

Reducing peripheral intravenous catheter CRBSI

Infection prevention in the vascular access setting often focuses on central line associated blood stream infection (CLABSI) prevention. However, given the amount of peripheral cannulae (PIV) placed yearly and their infection rates¹⁻², it is paramount to give attention to PIV caused CRBSI and its prevention as the microbes are often virulent, cause many complications requiring prolonged IV-antibiotic treatments and pose a threat of mortality as high as 30%²⁻³. We present an approach for reducing PIV related CRBSI in a university hospital.

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Background

From 2014 onward Peijas hospital (a part of Helsinki University Hospital) has had no recorded incidence of CLABSI. However, in 2018 there were 9 cases of CRBSI in hospitalized patients caused by peripheral intravenous catheters (PIV) and 2 by arterial catheters⁴. The superfluous cost was estimated at 275000€. In addition 3 deaths occurred in the PIV CRBSI patients, and in all of these cases CRBSI was deemed to have largely contributed to the death of these patients.

Materials and methods

After the apparent need to promptly intervene in the amount of CRBSI, a meeting with the infection control nurses and the vascular access team took place in our hospital. Our measures to reduce the infection rate were to

- 1) Change from an open PIV with an injection port to a closed catheter, as the nurses frequently use the injection port to give IV medication. This was deemed to be a clear infection risk as the injection port is difficult to disinfect.
- 2) Switch from a negative to a neutral pressure needleless connector and introducing the port protector cap in patients with intermitted infusions.
- 3) Increase the nurses' awareness in infection prevention recognizing risks and educate staff nurses in rigorous hand hygiene, aseptic cannulation technique, PIV dressing changes, and use of the VIP-score to assess. PIV site.

Results

After the intervention period the infection rate decreased by more than 63% from 9 PIV and 2 arterial catheter CRBSIs in 2018 to 3 PIV and 1 arterial catheter CRBSI in the year 2019¹. The estimated cost from CRBSI decreased by 175000€. No CRBSI related deaths were recorded in the hospital in 2019.

Discussion and Conclusion

Tight collaboration between the staff nurses, the vascular access team and the infection control team is crucial for the success of CRBSI prevention. Due to constant changes in ward personnel the education process has to be continuous and included in the nursing students and new nurses' orientation period. Infection prevention is not only about saving money, its about preserving health and preventing death caused by CRBSI.

Interventions in the ward

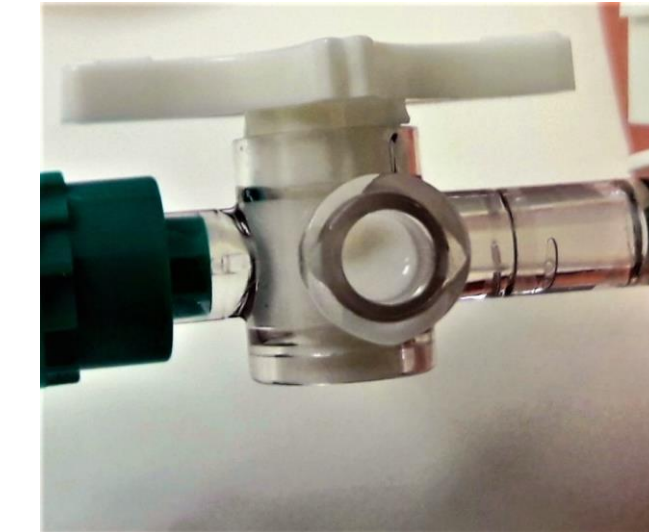
- Introduction of a closed IV-catheter and education in a novel cannulation technique
- Implementation of neutral pressure needleless connectors and port protectors
- Avoidance of PIV insertion in the antecubital fossa and the wrist area
- Removal of surplus 3-way stopcocks from the infusion line
- Active implementation of the VIP-score and monitoring the catheter entry site and its surroundings in every shift

Benefits of a closed peripheral cannula

- Better flow: 20G/25mm 8ml/s 300 PSI good for contrast power injection and rapid iv-fluid flow allowing use of smaller gauge cannula
- Smaller gauge equals less damage to venous structure
- No bleeding when removing needle from cannula
- Ability to draw blood with a totally closed method
- No injection port, smaller risk of PIV contamination and infection
- Lower cannula profile, less tangling in clothes and less accidental removal of PIV



Propofol contamination of cannula injection port and 3-way stopcock



Non-transparent IV-dressing covers entry site



Neglected PIV



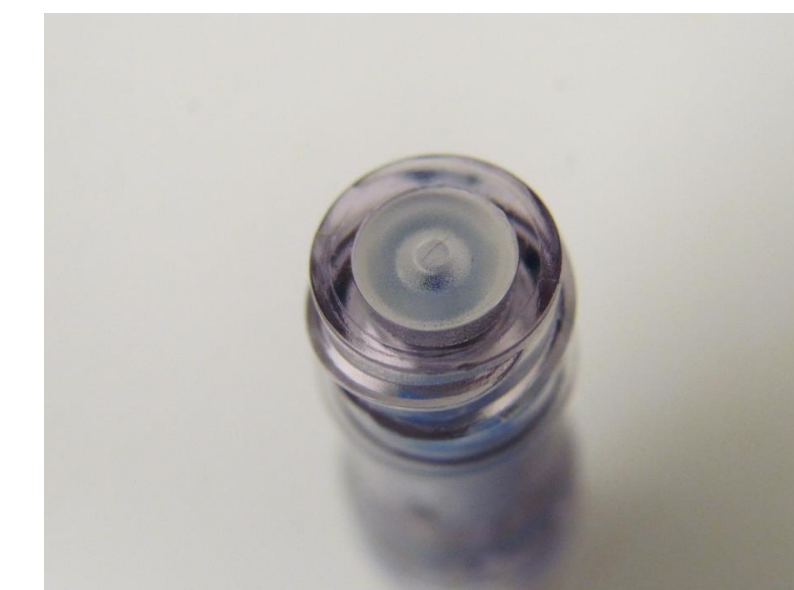
Septic thrombophlebitis



Multiple sticks, extravasation and infection



Closed peripheral 22G cannula



Flat surface of needleless connector is easy to disinfect



Transparent IV-dressing allows VIP-score monitoring of the insertion site

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