International Journal of Infectious Diseases 68 (2018) 115–121

Contents lists available at ScienceDirect

International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid

Perspective

Characteristics and factors associated with nosocomial pneumonia among patients undergoing continuous renal replacement therapy (CRRT): A case–control study

Manhua Zuo[a,b,1], Jun Tang[c,1], Miaomiao Xiang[c], Qing Long[c], Jianping Dai[c], Xiuying Hu[a,*]

[a] West China Nursing School/West China Hospital, Sichuan University, Chengdu, China
[b] Medical College, Hubei University for Nationalities, Enshi, China
[c] Department of Nephrology, The Central Hospital of Enshi Autonomous Prefecture, Enshi, China

ARTICLE INFO

Article history:
Received 3 November 2017
Received in revised form 26 December 2017
Accepted 13 January 2018
Corresponding Editor: Eskild Petersen, Aarhus, Denmark

Keywords:
Continuous renal replacement therapy (CRRT)
Nosocomial pneumonia
Pathogen
Associated factors

ABSTRACT

Objectives: Continuous renal replacement therapy (CRRT) is a specialized type of dialysis. However, the characteristics and factors associated with nosocomial pneumonia in patients undergoing CRRT have received little attention to date. Therefore, this study investigated the characteristics of and factors contributing to nosocomial pneumonia in patients receiving CRRT.
Methods: The clinical data of 1160 patients undergoing CRRT during the period January 2008 to December 2015 were analyzed retrospectively. Of these 1160 cases, 145 (12.5%) were included in the nosocomial pneumonia group, while 1015 were included in the control group.
Results: The primary pathogen in the 145 cases of nosocomial pneumonia in the CRRT patients was *Staphylococcus aureus* (58.57%); the morbidity rate was 12.5%. Multivariate logistic regression analysis revealed that age (odds ratio (OR) 2.209), initial curative time (OR 1.960), underlying diseases (OR 1.820), consciousness disorder (OR 1.616), organ failure (OR 2.154), the Acute Physiology and Chronic Health Evaluation II score (APACHE II) (OR 1.186), and the Charlson Comorbidity Index score (CCI) (OR 1.278) were risk factors for nosocomial pneumonia (all $p < 0.05$). Conversely, the serum white blood cell count (OR 0.585), albumin (OR 0.673), and hemoglobin (OR 0.712) levels were protective factors (all $p < 0.05$).
Conclusions: Results from this study indicate that by modifying risk factors, such as providing adequate nutrition, earlier treatment of underlying diseases, and controlling organ failure, the risks associated with nosocomial pneumonia may be reduced.
© 2018 The Author(s). Published by Elsevier Ltd on behalf of International Society for Infectious Diseases. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Chronic diseases limit daily activity and reduce health-related quality of life. End-stage renal disease (ESRD) and uremia result from untreated chronic kidney disease (CKD). The prevalence of CKD and ESRD has increased over the past several years (Okpechi et al., 2013). Renal replacement therapy is necessary for survival in patients with ESRD and includes hemodialysis (HD), peritoneal dialysis (PD), and renal transplantation. However, peritonitis is a common complication of PD, and renal allograft rejection is also common (Lafrance et al., 2012; Briggs 2001). Although, the rate of acute rejection in the first year post-transplantation is 1–2% lower in living-donor than deceased-donor kidney transplants (Salkowski et al., 2016), living donors are only rarely the source of kidneys. Thus, intermittent hemodialysis (IHD) has been the main treatment method for ESRD for many years.

Approximately 20% of infectious diseases in HD patients are attributable to pneumonia (Slinin et al., 2006). Moreover, the mortality rate due to nosocomial pneumonia in HD patients is reportedly 14–16 times higher than that in the general population (Sarnak and Jaber, 2001). According to previous reports, the pathogens causing pneumonia in HD patients include *Candida albicans* and methicillin-resistant *Staphylococcus aureus* (Wakino et al., 2009). In another study, approximately 50% of immunocompromised patients with pneumonia died of *Stenotrophomonas maltophilia* infection (Fujita et al., 1996). Moreover, the related literature has reported factors predisposing HD patients to

* Corresponding author at: West China Nursing School/West China Hospital, Sichuan University, Guoxue Alley 37, Wuhou District, Chengdu 610041, China.
E-mail addresses: mailzuoi80@163.com (M. Zuo), 13593620500@163.com (J. Tang), 717817186@qq.com (M. Xiang), 363401948@qq.com (Q. Long), 39942922@qq.com (J. Dai), xiuyinghu63@163.com (X. Hu).
[1] Manhua Zuo and Jun Tang are co-first authors.

https://doi.org/10.1016/j.ijid.2018.01.008
1201-9712/© 2018 The Author(s). Published by Elsevier Ltd on behalf of International Society for Infectious Diseases. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

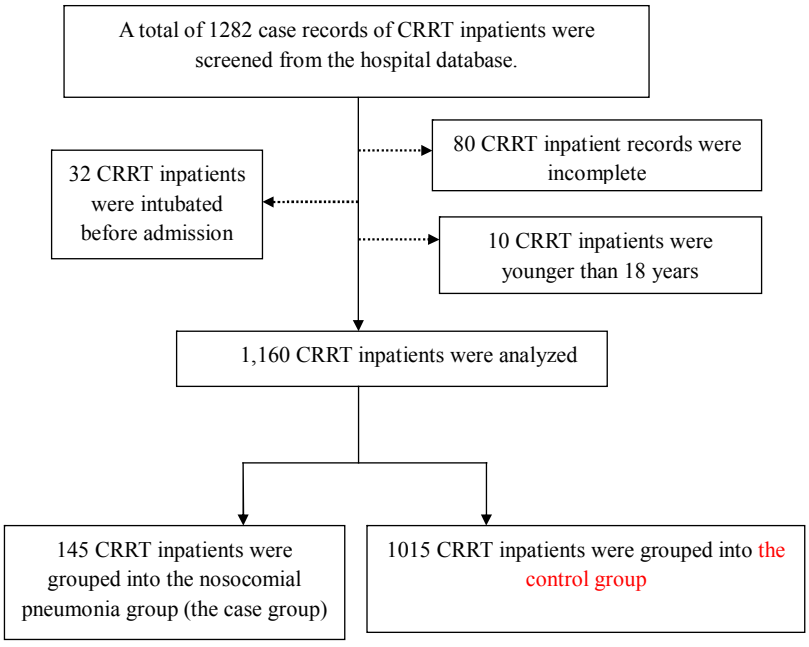

Figure 1. Data collection flowchart for a total of 530 patients, with 511 final valid samples and 19 excluded cases. RPFS Revised Piper Fatigue Scale, SF-36 36-Item Short Form Health scale, PSQI Pittsburgh Sleep Quality Index, HADS the hospital anxious and depression scale, PSSS Perceived Social Support Scale.

infection to include age, comorbid diseases, duration of the underlying diseases, body mass index (BMI), serum albumin (ALB), anemia, malnutrition, and the dialysis settings (Slinin et al., 2006; Wakino et al., 2009).

Continuous renal replacement therapy (CRRT) involves either dialysis or filtration treatments that operate in a continuous mode. The longer duration of CRRT makes it quite different from conventional intermittent hemodialysis (IHD). The major advantage of CRRT is the slower rate of solute or fluid removal per unit of time (Bagshaw et al., 2008; Bouchard et al., 2009). Therefore, CRRT is generally better tolerated than conventional therapy, since many of the complications of IHD are related to the rapid rate of solute and fluid loss. CRRT using convective methods is preferred in sepsis-induced acute kidney injury (Renal Study Investigators, 2008; Uchino et al., 2007), especially in hemodynamically unstable patients (Bagshaw et al., 2008; Bouchard et al., 2009), although clear evidence of the benefit over IHD is still not available.

However, critically ill patients undergoing CRRT can easily develop comorbidities such as bleeding, fluid loss, hypovolemia, and increased susceptibility to infection. In addition, patients with an immunodeficiency undergoing CRRT can be poorly nourished, and the resulting imbalance in bacteria, viruses, fungi, etc. in the body can also easily result in a nosocomial infection. The factors associated with infections in CRRT patients are poorly understood, and the clinical epidemiology of nosocomial pneumonia has not been adequately defined in the literature. A case–control study design is the most suitable methodology to determine the factors associated with infection caused by resistant pathogens (Kaye et al., 2005). Thus, the aim of this study was to identify the characteristics of the pathogens and factors associated with nosocomial pneumonia in critically ill patients receiving CRRT.

Materials and methods

Patients and setting

Data for a total of 1160 CRRT patients were evaluated retrospectively through a review of the medical records of all departments at a university-affiliated hospital. The records were retrieved for the period January 2008 to December 2015 (Figure 1). Inclusion criteria for CRRT patients were the following: (1) CRRT duration $\geq$72 h, (2) age $\geq$18 years, (3) inpatient status, and (4) patients with acute kidney injury or patients treated in any intensive care unit, not including patients treated with IHD. The following exclusion criteria were applied: (1) cough or upper respiratory tract infection prior to admission, (2) femoral vein or internal jugular vein fistula or cannulation before admission, and (3) outpatient status and inpatient status following mechanical ventilation.

This study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of Sichuan University (2016-23). Written informed consent was obtained from all participants.

Nosocomial pneumonia

Nosocomial pneumonia was defined radiologically and by the onset of cough and sputum production $\geq$72 h after hospitalization in a non-cannulated patient (American Thoracic Society, 2005); cases were required to meet at least one of the following criteria: (1) fever, lung rales, or X-ray showing new chest infiltrates; (2) sputum on smear microscopy showing a squamous epithelial cell count $<$10 per low-power field and a white blood cell (WBC) count $>$25 per low-power field; and (3) blood culture positive, or pneumonia complicated by the need for thoracic aspiration to identify a pathogen.

Download English Version:

https://daneshyari.com/en/article/8739066

Download Persian Version:

https://daneshyari.com/article/8739066

Daneshyari.com