Key Points

- Urodynamics allows for objective evaluation of bladder and urethral function in dogs and cats
- Cystometrogram (CMG) and Urethral Pressure Profile (UPP) are the most common urodynamic procedures performed on dogs and cats
- Urodynamics may be used to diagnose patients with inconsistent clinical signs and evaluate treatment efficacy
- Special considerations need to be taken into account when interpreting urodynamic studies in dogs and cats

Indications: Failed empirical medical therapy of urinary incontinence, increased residual urine volume (> 0.1 – 0.34 ml/kg)

The most common urodynamic procedures performed in the small animal patient are the urethral pressure profile (UPP) and the cystometrogram (CMG). Additional procedures that may be performed includes the leak point pressure (LPP). Most urodynamic studies are performed to assess lower urinary tract function in complicated patients or to measure response to pharmacologic or surgical management of urinary tract disorders as part of scientific investigation. All 3 of the above urodynamic test results are influenced by the sedation of anesthetic protocols used during the procedure. It is important that the clinician follow a standard protocol for each study for which there are normal values established. The urodynamic system generally consists of several pressure transducers, an integrated “puller” arm, and a computer with software to record and analyze the pressure data (Figure 1). Urodynamics are not meant to be used as definitive diagnostic tests, but must be interpreted in context of patient history, physical and neurologic examination, and previous response to therapy. Performance and interpretation of UPP and CMG results must be made carefully and with a well calibrated system.

UPP assesses the pressures along the urethral lumen during the filling phase of micturition. It is most often used to evaluated animals with urinary incontinence that is poorly responsive to therapy, or in suspected urethral obstruction. A urethral catheter with side ports in the walls to measure fluid pressure or a microtransducer is placed with the ports in the bladder lumen. Then at a predetermined rate, the catheter is slowly withdrawn while fluid is slowly infused. Pressures are recorded relative to the location along the urethra (Figure 2). While several values can be evaluated, the most important in veterinary medicine appear to be the maximum urethral closure pressure (MUCP), the maximum pressure obtained in the urethra minus the resting bladder pressure, and the functional profile length (FPL), the length of the urethra over which the urethral pressure exceeds the resting bladder pressure.

A CMG study evaluates bladder capacity and compliance as well as detrusor function during voiding. The study is used to evaluate for detrusor atony, non-compliant bladder, or low bladder capacity. A catheter is placed transurethrally into an empty bladder and fluid (or rarely, gas) is slowly infused into the bladder while bladder pressure is measured through a transducer or additional channel in the catheter. The resulting pressure curve is evaluated for the threshold pressure, threshold volume, and compliance.
**Figure 1:** Life-Tech urodynamic system with integrated puller arm, pressure transducers, and computer.

**Figure 2:** UPP curve from a normal female dog (modified from Rosen et al, 1980).