

## Development of a Peri-renal Urinoma in a Follow-up Patient with History Posttraumatic Peri-nephric Hematoma: Role of Renal Scintigraphy

### Abstract

A 7-year-old male with a history of blunt trauma to the abdomen and diagnosis of perinephric hematoma in contrast-enhanced computed tomography (CT) presented with increasing peri-nephric collection (after ~1.5 months) in the serial ultrasound examinations. The patient was referred to the department of nuclear medicine for the assessment of this collection as well as renal function. In <sup>99m</sup>Tc-diethylenetriamine pentaacetate renal scintigraphy, progressively increasing radiotracer activity was noted inferolaterally to the left kidney, separated from the same by a photopenic area. Single-photon emission computed tomography/CT revealed a peri-nephric urinoma in relation to the previously diagnosed hematoma at the lower pole; which was communicating with the pelvi-calyceal system (PCS). Not only did the renal scintigraphy aid in the diagnosis of urinoma but it was also able to show that it was communicating freely with the PCS and that the rest of the renal parenchyma was functioning adequately. This multi-faceted assessment in a single investigation allowed clinicians to opt for the conservative management despite the increasing size of urinoma in the early follow-up.

**Keywords:** <sup>99m</sup>Tc-diethylenetriamine pentaacetate renal scintigraphy, perinephric-hematoma, trauma, urinoma

### Case

A 7-year-old male with a history of fall presented with left flank pain and hematuria. Focused assessment with sonography in trauma (FAST), followed by contrast-enhanced computed tomography (CECT) revealed Grade-4 laceration at the lower pole of the left kidney and a peri-nephric hematoma, which was confined within the Gerota's fascia. The patient was managed conservatively on antibiotics and pain-killers. During the follow-up, ultrasound scan revealed increase in the size of the peri-nephric collection (after ~1.5 months). Thereafter, the patient was referred to the department of nuclear medicine for assessment of the nature of this peri-nephric collection, in addition to the evaluation of residual functioning renal parenchyma. <sup>99m</sup>Tc-diethylenetriamine pentaacetate scintigraphy revealed a photopenic area in relation to the lower half of the left renal fossa [Figure 1a]. The upper half of the left kidney showed preserved function. In late dynamic images, an area of progressively increasing radiotracer activity was noted

in the infero-lateral aspect of the left renal fossa; which was still separated from the functioning left renal parenchyma by a photopenic area. Still, greater extravasation of radioactive urine was noted into this collection in serial static images acquired till 4 h [Figure 1b-d]. Single-photon emission computed tomography images were also acquired, which revealed a parenchymal laceration in the inferior pole of the left kidney [Figure 2a-h]. A large iso-dense hematoma was noted inferior to the inferior pole of the left kidney, which did not show any significant radiotracer uptake. A radioactive collection with fluid density was noted lateral to this hematoma, but still confined within the Gerota's fascia [Figure 2c and d]. This fluid density was communicating with the pelvi-calyceal system (PCS) though the renal laceration [arrows in Figure 2d, f and h]. The collection was thus diagnosed as a urinoma and because it was communicating with the PCS, the clinicians decided on the conservative management. During follow-up, the swelling was seen to reduce in size in sequential ultrasounds.

Posttraumatic urinomas are very rare. Prerequisites for their formation are

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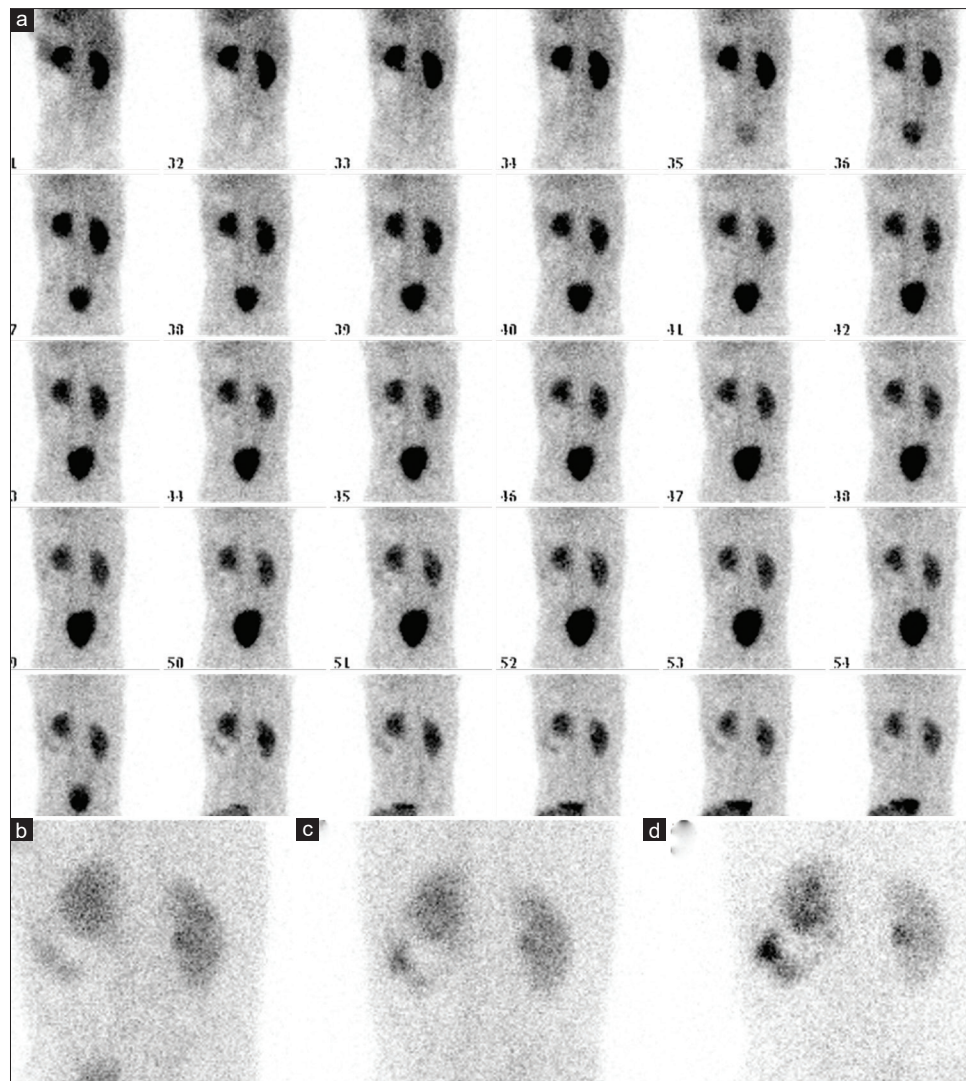
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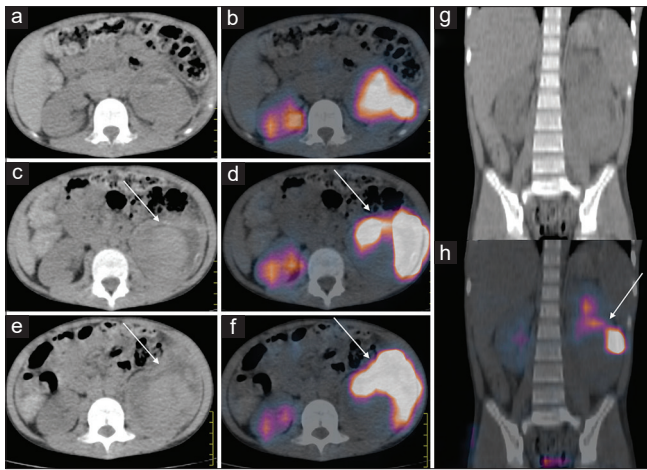
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**Figure 1:**  $^{99m}\text{Tc}$ -DTPA Renal scintigraphy in a 7-year-old male with history of blunt trauma. (a) Dynamic frames showing a normal functioning right kidney and preserved function in the upper half of left kidney. A photopenic area is visible in the inferior aspect of left kidney in early frames, which shows radiotracer uptake (on account of urinary extravasation) in the inferolateral aspect in later frames. (b) Post-void; (c) 2 hours delayed static and (d) 4 hours delayed static images showing progressive increase in the radiotracer concentration in this collection

functioning renal parenchyma, injury to PCS and obstruction in the urinary tract.<sup>[1]</sup> Many urinomas are small and resolve spontaneously, but large and expanding urinomas often require intervention.<sup>[2]</sup> Intervention may also be required to accelerate healing in cases where renal urinomas separate the fragments of renal parenchyma.<sup>[3]</sup> CECT is the preferred modality for the diagnosis, as extravasated contrast can be used to identify urinomas/urinary leaks.<sup>[4]</sup> However, CECT cannot be used to measure renal function and associated risks with administration of IV contrast are a constant worry. In addition, in many patients with renal trauma, the renal function may be compromised. Although there were no such complications in the presented case, there were apprehensions related to repeat contrast administration after just 1 month of previous CECT as well as radiation-related concerns in a young child. The use of

sequential CECTs is less than ideal in such a scenario as there was no urinary collection at initial presentation but progressively increasing collection was noted in follow-up, which necessitated serial imaging. Renal scintigraphy, on the other hand, is not associated with severe side effects such as allergic reactions (vs. IV contrast), it can be used in patients with compromised renal function and delivers much less radiation dose compared to CECT.<sup>[5]</sup> This case shows the utility of this old and relatively inexpensive imaging modality in multi-faceted evaluation of cases with renal trauma, wherein it was able to diagnose preserved function in the residual renal parenchyma, identify the nature of peri-nephric collection, and establish the communication of this collection with PCS. All this allowed clinician to opt of conservative management in spite of increasing the size of collection and provided them with a low radiation alternative to serial CECTs in follow-up.



**Figure 2:** Axial (2a, 2c, 2e) and coronal (2G) CT images, along with corresponding SPECT/CT images (2b, 2d, 2f, 2h respectively) showing a parenchymal laceration in the inferior pole of the left kidney. A large iso-dense hematoma can be seen in the inferior aspect of left kidney without any significant radiotracer uptake. Additionally, a radioactive fluid collection can be noted lateral to this hematoma, which is confined within the Gerota's fascia (Figure 2c, d). This fluid density is seen to be communicating with the pelvi-calyceal system through the renal laceration (arrows in Figure 2 d, f, h)

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

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