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Escalation and De-Escalation of Antibiotic Therapy at a Tertiary Care Hospital in Telangana

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Abstract

Antibiotic therapy is the most common practice in regular practice by most of the practitioners. With increased antibiotic therapy by the practitioners and poor awareness of most of the patients may result in antibiotic resistance. Because of this present situation, the antibiotic therapy has to be judicious and appropriate. Antibiotic de-escalation is broad, empiric discontinuation or replacement with a narrow spectrum antibiotic drugs. The aim of the present research work is to study and evaluate the incidence of antibiotic de-escalation among patients who were initiated on empirical antibiotic treatment. Patients who are suitable into the inclusion criteria will be released after 48 to 72 hours to look for the evidence based definitive diagnosis. Out of 1180 patients who were screened from June 2020 to March 2021.we found 198 patients fulfilled our inclusion criteria. We did not find any gender preponderance but most of the study population fulfilling the inclusion criteria had comorbid illness. The laboratory evidence for de-escalation was by the culture based evidence, especially blood cultures. We noticed that the small proportion of patients who are been treated for sepsis caused by bacteria were not culture positive this can be explained by untimely collection of the sample.

Keywords: Antibiotic therapy, Antibiotic de-escalation, antibiotic stewardship, antibiotic resistance, antimicrobial stewardship.

Introduction

Antibiotic therapy is the most common practice in regular practice by most of the practitioners. With increased

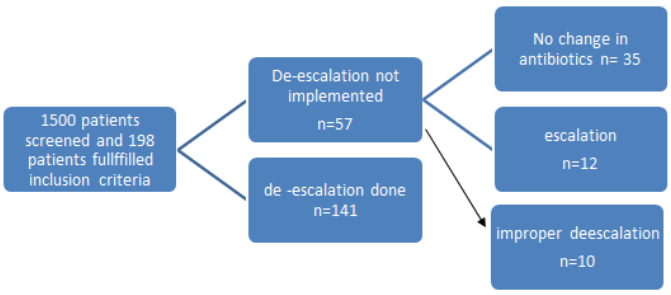
antibiotic therapy by the practitioners and poor awareness of most of the patients may result in antibiotic resistance. Because of more occurrence of many cases of antibiotic resistance, there is a need for development of novel antibiotic agents. But, in the present situation development and approval of novel antibiotics is considerably decreased. Because of this present situation, the antibiotic therapy has to be judicious and appropriate. Antibiotic de-escalation is broad, empiric discontinuation or replacement with a narrow spectrum antibiotic drugs. This type of de-escalation of antibiotic therapy is now focused for the proper benefit of the mankind [1-4]. In accordance with this, it has been found that de-escalation is safe and not associated with poorer outcomes[3-12]. As per Infectious Diseases Society of America stewardship guidelines streamlining and de-escalation of empirical antibiotic therapy is found to be more effective in targeting the causative pathogen resulting in decreased antibiotic exposure and substantial cost savings[13]. Few studies which are available suggest different frequency of antibiotic de-escalation with a range of 10% to 70% [14-18]. The aim of the present research work is to study and evaluate the incidence of antibiotic de-escalation among patients who were initiated on empirical antibiotic treatment. The objectives of the study are to determine the proportion of patients in whom antibiotic de-escalation is done and to study factors associated with de-escalation of the empirical therapy.

Materials and methods

The present study has been conducted on the patients who have been admitted in the in-patient departments, who were admitted in the medical wards and ICUs at Maheshwara Medical College, Chitkul(V), Patancheru(M), Sangareddy Dist, Telangana State on empirical antibiotic therapy. Patients were recruited during the duration from June 2020 to March 2021. The inclusion criteria for the present study is adult patients of age > 18 yrs are included in the study; patients admitted to the medical wards; patients whose definitive diagnosis was made based on the laboratory or clinical evidence. While exclusion criteria are patients who deny to sign the informed consent; patients with recurrent infections.

As per the institutional antibiotic policy, empirical antibiotic therapy prescribed to patients on the basis of the medical history, suspected infections. Patients who are suitable into the inclusion criteria will be released after 48 to 72 hours to look for the evidence based definitive diagnosis. If the definitive diagnosis of the patient was confirmed by the treating physician, these patients were assessed for the antibiotic de-escalation. The patients clinical wellbeing will be assessed by the concerned treating physician by evaluating the signs of clinical instability such as presence of increased body temperature (fever), blood pressure (<90mmHg), heart rate >100 beats per minute.

Criteria for descalation of the antibiotic therapy are shift from broad spectrum to narrow spectrum; Change to monotherapy from combination therapy; No antibiotic usage in non- infectious cases; Ensuring not to give any antibiotics in viral infections unless secondary bacterial infections are proven by the culture and antimicrobial susceptibility testing done. For de-escalation we have created a request form. During the hospital infection control rounds, we as a microbiologist will request the concerned treating physician for de-escalation. Physician will take the decision taking the patient clinical condition of the patient into consideration.



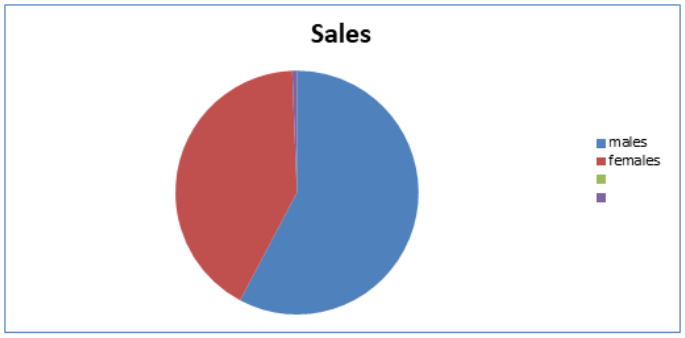


Figure 1 : Among 198 patients fulfilling the inclusion criteria has 111 males and 80 females

Median age of the population recruited: 50 and mean is 48

Most of the patients admitted had co-morbidities

HTN> diabetes>Ischemic heart disease

Table 1: Comorbid conditions among the study population

No of patients	Percentage
Hypertension (75)	37.8%
Diabetes mellitus (60)	30%
Heart disease (20)	10%
Renal failure(10)	5.5%
Cardiac failure (8)	4%
Thyroid disorder (4)	2%
Liver disease (3)	1.5%
COPD(3)	1.5%
Hiv positive (2)	1%
Pregnancy (2)	1%

Table 2: Among 198 patients, 130patients had co morbidities, 57 patients had dual co morbidities

Dual comorbid conditions observed	percentage
Diabetes with HTN (48)	24%
Hypertension with renal failure (4)	2%
Hypertension with cardiac failure (5)	2.5%

Table 3: Vital signs at admission

Mean heart rate was 108/min, mean arterial pressure 87mmhg and respiratory rate of 26/min

Vital signs at admission	Mean (SD)
Pulse rate (bpm)	108(30)
Respiratory rate (RR/min)	26(10)
GCS	15(5)
Systolic blood pressure(mmHg)	110(30)
Diastolic blood pressure(mmHg)	72(30)
Mean arterial pressure (mmHg)	87(25)
Median sofa score at admission(IQR)	1(1-1)
Median qsofa score at admission (IQR)	1(0-1)

The most common clinical diagnosis was pyelonephritis, followed by community acquired pneumonia.

Table 4: Diagnosis at initiation of treatment

Clinical diagnosis	Patients
Pyelonephritis	78
Community acquired pneumonia	72
Catheter associated UTI	3
Acute febrile illness	28
Gastrointestinal infections	8
Soft tissue infections	6
Infective endocarditis	2
Meningitis	1

Table 5: Antibiotics initiated

Cefaperazone sulbactum	62(31%)
Piperacillin tazobactum	55(27.7%)
Azithromycin	20(10%)
Meropenem	5(2.5%)
Ceftriaxone	35(17.6%)
vancomycin	2 (1%)
Colistin	1(0.5%)
doxycycline	7(3.5%)
acyclovir	5(2.5%)
oseltamavir	6(3.3%)

Table 6: The most common methods for confirming the microbiological diagnosis was blood, urine, sputum culture and PCR for influenza viruses

Sputum culture	42 (21%)
Urine culture	30(15%)
Blood culture	50(25%)
Pcr	10(5%)
Serology	60(30%)
Pus culture	5(2.5%)
CSF	1(0.5%)

Table 7: Organisms isolated from blood

Organisms isolated	patients
Non fermenting GNB	2(1%)
Pseudomonas spp	5(2.5%)
S.typhi	5(2.5%)
Streptococcus pneumoniae	4(2%)
Klebsiella pneumoniae	10(5.5%)
S.aureus	8(4%)
E.coli	16(8%)

Table 8: Organisms isolated from urine

Organism isolated	Patients
Escherichia.coli	24(12%)
Klebsiella pneumoniae	5(2.5%)
Enterococcus	1(0.5%)

Table 9: Serology n=60

Tests done	Patients
Widal	35 (68%)
Leptospira	3(1.5%)
dengue	12(6%)
Pcr	
influenza	10(5.5%)

Table 10: The change in plan of treatment by the treating physician after the availability of the laboratory reports

Action taken n=141	N (%)
Narrow spectrum	104(52%)
IV to oral	29(15%)
Completely stopping the antibiotic treatment	22(11%)
Switch from combination therapy to mono therapy	43(21%)

Discussion

This study was one of the few which is been looking for the proportion of antibiotic de-escalation in the Indian setting. This study is aimed to identify the proportion of patients who underwent de-escalation among those receiving empirical therapy for syndromic approach. Out of 1180 patients who were screened from June 2020 to March 2021.we found 198 patients fulfilled our inclusion criteria. We did not find any gender preponderance but most of the study population fulfilling the inclusion criteria had comorbid illness. The laboratory evidence for de-escalation was by the culture based evidence, especially blood cultures. We noticed that the small proportion of patients who are been treated for sepsis caused by bacteria were not culture positive this can be explained by untimely collection of the sample. We would further conclude that the de-escalation of empiric antibacterial therapy has to be sufficiently recognized as an important principle of antibiotic stewardship. It has

also to be noted that the antibiotic de-escalation may not be feasible or appropriate in all the cases or in all the patients.

Future studies may be focused on the frequency of antibiotic de-escalation at other hospital setups. Furthermore, studies done with increased duration of comparisons of the frequency of antibiotic de-escalation will definitely add further important information on the frequencies and change over time for antibiotic de-escalation.

References

1. Singh N, Rogers P, Atwood CW, et al. Short-course empiric antibiotic therapy for patients with pulmonary infiltrates in the intensive care unit: a proposed solution for indiscriminate antibiotic prescription. Am J Respir Crit Care Med. 2000;16:505–11.
2. Giantsou E, Liratzopoulous N, Efraimidou E, et al. De-escalation therapy rates are significant higher by bronchoalveolar lavage than by tracheal aspirate. Intensive Care Med. 2007;33:1533–40.
3. Heenen S, Jacobs F, Vincent JL. Antibiotic strategies in severe nosocomial sepsis: Why Do We Not De-escalate more often? Crit Care Med. 2012;40:1404–409.
4. Kaki R, Elligsen M, Walker S, et al. Impact of antimicrobial stewardship in critical care: a systematic review. J Antimicrob Chemother. 2011;66:1223–230.
5. Niederman M, Soulountsi V. De-escalation therapy: is it valuable for the management of ventilator-associated pneumonia? Clin Chest Med. 2011;32: 517–34.
6. Shime N, Satake S, Fujita N. De-escalation of antimicrobials in the treatment of bacteraemia due to antibiotic-sensitive pathogens in immunocompetent patients. Infection. 2011;39:319–25.
7. Morel J, Casoetto J, Jospe R, et al. De-escalation as part of a global strategy of empiric antibiotherapy management: a retrospective study in a medicosurgical intensive care unit. Crit Care. 2010;14:1–7.
8. Schleuter M, James C, Dominguez A, et al. Practice patterns for antibiotic De-escalation in culture negative healthcare-associated pneumonia. Infection. 2010;38:357–62.
9. Eachempati SR, Hydo LJ, Shou J, et al. Does de-escalation of antibiotic therapy for ventilator-associated pneumonia affect the likelihood of recurrent pneumonia or mortality in critically ill surgical patients? J Trauma. 2009;66:1343–8.
10. Boyce JM, Pop OF, Abreu-Lanfranco O, et al. A trial of discontinuation of empiric vancomycin therapy in patients with suspected methicillin-resistant staphylococcus aureus health care-associated pneumonia. Antimicrob Agents Chemother.2013;57:1163–8.
11. Pardo J, Klinker KP, Borgert SJ, et al. Time to positivity of blood cultures supports antibiotic de-escalation at 48 hours. Ann Pharmacother. 2014;48:33–40.
12. Garnacho-Montero J, Gutierrez-Pizarraya A, Escoresca-Ortega A, et al. Deescalation of empirical therapy is associated with lower mortality in patients with severe sepsis and septic shock. Intensive Care Med. 2014;40:32–40.
13. Dellit TH, Owens RC, McGowan Jr JE, et al. Infectious diseases society of America and the society for healthcare epidemiology of america guidelines for developing an institutional program to enhance antimicrobial stewardship. Clin Infect Dis. 2007;44:159–77.

14. Montravers P, Piednoir P, Allou N. De-escalation: in drug we trust. Crit Care Med. 2012;40:1645–646.
15. Masterton RG. Antibiotic de-escalation. Crit Care Clin. 2011;27:149–62.
16. Bal AM, Gould IM. Antibiotic stewardship: overcoming implementation barriers. Curr Opin Infect Dis. 2011;24:357–62.
17. Gonzalez L, Cravoisy A, Barraud D, et al. Factors influencing the implementation of antibiotic de-escalation and impact of this strategy in critically ill patients. Crit Care. 2013;17(4):R140.
18. De Waele JJ, Ravyts M, Depuydt P, et al. De-escalation after empirical meropenem treatment in the intensive care unit: fiction or reality? J Crit Care. 2010;25:641–6.
19. Tabah A, Cotta MO, Garnacho-Montero J, Schouten J, Roberts JA, Lipman J, Tacey M, Timsit JF, Leone M, Zahar JR, De Waele JJ (2016) A systematic review of the definitions, determinants, and clinical outcomes of antimicrobial de-escalation in the intensive care unit. Clin Infect Dis 62:1009–1017. https ://doi.org/10.1093/cid/civ11 99.
20. De Waele JJ, Akova M, Antonelli M, Canton R, Carlet J, De Backer D, Dimopoulos G, Garnacho-Montero J, Kesecioglu J, Lipman J, Mer M, Paiva JA, Poljak M, Roberts JA, Rodriguez Bano J, Timsit JF, Zahar JR, Bassetti M (2018) Antimicrobial resistance and antibiotic stewardship programs in the ICU: insistence and persistence in the fight against resistance. A position statement from ESICM/ESCMID/WAAAR round table on multi-drug resistance. Intensive Care Med 44:189–196. https ://doi.org/10.1007/s00134-017-5036-1.
21. Garnacho-Montero J, Gutiérrez-Pizarraya A, Escoresca-Ortega A, Fernández- Delgado E, López-Sánchez JM (2015) Adequate antibiotic therapy prior to ICU admission in patients with severe sepsis and septic shock reduces hospital mortality. Crit Care 19:302. https ://doi.org/10.1186/s1305 4-015-1000-z.
22. Sadyrbaeva-Dolgova S, Aznarte-Padial P, Pasquau-Liaño J, Expósito-Ruiz M, Calleja Hernández MÁ, Hidalgo-Tenorio C (2019) Clinical outcomes of carbapenem de-escalation regardless of microbiological results: a propensity score analysis. Int J Infect Dis 85:80–87. https ://doi.org/10.1016/jijid.2019.04.034.
23. Madaras-Kelly K, Jones M, Remington R, Hill N, Huttner B, Samore M (2014) Development of an antibiotic spectrum score based on veterans affairs culture and susceptibility data for the purpose of measuring antibiotic de-escalation: a modified Delphi approach. Infect Control Hosp Epidemiol 35:1103–1113. https ://doi.org/10.1086/67763 3.
24. Denny KJ, De Wale J, Laupland KB, Harris PNA, Lipman J (2019) When not to start antibiotics: avoiding antibiotic overuse in the intensive care unit. Clin Microbiol Infect. https ://doi.org/10.1016/j.cmi.2019.07.007.
25. Van den Bosch CM, Hulscher ME, Natsch S, Wille J, Prins JM, Geerlings SE (2016) Applicability of generic quality indicators for appropriate antibiotic use in daily hospital practice: a cross-sectional point-prevalence multicenter study. Clin Microbiol Infect 22:888.e1–888.e9. https ://doi. org/10.1016/j.cmi.2016.07.011.