

Using evidence-based guidelines to reduce catheter related urinary tract infections in England

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Abstract

Acquiring a healthcare associated infection (HCAI) in hospital remains a significant threat to patient safety, and catheter associated urinary tract infections (CAUTI) account for the majority of these infections. This review focuses on the complementary and continuing influence of central policy, evidence for practice, and educational support on strategies to reduce the incidence of CAUTI in the National Health Service (NHS). The development of the Department of Health's (DH) national guidelines for preventing HCAI (the 'epic' guidelines) (Pratt et al, 2001, 2007) became the evidence base for the development of the DH *Saving Lives* strategy (DH, 2007). This initiative provides the tools and resources for NHS trusts to embed clinically effective HCAI prevention and control measures into everyday practice that are applied consistently to everyone. The national guidelines are also providing the evidence base for various educational initiatives designed to support guideline implementation, including the NHS Core Learning Unit's (CLU) Infection Control Programme.

Introduction

Since the publication of the first epic guidelines (Pratt et al, 2001), the reduction of HCAI has become a key government priority resulting in a series of policy documents and initiatives. It is therefore disappointing that the recent HCAI prevalence survey in England (Hospital Infection Society, 2007) showed so little improvement in comparison with previous HCAI prevalence surveys in 1980 and 1993/94 (Meers et al, 1981; Emmerson et al, 1996). These surveys reported an overall HCAI prevalence in England of 9.2% and 9.0% respectively. Although not directly comparable with previous prevalence surveys because of differing methodologies and definitions of infection, the HIS survey of 58,775 patients conducted during the summer of 2006 reported an overall HCAI prevalence of 8.2%. Urinary tract infections accounted for 19.7% of these infections. This survey also reported that 31.6% ($n=18,554$) of the patients surveyed had a urinary catheter in situ on the day or within seven days of the survey. As urinary catheterisation

is frequently associated with urinary tract infection, these survey results show that there remains an ongoing need to ensure practitioners at all levels are aware of what is best practice and implement it in their care delivery.

National evidence-based guidelines

National evidence-based guidelines are systematically developed broad statements (principles) of good practice. They are driven by practice need, based on evidence and subject to multi-professional debate, timely and frequent review, and modification. National guidelines are intended to inform the development of detailed operational protocols at local level and can be used to ensure that these incorporate the most important principles for preventing HCAI in NHS hospitals and other acute and community care health services. This stage is critical as adaptation encourages ownership, which is a key contributor to sustainability.

The original epic guidelines were commissioned by the DH and developed during 1998–2000 by a nurse-led multi-professional team of researchers and specialist clinicians. Following their publication, the National Institute for Health and Clinical Excellence (NICE) commissioned an equivalent set of guidelines to be developed for primary and community care (Pellowe et al, 2003). This meant that all practitioners would have current evidence-based guidelines to support best infection prevention and control practice in all care settings. Evidence however is always changing and, following the publication of the NICE guidelines, it was clear that aspects of the epic guidelines required updating. The DH commissioned an interim report (Pellowe et al, 2004) that resulted in a commission to update the epic guidelines. The epic2 guidelines were published in 2007 (Pratt et al, 2007). As in the original epic guidelines, recommendations are provided for:

- Standard Principles, i.e., hospital hygiene, hand hygiene, personal protective equipment, safe use and disposal of sharps;
- Preventing infections associated with the use of short term indwelling catheters; and
- Preventing infection associated with the use of central venous access devices (CVAD).

The reason for choosing these two devices is that urinary catheters are a frequent cause of HCAI and CVAD are associated with the highest HCAI morbidity and mortality.

Guideline development

Guidelines are developed using a systematic review process. This is a review of the evidence based on a clearly formulated question that uses explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyse data from the studies that are included in the review. The process is organised by protocols that describe each stage of the development and are available for peer review. A team of stakeholders oversee the project throughout and approve and comment on findings. Finally the guidelines are subject to extensive public and professional consultation prior to publication.

The evidence for these guidelines was identified by multiple systematic reviews of experimental and non-experimental research. In addition, evidence from expert opinion as reflected in systematically identified professional, national and international guidelines was considered

following formal assessment using a validated appraisal process (Agree, 2001). All evidence was critically appraised for its methodological rigour and clinical practice applicability and the best available evidence influenced the guideline recommendations. Each recommendation is graded to reflect the strength of evidence upon which it is based.

Recommendations for preventing CAUTI

The guidelines on short term urinary catheters apply to adults and children aged one year and above should be read in conjunction with Standard Principles. The urinary catheters guidelines are divided into five distinct sections:

- Assessing the need for catheterisation;
- Selection of catheter type and system;
- Catheter insertion;
- Catheter maintenance; and
- Education of patients, relatives and healthcare workers.

The guidelines concerning urinary catheters can be found in Table 1.

Table 1. Epic2 guidelines for preventing infections associated with the use of short term indwelling urinary catheters

Assessing the need for catheterisation		
UC1	Only use indwelling urethral catheters after considering alternative methods of management	Class D/GPP
UC2	Document the need for catheterisation, catheter insertion and care	Class D/GPP
UC3	Review regularly the patient's clinical need for continuing urinary catheterisation and remove the catheter as soon as possible.	Class D/GPP
Selection of catheter type		
UC4	Choice of catheter material will depend on clinical experience, patient assessment and anticipated duration of catheterisation	Class D
UC5	Select the smallest gauge catheter that will allow free urinary outflow. A catheter with a 10 ml balloon should be used in adults. Urological patients may require larger gauge sizes and balloons	Class D
Catheter insertion		
UC6	Catheterisation is an aseptic procedure. Ensure that healthcare workers are trained and competent to carry out urethral catheterisation	Class D
UC7	Clean the urethral meatus with sterile normal saline prior to the insertion of the catheter	Class D
UC8	Use an appropriate lubricant from a sterile single use container to minimise urethral trauma and infection	Class D
Catheter maintenance		
UC9	Connect indwelling urethral catheters to a sterile closed urinary drainage system	Class A
UC10	Ensure that the connection between the catheter and the urinary drainage system is not broken except for good clinical reasons, e.g., changing the bag in line with manufacturer's recommendation	Class A
UC11	Decontaminate hands and wear a new pair of clean, non-sterile gloves before manipulating a patient's catheter and decontaminate hands after removing gloves	Class D
UC12	Obtain urine samples from a sampling port using an aseptic technique	Class D/GPP
UC13	Position urinary drainage bags below the level of the bladder on a stand that prevents contact with the floor	Class D/GPP
UC14	Empty the urinary drainage bag frequently enough to maintain urine flow and prevent reflux. Use a separate and clean container for each patient and avoid contact between the urinary drainage tap and container	Class D/GPP
UC15	Do not add antiseptic or antimicrobial solutions into urinary drainage bags	Class A
UC16	Do not change catheters unnecessarily or as part of routine practice except where necessary to adhere to the manufacturer's guidance	Class D/GPP
UC17	Routine daily personal hygiene is all that is needed to maintain meatal hygiene	Class A
UC18	Bladder irrigation, instillation and washout should not be used to prevent catheter associated infection	Class A

continued

Table 1. Continued

Education of patients, relatives and healthcare workers

UC19	Healthcare workers must be trained in catheter insertion and maintenance	Class D/GPP
UC20	Patients and relatives should be educated about their role in preventing urinary tract infection	Class D/GPP

Assessing the need for catheterisation

One of the key messages in the guidelines is that practitioners should recognise the potential danger of infection that catheterisation poses and only catheterise a patient if absolutely necessary and when all other options have been considered and rejected. For every day a catheter remains in situ the risk of bacteriuria is 5% so that around 50% of patients catheterised for longer than 7–10 days will have bacteriuria. Although this is often asymptomatic, 20–30% of patients with bacteriuria will develop a CAUTI and of these, 1–4% will develop bacteraemia. Indwelling urinary catheters are strongly associated with significant morbidity and mortality and should be used for the shortest time possible. The reasons for inserting a catheter need to be clearly documented and continuation of the need for catheterisation reviewed daily so that it can be removed at the earliest opportunity.

Selection of catheter

There is an array of catheters on the market and much debate about which type of catheter should be used. Evidence suggests that catheters coated with silver alloy are clinically effective in reducing the incidence of CAUTI though the cost benefit is less clear (Brosnahan et al, 2004).

A recent report by Morgan and Stickler (2007) noted that when Rüschi™ silver-coated silicone catheters were compared with Bard™ IC silver/hydrogel-coated latex catheters and Rüschi™ all-silicone catheters, 'All three types of catheter are vulnerable to encrustation and blockage by *Proteus mirabilis* crystalline biofilm. There was no statistically significant difference in the mean times the three types of catheter took to block in the bladder models.' (page 27). A Health Technology Assessment is now underway to clinically verify these results.

At present, the choice of catheter material will depend on an assessment of the patient and an estimation of duration of catheterisation. The smallest gauge catheter with a 10ml balloon should be selected as these minimise urethral trauma, mucosal irritation and residual urine in the bladder.

Catheter insertion

Catheterisation undertaken by practitioners must use sterile equipment and an aseptic technique. There is no advantage in using an antiseptic rather than normal saline to clean the meatus prior to insertion but a single use lubricant or anaesthetic gel will reduce trauma and discomfort, both of which are contributors to CAUTI. The procedure should be documented in the patient care plan.

Catheter maintenance

Once a catheter has been inserted it is imperative to maintain a sterile, continuously closed system. The connection between the catheter and drainage system should not be broken unless absolutely necessary, for example when changing the drainage bag in line with manufacturer's recommendations. If the system has to be manipulated, hands must be decontaminated and clean non-sterile gloves worn before touching the system and hands decontaminated again on completion of the task, once gloves have been removed. Urine samples should be taken from the sampling port using an aseptic technique. The addition of bacterial solutions to drainage bags or irrigations, instillations and washout provide no benefit in terms of

preventing CAUTI and cause unnecessary breaks to the system. In terms of maintaining hygiene, cleaning the catheter and meatus during a daily bath or shower is all that is required. The important message as regards maintenance is – leave the system alone!

Education of patients, relatives and healthcare workers

Urinary catheters are used frequently in care settings and it is critical that everyone, including the patient, understands how to look after the catheter safely and avoid infection.

Policy changes since epic

The publication of the original epic guidelines was at a time when clinical governance was the driving force behind care delivery. The clinical governance framework requirement that the NHS must be accountable for continually improving the quality of services and safeguarding high standards of care remains but this framework has now been complemented by more focused DH and NHS policies that have placed responsibility for infection control firmly in organisational management and patient safety. *Getting Ahead of the Curve* (DH, 2002) identified HCAI as a key government priority. This was followed swiftly by *Winning Ways* (DH, 2003), which identified key action areas including the new post of Director of Infection, Prevention and Control. Training was also identified as an integral part of all staff's personal development plans.

The Healthcare Commission (HC) was established in 2004 as a result of the Health and Social Care (Community Health and Standards Act) 2003. It has a statutory duty to 'assess the performance of healthcare organisations, award annual ratings of performance for the NHS and coordinate reviews of healthcare with others.' Under the Act the Commission is also charged with investigating allegations of serious failings, particularly when they concern the safety of patients, and the recent investigations into HCAI outbreaks at Stoke Mandeville Hospital (HC, 2006) and Maidstone and Tunbridge Wells (HC, 2007) have clearly demonstrated the power of this commission.

More recently the NHS Health Act (DH, 2006) which introduced the *Code of Practice for the Prevention and Control of HCAI* increased the status of HCAI within organisations and the power of the Healthcare Commission by granting it powers to issue Improvement Notices. Now every NHS organisation must demonstrate that preventing HCAI is an organisational priority and that action is being taken from board to ward to ensure that effective prevention and control is embedded in everyday practice. This includes auditing key HCAI prevention policies and procedures.

In order to achieve this, the DH *Saving Lives* initiative (2007) provides tools and resources, e.g., high impact intervention (HII), care bundles and compliance tools to 'provide a simple way of highlighting the critical elements of a particular procedure, the key actions required and a means of demonstrating reliability using compliance management.' (Page 1 Introduction). HII are based on a care bundles approach which identifies the critical aspects of care and links them with a tool to measure compliance. The tools are intended to be used as a means of identifying where improvements can be made in overall performance. There are currently seven HII and urinary catheter care is HII number 6.

High impact intervention no 6: urinary catheter care bundle

This HII is based on the epic2 guidelines and covers insertion actions and ongoing care. One aspect of insertion though is incorrect. The epic2 guidelines do not state the use of gowns for aseptic technique during insertion as disposable plastic aprons are sufficient. However if all the elements of care were performed correctly the risk of CAUTI would be minimised and an estimated £1,122 saved per patient (NAO, 2000). The compliance tool enables practitioners to compare their practice against these standards and identify where to focus improvements in order to achieve full compliance.

Increasing education opportunities

These policy developments have strengthened the need for establishing a comprehensive ongoing infection prevention and control education programme throughout the NHS. It has always been recognised that guidelines alone are not self-executing. There needs to be widespread dissemination and education for staff to know about them and understand their implications and then implement them into practice.

Following the publication of the initial epic guidelines in 2001, a series of national workshops were hosted by Bard™ and facilitated by the ICNA and Thames Valley University's Richard Wells Research Centre. The purpose of these workshops was to further disseminate the guidelines and encourage participants to use the toolkit provided for developing an action plan to improve practice. A follow up survey revealed that 73% had progressed with their plans (Pellowe and Pratt, 2004). Those who had experienced problems implementing their plans confirmed issues highlighted in the workshops, such as resistance to change from managers and lack of time.

In order to disseminate the guidelines to a wider audience the NHS University (now NHS Core Learning Unit) commissioned the Richard Wells Research Centre and Intuition Publishing Ltd. in Dublin to develop a blended e-learning programme for all NHS staff, both clinical and non-clinical. The programme was launched in 2005 and is available free of charge to all NHS trusts in England at <http://www.infectioncontrol.nhs.uk>.

The programme is provided in three distinct parts. The core course referred to as Part A has two versions: one for clinical and another version for non-clinical staff (housekeepers, porters and domestic cleaners) and describes the importance of preventing HCAI and an overview of Standard Principles for preventing infections. Parts B and C are aimed at non-clinical staff and provides them with a more in depth explanation of Standard Principles and their application to their work practices.

The course has proved to be very popular and over 72,000 NHS staff are now registered users. One advantage of this approach is that staff are able to access the course from anywhere and, on completion, receive a certificate. Managers are able to monitor usage of the course and record completion rates which meet the education requirements of the *Code of Practice* (Pratt and O'Malley, 2007).

With the publication of *Saving Lives* (DH, 2007) the need for additional clinical modules was recognised and the first phase is now complete. These include an Introduction to Saving Lives and two vascular device modules: the first covers selection and insertion and the second, vascular access device maintenance. The second phase of clinical module development is now underway and two urinary catheter modules are being developed: one focused on short term catheters in acute care and the other on long term catheters in community settings. They will be available in the autumn of 2008.

The ongoing circle of evidence, audit and practice improvement

In a very short time all of the systems needed for ensuring safe practice when using urinary catheters will be available to practitioners. Never before have we been in a position of knowing what best practice is, having access to an educational programme to disseminate best practice and use of an audit tool to monitor practice at the bedside. This cannot be a 'one off' event but instead a cycle of ongoing improvement being performed regularly throughout the trust. In this way we can demonstrate a commitment to quality and safe care for all patients at all times and at the same time save valuable resources by preventing unnecessary HCAI.

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