Selecting gel types for urinary catheter insertion

In this article...

- Why lubrication should be used when inserting catheters
- Overview of different lubricating gel types
- Potential adverse effects encountered with some gel types

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Abstract
Yates A (2015) Selecting gel types for urinary catheter insertion
Nursing Times; 111: 26, 18-20.
National guidance recommends using a suitable lubricant from a single-use container when inserting urinary catheters to minimise the risk of infection and trauma to the urethra. However, it is unclear whether an anaesthetic or lubricating gel should be used. If the type of lubricant used is not dictated by local policies, the nurse carrying out the procedure must decide. This article reviews the types of lubricant gels available, national guidance, and reasons and contraindications to help staff make the right choice for patients.

Historically, anaesthetic gel was routinely used for male catheterisation as the procedure was deemed painful. It was not considered for women due to the short length of the female urethra (Box 1).

The urethra has a flattened convoluted tube shape with epithelial folds, making it prone to trauma on catheter insertion. In males and females the urethra is prone to friction during catheter insertion as the area contains a good blood and nerve supply (de Courcy-Ireland, 1993). Lubrication is therefore required, but which gel is the most beneficial?

Reasons for lubrication
Current national guidelines (Loveday et al, 2014; National Institute for Health and Care Excellence, 2012; Royal College of Nursing, 2012) all recommend the use of an appropriate lubricating gel as it will:
- Reduce the risk of urethral trauma on catheter insertion;
- Reduce discomfort and friction, which, in turn, may reduce infection;
- Reduce pain;
- Dilate the urethra.

Some literature suggests a lubricant gel can aid visualisation of the female urethra (Woodward, 2005; de Courcy-Ireland, 1993) as the urethra is difficult to distinguish. Once it is identified, the lubricant can be used to mark the spot (Wilson, 2013).

Lubricating gel is usually available in sterile, single-use containers of 6ml for females and 11ml for males. Tables 1 and 2 show the lidocaine and water-based lubricating gels currently available.

The dilemma
Nurses who undertake urinary catheterisation need to know which lubricant gel to use in specific circumstances. Historically, a 2% lidocaine anaesthetic gel has been used in male catheterisation but it was not until 1993 when de Courcy-Ireland (1993) identified it as a consideration for women.

When lidocaine has been used in females, studies have shown varying success in comparison with lubricating gels (Chan et al, 2013). Muctar (1991) showed that use of a 2% anaesthetic gel may reduce pain caused by involuntary movements in both male and female patients, while Chung et al (2007) later carried out a double-blinded experimental study, which showed that 2% lidocaine compared with lubricating gel reduced pain experience in females. These results were reproduced by Harmanli et al (2009). However, most of these studies identified limitations and some bias.

Keywords: Urinary catheter/Gel/Lubrication
- This article has been double-blind peer reviewed
This can occur. The stinging can be reduced in males, so patients need to be warned about transitory stinging on insertion, especially in catheters inserted into the urethra (Kyle, 2011). Although it seems to be rare, the prevalence and incidence of allergy and severe reactions to chlorhexidine is unknown.

**Water-soluble lubricating gels**

Water-soluble lubricating gels have no anaesthetic or bactericidal properties, but have advantages over other gels. They still:

- Provide lubrication on insertion of the catheter;
- Reduce friction;
- Can help with dilation.

Before use by cooling the gel to 4°C (Thompson et al, 1999).

Manufacturers caution against using lidocaine if there is damage to the mucous membranes as this could allow an increase in the systemic uptake of the drug. Caution should also be exercised in patients with impaired cardiac conditions, hepatic insufficiency or epilepsy.

Tzortzis et al (2009) reviewed the available evidence and warned of the adverse effects of using multiple or excessive amounts of lidocaine over a period of time, especially in patients who have severe or multiple urethral injuries. These adverse effects included:

- Slowing of nerve impulses through the heart muscle;
- Reduction in strength of heart beat;
- Possible cardiac arrest.

However, where the urethra was intact and a single application was used, the risks were significantly reduced.

**Chlorhexidine gels**

Micro-organisms can enter the bladder either on catheter insertion or via the catheter lumen, leading to catheter-associated infections (Tenke et al, 2004). Kyle (2011) acknowledged chlorhexidine had bactericidal and bacteriostatic action to Gram-positive bacteria (such as Escherichia) and Gram-negative bacteria. However, Gram-negative urease-producing bacteria, such as Proteus mirabilis, are resistant to chlorhexidine.

The RCN (2012) says there is limited evidence to support the use of chlorhexidine, and caution should be applied as it can cause anaphylactic reactions (Medicines and Healthcare products Regulatory Agency, 2012). Exposure can also cause:

- Sensitivity;
- Mild reactions;
- Rash;
- Swelling;
- Itching;
- Contact dermatitis.

Although it seems to be rare, the prevalence and incidence of allergy and severe reactions to chlorhexidine is unknown.

**TABLE 1** **LIDOCAINE GELS FOR URETHRAL LUBRICATION BEFORE CATHETERISATION**

<table>
<thead>
<tr>
<th>Product</th>
<th>Cathejell with lidocaine</th>
<th>Hydro-Caine</th>
<th>Instillagel</th>
<th>OptILube Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Montavit (distributed by Teleflex Medical)</td>
<td>Prosys (distributed by ClniSupplies Ltd)</td>
<td>FarcoPharma (distributed by CliniMed Ltd)</td>
<td>Optimum Medical</td>
</tr>
<tr>
<td>Gel type</td>
<td>● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine dihydrochloride 0.05%</td>
<td>● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine gluconate 0.25%</td>
<td>● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine gluconate 0.25%</td>
<td>● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine gluconate 0.25%</td>
</tr>
<tr>
<td>Presentation</td>
<td>Accordion-type applicator 8.5g = 8.05ml (female) 12.5g = 11.8ml (male)</td>
<td>Syringe applicator 6ml (female) 11ml (male)</td>
<td>Syringe applicator 6ml (female) 11ml (male)</td>
<td>Syringe applicator 6ml (female) 11ml (male)</td>
</tr>
</tbody>
</table>

**TABLE 2** **WATER-BASED GELS FOR URETHRAL CATHETERISATION**

<table>
<thead>
<tr>
<th>Product</th>
<th>Cathejell Mono</th>
<th>OptILube</th>
<th>Steri Lub</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Montavit (distributed by Teleflex Medical)</td>
<td>Optimum Medical</td>
<td>Distributed by Bard Ltd</td>
</tr>
<tr>
<td>Gel type</td>
<td>Water-soluble lubricant gel</td>
<td>Water-soluble lubricant gel</td>
<td>Water-soluble lubricant gel</td>
</tr>
<tr>
<td>Presentation</td>
<td>Accordion-type applicator</td>
<td>Syringe applicator 6ml (female) 11ml (male)</td>
<td>Available in Bard Comprehensive trays Syringe-type applicator</td>
</tr>
</tbody>
</table>

Note: some gels are classed as medical devices while others are medication. Nurses should check whether a prescription is required. Source: Wilson (2013)
There have been no adverse reactions known in patients who have had multiple trauma to the urethra or in terms of multiple use. In addition, no prescription is required. However it is still important to check whether the patient is allergic to any of the gel’s ingredients.

**Gel selection**

NICE (2012) and Epic (Loveday et al, 2014) guidelines specify that an appropriate lubricant from a single-use container should be used during catheter insertion to minimise urethral trauma and infection.

However, although there seems to be a plethora of articles in relation to the use and efficacy of lubricating gels, without robust evidence-based research, it remains difficult in specific situations to identify which lubricating gel is more beneficial when inserting catheters in specific situations. With the various gels available, each of which may have different ingredients, choosing the right gel can still be confusing. What is of paramount importance, however, is acting in the best interests of the patients and practising in line with the best available evidence to preserve patient safety (Nursing and Midwifery Council, 2015).

It is the nurse’s responsibility to identify before catheterisation whether there are any risks, cautions or contraindications that may be identified or exacerbated, and should prevent a certain gel from being used on a particular patient. Table 3 outlines the use or caution applicable to different gel types. Information on the type of gel used during catheterisation and any adverse effects should be documented as this may help other practitioners choose the correct lubricating gel for patients in the future.

**Conclusion**

Catheter insertion is a common procedure but the evidence base regarding which lubricating gels to use in which circumstances is lacking. Nurses should take note of manufacturers’ instructions, as well as individual patients’ medical history and experiences, before choosing which type of lubricant gel to use. NT

**Table 3 - Considerations for each gel type**

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Water-soluble lubricant gel</th>
<th>Lidocaine hydrochloride 2%</th>
<th>Chlorhexidine gluconate 0.25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubrication</td>
<td>Reduces trauma/infection</td>
<td>Reduces trauma/infection</td>
<td>Reduces trauma/infection</td>
</tr>
<tr>
<td>Dilution</td>
<td>Reduces friction/infection</td>
<td>Reduces friction/infection</td>
<td>Reduces friction/infection</td>
</tr>
<tr>
<td>Pain relief on insertion</td>
<td>Follow manufacturer’s guidelines. No required waiting time</td>
<td>Follow manufacturer’s guidelines.</td>
<td>Instil 5 mins before catheterisation</td>
</tr>
<tr>
<td>Transitory stinging on insertion of gel</td>
<td>No</td>
<td>Can occur, warn patient, decrease likelihood by cooling gel to 4°C</td>
<td>Can occur, warn patient, decrease likelihood by cooling gel to 4°C</td>
</tr>
<tr>
<td>Contraindication?</td>
<td>Check allergy to ingredients</td>
<td>Cardiac problems, hepatic problems, epilepsy</td>
<td>Can cause sensitivity and mild reactions but also anaphylactic reactions (MHRA, 2012)</td>
</tr>
<tr>
<td>Patient has multiple trauma or injuries to urethra</td>
<td>No adverse reactions known</td>
<td>Can increase absorbency and increase risks of systemic side-effects</td>
<td>Not known</td>
</tr>
<tr>
<td>Excessive amounts over time (either multiple amounts or repeated)</td>
<td>No adverse reactions known</td>
<td>Can increase absorbency and increase risks</td>
<td>Can increase sensitivity and reactions</td>
</tr>
<tr>
<td>Prescribing</td>
<td>No prescription required</td>
<td>May require a signed prescription</td>
<td>May require a signed prescription</td>
</tr>
</tbody>
</table>

For more on this topic go online...

- Reducing the risk of infection with indwelling urethral catheters
- NICE.org.uk/cg139
- The Code – Professional Standards of Practice and Behaviour for Nurses and Midwives
- Royal College of Nursing (2012) Catheter Care: RCN Guidance for Nurses
- Thompson TJ et al (1999) To determine whether the temperature of 2% lignocaine gel affects the initial discomfort which may be associated with its instillation into the male urethra. British Journal of Urology International; 84: 9, 1035-1037.

**References**