

Audit of the incidence of central venous line suture site infections

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Background

Following a critical incident within the Northumbria Healthcare trust where a patient was able to pull out their CVC, leading to an air embolism and cardiac arrest, a serious untoward incident investigation was undertaken. This identified loose Ethilon (monofilament nylon) sutures, as a potential contributory factor. Consequently the decision to re-institute the use of silk sutures for the securing of all CVC lines was made.

However this does not come without its own risks as clinical research has shown that braided sutures such as silk can be associated with much higher rates of infection than monofilament sutures like nylon. This is due to the nylon being much less prone to potentiating infections due to the reduced bioadherence of the bacteria and the improved ability of the bodies phagocytic cells to reach the bacteria on the suture¹. Other studies have shown that the site of the CVC is also of importance when looking at infection rates and that sub-clavian lines are associated with the lowest rates of infection followed by internal jugular and femoral lines being the most likely to become infected².

Subsequent to the reintroduction of silk sutures this audit was undertaken to monitor rates of infection.



Methods

The audit was registered with the trust and received approval from the audit department.

Information was obtained prospectively from the critical care outreach CVC log, reviewing inpatient notes and looking at the daily assessment sheets.

Results

>Over a two month period from 11/04/2015 to 13/05/2015 data was recorded for a total of 36 CVC lines that were secured with silk sutures. There anatomical sites are as listed in Fig.1 and there clinical indications in Fig.2.

>27 seven of the reviewed lines were dual lumen, 8 were quad lumen and 1 was a vas-cath.

>Of the 36 lines 21 were used for TPN and 13 were not, two lines the use of TPN was not recorded.

>Two of the lines were flagged as being a possible source of infection in the patients they were sited, due to temperature spikes and raised inflammatory markers. Both of the lines were immediately removed and the tips sent for culture.

>In Patient A – the line was a left internal jugular bi-lumen line secured with silk, inserted for poor peripheral access and the delivery of TPN. The line was removed after the patient developed a fever and the CRP and WCC were elevated on day 7. The tip grew Staph. Epidermis and this was not attributed to the patients cause of sepsis.

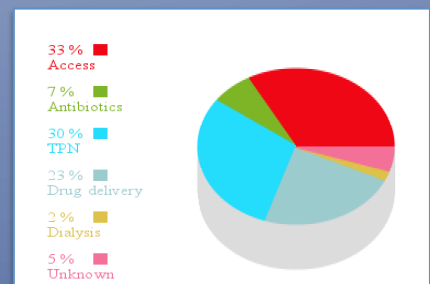
>In Patient B – the line was a right femoral vas-cath secured with silk, inserted for haemofiltration due to acute renal failure. The patient began to spike fevers and there was concern around the groin insertion site. There was no documentation of concerns around the suture sites specifically. The tip was sent to microbiology and the cultures were negative. The patient was subsequently treated for a ventilator acquired pneumonia with Meropenem.

>The average number of days the lines reviewed were in-situ was 5 days with the shortest duration being 1 day and longest 14 days. For five lines this data was not recorded.

Fig. 1

Anatomical site	Number of CVC
Left Internal Jugular	8
Right Internal Jugular	26
Femoral	1
Subclavian	1

Fig 2.



Discussion & Conclusions

The primary limitation is the size of the audit as more lines need to be observed to ensure there is no true rise in infection rates. Secondly it is very difficult to obtain baseline data on infection rates so we have no true comparison. Strong previous research has shown that there is significant increase in surgical site infections with the used of braided silk sutures and therefore ongoing monitoring is required. All staff have been informed that an IR1 should be completed for any lines where infection is possible. This will provide an accountable and reliable source of ongoing incidence of CVC line site infections and inform the future practice of the department.

Subsequent to this audit no IR1 forms have been completed and there have been no CVC site infections reported. However this needs to be formally re-audited.

References

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- Alexander, J. Wesley MD, ScD; Solomkin, Joseph S. MD; Edwards, Michael J. MD. Annals of Surgery. 2011;253(6):1082-1093.