# ACTA SCIENTIFIC CLINICAL CASE REPORTS

Volume 1 Issue 6 July 2020

# Failure of Urethral Catheterisation to Relieve Urinary Retention Reported by a Bladder Scanner

# Ram Dhotarkar<sup>1</sup> and Rajkumar Rajendram<sup>2,3,4\*</sup>

<sup>1</sup>Registrar in Anaesthesia and Intensive Care Medicine, Buckinghamshire NHS Trust, Stoke Mandeville Hospital, Aylesbury, UK <sup>2</sup>Consultant in Anaesthesia and Intensive Care Medicine, Buckinghamshire NHS Trust, Stoke Mandeville Hospital, Aylesbury, UK <sup>3</sup>Consultant in Internal Medicine, Department of Medicine, King Abdulaziz Medical City, Ministry of National Guard - Health Affairs, Riyadh, Saudi Arabia <sup>4</sup>Joint Appointment Assistant Professor College of Medicine, King Saud hin Abdulaziz Uni

<sup>4</sup>Joint Appointment Assistant Professor, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

\*Corresponding Author: Rajkumar Rajendram, Consultant in Internal Medicine, Department of Medicine, King Abdulaziz Medical City, Ministry of National Guard - Health Affairs, Riyadh, Saudi Arabia. Received: February 17, 2020 Published: June 30, 2020 © All rights are reserved by Ram Dhotarkar and Rajkumar Rajendram.

# Abstract

Bladder scanning is a fast, non-invasive method of detecting the residual volume within the bladder with no risk of infection or trauma. Although highly sensitive, the post void residual volumes reported by bladder scanning is not specific for urine retention; false positive rates of up to 9% have been reported. To increase the awareness of this phenomenon we outline an illustrative case in which a BladderScan (BVI 3000, Verathon, The Netherlands) reported a post void residual volume of 494ml and urethral catheterisation was performed but no urine drained. Bedside abdominal ultrasound eventually demonstrated that the patient had ascites. The BladderScan had misinterpreted this intra-abdominal fluid as urine within the bladder. We therefore recommend that formal diagnostic imaging of the abdomen and pelvis is performed if there is any discrepancy between the urine volume reported by bladder scanning and that measured by urinary catheterization.

Keywords: Ascites; BladderScan; Urine Retention

# Introduction

Several techniques are available for the measurement of the volume of urine in the bladder. Urethral catheterization is the gold standard for accurate measurement of bladder volume. However, ultrasonography is a valid and reliable substitute [1,2]. Unfortunately, the use of a standard ultrasonographic machine requires specific training and a mathematic calculation after measurement. This is unsuitable for everyday clinical use by the vast majority of healthcare professionals.

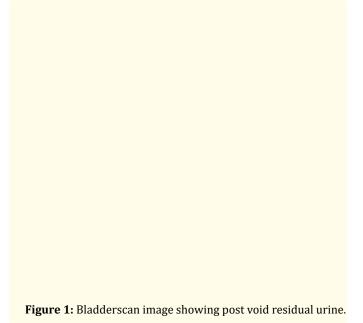
Automatic portable hand-held ultrasound (US) devices (i.e. bladder scanners) have been developed to facilitate the measurement of bladder volume and detect urinary retention. The scanners use ultrasound to automatically calculate the bladder volume. This procedure is commonly known as bladder scanning. The reliability of bladder scanners is well recognised [3,4]. Their use in clinical practice is now widespread. However, it is important to remember that bladder scanners may report any intra-abdominal fluid (e.g. ascites) as residual urine within the bladder. So abdominal and pelvic ultrasonography must be considered if the residual urine volume obtained on urethral catheterisation does not match that reported by a bladder scanner.

#### **Case Report**

A 74-year-old obese man presented with increasing confusion, abdominal discomfort, hypotension and anuria 24 hours after amputation of his left 5th toe under general anaesthesia. He had a background of alcohol misuse, hypertension, ischaemic heart disease, atrial fibrillation treated with warfarin, diabetes mellitus and peripheral vascular disease.

**Citation**: Ram Dhotarkar and Rajkumar Rajendram. "Failure of Urethral Catheterisation to Relieve Urinary Retention Reported by a Bladder Scanner". *Acta Scientific Clinical Case Reports* 1.6 (2020): 13-15.

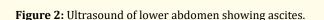
A BladderScan (BVI 3000, Verathon, The Netherlands) reported a residual volume of 494 ml (Figure 1). Urethral catheterisation was performed but no urine drained. Several measurements were performed with the BladderScan. On each measurement the BladderScan still reported a residual urine volume of over 450 ml. Passage of the urethral catheter into a false urethral passage was suspected. The urology registrar on call was therefore asked to review the patient. The urology registrar exchanged the 12Fr catheter for a 16Fr catheter. However, no urine drained and the BladderScan still reported a residual volume over 450 ml.



When pelvic ultrasonography was performed at the bedside this visualised the balloon of the catheter within an empty bladder. Abdominal ultrasonography revealed that the fluid reported by the BladderScan was in fact ascites (Figure 2). The patient's liver also was noted to be cirrhotic. The bladder scanner had misinterpreted ascitic fluid as urine within the bladder.

#### **Discussion and Conclusion**

Many techniques are available for the measurement of the volume of urine in the bladder. Urethral catheterization is the gold standard for accurate measurement of bladder volume. However, urethral catheterisation is invasive, uncomfortable and often causes catheter-associated urinary tract infection.



14

Bladder scanning is a fast, non-invasive method of detecting urine within the bladder. It is painless and eliminates the risks associated with urethral catheterization [2-5]. The scan takes less than a minute to perform. The procedure can be performed by any healthcare professional (i.e. does not require a sonographer).

Bladder scanning is currently used in routine clinical practice in many healthcare settings. It is commonly used to detect post-void residual (PVR) urine (i.e. urinary retention) with no risk of infection or trauma [2-5]. However, although highly sensitive, the PVR reported by bladder scanning is not specific for urine retention; false positive rates of up to 9% have been reported [6]. Rarely, this may be due to the misinterpretation of intra-abdominal fluid collections or cysts as urine in the bladder [7].

Ultrasonography is a valid and reliable substitute for urethral catheterisation if accurate measurement of bladder volume is required [1,2]. Ultrasonography can also diagnose other causes of abdominal distension. Unfortunately, the use of a standard ultrasonographic machine requires specific training and a mathematic calculation after measurement. This is beyond the capability of the vast majority of healthcare professionals.

However, we recommend that formal diagnostic imaging of the abdomen and pelvis (i.e. ultrasonography or computed tomography) must be performed if there is any discrepancy between the PVR measured by bladder scanning and that measured by urinary catheterization.

**Citation:** Ram Dhotarkar and Rajkumar Rajendram. "Failure of Urethral Catheterisation to Relieve Urinary Retention Reported by a Bladder Scanner". *Acta Scientific Clinical Case Reports* 1.6 (2020): 13-15.

#### **Conflicts of Interest**

None.

# **Sources of Funding**

None.

# Bibliography

- 1. Hakenberg OW., *et al.* "The estimation of bladder volume by sonocystography". *Journal of Urology* 130 (1983): 249-251.
- 2. Bano F., *et al.* "Comparison between bladderscan, real-time ultrasound and suprapubic catheterization in the measurement of female residual bladder volume". *Journal of Obstetrics and Gynaecology* 24.6 (2004): 694-695.
- 3. Goode PS., *et al.* "Measurement of postvoid residual urine with portable transabdominal bladder ultrasound scanner and urethral catheterization". *International Urogynecology Journal and Pelvic Floor Dysfunction* 11.5 (2000): 296-300.
- Fuse H., *et al.* "Measurement of residual urine volume using a portable ultrasound instrument". *International Urology and Nephrology* 28.5 (1996): 633-637.
- Brouwer TA., *et al.* "Non-invasive bladder volume measurement for the prevention of postoperative urinary retention: validation of two ultrasound devices in a clinical setting". *Journal of Clinical Monitoring and Computing* 32.6 (2018): 1117-1126.
- Cooperberg MR., *et al.* "Cystic pelvic pathology presenting as falsely elevated post-void residual urine measured by portable ultrasound bladder scanning: report of 3 cases and review of the literature". *Urology* 55.4 (2000): 590.
- Tan TL., *et al.* "False positive findings in the ultrasound assessment of postvoid residual urine volume". *Age and Ageing* 32.3 (2003): 356.

### Assets from publication with us

- Prompt Acknowledgement after receiving the article
- Thorough Double blinded peer review
- Rapid Publication
- Issue of Publication Certificate
- · High visibility of your Published work

Website: <u>www.actascientific.com/</u>

Submit Article: www.actascientific.com/submission.php Email us: editor@actascientific.com Contact us: +91 9182824667