

## A case of postoperative recurrent intussusception associated with indwelling bowel tube

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### Abstract

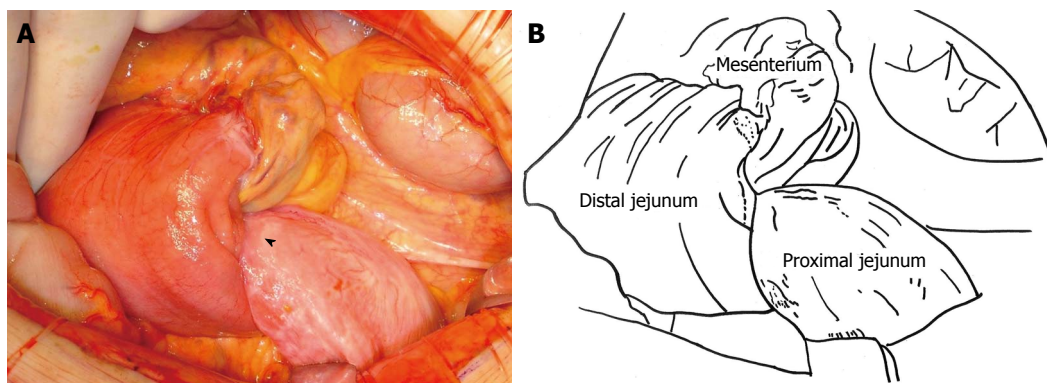
Intussusception is quite uncommon in adults. We report a rare case of a 76-year-old man with small bowel intussusception induced by two indwelling bowel tubes, the first a jejunal feeding tube and the second an ileus tube. After complete reduction of the first intussusception caused by the jejunal feeding tube and adhesion, re-intussusception occurred due to the postoperative adhesion and ileus tube inserted into the bowel after the previous operation for intussusception. Finally, the part of the jejunum with re-intussusception and adhesion, including the place where the previous reduced intussusception had occurred, was resected. This case is a reminder that when there is no mucosal lesion other than an indwelling bowel tube or a hard adhesion/inflammation around intussusception, the patient should be operated on without delay for resection of the intussusception to prevent re-intussusception, even if the resected bowel is predicted to be long.

### INTRODUCTION

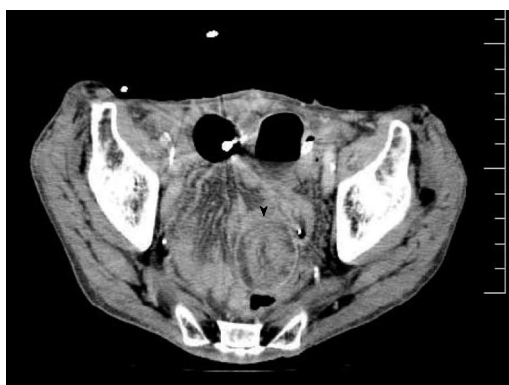
Intussusception is a rare cause of postoperative intestinal obstruction in adults<sup>[1,2]</sup> and recurrent intussusception seldom occurs in patients who have undergone surgical reduction<sup>[3]</sup>. We present here the case of a patient with small bowel intussusception induced by jejunal feeding tube placement and with re-intussusception induced by an ileus tube inserted after operative reduction of intussusception. Finally, both the part of the jejunum with re-intussusception including adhesion and the place where the previous reduced intussusception had occurred was resected.

### CASE REPORT

A 76-year-old man was transferred to our hospital with a chief complaint of dyspnea. He had a history of chronic obstructive pulmonary disease (COPD) combined with emphysema, bronchial asthma and distal gastrectomy for gastric ulcer. After being given artificial respiration for 1



**Figure 1** First intussusception. A: The intussusception was 10 cm in length (arrowhead), showed slightly edematous changes without necrosis, and started at a site about 15 cm distal from the entry of the jejunal feeding tube; B: Schematic diagram of the intussusception.



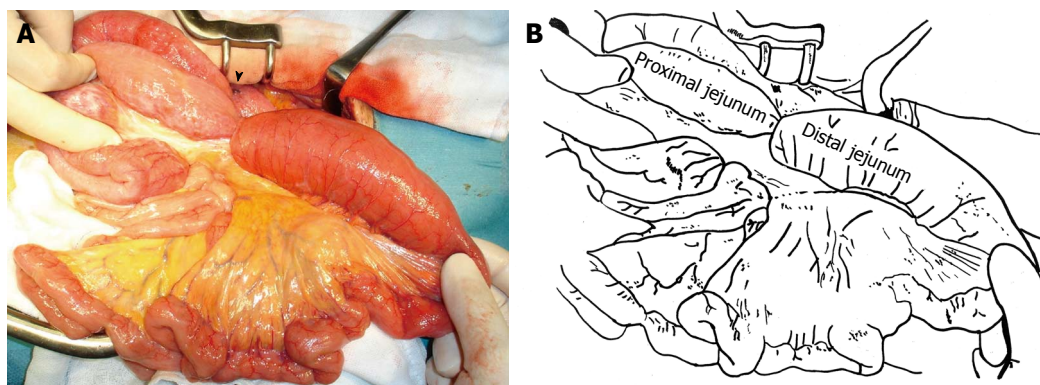
**Figure 2** Abdominal CT appearance of the intussusception with a target mass (arrowhead) in the pelvis.

mo because of deterioration in dyspnea, unexpected dysphagia appeared, the cause of which could not be detected by computed tomography and gastrointestinal fiberscope. A Witzel jejunostomy was carried out to allow feeding because of the impossibility of swallowing and his small residual stomach, and early enteral nutrition was begun on the 3rd postoperative day. About 3 wk after the initial feeding tube placement, the patient had occasional episodes of vomiting and abdominal pain without palpation of an abdominal mass. As an X-ray of the abdomen revealed distention of the proximal jejunum, a nasogastric tube was inserted into the stomach to decompress the jejunal gas. Because we assumed there was postoperative adhesion of the jejunum, we performed an X-ray examination using a water-soluble contrast medium from the nasogastric tube and jejunal feeding tube. This revealed the retention of contrast medium from the stomach to the proximal jejunum and normal caliber of the distal jejunum. Judging from the small bowel series results, we did not suspect intussusception associated with the feeding tube but rather postoperative adhesive bowel obstruction or torsion around the tube. We therefore performed exploratory laparotomy. A fleshy sausage-like tubular intestinal mass 10 cm in length was found at the proximal jejunum, about 15 cm distal to the entry of the tube. The intussusception, which showed edematous changes without necrosis, was ante-grade in direction and jejunojejunal in nature (Figure 1A and B). The two sites of fixation on the jejunostomy were still in position without rotation, and were well attached to the peritoneum. Complete reduction of the

intussusception, and appendectomy and adhesiotomy of the mesentery of the jejunum, 30 cm distal from the entry of the tube, was performed. After this procedure, an ileus tube without an inflating balloon (to avoid ileus relapses) was put into the distal jejunum far beyond the adhesiotomy of the adhesional point. On the 5th postoperative day, because an X-ray of the abdomen revealed dilated jejunal gas and a change in the position of the top of the ileus tube, we tried to examine the jejunum again, using contrast medium, to confirm whether the tube had moved and the ileus existed. However, the bowel passage was normal except that the tube had moved toward the proximal position. In addition, the patient had been experiencing intermittent abdominal pain since the abnormal gas had appeared. An abdominal computed tomography (CT), which was performed after decompressing the abnormal jejunal gas, demonstrated a target sign in the pelvis (Figure 2). Because we diagnosed the patient as having a 'recurrent intussusception' and the patient consented to an operation on the 18th postoperative day, exploratory laparotomy was performed again. A 15-cm long mass, as well as the jejunal intussusception that we had experienced at the last surgery, was found at the distal jejunum at a different point to the last intussusception (Figure 3A and B). The jejunal intussusception was found between the tip of the ileus tube, which had moved back to the proximal jejunum, and the adhesion of the stump of the resected appendix and mesentery of the small intestine. A 50-cm segment of the jejunum with 're-intussusception' and adhesion, including the place of the previously reduced intussusception, was resected. Because of the difference in the size of the bowel between the proximal and distal sides, functional end-to-end anastomosis was performed without any change to the previous feeding tube. To prevent ileus or 're-recurrent intussusception', the ileus tube was not inserted in the bowel. Enteral nutrition was started again on the 3rd postoperative day and the patient's postoperative course was uneventful. Examination of CT and contrast medium injection of the feeding tube revealed no problems 6 mo postoperatively.

## DISCUSSION

It is generally believed that any lesion in the bowel wall or irritant within the bowel lumen that alters normal peristaltic activity is able to initiate an invagination<sup>[1,4]</sup>. On the oth-



**Figure 3** Recurrent intussusception. A: A 15-cm long re-intussusception was found at the distal jejunum at a separate point of the last intussusception. Arrowhead shows the repair point of the adhesiotomy at the first intussusception; B: Schematic diagram of the recurrent intussusception.

er hand, uneven return of peristalsis after surgery, with possible local spasms or edema of the bowel, is a plausible explanation in cases without obvious lead points<sup>[5]</sup>. Ein *et al*<sup>[6]</sup> claimed that postoperative intussusceptions are likely to be caused by altered peristalsis following prolonged and excessive manipulation with drying and bruising of the bowel, extensive preperitoneal dissection, abdominal serum electrolyte levels, local hypoxia, anesthetic agents, postoperatively administered drugs, or neurogenic factors. In our case, the location of the 're-intussusception' was different from that of the first intussusception that had been reduced. The main cause of the 're-intussusception' may have been the ileus tube and adhesion, whilst the first intussusception was caused by the feeding tube and adhesion. In the present case, there were no pathological problems, such as a tumor, in our resected specimen. The probable causes of this intussusception are believed to be: (1) restriction of peristalsis due to adhesion of mesentery or bowel in front of or behind the tip of the tube; (2) excessive dilatation of the small intestine before decompression; (3) a decrease in the degree of freedom of the small intestine due to the presence of a tube in the bowel which acts as a stent<sup>[7]</sup>; (4) rise of abnormal abdominal pressure due to coughing; (5) abnormal and irregular peristalsis without cooperation; and (6) functional disorder of ganglion cells or neuron transmission after expanded bowel *etc.* However, the mechanism of intussusception that occurs following the placement of an ileus tube or jejunal feeding tube is still unknown.

All patients with enteric lesions who have not had a previous laparotomy should undergo resection without reduction because of the high incidence of associated malignancy<sup>[8]</sup>. Especially in cases of colonic intussusception, many researchers recommend resection without reduction<sup>[1,8-10]</sup>. On the other hand, the argument for initial resection in small bowel intussusception may not be as convincing as for large bowel intussusception, because the incidence of malignancy ranges from 1%-40% and the vast majority of these are metastasis<sup>[11,12]</sup>. Eisen *et al*<sup>[11]</sup> stated that small bowel intussusception should be reduced only in patients in whom a benign diagnosis has been made preoperatively or in patients in whom resection may result in short gut syndrome. If we consider our case only, resection, rather than reduction, was necessary for our intussusception to prevent 're-recurrent intussusception' as the

proximal jejunum had become dilated due to the restriction of bowel movement, and there was hard adhesion of the mesentery or the bowel around the place of the first intussusception. While recurrence rates of 3% (after surgical reduction) to 10% (after hydrostatic reduction) have been reported following treatment of primary intussusception<sup>[12]</sup>, no recurrence has been recorded following surgical reduction of post operative intussusception after up to 20 years follow-up<sup>[13]</sup>. Yang *et al*<sup>[3]</sup> concluded that recurrent intussusception seldom occurred in patients who underwent surgical reduction. Three case reports<sup>[2,14,15]</sup> have reported 'recurrent small bowel intussusception after operation of small bowel intussusception' (Table 1). The recurrent rate of 'small bowel intussusception' is only about 0.2% in English publications, according to the results of our searches on PubMed.

The classic pediatric symptoms of intussusception such as abdominal pain, mass, and blood per rectum are rarely found in adults, in whom the predominant symptom is bowel obstruction. Consequently, intussusception is often initially misdiagnosed in the adult population<sup>[1,9-11,16]</sup>. As mentioned above, we first misdiagnosed the patient with postoperative adhesive bowel obstruction or torsion around the tube because there was no palpable abdominal mass and the only symptoms of intestinal obstruction that had appeared were abdominal pain and vomiting. Aware of the difficulty of diagnosing intussusception from symptoms and contrast medium studies, because we had experienced intussusception in this patient before and despite a negative study using contrast medium, 're-intussusception' was later suspected when he reported intermittent abdominal pain. This diagnosis was confirmed by using CT. Our experience in this case confirms earlier reports that the diagnosis of intussusception is difficult to make before surgery. Some researchers have claimed that a diagnosis of intussusception was suspected preoperatively in 14%-75% of patients<sup>[8,11,16,17]</sup>. Abdominal CT is the most sensitive radiologic method for confirming a diagnosis of intussusception, with a reported diagnostic sensitivity of 71.4%-87.5%<sup>[8,11,16-21]</sup>. Even though high resolution CT is now widely used in many institutions, misdiagnoses may occur due to human error when clinicians do not have experience of 'intussusception', limiting how many correct preoperative diagnoses can be made. Abdominal ultrasonography (US) is also a very useful and



Table 1 Summary of recurrent intussusception after operation of small bowel intussusception in adults

	Authors (year)	Age (yr)	Preoperative diagnosis	Diagnosis method	Surgical Treatment	Nature of Lesion
			1st 2nd	1st 2nd	1st 2nd	1st 2nd
1	Felix <i>et al</i> <sup>[22]</sup> (1976)	34	Acute abdomen	Exploratory laparotomy	Resection	Lymphoma nodule (Burkitt's lymphoma)
2	Dong <i>et al</i> <sup>[14]</sup> (2004)	25	Mechanical obstruction	Barium meal	Resection	No tumor
			Intussusception	Not described	Resection	Hamartoma (Peutz-jeghers syndrome)
3	Akimaru <i>et al</i> <sup>[13]</sup> (2006)	41	Intussusception	Not described	Resection	Hamartoma
			Intussusception	CT	Reduction and resection	Hamartoma (Peutz-jeghers syndrome)
4	Our case	76	Intussusception	CT	Resection	Lipoma
			Ileus	Exploratory laparotomy	Reduction	No tumor
			Intussusception	CT	Resection	(Feeding tube and adhesion) No tumor (Ileus tube and adhesion)

1st: Intussusception at the first time; 2nd: Recurrent intussusception.

appropriate technique in the diagnosis of intussusception in adults<sup>[22]</sup>, while contrast medium studies of the small intestine were able to confirm the diagnosis of intussusception preoperatively in only 17% of patients<sup>[16]</sup>. In obese cases or those with full bowel gas, it is difficult to accurately detect intussusception using US. Given these facts, a plural examination including CT, US, contrast studies, and Magnetic Resonance Imaging (MRI) is necessary to improve the diagnosis of intussusception.

In conclusion, the mechanism of the relationship between intussusception and a feeding or ileus tube has not been well understood. There may be complicating factors, such as adhesion, abnormal peristalsis, and the tube itself. When encountering a hard adhesion, inflammation on the bowel surface or a mesenteric obstruction in a patient who has had an intussusception, it is necessary to operate on the patient to resect the intussusception, including the adhesion, in order to prevent 're-intussusception', even if it is predicted that the resected bowel will be long.

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