ISSN 2563-7142

CASE REPORT

# Intussusception: Lab Report and Review of Literature

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**Ochieng J J. Intussusception: Lab Report and Review of Literature. Int J Cadaver Stud Ant Var. 2022;3(2):43-48.**

## Abstract

**Objective:** Intussusception is the invagination of a proximal portion of the gastrointestinal tract into an adjacent distal portion. This unusual form of bowel obstruction occurs less frequently in adults. We report a case of small bowel intussusception in a 39-year-old African male cadaver in the cadaveric laboratory in the, Department of Human Anatomy at Uzima University. We have also performed a literature review of this rare condition.

**Method:** Student cadaver groups at Uzima University were assigned with a ratio of 8:1 meaning that eight students received one cadaver to work on. There were a total of nine cadavers. One out of the nine assigned specimens had a lead point in the ileocecal valve resulting in ileocecal intussusception upon dissection.

**Results:** At the ileocecal junction, an intussuscepted distal small bowel was discovered. We concluded it to be an ileocecal intussusception.

**Conclusion:** The rarity of intussusception in adults makes it an exceptional finding in standard anatomy laboratory. Intussusception can occur anywhere in the gastrointestinal tract. Surgeons should consider intussusception as a severe cause of intestinal obstruction and consequently, anticipate different clinical presentations. Diagnosis of intussusception is difficult to make without surgery, therefore, surgeons need to familiarize themselves with different imaging modalities.

**Key Words:** *Intussusception; Intussusceptum; Intussuscipiens; Small bowel; Infant; Adult; Diagnosis; Surgery*

## Introduction

Intussusception is the invagination of one portion of the intestines into an immediately adjacent portion [1,2]. It is the most common form of intestinal obstruction in infants. Intussusception represents the most common abdominal emergency in infancy with significant morbidity [2-4]. In children between three months and six years, it is the most common cause of intestinal obstruction worldwide [2-4]. In these pediatric individuals, the cases are usually idiopathic with the causative factors ranging from anatomic features of the organogenesis of gastrointestinal (GI) tract to underlying pathology for example, hyperplasia of lymphoid tissue in the distal ileum, which causes ileocolic (ileileolic or ileocecal) invagination [5]. Rotavirus vaccine

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*Received: August 27, 2022, Accepted: September 21, 2022, Published: October 29, 2022*

has been implicated among the etiology and this has been validated in literature as having a small increased risk [6].

In adults, intussusception is rare and it is typically considered multifactorial. Studies have, however, determined certain non-idiopathic factors that tend to predispose an individual to intussusception, including postoperative surgery and infection influences [7]. The clinical scenario of intussusception remains only partially understood, which is why its diagnosis relies on clinical suspicion in patients presenting with a classic triad of vomiting, abdominal pain, and bloody stools [8]. Delayed presentation of intussusception patients (> 48 hours after onset of symptoms) has led to increased morbidity and mortality [9]. In the new age, medicine intussusception usually can be preoperatively diagnosed and treated with success.

## Case Report

A 39-year-old male, African cadaver, with unknown cause of death, was acquired by the Faculty of Medicine at Uzima University for cadaveric dissection by undergraduate second year medical gross anatomy course in accordance with the Anatomy Act Cap 249, Republic of Kenya. All ethical matters were considered in drafting this case report. The identity, privacy and permission regarding the specimen were all maintained. The cadaveric specimen had an exposed femoral vessel used for primary trans-arterial perfusion by government mortuaries. Besides that, the cadaver did not present any other signs of surgical history. The postmortem report obtained from the hospital had indicated that the cadaver was a 39-year-old male of an average height and weight. Following secondary embalming, the specimen was carefully prosected in the cadaveric classroom space in order to expose the abdominal organs. We noted invagination of the distal segment of the ileum into the adjacent distal segment; the cecum (Figures 1 and 2).

**Figure 1)** *Photograph showing a section of intussuscepted small bowel.*

**Figure 2)** *Photograph showing exterior of ileocecal junction having undergone Ileocecal intussusception without reduction.*

## Discussion

The preferred localizations of intussusception are the junctions between segments that are freely mobile and are retroperitoneal. Additionally, segments that are fixed by adhesions can be a potential site for intussusception. The entry of intussusceptum into intussuscipiens, carries the mesentery forward, entrapping it between the overlapping layers of bowel and leading to stretching (Figure 3). Consequently, the vessels become compressed resulting in edema of the bowel with eventual ischemia [10]. Donhauser & Kelly (1950) conducted a series of 665 cases and recorded the different types of intussusceptions (Table 1) [11]. Double intussusceptions have

been reported to occur at times. They are often categorized as being retrograde type (Figure 4). Usually after progressing for a certain distance, direct intussusception stops at that point. Instead of passing onwards, it passes backwards into the proximal bowel. Some authorities suggest that retrograde intussusceptions are formed by the meeting of two intussusceptions, one being direct and another retrograde, the direct passing for a short distance into retrograde [12,13].

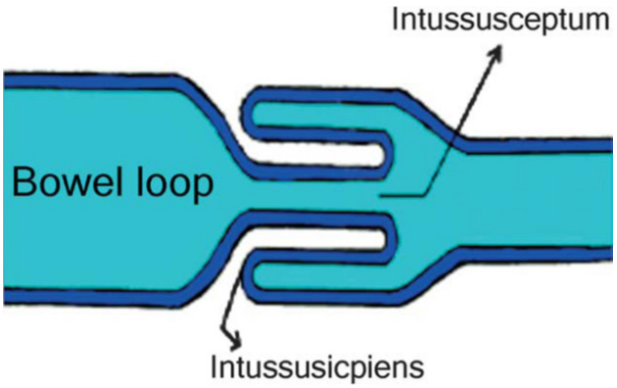


**Figure 3)** *An illustration of the outer receiving segment of the intussuscipiens and the inner segment of the intussusceptum (Byrne et al., 2005)*

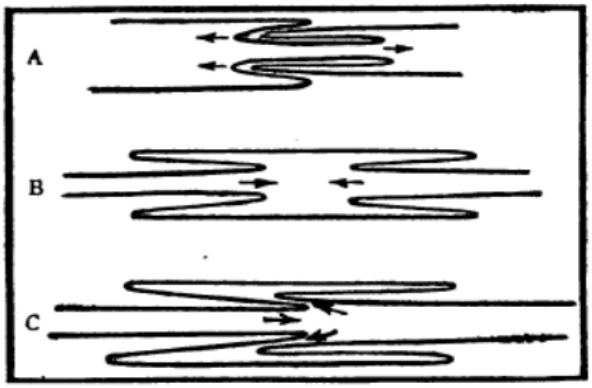


**Figure 4)** *A. Direct intussusception (to the right) passes in a retrograde direction and becomes a double intussusception B. Multiple intussusceptions, one direct, the other retrograde. C. Double intussusception formed by the meeting of the two varieties shown in B. The retrograde has included portion of direct (Hipsley, 1996).*

**TABLE 1**
**Types of Intussusceptions**

| | |
|---|---|
| Gastroduodenal | 36 |
| Gastroduodenojejunal | 1 |
| Pyloropyloric | 1 |
| Gastropyloric | 1 |
| Jejunogastric | 29 |
| Duodenoduodenal | 4 |
| Duodenojejunal | 3 |
| Jejunojejunal | 53 |
| Jejuno-ileal | 4 |
| Ileojejunal | 1 |
| Appendico-appendiceal | 8 |
| Appendicocecal | 20 |
| Appendicocecocolic | 4 |
| Appendico-ileo-colic | 3 |
| IIeo-appendico-cecal | 2 |
| Ileo-appendico-colic | 1 |
| Ileocecocolic | 1 |
| IIeocecal | 95 |
| IIeo-ileal | 205 |
| Ileocolic | 82 |
| Colocolic | 55 |
| Cecocoli | 25 |
| Cecal | 1 |
| Small intestine | 2 |
| Sigmoidosigmoidal | 11 |
| Sigmoidorectal | 14 |
| Colorectal | 5 |
| Epiploicosigmoidal | 1 |

(Donhauser, 1950)

Intussusception can be categorized based on its location (i.e. small bowel (enteric) or colon), or according to the underlying cause (i.e. neoplastic or idiopathic). Benign lesions have been identified to be the most common cause of intussusception in the small intestine. Idiopathic intussusception accounts for about 20%, and malignant lesions causing intussusception account for 15% of the cases [14,15]. As for the large bowel, malignant lesions causing intussusception account for 50-60% of the cases, a reflection of a higher frequency of malignant tumor relative to small intestine. It is for this reasons that large bowel has to be

resected without reduction because pathology is mostly malignant and may disseminate in cases of reduction [16]. Benign lesions on the other hand constitute 30% and idiopathic intussusception occurs less frequently compared to small intestine. These masses are usually pulled forward by normal peristalsis, with resultant telescoping of the involved wall. Acquired immunodeficiency syndrome (AIDS) has been liked to variety of the neoplastic masses. Intussusception, should therefore, be included in the differential diagnosis of patients presenting with prolonged abdominal pain. In certain incidences where a mass is not involved (e.g. celiac disease caused by toxic gluten), the loss of normal tone in the small bowel causes it to become flaccid and dilated resulting in loops that are more prone to non-obstructing intussusception [17]. Postoperative period has been reported also to increase the frequency of intussusception due to resulting oedema [18]. Other factors that tend to contribute to the pathophysiology of intussusception were categorized by Cera in Table 2. Intussusception leads to venous compression and bowel wall edema. If not diagnosed and managed early, arterial obstruction may ensue, causing bowel necrosis, perforation, and eventual death [19].

**TABLE 2**

**Factors that contribute to the pathophysiology of intussusception**

| **Pediatric Intussusception: Predisposing Factors** | **Causes of Adult Intestinal Intussusception (Nonidiopathic)** |
|---|---|
| **Anatomic** | **Enteric benign** |
| Anatomic variations during gastrointestinal tract organogenesis | Adhesions |
| Appendix | Glandular cancer (adenoma) |
| Enteritis | Invasive instruments e.g. Cantor tubes |
| Intestinal duplication | Celiac disease |
| Enlarged Peyer's patches | Inflammatory disease of the bowel (Chron's) |
| Lipomas | TB |
| Lymphomas involving lymph vessels | Inflammation of endometrium |
| Leiomyosarcoma | Malignant stromal tumor |
| Meckel's diverticulum | Meckel's diverticulum |
| **Associated infections** | Blood vessel tumor (Hemangioma) |
| Adenovirus | Inflammatory polyp |
| Rotavirus | AIDS associated illnesses (Kaposi's) |
| Intestinal Parasites | Lipoma |
| **Bleeding disorders** | Neurofibroma |
| Hemophilia | Submucosal hemorrhages |
| Malignant division of leukocytes | **Enteric malignant** |
| **Associated disease processes** | Adenocarcinoma |
| Neuronal intestinal dysplasia | Carcinoid tumor |
| Celiac disease | Metastatic carcinoma |
| Cystic fibrosis | Leiomyosarcoma |
| **Certain vaccines** | Lymphoma |
| | Neuroendocrine tumor |
| | **Colonic benign** |
| | Adenoma |
| | Lipoma |
| | **Colonic malignant** |
| | Adenocarcinoma |
| | Lymphoma |
| | Sarcoma |

(Cera, 2008)

The pattern of prevalence of intussusception has been seen to vary across Africa. Mbuwayesango (1997) reported a frequency of 75% of infants in Zimbabwe. As for gender variation, Garrido (1992) reported a slight male preponderance among individuals of all ages contrary to Mbuwayesango who noted a slight female dominance; however, this was among infants. In Lusaka, it was noted among seven common causes of admission of intestinal obstruction patients. In Tanzania, the approximate incidence of intussusception in infants is between 75-78% based on seasonal variation. Primary adult intussusception has also been reported in central and western Africa where it has been dubbed ''Ibadan intussusception'' or ''tropical intussusception''; a testament that the condition is not uncommon to the natives. Mozambique and the central province of Kenya have also shown incidences but with fewer reports [9,19-22].

In the past, diagnosis of intussusception remained elusive and challenging for many clinicians. Overtime, due to discovery of different imaging modalities, such as computed tomography, ultrasonography, X-ray and barium studies, diagnosis has significantly improved. Surgical intervention remains the definitive way to confirm the disease process [23].

## Conclusion

Intussusception remains a concern in our clinical environment due to its late presentation and considerable consequences of morbidity and mortality. Since it can occur anywhere in the GI tract, any lesion within the lumen or surrounding wall may alter the normal peristalsis and cause invagination. Efforts should be made to improve sanitation, personal hygiene, and referring health center facilities. Knowledge about the various clinical presentations with different symptoms will familiarize surgeons with a variety of treatment options and diagnostic techniques that will elevate their clinical decision making and therapeutic interventions.

## Acknowledgments

Permission was obtained from the Department of Human Anatomy of Uzima University. Second year medical students at the University were present at the time of identifying the tract.

## Ethical Approval

Legally, Uzima University, a renowned medical institution, with permission from the Ministry of Health, is permitted by the Anatomy Act Cap 249 to procure unclaimed bodies for studies.

## Informed Consent

The samples used were from bodies that remained unclaimed for period exceeding eight months sourced from public mortuaries of government hospitals. Acquisition warranted documented consent from the ministry of health, through the medical superintendent, authorizing the specimen for anatomical studies in Uzima University. Informed consent of the patient did not apply since this was a cadaveric case study.

However, all ethical issues were considered in writing the case report, for example, the cadaver's identity, privacy, confidentiality were all maintained and permission to use the cadaver for our study was obtained from the Department of Anatomy of Uzima University.

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