

Bladder Mimic on Point-of-Care Ultrasound in Acute Retention of Urine in Woman - An Unusual Presentation of Ovarian Torsion

Chia MYC*

Department of Emergency Medicine, Tan Tock Seng Hospital, 11 Jalan Tan Tock Seng, Singapore

*Corresponding author:

Michael Yih Chong, Chia,
Department of Emergency, Tan Tock Seng Hospital,
Singapore, 11 Jalan Tan Tock Seng, Singapore 308433,
E-mail: michael_yc_chia@ttsh.com.sg

Received: 18 Sep 2021

Accepted: 04 Oct 2021

Published: 09 Oct 2021

Copyright:

©2021 Chia MYC, This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and build upon your work non-commercially.

Citation:

Chia MYC, Bladder Mimic on Point-of-Care Ultrasound in Acute Retention of Urine in Woman - An Unusual Presentation of Ovarian Torsion. *J Clin Med Img.* 2021; V5(16): 1-5

Keywords:

Acute urinary retention; Ovarian torsion; Point-of-care ultrasound

1. Abstract

1.1. Background: Acute Urinary Retention (AUR) is a common urologic emergency. Acute urinary retention in women is uncommon and necessitate further investigations to uncover the underlying cause.

1.2. Case Report: This case report describes a 28-year-old nulliparous woman presenting with lower abdominal pain and AUR to the emergency department, with point-of-care ultrasound findings mimicking the bladder. She was taking oral antihistamines for her skin allergy the preceding two days. She was initially diagnosed to have AUR secondary to antihistamine use, and later found to have an ovarian torsion. Some methods that can be used to differentiate the bladder mimic from the bladder on ultrasound include confirming the presence of the distal balloon of the urinary catheter or using a sterile saline flush to look for changes on ultrasound similar to a bubble test (this involves the injection of saline after agitation with air to create micro-bubbles that are ultrasound reflective). The absence of these findings should prompt one to evaluate with further studies, for example, a Computed Tomography (CT) scan to search for the underlying pathology.

1.3. Conclusion: Acute urinary retention in women is uncommon. Investigations should focus on identifying reversible causes. Ovarian torsion positioned anteriorly to the bladder can be mistaken for the bladder on point-of-care ultrasound in women presenting with acute urinary retention. It is important for the emergency physician to recognise this ultrasound mimic so that timely diagnosis would not be delayed.

2. Introduction

The most common urologic emergency is Acute Urinary Retention (AUR) [1]. This is the inability to voluntarily pass urine and is usually associated with suprapubic pain. Acute urinary retention is common in men and benign prostatic hyperplasia is a common cause. The incidence increases with age, most frequently occurring in men over the age of 60 [2]. In contrast, AUR is uncommon in women, and could be due to neurologic or pelvic pathology [3,4]. The female to male incidence ratio is estimated at 1:13.

This case report describes a young nulliparous woman presenting with AUR to the emergency department, with point-of-care ultrasound findings mimicking the bladder. She was taking oral antihistamines for her skin allergy the preceding two days. She was initially diagnosed to have AUR secondary to antihistamine use, and later found to have an ovarian torsion.

3. Case Report

A 28-year-old nulliparous woman presented to the emergency department with acute onset of lower abdominal pain 30 minutes prior to her attendance. The patient described the pain as sharp, intense, and continuous without any radiation. She also complained of nausea but there was no vomiting. She did not have any urinary symptoms like dysuria, hematuria, urinary frequency, vaginal discharge, or vaginal bleeding. She was on her second day of menses. Her menstrual history had been irregular, ranging from 20 to 25-day cycles. She did not have dysmenorrhea or menorrhagia. She gave a history of antihistamine use the last two days due to a skin allergy. Her last urine output was five hours before her ED attendance. There were no previous medical, surgical, or gynecological histories.

The physical examination revealed tenderness over her suprapubic area with a palpable firm and distended globular mass like the bladder. There was no iliac fossa tenderness, or signs of peritonism. The neurological examination was unremarkable. Her urine β -Human Chorionic Gonadotropin (BHCG) was negative, and her urine dipstick was unremarkable. Bedside ultrasound showed an anechoic mass in the suprapubic area. There was no

intrauterine pregnancy or free fluid. Both ovaries were not well visualized (Figure 1). Point-of-care ultrasound scan of bladder as an anechoic mass (white arrow) in relation to the pubic bone (black arrow) and uterus (+). Kidney, Ureter, and Bladder (KUB) x-ray was unremarkable (Figure 2). Kidney, ureter, and bladder (KUB) x-ray with no abnormalities. Her full blood count and renal panel were normal.

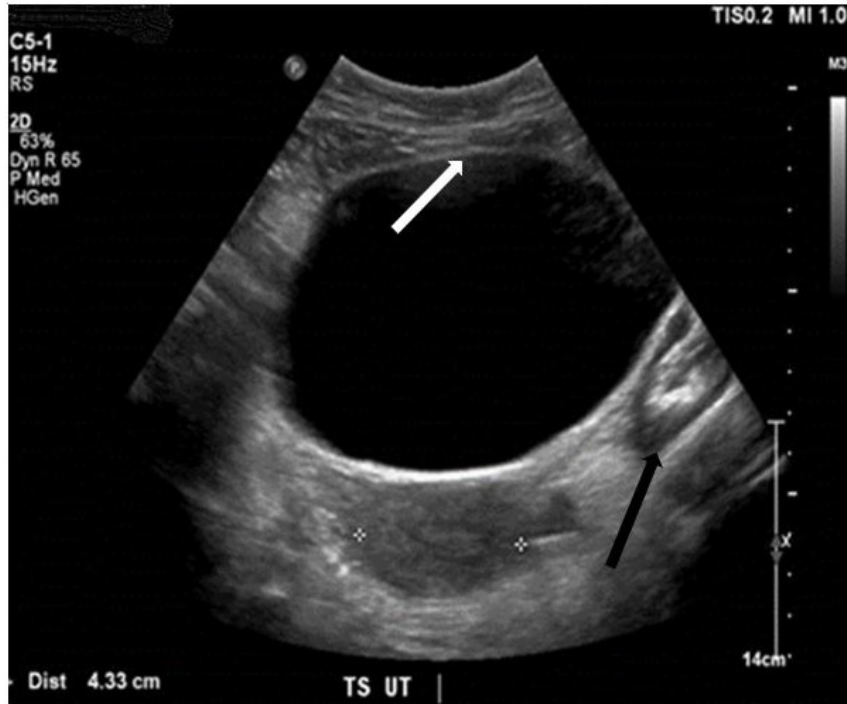


Figure 1: Point-of-care ultrasound scan of bladder as an anechoic mass (white arrow) in relation to the pubic bone (black arrow) and uterus (+).



Figure 2: Kidney, ureter, and bladder (KUB) x-ray with no abnormalities.

The diagnosis was Acute Urinary Retention (AUR) secondary to antihistamine use. An indwelling urinary catheter was inserted and drained 500mls of clear color urine. She was also administered intravenous ketorolac for pain. The patient was kept under observation. Two hours later, her symptoms of suprapubic pain recurred, and she vomited once. Bladder scan showed 585mls of urine. A blocked urinary catheter was considered and replaced with a new one. However, one hour post replacement, there was still no urine output and repeated bladder scan continued to show 566mls of urine.

The patient was referred immediately to the urologist for further workup. Repeated bedside ultrasound by the urologist showed similar findings. The urologist flushed the urinary catheter and challenged with sterile normal saline, but there was no change in appearance of the anechoic mass under ultrasound. An urgent Computed Tomography (CT) of the abdomen and pelvis was done which showed a large ovarian cyst and the possibility of torsion of ovary (Figure 3). Computed Tomography (CT) of abdomen and pelvis showing large ovarian cyst (black arrow) in relation to the bladder (slim white arrow) and urinary catheter (broad white arrow).

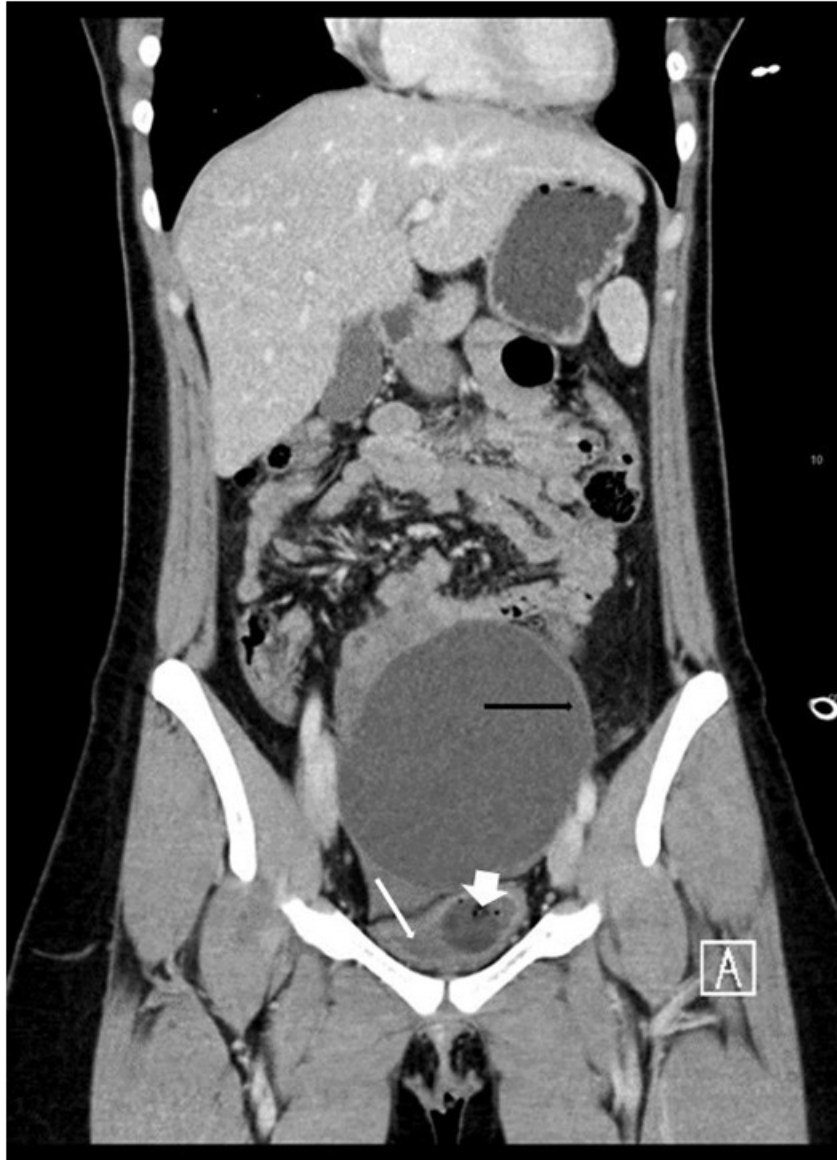


Figure 3: Computed tomography (CT) of abdomen and pelvis showing large ovarian cyst (black arrow) in relation to the bladder (slim white arrow) and urinary catheter (broad white arrow).

Based on the CT results, the patient was referred urgently to the gynecological team for further management. Her ultrasound pelvis showed an ovarian mass with dimensions of 12.3 x 11.4 x 7.7 cm (564.7cm³). There was absence of venous flow which suggested right adnexal torsion, and the presence of a large septated cystic mass in the right ovary. The patient underwent open right sal-

pingectomy. Intra-operatively, there was a twelve-centimeter right para-tubal cyst with hydrosalpinx and right ovarian torsion which turned three times. The right ovary was finally found to be viable and conserved at the end of the operation. The operation went smoothly without any complications. The patient was discharged well three days after.

4. Discussion

Acute Urinary Retention (AUR) is a common urologic emergency. It is also a very common presentation to the ED. There are a number of pathophysiologic mechanisms causing AUR. These include outflow obstruction, neurologic impairment, inefficient detrusor muscle, medications, infection and trauma. Acute urinary retention in women, however, is uncommon. In women with AUR, investigation should focus on identifying reversible causes. The first step is a detailed history. The history should include details on medication, changes in bowel habits, neurological deficits, symptoms related to the lower urinary tract, and previous gynaecological or urological surgeries. This should follow by a detailed physical examination, including neurological and pelvic examinations. Outflow obstruction in women is generally due to pelvic pathology, including pelvic organ prolapse and pelvic masses.

The complex mechanism of micturition can be affected by many drugs, through different pathophysiological pathways [5]. But there are limited data on the incidence of drug-induced urinary retention. Drugs with anticholinergic activity, α -adrenoceptor agonists, benzodiazepines, calcium channel antagonists, detrusor relaxants, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and opioids have been known to cause AUR. Elderly patients are also prone to drug-induced urinary retention. This results from a combination of factors, including co-existing co-morbidities and concomitant medications which could have an additive impairing effect on micturition.

Drugs with anticholinergic effects could impair contraction of the detrusor muscle leading to AUR, through blockages of the parasympathetic pathways. Histamine H1 receptor antagonist also causes urinary retention from its anticholinergic effects [6]. There are also reported cases of urinary retention when these drugs are applied topically [7]. The patient had oral antihistamines for two days for her skin allergy, which led to the initial diagnosis that her acute urinary retention could be secondary to antihistamine use.

Prostaglandin, especially Prostaglandin E2 (PGE2) is important for genitourinary function. Inflammation, trauma and bladder over-distension up-regulate prostaglandin synthesis in the bladder through Cyclo-Oxygenase (COX)-2 pathways. PGE2 causes micturition through tachykinin release. Tachykinin in turn, initiates micturition reflex through stimulation of neurokinin receptors on afferent nerves and detrusor smooth muscles [8]. There were reported cases of AUR that occurred within one week of initiating COX-2 inhibitors [9]. And this risk doubles for current users of NSAIDs and higher dosages [10]. As intravenous ketorolac (NSAIDs) was administered to the patient in the ED for her pain, this could potentially have an additive effect to her preceding consumption of antihistamines and compounded her AUR.

Using point-of-care ultrasound is the easiest and quickest way to visual the bladder at the bedside. Bladder volume and obstruction, urinary catheter placement, and bladder pathologies such as stones

and masses can be assessed. Ureteral jets are normal and periodic efflux of urine from both ureters into the bladder. Visualisation of ureteral jets on colour doppler imaging aids confirmation that the anechoic mass is the bladder. Presence of ureteral jets also rules out complete obstruction of a specific ureter [11]. Bladder stones will appear hyperechoic and mobile with acoustic shadowing. Bladder masses, on the other hand, are generally echogenic, irregularly shaped, and mounted on bladder walls of irregular thickness. Point-of-care ultrasound can also be used for diagnosis of renal tract obstruction, specifically hydronephrosis, in the assessment of patients with Acute Kidney Injury (AKI) with a sensitivity of 90% and specificity of 100% [12].

When subsequent change in urinary catheter did not relieve the AUR, this prompted a sterile saline flush test which confirmed the earlier anechoic mass on ultrasound not to be the bladder. A computed tomography scan was performed to look for the underlying cause. It was important to highlight that initial point-of-care ultrasound, together with bladder scan [13], pointed to a bladder mimic. And the volume measured by the bladder scan also coincided with the dimensions and volume of the ovarian cyst (approximate 567cm³). Confirmation of bladder on point-of-care ultrasound could be performed by looking for distal balloon of the urinary catheter within the bladder, or in this case report, performing a sterile saline flush test. The saline flush test is similar in concept to a bubble study that involves the injection of saline after agitation with air to create micro-bubbles that are ultrasound reflective. Absence of these changes on ultrasound led to the confirmation of the bladder mimic on initial point-of-care ultrasound, and a search for the underlying pathology with a computed tomography study. This led to a timely diagnosis of ovarian torsion, immediate surgery and a good outcome.

Ovarian torsion is a surgical emergency, and the diagnosis is challenging. Torsion is usually associated with an ovarian cyst in a menarchal patient. Judy Lin et al described the appearance of the abnormal location of the ovary as a “double bladder sign” [14]. This appearance of a midline ovary adjacent to the bladder on a transverse transabdominal scan creates the appearance of two anechoic structures that resembles two bladders visualized in succession. This usefulness of this sign for the emergency physician lies in its ability to be recognized at the bedside without advanced knowledge of doppler flow measurements or performing a transvaginal ultrasound.

5. Conclusion

Acute urinary retention in women is uncommon. Investigations should focus on identifying reversible causes. Ovarian torsion positioned anteriorly to the bladder can be mistaken for the bladder on point-of-care ultrasound in women presenting with acute urinary retention. It is important for the emergency physician to recognise this ultrasound mimic so that timely diagnosis would not be delayed.

References

1. Marshall JR, Haber J, Josephson EB. An evidence-based approach to emergency department management of acute urinary retention. *Emerg Med Pract.* 2014; 16: 1-20.
2. Fong YK, Milani S, Djavan B. Natural history and clinical predictors of clinical progression in benign prostatic hyperplasia. *Curr Opin Urol.* 2005; 15: 35-8.
3. Ramsey S and Palmer M. The management of female urinary retention. *Int Urol Nephrol.* 2006; 38: 533-5.
4. Klarskov P, Andersen JT, Asmussen CF, Brenoe J, Jensen SK, Jensen IL, et al. Acute urinary retention in women: a prospective study of 18 consecutive cases. *Scand J Urol Nephrol.* 1987; 21: 29-31.
5. Verhamme KM, Sturkenboom MC, Stricker BH, Bosch R. Drug-induced urinary retention: incidence, management and prevention. *Drug Saf.* 2008; 31: 373-88.
6. Horowitz R, Reynolds S. New oral antihistamines in pediatrics. *Pediatr Emerg Care.* 2004; 20: 143-8.
7. McGann KP, Pribanich S, Graham JA, Browning DG. Diphenhydramine toxicity in a child with varicella: a case report. *J Fam Pract.* 1992; 35: 213-4.
8. Andersson KE and Hedlund P. Pharmacologic perspective on the physiology of the lower urinary tract. *Urology.* 2002; 60: 13-20.
9. Gruenenfelder J, McGuire EJ, Faerber GJ. Acute urinary retention associated with the use of cyclooxygenase-2 inhibitors [letter]. *J Urol.* 2002; 168: 1106.
10. Verhamme KM, Dieleman JP, Van Wijk MA, Lei JD, Bosch JLHR, Stricker BHC, et al. Non-steroidal anti-inflammatory drugs and increased risk of acute urinary retention. *Arch Intern Med.* 2005; 165: 1547-51.
11. Strehlau J, Winkler P, de la Roche J. The uretero-vesical jet as a functional diagnostic tool in childhood hydronephrosis. *Pediatr Nephrol.* 1997; 11: 460-7.
12. Samiksha N, Martin D, Nicholas S. Point-of-care ultrasound rapidly and reliably diagnoses renal tract obstruction in patients admitted with acute kidney injury. *Clin Med (Lond).* 2020; 20: 541-4.
13. Davis C, Chrisman J, Walden P. To scan or not to scan? Detecting urinary retention. *Nursing Made Incredibly Easy.* July/August 2012; 10: 53-4.
14. Judy Lin and Simran Buttar. Double Bladder Sign: Three Cases of an Ultrasonographic Sign that Indicates Ovarian Torsion. *Cureus.* 2019; 11 :e5134.