

## INCONTINENCE

# Artificial sphincter can't take the pressure

New research has uncovered a possible cause of occasional urinary leaks in men fitted with an artificial urethral sphincter, suggesting that simple behavioural changes can avoid compromise of the sphincter. These results could provide valuable information to designers of improved implants.

The AMS800® (American Medical Systems, USA) is considered the gold standard for the treatment of male urinary incontinence, and has been fitted in >94,000 men in >30 years of use. It uses fluid pressure in a plastic cuff to compress the urethra for continence, with temporary pumping of fluid to a balloon reservoir to reduce cuff pressure and enable micturition. This arrangement generally functions very well, but some patients report urine leakage. Although some urinary leaks can be explained by changes in intra-abdominal pressure, others occur in the sitting position and are harder to explain.

In search of an answer, Beaugerie *et al.* performed an *ex vivo* mechanistic

investigation into the fluid dynamics of the AMS800® exposed to typical perineal pressures measured in seated men. Compression of the cuff caused reflux of fluid through the pump resistor into the reservoir, resulting in lower fluid pressure in the cuff on removal of compression. This effect, and the time taken to subsequently repressurize the cuff, was dependent on the duration of compression and the pressure applied. After 5 s compression at 150 cmH<sub>2</sub>O, the lowest test pressure used, 68 s was required for full repressurization, whereas after 20 s at 250 cmH<sub>2</sub>O, a full 207 s was required for normalization of cuff pressure.

The implication of these results, for men fitted with the AMS800®, is that moving from a sitting position that exerts pressure on the cuff of the device to a position that removes this pressure can potentially compromise the artificial sphincter for a prolonged period. Sitting on a hard surface, or a narrow one, such as the arm of a chair or the edge of a seat, are likely sources of compression.

These findings will enable urologists to reassure patients who have been fitted with the AMS800® and who experience urinary incontinence when sitting that they do not have a malfunctioning implant. Patients should be able to remedy the leakage with simple behavioural measures. Furthermore, the researchers hope that their mechanistic study will aid the design of the next generation of artificial sphincters by pinpointing the weaknesses of the current gold standard.

Robert Phillips

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