

Designing and implementing a hospital wide CLABSI surveillance program

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Introduction:

- In recent years, the drive to 'zero' CLABSI has gathered momentum across the globe. Harnage (2007) reported how the bundle approach to central line care ensured they achieved zero central line infections over a period of fifteen months.
- The NPSA highlight from their promotion of the Matching Michigan (2009) initiative that an estimated 200,000 central lines are inserted in the UK each year.
- Of these, approximately 6.2% (or 12,400 cases) may be associated with a Central Line Associated Bloodstream Infection (CLABSI).
- However, the authors of this poster feel that a limitation of the Matching Michigan initiative is its sole focus upon Intensive Care Units.
- A team was assembled to redress this imbalance. The team consisted of two senior IV nurses, a junior doctor, clinical scientist and a clinical support worker.
- The collection of hospital-wide CLABSI surveillance data was commenced early 2009.

Background:

- The Rotherham NHS Foundation Trust, UK is a single site hospital with approximately 550 beds.
- The hospital serves a population of approximately 252,000.
- A senior IV nurse presence has existed since 1995. The Vascular Access Team was developed in 2001.
- Elements of best IV care that are grounded in everyday practice include (not an exhaustive list):
 - The use of Chlorhexidine 2% in alcohol as skin preparation before vascular access device placement, during dressing change and whilst 'scrubbing the hub'.
 - Implementation of a central line placement pack that conforms to 'full barrier' expectations.
 - Extensive hospital-wide use of midlines and Peripherally Inserted Central Catheters (PICCs) as a first line alternative to traditional forms of vascular access (such as jugular placed catheters).
 - High volume of ultrasound guided vascular access device placement.
 - The use of Chlorhexidine impregnated IV dressings for haematology and parenteral nutrition patients (wider clinical use growing).
 - Focus on dressing suitability and integrity. Use of a large IV dressing and a no-sting barrier solution to prep the skin and seal the dressing edges.

Objectives:

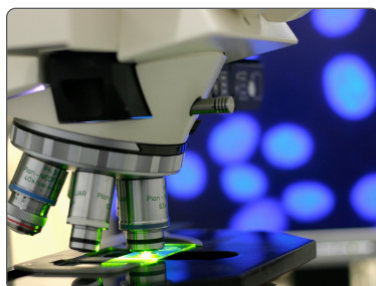
- Develop a CLABSI surveillance program for a medium sized district general hospital.
- Identify and investigate the number of central line associated bloodstream infections (CLABSI) within the facility that occur in the adult patient population.
- Establish a route cause analysis methodology to investigate confirmed CLABSI.
- Define weak areas of practice and develop feedback mechanisms to ensure best practice principles are followed across the organisation.

Standards:

- Review each adult in-patient with a central line in place at least every seventy-two hours.
- Maintain a zero CLABSI rate.
- Present all CLABSI rates consistently as per thousand catheter days.

Definitions:

- Central Line:** This will include all central venous access devices (CVAD) including Peripherally Inserted Central Catheters (PICC), Tunnelled Silastic Cuffed Catheters, Femoral, Acute Renal Dialysis, Pacing Wire Introducer, Implanted Port, Jugular and Subclavian catheters. Although not a central line we have included midline catheters in our surveillance as they provide a significant alternative to traditional central access.
- Central Line Associated Bloodstream Infection (CLABSI):** This will be determined by the presence of clinical signs of infection with no other evident source and positive peripheral and central blood cultures (Central cultures will be positive two hours before the peripheral cultures). In addition a positive tip culture may assist with diagnosis.
- Recognising CLABSI:** The Sepsis Care Initiative (2006) provide the following SIRS (systemic inflammatory response syndrome) definition:
 - ≥ 2 of the following white blood cell count $>12,000/\text{mm}^3$ or $<4,000/\text{mm}^3$ or $>10\%$ immature neutrophils
 - Temperature $>38\text{ C}$ or $<36\text{ C}$
 - Heart rate >90 beats/min
 - Respiratory rate >20 breaths/min
 - In addition inflammation, swelling and exudate may be present at the entry site.



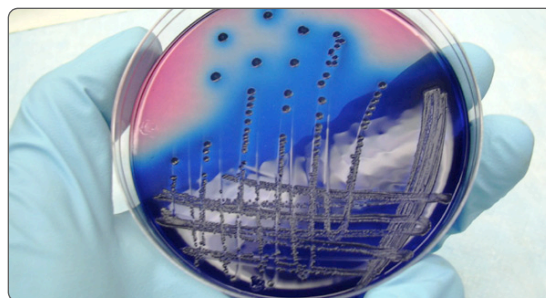
Methods:

- An initial review of all patients with central lines in place was completed within the trust.
- The majority of CVADs occur outside of the ITU setting, therefore a decision was made to proceed with trust wide CLABSI surveillance on all adult in-patients (16yrs+).
- A junior doctor, clinical scientist and clinical support worker were recruited to the surveillance team.
- Surveillance form and database designed.
- To locate patients for the surveillance program the team completed regular surveillance visits to all clinical areas. Patients reviewed until line removal or discharge from hospital.
- If patients triggered the recognising CLABSI criteria an investigation was commenced.
- Weekly meetings took place with microbiology to discuss any potential line infections.
- If CLABSI was confirmed a root cause analysis was completed and a local action plan implemented.
- Advice given to medical teams on management of suspected line infections.
- Total CLABSI results presented monthly to the infection control committee and the executive team.

Results:

- Surveillance data was collected for six months from February to July 2009.
- A total of 647 lines reviewed, with a total of 3928 actual catheter days.
- ITU patients represent 15% of the total lines surveilled across the organisation.
- Frequency of type of line in use for the six month period:
 - Acute = 139
 - Pacing Wire Introducer = 20
 - Tunnelled Silastic Cuffed Catheters = 14
 - Acute Renal Dialysis Catheters = 22
 - PICC = 105
 - Midline = 347
- Three episodes of CLABSI identified during this period.

CLABSI rate = 0.78 per thousand catheter days



Case A: 76 year old male. Admitted to CCU with complete heart block. Right sided jugular temporary pacing wire inserted. Wire failed after two days. Replacement wire inserted in original site through the pacing wire introducer. Coagulase Negative Staphylococcus CLABSI identified after day five.

Case B: 66 year old female admitted to ITU with pyrexia of unknown origin. Severe sepsis evident throughout a lengthy ITU stay. Complex vascular access history (3 acute CVAD and 2 acute renal dialysis catheters). VRE CLABSI confirmed from a femoral acute renal dialysis catheter.

Case C: 72 year old male admitted to CCU with complete heart block. Three attempts at insertion of temporary pacing wire. Wire failed and a replacement wire was inserted in original site through the pacing wire introducer. Staphylococcus aureus CLABSI identified after day five.



Discussion:

- Some patients with possible CLABSI only had a partial set of microbiological investigations (line tip, peripheral or central blood cultures) completed and this may have led to potential missed infections.
- Lines that were inserted out of hours were occasionally referred late to the surveillance team due to lack of a formal handover procedure from ward staff to the team.
- The 'clinical visit' (shoe leather) surveillance methodology adopted for this initiative featured additional 'value-added' benefits such as the identification of the need for clinical interventions and/or educational opportunities.

Conclusion:

- CLABSI rates consistently sit below 'one' per thousand catheter days.
- We attribute these exceptional results to a number of factors, including
 - The implementation of the Saving Lives bundle (DH 2007).
 - Investment in innovation that includes the introduction of products such as Chlorhexidine 2% in alcohol, needlefree devices, central line placement packs and novel approaches to central line dressing techniques.
 - The provision of midlines and PICCs with ultrasound guided placement as an alternative to acute CVAD placement outside of the Intensive Care Unit.
 - A highly visible vascular access team, who provide a standard and advanced vascular access service, practical clinical support and educational opportunities for clinical staff.
- The surveillance program highlighted the need for the development of 'recognising CLABSI guidelines' to ensure that appropriate action is taken by staff if they suspect CLABSI. This development has now been completed (available by request).

References:

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