

# Right Renal Pelvic Calculus Mimicking an Extrarenal Pelvis

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## ABSTRACT

A 57-year-old man presented with recurrent intermittent colicky right flank pain of 1-year duration. Intravenous urogram (IVU) on two separate occasions suggested a right-sided, extrarenal pelvis. However, when pain became recurrent and persistent, he had a non-contrast computed tomography (CT) examination, which revealed a calculus in the renal pelvis. Diagnosis was missed in the initial imaging modalities because apart from the dilated pelvis, there was no evidence of hydronephrosis or calculus seen, hence a diagnosis of extrarenal pelvis. This case report highlights the superior utility of CT in imaging of suspected urolithiasis, especially when the patient remains symptomatic. Radiologists should be wary, especially in symptomatic patients with features of extrarenal pelvis on IVU.

**Key words:** Calculus; non-contrast computed tomography; extrarenal pelvis

## Introduction

Acute flank pain due to urolithiasis is a common complaint in patients presenting to emergency departments.<sup>[1,2]</sup> Patients typically present with radiating colicky pain with or without hematuria.<sup>[1]</sup> Patients treated for urolithiasis are usually between 30 and 60 years of age and the disease affects men three times as often as it does women.<sup>[2]</sup>

Imaging, therefore, has become an increasingly important tool in the evaluation and treatment planning of these patients.<sup>[1,3]</sup> Many imaging modalities can be used, namely ultrasonography (US), nuclear medicine, intravenous urography (IVU), and conventional radiography.<sup>[2,4]</sup>

The mainstay of imaging of suspected urolithiasis in Nigeria had been conventional radiography, US, and IVU, until the last decade when CT became available in many tertiary institutions, including our institution.

Non-enhanced computed tomography (CT) has provided a means to enable detection and characterization of urolithiasis with unprecedented sensitivity, specificity, and accuracy while yielding important information for

treatment planning, including the size and location of calculi.<sup>[2]</sup>

We report a case of a 57-year-old man, with right-sided renal calculus, whose diagnosis was missed initially and delayed for a year, due to imaging features on IVU mimicking an extrarenal pelvis.

## Case Report

Mr A.Z is a 57-year-old man who presented with recurrent intermittent colicky right flank pain of a-year duration initially at a private hospital in Lokoja.

At initial presentation, there was associated nausea and vomiting.

On examination, he was not pale, anicteric, and afebrile.

Blood pressure was 130/80 mmHg and pulse rate 110/min.

He was admitted and placed on intravenous (IV) fluid and analgesics.

He was also commenced on Augmentin 1gm twice daily for 7 days.

He had an ultrasound examination, which was essentially normal and an IVU which showed a right extrarenal pelvis. He was discharged afterwards and pain had subsided.

Five months later, he had another bout of colicky renal pain and again admitted and had a course of antibiotics, analgesics,

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and, he had a repeat IVU, the preliminary plain film showed no obvious abnormality [Figure 1]. Contrast film showed dilated renal pelvis but normal calyces [Figure 2], hence an impression of extrarenal pelvis was made the second time.

He was discharged but presented again 3 weeks later, with severe right-sided colicky pain. He was placed on analgesics and request made for CT examination.

Non-enhanced abdominal computed tomography (CT) was later done and showed a calculus measuring 1.6 cm, with an HU of 772 in the right renal pelvis; however, the calyces were not dilated [Figures 3 and 4].

Patient opted to travel to overseas for further management.

## Discussion

In the recent years, many practices have adopted non-enhanced helical CT as the imaging modality of choice for rapid examination of patients suspected of having urolithiasis



**Figure 1:** Plain abdominal radiograph showing no obvious abnormality

but without the limitations of radiography, IVU, US, or nuclear medicine.<sup>[1]</sup> Non-enhanced CT can help identify calculi and their location, determine their size, and guide management.<sup>[1,2]</sup>

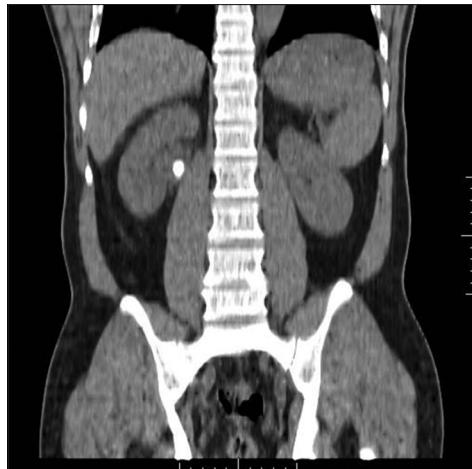
Despite availability of CT in most tertiary institution in Nigeria, due to relatively high cost, conventional radiography, IVU, and US still remain the main stay of imaging patients with suspected renal stone.

This patient had IVU twice and US twice, but the only positive finding was a dilated pelvis on IVU; the fact that the calyces were not dilated on both US and IVU, and ureters were also normal on IVU, a diagnosis of extrarenal pelvis was entertained.

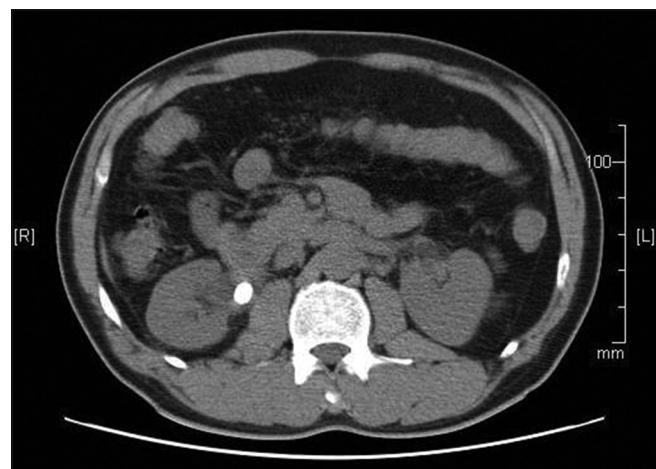
Often the pelvis is entirely intrarenal, but sometimes it appears to be outside the confines of the kidney, where it often has a distended appearance (the extrarenal pelvis). In the latter case, if the calyces can be shown to be normal, the distension can be assumed not to represent obstruction.<sup>[5]</sup>



**Figure 2:** Intravenous urogram showing a dilated right renal pelvis, with normal calyces



**Figure 3:** Non-contrast coronal computed tomography showing a renal calculus in the right pelvis, note that the calyces are not dilated



**Figure 4:** Non-contrast axial computed tomography image showing a right renal pelvic calculus, note that the calyces are not dilated

Care must be taken to differentiate a true UPJ obstruction from a large extrarenal pelvis. In the latter case, the renal pelvis may appear quite dilated; however, in the absence of caliectasis, the diagnosis of UPJ obstruction should not be entertained.<sup>[5-7]</sup> This may explain the reason why this case was misdiagnosed as extrarenal pelvis on two different occasions.

However, the finding of a moderate-sized right pelvic calculus on CT in this case report clearly highlights the superiority of CT as a diagnostic modality in suspected urolithiasis.

The high sensitivity of non-enhanced helical CT for urinary calculi is well established.<sup>[8]</sup> The reported sensitivity of unenhanced helical CT in evaluating patients with suspected renal colic is 97 to 98%, and the reported specificity is 96 to 100%.<sup>[8,9]</sup> Thus, this modality is viewed by many to be preferred for depicting renal colic and evaluating renal stone disease.<sup>[1,2,8]</sup>

The preliminary plain abdominal film (pre-IVU series) did not show any obvious abnormality; however, the Housefield unit (HU) of the stone which was 772 on CT would suggest a calcium rich stone, implying a radiopaque stone. Perhaps, it was missed on the plain film because of the overlying bowel gas on the right side and adjacent bony structures (the adjacent transverse process of the vertebrae body).

Non-enhanced CT enjoys clear advantages for evaluation of ureteral calculi that are often difficult to visualize with US or radiography because of overlying bowel gas and adjacent bone structures.<sup>[3]</sup>

CT is also superior to plain radiographs in this respect, as all urinary tract calculi, regardless of composition, can be identified by CT scan.<sup>[4]</sup> Levine *et al.*<sup>[10]</sup> also reported that many calculi detected at non-enhanced helical CT are missed at radiography.

When compared with those of intravenous urography, the benefits of non-enhanced CT include the following: High sensitivity for calculus detection and ability to depict non-urinary causes of acute flank pain.<sup>[1]</sup> Also, CT is performed without intravenous administration of contrast material and can therefore be performed in patients with a history of severely impaired renal function or of allergy to iodinated contrast material. The CT study can be performed rapidly, without the need for the delayed imaging required for IVU.<sup>[2,4]</sup>

The expected sign of obstruction (hydronephrosis and perirenal stranding) may be minimal or absent, because

renal stones may intermittently obstruct at the ureteropelvic junction or at the infundibulum-calyceal level causing pain and uroepithelial damage.<sup>[11]</sup> This may be a possible explanation for the intermittent nature of the pain in this patient and non-demonstration of hydronephrosis on all the imaging modalities.

In conclusion, patients with recurrent renal pain, with features of extrarenal pelvis on IVU, should be evaluated with CT.

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