



Multimodal Intervention Programme to Reduce Central Venous Catheter-Associated Bloodstream Infections

Prospective study at the University of Geneva Hospitals, Geneva, Switzerland

WHAT WAS INVESTIGATED?

The study investigated the effectiveness of a hospital-wide, multimodal and multidisciplinary prevention strategy on central line-associated bloodstream infections (CLABSI) reduction at a large university-affiliated, tertiary care hospital.

The multimodal intervention included:

- update of existing protocols for insertion of a central venous catheter (CVC)
- definition of an insertion checklist
- establishment of an e-learning programme for catheter care
- introduction of CVC-insertion carts and prepacked single-use kits

WHAT WAS THE RESULT?

Main Result: The incidence of CLABSI was significantly reduced by the hospital-wide strategy.

Changes in CLABSI per 1000 catheter days:

- hospital-wide: reduction by 70% (2.3 to 0.7 infections/1,000 catheter days)

- Intensive care units: reduction by 76% (1.7 to 0.4 infections/1,000 catheter days)
- In non-intensive care settings: reduction by 67% (2.7 to 0.9 infections/1,000 catheter days)

Clinically relevant reduction of hospital-wide CLABSI was reached with a comprehensive quality improvement programme focusing on training and key principles of good implementation practice.





BACKGROUND

CLABSIs are a severe complication of central venous catheters (CVCs). Since CVCs are indispensable in hospital care, it is key to minimise the risk factors for catheter-associated infections (e.g. dwell time, access site, patient's conditions, etc.). Insertion of CVCs mainly take place in the ICU. However, the incidence of CLABSIs in the non-ICU setting is not negligible and sometimes even higher compared to ICU settings. Therefore, the need for hospital-wide surveillance and measures for prevention of CLABSIs are indicated.

GOAL

The aim of the study was to test the effectiveness of a hospital-wide, multimodal, prevention strategy on the reduction of CLABSIs.

DESIGN AND METHODS

The study was conducted between 2008 and 2011 at the University of Geneva Hospitals, Geneva, Switzerland, a 1908-bed primary and tertiary care centre. CVC surveillance was performed individually and included all relevant information, such as dwell time, insertion site or CVC type.

Primary outcomes were bloodstream infections defined as bacteraemia or fungaemia in presence of a CVC and with no other apparent source of infection. Secondary outcome was the all-cause mortality at day 28 after CVC removal.

For the intervention, physicians were trained in CVC insertion in simulator workshops. Therefore, a complete insertion procedure from patient preparation until dressing application was filmed. A web-based, modular, e-learning programme on catheter care was developed for the training of nurses. The e-learning included assistance with CVC insertion, infusate preparation, CVC manipulation, dressing change, CVC removal, and clinical surveillance and documentation.

In addition to the interventions related to training and education, dedicated CVC insertion carts and complete single-use kits were introduced hospital-wide.

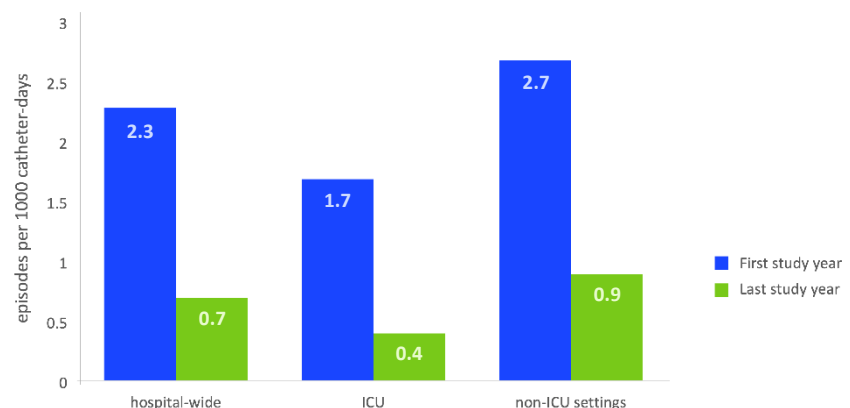
RESULTS

A total of 146 physicians were trained in 36 simulator-based workshops between 2008 and 2011. Moreover, 980 nurses and an additional 294 newly-employed nurses were trained by the e-learning tool.

Overall, 6,352 CVCs were placed in 3,952 patients during 4,452 hospitalizations.

Main results are demonstrated in figure 1. CLABSI incidence decreased hospital-wide from 2.3 to 0.7 cases per 1,000 catheter days (70%) and in ICU as well as non-ICU settings from 1.7 to 0.4 and 2.7 to 0.9 cases per 1,000 catheter days, respectively. Over the study period no significant positive or negative time trends for all-cause mortality could be identified.

Fig. 1: CLABSI incidence



CONCLUSION

A clinically relevant reduction of hospital-wide CLABSIs can be achieved using a comprehensive, multidisciplinary and multimodal quality improvement programme focusing on optimisation and standardisation of processes and a comprehensive training programme.

