Open Access Library Journal
2025, Volume 12, e14463
ISSN Online: 2333-9721
ISSN Print: 2333-9705

The Challenge Affecting Early Diagnosis of Intussuscepting in Newborn Baby in Most Limited Resources in Tanzania

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How to cite this paper: Karuhanga, T.A., Tekie, F., Singo, J., Mrutu, R., Madoshi, B., Morro, R. and Sakurani, B. (2025) The Challenge Affecting Early Diagnosis of Intussuscepting in Newborn Baby in Most Limited Resources in Tanzania. *Open Access Library Journal*, **12**: e14463
https://doi.org/10.4236/oalib.1114463

Received: October 15, 2025
Accepted: November 21, 2025
Published: November 24, 2025

Abstract

Intussusception in newborn is rare and associated with nonspecific features of intestinal obstruction. We present the new born who presented progressive abdominal distension, vomiting, and neonatal jaundice. There was delayed diagnosed and surgical intervention caused by missing diagnosis whereby the initial diagnosis was necrotizing enterocolitis (NEC). The surgical intervention was done at day five after admission, intraoperatively was ileo-ileal intussusception. Post operative management was no successfully whereby the baby died at the second day post operatively. The aim of this case is to highlight the challenge of distinguishing the NEC and intussusception in extreme young age. The abdominal X-ray radiological features are very important in differentiating the two newborn conditions to prevent delayed diagnosis and management to improve unfavorable outcome. Intussusception should be considered in any preterm infant with suspected NEC till when it is proven otherwise.

Subject Areas

Palliative Care, Pediatrics

Keywords

Prenatal Intussusception, Necrotizing Enterocolitis, Air-Fluid Levels,

Enterohepatic Circulation, Pneumatosis Cystoids Intestinalis, Neonatal Jaundice

1. Introduction

Intussusception may be defined as invagination of bowel loop segments resulting into intestinal obstruction (IO) [1] [2]. It remains as the main cause of mechanical IO in young children of 3 months to 2 years old whereby the peak incidence occurs between 3 and 9 months [1]-[4] Intussusception during neonatal is rare surgical condition accounting for only 3% of all childhood intestinal obstruction [5] [6]. About 1.3% of all cases occur in term new born [5]-[7] while prenatal cases are extremely rare [4] [7]. There is no specific clinical presentations for prenatal intussusception but they are mimicking with other neonatal conditions including Necrotizing enterocolitis (NEC) [4] [5] [7]-[9]. Abdominal distention, vomiting, lethargic and failure to breast feeding are common clinical presentation in both NEC and IO [4] [5] [10] [11] leading to delay diagnosis and ultimately delayed surgical intervention. In some cases, the baby may jaundice due to impairment of intrahepatic circulation of bile [12].

Misdiagnosis is common as general pediatricians are often the first to attend these young infants and may be less aware of the surgical condition [1] [10]. This results into untimely diagnosed and appropriate management [1] [10]. Misdiagnosis and delayed treatment contribute to increased morbidity and mortality [13] [14]. Despite that Tanzania is among of seven African countries with high incidence of intussusception in infants [15], yet no case of intussusception in term newborn has been reported to date. This pose availability of data for reference and comparison of the management outcome in different scenarios within our regions.

In this report, we present a case of a 13-day-old baby born at 42 weeks gestational age who was treated conservatively for necrotizing enterocolitis (NEC) but was later diagnosed with intestinal obstruction. The baby was planned for exploratory laparotomy but unfortunately died on the second day post-operatively. The aim of this case report is to highlight the importance of early diagnostic imaging and case sharing among clinicians to reduce the probability of misdiagnosis and improve mortality outcomes.

2. Case Report

A 13-day-old male neonate, born at 42 weeks gestational age with a birth weight of 3.8 kg, who was home delivery, The mother noticed failure to pass meconium Since birth, of which one day later the baby started to develop progressive abdominal distention, failure to breastfeed. Other features reported by the mother included fever associated with convulsions, jaundice, and vomiting. Thereafter, baby was taken to nearby health center where diagnosis was neonatal sepsis with Necrotizing enterocolitis was documented. Initial management was IV ampicillin,

gentamycin and Cloxacillin as per Tanzania pediatric first line regime. After four days at this primary health center the condition was worsening, then the baby was referred at our institute for further management.

On arrival at our institute the infant was alert but weak, with deep jaundice. The infant weighed 3.76 kg and exhibited tachycardia, tachypnea, SpO_2 of 96% on room air, a temperature of 40°C, a heart rate of 190 bpm, a respiratory rate of 60 c/min, and a random blood glucose (RBG) of 4.9 mmol/l. On systemic examination, the abdomen was distended with visible bowel loops (**Figure 1(A)**) The baby was admitted to neonatal intensive care unit (NICU) with the provisional diagnosis of NEC, pathological jaundice and neonatal sepsis. The baby was managed according to pediatric management guidelines hence he was kept on IV ceftriaxone as a second line regime. Initial laboratory investigations revealed elevated white blood cell count (WBC) and C-reactive protein (CRP), normal hemoglobin (16.6 g/dl) for age, and elevated sodium (151 mEq/l) and potassium (7.1 mEq/l). Intravenous fluid was administered to restore systemic circulation as the infant had already shown signs of hemodynamic instability. Blood culture and Sensitivity was also done but revealed no bacterial growth. The baby was managed primarily for NEC and septicemia. On the fifth day of admission in NICU (10 day old) the bay had no clinical improvement on in the primary symptoms (abdominal distention, failure to pass stool, fever and jaundice), Additionally, the infant developed opisthotonos, convulsions, and anuria. At this point, a new diagnosis of meningitis and acute kidney injury (AKI) was considered. Further investigation revealed a total bilirubin level of 89.9, direct bilirubin of 73.6, serum creatinine of 78.4 μmol/l, electrolytes: K^+ 3.7, Na^+ 141 mEq/l, Cl^- 102 mEq/l, unconjugated bilirubin 73.6 mg/dl, and total bilirubin 89.9 mg/dl.

An emergency surgical consult was requested of which surgeon reviewed the baby. The surgeon came up with congenital intestinal obstruction (CIO) as the provisional diagnosis based on cardinal features (failure to pass stool since birth, gross abdominal distention and vomiting), other clinical conditions were regarded as complications of CIO which included severe hemodynamic instability and AKI. Emergency plain abdominal X-ray and abdominal ultrasound were ordered as emergency diagnostic imaging. The X-ray revealed dilated bowel loops centrally, along with multiple air-fluid levels (**Figure 1(B)**). An ultrasound also showed dilated bowel loops and no other significant features was identified. These radiological findings strengthened the diagnosis of intestinal obstruction. Exploratory laparotomy was planned after adequate rehydration to restore kidney function. Six hours later, the urine output improved to 2 ml/kg/hr, which allowed for proceeding operation, then the baby was planned for emergency explorative laparotomy. Transverse incision was preferred to have adequate abdominal exposure in neonates. Intraoperatively, the findings were adhesive band originated from the abdominal wall; there was also an ileo-ileal intussusception (**Figure 1(C)** and **Figure 1(D)**). Further assessment was done to identify a lead point, but no obvious lead point was identified. The intussusception was reduced, and it was found that the

obstructed loops were ischemic but became viable after reduction (**Figure 1(C)** and **Figure 1(D)**). Ileostomy was the most option to in this operation due to edematous loop in critical ill baby as it is recommended in literature [1] [2]. The post-operative period was complicate associated with persistent jaundice and elevated fever, which did not respond to antibiotics and antipyretics. The baby eventually developed shock, acute kidney injury, and meningitis. On day two post-op, the infant died due to multiple organ dysfunction (MOD).

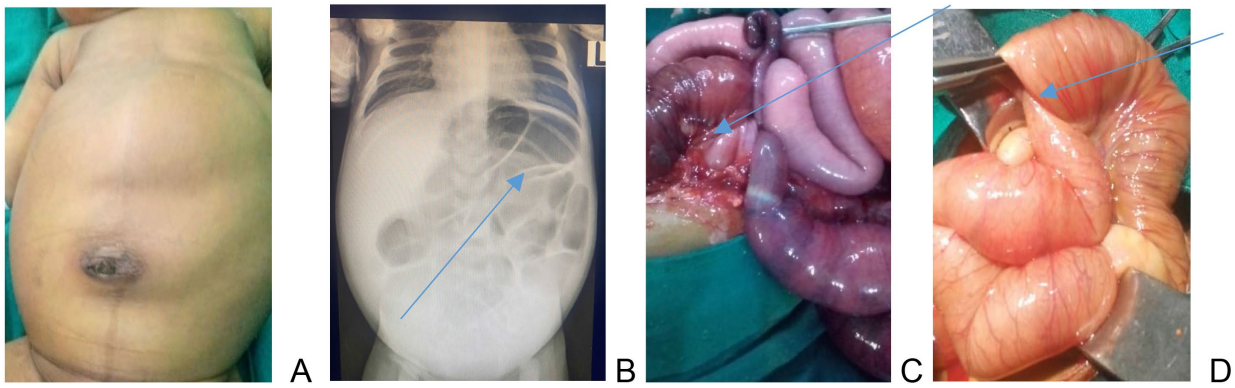

Figure 1. The distended abdomen, X-ray film with airfiled levels, ischemic bowel loop with bands and resolved ischemic telescopic loop after band release in (A), (B), (C) and (D) respectively.

3. Discussion

Intussusception in the first month of life is rare with about 1% of intussusceptions cases occurring in the neonatal period [5]. The reported incidence of neonatal intussusception in the 1st month of life range between 0% to 2.7% of all cases [6] [8] [10]. Wang *et al.* described that, neonatal intussusception can occur both prenatally and neonatally with deferring prognoses and clinical manifestations [6]. Intussusception in childhood and full-term neonates occurs mostly at the level of the ileo-colic junction (80%) [16] while the small bowel intussusceptions account for less than 10% of all ages [10]. However, in premature newborn babies, small bowel intussusception mostly occurs along ileum and jejunum for 91.6% of all cases [1] [5] [9] [10]. Ultrasound imaging in this case only revealed dilated bowel loops without characteristic target sign of intussusception. This mirrors report in the literature where intussusception is sometimes missed on sonography [16]. In this case, abdominal X-ray was the most reliable diagnostic tool. As it is recommended in the literature, and in daily clinical observation, mechanical intestinal obstruction, plain abdominal X-ray usually reveal air patterns with air-fluid levels while in NEC pneumatosis cystoids intestinalis with or without Free gas in portal vein [17]-[19]. There are other features mentioned to be radiological diagnostic feature such as intestinal wall thickening usually observed in NEC [19]. In our case, there were two causes of delay; first the mother had home delivery of which the patient stayed at home for more than 24 hours which was identified by the mother at home taking into consideration that most of rural women are illiteracy. Secondly, there was

initial missed diagnosis of intestinal obstruction instead it was NEC and neonatal sepsis. It should be remembered that, the first and the second clinicians who attended the baby missed the diagnosis up to day ten. Usually, the baby and pediatric patient is attended by pediatricians who may be less familiar with neonatal surgical conditions [10]. Neonatal intestinal obstruction (IO) is highly suspicious in such cases, as the clinical presentation often mimics other non-surgical diseases [11] [18]. In this case, however, there were specific clinical signs suggesting acute abdomen: failure to pass stool, abdominal distension, and vomiting. The absence of meconium passage from birth raised the possibility of prenatal intussusception, which could also explain the observed pathological jaundice. Jaundice in such case can be caused by small bowel obstruction (SBO), infection, drugs such as ceftriaxone or failure of breast feeding [12] [20] [21]. Gastrointestinal obstruction promotes increased bilirubin recycling by augmenting enterohepatic circulation [12], and ceftriaxone displaces bilirubin from albumin binding sites and increases the unconjugated free bilirubin in plasma and hence it should be prescribed with caution [20]. Our patient died at the second day post op due to MOD. Delayed of both proper management and surgical intervention are reported in literature to be major contributing for poor management outcome [15].

Despite advancements in pediatric surgical care, infant mortality from intussusception remains high in developing countries where healthcare services continue to struggle. In contrast, mortality rates are much lower in high-income countries [1] [2] [10] [13] [16]. Missed diagnosis, often mistaking intussusception for NEC compromise bowel viability and lead to septicemia, hemodynamic instability and multiple organ failure (1] [4] [7] [10] [22). Early surgical intervention is the definitive treatment and is crucial for better outcomes with bowel anastomosis or stoma formation depending on the patient condition or bowel loop [7] [10] [11] [23]. In our case no specific lead point was identified but there was bads along the intussusception regions which attached to the abdominal wall was causing limitation of free bowel movement and hence acted as a lead in this case. It has been reported in literature that a lead point is found in 8% cases [4] [7] [8] [13]. For our patient the loop was viable, but we could not prefer primary anastomosis as the baby was critically ill hence ileostomy was done along the left flank region. It advised that, in critical condition, and late presentation stoma formation is the better option [1] [10]. At admission the temperature was 40˚C which increased suspecting of infection [1] [4] [8] [10]. Our patient was on critical condition with MOD which was characterized with Kidney injury, septicemia with meningitis. Hence mortality rate was likely to occur.

4. Limitation

There was no prenatal intrauterine image done which could gave information on antenatal bowel obstruction. But also, no CT scan imaging which could explore any probability of congenital anomalies such as biliary tree anomalies causing jaundice. This could have been recommended to the mother for mandatory hospital

delivery. But also, early diagnostic imaging could have facilitated early surgical intervention immediately after birth which could bring good outcome.

5. Conclusion

Intussusception is a rare clinical-surgical condition in in-term neonates, requiring a high index of suspicion for early diagnosis. Misdiagnosis, often confused with NEC, is common. Prompt consultation with pediatric surgeons and early diagnostic imaging are crucial to reduce the likelihood of delayed surgical intervention and improve outcomes. When there is poor response to conservative therapy, surgeons should be involved to assess the possibility of intussusception and other forms of intestinal obstruction, enabling timely diagnosis and appropriate management.

Acknowledgments

The authors would like to give thanks to St Francis Referral Hospital and St Francis University College for giving permission to write this case. But also, a lot of thanks are given to the pediatric nurses and intern doctors who participated in care during the whole admission period.

Ethics Approval

Informed consent to publish this case and images was signed by the mother. But also, Ethical approval for this publication was obtained from the institutional review board.

Conflicts of Interest

No conflict of interest among authors.

Funding

No funder per this study.

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