



## THE DUAL COMPRESSION PUZZLE: SMA SYNDROME MEETS NUTCRACKER SYNDROME

### Radio-Diagnosis

**Dr. Darapaneni  
Chaitanya Kumar**

MBBS, Postgraduate, Department of Radiology, Narayana Medical College, Nellore.

**Dr. Rama Krishna  
Rao Baru**

MD, DNB, DMRD, Professor and HOD, Department of Radiology, Narayana Medical College, Nellore.

**Dr. Malgireddy  
Vinitha**

MBBS, Postgraduate, Department of Radiology, Narayana Medical College, Nellore.

**Dr. Ganesam**

**Venkata Sai Akhil  
Kalyan**

MBBS, Postgraduate, Department of Radiology, Narayana Medical College, Nellore.

### ABSTRACT

Superior Mesenteric Artery (SMA) syndrome also known as Wilkie syndrome, Cast syndrome, Aortomesenteric duodenal compression syndrome occurs when the angle between the superior mesenteric artery and the abdominal aorta is reduced, leading to compression of the third portion of the duodenum and resulting in bowel obstruction. Nutcracker syndrome, which shares a similar underlying mechanism, involves the compression of the left renal vein between these structures, causing venous congestion and backflow. We present a unique case highlighting the coexistence of these two syndromes, diagnosed via computed tomography (CT) and treated with conservative management.

### KEYWORDS

Superior mesenteric artery syndrome, Wilkie syndrome, Cast syndrome, Aortomesenteric duodenal compression syndrome, Nutcracker syndrome, vascular and visceral compression, SMA-Aorta angle, computed tomography, left renal vein, left gonadal vein, gastrointestinal obstruction, venous congestion, radiological diagnosis, multidisciplinary approach.

### INTRODUCTION

Superior mesenteric artery (SMA) syndrome is an uncommon disorder resulting from a reduced angle between the SMA and the abdominal aorta, which compresses the third portion of the duodenum, causing bowel obstruction (1,5).

Similarly, Nutcracker syndrome is a vascular compression disorder where the left renal vein is compressed between the SMA and the aorta, leading to venous congestion (1,2).

While these conditions share a similar underlying mechanism, their coexistence is exceedingly rare. Computed tomography (CT) plays a key role in their diagnosis (1,4)

### Case Presentation

A 45-year-old male presented with abdominal pain, indigestion, vomiting, and significant weight loss (approximately 15 kg). Contrast-enhanced CT revealed gross gastric and duodenal dilatation with gradual narrowing of the third part of the duodenum. Additionally, there was mild compression of the left renal vein between the SMA and the aorta, leading to a prominent proximal left renal vein and left gonadal vein in the scrotum. These findings confirmed the coexistence of SMA syndrome and Nutcracker phenomenon. The patient was referred to surgery and managed conservatively.

### Radiological Findings

Contrast-enhanced CT imaging demonstrated:

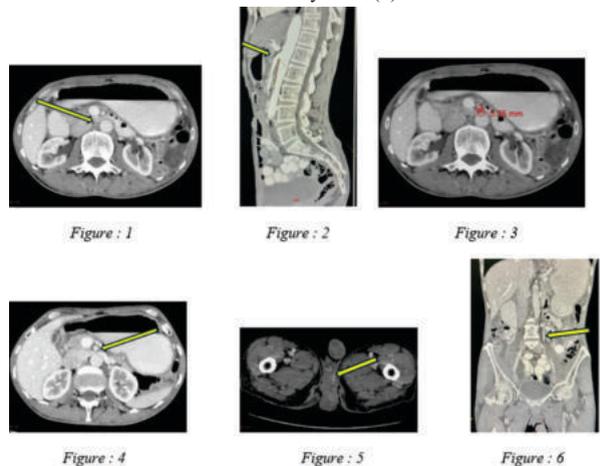
1. Gross dilatation of the stomach and proximal duodenum with narrowing of the third part of the duodenum. (figure: 1)
2. Decreased SMA-Aorta angle meas 15 degrees (normal : 28 – 65 degrees) and reduced distance meas 5.2mm (normal: 10 - 34 mm) between the SMA and the aorta. (figure: 2 & figure: 3)
3. Compression of left renal vein between superior mesenteric artery and the aorta resulting in prominent proximal left renal vein (figure: 4) and congestion of the left gonadal vein in the scrotum. (figure: 5 & figure:6)

These findings were diagnostic of both SMA syndrome and Nutcracker phenomenon.

### DISCUSSION

SMA syndrome and Nutcracker syndrome are rare vascular compression disorders that share a common anatomical and pathophysiological basis (1,2). The coexistence of these conditions, as

demonstrated in this case, underscores the importance of a comprehensive radiological evaluation in patients presenting with unexplained gastrointestinal and urological symptoms (3,5). CT imaging is pivotal for diagnosing these syndromes and guiding management strategies (3,4). Conservative treatment options include nutritional support and symptom management, while surgical intervention is reserved for refractory cases (4).



### CONCLUSION

The coexistence of SMA syndrome and Nutcracker syndrome should be considered in patients presenting with symptoms of vascular compression. CT imaging is invaluable in diagnosing these conditions and facilitating timely management. A multidisciplinary approach is essential for optimizing patient outcomes.

### Acknowledgments

We acknowledge the contributions of the surgical and radiology teams involved in the management of these cases.

### Conflict Of Interest

The authors declare no conflict of interest regarding this publication.

### Ethical Clearance

This study was conducted following ethical guidelines and received approval from the institutional review board.

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