Infection Prevention - Changing Practice in Catheter Management

Keywords:
Urinary catheters, catheter specimen of urine, antibiotics

Duration of project:
April 2007 – March 2009

Report received for publication:
October 2009

Project team
Dr Rohinton Mulla; Dr Puthrasingam; Janet Graham, Deputy Director of Nursing; Matron Vimla Sharma; Ron Driver, Chair of Bedfordshire Ethics Committee, University of Bedfordshire; Sue Fox, Senior Infection Control Nurse; Yvonne Weldon, Ward Manager; Julie Pilley, Staff Nurse; Bejamol Matthew, Staff Nurse; Elaine Swanson, Clinical Quality; Daniel Grierson – Hill, Clinical Quality Facilitator; Liz Bonner, Nurse Consultant Bladder Bowel Dysfunction

Introduction
Urinary tract infection (UTI) is the largest single hospital acquired infection accounting for 23% of all hospital acquired infections (Saving Lives, DOH, 2006) of which 80% are associated with indwelling urinary catheters. UTI in inpatients is estimated to cost an extra £1,122 per patient (Winning Ways, 2003). Catheters have the potential to traumatisethe urethra as well as providing a pathway for bacteria to enter the bladder (Raz et al., 1998). The longer such catheters are in place the greater the risk of infection, by 30 days the catheter acquired infection rate is almost 100% (Burke and Zavaskey, 1999). The causes include contamination on insertion, disconnection of the drainage system, colonisation/encrustation via the formation of biofilm on both the catheter and host tissue and the migration of urogenital or faecal pathogens (Wilson, 2001). The most significant risk factor for developing an infection is duration of catheterisation (Tenke et al., 2008). A catheter acquired urinary tract infection (CAUTI) is likely to increase the length of stay of each patient by 5-6 days which costs an extra £1,327 to treat (Plowman et al., 1999)

The Royal College of Physicians continence audit (RCP, 2006) identified a high rate of catheterisation amongst older people without prior continence assessment or identification of the type of incontinence. To develop an understanding of how CAUTI affects the patient it is very useful to view the Bristol BIO Med Institute (2006) DVD reporting the stories of patients with indwelling catheters, the embarrassment when the catheter leaks and the problems with infection.

Winning Ways (DOH, 2003) identified that indwelling catheters are a major cause of morbidity in older people and produced action plans to reduce the infection risk. The National Audit Office (2004) subsequently found many acute trusts had guidance and policies regarding catheterisation and prevention of infection but that it was not being implemented (Saving Lives, DOH, 2006).
Locally, in this acute trust, a catheterisation assessment tool and record of catheter management had been developed but implementation had been problematic due to lack of specialist continence staff on site to take forward the continence agenda.

**Project aim**
The senior clinicians recognised the need to reduce catheter acquired urinary tract infections, improve assessment for initial catheterisation and long term catheter care. A project was initiated by the Consultant Microbiologist and carried out by a multi disciplinary team committed to working together to reduce catheter acquired urinary tract infections.

**Method**
Two wards in each department of medicine for the elderly and general medical wards (four in all) were identified for the project. Ward champions were identified to join the multi disciplinary team.

The team agreed a project plan which included:
- A baseline audit of current catheterisation practice
- Engaging the multidisciplinary team in improving catheter care and reducing CAUTI
- Improving patient outcomes by reducing inappropriate catheterisations
- Reducing catheter acquired urinary tract infections
- Reducing inappropriate catheter specimens of urine sent for culture
- Ensuring Department of Health advice is in place (Winning Ways and Saving Lives).

The base-line audit looked at current practice, using patient notes over a 2 week period, examined documentation of rationale for catheterisation, urine testing prior to catheterisation, incidence of CAUTI, catheter specimen urine results and use of antibiotics.

On completion of the audit, an observational survey of clinical care was completed by the ward champions using the High Impact Intervention No 5 (DOH, 2007) on 40 patients. This report amalgamated the results of the audit and observation of practice.

The results were discussed at ward focus group meetings and areas of care identified for improvement were highlighted during discussion. The focus groups were open to all grades of staff, medical, nursing and allied health professionals. The initial audit was presented and discussion followed to try and understand:
- any barriers to changing practice
- what would help to change practice

The information from the report and the issues identified at the focus groups formed the basis for the development of the training programme. The training programme covered the following areas:
- rationale for catheterisation
• associated risks of infection
• when to organise a catheter specimen of urine
• the use of antibiotics
• catheterisation procedure
• long-term catheter management

Following the training programme for nurses, the catheterisation assessment pathway was introduced to the wards to ensure initial catheterisation and long-term management was documented.

Three months after completion of training and implementation of the catheter assessment pathway, the audit and observation of practice was repeated to monitor change in practice, any reduction in the use of antibiotics and infection rates.

**Results**
A comparison of the clinical audit data collected in 2007 and 2008 is provided below.

**Sample size**
2007: 47 patients
2008: 30 patients

**Demographics**

<table>
<thead>
<tr>
<th></th>
<th>2007: Number of patients (%)</th>
<th>2008: Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>18 (38%)</td>
<td>16 (53%)</td>
</tr>
<tr>
<td>Female</td>
<td>29 (62%)</td>
<td>14 (47%)</td>
</tr>
</tbody>
</table>

In both audits the majority of patients (61% and 73%) within the sample group were between 70-99 years of age.
Details of initial catheterization

<table>
<thead>
<tr>
<th>Reason for catheter insertion: (by individual episode)</th>
<th>2007: Number of catheters (%)</th>
<th>2008: Number of catheters (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No reason was documented</td>
<td>23 (43%)</td>
<td>15 (43%)</td>
</tr>
<tr>
<td>Monitor output</td>
<td>12 (23%)</td>
<td>6 (17%)</td>
</tr>
<tr>
<td>Retention</td>
<td>8 (15%)</td>
<td>7 (20%)</td>
</tr>
<tr>
<td>Incontinence</td>
<td>5 (9%)</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Immobility</td>
<td>1 (2%)</td>
<td>-</td>
</tr>
<tr>
<td>Chronic renal failure (Monitor output)</td>
<td>-</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>Bypassing</td>
<td>-</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Distended bladder</td>
<td>-</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Intercranial haemorrhage</td>
<td>-</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Poluria</td>
<td>-</td>
<td>1 (3%)</td>
</tr>
<tr>
<td>Catheter in wrong place originally</td>
<td>1 (2%)</td>
<td>-</td>
</tr>
<tr>
<td>Urgency</td>
<td>1 (2%)</td>
<td>-</td>
</tr>
<tr>
<td>Prior to ECT</td>
<td>1 (2%)</td>
<td>-</td>
</tr>
<tr>
<td>Pulmonary oedema</td>
<td>1 (2%)</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>53 (100%)</td>
<td>35 (100%)</td>
</tr>
</tbody>
</table>

In both audits, 2007 and 2008, review of patient notes revealed lack of documentation of the rationale for catheter insertion (43%). Where information was available, in 2007 the most common reason for catheter insertion was to monitor urine output; however in 2008 the most common reason documented was retention.

There was no documentation of the type of night or day bag or type of valve in both audits.

Observations of clinical practice
A series of observation audits were carried out by the CAUTI champion nurses on the project wards.

Results for observed catheter insertions

<table>
<thead>
<tr>
<th>Sample size</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Was catheter needed?</td>
<td>17 (100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Urethral meatus was cleaned</td>
<td>16 (94%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Sterile, closed drainage system used</td>
<td>16 (94%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Hand hygiene observed</td>
<td>17 (100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Aseptic technique observed</td>
<td>17 (100%)</td>
<td>8 (80%)</td>
</tr>
<tr>
<td>Personal protective equipment used</td>
<td>15 (88%)</td>
<td>9 (90%)</td>
</tr>
<tr>
<td>All six elements achieved</td>
<td>14 (82%)</td>
<td>7 (70%)</td>
</tr>
</tbody>
</table>
Results for observed catheter care

<table>
<thead>
<tr>
<th>Sample size</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand hygiene observed</td>
<td>9 (45%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Catheter hygiene observed</td>
<td>9 (45%)</td>
<td>7 (70%)</td>
</tr>
<tr>
<td>Aseptic technique used</td>
<td>19 (95%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Drainage bag position is optimal and hygenic</td>
<td>11 (55%)</td>
<td>8 (80%)</td>
</tr>
<tr>
<td>Catheter manipulation</td>
<td>13 (65%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>The catheter was needed</td>
<td>20 (100%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>All six elements achieved</td>
<td>0 (0%)</td>
<td>6 (100%)</td>
</tr>
</tbody>
</table>

Summary of findings

- In 2007, 11% of patients were confirmed as having two or more catheters placed throughout their inpatient stay compared to 5 patients (17%) in 2008. A total of 53 individual catheters could be confirmed as being placed in 2007, and 35 in 2008.
- In both 2007 and 2008, on retrospective review of patient notes, the majority of catheters inserted had no reason for insertion documented, 43% reported in both audits, representing a litigation risk. Where information was available, in 2007 the most common reason given for catheter insertion was to monitor urine output (23%), however in 2008 the most common reason documented was retention (20%).
- In both 2007 and 2008, on retrospective review of patient notes, the majority of catheters inserted had no information documented regarding the ward/department where the catheter was placed. 68% reported in 2007 and 43% in 2008 and again representing a litigation risk. Where information was available, in 2007 the most common unit for catheter insertion was the AAU (9%, 2008: 9%). In 2008 the most common location for catheter insertion was on the wards (26%, 2007: 6%).
- Documentation of the type of catheter used increased from 2% to 70% in 2008.
- Through both audits, Charrier size 12 catheters were the most commonly used, reported for 38% and 31% of catheters in 2007 and 2008 respectively.
- In both audits there was no information documented in the patients notes about the type of night/day bag or type of catheter valve.
- Short or long-term catheter use was documented for 41% catheters inserted in 2007 and 31% in 2008, demonstrating a decrease in documentation and a potential litigation risk as to the appropriate use of these products.
- The re-audit demonstrated an increase in dipstick testing, from 28-57% of patients in 2007-2008 respectively.
- In 2008, of the patients where dipstick results were available, 59% had results suggestive of UTI; this showed a decrease from the number of UTI positive dipstick results carried out in 2007 (85%).
- 2008 showed a decrease (58-42%) in the number of patients prescribed antibiotics - prior to a catheter specimen of urine (CSU) being sent for culture.
2008 showed a 24% increase (49-73%) in the number of patients who had CSU samples taken. 2008 showed a decrease in the number of CSU samples showing positive growth (52 – 45%)

In 2008, there was a large increase in the number of patients where only 1 bacterial strain was isolated post culture suggesting an improvement in sampling methodology with diminished contamination

There was a decrease in the number of patients prescribed antibiotics post CSU testing from 11% to 7% in 2008

The catheter assessment form to be completed on initial insertion was used for only 33% of patients. The completed form would have shown evidence of rationale for catheterization, type of catheter bag/valve being used. The care plan was used in the majority of cases (73%), however as stated, to varying levels of completion. Although both documents were introduced and/or promoted concurrently, there is a significant difference in the use to the two forms

Recommendations/Action plans following the 2008 re-audit

- The ward champions presented the findings to the project ward staff, supported by the consultant microbiologist and clinical governance facilitator
- Ongoing promotion and use of the catheter assessment form to be completed for initial catheter insertion. To ensure rationale documented for catheterization, date, and details of catheter, leg bag, night bag, short term or long term catheter
- Ongoing education with regards to antibiotic prescribing (narrow spectrum antibiotic usage with CSU sensitivity taken into account) and correct techniques for the collection of CSU samples
- A series of good practice messages regarding catheter care was developed by one of the ward champions and will be laminated and a set given to each ward/unit. The laminates can be changed monthly to refresh the message
- A Catheter Care Study Day was organized to present the findings of the audit, Dr Morris from the Bristol Bio-med centre attended to present the future for catheter care and screened a dvd on how catheterization affects patients
- The catheter assessment form was revised and went from 2 pages to 1 page with the risks and contraindications printed on the back. The paperwork was disseminated at the study day and is now available via the hospital intranet
- A catheterization information leaflet for patients was also distributed at the study day
- The results of the audit were presented at the senior nurse meetings to raise awareness of poor documentation/record keeping risk and to ensure in future the completion of the catheterization documentation
- The work to improve catheter care is an important component of the patient safety agenda for the entire hospital and is being taken forward by the transformation team
**Conclusion**
Indwelling urinary catheters can have a negative impact on morbidity and mortality. Catheter acquired urinary tract infection is a significant factor in prolonging recovery times, is unpleasant for the patient and expensive for the institution. This project supported the development of the ward champions and gave the project team an insight into the complexity of changing practice. The audits identified a reduction in antibiotic use and decrease in contaminated CSU specimens. Documentation requires further work. There are many challenges to moving practice forward, and it is important that senior managers have an understanding of the resistance to change and ensure staff have time to be trained to understand the need for change. The issues identified by staff implementing change need to be addressed to ensure all patients experience safe practice. The staff influenced the reduction of the catheter assessment from two to one page. A rolling programme of updated training must be available to all grades of staff. To ensure change is implemented and maintained regular audit of practice is integral, feeding back to all staff the improvements made and areas requiring further development.

**Limitations**
One of the project leads not employed by the hospital had a long period of sick leave which delayed the project significantly.

**Acknowledgement**
Kate Sanders from the Foundation of Nursing Studies was a great help in moving the project forward and suggesting strategies to engage the staff.

**References**
BioMed health technology Co – operative research for innovation for urinary continence [www.biomedhtc.org.uk](http://www.biomedhtc.org.uk)


Further reading
www.npsa.uk


