

LETTER

Open Access



Advances in antibiotic therapy in the critically ill

Rufu Jia¹ and Linpei Jia^{2*}

See related research by Vincent et al., <http://ccforum.biomedcentral.com/articles/10.1186/s13054-016-1285-6>

Vincent and colleagues discussed some of the key issues related to antibiotic management in the critically ill, including problems associated with timing, duration, and dosing of antibiotics [1]. In particular, the authors highlighted the importance of early diagnosis of infection and controversies about the use of combination or monotherapy and the duration of therapy [1]. We agree that decisions regarding the use of antibiotics should be made on an individual basis, e.g., according to the severity of the disease and local microbiological patterns [1]. However, some issues should be taken into account in determining an antibiotic therapy.

Vincent et al.'s review covered all infections in the critically ill but, with regard to the duration of antibiotic treatment, the authors referred to a guideline for the management of sepsis and septic shock only [2]. Dichotomy according to nosocomial or community-acquired infection seems necessary to make better decisions. Moreover, severe nosocomial infections like sepsis due to resistant Gram-negative bacteria and mild infections like community-acquired pneumonia caused by a susceptible microorganism may need different guidelines. Non-intensive care unit-acquired pneumonia has recently been proposed as a new clinical entity, as epidemiological data seem to be different between patients acquiring hospital-acquired pneumonia in the intensive care unit versus general wards [3].

Among others, the consciousness state of the critically ill seems important for the initiation or discontinuation of antibiotic treatment. Ventilator-associated pneumonia is the most frequent intensive care unit-related infection in patients requiring mechanical ventilation, and comatose patients present a high risk of early-onset ventilator-associated pneumonia [4]. For comatose patients who required mechanical ventilation, antibiotic prophylaxis at intubation lowers the incidence of ventilator-associated pneumonia [4]. In patients with ventilator-associated pneumonia due to non-fermenting Gram-negative bacilli, there appears to be a higher risk of recurrence following short-course therapy, i.e., a 7–8-day course [5].

Doctors in Western countries may say that it takes seven days to cure a common cold with medication but it will take a week to get better without it, but this advice does not apply to developing countries like China. Subsequent bacterial infections may prolong a common cold to as long as one month. The use of antibiotics varies substantially, even among developed countries. This discrepancy is particularly important for pediatric patients and the elderly with poor health. In conclusion, for antibiotic medication, general recommendations should be tempered by awareness of many local and specific factors in order to get the best effect from medicines.

Authors' response

Jean-Louis Vincent, Matteo Bassetti, Bruno François and Fabio S. Taccone

We thank Drs Jia and Jia for their interest in our recent review on antibiotic therapy [1]. Indeed, as mentioned briefly in our concluding paragraph, it is obvious that

optimal antibiotic therapy—in terms of choice of antibiotic, dose, and duration of therapy—in critically ill patients will be influenced by multiple factors. Examples include the past history and age of the patient, the site and severity of infection, any previous prolonged exposure to antibiotics, likely causative organisms, concomitant therapies such as renal support, and

* Correspondence: anny_069@163.com

²Department of Nephrology, The Second Hospital of Jilin University, 130041 Changchun, Jilin Province, China

Full list of author information is available at the end of the article



local microbiological patterns, including bacterial resistance. Another important issue is the immune status of these patients [6]. Sepsis may significantly and rapidly alter cellular and humoral immune responses, such that hospital-acquired (and recurrent) infections may be secondary to a marked immunosuppressed state, which, together with insufficient tissue drug penetrations and high resistance levels, may further limit the definition of “adequate” antibiotic therapy and clinical response in this setting.

Drs Jia and Jia also mention that antibiotic “prophylaxis” may reduce the occurrence of ventilator-associated pneumonia in brain-injured patients [4]. Nevertheless, this strategy had no impact on survival or hospital stay and needs to be further evaluated in prospective studies before it can be considered as “standard of care”.

Regarding the last statement on the use of antibiotics in patients with a common cold in developing countries, we respectfully disagree. Recommendations to rationalize the use of antibiotics in patients with acute respiratory infections have the common objective of minimizing unnecessary antibiotics because “antibiotic pressure” is one of the factors triggering bacterial resistance. Antibiotics are widely misused in medicine, especially for viral infections. Should subsequent bacterial infection develop, appropriate targeted antibiotics should then be started.

Acknowledgements

Thanks for the suggestion from Dr. Hong-Liang Zhang and Ms Jingyan Yang, which helped us to revise the letter and have better understanding of antibiotics.

Authors' contributions

RJ wrote this letter and the idea for it was from LJ. Both authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Consent for publication

All the authors agree with the publication of this letter in *Critical Care*.

Author details

¹Cangzhou Central Hospital, Cangzhou, Hebei Province, China. ²Department of Nephrology, The Second Hospital of Jilin University, 130041 Changchun, Jilin Province, China.

Published online: 05 December 2016

References

- Vincent JL, Bassetti M, François B, Karam G, Chastre J, Torres A, et al. Advances in antibiotic therapy in the critically ill. *Crit Care*. 2016;20:133.
- Dellinger RP, Levy MM, Rhodes A, Annane D, Gerlach H, Opal SM, et al. Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock, 2012. *Intensive Care Med*. 2013;39:165–228.
- Di Pasquale M, Aliberti S, Mantero M, Bianchini S, Blasi F. Non-intensive care unit acquired pneumonia: a new clinical entity? *Int J Mol Sci*. 2016;17(3):287.
- Vallés J, Peredo R, Burgueño MJ, de Freitas AP R, Millán S, Espasa M, et al. Efficacy of single-dose antibiotic against early-onset pneumonia in comatose patients who are ventilated. *Chest*. 2013;143:1219–25.
- Pugh R, Grant C, Cooke RP, Dempsey G. Short-course versus prolonged-course antibiotic therapy for hospital-acquired pneumonia in critically ill adults. *Cochrane Database Syst Rev*. 2015;8:CD007577.
- Grimaldi D, Llitjos JF, Pène F. Post-infectious immune suppression: a new paradigm of severe infections. *Med Mal Infect*. 2014;44:455–63.