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Vesico-Urachal Diverticulum: Diagnostic Imaging and Carcinomatous Risk Assessment: A Case Report

M. Boussif[1*], I. Akhiyat[1], A. Mourchad[1], I. Azzahiri[1], M.R. Bouroumane[1], A. Diani[1], M. Benzalim[1], S. Alj[1]

[1]Department of Radiology, Ibn Tofail Hospital, University Hospital of Mohamed VI, Marrakech, Morocco

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***Corresponding author:** M. Boussif
Department of Radiology, Ibn Tofail Hospital, University Hospital of Mohamed VI, Marrakech, Morocco

Abstract | **Case Report**

The vesico-urachal diverticulum represents a blind-ending conduit that communicates with the urinary bladder, resulting from a failure to obliterate the juxtavesical portion of the allantoic canal, while urachal sinus was a blind focal dilatation at the umbilical end and urachal cyst was identified as an anechoic structure along the urachus [1]. We present the case of a patient in whom an urachal diverticulum was incidentally discovered.

Keywords: CT scans, ultrasonography, Urachal Pathology, Urachal Diverticulum.

INTRODUCTION

The urachus originates from the allantois and cloaca and extends between the bladder dome and the umbilicus. With normal embryonic development, the urachus involutes and its lumen is obliterated, becoming the median umbilical ligament [2]. Due to an incomplete obliteration of the urachus, urachal anomalies may present along the urachal tract and give rise to various clinical pathological situations such as inflammation, infection, umbilical discharge, lower abdominal pain and potential malignancy [3]. The clinical signs and symptoms may be confused with other abdominal and pelvic diseases, so the accurate diagnosis of urachal anomalies may be challenging. Urachal anomalies can be evaluated using various imaging modalities, such as computer tomography (CT) and magnetic resonance imaging (MRI), but the most commonly used imaging modality for initial screening is ultrasonography (US). This report details a case of incidentally discovered urachal diverticulum in a patient.

CASE PRESENTATION

A 74-year-old female with a history of recurrent urinary tract infections presented with abdominal pain. She exhibited no additional lower urinary tract symptoms such as hematuria, and she was afebrile with a generally preserved condition. Clinical examination revealed a soft abdomen with a negative Giordani sign. Urine dipstick analysis demonstrated leukocyturia and nitrites, with no evidence of hematuria. Urine culture confirmed the presence of *E. coli*, sensitive to standard antibiotics.

Abdominal ultrasonography revealed a diverticular formation with anechoic content, continuous with the anterosuperior bladder wall, which resulted in a distortion of its contour Figure1).

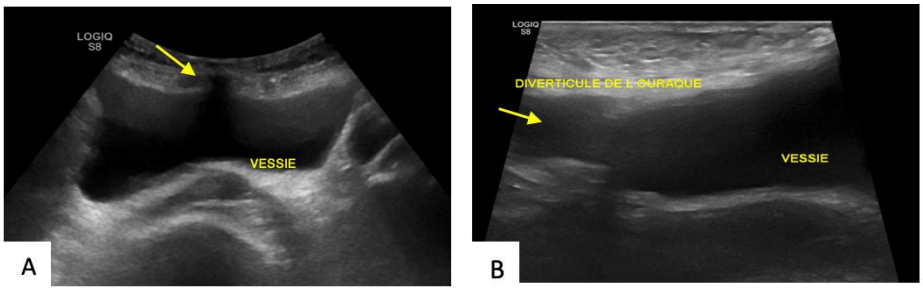

Figure 1: Axial (A) and sagittal (B) ultrasound views of the bladder demonstrating a diverticulum arising from the anterosuperior wall

Computed tomography (CT) of the abdomen and pelvis, performed with a partially filled bladder, identified a communication between the internal end of the urachus and the bladder dome, forming a diverticular image. Sagittal reconstructions clearly delineated the pathway of the diverticulum along the Retzius space within the urachal ligament, extending toward the umbilicus over approximately 13 mm (Figure 2).

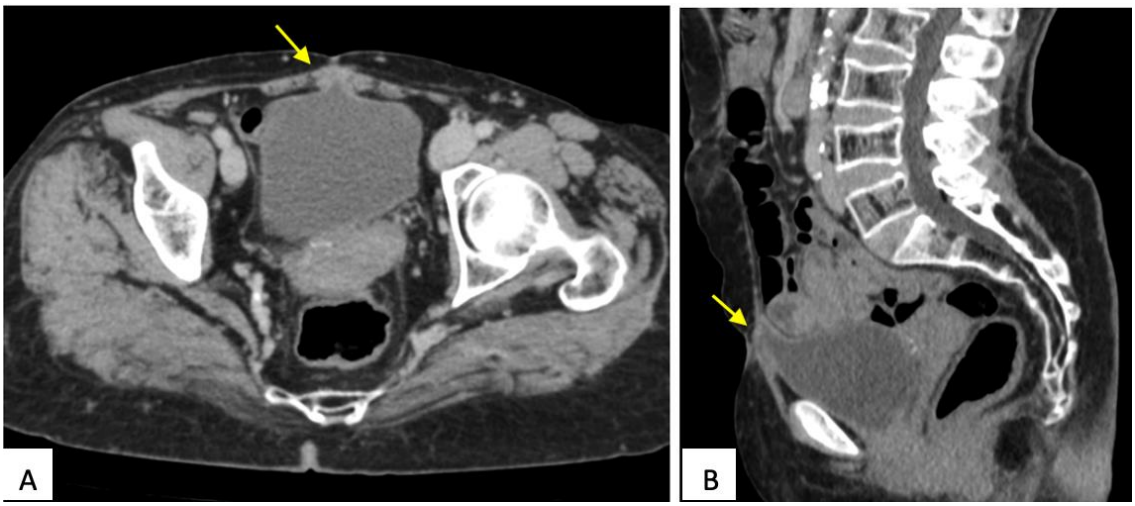

Figure 2: Axial (A) and sagittal (B) CT views showing a communication between the internal end of the urachus and the bladder dome, forming a diverticular structure

These findings are compatible with a diagnosis of urachal diverticulum.

DISCUSSION

The urachus is situated between the peritoneum and the transversalis fascia, within the Retzius space, extending from the bladder dome to the umbilicus. It is accompanied by the umbilical ligaments, remnants of the umbilical arteries [1]. Congenital urachal anomalies stem from a failure of complete obliteration, with the urachal diverticulum representing a defect at the bladder end. The diverticulum can vary in size and may become significantly enlarged in adults, leading to post-void residual urine and recurrent urinary infections [4]. Although the diagnosis is often incidental, complications such as lithiasis may reveal its presence later in life.

Because urachal pathology is rarely accessible to clinical or endoscopic examination, imaging remains essential for diagnosis [5]. On ultrasound, urachal diverticula appear as anechoic masses along the midline at the anterosuperior aspect of the bladder, posterior to the rectus sheath. Additional features such as a solid component suggesting tumor, heterogeneous mucinous content, or evidence of lithiasis may also be evaluated [6].

The reference imaging modality is abdominopelvic CT, which can definitively demonstrate the communication between the bladder dome and the umbilicus on sagittal reconstructions [1, 4].

Magnetic resonance imaging does not typically offer additional morphological details but serves as an alternative in cases of iodinated contrast allergy or renal insufficiency [7, 8].

A critical concern in urachal pathology is the risk of carcinomatous degeneration within the intramural portion of the bladder. Suspicion of malignant transformation is heightened by the presence of a solid or mixed lesion, particularly when it extends into the pre-vesical space toward the umbilicus; calcifications are frequently observed. When malignancy is suspected, percutaneous or endoscopic biopsy may be indicated [6, 9].

Carcinomatous transformation most often manifests as adenocarcinoma, which tends to be resistant to radiotherapy, underscoring the necessity of a systematic surgical approach [4, 10].

CONCLUSION

Although the urachal diverticulum is an uncommon and generally benign condition, it can give rise to infectious, lithiasic, or carcinomatous complications that necessitate prompt intervention. Accurate diagnosis of urachal anomalies relies on advanced imaging techniques, which are indispensable for early detection. Consequently, a systematic surgical approach is strongly recommended to prevent these adverse outcomes.

Conflicts of Interest: The authors declare no conflicts of interest.

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