

# INTUSSUSCEPTION IN ADULTS – A NOVEL POINT-OF-CARE ULTRASOUND GUIDED DIAGNOSIS IN THE EMERGENCY DEPARTMENT

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## Abstract

*Introduction:* Intussusception of the bowel is defined as the telescoping of a proximal segment of the gastrointestinal tract within the lumen of the adjacent segment. This condition is frequent in children and presents with the classic triad of cramping abdominal pain, bloody diarrhoea and a palpable tender mass. However, bowel intussusception in adults is considered a rare condition, accounting for 5% of all cases of intussusceptions and almost 1%-5% of bowel obstruction. *Case Presentation:* We present a case of a 36 -year-old male who presented to the Emergency Department with complaints of pain per abdomen, localised in the periumbilical region, spasmodic and intermittent in nature for 10 days. It was associated with constipation, obstipation and abdominal distension, with the patient having passed stool and flatus 3 days prior presentation. History of similar complaints in the past one year was noted in the patient. *Discussion:* Delayed diagnosis of intestinal intussusception can lead to intestinal ischemia leading to gangrene. The current standard of care is radiology-performed diagnostic ultrasound, but recently published studies using Point-of-Care Ultrasound (POCUS) demonstrate similar accuracy. *Conclusion:* Adult intussusception is not a common condition and can be difficult to diagnose. An adult patient presenting to the emergency department with non-specific abdominal pain with associated features of vomiting and unable to pass stool and flatus warrants a suspicion of intestinal intussusception. The use of point-of-care ultrasound in the emergency department may help in quicker diagnosis and lesser wait time, thus resulting in fewer life-threatening complications.

**Keywords:** Intussusception, Adults, Point-of-Care Ultrasound.

## INTRODUCTION

Intussusception of the bowel is defined as the telescoping of a proximal segment of the gastrointestinal tract within the lumen of the adjacent segment. This condition is frequent in children and presents with the classic triad of cramping abdominal pain, bloody diarrhoea and a palpable tender mass. However, bowel intussusception in adults is considered a rare condition, accounting for 5% of all cases of intussusceptions and almost 1%-5% of bowel obstruction <sup>[1]</sup>.

Delayed diagnosis can lead to intestinal ischemia leading to gangrene. The current standard of care is radiology-performed diagnostic ultrasound, but recently published studies using Point-of-Care Ultrasound (POCUS) demonstrate similar accuracy and lesser wait-time in diagnosis.

## CASE PRESENTATION

We present a case of a 36 -year-old male who presented to the Emergency Department with complaints of pain per abdomen, localised in the periumbilical region, spasmodic and intermittent in nature for 10 days. It was associated with constipation, obstipation and abdominal distension, with the patient having passed stool and flatus

3 days ago. He also complained of multiple episodes of bilious vomiting, especially after any food/ intake over the last 3 days. He gives history of low-grade intermittent fever for 1 week. No history of trauma, yellowish discoloration or urinary complaints. On primary survey, his airway was patent, respiratory rate was 22 breaths per minute with an oxygen saturation of 84% on room air.

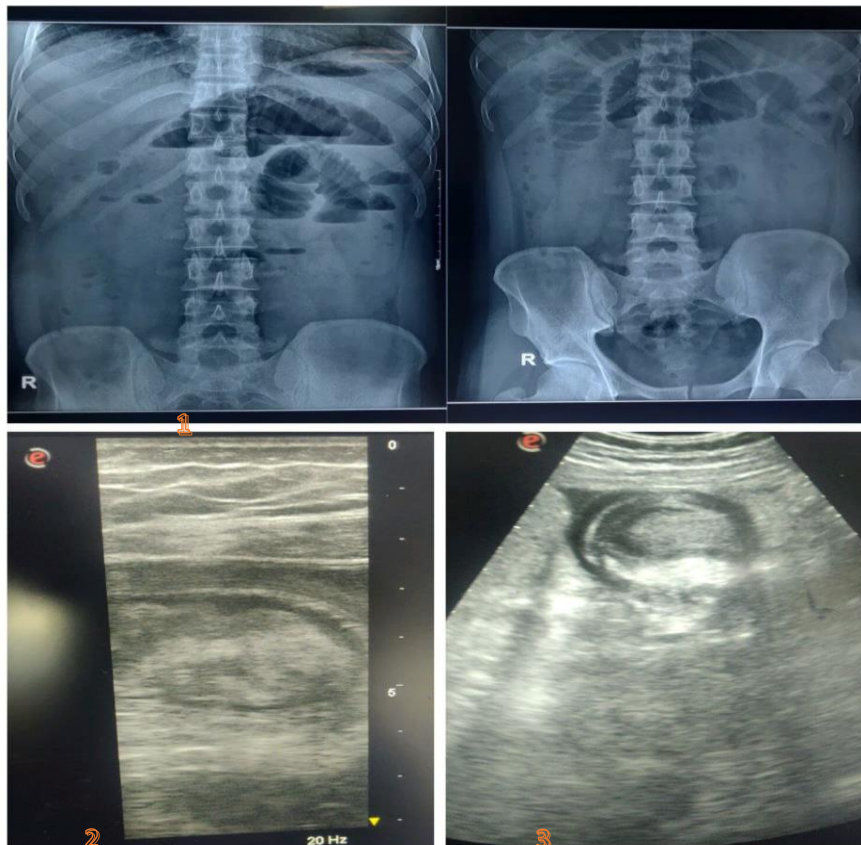
Air entry was equal bilaterally. Heart rate was 110 beats per minute with a blood pressure of 90/64 mm Hg. GCS was E4V5M6, pupils bilaterally equal and reactive. Temperature was 102F. Pain score was 8/10 on the Visual Analogue Scale. As adjuncts to Primary Survey, two 18G IV cannula were secured and started on IV Fluids, oxygen supplementation via face mask at 6 litres per minute was given, and sample was sent for an arterial blood gas analysis.

Intravenous analgesics with PPI and anti-emetic was given for patient's severe pain. Secondary survey revealed a firm abdomen with tenderness in the periumbilical region. Bowel sounds were absent on auscultation. Other systemic examination was within normal limits.

Patient gives history of previous episode of the similar complaints in the past year, which was relieved with medications and did not require any surgical intervention. Patient is an occasional alcoholic, has no comorbidities and no ongoing medication history. Point-of-care Ultrasound (POCUS) was done in the Emergency Department which was suggestive of Target Sign/ Donut Sign in the right lower quadrant on transverse section and Pitchfork Sign along the longitudinal axis as depicted in *Figures [1], [2] and [3]*. Furthermore, it also revealed distended bowel loops with to-and-fro motion of bowel contents suggestive of impaired peristalsis in bilateral para-umbilical regions.

A provisional diagnosis of Subacute Intestinal Obstruction due to Intussusception was made on the basis of emergency point-of-care sonography findings. X-Ray Abdomen – erect and supine views were suggestive of multiple air-fluid levels with no gas under the diaphragm. Radiography findings coinciding with POCUS findings raised the suspicion more in favour of intussusception.

Blood gas analysis was suggestive of metabolic acidosis with lactate levels measuring 4.8 mmol/L. Laboratory findings showed that haemoglobin - 10 g/dl, white blood cell count - 17824 / $\mu$ l, platelet count of 3.5 lac/  $\mu$ l. Liver Function Test was within normal limits and Renal Function Test revealed a serum creatinine levels of 2.1mg/ dL. Serum amylase and lipase levels were slightly elevated. Nasogastric tube and Foley's catheterization were done. Patient was initiated on IV antibiotics – Inj. Piperacillin-Tazobactam with Inj. Metronidazole. Patient was taken for emergency exploratory laparotomy under general anaesthesia and planned for resection with ileo-ileal anastomosis with loop ileostomy on the basis of intra-operative findings of long segment of gangrenous small bowel.



**Figure [1]: X-Ray Abdomen Erect and Supine Suggestive of Multiple Air-fluid Levels Suggestive of Intestinal Obstruction.**

**Figure [2]: Pitchfork Sign on Point-of-Care ultrasound in the Longitudinal Axis**

**Figure [3]: Donut Sign/ Target Sign on point-of-care Ultrasound in the Transverse Axis**

## DISCUSSION

Adult intussusception is a rare entity in patients presenting with acute abdomen and is not commonly considered among the top differential diagnoses in bowel obstruction unless proven with imaging. It usually is secondary to another pathology, mostly a malignant or benign mass or can be due to another primary bowel wall pathology such as Crohn's disease. Around 65 % of cases are caused by neoplasms. Although paediatric intussusception can present as a triad of abdominal pain, bloody diarrhoea and abdominal mass, adult intussusception presents with vague abdominal symptoms. Thus, the diagnosis of adult intussusception can be delayed as a result of the non-specificity of symptoms [2][3]. However, it has been suggested that adult intussusception often manifests as chronic intermittent cramping abdominal pain associated with nonspecific signs of bowel obstruction which applies to this patient. While the symptoms and signs of a patient with intussusception are non-specific, Wang et al. have reported that intussusception presents with subacute (24.4 %) or chronic (51.2 %) history [4]. The patient described in the said case also presented to us with chronic complaints for one year.

Ultrasonography is often used to evaluate suspected intussusception as it is cheap, readily available, and non-invasive and is the first-line diagnostic test of choice when evaluating children for intussusception given its high accuracy and lack of harmful radiations.

The classic features include the “target and doughnut sign” on transverse view and the “pseudo-kidney and pitchfork sign” in longitudinal view. Radiology-performed ultrasound has been shown to have excellent test characteristics, with high sensitivity (98%) and specificity (98%) and is far superior to abdominal plain radiography in accurately evaluating children for intussusception [11].

As far as adults are concerned, the preoperative diagnostic accuracy of ultrasonography is 78.5%. In cases of palpable abdominal mass, the diagnostic accuracy of ultrasonography is even better 86.6% [5]. However, a radiology performed ultrasound requires a capable radiologist which may not be feasible in resource limited settings. Delay due to limited access may lead to increased morbidity and mortality [6]. In the said case, intussusception if not diagnosed and managed early can lead to life threatening complications such as intestinal gangrene, necrosis, perforation and death.

To reduce the risk of these complications, early diagnosis of intussusception in emergency departments would be crucial particularly in medical centres with no access to experienced paediatric radiologist and trained ultrasonologists in general. In a prospective study by Rierra et al, it was seen that ultrasonography and particularly POCUS can improve resource utilization by reducing time to diagnosis and prioritize the management of patients by providing early definitive treatment [7] [10].

In a study conducted by Bergmann et al, the diagnostic accuracy of point-of-care ultrasound was 97.7% compared to 99.3% for radiology performed ultrasound in clinically important intussusceptions in the paediatric population with a sensitivity of 96.6% and specificity of 98% [8]. This is good evidence to commit to the fact that bedside ultrasound may be non-inferior to that of radiology performed ultrasound. This is well supported by the findings of Rahmani et al in a meta-analysis conducted in 2023 [9].

All said and done, there is lacking evidence regarding the utility of point-of-care ultrasound usage for adults presenting with intussusception in the emergency department, given the rarity of the case. This case highlights the need for point-of-care ultrasound in adults presenting to the emergency department with non-specific chronic abdominal symptoms and suspected intestinal obstruction. It can help in rapid diagnosis and prevent delay in definitive management, thereby curbing complications.

## CONCLUSION

Intussusception should not be ruled out as a diagnosis in adults presenting with chronic abdominal pain. Suspicion of obstruction with or without features of peritonitis in the emergency department should warrant a screening of the abdomen with emergency physician performed point-of-care ultrasound. Diagnostic accuracy of POCUS for the detection of intussusception is non-inferior to radiology performed ultrasound and hence, can guide in providing definitive treatment to patients without delay in diagnosis and furthermore prevent morbidity and mortality.

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