

Role of Transvaginal Ultrasonography in the Detection and Follow-up of Distal Ureteric Calculi in Non-Pregnant Sexually Active Women

Gomathiponshankar Ilayappan¹, Pradeep Vel M², Anbukumar Dhakshinamoorthy³

¹Assistant Professor, Government Medical College, Kallakurichi, Tamil Nadu, India, ²Assistant Professor, Government Mohan Kumaramangalam Medical College, Salem, Tamil Nadu, India, ³Assistant Professor, Government Medical College, Kallakurichi, Tamil Nadu, India

Abstract

Background: Distal ureteric calculi are a frequent cause of acute pelvic and flank pain in women. Although non-contrast computed tomography (NCCT) provides excellent diagnostic accuracy, its routine use is limited by radiation exposure and cost [1,2]. Transabdominal ultrasonography (TAUS), despite being widely available, often has limited sensitivity for distal ureteric stones. Transvaginal ultrasonography (TVUS) may overcome these limitations by allowing improved visualisation of the distal ureter and ureterovesical junction [4,5]. The objective is to assess the diagnostic performance of TVUS and its usefulness in follow-up evaluation of distal ureteric calculi in non-pregnant sexually active women. **Material and Methods:** This prospective observational study was conducted over three years in sexually active, non-pregnant women presenting with symptoms suggestive of ureteric colic. All patients initially underwent TAUS. TVUS was performed when TAUS findings were inconclusive or when indirect signs of distal ureteric obstruction were present. NCCT was reserved for cases in which both ultrasound modalities failed to establish a diagnosis [6–8]. Patients managed conservatively were followed up using TVUS. **Results:** Among 462 evaluated patients, 152 underwent TVUS. Distal ureteric calculi were identified in 81 patients (53.3%). Alternative pelvic or gynecologic pathology was detected in 26 patients (17.1%). TVUS was inconclusive in 45 patients, and subsequent NCCT confirmed distal ureteric calculi in only one case. TVUS demonstrated superior sensitivity compared to TAUS and reliably documented stone clearance during follow-up [5,10]. **Conclusion:** TVUS is an effective, radiation-free imaging technique for both detection and follow-up of distal ureteric calculi in sexually active women, particularly when TAUS findings are non-diagnostic.

Keywords: Transvaginal ultrasonography; Distal ureteric calculi; Ureterovesical junction; Non-contrast CT; Diagnostic imaging; Ureteric colic; Radiation-free imaging; Follow-up evaluation.

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INTRODUCTION

Acute ureteric colic is a common indication for emergency imaging and requires timely diagnosis to guide appropriate management. NCCT is widely regarded as the reference standard for detecting ureteric calculi due to its high sensitivity and specificity.^[1,2] However, concerns related to ionizing radiation exposure, especially in women of reproductive age, and higher costs limit its use as a routine first-line investigation.

Ultrasound remains the preferred initial imaging modality in many clinical settings because it is safe, widely accessible, and cost-effective. TAUS is commonly employed but has well-documented limitations in detecting distal ureteric calculi. Visualisation of the lower ureter is frequently compromised by bowel gas, patient body habitus, and inadequate bladder distension, resulting in reduced sensitivity.^[3]

TVUS provides a closer acoustic window to the distal ureter and ureterovesical junction, thereby improving visualisation and diagnostic confidence. Previous studies have demonstrated improved detection rates of distal ureteric calculi using TVUS compared with TAUS.^[4,5] The present study was undertaken to evaluate the diagnostic accuracy of TVUS and its role in follow-up assessment of distal ureteric

calculi in non-pregnant sexually active women.

MATERIALS AND METHODS

Study Design and Population

This prospective observational study was conducted over 3 years. Sexually active, non-pregnant women presenting with flank or pelvic pain suggestive of ureteric colic were included. Patients in whom TAUS provided a definitive diagnosis were excluded from further evaluation.

Imaging Protocol

TAUS was performed as the initial imaging modality in all patients. TVUS was subsequently performed in patients with:

- Inconclusive TAUS findings
- Renal calculi with suspected distal ureteric obstruction

Address for correspondence: Dr. Gomathiponshankar Ilayappan, Assistant Professor, Government Medical College, Kallakurichi, Tamil Nadu, India
E-mail: stanshankar@gmail.com

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- Indirect signs, such as distal ureteric dilatation without a visible calculus

TVUS examinations were performed using a high frequency endovaginal probe. Echogenic foci with posterior acoustic shadowing were considered suggestive of calculi, and ureteric jets were assessed when feasible. NCCT was performed only when both TAUS and TVUS were inconclusive.^[6-8]

Follow-up: Patients with distal ureteric calculi measuring ≤ 6 mm were managed conservatively with medical expulsive therapy. Follow-up TVUS examinations were performed at 2- and 4-week intervals to assess stone passage. Persistent calculi were referred for endoscopic intervention.^[9]

Statistical Analysis: Continuous variables were expressed as mean \pm standard deviation, while categorical variables were presented as percentages. Diagnostic performance parameters were calculated using standard statistical methods.

RESULTS

A total of 462 patients were evaluated during the study period. TAUS findings were inconclusive in 152 patients, who subsequently underwent TVUS.

- Distal ureteric calculi detected on TVUS: 81 patients (53.3%)
- Alternative pelvic or gynecologic pathology: 26 patients (17.1%)
- Inconclusive TVUS findings: 45 patients (29.6%)

Among patients with inconclusive TVUS, NCCT demonstrated distal ureteric calculi in only one patient. The mean size of calculi detected on TVUS was 7.1 ± 2.4 mm. TAUS demonstrated low sensitivity for distal ureteric calculi, consistent with previously published data.^[3] TVUS showed significantly higher diagnostic performance, approaching that of NCCT.^[5,10] Follow-up TVUS reliably confirmed stone expulsion or persistence.^[9]

Image: TVS image shows VUJ calculus with shadowing and twinkle artefact



DISCUSSION

Detection of distal ureteric calculi in women can be challenging, particularly when relying on TAUS alone. The present study demonstrates that TVUS significantly improves the detection of distal ureteric stones when initial transabdominal imaging is inconclusive. This advantage stems from the transvaginal probe's proximity to the distal ureter and ureterovesical junction, which allows improved spatial resolution and reduced interference from bowel gas and adipose tissue.^[4,5]

Although NCCT remains the most accurate imaging modality for ureteric calculi, increasing concern regarding radiation exposure has encouraged the use of ultrasound-based techniques, particularly in women of reproductive age.^[1,2] TAUS, while commonly used as a first-line modality, has limited sensitivity for distal ureteric calculi.^[3] The addition of TVUS substantially increases diagnostic yield and reduces the need for CT imaging. In this study, more than half of the patients undergoing TVUS were diagnosed with distal ureteric calculi, underscoring its clinical value. Additionally, TVUS identified alternative gynecologic or pelvic pathologies in a considerable proportion of patients, highlighting its broader diagnostic utility in women presenting with nonspecific pelvic pain.^[11]

The minimal additional diagnostic yield of NCCT after inconclusive TVUS further supports TVUS's effectiveness. Only one patient was diagnosed with a distal ureteric calculus on CT after an inconclusive ultrasound evaluation, suggesting that TVUS approaches CT-level sensitivity for distal ureteric stones.^[5,10]

TVUS also proved valuable in follow-up imaging. Accurate confirmation of stone passage is essential in patients managed conservatively. Unlike TAUS, TVUS does not require bladder distension and allows comfortable, repeatable assessment, making it well-suited for follow-up evaluation.^[9,12]

Limitations: This was a single-center study with imaging performed by experienced operators, which may limit generalisability. Additionally, not all patients underwent confirmatory NCCT, introducing potential verification bias.

CONCLUSION

Transvaginal ultrasonography is a safe, effective, and radiation-free imaging modality for the diagnosis and follow-up of distal ureteric calculi in non-pregnant sexually active women. Incorporation of TVUS into routine diagnostic pathways may significantly reduce reliance on CT imaging.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Türk C, Petrik A, Sarica K, Seitz C, Skolarikos A, Straub M, et al. EAU guidelines on diagnosis and conservative management of urolithiasis. *European Urology*. 2016;69(3):468–474.
2. Smith-Bindman R, Aubin C, Bailitz J, Bengiamin RN, Camargo CA Jr, Corbo J, et al. Ultrasonography versus computed tomography for suspected nephrolithiasis. *New England Journal of Medicine*. 2014;371(12):1100–1110.
3. Ray AA, Ghiculete D, Pace KT, Honey RJ. Limitations to ultrasound in the detection and measurement of urinary tract calculi. *Urology*. 2010;76(2):295–300.
4. Yang JM, Yang SH, Huang WC. Transvaginal sonography in the assessment of distal ureteral calculi. *Ultrasound in Obstetrics & Gynecology*. 2005;26(6):658–662.
5. Laing FC, Benson CB, DiSalvo DN, Brown DL, Frates MC, Loughlin KR. Distal ureteral calculi: detection with vaginal ultrasonography. *Radiology*. 1994;192(2):545–548.

6. Vega C. Detection of ureteral stones with transvaginal sonography. *Journal of Diagnostic Medical Sonography*. 2013;30(3):160–163.
7. Eisner BH, Reese A, Sheth S, Stoller ML. Ureteral stone location at emergency room presentation with colic. *Journal of Urology*. 2009;182(1):165–168.
8. Poletti PA, Platon A, Rutschmann OT, Schmidlin FR, Iselin CE, Becker CD. Low-dose versus standard-dose CT protocol in patients with clinically suspected renal colic. *American Journal of Roentgenology*. 2007;188(4):927–933.
9. Moesbergen TC, de Ryke RJ, Dunbar S, Wells JE, Anderson NG. Distal ureteral calculi: ultrasound follow-up. *Radiology*. 2011;260(2):575–580.
10. Song HJ, Cho ST, Kim KK. Investigation of ureteral stone location and ureter diameter in patients with renal colic. *Korean Journal of Urology*. 2010;51(3):198–201.
11. Goldstein SR. Incorporating endovaginal ultrasonography into the overall gynecologic examination. *American Journal of Obstetrics and Gynecology*. 1990;162(3):625–632.
12. Pateman K, Mavrelos D, Hoo WL, Holland T, Naftalin J, Jurkovic D. Visualization of ureters on standard gynecological transvaginal scan: a feasibility study. *Ultrasound in Obstetrics & Gynecology*. 2013;41(6):696–701.