DOES A AIR–FILLED INTRAVESICAL BALLOON INCREASE THE ABDOMINAL PRESSURE REQUIRED TO INDUCE STRESS URINARY INCONTINENCE RELATED LEAKAGE?

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Introduction
• Stress urinary incontinence (SUI) is a disorder where leakage occurs when abdominal pressure that exceeds the bladder pressure. This condition is common in women, as it occurs during coughing, sneezing, or exercising.

• Historically, most SUI treatments have focused on increasing urethral closure pressure (i.e., an internal, closing muscle). However, the closing mechanism can be overwhelmed in the presence of high abdominal pressure.

• The Vesair Balloon: A balloon that is designed to reside in the bladder is inflated once it is inside the bladder, and released. No anesthesia or analgesia is required.

Results
• The results of the in-vitro measurements using a 20 msec pulse in the acrylic chamber are shown in Figure 1. For a balloon volume of 30 ml, the amplitude of a transient pressure pulse was reduced by 81% from 140 cm H2O to 27 cm H2O.

Materials and Methodology

Background (cont’d)
• Air-filled balloon attenuation technique is associated with pressure reduction when the balloon is inflated and fluid pressure is increased. Since reduction is driven by sustained pressure, it should not be affected by the presence of the balloon.

Discussion
The in-vitro simulation provides a demonstration of how the physics of an air-filled balloon attenuator system works. It verifies that the magnitude of the attenuation obtained in an experiment that simulates physiological parameters is of a sufficient level that it should provide a clinically relevant result when applied in-vivo.

Conclusion
For volumes and pressures that approximate physiological values, significant pressure attenuation can be obtained using a balloon volume less than 10% of typical functional bladder capacity. The findings warrant further investigation into the use of air-filled balloon attenuator to reduce leakage associated with stress urinary incontinence.

References