Single daily heat disinfection of haemodialysis machines

Theme: Sustainability

Authors and Affiliations

You will be asked to provide author and affiliation details within the submission process.

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Abstract Body

Word count: Maximum 500. Introduction including a clear aim for the project

The first paragraph should concisely outline why the work was undertaken, for example the practical implementation of a known or new intervention to improve patient care. It should include a clear project aim

Introduction

Reducing carbon emissions from in-centre haemodialysis (ICHD) is one of the key priorities for the Yorkshire and Humber Kidney Network (YHKN). In partnership with the UK Kidney Association (UKKA) Kidney Quality Improvement Partnership (KQIP), a regional project was set up. This project was named Trying to Reduce UnNecessary Carbon in Haemodialysis (TRUNC_HD).

Heat disinfection of haemodialysis machines is a critical process to remove calcification and microorganisms within the system hydraulics. Conventional protocols often involve heat disinfection cycles performed multiple times a day, typically after each dialysis session. While effective, these frequent cycles uses high volumes of electricity, water and time. This case study explores strategies to optimise this process while maintaining patient safety.

The aim of this project is to reduce the environmental impact of ICHD by reducing the frequency of heat disinfection to once daily, supplemented by 11 minute rinse cycles between patient sessions.

QI methodology used

The second paragraph should concisely outline what you did, for example team structure, baseline data, QI methodology used, how progress was measured over time. Measurement may be qualitative (eg. surveys) or quantitative (numerical). The methods should usually be described in time order. Full details of any non-standard abbreviation should be given the first time it is used.

Project leads attended four Kidney Quality Improvement Partnership (KQIP) workshops and two Yorkshire & Humber TRUNC_HD sharing and learning meetings to develop their QI skills and exchange best practices. The team employed key QI tools such as stakeholder analysis

to identify and engage relevant individuals, process mapping to clarify workflows and involve staff and a prioritising change idea matrix to identify change ideas that could be easily implemented with the biggest impact.

The team identified a significant sustainable quality improvement opportunity which is reducing the frequency of heat disinfection cycles from three times daily to once daily, with rinse cycles in between sessions for routine cleaning.

The team carried out a literature review of current practices and had discussions with the machine manufacturers and other units which are currently doing single daily heat disinfections to share their practices and protocols. The team also measured water microbial and endotoxin levels from water samples taken from five different haemodialysis machines every week for a period of __ months prior to reduction of heat disinfection to ensure that this could be done safely.

A draft standard operating procedure was drafted and this proposal was reviewed and approved by clinical governance, infection prevention, and microbiology teams. For patients with specific risks, such as those with blood-borne viruses or those returning after dialysis abroad, heat disinfection is still carried out after each session and this is flagged in the patient's folder with bright green stickers to act as staff reminders.

The environmental and financial impact of this change was calculated by the trust's sustainability team and local renal sustainability fellow. Staff surveys were conducted post-implementation to assess satisfaction, ensuring that the intervention met clinical and operational standards while supporting sustainability.

<u>Results</u>, ideally showing changes in data over time The next section requires a clear description of the results, including run charts of data where appropriate. Run chart rules or Statistical Process Control (SPC) charts can be used to show signs of real change. Tables, figures and references may be included.

Environmentally, reducing heat disinfection cycles from three times daily to once daily led to notable reductions in energy, water, and chemical usage. By switching a heat disinfection cycle to a rinse cyle, this would save __ kgCO2e and £_ per action. The trust benefited from lower utility costs and operational savings as the unit was able to reduce its operational hours from 16 to 15 hours per day. The

This initiative also significantly improved patient experience while reducing the environmental and financial impact of heat disinfections. Patients experienced shorter wait times and earlier start and finish times for their dialysis sessions, enhancing their experience. This is as a single heat disinfection cycle takes 45 minutes compared to a rinse cycle which takes 11 minutes in the Fresenius 6008 machines.

Most staff expressed satisfaction to this change, despite some adjustments to the fasterpaced environment. [insert survey findings]. These efforts also boosted team morale, earning a shortlist nomination for the trust's Star Award in Sustainability. This project demonstrated the potential for sustainable quality improvement while maintaining high standards of care.

<u>Discussion</u> – summary of main findings and assessment of how the work can be sustained The final section should concisely outline your main findings with reference to the project aim, and next steps. The best QI abstracts will often describe the steps taken to ensure the improvement work can be sustained over time, and an assessment of the potential to spread to other healthcare settings.

This project successfully demonstrated the feasibility of reducing the frequency of heat disinfection cycles in haemodialysis machines from three times daily to once daily, supplemented by rinse cycles between sessions. The findings show that this intervention achieved the project aim of improving operational efficiency while maintaining patient safety and satisfaction.

Several challenges were encountered during the implementation of this initiative. Achieving consensus among the multidisciplinary team, particularly with infection control and microbiology departments, haemodialysis technicians required extensive discussions and evidence-sharing to address concerns about patient safety. Additionally, water testing which was a critical component to ensure the revised protocol met the current safety standards was time-intensive, delaying the project timeline. These barriers underscored the importance of early and proactive engagement with stakeholders.

The next steps for our unit will continue to focus on enhancing sustainability and operational efficiency. The unit plans to introduce patient smartcards for data management thus replacing paper records while improving data accuracy and accessibility. The unit also plans to quantify its environmental impact using an online carbon calculator tool to provide a baseline for setting targeted reductions and tracking progress over time. Patients will also be encouraged to bring their own blankets, reducing the reliance on single-use or facility-provided options and contributing to waste reduction.

Conclusion:

Biography

Word count: Maximum 200

You will be asked to provide a short biography for the lead author.

Staff survey:

Please rate your experience since the reduction to single heat disinfection?

- 1 Extremely not satisfied
- 2 Not satisfied
- 3 Neutral
- 4 Satisfied
- 5 Very satisfied

Please expand on why you have selected this rating. [free text]

Do you feel confident identifying which patients still require a heat disinfection after their session? Yes/No

Patient survey:

Have you noticed any change in wait times for going onto dialysis recently? Yes / No

How was your experience of dialysis today?

- 1 Extremely not satisfied
- 2 Not satisfied
- 3 Neutral
- 4 Satisfied
- 5 Very satisfied

Any other comments you would like to share with us?

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