



CASE REPORT

## Open Appendectomy for Left Sided Acute Appendicitis in a Young Patient with Situs Inversus Totalis.

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**ABSTRACT...** Primary appendicitis presenting in left side is uncommon. Diagnosis is dependent on index of suspicion which is high. We present to you a case of left-sided appendicitis. Appendix was visualized as a long, tubular, edematous, inflamed structure in left lower quadrant with the whole of the colon present in the same region. Computed tomography is useful in providing accurate diagnosis of acute appendicitis and in detecting rotational abnormalities.

**Key words:** Appendicitis, Appendectomy, Situs Inversus.

### INTRODUCTION

Situs inversus totalis, a global defect of sinus orientation is a congenital abnormality characterized by transposition of abdominal and thoracic organs, as a mirror image.<sup>1</sup> Any failure in normal left to right laterality which is established early on during fetal development, leads to a spectrum of disturbances. Several genetic abnormalities and over a hundred genes have been identified to play a role in this. This is a rare condition which even the most experienced surgeons and clinicians encounter once or twice during their entire life. This condition may cause problems in diagnostics as well as therapeutics. The diagnosis of situs inversus is important in emergency situations. There are several advanced modalities in imaging for example computer tomography (CT scan) and magnetic resonance imaging (MRI) which may be used to diagnose and plan management of different diseases in these special circumstances especially helping in assessing fine anatomical details.

This anomaly was first described in animals by Aristotle in BC. 384-322. First observations in humans were not made till 1600s. The first case

reported is of liver and spleen reversal. Later, dextrocardia was reported in two cases from University of Paris.<sup>2</sup> The term situs viscerum transversus was given to pictorial illustrations by Küchenmeister who observed four different cases and performed detailed physical examinations on them.<sup>2</sup> Vehsemeyer is credited for demonstration of situs transversus on x-rays.<sup>3</sup>

Acute appendicitis is one of the most common reasons of emergency room admissions and non-traumatic emergency abdominal surgery, worldwide. The disease does not show any gender predominance; however, it is more common in the age group 20 to 30 years.<sup>4</sup> An effective diagnosis is established based on history, physical examination and investigations.<sup>5</sup> Situs inversus totalis complicates the diagnosis and management of acute appendicitis but its early detection is essential as immediate surgical intervention is often required.

### CASE REPORT

A 17-year-old male patient with no co-morbidities and no previous surgical history, presented to the emergency department with complaint of pain

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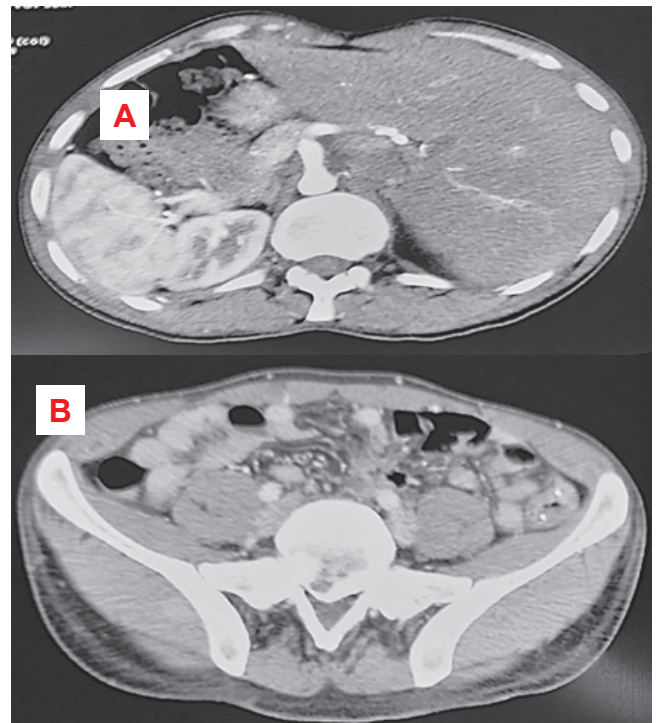
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in the left iliac fossa for 1 day associated with nausea. There was one episode of non-bilious, non-foul smelling, non-projectile vomiting. There was no complaint of diarrhea, fever, chills or any urinary symptoms for example dysuria, urgency or frequency. On examination, his pulse rate was 110 beats per minute, temperature of 37°C and respiratory rate of 20 breaths per minute. Physical examination showed guarding in lower abdomen, tenderness on deep palpation in the left iliac fossa and rebound tenderness in the same. Psoas sign and obturator sign were negative. Digital rectal examination was unremarkable. Bowel sounds were sluggish. Laboratory values showed hemoglobin of 11 g/dL and white cell count of 16,000 cells/mm<sup>3</sup> with 71% neutrophils. Rest of the baseline tests were normal. Ultrasound abdomen showed no signs of acute appendicitis in right iliac fossa but probe tenderness and streak of fluid in the left iliac fossa. Radiograph abdomen supine showed mild distention of gut loops in the left hemiabdomen and calcific density in left lower quadrant. An abdominal contrast enhanced CT scan was advised to confirm diagnosis and it revealed an enhancing structure in left lower quadrant with two calcific densities (appendicoliths) in lumen and fat stranding in peri-colic region. Free fluid also noticed in the cul-de-sac. Diagnosis of left sided appendicitis was made. Additionally, the diagnosis of situs inversus totalis was also made with note of all major abdominal viscera located in opposite (mirror image) locations.

Patient was prepared for surgery, and he underwent open appendectomy via left iliac fossa approach on 11<sup>th</sup> October 2022. An inflamed, gangrenous appendix was found with minimal reactionary fluid. Rest of the bowel was normal.

Patient was shifted to ward for post-operative care, and he had an uneventful stay for two days after which he was discharged. He was seen in the outpatient department on tenth post-operative day for stitches removal.



**Figure-1.** Contrast enhanced CT scan showing A. liver on the left side and spleen on the right B left lower quadrant containing a round calcific density.



**Figure-2.** Intra-operative findings of thick walled, edematous, inflamed, gangrenous appendix.



**Figure-3.** Post-operative picture of patient's abdomen showing left iliac fossa incision after stitches removal.

## DISCUSSION

Appendix can be left-sided, and in order of frequency they are different causes for it; visceral transposition (situs inversus), intestinal malrotation, wandering cecum with a long mesentery, and appendage of excessive length, crossing the midline. For reasons of the present case, we will focus on the first cause; situs inversus.

Situs inversus is a rare condition caused by an autosomal recessive gene with incomplete penetrance, occurring in 1/10,000 to 1/35,000 live births.<sup>6</sup> This condition can be complete or partial; when both the thoracic and abdominal organs are transposed, or when only one of these cavities is affected, respectively.

The incidence of situs inversus totalis reported varies from 0.001 to 0.01% in the general population; however, the incidence of acute appendicitis with situs inversus totalis is reported between 0.016 and 0.024%.<sup>5,6</sup> According to case reports of acute appendicitis in situs inversus occurs between 8 and 63 years of age and is 1.5 times more frequent in men. The World Journal of Gastroenterology published a systemic review whereby it was found that the average age was  $29.3 \pm 16.1$  years, and the male-female ratio was 1.5:1.<sup>6</sup>

Acute appendicitis in situs inversus is a diagnostic dilemma due to the abnormal position of the appendix. Although the viscera are transposed, the nervous system may not always show the corresponding transposition, which results in confusion of signs and symptoms as in about 18.4% to 31% of patients with situs inversus, the pain has been reported in the right lower quadrant with left sided appendicitis.<sup>6</sup>

In general, the diagnosis of surgical diseases in these patients is delayed due to low clinical suspicion, so these patients are usually diagnosed in advanced stages of the disease. Diagnosis of acute appendicitis in situs inversus is generally intraoperative motivated by the clinical picture of acute abdomen. In some cases, the imaging diagnosis evidenced by contrast-enhanced

abdominal CT scan is documented, and in some population groups where tomography is contraindicated, another option is MRI whereby pre-operative diagnosis of left-sided appendix is made and surgery including the incision is planned.<sup>6</sup>

## CONCLUSION

It is extremely important to know the different existing differential diagnoses of acute abdominal pain in the lower right quadrant, since many of these pathologies can cause referred pain with completely different clinical presentation and surgical findings, at the time of performing the operative approach.

Acute left appendicitis, as a rare pathology, should not be underestimated. The aetiology of acute abdomen, its diagnosis and possible treatment should not be delayed avoiding further complications in this small population group. There are obvious shortcomings in our health system as well as the non-availability of diagnostic aids and minimally invasive or laparoscopic equipment, clinical suspicion should not be delayed, especially for this entity, and the surgical approach should be executed according to the expertise available.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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#### AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Hafiz Muhammad Sufyan	Data collection, patients manuscript.	
3	Arif Javaid	Operating surgeon, proof reading.	