Patients who experience the common but uncomfortable sensation of “needing to void” due to indwelling Foley catheters exhibit behaviors ranging from reporting the sensation, to moaning, calling out, pulling on the catheter, attempting to get out of bed, and becoming agitated and combative. What is the physiological basis for this distressing sensation? Is the sensation related to the type of catheter, insertion technique, or other variables nurses can control? What nursing and medical measures can relieve this sensation?

Linda M. Sulzbach, RN, MSN, CCRN, replies:

The indwelling urinary catheter is an essential part of medical care. This catheter is a fairly rigid structure that is inserted into the bladder via the urethra, and is used to relieve anatomic or physiologic obstructions to provide a dry environment for comatose or incontinent patients and to permit accurate measurement of urinary output in critically ill patients. However, this catheter, when used inappropriately or when left in place too long, may be a hazard to the very patients it is designed to protect.

An indwelling urinary catheter is a foreign body and can cause discomfort. Many patients experience catheter cramp, which results from irritation of the urethra and bladder and usually subsides within the first 24 hours of catheter insertion, though it can persist in some people. To understand the etiology of the discomfort of indwelling urinary catheters, it is essential to know the anatomy and physiology of the urinary system.

**LOWER URINARY SYSTEM**

An intact urinary system transports urine from the kidneys to the ureters and then to the bladder for expulsion via the urethra. The physiologic role of the bladder is to store urine at a low pressure and to expel it at suitable intervals. The bladder is a hollow, distensible muscular organ. Storage of urine in the bladder is mediated by relaxation of the detrusor muscle, which provides the propulsive force for emptying the bladder and closure of the sphincters. It consists of interfacing fibers of smooth muscles that are controlled by the parasympathetic nervous system. The triangle-shaped area located at the base of the bladder between the ureteric orifices and the internal urethral meatus is called the trigone. The smooth muscle of the trigonal portion of the bladder is innervated by the sympathetic nervous system. This layer of muscle acts as an involuntary internal urinary sphincter. The urethra is a tubular structure attached to the bladder that carries urine from the bladder to the urethral meatus and out of the body. The external urinary sphincter provides the voluntary control and sits at the base of the urethra.

The normal voiding cycle is initiated voluntarily, but relies upon involuntary muscle activity, within the detrusor muscle. Control of the detrusor reflex requires coordination of the nervous system. When the volume of urine in the bladder reaches about 250 to 450 mL, the pressure of the urine stimulates sensory nerve fibers in the detrusor muscle called stretch receptors. These stretch receptors transmit messages to the brain and the pons. These stretch receptors transmit messages to the brain and the pons. The brain inhibits the detrusor reflex until the individual wishes to urinate. As a result, sympathetic signals to the bladder predominate, and the detrusor remains relaxed while the sphincter mechanism remains closed. At an appropriate time and place, micturition ensues. The brain releases its inhibitory control over the pons. Parasympathetic fibers...
transmit the impulses causing the detrusor muscle to contract, resulting in reflex relaxation of the internal sphincter and voluntary relaxation of the external sphincter. In rapid succession, different regions of the detrusor muscle in the bladder wall contract reflexively. When the bladder is empty, the detrusor contractions stop, the sphincter closes, and filling and storage resume.1,6

BLADDER SPASMS

The trigone area undergoes little change in size during bladder filling. Therefore, it is sensitive to stretch and, because of its nerve supply, the whole area is easily irritated by foreign bodies such as indwelling urinary catheters. The trigone is probably responsible for causing detrusor contractions, known as bladder spasms, in patients with indwelling urinary catheters, particularly if the balloon is sitting low within the bladder.7

Bladder spasms are a distressing complication for the patient. Contraction may intensify when large indwelling urinary catheters with large-capacity balloons are inserted.7 Bladder spasms are caused by the irritation of the bladder mucosa, the presence of an indwelling urinary catheter, or clots leading to obstruction of the catheter; either may be uncomfortable for the patient. Generally, bladder spasms from a catheter do not increase in intensity or frequency. If, however, the indwelling urinary catheter is obstructed, spasms become increasingly painful as the bladder distends with urine. Bladder contractions can cause considerable discomfort to the patient and lead to bypassing of urine from the space between the urethra and the catheter. Occasionally, these contractions are strong enough to cause expulsion of the catheter from the bladder. The patient should be instructed not to attempt to void around the catheter, as this will increase the likelihood of spasm.8

Patients may experience pain if the drainage bag is allowed to drag on the indwelling urinary catheter, which will then pull on the bladder neck and the urethra, causing urethra pain. It is vital that the nurse ensures that the drainage bag and catheter are well supported.8

MANAGEMENT

Treatment is based on removal of the cause of the spasm whenever possible and confirming that the catheter is not blocked.8 Indwelling urinary catheter obstruction may occur from any solid matter passed into the urine such as blood clots, mucus shreds, tissue particles, and urinary calculi. Obstructed catheters should be changed.8 Spasm occurring immediately after catheterization may be a temporary response and may settle down after 24 to 48 hours.

The pain of detrusor spasm can range from a dull ache to severe pain. Explain to the patient the reason for the bladder spasms; the catheter is irritating the bladder and the bladder is trying to rid itself of the foreign body. The cause of the spasm should be assessed and the patient should be given analgesic or antimuscarinic drugs. If bladder spasms continue and cannot be controlled, it may be necessary to remove the catheter. If appropriate, intermittent catheterization or condom drainage should be considered.

Appropriate selection of catheter type and size will help to reduce the likelihood of this painful reaction.7 The balloon size is relevant to levels of bladder irritation. Although balloons are thin walled to reduce irritation to the bladder, it is still important to use the smallest size possible, usually with a 5- to 10-mL capacity.10

A wide variety of catheters exist on the market, and the number is increasing because of the developments in materials and coating technology. The most appropriate catheter will stay in place for the maximum recommended time, is comfortable for the patient, and has the least number of complications.10 Latex catheters are made from natural rubber and can cause irritation; therefore, uncoated latex catheters are no longer recommended. Smoother biocompatible catheter surfaces consisting of Teflon, silicone, and hydrogel are less likely to irritate the urethra and bladder wall.11 Hydrogel-coated latex catheters are most compatible with human tissue and are therefore the most comfortable; however, they are more expensive than silicone- and Teflon-coated catheters.12 Although these coatings exhibit obvious
ASK THE EXPERTS

benefits over the use of pure latex, the additive does diffuse over time and can ultimately lead to tissue irritation and reaction. All hydrogel and silicone catheters are suitable for long-term use up to 3 months. These catheters are expensive but are least likely to cause allergies and tissue inflammation. Polyvinyl chloride or plastic catheters are the cheapest and are recommended for intermittent catheterization.

MEDICATIONS

Antimuscarinic drugs such as oxybutynin, propantheline bromide, and tolterodine tartrate are most commonly used to treat bladder control problems. Unstable detrusor contractions are inhibited by anticholinergic inhibition of smooth muscle; functional capacity is enhanced and sensory urgency reduced. For some people, however, the spasm may be resistant to treatment, and removal of the catheter may have to be considered.

Analgesics will reduce the pain associated with bladder spasms, but the catheter must be patent. Antispasmodics will reduce the intensity of the spasms. Opium and belladonna suppositories have both analgesic and antispasmodic properties and therefore provide the most complete relief of discomfort. However, these suppositories, and any other suppositories, are contraindicated immediately after a prostatectomy because of the risk of disruption of the surgical site.

Phenazopyridine hydrochloride is a urinary tract analgesic that helps relieve the pain, burning, urgency, frequency, and irritation caused by infection, trauma, catheters, or various surgical procedures in the lower urinary tract. Phenazopyridine hydrochloride is indicated for short-term use and can only relieve symptoms; it is not a treatment for the underlying cause of the symptoms. This drug works by being excreted into the urine and soothing the bladder lining. Phenazopyridine hydrochloride colors the urine a noticeable orange, and care must be taken to prevent staining of undergarments. Patients who wear contact lenses should be aware that contacts may become stained as well.

AVOIDING INDWELLING URINARY CATHETERS

Inserting an indwelling urinary catheter is considered a minor intervention; this procedure is therefore performed with minimal consideration. Indwelling urinary catheters are often needed for hospitalized patients; however, these catheters are often used inappropriately. In a prospective study, Jain and colleagues found that patients had an indwelling urinary catheter for unjustified purposes for 41% of patient days in a medical intensive care unit. The use of indwelling catheters was also found to be unnecessary for 58% of patient days on the general medical ward. Inserting a catheter for the convenience of the nursing or medical staff is rarely appropriate. Another frequent problem is that even when a catheter is inserted appropriately, it is left in too long. It needs to be removed immediately when it is no longer required.

Indwelling urinary catheters should be limited to (1) urinary retention, (2) close monitoring of urine output in critically ill patients, (3) fluid challenge in patients with acute renal insufficiency, (4) open wound in sacral or perineal area in patients with urinary incontinence, and (5) comfort care in terminally ill patients. Oliguric patients do not need catheters; urine output can be measured using noninvasive portable bladder scanners. These scanners, combined with intermittent catheterization, as needed, or condom drainage, should help eliminate indwelling urinary catheter use in intensive care units.

Nurses influence the decision to initiate indwelling urinary catheters. Therefore, nurses need to justify the use of indwelling urinary catheters and remove them when they are no longer indicated. Nurses are in key positions to make practice changes in their unit. Reducing the use of indwelling urinary catheters will benefit the patient by decreasing the risk of urinary tract infections and reducing bladder irritation causing bladder spasms. Nurses should avoid using indwelling urinary catheters whenever possible, and, when catheterization is necessary, nurses should remove the device as soon as possible.
References