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Imaging Findings of a Rare Case of an Infected Urachal Diverticulum

FRASER GOMES[1], SUSHMITHA PRASAD[2], JENIKAR PAULRAJ[3], HARSHAVARDHAN BALAGANESAN[4], KUSHBU SONY[5]

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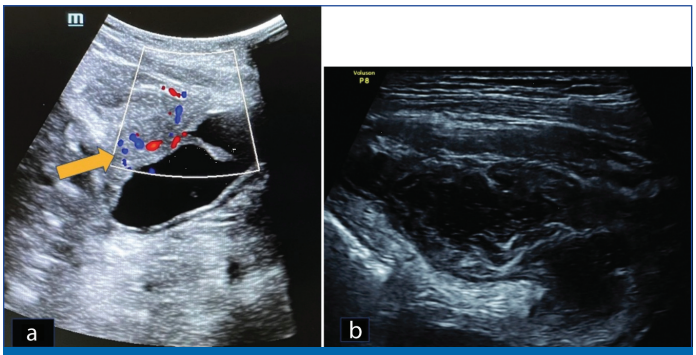
A 26-year-old female patient was referred to the Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamil Nadu, India. with complaints of severe right iliac fossa and pelvic pain, fever, nausea and vomiting since a week. Physical examination revealed tenderness predominantly in the lower abdomen. Initial work-up, which included chest and abdominal plain radiographs, was normal.

An abdominal Ultrasound (US) was performed, revealing a fairly defined heteroechoic collection measuring approximately 3.5×3.7×5.9 cm (volume approximately 41 cc) in the infraumbilical region. This collection showing septations and peripheral vascularity on colour Doppler and was seen closely abutting and indenting the urinary bladder superiorly [Table/Fig-1a,b].

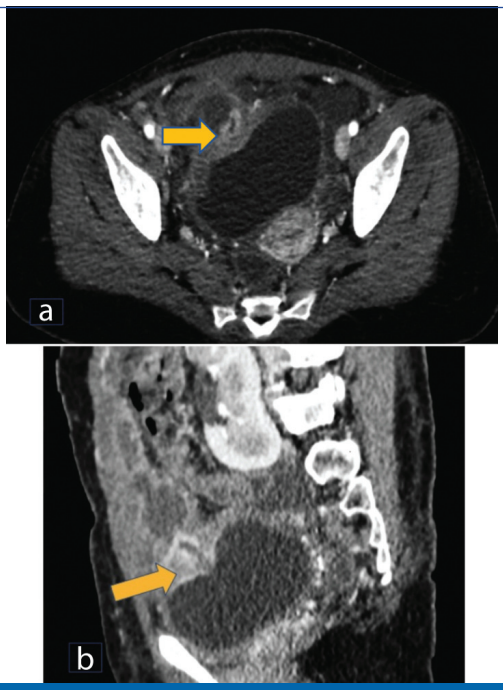


[Table/Fig-1]: a) Axial transabdominal Ultrasonography (USG) image demonstrating fairly defined heteroechoic collection closely abutting and indenting the urinary bladder superiorly with peripheral vascularity on colour doppler (arrow); b) Axial transabdominal USG image showing the heteroechoic collection in the infraumbilical region showing septations.

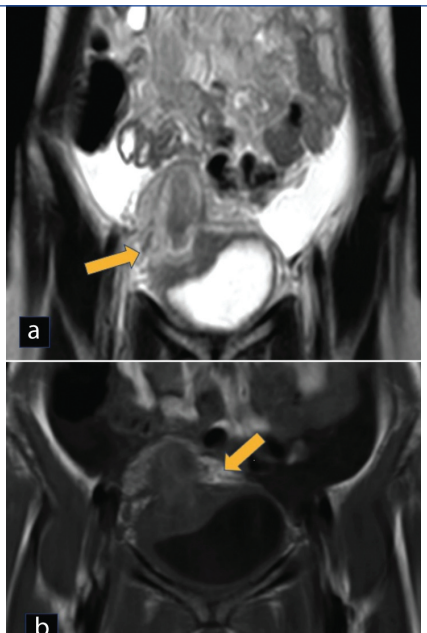
An abdominal contrast-enhanced Computed Tomography (CT) was performed, which revealed a well-defined hetero-dense predominantly hypodense collection measuring approximately 3.0×3.2×4.6 cm {Anteroposterior (AP), Transverse (TR), and craniocaudal (CC)} with thick enhancing wall (approximately 2.6 cm) within the region of the median umbilical fold. This collection was indenting the dome of urinary bladder inferiorly and included a thickened median umbilical ligament. The collection show tiny luminal communication with the bladder; however, no obvious communication between the collection and umbilicus could be showed [Table/Fig-2a,b].

An Magnetic Resonance Imaging (MRI) of the abdomen showed a distinct structure that was hypointense on T1 and heterointense on T2, which bordered the inferior dome of the bladder and communicated with it [Table/Fig-3a,b]. The patient was treated with antibiotics and surgical removal of the urachal remnant was performed after four weeks. Postoperatively, the diagnosis was confirmed by Histopathological Examination (HPE).

Urachus originates from the early foetal anterior bladder wall to the allantois and extends cranially to the umbilicus [1]. The diagnosis of urachal anomalies has increased in frequency in the current cross-sectional imaging era and incidental imaging findings are increasingly being used to diagnose asymptomatic cases [2].



[Table/Fig-2]: a) Axial contrast enhanced CT Abdomen image demonstrating well-defined heterodense predominantly hypodense collection with thick enhancing wall within the region of median umbilical fold, indenting the dome of urinary bladder inferiorly (arrow); b) Sagittal contrast enhanced CT Abdomen image showing thin luminal communication of the collection with the urinary bladder (arrow).



[Table/Fig-3]: a) Sagittal T2W image demonstrating a well-defined heterointense collection abutting the dome of urinary bladder inferiorly and communicating with the urinary bladder (arrow); b) Coronal T1W image demonstrating hypointense collection (arrow) indenting the dome of urinary bladder.

Tan C et al., reported a case of vesicourachal diverticulum in a young female, wherein MRI results showed a midline structure measuring 11×8.9×29 mm that originated from the bladder dome and was consistent with a urachal remnant. Although it has some conceptual similarities with the umbilical urachal sinus, the vesicourachal diverticulum differs in that it opens to the bladder via a blind terminating urachus, rather than to the umbilicus. Unintentional discovery of urachal anomalies is common. On ultrasound, a midline tubular structure with anechoic content and hypoechoic walls has been detected. Additional imaging modalities can more clearly demonstrate the magnitude of the aberration and support the US findings [3].

Qureshi I et al., described a little protrusion from the bladder's anterosuperior wall that connected to a cord-like structure extended to the umbilicus; however, there was no connection between this small outpouching and the umbilicus. The findings indicate a small vesicourachal diverticulum [4].

Ramos Pacheco VH et al., observed an ultrasound of a gas-containing heterogeneous mass in the midline, extending from the bladder's anterior and superior walls to the umbilicus, in a rare instance of infected urachal remains. Vascularity was assessed using colour Doppler. A tubular mass extending from the umbilicus to the bladder dome was detected on abdominal CT. A contrast CT scan showed fat stranding, rim enlargement and fluid collection density. The bladder dome showed inflammatory changes and inadequate purulent drainage during cystoscopy [5].

In both paediatric and adult populations, urachal abnormalities manifest and develop differently, according to a study by Ashley RA et al., Urachal cancer is more common in adults; however, it usually has a lower morbidity rate in youngsters. Early infancy urachal lesions should be addressed to avoid issues in adulthood [6].

On a computed tomography image of an urachal residual with heterotopic sinus, Sun Z-H et al., (2019) found a 4-cm cystic tumour at the urinary bladder's ventral wall. Retrograde urethrography showed the heterotopic sinus mass on the dorsal side of the typical external urethral opening. Cystoscopy revealed that the tumour and the bladder were not communicating [7].

Infections of urachal diverticulum are rarely documented. However, patients presenting with right iliac fossa and pelvic pain, which classically points towards acute appendicitis in the emergency setting, should be carefully evaluated for infections related to urachal anomalies.

REFERENCES

[1] Wilson AL, Gandhi J, Seyam O, Rahmani B, Patel S, Joshi G, et al. Urachal anomalies: A review of pathological conditions, diagnosis, and management. Translational Research in Anatomy. 2019;16:100041. Doi: 10.1016/j.tria.2019.100041.

[2] Parada Villavicencio C, Adam SZ, Nikolaidis P, Yaghmai V, Miller FH. Imaging of the urachus: Anomalies, Complications, and mimics. RadioGraphics. 2016;36(7):2049-63. Doi: 10.1148/rg.2016160062.

[3] Tan C, Simon MA, Dolin N, Gesner L. Incidental vesicourachal diverticulum in a young female. Radiology Case Reports. 2020;15(8):1305-08. Doi: 10.1016/j.radcr.2020.05.046.

[4] Qureshi I, Hamed HS, Nathani P, Al Sadairi FMK, Ghazala G, Kuncheria SK, et al. Vesicourachal diverticulum: A unique case report. Journal of Medical Research and Surgery. 2023;4(6):121-22. Doi: 10.52916/jmrs234124.

[5] Ramos Pacheco VH, Dominguez YS, Cervantes Sánchez AM. Infected urachal remnants: An unusual presentation. BJR|Case Reports. 2016;2(2):20150226. Doi: 10.1259/bjrcr.20150226.

[6] Ashley RA, Inman BA, Routh JC, Rohlinger AL, Husmann DA, Kramer SA. Urachal anomalies: A longitudinal study of urachal remnants in children and adults. Journal of Urology. 2007;178(4S):1615-18. Doi: 10.1016/j.juro.2007.03.194.

[7] Sun Z-H, Kong X-H, Huang W-J, Chen G, Huang X-J. Urachal remnant with heterotopic sinus in an adult male. Medicine. 2019;98(18):e15430. Doi: 10.1097/md.0000000000015430.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamil Nadu, India.
2. Junior Resident, Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamil Nadu, India.
3. Associate Professor, Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamil Nadu, India.
4. Assistant Professor, Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamil Nadu, India.
5. Associate Professor, Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sushmitha Prasad,
Junior Resident, Department of Radiodiagnosis, Shri Sathya Sai Medical College and Research Institute, SBV Chennai Campus, Shri Sathya Sai Nagar, Ammapettai, Thiruporur, Chengalpet-603108, Chennai, Tamil Nadu, India.
E-mail: sushmithaprasad22027@gmail.com

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