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Probability of Developing a Central Vascular Catheter Associated Bloodstream Infection When Comparing Open and Closed Infusion Systems in Brazil.

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Background:

To determine probability of developing a central vascular catheter associated bloodstream infection (CVC-BSI) when comparing open infusion system (OIS) and closed infusion systems (CIS) in 3 ICUs in Brazil.

Methods:

An open label, prospective cohort, active device associated infection (DAI) surveillance, sequential study was conducted in adult patients with a CVC in place ≥ 24 hours. CDC-NNIS definitions were applied for DAI. Probability of developing a CVC-BSI was compared between the OIS (glass) and CIS periods. Time to first CVC-BSI was analyzed using a log rank test and graphics using Kaplan Meier curves. Time to first CVC-BSI was examined in sequential 3-days intervals. Simple life table conditional probabilities (CP) are presented graphically to explain changing risk of CVC-BSI over time.

Results:

From 03/04 to 04/05, 1125 patients were enrolled. Compliance with CVC site care ($\geq 98\%$) and hand hygiene no less than 63% was achieved during both periods. The CVC-BSI rate during the OIS period was 6.5 CVC-BSI per 1000 CVC days and 3.2 during the CIS period (RR=0.49, 95% CI=0.26–0.95, P=0.031). During CIS period CP of acquiring a CVC-BSI was relatively constant (0.8% at days 2-4 to 0.7% at days 11-13). In the OIS period, the CP of acquiring a CVC-BSI was higher in each interval compared to the CIS period, and ranged from 1.5% at days 2-4 to 2.3% at days 11-13. Chance of a patient acquiring a CVC-BSI was significantly decreased (55%) in the CIS period (Cox proportional hazard ratio 0.45, P=0.019).

Conclusions:

To evaluate the effect of time on CVC-BSI, the CP of developing a CVC-BSI was assessed in sequential 3-days intervals. The CVC-BSI rate over time during the CIS period remained constant and achieved similar levels to those published in the NNIS report, whereas the CP of acquiring a CVC-BSI during the OIS period significantly increased over time.