Section: General Medicine

Case Report

# A RARE CLINICAL TRIAD: MEDIAN ARCUATE LIGAMENT SYNDROME, NUTCRACKER SYNDROME, AND GASTRIC VOLVULUS IN A YOUNG MALE

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ABSTRACT

This case report presents a diagnostically challenging and rare clinical triad in a 19-year-old male: Median Arcuate Ligament Syndrome (MALS), Nutcracker Syndrome (NCS), and suspected gastric volvulus. The patient presented with recurrent epigastric pain, vomiting, and upper gastrointestinal bleeding. Imaging studies revealed anatomical vascular compression involving the coeliac artery and left renal vein, along with endoscopic evidence of multiple gastric ulcers and gastric lumen deformity. Histopathology showed oxyntic gland hyperplasia without evidence of malignancy or *Helicobacter pylori*. Laboratory findings included neutrophilic leukocytosis. This constellation of findings underlines the need for a high index of suspicion and the use of advanced imaging in evaluating unexplained abdominal symptoms in young patients. The report emphasizes a multidisciplinary approach, incorporating radiology, gastroenterology, surgery, and pathology, for effective diagnosis and management. To our knowledge, this is one of the few documented instances reporting all three conditions concurrently, making it a valuable contribution to existing medical literature.

**Keywords:** MALS, NSC.

## INTRODUCTION

Vascular compression syndromes of the abdomen are rare and often under diagnosed causes of chronic abdominal pain and gastrointestinal symptoms in young individuals. Median Arcuate Ligament Syndrome (MALS) is characterized by external compression of the celiac artery by the median arcuate ligament of the diaphragm, leading to symptoms like postprandial abdominal pain, nausea, vomiting, and weight loss. Anatomical compression of the celiac artery is relatively common on imaging (seen in 10–24% of the general population), but symptomatic MALS is rare with an estimated prevalence of less than 0.5%.[1,2]

Nutcracker Syndrome (NCS) results from compression of the left renal vein between the abdominal aorta and the superior mesenteric artery. Though anatomical nutcracker phenomenon is relatively common, true symptomatic NCS is rare, with an estimated prevalence below 0.1%.[3] NCS often presents with hematuria, flank pain, and abdominal discomfort, especially in young adults.

Gastric volvulus, an abnormal rotation of the stomach along its axis, is an extremely rare clinical condition representing less than 0.01% of hospital admissions for abdominal pain [4]. It is more commonly seen in elderly patients due to diaphragmatic defects but is rarely reported in young adults, often secondary to anatomical abnormalities or predisposing factors.

To our knowledge, no cases have reported the coexistence of MALS, Nutcracker Syndrome, and gastric volvulus in a single patient. We report this unique clinical triad in a young male patient, emphasizing the diagnostic challenges and the need for comprehensive evaluation.

## CASE PRESENTATION

A 19-year-old male presented with a 10-day history of abdominal pain and recurrent vomiting. The abdominal pain was primarily epigastric, intermittent, moderate in intensity, aggravated by meals, and partially relieved by medications. Vomiting episodes were frequent, non-bilious, and associated with nausea. Five days prior to admission,

he developed hematemesis and melena, raising concern for upper gastrointestinal bleeding. There was no history of fever, chest pain, breathlessness, or urinary and bowel complaints. No significant weight loss or anorexia was reported.

**Examination**

**General condition:** Stable

**Vital signs:** BP 136/84 mmHg, PR 80 bpm, RR 18/min, afebrile, $SpO_2$ 99% on room air

**Per Abdomen:** Mild epigastric tenderness without guarding or rigidity

**Respiratory -** B/L nvbs , no added sounds

**Cardiovascular -** S1 S2 heard , no murmurs

Central Nervous System - E4 V5 M6

**Investigations**

****Upper GI Endoscopy and Imaging****

Ultrasound Abdomen (USG): Showed biliary echogenicity, mesenteric lymphadenopathy, mild splenomegaly

Upper GI Endoscopy: Revealed multiple gastric ulcers and mucosal erosions with lumen deformity suggestive of possible gastric volvulus

Contrast-enhanced CT (CECT) Abdomen: Demonstrated wall thickening of distal ileum, hepatomegaly, and findings consistent with Nutcracker Syndrome

CT Enterography: Confirmed Median Arcuate Ligament Syndrome with compression of the celiac artery, Nutcracker Syndrome, and diffuse gastrointestinal mucosal inflammation

Histopathology: Biopsy from gastric ulcers showed oxyntic gland hyperplasia with no evidence of malignancy or Helicobacter pylori infection.

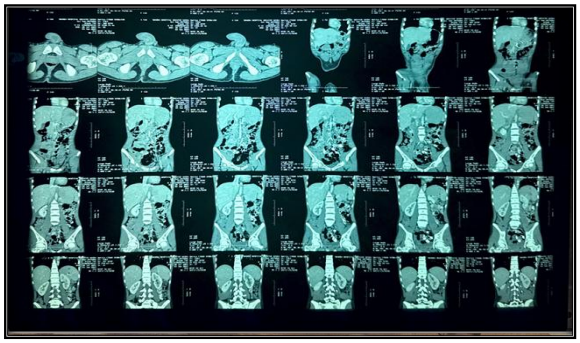

**Figure 1: Contrast Enhanced CT Scan Whole Abdomen Film**

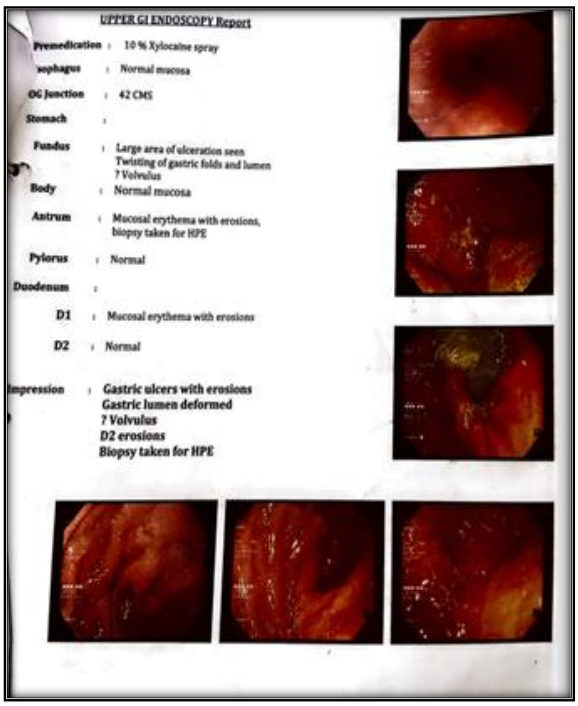


**Figure 2: Upper GI Endoscopy Report**

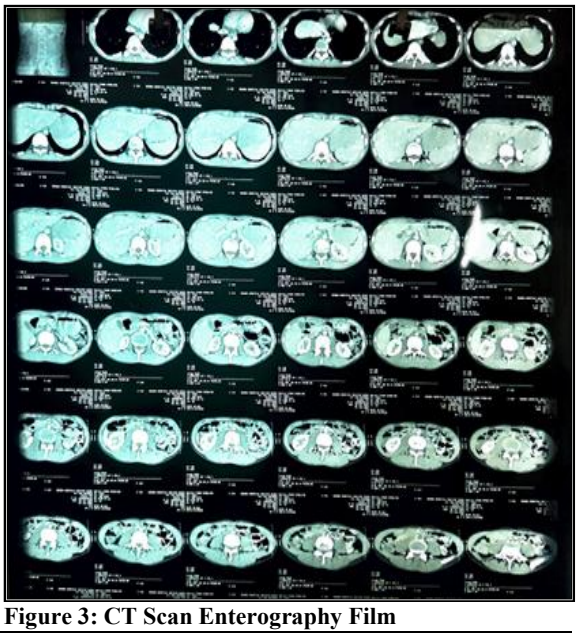

**Figure 3: CT Scan Enterography Film**

**Laboratory Investigations:** Investigation Summary

**Table 1**

| Investigation | 03/06/25 | 04/06/25 | 05/06/25 | 06/06/25 | 12/06/25 | Histopath |
|---|---|---|---|---|---|---|
| Amylase | 139 ↑ | - | - | - | - | - |
| Bleeding/Clotting Time | - | - | BT 2.30 min, CT 6.30 min | - | - | - |
| Blood Culture | - | No Growth | - | - | - | - |
| CBC | - | TLC 18.92 ↑, Neutro 80% ↑ | TLC 14.83 ↑, Neutro 80% ↑ | - | TLC 13.03 ↑, Neutro 81% ↑ | - |
| CBC + ESR | TLC 17.67 ↑, Neutrophils 90% ↑ | - | - | - | - | - |
| CRP | 10.53 mg/L ↑ | - | - | 5.19 mg/L | - | - |
| Dengue NS1/IgG/IgM | Negative | - | - | - | - | - |
| ESR | - | - | - | 12 mm/hr | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Electrolytes | Na+ 134 ↓, Cl– 93 ↓ | - | - | - | - | - |
| Gastric biopsy | - | - | - | - | - | Focal ulceration, no malignancy |
| HBsAg / Anti-HCV / HIV I & II | All Negative | - | - | - | - | - |
| LFT | Normal | - | Normal | - | - | - |
| Lipase | 44 | - | - | - | - | - |
| PT/INR | 18.2 sec / 1.32 | - | - | - | - | - |
| Procalcitonin | 0.09 ng/mL | - | - | - | - | - |
| RFT | Urea 29.2, Creat 0.7, Phos 5.7 ↑ | Urea 45.2 ↑, Phos 6.2 ↑, Na 130 ↓ | Urea 37.7, Phos 5.6 ↑, Na 132 ↓ | - | Urea 43.8 ↑, Phos 5.7 ↑, Na 136 ↓ | - |
| Urine Culture | - | No Growth | - | - | - | - |
| Urine R/M | Trace Protein, RBC 1-2 | - | - | - | - | - |

**Hospital Course:** The patient initially presented to the emergency department with complaints of recurrent vomiting, epigastric pain, and a recent history of hematemesis and melena. He was admitted for further evaluation and management. Preliminary ultrasound of the abdomen showed mesenteric lymphadenopathy, but no definitive pathology to explain the bleeding or persistent symptoms.

In view of the gastrointestinal bleeding, an upper GI endoscopy was performed which revealed multiple gastric ulcers with mucosal erosions, deformity of the gastric lumen, and a possible gastric volvulus. Empirical intravenous antibiotics and proton pump inhibitors (PPIs), along with mucosal protectants, were initiated.

A contrast-enhanced CT (CECT) scan of the whole abdomen was subsequently ordered for further evaluation. It revealed distal ileal wall thickening and findings consistent with Nutcracker Syndrome. Given the diagnostic dilemma between enteric fever and abdominal tuberculosis — especially since typhoid serology was negative — a Mantoux test was also performed. Pending results, the patient was started on empirical treatment for enteric fever.

Despite therapy, the patient continued to report persistent dull aching abdominal pain. For better characterization of gastrointestinal pathology, a CT enterography was performed, which revealed compression of the celiac artery (consistent with Median Arcuate Ligament Syndrome), along with Nutcracker Syndrome and features of gastric lumen deformity. These findings confirmed the coexistence of abdominal vascular compression syndromes.

Given the complexity and rarity of this combination — MALS, NCS, and suspected gastric volvulus — and in view of the persistence of symptoms, the patient was referred to a specialized gastrointestinal surgery center for further evaluation and definitive management. Referral also included assessment for any associated large bowel pathology and surgical planning for the vascular compression syndromes.

Patient underwent MALS release surgery and was symptomatically better. Patient is currently under our follow up.

**Diagnosis:** Symptomatic Median Arcuate Ligament Syndrome (MALS) with
Nutcracker Syndrome (NCS) with
? Gastric Volvulus with
Gastric ulcers

**Treatment:** Intravenous antibiotics, Intravenous proton pump inhibitor, Multi Vitamins, Mucosal protectant, Laxative, Antispasmodic, Analgesic and Supportive and symptomatic care was provided. Gastroenterology consultation was obtained, and the patient was referred to a tertiary care center for advanced gastro-surgical management. After MALS Release patient is symptomatically better and is currently on supportive measures.

## DISCUSSION

This case highlights an extremely rare clinical triad of Median Arcuate Ligament Syndrome (MALS), Nutcracker Syndrome (NCS), and suspected gastric volvulus in a young adult male.

**Incidence and Prevalence:**

Anatomical compression of the celiac artery by the median arcuate ligament is seen in 10–24% of the population; however, symptomatic MALS is rare, with prevalence less than 0.5%.[1,2]

Nutcracker Syndrome, caused by left renal vein compression, has an estimated prevalence below 0.1%.[3]

Gastric volvulus is an extremely rare condition, accounting for less than 0.01% of hospital admissions for abdominal pain.[4]

While individual cases of MALS and NCS have been reported, their coexistence is rare, and the addition of gastric volvulus has not been previously documented to our knowledge. The vascular compressions likely contributed to compromised blood flow, gastrointestinal mucosal ischemia, and motility disturbances, precipitating gastric ulcers, mucosal erosions, and possibly the gastric volvulus.

The diagnostic challenge in this case stemmed from the overlapping and nonspecific symptoms including abdominal pain, vomiting, and gastrointestinal bleeding. Advanced imaging techniques such as CT angiography and enterography were critical for identifying the vascular compressions and anatomical abnormalities. Endoscopic findings of ulcers and deformity of the gastric lumen raised

suspicion for volvulus, necessitating multidisciplinary management involving gastroenterology, radiology, and surgery.

This case emphasizes that young patients with unexplained chronic abdominal pain and upper GI bleeding should be evaluated for rare vascular compression syndromes. Timely diagnosis followed by appropriate surgical or endovascular intervention can significantly improve outcomes.

## CONCLUSION

We present a rare and unique clinical triad of Median Arcuate Ligament Syndrome, Nutcracker Syndrome, and gastric volvulus in a young male. Individually, these conditions are rare, and their coexistence presents a diagnostic and therapeutic challenge. Early recognition using advanced imaging modalities and a multidisciplinary approach is essential for accurate diagnosis and to guide surgical management. Awareness of such rare associations is important for clinicians evaluating unexplained abdominal symptoms in young adults.

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