How a central venous catheter surveillance tool was developed for use with all ethnic groups

Central venous catheters are a common cause of infections. A nurse team devised surveillance that enables staff to identify infection in patients of any skin colour.

INTRODUCTION

Central Manchester University Hospital Foundation Trust is an acute city based teaching hospital that caters for a diverse population. When we identified a need to reduce infection rates in central venous catheters (CVCs), an extensive literature search found no CVC surveillance tools that addressed: infection control; black and minority ethnic groups; and standardised care of CVCs. (Department of Health, 2007; Pratt et al, 2007; UK Renal Registry, 2006; Kidney Disease Outcomes Quality Initiative, 2002).

As a result, an initial focus group of multidisciplinary nursing staff in the renal directorate started to develop the multiracial visual inspection catheter tool observation record (MR VICTOR). The tool is used to recognise early signs of infection, prevent complications and speed up the removal of CVCs. It is a unique visual tool for healthcare professionals, which uses both pictures and a scoring system to assess levels of infection for different skin colours (Bethell, 2005). It also gives guidance at each step to ensure prompt diagnosis and treatment.

HEALTHCARE ASSOCIATED INFECTIONS

Healthcare associated infections (HCAIs) are a major clinical problem, causing significant personal and financial burdens (see Background).

A significant proportion of HCAIs are related to the insertion of CVCs. These infections are generally caused by skin microorganisms at the insertion site migrating along the cutaneous catheter track, or by poor hand hygiene and contamination of the catheter hub during interventions (Pratt et al, 2001).

Infection control issues are high trust priorities across the UK. To reduce infection rates, all areas of infection control management were reviewed locally with an emphasis on handwashing, auditing infection rates, education and the introduction of aseptic non-touch technique (ANTT).

Despite these measures, in 2006, renal services were contributing to 30% of all MRSA bacteraemias in the trust. A root cause analysis demonstrated that all infections were directly related to CVCs, which presented as exit site infections then progressed to systemic bacteraemias. An audit showed there was no consistency in managing CVC care.

The main objective in developing the MR VICTOR tool was, therefore, to ensure consistent catheter surveillance and treatment to improve patient safety and standardise care.

It was important to ensure that staff and all patients with CVCs were made aware of the surveillance tool, that it is used on a daily basis and that all infections are recognised early to prevent progression to severe infection and bacteraemia.

Standards of care required were provided so junior members of the multidisciplinary service were confident they should receive.

MR VICTOR is a universal tool that is transferable to all clinical areas and suitable for primary and acute care. Expert patients can remain independent if they are using MR VICTOR when dealing with their own catheter care. The tool could be given to appropriate patients in the community to empower them to manage vascular access sites as they become familiar with it over time.

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ABSTRACT

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PRACTICE POINTS

● All patients with a central venous catheter should have the MR VICTOR tool package incorporated into their care.

● The tool standardises care delivery, regardless of whether nurses are novices or expert practitioners.

● Patients who are familiar with MR VICTOR have higher expectations about the care that they should receive.

● MR VICTOR is a universal tool that is transferable to all clinical areas and suitable for primary and acute care.

● Expert patients can remain independent if they are using MR VICTOR when dealing with their own catheter care. The tool could be given to appropriate patients in the community to empower them to manage vascular access sites as they become familiar with it over time.

IF YOU COULD DO ONE THING TO IMPROVE PATIENT SAFETY, WHAT WOULD IT BE?

The Change One Thing campaign is collating ideas to share across the NHS. The results will be used as a new interactive part of the Patient Safety Congress on 25 and 26 May 2010 at Birmingham’s ICC.

www.patientsafetycongress.co.uk/ntonething
team unfamiliar with CVCs would have guidance on how to care for exit site infections.

Several documents provide guidance on CVC care (Bishop et al, 2007; DH, 2007; Pratt et al, 2007; Pratt et al, 2001). However, none of these appeared to provide a definitive catheter surveillance tool that was easy for novice and expert staff to use in the clinical area.

LOCAL PRACTICE
MR VICTOR consists of several components: an A2 poster for display in clinical areas; an identical A4 laminated poster to be placed in patients’ folders; and an A4 documentation chart to record scores, which also features recommendations on CVC care on the reverse.

Both posters have several features including colour photographs of CVC exit sites showing different skin tones. These images represent sites ranging from no visual signs of infection (score 0) to severe signs (score 4). Shown alongside each individual image and score are corresponding inspections and actions to aid nursing interventions.

Nurses record a daily score and subsequent nursing care for the duration of the patient’s CVC. The benefits of the tool’s design are its ease of use and its use in auditing care.

The tool was designed after considering infection control policies. As the A4 poster is an individualised document to be kept in patients’ folders, we decided it should be laminated so it can be cleaned during the patient’s stay. When patients are discharged, their poster is discarded in line with single use policies.

VALIDATION
As part of the validation process, we tested the scoring capabilities of a cross-section of nursing staff across all areas of the trust.

BACKGROUND
● Healthcare associated infections cost around £1bn per year and directly cause 5,000 deaths and a further 15,000 associated deaths each year (National Audit Office, 2004).
● At any one time, 9% of inpatients in the UK have a hospital acquired infection (NAO, 2004), and there are at least 100,000 such infections in inpatients each year (Pratt et al, 2007).
● Main causes of hospital acquired infections are temporary and permanent implanted medical devices (Coello et al, 2003).

The nurses were shown photographs of CVC exit sites which portrayed different signs of infection in both white (W) patients and those with other (O) skin colours. They were then asked to score the photographs using the MR VICTOR scoring system of 0-4.

When they scored exit sites without using the poster as an aid, they were correct more than 62% of the time (Fig 1) but this increased to 95% when they used the poster for reference (Fig 2).

Comparing data
Six months after MR VICTOR was introduced, data was gathered from patients’ scoring documentation.

In the nine areas sampled, there were no scores above 1 and the majority recorded scores of zero. As there were no formal assessment methods of CVC exit sites before the tool was introduced, we had no comparable data.

However, the photographs used for the poster—some of which displayed severe signs of infection scoring 3 and 4—had come from the clinical areas sampled.

This suggests that signs of infection in CVC exit sites had reduced since the tool was introduced, since no other interventions had been introduced at the same time as MR VICTOR that could have biased the sample.

CHALLENGES
The initial challenge was to resolve CVC related bacteraemia quickly as, during the tool’s development period, we recorded a further MRS A bacteraemia that had developed as a result of poor exit site care and lack of surveillance.

A further challenge was to develop a method of surveillance that could be used immediately with minimal educational support.

As MR VICTOR was developed for use with a local multiracial cohort of patients and the literature review showed it took a unique approach, we were aware that people may be sensitive about the tool addressing skin colour. We therefore discussed the tool with the trust’s equity and diversity department, which assessed its sensitivity and then approached some outside agencies to gauge the content.

Since MR VICTOR was initially designed specifically for use in renal services, when the trust asked us to make it generic, another challenge was how to achieve this while maintaining its simplicity. Small changes were made to the actions on the posters and we developed further documentation that addressed the needs of other clinical areas.

Due to initial inaccuracies in colour reproduction, our printer and medical illustration departments, appointed by the trust, carried out rigorous quality control checks of the tool’s photographic content to ensure the images accurately reflected patients’ skin tones.

While an education package with a pilot project would have been the ideal way to launch the tool, it was implemented more quickly as it was felt it could benefit all patients with CVC lines in situ. This meant the original pilot, which had been planned for the renal area only, did not take place.

The tool was launched trust wide in August 2008, with the proviso that an extensive audit would be undertaken in January 2009. This was delayed until June because of the project leaders’ competing work priorities.

As the tool is simple and self-explanatory, staff adapted easily to the new practices.

TRUST WIDE AUDIT
Eleven months after the launch of MR VICTOR, an audit on its use was undertaken across all 42 clinical areas caring for patients
The MR VICTOR tool is available at www.mrvictorcvctool.com/ and further research on its efficacy is being undertaken.

RESULTS AND BENEFITS
The development of MR VICTOR means that every patient with a CVC in the trust now receives standardised and enhanced care. Previously, catheter care depended on nurses’ expertise, with no clear visual guidelines for reference. The tool has given junior and inexperienced nurses confidence in the assessment process of CVC care.

It has also helped to raise awareness about the problems that can occur without appropriate surveillance and the importance of holistic care.

MR VICTOR has highlighted to staff how simple research problems encountered in practice can be resolved with a team approached by experienced project leaders. As staff have become familiar with the tool and followed the guidelines for obtaining swabs and blood cultures, the numbers sent for analysis have fallen.

The tool has given patients the opportunity to self-manage exit site care and promoted a sense of empowerment. Patients now have confidence that regular surveillance will be carried out and any signs of infection detected at an early stage, possibly preventing bacteraemia. The associated documentation ensures that CVCs do not remain in situ longer than necessary. Since adopting MR VICTOR, scores of 3–4 – the most severe signs of infection – have been eradicated in patients undergoing haemodialysis.

While the original tool was renal specific, it soon became evident it has universal appeal, in areas from paediatrics to any adult specialty. Since it was presented at local and national educational meetings, the interest generated has highlighted the demand for such a tool in the NHS.

MR VICTOR is a simple surveillance tool that could be introduced at negligible cost, with minimal training.

We believe it is unique in its design, and its multiracial perspective addresses a neglected dimension in catheter care.

CONCLUSION
HCAs are linked to hospital admissions, prolonged length of stay, additional antibiotic therapy and potential loss of vascular access (Bishop et al, 2007; Harnage, 2007; National Audit Office, 2004). Furthermore, undetected infections can lead to increased morbidity and mortality (DH, 2005).

Using MR VICTOR could lead to fewer bacteraemias, contributing to reduced antibiotic costs, hospital admissions and loss of vascular access, as well as increasing patients’ quality of life.

CVC surveillance involves minimal nursing input, compared with the time, cost and quality of life implications for patients if they develop a bacteraemia.

This tool could reduce the risk of HCAs in CVCs, speed up referral, and improve management of complications in all patients.

REFERENCES

with CVC access. The audit questionnaire consisted of 14 questions on staff experiences of using the tool in clinical practice. Each clinical area received five questionnaires, meaning 210 were distributed in total; 174 completed questionnaires were received, giving a response rate of 83%.

No clinical staff groups were excluded from completing the questionnaire and Fig 3 shows the range of staff who responded. When asked if the tool was easy to use, 66% (n=114) said yes, only 7% (n=13) said no; the remaining 27% (n=47) did not answer that question (Fig 4).

CONTINUING DEVELOPMENT
One of the biggest challenges in maintaining momentum in the use of MR VICTOR is that, after initial widespread enthusiasm, the responsibility for overseeing its use has fallen to the project leaders. This is difficult since each person already has an existing role within nursing and combining both responsibilities is challenging.

However, initial responses from outside the trust suggest the tool has universal appeal and could be implemented easily across the NHS without incurring significant costs. The challenge has been how to validate it quickly, as demand from other trusts to release it has been overwhelming.