



Randomized controlled trial of care bundles with chlorhexidine dressing and advanced dressings to prevent catheter-related bloodstream infections in pediatric hematology-oncology patients



Gülçin Özalp Gerçeker, PhD, RN ^{a,*}, Figen Yardımcı, PhD, RN ^b, Yeşim Aydınok, MD ^c

^a Dokuz Eylül University Nursing Faculty, Department of Pediatric Nursing, Izmir, Turkey

^b Ege University Nursing Faculty, Department of Pediatric Nursing, Izmir, Turkey

^c Ege University Hospital, Department of Paediatric Hematology-Oncology, Izmir, Turkey

ARTICLE INFO

Article history:

Received 12 December 2016

Received in revised form

17 February 2017

Accepted 20 February 2017

ABSTRACT

Purpose: To compare the effects of the care bundles including chlorhexidine dressing and advanced dressings on the catheter-related bloodstream infection (CRBSI) rates in pediatric hematology-oncology patients with central venous catheters (CVCs).

Method: Twenty-seven PHO patients were recruited to participate in a prospective, randomized study in Turkey. The researcher used care bundles with chlorhexidine dressing in the experimental group (n = 14), and care bundles with advanced dressings in the control group (n = 13).

Results: According to the study results, 28.6% of the patients in the experimental group had CRBSI, while this rate was 38.5% in the control group patients. The CRBSI rate in the experimental group was 3.9, and the control group had 4.4 per 1000 inpatient catheter days. There was no exit-site infection in the experimental group. However, the control group had 1.7 per 1000 inpatient catheter days.

Conclusions: Even though there was no difference between the two groups in which the researcher implemented care bundles with chlorhexidine dressing and advanced dressings in terms of CRBSI development, there was reduction in the CRBSI rates thanks to the care bundle approach. It is possible to control the CRBSI rates using care bundles in pediatric hematology-oncology patients.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

The Joint Committee's National Patient Security Goals included the theme "Preventing Infections" for which initiations were put forward relating to the performance elements to prevent central venous catheter (CVC) infections (Joint Commission, 2017). Several studies managed to reduce the infection rates in the pediatric population as a result of interventions aimed at preventing catheter-related bloodstream infections (CRBSI). These interventions consisted of simple and inexpensive methods, including the daily examination of the catheter, maintenance of care, hand hygiene, and feedback/cooperation about infection rates (Bundy et al., 2014; Choi et al., 2013; Costello et al., 2009; Jeffries et al., 2009; McKee et al., 2008; Miller et al., 2011; Rinke et al., 2013). The infection

rates are quite high in CVCs, and the catheters are frequently taken out, both of which show that the guides and catheter care in the pediatric population are very important (Zachariah et al., 2014).

Central venous catheters play a major role in chemotherapy implementation; yet they create a massive risk for the Catheter-Related Bloodstream Infections (Allen et al., 2008). CRBSI is a remarkable cause of mortality and morbidity patients whose immune systems are suppressed. Neutropenia, mucositis, corticosteroid intake, donor incompatibility, graft versus host disease (GVHD) and hyposplenism may increase the risk for bacterial and fungal bloodstream infections. In hematology and oncology patients, infection may lead to delays in chemotherapy, extended hospital stay, and increases in costs due to the anti-microbial treatment (Worth and Slavin, 2009). For this reason, this study focuses on the prevention and reduction of CRBSI in the pediatric hematology-oncology (PHO) population.

An initial retrospective study that comprised 34 PHO patients who were treated in Ege University Pediatric Hematology Unit between January 2013 and July 2014 demonstrated the high CRBSI

* Corresponding author.

E-mail addresses: gulcinozalp@gmail.com (G.Ö. Gerçeker), figenyardimci@gmail.com (F. Yardımcı), yesim.aydinok@yahoo.com (Y. Aydınok).

rates and highlighted the requirement for prevention strategies to reduce CRBSI (Gerçeker, 2015). The following studies that implemented care bundles to prevent CRBSI in the PHO population provided a considerable reduction in infection rates (Bundy et al., 2014; Choi et al., 2013; Duffy et al., 2015; Rinke et al., 2012). A “care bundle” is a set of approaches that includes several interventions and has a positive impact on the recovery process with a collective application of these interventions. The prevention of CRBSI is one of the implementation areas of the care bundle (Marschall et al., 2014; O’Grady et al., 2011; Şardan et al., 2013). The use of chlorhexidine-containing dressings is recommended in units where infection rates are very high (Marschall et al., 2014), but the number of the studies using this dressing is still limited with the pediatric population. In the current study, the efficacy of care bundles in reducing CRBSI was assessed prospectively in the Pediatric Hematology Unit. This prospective study was also designed to assess whether chlorhexidine-containing dressing had a further advantage in CRBSI prevention, compared to transparent dressing.

2. Methods

2.1. Study design

This prospective randomized controlled and single-blinded study was designed to compare care bundles with the following transparent dressings; (1) 3M™ Tegaderm™ Chlorhexidine Gluconate (CHG) I.V. Securement Dressings (*experimental group*) (2) 3M™ Tegaderm™ I.V. Advanced Securement Dressings (*control group*) in prevention of CRBSI. This study was conducted in the Ege University Pediatric Hematology Unit between October 2014 and May 2015. The study was approved by the Ege University Institutional Ethical Committee (14–3.1/15).

2.2. Intervention

The author investigated care bundles suggested by Rinke et al. (Rinke et al., 2012) and Choi et al. (Choi et al., 2013), and guidelines suggesting the use of transparent or chlorhexidine containing dressings as a part of a care bundle (Marschall et al., 2014; O’Grady et al., 2011). The guidelines also provide strong evidence for the use of checklists related to catheter intervention (Marschall et al., 2014; O’Grady et al., 2011). The components of the care bundle used throughout the study and the checklists for the standardization of CVC interventions determined by researchers. The researcher described the implementation stages of the catheter interventions and created checklists for “Medication Administration Through the CVC”, “Connection and Changing of the Infusion Sets to the CVC”, “Maintenance of CVC Exit Site”, and “Port Use-Connection and Disconnection of the Port Needle”. The care bundle and checklists were evaluated and confirmed by an independent group comprising six academic teaching staff and three nurses experienced in the management of the PHO patients with CVCs.

The care bundle included: 1) Catheter entries (hand hygiene, closed intravenous system); 2) Catheter site care (chlorhexidine gluconate skin antiseptics, checklist for CVC exit site care and port needle change); 3) Daily dressing/site assessment performed; 4) Catheter cap/hub/tubing care (split septum needleless connector, checklist for medication administration and infusion sets change/connection); 5) Providing patient and family training for catheter safety (Table 1). The researchers examined the guidelines on the use of transparent dressings, and decided to make a comparison between the use of chlorhexidine-containing dressings for CVCs in patients over two months of age (quality of evidence: I) which is also recommended by the relevant guidelines (Marschall et al., 2014), and transparent dressings. Staff training on the care

Table 1
Care bundle for CVCs.

(1) Catheter entries

Hand hygiene before every catheter/tubing/dressing interaction
Nonsterile gloves and mask worn for all catheter entries
Maintained closed intravenous system
Cap scrubbed with alcohol (15 s scrub and 15 s dry) or Chlorhexidine Gluconate (CHG) (30 s scrub and 30–60 s dry) for each entry
Use checklist for all catheter procedures

(2) Catheter site care

Chlorhexidine gluconate skin antiseptics when transparent dressing changed
Change needle every 7 d; unless soiled, loosened, dislodged, or infiltrate
Change transparent dressing every 7 d; unless soiled, dampened, loosened
Use checklist for catheter site care and Port needle change
Use sterile gloves for dressing and Port needle change

(3) Daily dressing/site assessment performed

(4) Catheter cap/hub/tubing care

Use split septum needleless connector at 96 h but should be replaced when infusion set is changed
Replace infusion sets, including add on devices at 96 h, unless soiled or suspected to be infected
Replace tubing used to administer blood, blood products, or lipids at 24 h
Use checklist for medication administration and infusion sets change

(5) Providing patient and family training for the catheter safety

Dressing and catheter covered during bath or shower
Dressing changed immediately after bath or shower

bundle and the use of checklists was conducted prior to the implementation with all nursing staff between June and September 2014.

2.3. Staff training

Each nurse working in the relevant unit was observed by the researcher according to checklists. Before the observations, the researcher obtained written consent from the nurses to observe the catheter intervention. As there was no specific time for catheter interventions, the researcher made the observations during the day shift (8.00–16.00 p.m.). The researcher also anticipated that one observation of catheter intervention would not provide sufficient or accurate data, and environmental factors would alter the data and restrict the observation. Thus, the observation period was determined to be eight hours during the day shift. The eight nurses working in the hematology unit were observed using the checklists during the catheter interventions. At the end of the interventions, the researcher informed the nurses about any inaccurate steps of the intervention, and asked them to repeat the intervention. Following the observation of the nurses, the researcher provided a two-session training session to the nurses on the steps of the care bundles and CRBSI prevention. The researcher administered a test before and after the training with the aim of evaluating its efficiency. After the training, the researcher re-observed the nurses during the day shift. At the end of the observation process, if any inaccurate steps were included, the researcher asked the nurses to repeat the catheter intervention. The nurses who had deficiencies in the implementation stages were re-observed by the researcher for one day. The researcher continued to observe nurses’ CVC interventions when necessary to ensure they were performed correctly and safely.

2.4. Study population

Data on CRBSIs, patients and catheter characteristics for PHO patients was collected prospectively between October 20, 2014 and April 30, 2015. Potential patients with CVCs were identified through clinic visits and their electronic and written charts screened for the presence of a CVC, day of catheterization and positive blood

Download English Version:

<https://daneshyari.com/en/article/5567753>

Download Persian Version:

<https://daneshyari.com/article/5567753>

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