Incidental Detection of Bilateral Large Urinary Bladder Diverticulae on Tc99m Ethylene Dicysteine Renography with Single-photon Emission Computed Tomography-Computed Tomography

Abstract

The complementary anatomical and functional information provided by hybrid imaging with single-photon emission computed tomography-CT (SPECT-CT) is a very useful imaging tool in selected cases where anatomical information is lacking as in the scenario of dynamic renal scintigraphy. The authors present a case of a 5-year-old male child with symptoms suggestive of cutis laxa with urinary tract infection. The child underwent dynamic renal scintigraphy with Tc99m ethylene dicysteine for cortical function and drainage assessment. Hybrid SPECT/CT proved valuable in the child in identification of the bilateral gross urinary bladder diverticulae.

Keywords: *Bladder diverticulum, cutis laxa, dynamic renal scintigraphy, Tc99m ethylene dicysteine*

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A 5-year-old male child presented with the complaint of recurrent episodes of burning micturition and fever for 3 months with occasional episodes of urinary incontinence. On examination, he had sagging cheeks and eyelids with skin overlying the anterior abdominal wall thrown into folds with an inverted V-shaped scar. His history revealed surgery for rolling type of hiatus hernia at the age of 2 months and for right-sided direct inguinal hernia at the age of 1 year. A urine culture was obtained that was positive for *Escherichia coli*, for which the child was put on uroprophylaxis. Ultrasonography of the abdomen obtained as a part of the investigative workup revealed bilaterally normal kidneys and a cystic structure near the left ureterovesical junction, suspicious for a hutch diverticulum. The child was then referred for a Tc99m ethylene dicysteine (Tc99m EC) diuretic renography for assessment of renal function and drainage. The child was injected with 2 mCi (74 MBq) of Tc99m EC as an intravenous bolus along with 20 mg furosemide (F-0 protocol), and dynamic images were acquired in the posterior projection for 24 min [Figure 1a]. Subsequent prevoid, postvoid, and delayed 3 h images were also acquired [Figure 1b-d]. Dynamic images from the second minute onward revealed a focus of tracer activity just superolateral to the urinary bladder on the right side with progressive intensification in the subsequent dynamic images (blue arrow). A second, less intense focus of tracer activity was also noted superior to the urinary bladder on the left side (red arrow). Both the foci of tracer activity persisted till the 3 h delayed study [Figure 1d]. Hybrid single-photon emission computed tomography-CT (SPECT/CT) of the pelvis revealed tracer activity in large lobulated diverticular sacs with multiple internal septae, superolateral to and with internal communication with the urinary bladder [Figure 2a-d]. Another smaller diverticulum was also noted in the posterolateral aspect of the urinary bladder on the left side [Figure 2a-d]. In spite of the presence of bilateral large diverticulae, the study showed unobstructed and prompt drainage of tracer from both kidneys [Figure 1e].

The child was conservatively managed with the purpose of treating the present urinary infection so that definitive surgery could be performed later on. The clinical spectrum of cutis laxa syndrome is highly heterogeneous.[1,2] Bladder diverticulae with cutis laxa syndrome can be primary like hutch diverticulum or secondary to obstruction like posterior urethral valve.[3,4] They worsen over time and predispose

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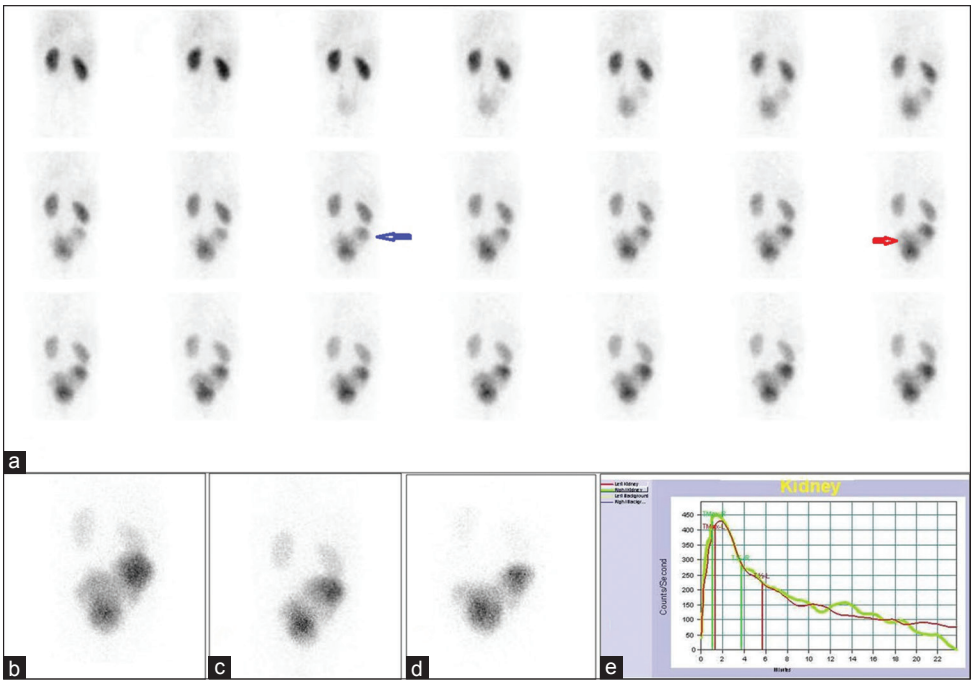

Figure 1: Sequential dynamic images on Tc99m EC renography (a) showing focus of tracer activity at the right superolateral aspect of the urinary bladder with progressive intensification (blue arrow) and smaller focus of tracer activity at the left superolateral aspect of the urinary bladder (red arrow). Prevoid (b), postvoid (c) and 3 hr delayed (d) static images showing persisting tracer activity at left and right (R>L) superolateral aspects of the urinary bladder. Renogram curves (e) demonstrating prompt unobstructed drainage of both kidneys.

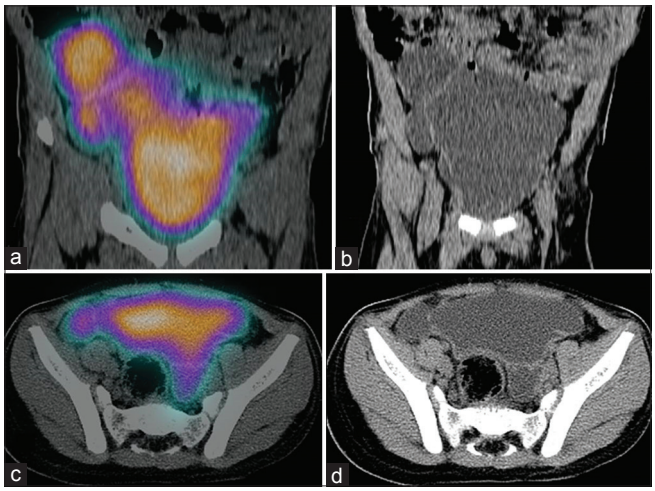

Figure 2:Hybrid SPECT/CT (a, c) and CT (b, d) images revealing tracer activity in the urinary bladder and extending into the bilateral gross diverticulae

to hydronephrosis and urinary tract infections due to dilated system/vesicoureteric reflux.[5] The additional value of SPECT-CT in enhancing diagnostic confidence/alternate diagnosis in image interpretation has been well documented.[6-10] Dynamic renal scintigraphy along with SPECT-CT proved to be valuable to identify, assess, and determine the extent of the urinary bladder diverticulae before it caused significant obstructive uropathy in this child. It provided additional information that ultrasound sonography of the abdomen could not provide in detail with respect to the bilateral diverticulae.

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Conflicts of interest

There are no conflicts of interest.

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