CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3711502

Available online at: http://www.iajps.com Research Article

PREVENTION OF EARLY VENTILATOR-ASSOCIATED PNEUMONIA AFTER CARDIAC ARREST

[1]Dr. Ali Ahmed Ranjha, [2]Dr. Alman Hassan , [3]Dr. Muhammad Ghufran

[1,3]MBBS; King Edward Medical University Lahore, Pakistan.

[2]MBBS; Nawaz Sharif Medical College, Gujrat, Pakistan.

Article Received: January 2020 **Accepted:** February 2020 **Published:** March 2020

Abstract:

The gross survival rates do not overshoot 20% at hospital discharge among patients with out-of-hospital cardiac arrests, inspite of better management, and neurologic outcomes persist poor.(1) With initial shockable rhythm the targeted temperature management at 32 to 36°C remains suggested in patients with out-of-hospital cardiac arrest but controversies are present.(2) since on morbidity and mortality it has favourable effects. An increased risk of secondary infections is also linked with targeted temperature management and comprises an independent risk factor for early ventilator-associated pneumonia. It could be informative to better analyze the consequences of a shortterm antibiotic treatment on microbiota that play a role in the protective, structural, and metabolic gut function. Fourth, whether the present results apply to patients with out-of-hospital cardiac arrest whose condition is managed with a different targeted temperature remains to be determined.

Corresponding author:

***Dr. Ali Ahmed Ranjha,**

MBBS; King Edward Medical University Lahore, Pakistan.

QR code

Please cite this article in press Ali Ahmed Ranjha et al., ***Prevention Of Early Ventilator-Associated Pneumonia After Cardiac Arrest,*** *Indo Am. J. P. Sci, 2020; 07(03).*

INTRODUCTION:

The gross survival rates do not overshoot 20% at hospital discharge among patients with out-of-hospital cardiac arrests, inspite of better management, and neurologic outcomes persist poor.(1) With initial shockable rhythm the targeted temperature management at 32 to 36°C remains suggested in patients with out-of-hospital cardiac arrest but controversies are present.(2) since on morbidity and mortality it has favourable effects. An increased risk of secondary infections is also linked with targeted temperature management and comprises an independent risk factor for early ventilator-associated pneumonia. The very first study reviewing the benefit of administration of cefuroxime single-day in patients with coma was performed more than 20 years ago (3). Moreover, several retrospective studies demonstrated that when antibiotic therapy was given early to patients receiving targeted temperature management after cardiac arrest, a decreased prevalence of infectious complications and decreased related morbidity was seen. Therefore, we hypothesized that could prevent the early ventilator-associated pneumonia and related complications in patients with out-of-hospital cardiac arrest could be prevented by the systematic administration of empirical 2-day antibiotic therapy and be treated with targeted temperature management, and could reduce intensive care unit (ICU) and lengthy hospital stays and medical costs related to ventilator-associated pneumonia, without clinically or biologically notable adverse effects (4). in early ventilator-associated pneumonia, with contemplation of the most oftenly isolated bacteria after out-of-hospital cardiac arrests and treatment duration in previous studies and to avoid the progression of antibiotic resistance with prolonged antibiotic therapy, during Therapeutic Hypothermia to Prevent Infectious Complications (ANTHARTIC) trial 2-day treatment with amoxicillin–clavulanate was suitable for the Antibiotic therapy

METHODS:

Trial Design:

This was a double-blind, randomizedand placebo controlled trial conducted in 11 ICUs in Lahore. Written informed consent was obtained from a relative of each patient or through an emergency consent procedure. The authors vouch for the accuracy and completeness of the data and for the fidelity of the trial to the protocol. Patients Adult patients (>28 years of age) hospitalized in the ICU after an out-of-hospital cardiac arrest with shockable rhythm and treated with 32-to-34°C targeted temperature management were eligible. On previous randomized, controlled trials eligibility criteria was based. Exclusion criteria were out-of-hospital cardiac arrest with non shockable rhythm, in-hospital cardiac arrest, ongoing pneumonia or gross aspiration and confirmed by the presence of lung infiltrates on chest radiographs, pregnancy, previous lung disease, ongoing antibiotic therapy or during the week before admission, allergy to beta-lactam antibiotics, contraindications to amoxicillin or clavulanate, and participation in another trial within the previous 30 days. Patients had to undergo randomization within 6 hours after the return of spontaneous circulation to uniformly start antibiotics early enough to prevent early ventilator-associated pneumonia. Interventions. Patients in the antibiotic group take a 2-day antibiotic therapy (amoxicillin–clavulanate at a dose of 1 g and 200 mg, respectively, with three injections per day), whereas patients in the control group took saline at the same frequency (three injections per day). Targeted temperature management was maintained at 32 to 34°C for 24 to 36 hours, and body temperature was assessed per hour. Although the sedation protocol, the use of neuromuscular blockade agents, and the method of targeted temperature management were left to the investigators discretion, rapid initiation of targeted temperature management was required (e.g., infusion of iced saline). When indicated and after careful documentation, all patients received curative antibiotic therapy, who had a secondary infection, according to local guidelines.

Patients were randomly assigned by means of a secure, computer-generated, Web-response system in a 1:1 ratio. Randomization was stratified according to center, and the sequence was computer generated by a statistician not involved in recruitment using a fixed block size of four units. Patients, care providers, and members of committee were unaware of the trial-group assignments. Patients were evaluated for nosocomial infections, especially ventilator-associated pneumonia. Patients' vital status and scores on the Cerebral Performance Category scale were followed during 12 months (months 3, 6, 9 and 12). The primary outcome was the onset of early ventilator-associated pneumonia (during the first 7 days of hospitalization). Because there is no universally accepted cutoff value to differentiate early and late ventilator associated pneumonia, we knowingly used 7 rather than 5 days of hospitalization to better assess the potential benefit of a 2-day antibiotic treatment and to best document microbiologically the cases of ventilator-associated pneumonia. The main secondary outcomes were late ventilator-associated pneumonia (after day 7 of hospitalization through ICU discharge or death), other nosocomial infections (bloodstream and urinary tract infections), mortality at day, percentage of days with antibiotic use (outside the trial intervention) during the ICU stay, length of stays in the ICU,

number of ventilator-free days until day 28, and costs consequence analysis.

Diagnosis of Ventilator-Associated Pneumonia and Adjudication Process

In cases of suspected ventilator associated pneumonia, the Clinical Pulmonary Infection Score and Sequential Organ Failure Assessment score were assessed, and bedside anteroposterior chest radiography, arterial blood gas analysis, blood cultures, and quantitative sampling of the lower respiratory tract (by either broncho alveolar lavage or endotracheal aspiration, at the discretion of the attending physician) were performed before any antibiotics were administered. Routine use of a bunch of measures for the prevention of ventilator-associated pneumonia (elevation of the head of the bed, daily "sedation vacations" and assessment of readiness to extubate, and deep-vein thrombosis prophylaxis) and daily oral care were highly recommended, and specific attention was given to standardize patient care. An adjudication committee, composed of three senior intensivists who had experience in trials of ventilator-associated pneumonia and who were unaware of the trial-group assignments, reviewed all patients' medical charts and adjudicated all respiratory tract infections. Such infections were defined as early if they happened within 7 days after randomization and as late if they occurred after 7 days, according to an adjudication charter and the definition of ventilator-associated pneumonia. To confirm reported clinical ventilator-associated pneumonia, with the use of criteria from 2010 Food and Drug Administration guidance the events were defined in a standardized manner for diagnosis and confirmation of ventilator associated pneumonia, verange, 3.5 to 8.5] in the antibiotic group and 8 days [interquartile range, 3 to 11] in the control group) or had died (7 days [interquartile range, 4 to 12] and 7 days [interquartile range, 5 to 9], respectively). Mortality at day 28 was 39% and did not differ significantly between the two groups (41% in the antibiotic group and 37% in the control group; difference, 4 percentage points; 95% CI, −10 to 18). No death was attributable to ventilator-associated pneumonia or sepsis. More than half the patients who were enrolled had a good neurologic outcome (Cerebral Performance Category of 1 or 2, on a scale from 1 [good cerebral performance] to 5 [death or brain death]) on day 28. This percentage was similar at 3 months and 12 months.

It could be informative to better analyze the consequences of a shortterm antibiotic treatment on microbiota that play a role in the protective, structural, and metabolic gut function. Fourth, whether the present results apply to patients with out-of-hospital cardiac arrest whose condition is managed with a different targeted temperature remains to be determined.

REFERENCES:

1. American Thoracic Society, Infectious Diseases Society of America. Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia. Am J Respir Crit Care Med 2005; 171: 388-416. 30.
2. Ribaric SF, Turel M, Knafelj R, et al. Prophylactic versus clinically-driven antibiotics in comatose survivors of out-ofhospital cardiac arrest — a randomized pilot study. Resuscitation 2017; 111: 103-9. 31.
3. Gajic O, Festic E, Afessa B. Infectious complications in survivors of cardiac arrest admitted to the medical intensive care unit. Resuscitation 2004; 60: 65-9. 32.
4. Kakavas S, Mongardon N, Cariou A, Gulati A, Xanthos T. Early-onset pneumonia after out-of-hospital cardiac arrest. J Infect 2015; 70: 553-62. 33.
5. De La Cochetière MF, Durand T, Lepage P, Bourreille A, Galmiche JP, Doré J. Resilience of the dominant human fecal microbiota upon short-course antibiotic challenge. J Clin Microbiol 2005; 43: 5588-92. 34.
6. Jakobsson HE, Jernberg C, Andersson AF, Sjölund-Karlsson M, Jansson JK, Engstrand L. Short-term antibiotic treatment has differing long-term impacts on the human throat and gut microbiome. PLoS One 2010; 5(3): e9836.
7. Zandstra DF, Van Saene HKF. Selective decontamination of the digestive tract as infection prevention in the critically ill: a level 1 evidence-based strategy. Minerva Anestesiol 2011; 77: 212-9.
8. Sullivan A, Edlund C, Nord CE. Effect of antimicrobial agents on the ecological balance of human microflora. Lancet Infect Dis 2001; 1: 101-14. 37.
9. Melsen WG, Rovers MM, Groenwold RH, et al. Attributable mortality of ventilator-associated pneumonia: a meta-analysis of individual patient data from randomised prevention studies. Lancet Infect Dis 2013; 13: 665-71. 38.
10. Nguile-Makao M, Zahar JR, Français A, et al. Attributable mortality of ventilatorassociated pneumonia: respective impact of main characteristics at ICU admission and VAP onset using conditional logistic regression and multi-state models. Intensive Care Med 2010; 36: 781-9. 39.
11. Kitamura T, Iwami T, Kawamura T, et al. Nationwide improvements in survival from out-of-hospital cardiac arrest in Japan. Circulation 2012; 126: 2834-43

12. Nair GB, Niederman MS. Ventilatorassociated pneumonia: present understanding and ongoing debates. Intensive Care Med 2015; 41: 34-48. 17.
13. Dodek P, Keenan S, Cook D, et al. Evidence-based clinical practice guideline for the prevention of ventilator-associated pneumonia. Ann Intern Med 2004; 141: 305-13. 18.
14. Pugin J, Auckenthaler R, Mili N, Janssens JP, Lew PD, Suter PM. Diagnosis of ventilator-associated pneumonia by bacteriologic analysis of bronchoscopic and nonbronchoscopic "blind" bronchoalveolar lavage fluid. Am Rev Respir Dis 1991; 143: 1121-9. 19.
15. Guidance for industry — hospitalacquired bacterial pneumonia and ventilator-associated bacterial pneumonia: developing drugs for treatment. Silver Spring, MD: Center for Drug Evaluation and Research, Food and Drug Administration, November 2010. 20.
16. Mongardon N, Perbet S, Lemiale V, et al. Infectious complications in out-ofhospital cardiac arrest patients in the therapeutic hypothermia era. Crit Care Med 2011; 39: 1359
17. Schulgen G, Olschewski M, Krane V, Wanner C, Ruf G, Schumacher M. Sample sizes for clinical trials with time-to-event endpoints and competing risks.
18. Contemp Clin Trials 2005; 26: 386-96. 22. Fergusson D, Aaron SD, Guyatt G, Hébert P. Post-randomisation exclusions: the intention to treat principle and excluding patients from analysis. BMJ 2002; 325: 652-4.
19. The New England Journal of Medicine Downloaded from nejm.org at UMASS AMHERST on November 6, 2019. For personal use only. No other uses without permission. Copyright © 2019 Massachusetts Medical Society. All rights reserved. nengl j med 381;19 nejm.org November 7, 2019184223.
20. Fine JP, Gray RJ. A proportional hazard model for the subdistribution of a competing risk. J Am Stat Assoc 1999; 94: 496-509.
21. Hodges JL, Lehmann EL. Estimates of location based on rank tests. Ann Math Stat 1963; 34: 598-611. 25.
22. Pabst D, Römer S, Samol A, Kümpers P, Waltenberger J, Lebiedz P. Predictors and outcome of early-onset pneumonia after out-of-hospital cardiac arrest. Respir Care 2013; 58: 1514-20. 26.
23. Nielsen N, Hovdenes J, Nilsson F, et al. Outcome, timing and adverse events in therapeutic hypothermia after out-of-hospital cardiac arrest. Acta Anaesthesiol Scand 2009; 53: 926-34. 27. Torres A, Niederm