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Case Report

Ileus Tube-Related Intussusception: A Case Report and Review of 80 Previously Reported Cases

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We report a rare case of ileus tube-related intussusception in an adult. A 56-year-old man with adhesive bowel obstruction was treated with a nasointestinal ileus tube. Although his condition initially improved, persistent abdominal pain led to the diagnosis of intussusception via CT imaging. Manual repositioning of the tube resolved the intussusception without the need for bowel resection. A review of 80 previously reported cases of ileus tube-associated intussusception (total 81 cases, 95 lesions) highlighted the timing of onset, treatment strategies, and precautions. Early detection and diagnosis are crucial to prevent severe complications and preserve bowel function.

Key words: nasointestinal ileus tube, intussusception, small bowel obstruction, enterectomy, conservative treatment

Nasointestinal ileus tubes are widely used to manage intestinal obstruction in many hospitals. However, placement of a nasointestinal ileus tube has been identified as a potential cause of intussusception [1]. Intussusception is rare in adults and differs from pediatric cases in terms of etiology and clinical presentation. Placement of a nasointestinal ileus tube accounts for approximately 5% of all intussusception cases [2,3]. Reports indicate that 66-88% of adult intussusception cases occur in the small intestine [4]. Here we report a rare case of intussusception in an adult male that occurred at two different sites in the jejunum. We also present a review of 80 cases reported in the Japanese literature, offering relevant context and a clearer understanding of the clinical characteristics and management of ileus tube-induced intussusception.

Case Report

A 56-year-old man was admitted to another hospital because of adhesive small-bowel obstruction. The obstruction was located in the ileum approximately 20 cm from the ileocecal valve. The patient had undergone appendectomy for appendicitis 30 years prior.

Conservative treatment was initially administered. However, his symptoms did not improve. His abdominal pain worsened, and ascites were observed around the liver and pelvis.

Given the need for surgical intervention, the patient was referred to our hospital on the third day. Laboratory tests revealed a white blood cell count of $8.5 \times 10^3/\mu l$ and a C-reactive protein level of 2.58 mg/dl (Table 1). We diagnosed the patient with adhesive ileus, and a nasointestinal ileus tube was placed under fluoroscopic guidance on the same day (Fig. 1). The initial daily drainage volume was approximately 600 ml but suddenly decreased to approximately 100 ml on the

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Table 1 Laboratory tests at initial presentation of a patient with ileus tube-related intussusception

WBC	8,500	/μl	TP	7.0	g/dl	AST	12	U/l
Neut	71.4	%	Alb	3.6	g/dl	ALT	8	U/l
Ly	23.0	%	BUN	20.1	mg/dl	ALP	76	U/l
Mo	5.2	%	Cr	0.76	mg/dl	LDH	201	U/l
Eo	0.2	%	eGFR	82.5		γGTP	11	U/l
Hb	13.6	g/dl	Na	138	mEq/l	Amy	23	U/l
Plt	36.3	$\times 10^4/\mu l$	K	4.1	mEq/l	T.Bil	0.9	mg/dl
PT	95.2	%				CRP	2.58	mg/dl
PT-INR	1.03							
APTT	24.5	sec						

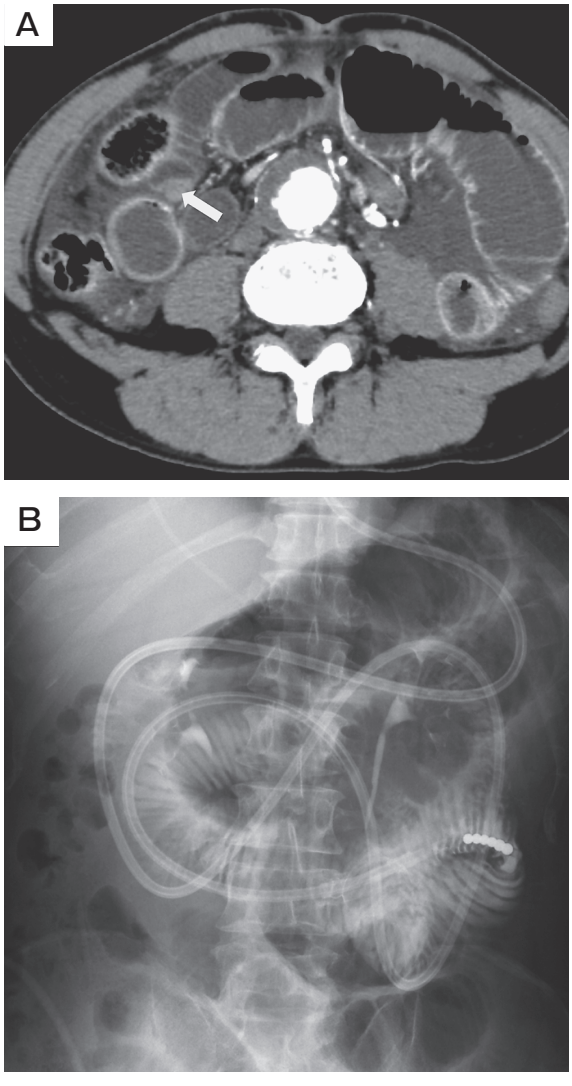

Fig. 1 A, Adhesive intestinal obstruction with an apparent beak sign; B, The ileus tube is placed beyond the Treitz ligament.

third day after admission to our hospital, and his clinical condition and laboratory findings improved. However, on the fourth day, a contrast study demonstrated that while the ileus tube advanced to the oral side of the adhesion site, the contrast medium failed to pass through the adhesion. This finding led to the decision to perform semi-emergency surgery.

On radiographic imaging, the ileus tube showed slight advancement and the drainage volume from the tube decreased on the sixth day. Although the adhesive small bowel obstruction progressed favorably, the patient continued to experience abdominal pain, prompting a computed tomography (CT) scan for further evaluation. CT revealed a target sign in the proximal jejunum beyond the ligament of Treitz, leading to a diagnosis of antegrade intussusception (Fig. 2).

We removed the balloon as usual up to the proximal jejunum and kept the balloon inflated at the tip of the suspected intussusception site under fluoroscopic guidance. This procedure carries a risk of perforation, potentially necessitating emergency surgery. Therefore, we thoroughly explained the risks and benefits of the

Fig. 2 Intussusception is observed in the proximal jejunum beyond the ligament of Treitz.

procedure to the patient.

Although CT imaging after manual reduction showed that the intussusception was resolved, a small amount of extraluminal gas remained (Fig. 3), and another target sign was detected in the small intestine distal to the first site. There was no improvement in the adhesive small bowel obstruction. The patient's clinical condition noticeably improved and vital signs were stable. Therefore, we planned to observe the intussusception during scheduled surgery for small bowel obstruction the following day.

On the seventh day, a laparotomy was performed. A 12 mm port was placed at the umbilicus as the camera port. Similar to the approach used for laparoscopic appendectomy, additional 5 mm ports were placed in the left lower abdomen and suprapubic region. No ascites were observed, and extensive adhesions between the omentum and peritoneum were identified in the right lower abdomen. These extensive adhesions led to twisting of the small intestine and obstruction of the adhesive small bowel. The adhesions causing bowel obstruction were released using an electrocautery device. Thorough examination of the small intestine from the ligament of Treitz to the terminal ileum showed that the intussusception had resolved. Mild bowel redness and dilation were observed; however, there were no signs of ischemia (Fig. 4). The operation time was 60 min, with no significant blood loss. The patient recovered uneventfully, and was discharged 16 days postoperatively.

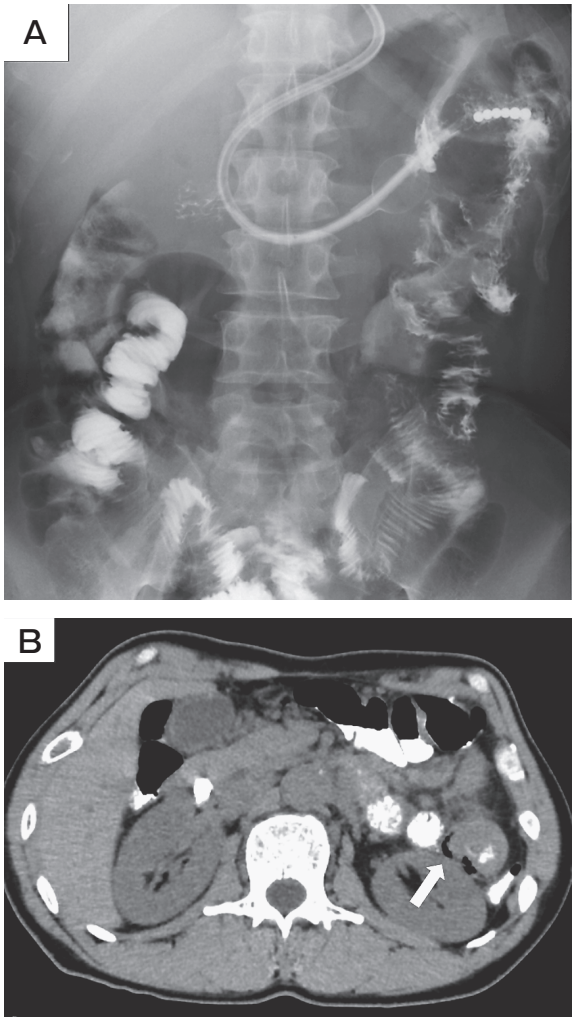

Fig. 3 A, The ileus tube is removed with its distal balloon inflated; B, Extra gas can be observed after ileus tube removal.

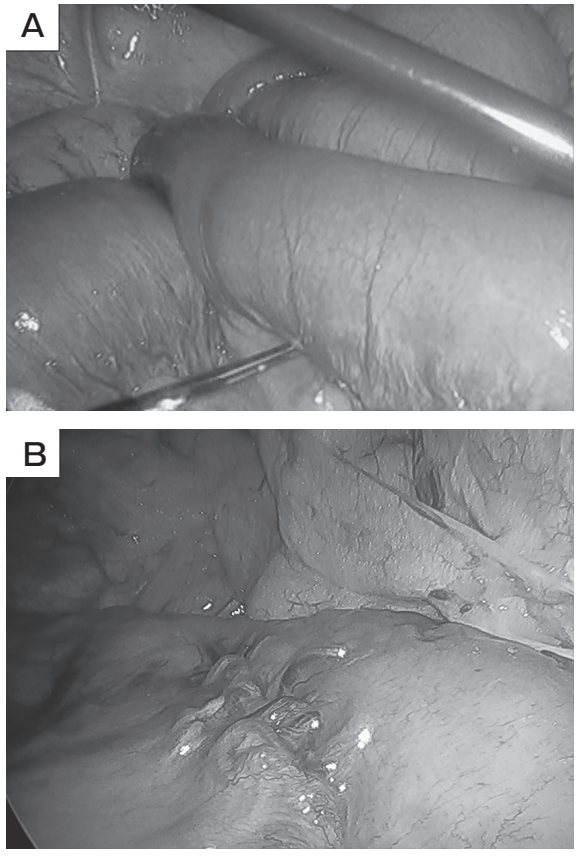

Fig. 4 Intraoperative findings. A, Small bowel dilation and congestion are observed; B, The intussusception shows spontaneous resolution.

Discussion

In the present case, nasointestinal ileus tubes were placed under fluoroscopic guidance with a contrast medium, advancing the tube beyond the ligament of Treitz until it formed a single loop. According to the Bologna guidelines [5], nasointestinal ileus tubes are generally preferred over nasogastric tubes for small-bowel obstruction [6]. The ileus tube is equipped with a balloon at its distal end, which advances toward the anal side in response to peristalsis. In this case, the balloon was inflated with 10 ml of distilled water. This approach offers several advantages, including a more effective bowel decompression than achieved with a nasogastric tube, facilitation of precise identification of the adhesion site, and improved operative conditions, such as preoperative decompression.

Daily radiography was performed every morning to confirm the position of the tube. If no coiling was observed in the stomach, the tube was advanced by approximately 10-20 cm/day. This process continued for 3-4 days, after which contrast studies or CT scans were performed to assess for bowel narrowing due to adhesions [7,8].

Intussusception often requires urgent intervention, as conservative management can increase the risk of severe complications [9]. Manual reduction is the first-line approach, but if reduction is unsuccessful, surgical intervention, often including bowel resection, is necessary. However, some reports suggest that conservative management may be effective in selected cases [10,11]. Treatment decisions should be based on a comprehensive assessment including vital signs, abdominal findings, laboratory results, and imaging studies.

Adult intussusception is often caused by underlying pathology, such as benign small intestinal tumors or malignant colonic tumors [12-14]. In cases associated with ileus tube placement, three distinct mechanisms have been proposed [8]: (1) a telescoping phenomenon triggered by peristaltic movement; (2) antegrade intussusception, where the balloon tip of the ileus tube acts as the leading point during advancement; and (3) retrograde intussusception occurring shortly after tube withdrawal. In the present case, mechanism (2) was considered the likely cause of intussusception. These mechanisms highlight the complexity of tube-related intussusception and underscore the importance of careful tube management.

Additional risk factors include prolonged tube placement, balloon overinflation, rapid advancement without monitoring, and pre-existing adhesions or bowel wall fragility. To minimize risk, clinicians should monitor for reduced drainage volume, persistent or worsening abdominal pain, and abnormal tube positioning on imaging. Routine daily radiography and cautious manipulation of the tube are essential. To our knowledge, no prior cases have reported successful resolution of intussusception via withdrawal of the ileus tube with an inflated balloon, thereby avoiding bowel resection, as observed in the present case.

We searched the ICHUSHI database using the keywords "intussusception" and "ileus tube" and reviewed 81 cases (95 lesions) from 1987 to 2019, including our current case [8,15,16]. Among these studies, the intussusception sites included the jejunum (82 lesions) and ileum (13 lesions). Antegrade, retrograde, and unknown intussusception were observed in 85, 8, and 2 lesions, respectively. Intussusception occurred during ileus tube placement in 46 cases (57%), after tube removal in 28 cases (35%), and at an unknown time point in 7 cases (9%). A total of 73 cases (90%) required surgery, and 45 cases (56%) underwent bowel resection. Only 2 cases (2%) showed spontaneous reduction (Table 2).

Aggregated data from the previous 80 cases and the present case (81 cases, 95 lesions) of ileus tube-related intussusception provide valuable insights into its clinical characteristics, timing of onset, and optimal management strategies. Notably, the jejunum was the most

Table 2 Summary of reported cases of intussusception caused by an ileus tube, including the present case (81 Cases, 95 Lesions)

Variable		Number of cases
Sex	M	43
	F	38
Site of occurrence	Jejunum	82
	Ileum	13
Time of onset	During placement	46
	After withdrawal	28
	Unknown	7
Type	Antegrade	85
	Retrograde	8
	Unknown	2
Treatment	Manual reduction	33
	Enterectomy	46
	Spontaneous resolution	2

frequently involved site (82 lesions, 86%), consistent with the typical anatomical location where the nasointestinal tubes terminate and peristaltic movement remains active. The high incidence in the jejunum suggests that mechanical factors such as balloon traction and tube advancement may interact with active peristalsis to precipitate telescoping of the bowel.

With regard to the direction of the intussusception, antegrade intussusception accounted for the vast majority of cases (85 lesions, 89%); this supports the hypothesis that the tube's forward movement — particularly with the balloon inflated—can serve as a lead point. Retrograde intussusception was less common (eight lesions, 8%), as it may occur during tube withdrawal. This highlights the necessity for careful deflation of the balloon before removal, as well as the importance of fluoroscopic monitoring during tube withdrawal.

The timing of onset also offers important implications for clinical practice. Intussusception occurred during tube placement in over half the cases (46 cases, 57%) and after tube removal in a significant proportion (28 cases, 35%). This distribution underscores the need for vigilance not only during tube insertion but also in the post-removal period. It is plausible that during withdrawal, traction forces applied to the intestinal wall may provoke retrograde telescoping, particularly in patients with fragile or excessively mobile bowel loops.

From a therapeutic perspective, 90% of cases required surgical intervention, and more than half (56%) underwent bowel resection. These findings emphasize the severity of the condition and the limited window for conservative treatment. Only 2% of cases experienced spontaneous reduction, suggesting that watchful waiting is generally not advisable unless very specific clinical criteria, such as stable vital signs, absence of peritonitis, and favorable imaging findings, are met.

In our case, CT performed shortly after the onset of the intussusception enabled timely manual reduction, ultimately allowing for jejunal preservation. While this underscores that early diagnosis and intervention are crucial to achieve favorable outcomes, intussusception during nasointestinal ileus tube placement is relatively uncommon and can be easily overlooked. When there is a decrease in the drainage volume from the tube and the presence of abdominal pain despite advancement of the tube, the potential for intussusception should be considered, and early imaging studies should be performed to evaluate intussusception. Although the intussusception was successfully reduced in our patient, a contrast study performed the day before surgery showed persistent adhesive small bowel obstruction, which necessitated surgical intervention. In addition, extraluminal gas was observed on CT, raising concern for possible bowel ischemia or perforation. Therefore, surgical exploration was considered necessary to confirm the absence of intestinal necrosis. However, if the obstruction had resolved and there had been no such radiological findings, surgery may have been unnecessary.

In terms of treatment, the key favorable conditions are early detection of the condition with no signs of intestinal necrosis, availability of emergency surgical intervention, and removal of the ileus tube without resistance. If all three conditions are met, withdrawing the ileus tube with its tip balloon inflated at the site of antegrade intussusception may be considered a viable treatment option, despite the potential risk of intestinal perforation.

Conclusion

We encountered a rare case of nasointestinal ileus tube-induced intussusception of the small intestine. In cases in which the drainage volume from the tube suddenly decreases, the occurrence of intussusception should be considered. Our review of 81 cases, including the present case, revealed that intussusception can occur at various time points during ileus tube placement, including the recovery phase of adhesive small bowel obstruction. Persistent or recurrent abdominal pain despite clinical improvement may be a warning sign.

Treatment approaches include surgical resection, endoscopic reduction, and conservative management. The choice of treatment should be guided by the patient's clinical stability, presence of peritonitis, and imaging findings. Early recognition and appropriate intervention are essential for favorable outcomes. Further studies may help to establish standardized management strategies for this rare condition.

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