

Cost Effectiveness of Switching from an Open IV Infusion System to a Closed System on Rates of Central Venous Catheter-associated Bloodstream Infection in Three Mexican Hospitals.

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Goal: To determine the effect of switching from an open infusion system to a closed system on rates and sequelae of central venous catheter (CVC)-associated bloodstream infection (BSI) in the intensive care units (ICUs) of three Mexican hospitals.

Methods: A prospective controlled, time-series cohort trial was conducted in adult patients admitted to four level-III adult ICUs in Mexico City, Mexico, who had a CVC in place for at least 24 hours. We compared the rates of CVC-associated BSI during a period of active surveillance with an open system (baseline; externally-vented semi rigid plastic containers, and glass bottles, and burettes) with rates after switching to a closed system (intervention; non-vented collapsible plastic bags).

Results: From September 2002 to November 2003, 1164 ICU patients with CVCs were enrolled. Patients during each study period (open system, 635; closed system, 529) had similar characteristics regarding gender, age, severity-of-illness score, and surgical stay, prevalence of diabetes, cancer, COPD, obesity, renal impairment, and abdominal surgery. Furthermore, similarities arose with respect to compliance with CVC site care during the two study periods. During both periods, the rate of compliance with hand hygiene was above 70%.

It was found that the incidence of central venous catheter-associated bacteremia during the closed system period was significantly lower than during the open system period (16.97 versus 3.00 per 1000 catheter-days, RR = 0.18, 95% CI = 0.10-0.32, P= 0.000). While 5.2% (33/635) patients with catheter-associated bacteremia died during the period the open system was in force, only 0.6% (3/529) died during the closed system period (RR 0.11, 95% CI: 0.03-0.36, P: 0.000). On the other hand, the global mortality of the ICU patients was reduced from 24.7% (157/635) to 16.6% (88/529) during closed system period (RR 0.67, IC 0.52 - 0.87, P: 0.0027). The estimated cost savings in the intervention period were \$388,066, and 202 ICU days per ICU yearly.

Conclusion: Adoption of a closed infusion system brought about meaningful reductions in the incidence of catheter-associated bacteremia, related mortality, and cost. In light of the fact that most Latin American hospitals still use externally vented fluid containers, switching to non-vented bags could substantially reduce rates of nosocomial bacteremia.