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A point prevalence study of cancer nursing practices for managing intravascular devices in an Australian tertiary cancer center

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A B S T R A C T

Purpose: The use of intravascular devices is associated with a number of potential complications. Despite a number of evidence-based clinical guidelines in this area, there continues to be nursing practice discrepancies. This study aims to examine nursing practice in a cancer care setting to identify nursing practice and areas for improvement respective to best available evidence.

Methods: A point prevalence survey was undertaken in a tertiary cancer care centre in Queensland, Australia. On a randomly selected day, four nurses assessed intravascular device related nursing practices and collected data using a standardized survey tool.

Results: 58 inpatients (100%) were assessed. Forty-eight (83%) had a device in situ, comprising 14 Peripheral Intravenous Catheters (29.2%), 14 Peripherally Inserted Central Catheters (29.2%), 14 Hickman catheters (29.2%) and six Port-a-Caths (12.4%). Suboptimal outcomes such as incidences of local site complications, incorrect/inadequate documentation, lack of flushing orders, and unclean/non intact dressings were observed.

Conclusions: This study has highlighted a number of intravascular device related nursing practice discrepancies compared with current hospital policy. Education and other implementation strategies can be applied to improve nursing practice. Following education strategies, it will be valuable to repeat this survey on a regular basis to provide feedback to nursing staff and implement strategies to improve practice. More research is required to provide evidence to clinical practice with regards to intravascular device related consumables, flushing technique and protocols.

Introduction

Intravascular access is critically important in the haemato-oncology setting for the delivery of anticancer treatments, supportive therapies, parenteral nutrition and blood sampling. However, the use of Intravascular Devices (IVD), is associated with a number of potential complications such as catheter-related blood stream infection (CRBSI), extravasation, thrombosis, phlebitis and catheter occlusion (Centers for Disease Control and Prevention, 2011; Ener et al., 2004; Rickard et al., 2010). These complications have a significant impact for patients and healthcare systems. Specifically, CRBSI is associated with increased morbidity, mortality and cost (approximately US $56 000/episode) (Collignon, 1994; Maki et al., 2006). It is estimated that CRBSI occur in about 0.1% of Peripheral Intravenous Catheters (PIVCs) or 0.5 per 1000 catheter days (Rickard et al., 2012), and 5.3 per 1000 catheter days for Central Venous Access Devices (CVADs) (Berenholtz et al., 2004), which contributes to the economic burden of healthcare associated infections, estimated to cost $1 billion per annum in Australia (Graves et al., 2009). Catheter thrombotic occlusion is another common IVD complication and has been identified as a risk factor for subsequent CRBSI (Krzywda and Andris, 2005; van Rooden et al., 2005). Catheter occlusion is currently reported to effect up to 50% of IVDs (Krzywda and Andris, 2005), often treated with an injection of anticoagulant or resulting in costly catheter replacement, increased clinical risk and discomfort for the patient (Rickard et al., 2012).

Identification and prevention of complications related to vascular devices, is increasingly recognized as a nurse sensitive indicator (Chan, 2013; Chan et al., 2012; Webster et al., 2011). Cancer nurses manage IVDs on a daily basis and are therefore in a unique position to prevent and reduce complications and minimize

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the associated financial and physiological burden (Chan, 2013). Although there are a number of evidence-based clinical guidelines and high level evidence for informing practice in this area (Cancer Nurses Society of Australia, 2007; Centers for Disease Control and Prevention, 2011; Chan et al., 2012; Harnage, 2012), there continues to be nursing practice discrepancies. Observing adherence to best-available evidence in the local setting can thus inform quality improvement initiatives. It is clear in the literature that undertaking surveillance surveys to identify clinical practice issues and providing feedback is an effective method for reducing hospital acquired infection (Durlach et al., 2012; Goddard et al., 2006; Ritchie et al., 2007; Robertson et al., 2010; Zingg and Pittet, 2009). For example, Goddard et al. (2006) report improvements over the 12 month period in which they conducted monthly prevalence surveys and provided feedback to staff. This point prevalence survey observed nursing practice in a haemato-oncology setting to identify nursing practice discrepancies and areas for improvement respective to evidence-based guidelines and best available evidence.

Patients and methods

Design

A point prevalence survey was undertaken in two inpatient units at a tertiary cancer care centre in Queensland, Australia. All current inpatients were invited to participate in the study and all agreed to participate. Verbal consent was obtained at the time of data collection. The study was approved by Human Research and Ethics Committee at the Royal Brisbane and Women's Hospital.

Instrument

The original survey instrument was designed and trialled by New et al. (2013). The original survey tool consisted of 25 assessment questions, including the type, number and purpose of devices in situ, visibility of site, presence and condition of dressings and/or other securement devices, insertion site location, where and by whom the catheter was inserted and evidence of any complications. Documentation on the daily patient care record or medication chart related to the IVD location, site assessment, 'insertion' or 're-site' dates, infusate and any intravenous medications were also noted. This original tool was modified to suit the context of IVDs in the cancer care setting. Additional items were added to capture patient diagnosis, current anti-cancer therapy, reason for admission, dominant arm site placement, the patient's opinion as to whether their CVAD was inserted "too late", and inspection of previous IVD sites (less than one month old). Items irrelevant to the cancer setting were removed. The tool was piloted by two advanced practice cancer nurses and further amended.

Procedure

At 0700 h on a Monday morning in November 2012, two teams of data collectors undertook the survey. The study date is not specified to allow anonymity of participants. Each team included one advanced practice nurse and one clinical nurse who regularly manage IVDs in their daily practice. Each data collector was sent the survey tool prior to survey day, to allow familiarization with the content. On survey day, and before data collection commenced, a brief training session was held to clarify the process, to allow any questions to be answered and to ensure consistency of approach to patient assessment during the survey. The teams assessed each patient together, collecting data using the standardized survey tool. The survey was conducted between 0700 and 1300 h. This time slot was chosen to maximize access to patients before procedures or discharges occurred. If there were disagreement during the patient assessment or data collection process, the two data collectors discussed to reach consensus. If consensus was not reached, a data collector from the other team was to serve as an arbiter, however this was not required.

Data analysis

Frequency counts were used to analyze data. Results are presented as numbers and proportions. A sole variable is represented as a mean and standard deviation. Predictive Analytics Software (SPSS Inc v19) was used to analyze the data.

Results

Participant characteristics

Of the 58 inpatients that were eligible, 100% were assessed for the presence of an IVD. Thirty-nine patients (67%) had a hematological malignancy and 19 patients a solid tumor. Hemato-oncologic reasons for patient admission included hematopoietic stem cell transplantation (21%), anti-cancer therapy (21%), symptom management (31%), radiation therapy (12%) or other reasons (15%). Participant demographic, clinical and IVD characteristics are summarized in Table 1.

Presence, use and placement of intravascular devices

Of the 58 inpatients, 48 (83%) had a device in situ, comprising 14 PIVCs (29.2%), 14 Peripherally Inserted Central Catheters (PICCs) (29.2%), 14 Hickman catheters (29.2%) and six Port-a-Caths (12.4%); with a total of 78 lumens. Forty-six devices (96%) were currently in use for fluid, supportive therapies or medication administration. The remaining two devices were Port-a-Caths that were de-accessed and not in use however both devices were in-place for required treatment in the near future.

Table 1
Demographic, clinical and IVD characteristics of participants ($n = 58$).

Chacteristics		
		Mean (SD)
Age		57.2 (13.2)
		N (%)
Gender	Male	26 (44.8)
	Female	32 (55.2)
Type of cancer	AML	16 (27.6)
	Lymphoma	14 (24.1)
	Multiple Myeloma	4 (5.2)
	MDS	3 (6.9)
	CLL	2 (3.4)
	Melanoma	1 (1.7)
	Breast	5 (8.6)
	Lung	2 (3.4)
	Gynaecological	2 (3.4)
	Pancreatic	1 (1.7)
	Head and Neck	3 (5.2)
	Mesothelioma	1 (1.7)
	GBM	1 (1.7)
	Anal	1 (1.7)
	Pineal Germinoma	1 (1.7)
	Unknown primary	1 (1.7)
Reason for admission	BMT	12 (20.7)
	Anti-cancer therapy	12 (20.7)
	Radiation Therapy	6 (10.3)
	Infection	3 (5.2)
	Symptom management	18 (31.0)
	Other	7 (12)
Type of IVD	Nil	10 (17.2)
	PIVC	14 (24.1)
	PICC	14 (24.1)
	Port-a-Cath	6 (10.3)
	Hickman catheter	14 (24.1)
Total number of lumens		78 (100)