour 24,25.3%),81-90 (patients received antibiotic within one hour 8,16.0% and patients received more than one hour 9,9.5%),91-100 (patients received antibiotic within one hour 0,0.0% and patients received more than one hour 1,1.1%). There was no significant difference in the age of the patients as the p value is > 0.05 the P value is 0.378. The mean APACHE IV score of patients received antibiotic within one hour 77.70 and patients received more than one hour 76.28 and the mean SOFA patients received antibiotic within one hour 3.52 and patients received antibiotic more than one hour 3.53. There was no significant difference in the APACHE IV score of the patients as the p value is > 0.05 the P value is 0.469. There was no significant difference in the SOFA score of the patients as the p value is > 0.05 the P value is 0.846. The baseline characteristics of the study population are described in Table 1.

Table 1. Showing the baseline characteristics of the study population

Characteristics	Patients received antibiotic < 1 hour	Patients received antibiotic > 1 hour	P value
Age, mean ± SD	69.66±11.68	66.06±12.50	0.115
Gender, n (%)			
Male	52.0%	58.9%	0.422
Female	48.0%	41.1%	
APACHE IV score, mean ± SD	77.70±19.71	76.28±16.05	0.469
OFA score, mean ± SD	3.52±0.93	3.53±0.83	0.846

GENDER	Frequency	Percent
FEMALE	63	43.4
MALE	82	56.6
Total	145	100.0

AGE	Frequency	Percent
31-40	5	3.4
41-50	8	5.5
51-60	27	18.6
61-70	46	31.7
71-80	41	28.3
81-90	17	11.7
91-100	1	.7
Total	145	100.0

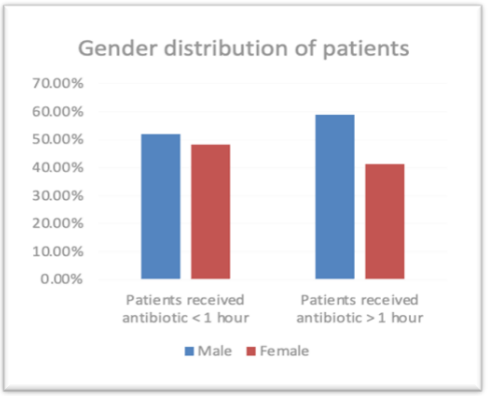


Fig.1: Gender distribution of patients who have received Antibiotic.

Co-morbidities

The Co-morbidities are another variable which impact the study frequency and percentage calculations. Hypertension is a common co-morbidities 115 ,79.3%, diabetes 71,49%, renal disease 3,2.1% lung disease 6,4.1% heart disease 9,6.2% (Table.2) .

Table 2: Co-morbidities data for hypertension, renal, lung, heart diseases.

CO-MORBIDITICS PERTENSION	Frequency	Percent
NO	30	20.7
YES	115	79.3
Total	145	100.0
CO-MORBIDITICS DIABETES	**Frequency**	**Percent**
NO	74	51.0
YES	71	49.0
Total	145	100.0
CO- MORBIDITICS RENAL DISEASE	**Frequency**	**Percent**
NO	142	97.9
YES	3	2.1
Total	145	100.0
CO-MORBIDITICS LUNG DISEASE	**Frequency**	**Percent**
NO	139	95.9
YES	6	4.1
Total	145	100.0
CO-MORBIDITICS HEART DISEASE	**Frequency**	**Percent**
NO	136	93.8
YES	9	6.2
Total	145	100.0

Co-morbidities, n (%)	Patients received antibiotic < 1 hour	Patients received antibiotic > 1 hour	P value
Hypertension	70.0%	84.2%	0.045
Diabetes	48.0%	49.5%	0.866
Renal disease	2.0%	2.1%	0.966
Lung disease	8.0%	2.1%	0.090
Heart disease	4.0%	7.4%	0.424

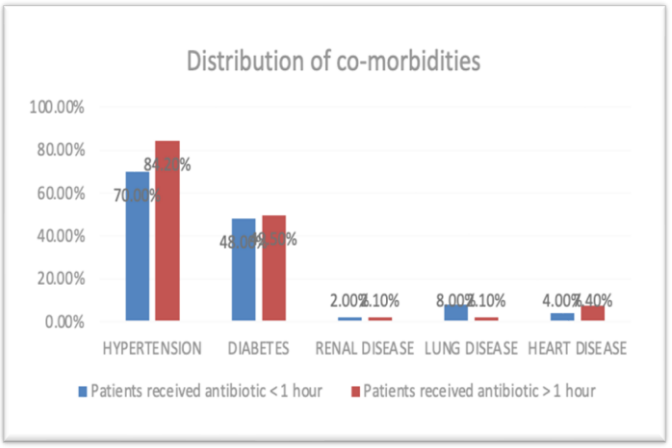


Fig 2: Distribution of co-morbidities of patients who have received Antibiotic

Cause of admission In ICU Department

During our study period, the hospital had 145 cases from July 22, 2022 till November 28, 2022 in that female 63, 43.4% and male 82, 56.6%. The cause of admission of patient was maximum was for respiratory and lung disease 30, 2.1% kidney disease 17, 11, 9.

Table 3: Cause of admission in ICU Department

CAUSE OF ADMISSION	FREQUENCY	PERCENT	PVALUE
Fever	15	10.5	
Respiratory and lung disease	30	21	
Cardiovascular disease	16	11.2	
Kidney disease	17	11.9	
Dengue	7	4.9	
Seizure	11	7.7	
Hernia	3	2.1	
Jaundice	1	0.7	
Malaria	4	2.8	
Sepsis	14	9.8	
Anemia	2	1.4	
Cold	1	0.7	0.414.
Hemorrhagic stroke	2	1.4	
Hepatic encephalopathy	3	2.1	
Gastrointestinal disease	9	6.3	
Hematemesis	2	1.4	
Polytrauma	1	0.7	
Loose motion	1	0.7	
Pancreatic cancer	2	1.4	
Pancytopenia	1	0.7	
Transurethral resection of the prostate	1	0.7	
Brest carcinoma	2	1.4	
Total	145	100	

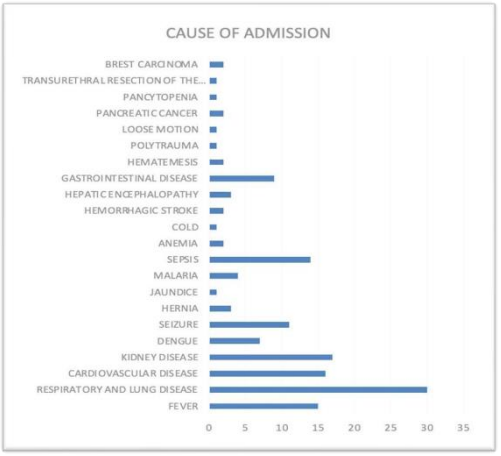


Fig 3: distribution of Cause of admission In ICU department

Antibiotic received in the ICU during the ICU stay

The patient in ICU is grouped in two parts, one who has received antibiotic within one hour and second group is patients who received antibiotic more than one hour. Antibiotic meropenem 67, 46.2% piperacillin & tazobactam 40, 27.6%, ceftazidime and avibactam

Table 4. Showing Antibiotic received and Timing in the ICU during the ICU stay

Antibiotics, n (%)	Patients received antibiotic < 1 hour	Patients received antibiotic > 1 hour	P value
Amoxicillin And Clavulanic Acid	2.0%	2.1%	0.966
Amoxicillin-Potassium Clavulanate	2.0%	3.2%	0.686
Meropenem	54.0%	42.1%	0.172
Piperacillin & Tazobactam	22.0%	30.5%	0.275
Rifaximin	0.0%	1.1%	0.467
Cephalosporin	0.0%	2.1%	0.302
Cefoperazone And Sulbactam	2.0%	0.0%	0.167
Ceftazidime And Avibactam	8.0%	1.1%	0.029
Azithromycin	2.0%	1.1%	0.642
Ceftriaxone	2.0%	6.3%	0.249
Doxycycline	0.0%	2.1%	0.302
Carbapenem	4.0%	1.1%	0.236
Teicoplanin	8.0%	11.6%	0.501

Use of antibiotics within 1 hour of Admission	Frequency	Percent	Use of antibiotics within 1 hour of Admission	Frequency	Percent
1.0	50	34.5	10.0	1	.7
2.0	36	24.8	11.0	1	.7
3.0	13	9.0	12.0	1	.7
4.0	4	2.8	13.0	1	.7
5.0	12	8.3	15.0	1	.7
6.0	10	6.9	16.0	1	.7
7.0	7	4.8	20.0	1	.7
8.0	2	1.4			
9.0	4	2.8	Total	145	100

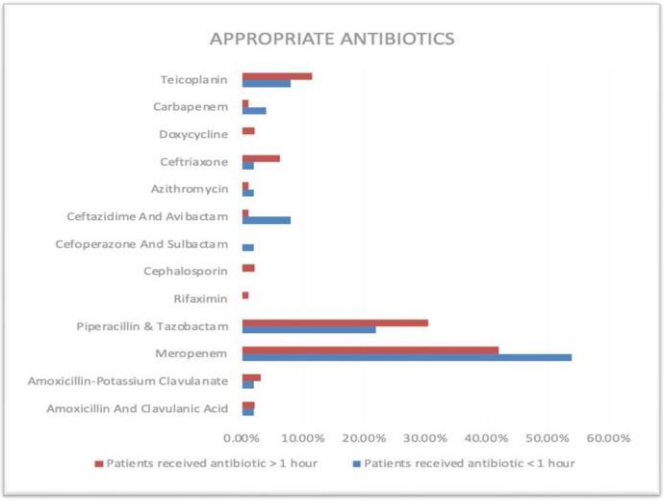


Fig 4: Antibiotic received in the ICU during the ITU stay

The Primary outcomes characteristics of the study population

Patients received antibiotic within 1hour of admission is50 out of 145 patient its 34.5%. ITU outcome is divided into three different part one is ITU discharge 132, 97.9%ITU Death3, 2.1%. Hospital outcome of the patients is group into two variable that is death and discharge among 145 cases 11, 7.6% death and 134,92.4% discharges from hospital (Figure 5). There was no significant difference in the primary outcome in ICU of the patients as the p value is > 0.05 but in ITU stay, P value is 0.002 and total stay, P value is 0.004 which is significant difference (Table 5, 6).

Table 5: Showing the Primary outcomes characteristics of the study population.

Characteristics	Patients received antibiotic < 1 hour	Patients received antibiotic > 1 hour	P value
ITU stay, mean ± SD	3.82±2.73	5.03±3.31	0.002
Number of day on mechanical ventilationmean ± SD	0.02±0.15	0.02±0.21	0.623
Hospital stays, mean ± SD	2.84±3.03	3.26±3.28	0.120
Total stay, mean ± SD	6.66±5.04	8.29±5.29	0.004

ITU Outcome	Frequency	Percent
ITU Discharge	132	97.9
ITU Death	3	2.1
Total	145	100.0

Hospital Outcome	Frequency	Percent
Death	11	7.6
Discharge	134	92.4
Total	145	100.0

Table 6: Showing the hospital outcome

Hospital Outcome	Patients received antibiotic < 1 hour	Patients received antibiotic > 1 hour	P value
Death, n%	4.0%	9.5%	0.237
Discharge, n%	96.0%	90.5%	

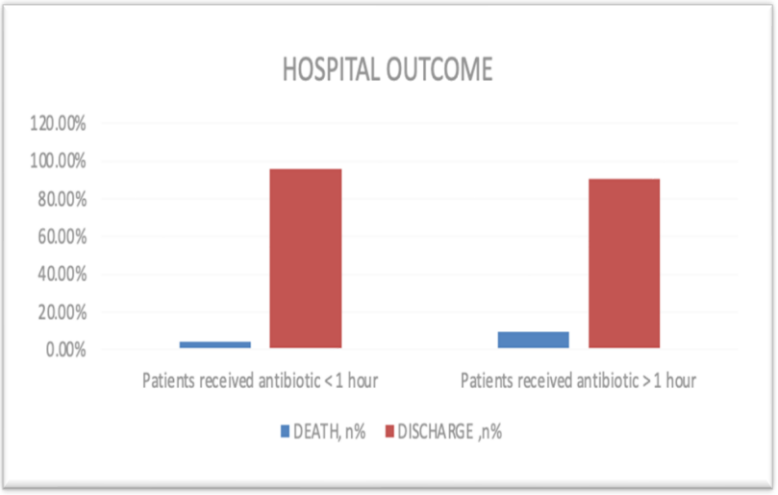


Fig 5: The hospital outcome

Mortality and Appropriate antibiotics

Mortality of the patients were divided into two groups, antibiotic received within one hour and other major group is antibiotic received more than one hour to death.The antibiotic received within one hour is sub group into antibiotic (death 2,4.0% and discharge 48,96.0%) and antibiotic received within more than one hour antibiotic (10,10.5% death and 85,89.5% discharge) the p value is 0.175. There was no significant difference in the mortality and in choice of antibiotic in ICU of the patients as the p value is > 0.05 (Table 8).

Antibiotics was compared with antibiotic police it complies with the antibiotic drug list provided with the list organism (Document: AMRI/DHK/HIC/POL/02 effective 15/09/2022) all are appropriate so we can conclude that the antibiotic which was received against theOrganism Antibiotic susceptibility (Table 8). Mortality total death 12 ,8.3%, discharge 133,91.7% (Table 7). Inthe total population, N=145 appropriate antibioticsreceived 48, 96.0%.

Table 7: Showing the Mortality

Mortality	Frequency	Percent
Death	12	8.3
Discharge	133	91.7
Total	145	100.0

Table 8: Antibiotic administration for bacterial infections

Bloodstream Infections	Number	Antibiotic susceptibility as per antibiotic police	Antibiotics received (n)
Escherichia coli	7	Amoxy-clav Ceftriaxone, Pip-taz, Imipemen/Meropenem, Ertapenem Amikacin, Colistin.	Meropenem (5) Ceftriaxone (2)
Klebsiella pneumoniae	2	Amoxy-clav, ceftriaxone,Pip-taz- ,Imipenam/Meropenam ,Ertapenem90%, Amikacin, Colistin.	Meropenam(2)
Proteus mirabilis	2	Amoxy-clav, Ceftriaxone ,Ciprofloxacilin, Azithromycin.	Azithromycin (2)
Pseudomonas aeruginosa	6	Ceftazidime,Pip-taz ,Cefo-sulb ,Imipenam/Meropenam ,Amikacin, Ciprofloxacin	Meropenam (4) Ciprofloxacin (2)
Staphylococcus aureus	6	Penicillin, Vancomycin / Tecicoplanin / Linezolid, Daptomycin, Cipro	Piperacillin & Tazobactam (6)

Table 9: Showing the appropriate antibiotic as per the antibiotic policy and list of antibiotic susceptibility (Document: AMRI/DHK/HIC/POL/02 effective 15/09/2022)

Urinary Isolates-OPD	Number	Antibiotic susceptibility As per antibiotic policy	Antibiotics Received
Candida species	2	Fluco, Vori, AmpB, Echinocandins	Meropenem (5) Ceftriaxone (2)
Enterococcus faecalis	1	Penicillin, Nitrofuran 35%, Vancomycin / Teicoplanin, Linezolid 100%	Piperacillin &Tazobactam (1)
Escherichia coli	21	Amoxy-clav, Ceftriaxone, Pip-taz, Imipemen / Meropenem, Ertapenem, Amikacin, Nitrofurantoin, Co trimoxazole, Colistin, Fosfomycin	Meropenem (18) Ceftazidime and Avibactam (3)
Klebsiella pneumoniae	2	Amoxyclav, ceftriaxone, cefo- sulb, Pip-taz, Imipemen / Meropenem, Cefta- Avi Amikacin, Colistin.	Piperacillin & Tazobactam (2)
Pseudomonas aeruginosa	2	Ceftazidime, Pip-taz, Cefo-sulb, Imipenam / Meropenam / Doripenem , Amikacin, Cipro/Levo ,Colistin	Meropenem (2)

Respiratory Isolates- ipd	Number	Antibiotic susceptibility as per antibiotic police	Antibiotics Received
Acinitobacter baumannii	4	Ceftazidime,Pip-taz,Imipenem /Meropenem 0 %, Amikacin, Cipro/ Levo Minocycline, Colistin 100%.	Meropenem (4)
Aeromonas sobria	2	Amoxy-clav 92%, Ceftriaxone 100%, Ciprofloxacilin 55%, Azithromycin 100%	Azithromycin (2)
Escherichia coli And *Streptococcus pneumoniae*	1	Amoxy-clav, Ceftriaxone, Pip-taz, Imipemen / Meropenem, Ertapenem, Amikacin, Nitrofurantoin, Co-trimoxazole,Colistin, Fosfomycin	Meropenem (1)
GRAM-NEGATIVE Bacilli	3	Amoxyclav, ceftriaxone, cefo-sulb , Pip-taz, Imipemen / Meropenem, Cefta-Avi Amikacin , Colistin .	Meropenem (1)
PROTEUS MIRABILIS	1	Amoxy-clav, Ceftriaxone, Ciprofloxacilin, Azithromycin	Cephalosporin (1)

Table 10: Showing the antibiotic Timing

			ANTIBIOTICS		Total	P- value
			Within one hour	More than one hour		
Mortality	Death	Count	2	10	12	0.175
		% within ANTIBIOTIC	4.0%	10.5%	8.3%	
	Discharge	Count	48	85	133	
		% within ANTIBIOTIC	96.0%	89.5%	91.7%	
	Total	Count	50	95	145	
		% within ANTIBIOTIC	100.0%	100.0%	100.0%	

Bacteriology and culture report

The blood culture was done for 97, 66.7% *Escherichia coli* 7,4.8% *Pesudomonas aeruginosa* 6,4.1%. The urine culture was done for 142,97.9% *Escherichia coli* 21, 14.5%, sputum culture 17,11.7% *Acinetobacter baumanni* 4, 2.8% gram-negative bacilli 3,2.1%, normal oral flora 3,2.1%. There was no significant difference in the culture report in the ICU of the patients as the p-value is > 0.05 but in the blood culture p-value is 0.045 which is a significant difference. The p value of urine culture is 0.00 and the P value for sputum culture is 0.278.

Table 9: Showing the Bacteriology and culture report of ICU patients

Blood Culture Result	Frequency	Percent
Escherichia coli	7	4.8
Klebsiella pneumoniae	2	1.4
Proteus mirabilis	2	1.4
Pseudomonas aeruginosa	6	4.1
Staphylococcus aureus	4	2.8
Swab GRAM positive	2	1.4
No Growth	122	84.1
Total	145	100.0

Sputum Culture Result	Frequency	Percent
Acinetobacter baumannii	4	2.8
Aeromonas sobria	2	1.4
Escherichia coli and Streptococcus pneumoniae	1	.7
Gram-negative Bacilli	3	2.1
Normal oral Flora	3	2.1
Proteus mirabilis	1	.7
No Growth	131	90.4
Total	145	100.0

Urine Culture Result	Frequency	Percent
Candida species	2	1.4
Enterococcus faecalis	1	.7
Escherichia coli	21	14.5
Gram negative bacteria	2	1.4
Klebsiella pneumoniae	2	1.4
Pseudomonas aeruginosa	2	1.4
Streptococcus pneumoniae	1	.7
No growth	114	78.7
Total	145	100.0

Characteristics	Patients received antibiotic < 1 hour (n%)	Patients received antibiotic > 1 hour(n%)	P value
BLOOD CULTURE RESULT			
Escherichia coli	8.0%	3.2%	0.045
Klebsiella pneumoniae	4.0%	0.0%	
Proteus mirabilis	2.0%	1.1%	
Pseudomonas aeruginosa	8.0%	2.1%	
Staphylococcus aureus	4.0%	2.1%	
No Growth	72%	90.6%	
URINE CULTURE RESULT			
Candida species	4.0%	0.0%	0.00
Enterococcus faecalis	0.0%	1.0%	
Escherichia coli	30.0%	6.3%	
Klebsiella pneumoniae	2.0%	1.1%	
Pseudomonas aeruginosa	0.0%	1.1%	
Streptococcuspneumoniae	0.0%	1.1%	
No Growth	60%	88.5%	
SPUTUM CULTURE RESULT			
Acinetobacter baumannii	6.0%	1.1%	0.278
Aeromonas sobria	2.0%	1.1%	
Escherichia coli and streptococcus pneumoniae	0.0%	1.1%	
Gram-negative bacilli	2.0%	2.1%	
Normal oral flora	4.0%	1.1%	
Proteus mirabilis	2.0%	0.0%	
No Growth	84.0%	93.7%	

Discussion

In this prospective observational study patient with age greater then 18 years old were Included and patient from any department to ICU department cause of admission is independent of any disease, door-to-antibiotic time was not associated with in-hospital mortality. Sterling et al. (18) found no significant differences when comparing the antibiotic administration within 3 hours from ED triage and within 1 hour from septic shock recognition. Door-to-antibiotic time and in-hospital mortality were themain focuses of this study, which showed that each extra hour (relative to door-to-antibiotic time ≤1 hour) was not associated with an increase in the mortality rate. The highest mortality rate in this study was in the door- to-antibiotic group of >1hours. Likewise, Peltan et al.

(22) found that a door-to-antibiotic time cutoff of 3 hourswas associated with mortality, but a cutoff of 1 hour did not show statistical significance. When the door-to- antibiotic times of ≤1 hour and >1hour were compared, the ≤1-hour group had greater severity of illnesses based on the ESI level and NEWS. For this reason, the door-to-antibiotic time of ≤1 hour had a higher mortality rate than the patients who received antibiotics later. The SSC guideline recommends antibiotic initiation within 1 hour. Nonetheless, many studies showed failure to achieve that goal. For instance, Abe et al. (23) found that30.5% of cases received antibiotics within 1 hour. Ko et al. (24) revealed that the 1-hour target was achieved in 28.6% of septic shock patients treated in the EU. In this study, 48, 96.0%. of the patients received antibiotics within 1 hour and treated in ICU department.

During our study period, the hospital had 145 cases from July 22, 2022 till November 28, 2022 in that female= 63,43.4% and male 82, 56.6%. The patients age group was divided into 7 groups 31-40,41-50,51-60,61-70,71- 80,81-90,91-100 in which 61-70 maximum patient were admitted in hospital 46,31.7%

and minimum patient admitted in hospital age group is 91-100 in hospital 1,0.7%. The cause of admission of patient wasmaximum was for respiratory and lung disease 30,2.1% kidney disease 17, 11.9% cardiovascular disease 16,11.2% fever 15,10.5%, sepsis 14,9.8%. Antibiotic meropenem 67, 46.2% piperacillin & tazobactam 40, 27.6%, ceftazidine and avibactam 5,3.4%. Patients who received antibiotics within 1 hour of admission are 50 out of145 patients 34.5%. ITU outcome is divided into three different parts one is ITU discharge 132,97.9% ITU Death3,2.1%. Hospital outcome of the patients is grouped into two variables that are death and discharge among 145 cases 11,7.6% died and 134,92.4% were discharged from the hospital. The co-morbidities are another variable that impacts the study and the calculation also hypertension is a common co-morbidities 115,76.3%, diabetes 71,49%, renal disease 3,2.1% lung disease 6,4.1% heart disease 9,6.2%. The blood culture was done for 97,66.7%escherichia coli 7,4.8%pesudomonas Aeruginosa 6,4.1%. The urine culture was done or 142,97.9%escherichia coli 21,14.5%, sputum culture 17,11.7% Acinetobacter baumanni 4,2.8% gram-negative bacilli 3,2.1% normal oral flora 3,2.1%. Mortality death 12,8.3%, discharge 133,91.7%. In the total population n=145 Antibiotics were compared with antibiotic police it complies with the antibiotic drug listprovidede wish list with the organism (Document: AMRI/DHK/HIC/POL/02 effective 15/09/2022) [46]. all are appropriate so we can conclude that antiantibioticschwere received against the Organism Antibioticsusceptibility (Table 8)

Conclusion

In my study, it is demonstrated that gram-negative bacteria remains the major pathogen as has been demonstrated in most ICUs in India. Mortality of the patients were grouped into two groups, antibiotic received within one hour and other major group is antibiotic received more than one hour. The antibiotic received within one hour is sub group into antibiotic (death 2,4.0% and discharge 48,96.0%) and antibiotic received within more than one hour antibiotic (10,10.5%death and 85,89.5% discharge) the p value is 0.175. There was no significant difference in the mortality and in the choice of antibiotic in ICU of the patients as the p value is > 0.05. There was no significant difference in the mean of ICU length of stay and mean hospital length of stay of patients based on the timing of antibiotic and theappropriate antibiotic was compare by the antibiotic policy.

Limitations

Number of patient population is small. The Sensitive % was not calculated. The study says the impact of appropriate antibiotics within 1hour of patient's admission and the culture report takes 3 days so Antibiotics were compared with the antibiotic policy it complies with the antibiotic drug list provided with the list with the organism (Document: AMRI/DHK/HIC/POL/02 effective 15/09/2022) all are appropriate so we can conclude that antibiotic which was received against the Organism Antibiotic susceptibility.

Conflict Of Interest

The authors have no conflict of interest

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