



Hemodialysis catheter-related infection: rates, risk factors and pathogens



Farida Sahli^{a,b,*}, Razika Feidjel^b, Rima Laalaoui^b

^a Microbiology laboratory, Setif University Hospital, Algeria

^b Faculty of Medicine, Setif 1 University, Algeria

Received 9 January 2016; received in revised form 14 May 2016; accepted 24 June 2016

KEYWORDS

Catheter-related infection;
Hemodialysis;
Risk factors;
Pathogens

Abstract The main complication of central venous catheter (CVC) in hemodialysis is infection. Identifying CVC related infection (CVC-RI) risk factors and causative micro-organisms is important for setting prevention policies. There were no data regarding CVC-RI in hemodialysis in Algeria.

To determine rates of CVC-RI in hemodialysis in Setif university hospital, risk factors and causative microorganisms, we conducted a prospective study from November 2014 to May 2015 involving patients with CVC in hemodialysis. Micro-organisms isolated from semi quantitative culture of CVC and blood culture were identified and tested for antibiotic susceptibility using the automated MicroScan system (DADE Behring, Sacramento, CA, USA). Chi-square test was performed to compare demographic and clinical variables (age, sex, comorbidities, duration of CVC, insertion site) in the groups of patients with and without CVC-RI. $P < 0.05$ was considered statistically significant. All analyses were performed using SPSS V17 for Windows statistical package (SPSS Inc., Chicago, IL, USA).

94 patients and 152 CVC procedures were analyzed. 34 CVC-RI were documented with an incidence of 16.6 per 1000 CVC-days. Incidence of CVC related bloodstream infection (CVC-RBI) was 10.8 per 1000 CVC-days. Independent risk factors associated with CVC-RI were diabetes ($P = 0.01$) and duration of catheterization ($P = 0.01$). Causative micro-organisms were: *Klebsiella pneumoniae* 26.5%, coagulase-negative staphylococci 23.5% and *Staphylococcus aureus* 23.5%. Micro-organisms were multidrug-resistant (MDR). Mortality was statistically associated to inadequate antibiotic therapy.

The duration of CVC should be reduced by creation of fistulas. More compliance to hygiene measure is needed for decreasing CVC-RI and resistance rate.

© 2016 King Saud Bin Abdulaziz University for Health Sciences. Published by Elsevier Limited. All rights reserved.

* Corresponding author at: Microbiology Laboratory, Setif University Hospital, Algeria. Tel.: +213 774599617.
E-mail address: sahlimicrobio@yahoo.fr (F. Sahli).

Introduction

Temporary vascular access by central venous catheter (CVC) is widely used in hemodialysis. However, CVC is associated with complications mainly infection. CVC related infection (CVC-RI) includes CVC related local infection (CVC-RLI) and CVC related bloodstream infection (CVC-RBI). CVC-RI and especially CVC-RBI is responsible for a considerable increase in health care costs, morbidity, and mortality [1–3]. This is particularly true in patients with end stage renal disease; sepsis is the second most common cause of death in this population after cardiovascular disease [4–6]. The incidence of CVC-RBI ranges between 0.6 and 6.5 episodes per 1000 catheter-days [7–11]. Causative agents are mostly *Staphylococcus aureus* [11–14]. Identifying CVC-RI risk factors is important for setting prevention policies. These risk factors vary from study to another. They include duration of CVC, diabetes mellitus, old age, and low hemoglobin and serum albumin levels [15–18].

There were no data regarding CVC-RI in hemodialysis in Algeria. In this prospective study, we aim to study rates, causative agents and risk factors of CVC-RI in our hemodialysis department, for better preventing this serious complication.

Methods

Study population

This prospective study was conducted in hemodialysis patients at Setif university hospital, a 900 beds hospital in the second most peopled city in Algeria. The hemodialysis patients at Setif university hospital are outpatients and represent 0.79% of patients undergoing hemodialysis in Algeria with similar socioeconomic status. During seven months, from November 2014 to May 2015, all hemodialysis patients with temporary CVC inserted more than 48 h were included in the study and followed up for CVC-RI.

Observation of hygiene measures

During the study period, we had 100 opportunities for observation of CVC insertion procedure. The variables observed were: hand hygiene, cutaneous disinfection before CVC insertion, use of mask, sterile gloves, sterile drapes, and sterile gowns by the health workers. Difficult insertion was recorded. We had also observed repair of dressing after each dialysis.

Patients' demographics and clinical data

Patients' data: age, sex, comorbidities (diabetes, immunosuppression, and malignancy), presence of fever, chills, presence of discharge, tenderness at CVC site, prior antibiotic use and CVC insertion date, insertion site and insertion duration, were collected.

Definitions

CVC-RLI: a positive semi quantitative culture of an intravascular catheter segment (more than 15 colony-forming units).

CVC-RBI: according to the criteria of the Centers for Disease Control and Prevention, presence of one or more positive blood cultures and a positive catheter tip culture, whereby the same organism is isolated and not related to another site of infection [19]. In our study, the same organisms belonged to the same species, had the same phenotypic characters and antibiotic type.

Microbiological methods

For each catheter removed, the implanted portion of the catheter from the skin interface to the tip was transported in a sterile container and cultured semi quantitatively as described previously [20]. Blood culture was done when suspecting CVC-RBI.

Both peripheral and central blood cultures were done when CVC-RBI was suspected and CVC not removed. CVC-RBI was confirmed when the central blood culture was positive at least 2 h before the peripheral blood culture. This was done with the automated microbial detection system, the BacT/ALERT®3D (bioMérieux, Inc., Durham, NC), by examining the growth curves.

Swab at the insertion site was cultured when presence of discharge from CVC site.

Micro-organisms identification and antibiotic susceptibility were performed using the automated MicroScan system (DADE Behring, Sacramento, CA, USA), according to CLSI guidelines. *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 25923, and *Pseudomonas aeruginosa* ATCC 27853 were used as reference strains. Multidrug resistant micro-organism (MDR) was defined as acquired non-susceptibility to at least one agent in three or more antimicrobial categories.

Statistical analysis

The rate of CVC-RI was calculated as an incidence per 1000 catheter-days.

Download English Version:

<https://daneshyari.com/en/article/5672775>

Download Persian Version:

<https://daneshyari.com/article/5672775>

[Daneshyari.com](https://daneshyari.com)