Managing patients in the community involves a number of challenges that differ significantly to those of hospital-based healthcare. This is particularly relevant to infection control. In the hospital environment the patient’s surroundings and personal hygiene can, to a certain extent, be managed. However, in the community, these circumstances are not so easily controlled. For a range of patients, infection control can be a particular challenge, for example those with indwelling catheters, leg ulcers or post-surgical wound sites.

Community nurses’ caseloads may include a large number of catheterised patients and catheter-related infection is a significant problem, with up to 90–100% of those who are catheterised long-term going on to develop a catheter-associated urinary tract infection (CAUTI). For community nurses, ensuring that their skin and that of the patient has been cleansed before any catheter-related intervention is paramount. This article looks at the use of a new antimicrobial cleansing solution (octenilin®; Schülke) and whether its properties reduced the infection risk associated with catheterisation in the community.

KEYWORDS: Continence ■ Catheters ■ Urinary tract infection ■ Infection control

This means that catheter-related infection can take up a significant amount of community nurses’ time and they need to understand the infection risks of catheterisation and how to combat them.

Nurses visiting patients’ homes needs a certain skill-set to work in an environment that may be contaminated with household refuse or pets, for example, and where there may be issues around showering and washing. Community nurses’ caseloads can include a large number of catheterised patients with differing issues. For example, blocked urinary catheters are a significant problem for district nurses (Evans and Painter, 2001), and many end of life patients have catheter-related needs (Young and Conway, 2011).

Catheter-related infection is a significant problem — between 10–30% of patients who are catheterised for a short period (2–4 days) develop bacteria in the urine (bacteriuria), a figure that rises to 90–100% of those who are catheterised long-term (Brusch, 2013). Similarly, approximately 80% of hospital-related (including post-discharge) urinary tract infections (UTIs) are related to urethral catheterisation (Brusch, 2013).

This means that catheter-related infection can take up a significant amount of community nurses’ time and they need to understand the infection risks of catheterisation and how to combat them.

This article looks at the microbial risks associated with catheterisation in the community. It examines the findings of a new study, which looked at an antimicrobial cleansing solution (octenilin®; Schülke) and whether its properties reduced the infection risk associated with catheterisation.

CATHETERISATION

Many people transferring from hospital to primary care will have a urinary catheter still in place (Seymour, 2007). Similarly, many patients seen regularly by community nurses, such as elderly patients in nursing homes, will have a long-term catheter in situ. Therefore, community nurses need to understand the basic principles behind this common procedure.

The purpose of urinary catheterisation is to drain urine from the bladder into a collection device, such as a catheter bag. The catheter itself comprises a flexible tube, usually manufactured from silicone, which is inserted through the urethra or sometimes via an abdominal incision (suprapubic catheterisation). In order to perform catheterisation, the clinician guides the catheter into the bladder permitting urine to flow into the drainage device (Ghaffary et al, 2013).

Urinary catheters can be in place for either a short time or be used as a longer-term measure.

Reasons for short-term catheterisation might include:

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In preparation for procedures such as hysterectomy
To monitor urine output
To deal with temporary blockage such as gall stones.

Long-term catheterisation is often necessary in the following:
- People who can no longer control their bladder due to nerve damage (neuropathic bladder)
- To treat urinary incontinence (loss of bladder control), for example in patients with spinal injury or late-stage dementia.

Community nurses are more likely to see patients with long-term catheterisation, although as mentioned above, some patients will be discharged from hospital with a short-term catheter in place.

The risk of infection increases the longer a patient is catheterised and best practice dictates that the procedure should be avoided unless clinically essential and, even then, should be removed as soon as possible to avoid potential complications including, infection, bacteraeuria, haematuria, urethritis and bladder perforation (Saint et al, 2006; A Strategy for the Control of Antimicrobial Resistance in Ireland [SARI], 2006).

**RISKS ASSOCIATED WITH CATHETERISATION**

UTIs are one of the commonest healthcare-associated infections (HCAIs) and up to 80% of these are related to urinary catheters (Lo et al, 2005). In common with any invasive healthcare procedure, catheterisation carries an infection risk, in this case bacteriuria (a bacterial infection of in the urine). UTIs can have a number of causes:
- The patient’s own colonic flora coming into contact with the urethra
- Contamination from the environment, such as other patients, the healthcare environment or bacteria in the home
- Cross-infection from the hands of healthcare staff
- The outer layers of the patient’s own skin.

Once bacteria enter the bladder, they can multiply rapidly and in more serious cases, symptoms include (Chenoweth and Saint, 2011):
- Dysuria
- Frequency
- Urgency
- Pain
- Fever.

**‘There are a number of steps that the community nurse can take to reduce the risk of catheter-associated infections.’**

The presence of urinary catheters and the length of time they remain in situ are both contributory factors to the development of what is known as catheter-associated urinary tract infection (CAUTI) (Saint and Chenoweth, 2003), as are contamination originating from the patient’s skin, or that transferred from the hands of healthcare staff.

**CAUTI**

CAUTI is a frequent and problematic HCAI, which causes discomfort and can result in serious health problems if left undetected. These infections often develop because of inadequate skin cleansing before the catheter is inserted, or from cross-contamination from the hands of healthcare workers, such as community nurses (Pratt et al, 2007). It has often been debated as to the use of an antimicrobial solution. Whether the use of an antimicrobial on the skin before insertion could be effective in reducing the likelihood of infection.

Bacteria colonise a catheter and form biofilms, which involve clusters of cells covered in a protective matrix of polysaccharide polymers (Kirker, 2009; Greener, 2011). Another problem is that some bacteria may include antibiotic-resistant pathogens, including *Escherichia coli*, *Klebsiella sp.*, *Enterobacter sp.*, *Proteus sp.* and *Citrobacter sp.*, and *Pseudomonas aeruginosa*, which makes them difficult to treat (Sandle, 2013).

CAUTIs are common and contribute up to 40% of all HCAIs (Kennedy et al, 2013). Some community patients are more at risk, including:
- Women
- Older male patients in long-term residential care
- Those who are immunocompromised
- Patients with diabetes mellitus

**REDUCING THE RISKS OF CATHETERISATION IN THE COMMUNITY**

There are a number of steps that the community nurse can take to reduce the risk of catheter-associated infections when caring for patients at home or in a primary care setting, such as a residential facility. These include (Health Protection Scotland, 2012):
- Ensure that there is a regular review of the need for the indwelling urinary catheter
- Remove if possible
- Ensure the connection between the indwelling urinary catheter and the drainage system is not interrupted, except to meet clinical requirements (e.g. when changing the bag)
- Make sure regular meatal (area around the urethra) hygiene is performed
- Make sure the drainage bag is emptied when clinically indicated; avoid touching the drainage tap with any environmental surface
- Ensure hand hygiene is performed and gloves are worn before touching the indwelling urinary catheter.

In terms of the last point above, there is an ongoing debate as to the use of soap and water for hand hygiene and whether an antimicrobial substance would be more efficient. Some evidence exists that antimicrobials contribute to the elimination of CAUTIs (Matsumoto et al, 1997; Pickard et al, 2012) and the efficiency of antimicrobials for skin cleansing was demonstrated in a recent study, using octenilin cleaning solution.
Octenilin incorporates octenidine dihydrochloride as its active ingredient, which acts as a broad-spectrum antimicrobial and is suitable for use on skin, mucous membrane and for wound antisepsis. Octenilin also contains ethylhexylglycerin (a conditioning agent and preservative), which reduces the skin’s surface tension, providing optimal moistening and cleansing, even on difficult-to-reach areas.

STUDY INTO THE ANTIMICROBIAL EFFECTIVENESS OF A SKIN CLEANSER

For community nurses, being able to ensure that their skin and that of the patient has been adequately cleansed before any catheter-related intervention is paramount. Community nurses can find themselves dealing with different patients in a variety of environments and the ability to easily transport a reliable antimicrobial could have a major impact on patient care.

A recent study conducted in an independent laboratory compared an antimicrobial (octenilin cleaning solution) with a standard hand-washing procedure to reduce the microbial content of the skin. The study involved 30 skin tests using different subjects for both techniques. To safeguard the safety of the subjects, the microorganism chosen was Escherichia coli strain K12 (which is safe to use in humans). E. coli is representative of the types of contamination that could be associated with catheters (Nicolle, 2005).

Before the study, the forearms of all subjects were washed to ensure that most of the natural skin bacteria were removed, then the E. coli (less than 200 colony forming units [CFUs] per arm) were applied to the forearms and allowed to dry. The study was repeated twice — during the first episode, the efficacy of octenilin cleaning solution was examined and the numbers of remaining microorganisms was measured. For the second study, saline (0.9% w/v solution) was used before the numbers of microorganisms were again measured. Both solutions were left in contact with the subjects’ forearms for two minutes.

The microorganisms were assessed using a contact agar plate (the growth medium was tryptone soya agar) and incubated for five days at a temperature of 30–35°C. Following this, the numbers of surviving colonies were calculated. Before depositing the bacteria onto the arm, the number of bacterial cells were assessed. This allowed any surviving bacteria, post-treatment, to be compared to a control count. The reduction in bacteria from each of the subject’s forearms was then calculated by comparison with the controls. The comparative efficiency of both octenilin cleaning solution and saline were compared in relation to the reduction in microorganisms achieved by each solution (Table 1).

The study concluded that octenilin cleaning solution had a greater effect, eliminating 91% of the known bacterial population, compared with the saline rinse, which removed 55%. The average population of the control counts varied a little, with the octenilin receiving a higher challenge — while the differences were not of great significance, the numbers show the large extent to which the bioburden on the forearms of each subject were reduced.

CONCLUSION

Community nurses visit a large variety of patients in a wide range of settings and one of the commonly encountered problems is that of CAUTI. This article has discussed the problems associated with catheterisation in the community, and highlighted some of the measures that can be taken by community nurses to reduce the contamination risk, including cleansing the skin before catheterisation as well as during any catheter-related intervention.

In an independent study, the use of an antimicrobial solution demonstrated superior microbial reduction properties compared with a saline rinse. Based on this, it would be prudent for community nurses to consider the use of an antimicrobial before the insertion or management of a catheter. 

<table>
<thead>
<tr>
<th>Results</th>
<th>Study A: octenilin® cleaning solution</th>
<th>Study B: 0.9% saline solution</th>
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</thead>
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<td>Control counts</td>
<td>144 CFU</td>
<td>121 CFU</td>
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<tr>
<td>Mean counts from skin tests</td>
<td>13 CFU</td>
<td>55 CFU</td>
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<tr>
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<td>31 CFU</td>
<td>98 CFU</td>
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<tr>
<td>Minimum count</td>
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<td>12 CFU</td>
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<tr>
<td>Mean percentage reduction</td>
<td>91%</td>
<td>55%</td>
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