Content available at: https://www.ipinnovative.com/open-access-journals

International Journal of Pharmaceutical Chemistry and Analysis

Journal homepage: https://www.ijpca.org/

Original Research Article

To study the incidence of pre-hospital antibiotic therapy among critically ill patients admitted in rural tertiary care hospital

Guntupalli Suma Geetika[1], Suhit Natekar[1], Akshaya N Shetti[1,*]

[1]*Dept. of Anesthesiology and Critical Care, Rural Medical College, PIMS, Loni, Maharashtra, India*

ARTICLE INFO

Article history:
Received 23-03-2021
Accepted 06-04-2021
Available online 04-05-2021

Keywords:
Antibiotics
Incidence
Prehospital
Critically ill

ABSTRACT

There is considerate amount of stress which lies in the application of antibiotics in critically ill patients. A study on pre-hospital antibiotic administration in such patients would provide crucial data and go a long way in determining and understanding trends in antibiotic prescribing, to identify where necessary steps to be taken to improve prescribing are most needed and to measure progress.

Materials and Methods: After ethical committee approval, we have conducted an observational cross-sectional study for four months. We collected the data from patient or the relatives regarding prehospital antibiotic therapy on admission.

Results: A total of 137 patients got admitted in the Medical intensive care unit (MICU) during the study period. Out of them, 91.24% of patients got admitted directly in MICU and 8.75% were referred from different hospitals. Those who received antibiotics prior to the admission were 2.18% and 93.43% of patients had not received antibiotics; the other patients who were not sure of antibiotic consumption were 4.37%. Among those 2.18% of patients who received, it was observed the most commonly utilized first antibiotic in our study was amoxicillin clavulanate potassium 66.66%. In all the patients that received more than one antibiotic, Metronidazole was the second antibiotic that was administered via intravenous route.

Conclusion: Amoxicillin clavulanate potassium was the most commonly and metronidazole was the second most antibiotic prescribed in prehospital admission. Proper guidelines should be initiated for the starting of the antibiotic therapies in India for general practitioners.

1. Introduction

The most common problem in the intensive care unit (ICU) are infections and antibiotics are therefore commonly used in this setting.[1] Antibiotics are also administered as prophylaxis to prevent or limit major infections in critically ill patients.[2] However, the management of such infections in the intensive care unit (ICU) is challenging, even though an early and appropriate antibiotic therapy is administered.[3] World Health Organization (WHO) delivered a report which stated most of the resistance happened because of improper and widespread use of antibiotics.[4] Till date about 5,000 antimicrobial agents (AMAs) have been discovered, out of which 100 drugs are used clinically. The resistance to AMAs is increasing over time.[5] As a result of widespread injudicious use of these agents, multi resistant organisms might arise and this is important for us as these organisms may be associated with higher mortality.[6] When the most appropriate antimicrobial agent has been chosen, it is important to then provide the right antibiotic dose regimen for the specific patient.[7,8] Therefore, we conducted our study to know the utilization pattern of antibiotics which would help us determine the most commonly used antibiotics in pre-hospital antibiotic therapy among critically ill patients admitted in critical care unit

2. Materials and Methods

We conducted an observational cross-sectional study in Department of Critical Care Unit of rural a tertiary care

* *Corresponding author*.
E-mail address: aksnsdr@gmail.com (A. N. Shetti).

https://doi.org/10.18231/j.ijpca.2021.007

unit in Maharashtra, India and the data was collected from September 2020 to December 2020 after ethical committee approval. Patients aged above 18years, of either gender and were admitted in rural tertiary care medical intensive care unit (MICU) willing to give informed written and verbal consent were included in this study.

Patients shifted from general ward to MICU and unconscious patient having no relatives but admitted in MICU were excluded from the study. In all the patients who were admitted in rural tertiary care ICU, Data is taken regarding demographic profiles like age, gender, diagnosis, type of admission whether direct or referred, type of ICU. We gathered data about, if the patients received pre hospital antibiotics or not, total number, name and class of the antibiotic, route of administration and frequency and duration and the antibiotic was advised by whom either a medical person or a non-medical person.

3. Results

A total of 137 patients got admitted in MICU during the study period. Out of them, 61(44.52%) females and 76 (55.47%) were males and the median age group was 18-40years among whom 125 (91.24%) of patients got admitted directly in ICU and 12 (8.75%) were referred from different hospitals (Table 1). Among 137 patients, the most common diagnosis was organophosphorus poisoning, followed by cerebrovascular accident, myocardial infarction, chronic kidney disease and snake bite (Figure 1). 3 patients (2.18%) received antibiotics prior to the admission and 128 (93.43%) of patients had not received antibiotics, the other group of patients who were not sure of antibiotic consumption was 6 (4.37%). The patients who received, it was observed the most commonly utilized first antibiotic in our study was amoxicillin clavulanate potassium 2(66.66%) in a twice daily dosage schedule via intravenous route, followed by ceftriaxone 1(33.33%). In all the patients that received more than one antibiotic, Metronidazole (nitroimidazole) was the second antibiotic that was administered via intravenous route(Table 2). None of the patients reported any adverse effects following antibiotic therapy. Most commonly, allopathic doctors prescribed the antibiotic therapy in these patients in comparison with ayurvedic doctors or pharmacists.

4. Discussion

The antimicrobial usage has been well defined for many years, but still inappropriate use of antimicrobials remains wide spread. In our study, the demographic parameters of the patients who were admitted in MICU revealed that 61(44.52%) females and 76 (55.47%) were males and the age group was between 18 and 40years. Patients with divergent clinical issues were admitted to the ICU during our study period. Among them, the most common

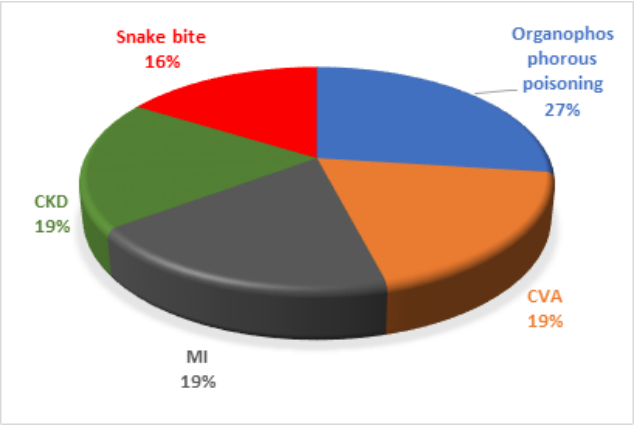

Fig. 1: Most common disease among admitted patients

diagnosis was organophosphorus poisoning, followed by cerebrovascular accident, myocardial infarction; chronic kidney disease and snake bite (Figure 1). 3(2.18%) patients received antibiotics prior admission and 128 (93.43%) of patients had not received antibiotics.

In Our study it was found that only little number of patients was prescribed an antibiotic at admission. Biswal et al[9] said that nearly 62% patients in a tertiary care ICU in northern India received antibiotics, while Shrikala et al[10] reported that 64% of ICU patients consumed antibiotics. Data from other countries report 60%-75% rates of antibiotic prescription in the ICU,[11,12] and studies from Europe report an average antibiotic use of 58%-61%.[13] But, here all the above studies have shown data of overall antibiotic usage and specifically not of antibiotic usage at admission, which might be the reason why our figures are lesser in number. Coming to our study, from 2.18% of patients who received antibiotic it was observed the most commonly utilized first antibiotic was amoxicillin clavulanate potassium 2 (66.66%) in a twice daily dosage schedule via intravenous route, followed by ceftriaxone 1(33.33%). In all the patients that received more than one antibiotic, Metronidazole (nitroimidazole) was the second antibiotic that was administered via intravenous route. Biswal et al stated that metronidazole followed by cefotaxime, amoxycillin/clavulanic acid, cefepime, and ciprofloxacin were the most frequently prescribed antibiotics at ICU admission[9] In another Indian study cefoparazone/sulbactam or piperacillin/tazobactam were the most commonly prescribed antibiotics at admission.[10] Depending upon various studies conducted from India, third generation cephalosporin followed by meropenem, metronidazole, ceftriaxone and levofloxacin were the five most highly taken antibiotics. Antibiotic administration is required in majority of the ICU patients, but ample use of these might lead to the development of resistant strains of organisms.[14] The use of antibiotics more than needed has been reported to increase the risk of toxicity and drug

Table 1: Demographic data

Parameters		Total admissions	Total
Sex	Male	76	137
	Female	61	
Age	18 to 40	53	137
	41 to 60	50	
	60 to 80	32	137
	> 80 years	2	
Type of Admission	Direct	125	137
	Referred	12	

Table 2: Type of antibiotics prescribed

Antibiotic		Class of antibiotic	Route of administration	Schedule	Number of admissions
Antibiotic 1	Amoxicillin / Clavulanic acid	Penicillin - β-lactamase inhibitor	IV	BD	2
	Ceftriaxone	Third-generation cephalosporin	IV	BD	1
Antibiotic 2	Metronidazole	Nitroimidazole	IV		1

interactions.[13]

5. Limitations

The study wasconducted for a limited time period hence less sample size was obtained. For broader picture we need large sample size. The hospital being in a rural area, direct admissions are more than referrals thus one cannot extrapolate or generalize the data nationally or globally.

6. Conclusion

Even in our rural tertiary care unit, the prehospital antibiotic therapy was found common. In A 2.18% of patients have received pre hospital antibiotics and most of them been prescribed by allopathic doctors and they gave broader spectrum antibiotic therapy. A strict national guidelines or law should be brought national wide for the proper use of antibiotic therapy.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Alberti C, Brun-Buisson C, Burchardi H, Martin C, Goodman S, Artigas A, et al. Epidemiology of sepsis and infection in ICU patients from an international multicentre cohort study. *Intensive Care Med*. 2002;28(2):108–21. doi:10.1007/s00134-001-1143-z.
2. Mangram AJ, Horan TC, Pearson ML. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol*. 1999;20:250–78.
3. Ferrer R, Loeches IM, Phillips G, Osborn TM, Townsend S, Dellinger RP, et al. Empiric antibiotic treatment reduces mortality in severe sepsis and septic shock from the first hour: results from a guideline-based performance improvement program. *Crit Care Med*. 2014;42(8):1749–55.
4. World Health Organization. Community based surveillance of Antimicrobial use and resistance in resource constrained settings; 2009.
5. Anand N, Nayak IMN, Advaitha MV, Thaikattil NJ, Kantanavar KA, Anand S. Antimicrobial agentsútilization and cost pattern in an Intensive Care Unit of a Teaching Hospital in South India. *Indian J Crit Care Med*. 2016;20(5):274–9. doi:10.4103/0972-5229.182200.
6. Salacata A, Chow JW. Cephalosporin therapeutics for intensive care infections. *New Horiz*. 1993;1(2):181–187.
7. Rayner CR, Forrest A, Meagher AK, Birmingham MC, Schentag JJ. Clinical pharmacodynamics of linezolid in seriously ill patients treated in a compassionate use programme. *Clin Pharmacokinet*. 2003;42(15):1411–23.
8. Lent-Evers N, Mathôt RAA, Geus WP, Hout BA, Vinks A. Impact of Goal-Oriented and Model-Based Clinical Pharmacokinetic Dosing of Aminoglycosides on Clinical Outcome: A Cost-Effectiveness Analysis. *Ther Drug Monitoring*. 1999;21:63–73. doi:10.1097/00007691-199902000-00010.
9. Biswal S, Mishra P, Malhotra S, Puri GD, Pandhi P. Drug Utilization Pattern in the Intensive Care Unit of a Tertiary Care Hospital. *J Clin Pharmacol*. 2006;46(8):945–51. doi:10.1177/0091270006289845.
10. Shrikala B, Kranthi K, Nafisa. A prospective study on evaluation of antibiotic prescription practices in an intensive care unit of a tertiary care hospital. *J Clin Diag Res*. 2010;4:3387–91.
11. Erbay A, Bodur H, Akıncı E, Çolpan A. Evaluation of antibiotic use in intensive care units of a tertiary care hospital in Turkey. *J Hosp Infect*. 2005;59(1):53–61. doi:10.1016/j.jhin.2004.07.026.
12. Hanssens Y, Ismaeil BB, Kamha AA, Elshafie SS, Adheir FS, Saleh TM. Antibiotic prescription pattern in a medical intensive care unit in Qatar. *Saudi Med J*. 2005;26:1269–76.
13. Emmerson M. Antibiotic usage and prescribing policies in the intensive care unit. *Intensive Care Med*. 2000;26(0):S026–S030. doi:10.1007/s001340051115.
14. Sarraf D, Phunyalb M, Mandals M, Rauniar G. Utilization pattern of antimicrobial agents and its culture sensitivity pattern in intensive care units in a tertiary care center in eastern Nepal. *Nepal Med Coll J*. 2015;17(3-4):107–12.

Author biography

Guntupalli Suma Geetika, Resident

Suhit Natekar, Assistant Professor

Akshaya N Shetti, Professor

Cite this article: Geetika GS, Natekar S, Shetti AN. To study the incidence of pre-hospital antibiotic therapy among critically ill patients admitted in rural tertiary care hospital. *Int J Pharm Chem Anal* 2021;8(1):32-35.