STUDY PROFILE

Prepackaged kits reduce procedural mistakes during central line insertion

Randomized controlled prospective study

WHAT WAS INVESTIGATED?

- Investigation of the **impact of a packaged all-inclusive central line kit on the quality of central line insertion** by novices.
- The performance was assessed in a controlled simulation environment, using five parameters for quality evaluation:
  - Procedure duration
  - Major technical mistakes
  - Minor technical mistakes
  - Breaches of aseptic technique
  - Proportion of process steps carried out correctly

WHAT WAS THE RESULT?

- **Significant better results** in four of five quality indicators by the group **using the prepackaged central line kit**
- Trend towards **fewer breaches of aseptic technique** in the prepackaged kit group

The use of prepackaged all-inclusive central line kits can reduce procedural mistakes.

Research for infection protection

Source: Fenik Y *et al.* (2013) Prepackaged central line kits reduce procedural mistakes during central line insertion: a randomized controlled prospective trial. BMC Med Educ 13: 60.

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BACKGROUND

The insertion of a central line catheter is associated with a number of serious complications. Training, hand hygiene, disinfection of the insertion site, use of antiseptic coated catheters, regular review of the indication, maximum barrier precautions and the use of all-inclusive catheter carts show strong evidence to be effective measures in the reduction of infectious complications. Due to the complexity of the task, central line catheter insertion represents a high cognitive load, especially for novices. One simple measure to reduce procedural mistakes is using a prepackaged all-inclusive central line catheter insertion kit. This is one of the first studies that examines the effect of a prepackaged all-inclusive central line kit on the reduction of mechanical complications and time resources.

GOAL

The goal of the study was to assess, whether the use of a prepackaged central line kit by novices can reduce the duration and technical mistakes of a procedure, as well as breaches of aseptic technique and mistakes in adherence to the procedural algorithm.

DESIGN AND METHODS

The investigation was designed as a randomized, controlled, prospective, single-blind study. Thirty novice residents and final year medical students were randomized into two equal groups. One group performed central catheter line insertion by using a prepackaged central line kit and the other group used a standard kit with additional necessary items provided in the clinic's stocked standard materials cart. The procedure was performed on a central line manikin. The participants received assistance from nursing students. For the evaluation, the procedures were videotaped and analyzed by two experienced physicians with no knowledge of the study design or the study question. The video raters used a 55 points checklist to evaluate performance. The following five quality indicators were assessed:

- procedure duration
- major technical mistakes
- minor technical mistakes
- number of correctly performed steps according to the checklist
- breaches of aseptic technique were assessed.

RESULTS

In four of the five quality items the group which used the prepackaged all-inclusive central line kit outperformed the standard kit group. Both major and minor mistakes were reduced by 35 % (3.1 ± 1.4 vs. 4.8 ± 2.6, mean ± SD, p=0.003; 5.2 ± 1.7 vs. 8.0 ± 3.2, p=0.007, respectively), duration time was significantly reduced (26:26 ± 3:50 min vs. 31:27 ± 5:57 min, p=0.01) and adherence to the procedural algorithm was significantly improved (83 ± 5 % vs. 75 ± 11 % of correctly performed steps, p=0.016). With regard to the aseptic technique the prepackaged group showed a tendency to fewer breaches (1.2 ± 0.8 vs. 3 ± 3.6, p=0.06).

CONCLUSION

The authors could show that prepackaged all-inclusive central line kits are suitable to reduce procedural mistakes in central line catheter insertion by novices in a controlled simulation environment. More studies are needed to further demonstrate the effectiveness of such kits in the hospital setting to simplify procedures and improve patients' outcomes

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