Case 15849

Eurorad

Benign tubular ectasia (ECR 2018 Case of the Day)

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Section: Uroradiology & genital male imaging
Area of Interest: Kidney
Procedure: Contrast agent-intravenous
Procedure: Comparative studies
Imaging Technique: CT
Special Focus: Dilatation Case Type: Clinical Cases
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Patient: 78 years, female

Clinical History:

A 78-year-old woman with a history of recurrent low-grade papillary transitional cell carcinoma lesions in the bladder was referred to the radiology department for CT to rule out upper urinary tract lesions. Multiphasic abdominal CT was performed.

Imaging Findings:

Figure 1: axial contrast-enhanced CT-image in the arterial phase (A) shows a symmetric nephrogram with normal corticomedullary differentiation. Venous phase image (B) shows some areas with faint hypodense aspect of the medulla (for example in the upper pole of the right kidney). Excretory phase images (C) show a symmetrical contrast excretion. Although there were no visible calcifications in the arterial and venous phase, the absence of calcifications (D) was confirmed on older non-enhanced CT examinations available in PACS.
Figure 2: CT urography images, in different window setting, in axial plane (A) and coronal MIP reformations (B) show a typical ‘paintbrush’ appearance of the renal medulla in both kidneys, due to dilated collecting ducts. Also note the duplicated collecting system of the left kidney.

Discussion:

Background: Benign tubular ectasia is a benign developmental condition where dilatation of the collecting tubules in the medullary pyramids of the kidney occurs. The term ‘benign’ is used to differentiate this entity from medullary sponge kidney. It is mostly seen as incidental finding on imaging studies. The pathogenesis is unknown. [1]

Imaging Perspective: In general, CT-images in the arterial and venous phase show no abnormalities at the renal medulla. Imaging modality of choice to depict tubular ectasia is excretory phase CT urography. CT urography images show parallel streaks of contrast in the medullary pyramids, corresponding to dilatation of the renal collecting ducts. On imaging this creates the typical ‘paintbrush’ appearance. Benign tubular ectasia can involve a different number of calyces, ranging from a few to all. [2, 3] CT urography in our case was performed to rule out malignancy, since fully opacified urinary tract is crucial for detection of upper urinary tract lesions. In general, subtle

abnormalities of the upper urinary tract (e.g. papillary necrosis, urothelial cancer,…) will be better portrayed in the excretory phase whereas arterial and venous phase images can be normal. [4, 5]
In case of renal tubular ectasia associated with medulla sponge kidney, nonenhanced CT shows small linear calculi in the renal pyramids. These calculi are formed when there is sufficient stasis of urine in the tubules. When extended, these calcifications can be seen on conventional radiography. CT, however, is more sensitive in detecting a smaller and/or limited number of calcifications. It can also more exactly define the location of these calcifications. In medullary sponge kidney, the tubular ectasia is more prominent and dilatation may be cylindrical or saccular. In contrast to patients with benign tubular ectasia, patients with medullary sponge kidney may show symptoms such as microhaematuria, episodes of renal colic, renal insufficiency and infection. [2, 5]

Take-Home Message: A typical ‘paintbrush’ appearance of the renal medulla on CT-urography should alert the radiologist to the diagnosis of renal tubular ectasia, in particular in the absence of medullary calcifications. Recognition of this benign entity is important in order to avoid unnecessary follow-up or other interventions.

Differential Diagnosis List: Benign tubular ectasia, Lithium-induced nephropathy, Papillary necrosis, Benign tubular ectasia, Medullary sponge kidney, Acute tubular necrosis

Final Diagnosis: Benign tubular ectasia

References:

Palubinskas AJ (1963) Renal pyramidal structure opacification in excretory urography and its relation to medullary sponge kidney. Radiology 81:963-70 (PMID: 14101720)
Fulcher AS, Turner MA, Sanyal AJ (2001) Case 38: Caroli disease and renal tubular ectasia. Radiology 220:720–723 (PMID: 11526273)
Lang EK, Macchia RJ, Thomas R, Watson RA, Marberger M, Lechner G, Gayle B, Richter F (2003) Improved detection of renal pathologic features on multiphasic helical CT compared with IVU in patients presenting with microscopic hematuria. Urology 61:528–532 (PMID: 12639640)
Silverman SG, Leyendecker JR, Amis ES (2009) What is the current role of CT urography and MR urography in the evaluation of the urinary tract?. Radiology 250:309–323 (PMID: 19188307)
Ginalski JM, Schnyder P, Portmann L, Jaeger P (1991) Medullary sponge kidney on axial computed tomography: comparison with excretory urography. Eur J Radiol 12:104–107 (PMID: 2036995)

Figure 1

a

Description: Axial contrast-enhanced CT image in the arterial phase shows a symmetric nephrogram with normal corticomedullary differentiation. **Origin:** Department of Radiology, Antwerp University Hospital, Antwerp, Belgium

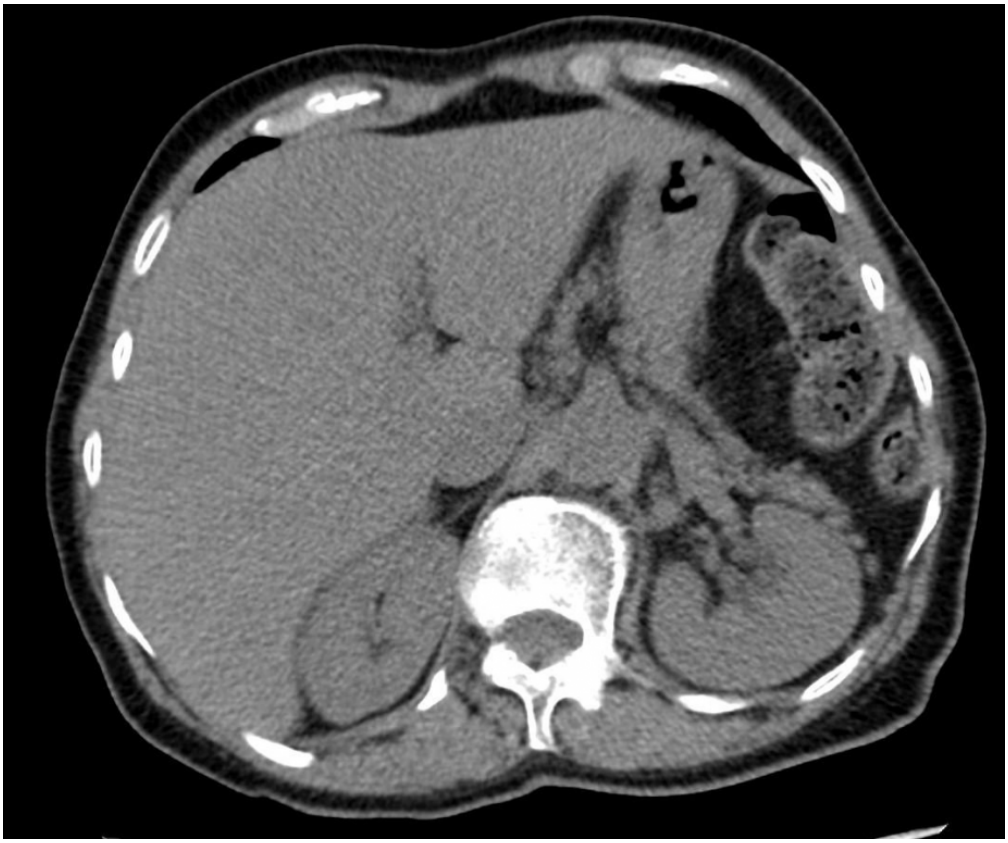
b

Description: Axial contrast-enhanced CT image in the venous phase shows some areas with faint hypodense aspect of the medulla (for example in the upper pole of the right kidney). **Origin:** Department of Radiology, Antwerp University Hospital, Antwerp, Belgium

c

Description: On this axial contrast-enhanced CT image in the excretory phase we see a symmetrical contrast excretion. **Origin:** Department of Radiology, Antwerp University Hospital, Antwerp, Belgium

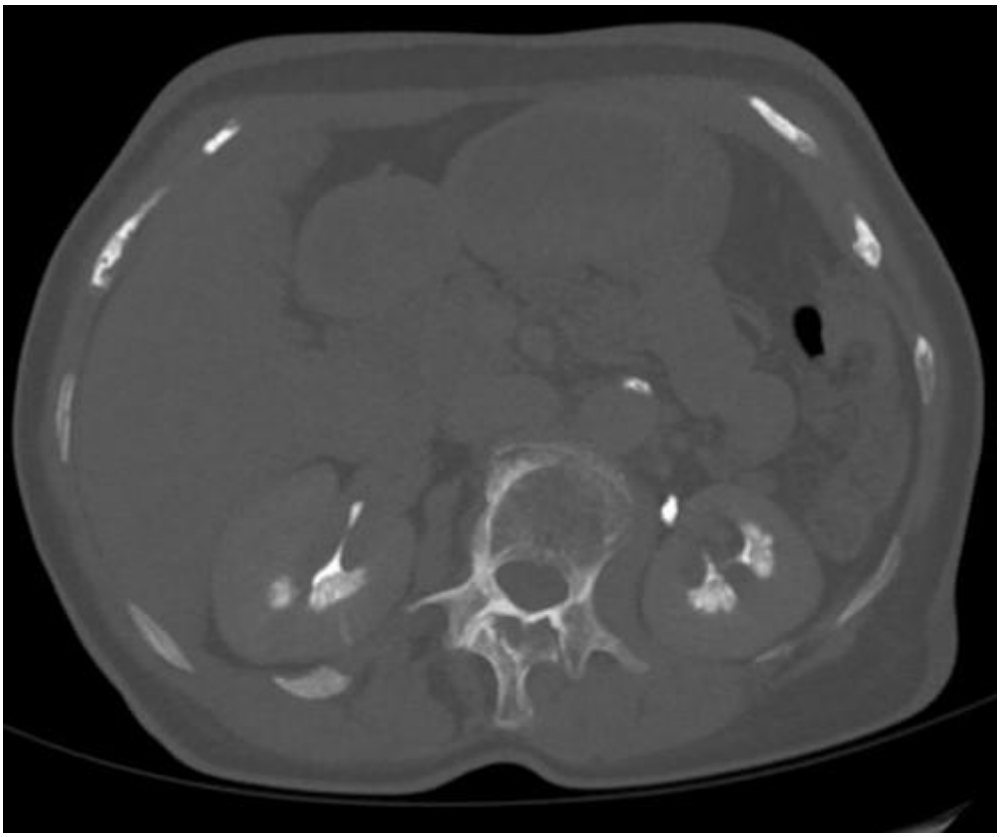
d



Description: Previous nonenhanced CT image showed absence of calcifications. **Origin:** Department of Radiology, Antwerp University Hospital, Antwerp, Belgium

Figure 2

a



Description: CT urography image in the axial plane shows the typical ‘paintbrush’ appearance of the renal medulla in both kidneys. **Origin:** Department of Radiology, Antwerp University Hospital, Antwerp, Belgium

b

Description: On this CT urography study with coronal MIP reformations we again see the typical ‘paintbrush’ appearance of the renal medulla in both kidneys. Also note the duplicated collecting system of the left kidney. **Origin:** Department of Radiology, Antwerp University Hospital, Antwerp, Belgium