When Bladder Scans Fail: Three Case Studies

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Portable ultrasound scanners have become a mainstay in urology offices for a noninvasive assessment of urinary retention. Numerous studies have shown that the Bladder-Scanner™ is accurate and simple to use (Coombes & Millard, 1994; Resnick, 1995; Schneider, Birner, Gendo, Ratheiser, & Auff, 2000). In a study by Goode, Locher, Bryant, Roth, and Burgio (2000), this device had a sensitivity of 66.7% and a specificity of 96.5%. This technology also has usefulness in the operating room. Moselhi and Morgan (2001) found the accuracy of the equipment was adequate enough to reduce the frequency of pre-operative catheterizations in women undergoing gynecologic laparoscopy procedures. Bladder scans are also being used as an alternative to intermittent catheterization as a test of bladder overdistension post-Cesarean section (Barrington, Edwards, Ashcroft, & Adekanmi, 2001). However, there are instances where technology fails. The alert clinician will be cognizant of these situations and will question supposedly reliable data and pursue further evaluations when all of the data do not correlate. Three cases illustrate this situation. They are examples of an initial presentation and testing with the Bladder-Scanner™ that indicated urinary retention but with further evaluation nonurologic causes were identified.

Case Study #1

A 31-year-old, 5’4”, 115-pound, white female presented to the emergency room (ER) with a sudden onset of acute urinary retention. Since awakening that morning, she had a strong constant urge to void, severe hesitancy, and was only able to empty 1 to 2 ounces of urine at a time. In the ER, she was catheterized for 100 cc of urine with moderate relief of her symptoms. She was then discharged and advised to followup with a urologist that day.

She presented to the urology office approximately 5 hours after her ER visit. When she arrived, she stated the constant urge to void had increased. She denied dysuria, hematuria, frequency, or nocturia. Her physical examination was normal except for a bladder scan that revealed a post-void residual (PVR) of 500 cc. A urinalysis was normal. The patient was taught intermittent self-catheterization and was scheduled for urodynamic testing. After the demonstration of self-catheterization, only a 10 cc PVR was obtained. A second bladder scan continued to show a 500 cc residual. She was sent for a stat pelvic ultrasound that identified a 5 cm ovarian cyst. The patient was referred to a gynecologist who performed an oophorectomy. The patient recovered without incident and denied any further voiding problems.

Case Study #2

A 38-year-old male construction worker presented to the general surgeon’s office with a sudden onset of acute lower abdominal pain. The patient also complained of having a constant urge to void and persistent post-void fullness. After examining the man and palpating suprapubic distention, the patient was sent to the urologist’s office for evaluation of urinary retention.

This was a healthy, 5’10”, 150-pound man. At the urology visit he stated his urinary stream was strong and denied the following: dysuria, hematuria, frequency, or nocturia.
quency, nocturia, neurologic problems, or diabetes. The patient’s only surgical history was arthroscopic knee surgery 4 years ago. He denied smoking or drug use. He was not taking prescription or over-the-counter medications. On physical examination, the suprapubic tenderness was noted again. Urinalysis was normal. A PVR of 550 cc of urine was indicated by a bladder scan. An indwelling Foley was inserted. The catheter drained only 75 cc of urine. This result prompted further examination of the suprapubic area and a mass was palpated. It was mobile and could be displaced superiorly towards the umbilicus. Stat computerized tomography (CT) of the abdomen and pelvis was ordered which revealed a large intra-intestinal mass, probably a malignancy. The patient was referred back to the surgeon for abdominal exploration.

Case Study #3
A 71-year-old white female, who is 5’6” and 230 pounds, presented to the urology office for symptoms of frequency and urge incontinence. Her past medical history includes diabetes, renal cell carcinoma, bladder tumors, hypertension, and arthritis. A recent cystoscopy revealed no tumor recurrence, and her presenting urinalysis was normal. A bladder scan disclosed a PVR of 480 cc. Urodynamic testing demonstrated a small capacity irritable bladder with a straight catheter PVR of 50 cc of urine. At a followup appointment, after testing the patient admitted that her daily blood sugars had been elevated. Currently, the glucose levels were under control, and her urinary symptoms had improved. The discrepancy between the bladder scan and straight catheter PVRs was assumed to be related to the patient’s obesity.

Two years later, the patient presented to the office complaining of a sudden onset of frequent urination. She had a 24-hour history of daytime frequency every 1 to 2 hours and nocturia every hour, post-void fullness, and urge incontinence. She denied dysuria, hematuria, fever, or chills. Urinalysis was normal, but a urine residual of 825 cc was seen on a bladder scan. A catheter was inserted and only drained 100 cc of urine. This time, the discrepancy was pursued and the patient was sent for a CT that showed bilateral ovarian cystic masses, possibly a neoplasm. The cysts ranged in size from 5 cm to 15 cm in diameter. The patient was referred to a gynecologist who performed an exploratory laparotomy, total abdominal hysterectomy, and bilateral salpingo-oophorectomy with lymph node dissection. The patient was fortunate that pathology reported finding a papillary serous ovarian neoplasm of low malignancy potential. At follow-up, the patient denied further voiding difficulties.

Clinical Implications
Bladder scanners are very useful noninvasive tools for screening of urinary retention. However, as these cases show, pathology other than urinary retention can also be found with this instrument. Nonurinary causes of urinary frequency and urgency should be kept in the differential diagnosis when evaluating retention symptoms. If scanned PVRs and actual cathed PVRs do not coincide, they should not be dismissed but warrant further testing to rule out other pelvic pathology. If a bladder scan is the only method used to evaluate PVR and the prescribed treatment does not relieve symptoms, further testing and/or straight catheterization of the patient may be necessary to validate the scanner’s accuracy.

Conclusion
Advanced practice nurses (APN) are prepared with excellent skills at gathering a thorough history and performing a detailed physical examination. The astute APN remembers that 70% of the diagnosis can be determined by history alone and 90% is determined by history and physical examination. As health care has become more dependent on technology, too often the data from sophisticated machines are trusted rather than the practitioner’s skills. Heightened awareness of the ability of the bladder scanner to find a variety of pelvic fluid filled masses, and the potential for nonurinary causes of urinary symptoms, should alert the practitioner to be sure that all data are considered when determining the diagnosis. Bladder scanners are a reliable diagnostic tool; however, all tools have the potential for error. If a significant discrepancy is found in the data, the patient should be sent for a pelvic CT scan or ultrasound. The potential for misdiagnosis and subsequent delay of appropriate treatment could make a significant difference in the patient’s prognosis.

References