



# Low-dose Pediatric CT Imaging Helps Detect Nutcracker Syndrome

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## Introduction

In cases of hematuria, a number of kidney conditions can cause the leakage of blood into the urine, including infection, injury, stones, cancer or other disease, and vascular compression disorder. Low dose CT enables a rapid evaluation of the kidneys and other abdominal organs and tissues while CT angiography provides visualization of the renal arteries.

## Patient history

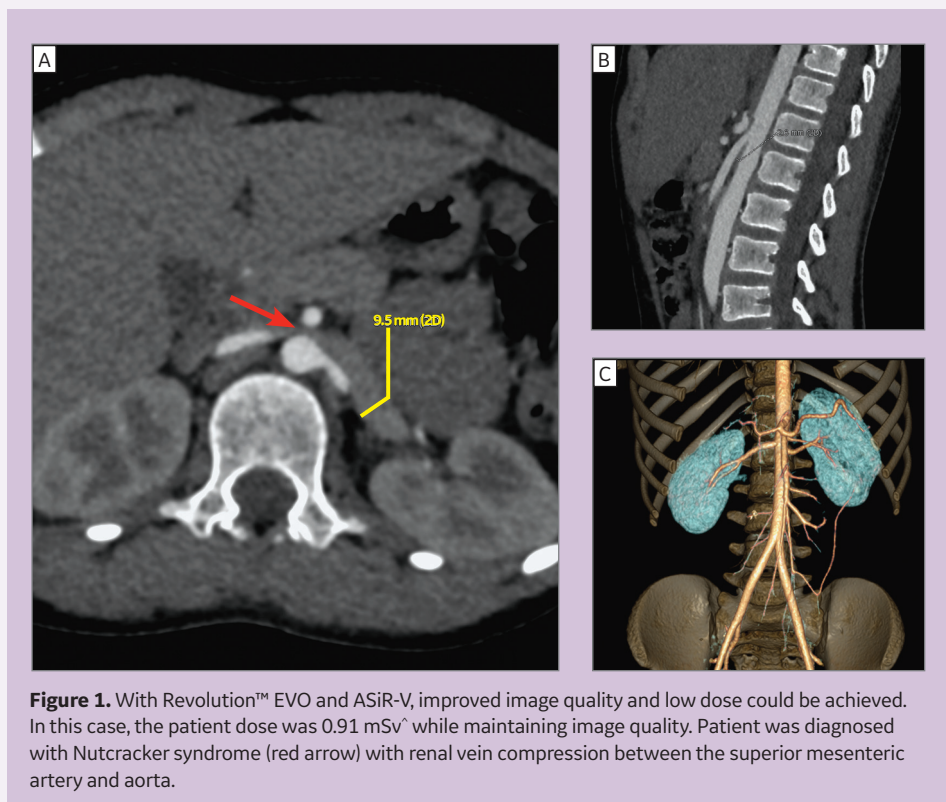
A 12-year-old patient with a chief complaint of “blood in urine.” After appropriate evaluations, the patient was referred to radiology for an abdominal CT angiography to determine if the etiology of hematuria is related to a vascular problem.

## Acquisition

kV: 100  
mA: 100  
Pitch: 0.958  
IV protocol: 30 ml @2.5 ml/sec  
ASiR-V: 70%  
DLP: 60.72 mGy.cm  
Effective dose: 0.91 mSv<sup>^</sup>

## Findings

Left renal vein compression between superior mesenteric artery and aorta was diagnosed. This clinical condition is called Nutcracker syndrome, resulting in increased intra renal pressure leading to hematuria from damaged micro vessels inside the kidney.



## Discussion

When it comes to pediatric patients, our main objective is to reach optimal image quality at the lowest possible dose with minimum contrast volume. ASiR-V™ reconstruction algorithm provides enhanced low-contrast detectability and low-dose routine imaging.\*‡ ■

\* Low contrast detectability (LCD), image noise, spatial resolution, and artifact were assessed using reference factory protocols comparing ASiR-V and FBP. The LCD measured in 0.625-mm slices and tested for both head and body modes using the MITA CT IQ Phantom (CCT183, The Phantom Laboratory), using model observer method.

‡ Image quality as defined by low contrast detectability. In clinical practice, the use of ASiR-V may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.

<sup>^</sup> Obtained with ICRP 10-year-old abdomen pelvis factor of 0.015 x DLP.

**Figure 1.** With Revolution™ EVO and ASiR-V, improved image quality and low dose could be achieved. In this case, the patient dose was 0.91 mSv<sup>^</sup> while maintaining image quality. Patient was diagnosed with Nutcracker syndrome (red arrow) with renal vein compression between the superior mesenteric artery and aorta.