Use of KurinJet® blood collection devices to reduce blood culture contamination rates in a district general hospital

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BACKGROUND

•Blood culture contaminants are associated with increased length of stay as well as extra antimicrobial costs and laboratory costs. Economic evaluations have estimated the financial costs to be approximately £5,001.50 per contaminated set of blood cultures (Alahmadi et al, 2011).

•There are environmental costs too; Gregg et al (2024) estimated that an average one hospital site in Ireland generates 1250kg of laboratory risk from used blood cultures collection bottles every year. This equates to 2.97kg of waste per bed.

•Warwick hospital, an acute district general hospital with 441 inpatient beds, is part of South Warwickshire Foundation Trust (SWFT), serving a community of approximately 270.,000 people. An audit of contaminated blood cultures taken in ED at Warwick hospital for April 1st 2023 to March 31st 2024 found contamination rates of 6.6%.

•The international benchmark for blood culture contamination rates is ≤ 3%. Given how high the contamination rates were at SWFT, it was felt that measures needed to be taken to reduce these to meet the benchmark aspirations. As well as education and training, it was felt that there needed to be an evaluation of KurinJet® devices, to see if they could help drive down contamination rates.

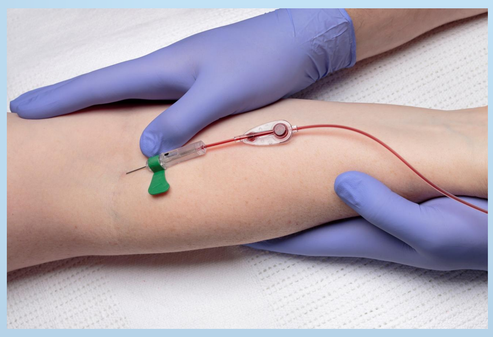
•KurinJet®, is a CE marked class IIa medical device for collecting blood cultures. It works by sidelining the first 0.15ml of blood drawn, potentially isolating blood contaminants. The system is automatic, quick and easy to use, being similar to current devices used.

•Kings College London found a 65.5% reduction in blood culture contamination rates (9% to 3.1%) in their emergency department (ED). They estimated widespread adoption of KurinJet® could save £4.6 million for the whole Trust and £1.3 million in their ED (Atta and Mcguire, 2022), and free up 5,051 bed days for the Trust. Hodson et al (2021) found a similar reduction at Guy's and St Thomas', (6% to 2%, 66% reduction) with estimated savings of £28-72,000 during the 5-month evaluation period.

OBJECTIVE

•To evaluate if using KurinJet® for blood culture collection could reduce the number of blood culture contaminants in South Warwickshire Foundation Trust (SWFT) ED.

The KurinJet® device (pictures courtesy of Iskus Health)



MATERIALS AND METHODS

•A baseline contamination rate of 6.6% for April 1st 2023 to March 31st 2024 was obtained using a numerator of total (211/3176) number of contaminated blood cultures (as determined by clinical microbiology), and denominator of total number of blood cultures taken.

•The evaluation was undertaken in SWFT ED between 7th October and 3rd December 2024.

•An educational campaign to increase awareness of the devices was undertaken in ED, mainly for the staff who regularly take blood cultures (resident doctors).

•ED staff created blood culture packs which contained the KurinJet® device, blood culture bottles and paper request form with sticky dots on them. Two different packs were made; one for blood culture collection from a peripheral site, and one for collection from cannulae.

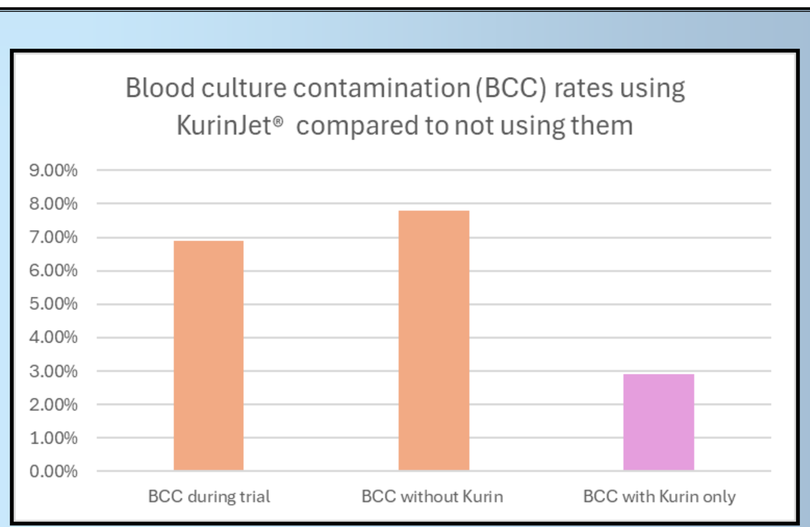
RESULTS

•Results showed that during the evaluation period there were 1,108 positive individual blood cultures (554 sets). There were 38 sets of blood cultures that were deemed by the clinical microbiologists to be contaminants, giving an overall 6.9% contamination rate, a slight increase on baseline data. Review of the forms and packs showed that only 103/554 positive blood cultures were taken using KurinJet® devices during the evaluation period. When analysis was performed for blood cultures taken using the KurinJet® devices only, there were only 3/103 contaminated blood culture sets using these devices. This gave a contamination rate of 2.9%.

•The contamination rate for blood cultures where KurinJet® devices were not used was 7.8% (41/513).

•Using KurinJet® devices reduced the blood culture contamination rate by 4.9% (7.8%-2.9%), a 62.8% reduction during the trial and 56% reduction from baseline data .

•Using Alahmadi et al's (2011) calculations, this could potentially save SWFT 1,058 bed days and £1,051,676 per annum.



LIMITATIONS

•Almost five times as many blood cultures were not taken using the KurinJet® devices, which could have skewed the results.

•Contamination rates overall were higher during the trial compared to baseline data. This could be explained by the smaller numbers of bottles evaluated.

CONCLUSIONS

•KurinJet® reduced blood culture contamination rates in ED.

•The low usage of the devices was disappointing given the educational sessions provided and their ease of use.

•We are currently exploring how to implement KurinJet® as the main blood collection device in ED at SWFT. We will need to look at how to implement a change in behaviours and attitudes with regards to blood culture collection to ensure successful implementation.

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