

## Urolithiasis diagnosed with endovaginal ultrasound after vaginal prolapse repair surgery using mesh: A case report

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### ABSTRACT

Pain after vaginal prolapse repair surgery with mesh is generally attributed to the mesh fixation, particularly to mesh erosion, dislocation or the development of hematoma. However, once all the causes have been excluded, the urinary system, bladder and ureters should be accurately examined by means of endovaginal ultrasound. This report concerns the case of a 72-year-old woman who had undergone mesh-supported prolapse surgery 3 months prior, with no other relevant diseases, who visited the emergency department complaining of dull, right-sided colic pain. The endovaginal ultrasound examination revealed a prevesical ureteral calculus on the right side with consequent dilatation of the proximal ureter. Computed tomography of the abdomen and pelvis confirmed the calculus in the distal right ureter and revealed a right renal lower pole calculus. The patient underwent treatment via an operative ureterorenoscopy with removal of stones and placement of a double-J-stent. Two months later, a second ureterorenoscopy was performed with double-J-stent removal and concomitant stone extraction. It appears that no similar cases have been reported in the literature. This is why, during the urogynecological postoperative follow-up, it is of paramount importance to examine the entire urogenital system with endovaginal ultrasound. This case report highlights how, through a simple, non-invasive, radiation-free examination, like ultrasound, most of the post-operative complications of vaginal prolapse repair surgery using mesh, including urolithiasis, can be excluded.

### 1. Introduction

Sacrocolpopexy is performed to correct prolapse of the vaginal vault in patients who have had a hysterectomy. Like all surgeries, it can cause postoperative pain, often associated to mesh-related issues such as mesh erosion, dislocation, or the development of hematoma. However, when other causes have been ruled out, it is important to examine the urinary system, bladder, and ureters. This can be easily done using endovaginal ultrasound. This report describes a patient complaining of colic pain after mesh-related surgery, who was ultimately diagnosed with urolithiasis.

Urolithiasis occurs when stones formed within the kidneys exit the renal pelvis and move into the remainder of the urinary collecting system, including the ureters, bladder, and urethra. Its prevalence ranges from 3% to 5% in females in Western countries [1], with around 85% of ureteric cases involving the distal ureter [2]. Urolithiasis typically presents with pain to the back, flank and groin, requiring proper diagnosis and treatment. Imaging plays a key role in the initial diagnosis, follow-up and urological management of urinary tract stone disease. Modalities

include plain radiography of the kidneys, ureters, and bladder (KUB), intravenous pyelogram (IVP), ultrasound (US), magnetic resonance urography (MRU) and non-contrast CT (NCCT). However, the use of intravenous radio-opaque contrast and the time required to perform an intravenous urogram (IVU) make this imaging method impractical in an emergency setting [3]. According to recent literature updates, NCCT is considered the gold standard in detecting urolithiasis due to its high sensitivity and specificity of 99%, as well as the ease of performing the study. Additionally, NCCT can reveal indirect or secondary signs of obstruction, such as periureteral fluid collection, perihepatic fat stranding, or hydronephrosis [4]. However, it is important to note that this imaging procedure exposes the patient to radiation, which should be avoided, especially for individuals frequently affected by stones, pregnant women, and women of childbearing age. Because of these drawbacks, sonography is often used as a common alternative method for detecting urolithiasis [3]. A study conducted in the National Hospital Ambulatory Medical Care Survey (NHAMCS) between 1996 and 2007 found that, despite increasing utilization of CT in hospitals, it had no effects on the number of hospitalizations or management of the patients

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[5]. Point-of-care ultrasound (POCUS) has moderate accuracy in making the diagnosis of urolithiasis. Nevertheless, it has the benefits of no radiation and the ability to be performed quickly at the bedside. The European Association of Urology (EAU) 2016 Guidelines state: "Following initial US assessment, NCCT should be used to confirm stone diagnosis in patients with acute flank pain, because it is superior to IVU (LE1a)" [6]. Transabdominal sonography and, more significantly, transvaginal ultrasound have proven to be effective imaging modalities in assessing ureterolithiasis [7,8]. Transvaginal sonography, with its higher frequencies and closer proximity of the transducer to the ureter, is particularly sensitive at detecting ureterolithiasis, more so than transabdominal sonography. Furthermore, when patients with distal ureteral stones receive conservative therapy, ultrasound has been found to be a good substitute for CT in follow-up imaging [4].

This case reports concerns a patient with postoperative urolithiasis after laparoscopic sacrocolpopexy, successfully diagnosed using transvaginal ultrasound.

## 2. Case Presentation

A 72-year-old woman presented to the emergency department complaining of dull, right-sided colic pain for the first time; the clinical history did not reveal any relevant diseases. Three months prior to the symptoms' presentation, she underwent a urogynecological surgery, laparoscopic sacrocolpopexy, with the use of Restorelle® Y mesh. As a result, the patient was referred to the urogynecology department with the suspicion of a mesh-related complication. The patient's vital signs at presentation were: heart rate 87 beats/min; blood pressure 140/80 mmHg; respiratory rate 15 breaths/min; temperature 36.7 °C; and oxygen saturation 98% on room air. On physical examination, the patient had right lower quadrant pain and right costovertebral angle tenderness. The urogynecological examination, by means of vaginal palpation and speculum examination, had normal findings, with no prolapse recurrence or mesh erosion. Laboratory studies revealed: a haemoglobin level of 13,73 g/dL, leukocytes 6,1 Gpt/L and a CRP of 6,7 mmol/L. Urinalysis revealed haematuria, but no signs of urinary infection.

The upper urinary tract was assessed by kidney ultrasound (HITACHI ARIETTA 750, Model C252 with 6.0–1.0 MHz). The transducer was first applied on the left lower intercostal space on the posterior axillary line. The urinary collecting system in the renal sinus was not visible, thus excluding hydronephrosis and indicating a normal kidney. On the right lower intercostal space on the posterior axillary line, it was possible to describe a normal cortical layer, but with anechoic fluid-filled interconnected space within the renal sinus, which is a typical finding for hydronephrosis (Fig. 1). The lower urinary tract was studied by means of a transvaginal probe (HITACHI ARIETTA Model C41V1 with, 10–2.0 MHz) with the patient lying supine with empty bladder. The endovaginal probe was placed in the proximal vagina, revealing: an empty bladder; the correct hyperechogenic mesh placement, ventral and dorsal to the vaginal vault (Fig. 2); no free fluids in the Douglas space; no hematoma or abscess formation; and a prevesical ureteral calculus on the right side with consequent dilatation of the proximal ureter. The calculus appeared as an echogenic structure with posterior acoustic shadowing (Fig. 3).

Computed tomography (CT) of the abdomen and pelvis without contrast revealed a right renal lower pole calculus (3,5x3mm) and confirmed the calculus in the distal right ureter (5,5 × 2 mm), before bladder entry, as well as confirming the hydronephrosis Grade I.

The patient underwent operative ureterorenoscopy with removal of stones and placement of a double-J-stent (DJ). Two months later, a second ureterorenoscopy was performed with DJ removal and concomitant stone extraction (5 mm). During the follow-up visit one week later, the endovaginal ultrasound examination confirmed the absence of any distal urethral dilatation and stones, as well as the normal position of the sacrocolpopexy mesh.



Fig. 1. Transabdominal ultrasound depicting hydronephrosis Grade I of the right kidney.

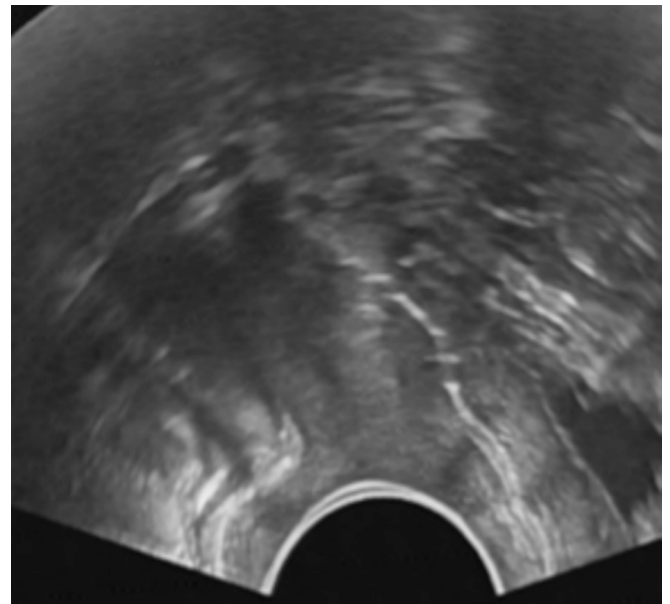
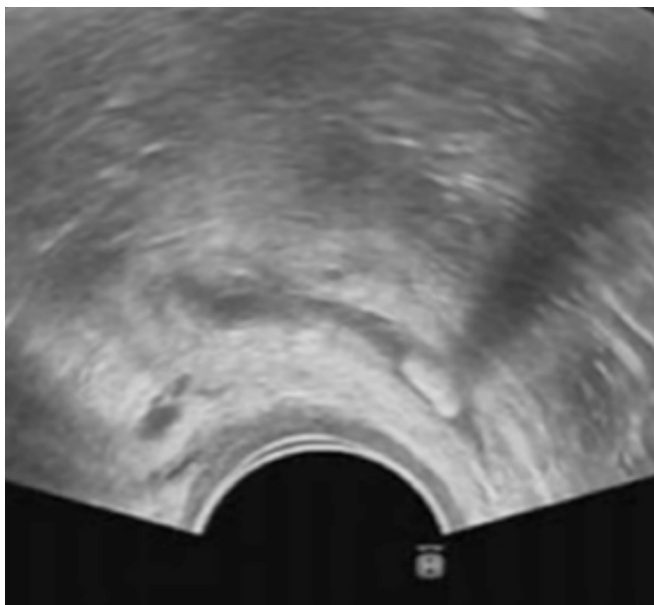


Fig. 2. Transvaginal ultrasound showing the correct position of the hyperechogenic mesh-implant ventral and dorsal to the vaginal vault.

## 3. Discussion

As different studies show, in patients with distal ureteral calculi, transvaginal ultrasound provides a rapid, non-invasive and repeatable means of assessing the morphology and function of the distal ureter [3,9]. Concerning urogynecology surgery, endovaginal sonography should rule out most of the pain-triggering postoperative complications, which can include postoperative ureteral dilatation. Ultrasonography with a transvaginal probe has the advantage over the transabdominal approach of not requiring an over-distended bladder [10]. It also avoids diminished ultrasound penetration caused by obesity and excess intestinal gas. In addition, the transvaginal probe, with a higher frequency and better resolution, is more sensitive at detecting a tiny stone in the distal ureter. However, renal calculi can only be detected by the



**Fig. 3.** Transvaginal ultrasound depicting the right distal ureter with the presence of a hyperechogenic calculus, with consequent dilatation of the proximal ureter.

transabdominal approach. Since 85% of ureteric stones are located in the distal ureter [11] and other pelvic disorders may mimic the symptoms of ureteral calculi, transvaginal ultrasound is appropriate as the first test for women with suspected renal colic, with the understanding that further imaging may be necessary. The ultrasonographic features of a distal ureteral calculus include identification of a stone within the ureter and demonstration of unilateral dilation of the collecting system. Studies state that CT is the gold standard for urolithiasis diagnosis. However, the literature shows that, despite excellent sensitivity and specificity, increased CT use in patients with suspected urolithiasis has not been associated with improved outcomes [12]. Certain urinalysis and POCUS (point-of-care ultrasound) findings may improve POCUS test characteristics, such as the presence of hematuria and degree of hydronephrosis [13,14]. In addition, a recently published trial has documented improved sensitivity and specificity when POCUS is used in conjunction with a prediction tool incorporating components of history and urinalysis [15]. Future research may also focus on elaborating the utility of ultrasound in those with a history of urolithiasis, the value of serial POCUS, and the cost-effectiveness of POCUS compared with CT [16].

#### 4. Conclusion

This case report demonstrates how pain after mesh-supported prolapse surgery is not strictly related to mesh interposition; hence, a differential diagnosis is of paramount importance. Additionally, attention should also be paid to the onset of patient complaints. In this case, the patient presented to the emergency room 3 months after the surgery, which is atypical for pain related to mesh-prolapse surgery. Such pain typically occurs shortly after the surgery, except in cases of mesh displacement, healing defects, or even mesh erosion, which can occur after some years. Therefore, it can be concluded that for a proper differential diagnosis during the follow-up after urogynecological operations, both endovaginal sonography and clinical examination are indispensable. This diagnostic tool can detect the typical causes of postoperative pain, such as hematomas, urinary retention, and mesh dislocation. Moreover, it allows physicians to assess the morphology and function of the genital and lower urinary tract. The efficacy of this tool in studying the distal ureters and its ability to rule out ureteral dilatation

and distal ureteral calculi have rarely been described in the medical literature. The aim of this work is to underline the benefits of endovaginal sonography due to its availability and sensitivity in detecting ureteral dilatation and distal ureteral calculi, while concurrently avoiding exposure to ionizing radiation.

#### Contributors

Graziana Antoci contributed to conception of the case report, acquiring and interpreting the data, drafting the manuscript, undertaking the literature review and revising the article critically for important intellectual content.

Ralf Tunn contributed to patient care, conception of the case report, interpreting the data, and revising the article.

Kathrin Beilecke contributed to patient care, conception of the case report, interpreting the data, and revising the article.

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#### Patient consent

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#### Conflict of interest statement

The authors declare that they have no conflict of interest regarding the publication of this case report.

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