

Catheter insertion is a common procedure for nurses to carry out, but the evidence regarding when the varying lubricant gels should be used is sparse

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.

5 key points

- 1** National guidance recommends using a suitable lubricant from a single-use container when inserting catheters
- 2** In both males and females the urethra is prone to friction during catheter insertion
- 3** Lubrication during catheterisation is required in both men and women
- 4** Type of gel should be selected following patient assessment
- 5** Caution should be taken when using lidocaine/chlorhexidine gels compared with their water-based counterparts



An example of a Cathejell Mono catheter

TABLE 1 LIDOCAINE GELS FOR URETHRAL LUBRICATION BEFORE CATHETERISATION

Product	Cathejell with lidocaine	Hydro-Caine	Instillagel	OptiLube Active
Manufacturer	Montavit (distributed by Teleflex Medical)	Prosys (distributed by CliniSupplies Ltd)	FarcoPharma (distributed by CliniMed Ltd)	Optimum Medical
Gel type	<ul style="list-style-type: none"> ● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine dihydrochloride 0.05% 	<ul style="list-style-type: none"> ● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine gluconate 0.25% 	<ul style="list-style-type: none"> ● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine gluconate 0.25% 	<ul style="list-style-type: none"> ● Water-soluble ● Lidocaine hydrochloride 2% ● Chlorhexidine gluconate 0.25%
Presentation	Accordion-type applicator 8.5g = 8.05ml (female) 12.5g = 11.8ml (male)	Syringe applicator 6ml (female) 11ml (male)	Syringe applicator 6ml (female) 11ml (male)	Syringe applicator 6ml (female) 11ml (male)

Tanabe et al (2004) showed no significant differences in pain levels of female patients and showed there could be other factors at work such as catheter size, age of patient and the competence of the professional inserting it. A randomised controlled study compared the gels in females and supported the use of lidocaine gel 2% to reduce procedural pain in catheterisation (Chan et al, 2013).

Lidocaine gel 2%

Lidocaine gel 2% is a prescribed medication used in catheterisation unless patients have a known allergy to lidocaine or there are concerns about possible side-effects. It should be used with caution in patients who have symptoms of heart block, hypotension and bradycardia. It has been used for male catheterisation, but practitioners tend not to leave it in situ for the recommended time (five minutes) for it to act. Inadequate anaesthesia can occur when insufficient time has elapsed or the gel has been applied directly to the catheter rather than inserted into the urethra (Kyle, 2011).

The gel has also been associated with transitory stinging on insertion, especially in males, so patients need to be warned this can occur. The stinging can be reduced

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.

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.

BOX 1. ANATOMY OF THE URETHRA

- Length of male urethra: 17.5-22cms
- Length of female urethra: 3-5cms
- Urethra in both sexes is a flattened and ribbon like surface with longitudinal folds
- Both have mucin-secreting cells
- The lumen of the urethra only dilates to allow voiding
- Only male urethras have lubricating glands

Source: Adapted from Wilson (2013)

TABLE 2 WATER-BASED GELS FOR URETHRAL CATHETERISATION

Product	Cathejell Mono	OptiLube	Steri Lub
Manufacturer	Montavit (distributed by Teleflex Medical)	Optimum Medical	Distributed by Bard Ltd
Gel type	Water-soluble lubricant gel	Water-soluble lubricant gel	Water-soluble lubricant gel
Presentation	Accordion-type applicator	Syringe applicator 6ml (female) 11ml (male)	Available in Bard Comprehensive trays Syringe-type applicator

Note: some gels are classed as medical devices while others are medication. Nurses should check whether a prescription is required. Source: Wilson (2013)

TABLE 3 CONSIDERATIONS FOR EACH GEL TYPE

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

individual patients' medical history and experiences, before choosing which type of lubricant gel to use. **NT**

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- Reducing the risk of infection with indwelling urethral catheters
- [Bit.ly/NTCatheterRisk](http://bit.ly/NTCatheterRisk)



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