Approaches for standardising best practice to reduce CRBSIs and CLABSIs

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On 22 August 2017, the *British Journal of Nursing (BJN)* and 3M held a round-table discussion on catheter-related bloodstream infections (CRBSIs) and central line-associated bloodstream infections (CLABSIs) to identify possible approaches for standardising best practice for reporting and reducing these infections. The panel included microbiologists, infection-prevention specialists, intravenous (IV) care nurses, vascular-access nurses and nurse consultants—nine based in England and one in Wales.

The objectives were to:

- Determine current understanding of variations in reporting of CRBSIs and CLABSIs
- Identify the most pragmatic and effective method of reporting this at a national level
- Discuss how best to standardise the use of chlorhexidine gluconate (CHG)-impregnated dressings and disinfection of needle-free connectors, with a view to reducing CRBSIs and CLABSIs
- Establish how to determine the lowest total cost in use through standardising best practice in reducing infection risk at all access points aligned to vascular access device (VAD) management.

Among the main topics of discussion were the definitions of CRBSIs and CLABSIs, the challenges in measuring and reporting them, the problems with standardising data collection and the need for some consensus on VAD-related bacteraemia.

Defining CRBSIs and CLABSIs

The chair opened the round table by sharing the definitions of CRBSIs and CLABSIs proposed by the Association for Professionals in Infection Control and Epidemiology (APIC) (2009):

- CRBSI: a rigorous clinical definition, defined by precise laboratory findings that identify the central venous catheter (CVC) as the source of the bloodstream infection (BSI) and is used to determine diagnosis, treatment and possibly epidemiology of BSI in patients with a CVC. It is not typically used for surveillance purposes, and there is little data available for comparison. Typically, the term CRBSI is more likely to be used in clinical research. Using the CRBSI definition requires more resources than the use of the CLABSI definition, as hospitals must have the capacity to correctly collect and label blood-culture sets drawn from the CVC and a peripheral phlebotomy, as well as culturing the CVC segment/tips. Typically, this rigorous approach requires a research study and staff
- CLABSI: a term used only for surveillance purposes to identify BSIs that occur in the population at risk (patients with central lines). Use of this term may lead to an overestimation of the infection rate compared with the use of the rigorous CRBSI criteria. Researchers have recently highlighted the serious implications for organisations and individual clinicians when CLABSIs are misclassified.

Most of the members of the panel believed these definitions were complex, confusing and difficult to always strictly apply to the clinical situation. A participant said: 'We use both of those definitions. The vast majority of people put in for the CLABSI, not the catheter-related one, because it is much more difficult from a microbiological point of view to provide that kind of support.'

Two participants thought that 'VAD-related infections' would be a better definition than CLABSI, as it looks at every VAD. Yet many members of the panel did not believe that having a definition for these terms was absolutely necessary for the clinical setting, with one of them stating: 'When you get to the ward and the patient, they're not that concerned whether it's a CLABSI or whatever it is; it's a bacteraemia. If we go too far with getting the definition right, we might miss the bigger picture, which is: this is a bacteraemia.' In other words, what is essentially needed is recognition of sepsis, with a possible source to allow early intervention with appropriate therapy.

Instead of identifying a suitable definition, the attendees considered it more relevant to discuss how to collect data that could help provide a clear idea of what is causing patients to contract bacteraemia and how to prevent it from happening.

Measuring and reporting CRBSIs and CLABSIs

A lack of consistency in measuring and reporting CRBSIs and CLABSIs was evident among the expert group, especially when describing data-collection procedures outside of the intensive care unit (ICU). Moreover, the majority of the participants said they did not have a formal mechanism in place to measure and report all CRBSIs and CLABSIs. 'If the microbiologist thinks there is an infected line, we take the line out. We don't have a formal procedure,' illustrated one of the attendees. This issue was especially noted across larger trusts.

A member of the panel suggested that recording catheter removal due to suspected sepsis would be a potentially useful indicator. 'We need to look at what lines we lose, but it's not even a discussion at the moment,' agreed another participant, who added: 'Clinicians do not involve the microbiologist; they just take the line out.' However, another attendee pointed out the microbiologist is usually involved in the ICU.

A member of the panel mentioned that her trust collects data in the ICU, but does not gather wider data. Another said that ICUs know what their bacteraemia rates are, but the same cannot be said across the rest of the trust. In addition, all members of the expert group admitted that, although they had a system signed up to the Matching Michigan programme, they were not necessarily reporting with it.

One of the attendees complimented the data-collecting system her previous trust had in place, by which all blood cultures were looked at consistently by microbiologists, who would enter the source of the bacteraemia into the system (e.g. whether it was a peripheral line or a central line). Clinicians would then be able to review those sources, and if a microbiologist had not filled in the source, a clinician would chase the microbiologist to get the missing details. Also, the teams on the wards would call the microbiologist if they thought there was an issue with a line. The key to this system, highlighted the participant, was that microbiologists were interested in making it work.

Documentation and monitoring of blood culture contamination rates came up as crucial factors when discussing best practice for data collection. 'The consultant microbiologist will be reviewing every positive blood culture on a daily basis and giving advice on the management of that patient,' pointed out a member of the panel. Another one, who is currently running the Infection in Critical Care Quality Improvement Programme (ICCQIP), said his team would collect data in the ICU—including source and treatment—for all bacteraemia, not just those thought to be line associated. They would also collect data on how many catheter days the patients have got while they are in the ICU. The taking of blood cultures is the most important part of their data collection, he emphasised.

Best practice for data collection

NHS England (2017) stipulates that in 2020–2021 there must be a 50% reduction in Gram-negative bloodstream infections. This will be addressed in steps, including the extension of mandatory data collection. When discussing the benchmarks of a potential national programme for data collection of bloodstream infections, the members of the panel had difficulties identifying potential approaches for standardising best practice. Where to start, what data to collect and how to collect it were seen as the main challenges.

A participant suggested that looking at meticillin-sensitive *Staphylococcus aureus* (MSSA) bacteraemia could be a good indication that there is something going wrong when it comes to lines. Another said that recording the coliforms (not just *Escherichia coli*) for about 3 months could be a good way of getting a benchmark and would enable a review of preventable infections, as well as giving hospitals the opportunity to compare themselves with others. Motivating organisations by allowing them to benchmark themselves against other organisations was identified as a crucial aspect to standardise data collection and implement interventions.

Compliance with basic care came up as a potential factor to be considered when collecting data. However, an attendee argued that benchmarking basic care could take a considerable amount of nurses' time and money with potentially limited benefit. 'It's important we don't turn data collecting into another industry to take the infection prevention nurses away from trying to improve clinical practice, which is the priority,' she warned.

One of the participants highlighted the need to know where catheter-related infections originated: 'If you are going to prevent these infections, you need to identify where the patient acquired it, for example, community or hospital-acquired. Hospitals should discuss this with their community colleagues, which may assist in preventing these infections.' However, a member of the panel pointed out that, although it would be good to know where the data is coming from, the focus should be on the whole of that patient journey: 'We have to take responsibility as a health system.'

'When you set up a system to get data, there is never any assistance or extra money; we always have to do this as well as everything else,' said a member of the expert group, and stressed: 'We never take enough time to look at what data we have, and we already have a lot of data we do nothing with.' Another participant agreed: 'There is a huge amount of data that we could do a lot more with. We've been collecting the top 10 bacteraemia in Wales for the past 10 years, and now different organisations have got a different top 10 and interaction between the organisations is also different.'

Reducing the risk of infection

When talking about caring for acute central lines, an attendee explained that, because they cannot find out what the infection rate is, and due to perceived poor care of acute central lines on the wards leading to potential infection, they would place the central lines in the ICU and stop them from going to the wards to minimise the risk of contamination. This intervention was based on observation, she said. In the same line, another participant explained that her trust decided to only place acute central lines in theatre or ICUs.

Keeping competencies up to date was identified as another method to prevent infection. Nurses in wards may see a CVC every couple of months, whereas, in the ICU, they would see it on a daily basis. Therefore, one of the attendees' trusts decided that every nurse had to have venepuncture training and cannulation training. 'People are now trained and regularly doing cannulation and venepuncture, so there will always be someone competent on those wards,' she explained.

Interventions can also relate to the specific priorities an organisation may have. 'If a hospital sees that similar hospitals have lower rates of infection within a speciality, this may be helpful in prioritising preventative actions,' pointed out a member of the expert group. 'We have infection targets to meet. If we don't meet them as an organisation, we get huge fines which then go on to affect future patient care,' added a participant.

Recent medical technologies guidance by the National Institute for Health and Care Excellence (NICE) (2015) came out on the use of CHG-impregnated dressings use of CHG impregnated dressings on central venous catheters and arterial lines in critically ill patients as a measure to reduce CRBSIs and CLABSIs. Some of the attendees said they had adopted these dressings, while others said they are using Biopatch (Ethicon).

Among the panel members who had not adopted CHG dressings, one explained that, because they do not know what their infection rates are, it would be difficult to evaluate the effectiveness of a new dressing. Another participant said they had trialled the CHG dressing, but did not change to it because what they were using worked well for them. 'If you are going to evaluate a new product to see if it makes any difference to your practice, assuming your infection rates are similar to others in terms of infections per catheter days, because of the numbers of patients required to reach any firm conclusions, this would take many years in the average hospital. To perform such an evaluation is therefore impractical for many hospitals to do on their own,' an attendee pointed out.

'I'm totally convinced that 2% CHG is what we should be using, but half the trusts in the country are still not using it for surgical site preparation; they are using 0.5%. I don't understand that,' expressed a member of the panel. Among the participants who did switch to CHG dressings, one of them explained they were using Biopatch but were having issues with staff putting it on upside down, being unable to see the insertion site, or with lines delivering

inotropes falling out. 'We trialled the CHG-impregnated dressing on the main ICU. The staff could see what was going on and got used to it. In most of the ICU patients, it became the norm. The number of infections went down and we advised NICE on the benefits of using it based on practical experience.'

The majority of the members of the expert group believed guidance on the use of CHG-impregnated dressings should be extended to cover all CVADs, including those in patients being treated in the community. 'CHG at the point of the insertion site should, in specific circumstances, be used in the community, because the risk of infection in the community with some patient groups is probably just as high from a microbiology point of view as in an acute care setting,' expressed a participant. Some, however, considered that it would be advantageous, but not absolutely necessary.

Determining the cost-effectiveness of CHG-impregnated dressings was also part of the debate. 'Collection of data is key to being able to evaluate the cost-effectiveness of CHG dressings,' said a member of the panel. A recent paper (Thokala et al, 2016) suggested that cost savings could be achieved if infection levels were at a certain level.

An attendee said it was not just about the cost, but also about what the dressing feels like for the patient. Her staff wore the dressings for a week and then went back to the patients to exchange feedback. 'Patient experience and patient safety were more important than cost,' she explained, 'but that was a few years ago, so it may have changed now.'

When discussing the use of negative, positive or neutral needle-free device connectors, most participants said they would use positive, with some members of the expert group having recently switched from neutral to positive. One of them mentioned the reason for this change was to reduce occlusion incidences. Another highlighted the use of passive disinfection devices: 'They provide a closed system, which protects the needle-free device between uses, whereas 'scrub the hub' is only as good as the individual who cleans the hub.' An audit (Cameron-Watson, 2016) described the effects on compliance and incidence of VAD-related bacteraemia following the introduction of a passive disinfection device. The results showed VAD-related bacteraemia rates reduced by 69%.

A participant explained that, in terms of infection risk, certain devices are more liable to cause ingress of microorganisms through these connectors. 'Recent findings suggest that the risk of infection with needle-free connectors is not necessarily related to the type of device but to individual devices, which may be more difficult to clean between use,' he said. 'The disinfection of the hub is key,' expressed another member of the panel.

National consensus document

The need for a potential national consensus document on data collection and reporting for VAD-related infections was also part of the debate. Some participants wondered how different it would have to be from the Matching Michigan programme, and whether it could take some aspects of that programme. Others questioned the ability to collect the data in the wards when people do not have an electronic system and are still reliant on a paper system, and many pointed out the issue of taking ownership of the data collection, whether it be done by microbiologists, infection control teams or vascular access teams.

'It's not going to happen, unless it's a national target. We are not going to get trusts to buy into this without it being driven,' said a member of the panel. Another attendee added: 'To do it continuously would become a headache and take resources away. It should be something done regularly but for a short period of time; that would be feasible.'

There was wide variation in the Matching Michigan project as to how well hospitals were able to comply with the infection control procedures and monitoring, and so whether they achieved sustained improvements in infection rates (Dixon-Woods et al, 2012; Dixon-Woods et al, 2013). 'There is no one way of doing it. In some it's infection control, in others it's the ICU staff, and in others it's ward champions. So, it is very variable,' said a participant, who pointed out that a lot of it seems to depend on the attitude of the chief executive of the trust: 'If he is not interested, it doesn't happen.'

Conclusion

Over a 3-hour discussion, the members of the panel agreed on few of the 15 topics listed under the round-table agenda. They could not determine a definition for CRBSI and CLABSI, with some of them suggesting 'VAD-related infections' as a better definition. There was no agreement on how to tackle the challenges related to data collection (what to collect, where to collect it, who should collect it), or on how to address the problem of missing a lot of data due to lines being removed without further investigation. There was, however, a general consensus that some form of a standardised documentation or recording process for VAD-related bacteraemia would be of benefit moving forward, and an agreement that a national target on data collection is required. **BJN**

KEY POINTS

- The members of the panel could not agree on a definition for catheter-related bloodstream infections (CRBSIs) and central line-associated bloodstream infections (CLABSIs)
- A lack of consistency in measuring and reporting CRBSIs and CLABSIs was evident among the panel, especially when describing data-collection procedures outside of the intensive care unit (ICU)
- Most attendees pointed out it was difficult to agree on what data to collect, where to collect it, and who should collect it
- When discussing the use of negative, positive or neutral needle-free device connectors, most participants said they would use positive, with some members of the group having recently switched from neutral to positive
- There was a general consensus that some form of a standardised documentation or recording process for VAD-related bacteraemia would be of benefit moving forward

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