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Surveillance of dialysis events: 12-Month experience at five outpatient adult hemodialysis centers in Kuwait

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KEYWORDS
Dialysis events;
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Summary
Background: Embedding dialysis surveillance scheme is associated with reductions in blood stream infection and antimicrobial consumption .The aim of this study was to establish baseline dialysis events (DE) rates; hospitalization, intravenous (IV) antibiotics start or a positive blood culture stratified by vascular access category and comparisons to published National Healthcare Safety Network (NHSN) rates.
Methods: A retrospective review of DE was done between January to December 2012, in five outpatient adult hemodialysis center.
Results: The pooled mean rates of hospitalization among patients with fistulas, grafts, permanent and temporary catheters were 2.8, 5.7, 5.1, and 10.6 per 100 patient-months, respectively. For positive blood culture the pooled mean rates were 0.2, 1.0, 1.9 and 2.7 per 100 patient-months in these groups. The IV antibiotics starts event pooled mean rates were 5.9, 9.0, 11.8, and 11.2 per 100 patient-months. DE were significantly more common in patients with permanent and temporary catheters when compared with patients with fistulas and graft ($p < 0.001$).
Conclusion: Surveillance of DE rates in Kuwait revealed significantly lower mean rate of hospitalization and positive blood culture while IV antimicrobial start shows significantly higher mean rate when compared to published NHSN data.
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Introduction

Hemodialysis (HD) patients are uniquely vulnerable to the development of healthcare-associated infections because of multiple factors, including exposure to invasive devices, immunosuppression, the lack of physical barriers between patients in the outpatient hemodialysis environment, and frequent contact with healthcare workers during procedures and care [1]. Four types of vascular access are used for hemodialysis: arteriovenous (AV) fistula, AV graft, tunneled central venous access and temporary venous access. Vascular access-related infection is a known complication of hemodialysis. AV fistula is considered to be the most favorable in terms of function, duration and absence of complications [2]. Studies have shown that vascular access is one of the most important risk factors for infection and bacteremia in hemodialysis patients [3].

The Dialysis Outcome Quality Initiative Guidelines (DOQI) published by the National Kidney Foundation has provided a list of techniques that could be applied to monitor and survey vascular access [4]. In 2008, the Center for Medicare and Medicaid Services (CMS) mandated that both monitoring and surveillance be part of the dialysis care being provided to ESRD patients with an aim of identifying and intervening at an early stage, as well as controlling the spiraling costs of access care [5].

The aim of this study was to establish baseline dialysis events (DE) rates, i.e., hospitalization, intravenous (IV) antibiotics starts or a positive blood culture, stratify these events by the vascular access category and compare them to published National Healthcare Safety Network (NHSN) rates.

Methods

A retrospective study for DE surveillance was performed for all maintenance hemodialysis outpatients, including transient patients, from January 2012 through December 2012 in five adult outpatient hemodialysis centers from five health region (Al Sabah-Al Ahmadi-Al Jahra-Hawaly-Al Farwanyia); these centers may be attached to or affiliated with a hospital.

All data were derived from the Kuwait National Healthcare-associated Infections Surveillance System-Dialysis events (KNHSS-DE) module, which is based on the NHSN Patient Safety Component Manual, Centers for Disease Control and Prevention (CDC) in of the United States Centers for Disease Control and Prevention. A DE was defined as any patient who required hospitalization, had an IV antimicrobial start or a positive blood culture. Hospitalizations included all hospitalizations that involved an overnight stay, irrespective of how soon after a previous hospitalization the stay occurred. The IV antimicrobial starts included all outpatient IV antimicrobial starts or outpatient starts that were continuations of inpatient treatment for any reason and duration of treatment, not only vascular access problems. If IV antimicrobials were stopped for $\leq$21 days, the treatment was considered to be same event. Positive blood cultures were recorded for all positive blood specimens drawn from a peripheral site before administering antibiotics over one 24-h period on an outpatient basis or within 1 day of hospital admission, irrespective of whether the patient received treatment. If positive blood cultures occurred less than 21 days apart, the second positive blood culture(s) was not considered a new dialysis event, and new organisms from these subsequent positive blood cultures were added to the first report [6].

Local access infection, access associated bacteremia and vascular access infections were defined as outlined in the NHSN protocol [6].

The data were collected as a census (denominator), expressed as patient-months and events (numerators) and inputted into a Microsoft Excel database. The DE rates were stratified by vascular access type and expressed per 100 patient-months. The rates were calculated by dividing the number of events by the number of patient-months and multiplying the result by 100. Statistical significance was determined using the chi-square test. A p value of <0.05 was considered statistically significant.

Results

Of the patients receiving hemodialysis at these five centers, 79.4% of patients were Kuwaiti citizens. Sex distribution was 40.4% male (mean age, 55.7 ± 14.6 years), and 59.6% female (mean age, 59.7 ± 14.9 years), Overall, the age ranged from 19 to 92 with a mean of 58.1 ± 14.9 years.

During the 12-month study period, a total of 1364 dialysis events and 9487 patient months were reported: the DE of hospitalizations, IV antibiotic starts and positive blood cultures were observed at rates of 4.3, 9.0 and 1.1 per 100 patient-months, respectively (Fig. 1).

The analyses of DE, local access site infection, vascular access infection and access-related bloodstream infection involved comparisons to the published NHSN [6] by means of incidence rate ratios, which are outlined in Table 1.

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