The Shrewsbury and Telford Hospital NHS Trust

Reducing Contaminated Blood Cultures in Adult ED using Kurin Lock Blood Culture Collection Set

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1. Introduction

Blood cultures are the gold standard for obtaining important diagnostic information to enable detection of the presence of a bacteraemia. The Clinical and Laboratory Standards Institute recommend that hospitals achieve a contamination rate of <1%[1] though rates are estimated to range from 2% to over 10%. Economically false positive blood culture results are estimated to cost approx. £5,000 and have a significant negative impact on patients[2] . These costs include delays in diagnosis, unnecessary administration of intravenous antibiotics, increased risk of complications related to unnecessary intravenous cannulation, unplanned removal of central venous access devices, additional laboratory testing, and delayed discharge by 5 days[2] resulting in an overall increase in the cost of hospitalisation. Additionally, there are time and costs pressures associated with the manpower required to investigate each false positive blood culture.

In Shrewsbury & Telford Hospitals NHS trust the contamination rate of blood cultures has consistently averaged 3.4%. The highest number of contaminated specimens are associated with ED averaging 5%. The use of a cannula for blood culture sampling is associated with increased risk of contamination however this is widely adopted as current practice in ED. Current practice involves taking a sample from the cannula with a syringe and injecting this into the blood culture bottle with a needle. The evaluation was to determine if the introduction of an initial specimen diversionary device (Kurin) that automatically side-line's the first flash of blood during the routine process of drawing a blood culture will reduce the number of false positives in this department.

2. Methods

- The diversionary device (Kurin) was introduced into PRH ED taking approx. 250 samples for blood culture per month.
- Introduction and training on the use of the device was provided at early morning hand-overs by the company for the last 2 weeks in April 22.
- Kurin diverts the first 0.15 ml of blood that may contain skin contaminants and sidelines it into a small chamber. Kurin is available in two versions, a traditional style butterfly needle and an extension set that attaches to an intravenous cannula (Images 1 and 2).
- Kurin was the only change in practice implemented for the duration of the study.
- There was no ongoing support and promotion of the evaluation other than posters to ensure that the results were due to the Kurin device evaluated.
- All ED staff members were involved in the trial.
- The current phlebotomy equipment was removed completely from the cannulation trolleys located across the adult ED .
- All samples for blood culture were included in the study including samples taken by femoral stab when Kurin was unable to be used.
- The results have been provided by the surveillance team on a monthly basis throughout the trial.

3. Results

- The evaluation was run in order to measure how the contamination rates change when using Kurin was used.
- Data has been collected on 464 specimens
- The base line contamination rate in PRUH ED was 5%
- When using Kurin the contamination rate reduced to 2.6%
- An overall reduction of 48%

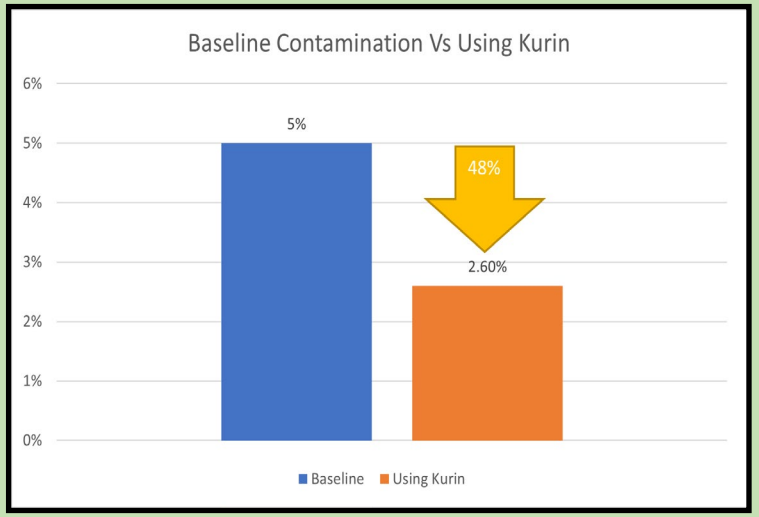

Image 1
Standard butterfly needle

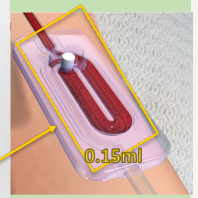

Image 2
Extension set for cannula

4. Discussion

The evaluation demonstrated a significant reduction in the number of false – positive blood cultures using Kurin. The staff in ED embraced the project. They found Kurin very simple to use as it required no change in their current practice. The results of the monthly data collection was fed back to the ED Matron to share with the department. The trial made clear despite a cannula being used regularly for blood culture collection, use of Kurin mitigated the increased risk of contamination. The decrease in false positives encouraged ED staff to follow best practice. The department is eager to continue using the product. A report on the project will be presented at the next Trust IV Selection Committee with a view to endorse adoption of Kurin Trust wide. If endorsed Initial plans for roll out should start with ED. Following on from ED the adult intensive care unit should be the next department to adopt use of the device. Further roll out to specialist areas will then follow. Plans can include adding or developing Kurin into a procedure pack as usage increases. There is an estimated downstream cost avoidance by the prevention of false–positive blood cultures of £1.6M for the Trust as a whole and £327K in PRH ED alone. Also, the Trust has an opportunity to free 359 bed days from PRUH ED and 1,836 bed days trust wideKurin is proven to not only reduce false–positive blood culture contamination rates significantly and thus generate savings for the Trust but also to have a positive impact on patient outcomes.

References

1.Dempsey C, Skoglund E, Muldrew KL, Garey KW Economic health care costs of blood culture contamination: A systematic review. American Journal of Infection Control 47 (2019) 963 -967
2.Alahmadi YM, et al., Clinical and economic impact of contaminated blood cultures within the hospital setting, Journal of Hospital Infection (2010), doi:10.1016/j.jhin.2010.09.03