Intussusception in a Young Female with Vibrio Gastroenteritis and Diabetic Ketoacidosis

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Abstract

The incidence of functional intussusception is extremely rare in adults. A 23-year-old woman, previously diagnosed with type 1 diabetes mellitus (DM), complained of colicky abdominal pain associated with vomiting of 1-day duration. Current jelly stool was observed. Irrespective of hydration and intravenous insulin injection under the diagnosis of diabetic ketoacidosis (DKA), her abdominal pain and laboratory parameters did not improve. Abdominal computerized tomography (CT) revealed a jejunojejunal intussusception. We maintained large-volume fluid administration, and her abdominal pain began to subside. The stool culture was positive for *Vibrio parahaemolyticus*. We confirm the intussusception that was resolved by supportive management without surgical intervention in a patient with gastroenteritis and diabetic ketoacidosis.

Key words: Intussusception, Diabetic ketoacidosis, *Vibrio parahaemolyticus*, Gastroenteritis

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Introduction

The incidence of intussusception in adults is very low and occurs mainly as a result of mechanical factors in association with a polyp, ulcerative lesion, or malignancy (1). Although many illnesses such as electrolyte imbalances, severe hyperglycemia, respiratory or metabolic acidosis, thyroid hormone excess, and gastroenteritis are well known to be associated with impaired gastrointestinal motility and dysrhythmia (2-4), they rarely lead to intussusception in adults. However, McFarlane et al presented a case report of intussusception in a patient with severe hyperglycemia (5). In this paper, we report a case of intussusception that developed in a patient with diabetic ketoacidosis (DKA) and vibrio gastroenteritis.

Case Report

A 23-year-old woman was referred to our hospital by a local clinic because of severe abdominal pain that was aggravated and became colicky in nature during intravenous hydration treatment with 3 L of normal saline for DKA. The patient had ingested some seafood several hours before the symptoms began. She was diagnosed as type 1 diabetes mellitus when she was 19 years old and required regular insulin injections (0.6 unit kg⁻¹ day⁻¹), but she had not had an insulin dose for 2 days prior to her referral. She was diagnosed as Graves’ hyperthyroidism when she was nine years old and took propylthiouracil 100 mg per day.

On arrival, the patient showed a period of lethargy alternating with spasmodic spells that repeated every 30 min. The patient’s abdomen was distended and tender, but we did not detect any palpable mass or organomegaly. Her vital signs were the following: body temperature, 36.0°C; blood pressure, 120/80 mm Hg; respiratory rate, 28/min; and pulse rate, 105/min. Her body weight was 53.4 kg; her BMI was 19.37 kg/m². She had decreased skin turgor, and her tongue appeared dehydrated. Mild goiter with a rubbery consistency and mild exophthalmos were observed. Her stool was currant jelly-like without visible blood but was positive for stool hemoglobin. Her initial blood laboratory findings were as follows: glucose, 25.6 mmol/L (2.22-3.89 mmol/L); hemoglobin, 17.1 g/dl (12.0-16.0 g/dl); WBC, 4.86×10⁹/L (4.5-11.0×10⁹/L); platelets, 2.94×10⁹/L (150-350×10⁹/L); C-peptide, 0.1 nmol/L (0.17-0.66 nmol/L); HbA1c, 13.1%
Figure 1. The clinical course and findings of the CT scans. Despite initial adequate treatment for DKA, the patient complained of increasing cyclic abdominal pain and passed currant jelly stool without any improvement of arterial pH and plasma glucose levels. At that time, CT revealed an occurrence of jejunojejunal intussusception (I) just beneath the ligament of Treitz (T) and diffuse enteric distension with minimal wall thickening, indicative of gastroenteritis. With continued intravenous hydration and insulin injection, the abdominal pain subsided gradually. The follow-up CT scan revealed that the previously detected lesion had disappeared and indicated a more swollen small bowel wall (B). N/S: normal saline. iv: intravenous.

(3.8-6.4%); BUN, 6.9 mmol/L (3.6-7.1 mmol/L); creatinine, 71 μmol/L (133 μmol/L); amylase, 0.8 μkat/L (0.8-3.2 μkat/L); lipase, 0.53 μkat/L (0.0-2.66 μkat/L); and cholesterol, 7.66 mmol/L (<200 mmol/L). She had a blood pH of 7.26 (7.38-7.44); 11 mmol/L bicarbonate (21-28 mmol/L) on arterial blood gas analysis; serum ketone bodies was 3 positive (negative in serum), serum sodium, 137.2 mmol/L (136-145 mmol/L); potassium, 3.3 mmol/L (3.5-5.0 mmol/L); Chloride, 102 mmol/L (98-106 mmol/L). On thyroid function test, TSH, 0.09 mU/L (0.5-4.7 mU/L); free T4, 18.0 pmol/L (10.3-35 pmol/L) and free T3, 2.14 pmol/L (0.22-6.78 pmol/L) were detected. Glutamic acid decarboxylase antibody was 370 mU/L (0-1.0 mU/L). Thyroglobulin antibody was 57.83 mIU/L (0-60 mIU/L), antimicrosomal antibody was 1390 mU/L (0-60 mU/L), and thyroid stimulating hormone-receptor antibody was 0.32 mU/L (0-1.0 mU/L). Initial simple abdomen radiography showed nonspecific decreased bowel gas pattern.

Despite hydration with an additional 2 L of normal saline and intravenous insulin administration, the arterial blood pH, plasma glucose, and urinary ketones were not improved (7.15, 25.6 mmol/L, and 3+, respectively). An abdominal computed tomography (CT) scan was performed to evaluate the persistent abdominal pain and passage of currant jelly-like stool. CT scan revealed a jejunojejunal intussusception just beneath the ligament of Treitz and diffuse enteric distension with mild wall thickening. We maintained the administration of insulin and intravenous hydration of normal saline at 10 mL/min to improve circulatory inadequacy and observed closely a possible surgical abdomen. Subsequently, the abdominal pain gradually subsided with improvements in the laboratory parameters ambient blood glucose, 12.2 mmol/L; pH, 7.33; and anion gap, 4.8). The follow-up CT scan revealed that intussusception had disappeared but that the wall of the small bowel had become more swollen (Fig. 1). The follow-up simple abdomen radiography showed improvement of a non-specific bowel gas pattern of initial X-ray finding. Colonoscopy was performed and was remarkable only for multiple hyperemic nodules confined to the terminal ileum. On day 5, the result of the stool culture from the specimen obtained on the day of admission indicated Vibrio parahaemolyticus. Stool sample was cultured on MacConkey, Salmonella-Shigella, and thiosulfate citrate bile salt (TCBS) agar. The colonies with green pigment on TCBS were positive of oxidase and urease. The microorganism was identified as V. parahaemolyticus with Vitek Systems (bioMerieux Vitek, Inc., Hazelwood, MO) using GNI+ (Gram negative plus) card. A markedly delayed gastric emptying was displayed on a radioisotope scan. The halftime of semi-liquid meal gastric passage was incalculable and 12 min clearance was only 7.3% (normal value was over than 50%). The patient was discharged on hospital day
7 with an improved general condition. The patient visited our outpatient clinic regularly for more than one year and she had no recurrence of intussusception.

**Discussion**

Variable conditions, such as electrolyte imbalances, metabolic derangements (e.g., severe hyperglycemia and DKA), excess thyroid hormone, and infectious gastroenteritis, are known to affect gastrointestinal motility (2-4). Although some reports have indicated transient intussusception on CT scanning in association with celiac diseases, Crohn’s disease, and small intestinal tumors (1), self-limited idiopathic intussusception in adults is extremely rare. To date, there has been only one reported instance of jejunojejunal intussusception which developed in a young male with severe hyperglycemia and DKA (ambient serum glucose, 72.7 mmol/L; pH, 7.2) (5). In addition to hyperglycemia, DKA, and sudden metabolic and electrolyte disturbances, this patient had several other factors, such as subclinical hyperthyroidism and *Vibrio parahaemolyticus* gastroenteritis, inducing faulty regulation of gastrointestinal motility and rhythmic movements. Although subclinical hyperthyroidism, including overt thyrotoxicosis, influences GI motility, these illnesses are not associated with intussusception. Furthermore, the patient was compliant with her antithyroid medication and showed normal levels of free T3 and T4. Consequently, her thyroid hormone status was discounted as a causal factor of the intussusception. Although some cases of ileocolic intussusception secondary to viral gastroenteritis and *Yersinia enterocolitica* infection have been reported in children (6), we are unaware of any other reports of *Vibrio parahaemolyticus* gastroenteritis accompanying jejunojejunal intussusception.

In the absence of definitive pathological data, we cannot clearly explain the clinical course of this young woman with jejunojejunal intussusception. We suspect that the intussusception was not present at the onset of the ketosis, but developed after the onset of the gastroenteritis. In reflecting on the clinical improvement of the colicky abdominal pain and DKA parameters following the addition of a large volume of hydration, we considered the possible combined effects of the above-mentioned factors, most importantly the DKA and Vibrio gastroenteritis, both of which can produce GI dysmotility, as the cause of intussusception in this patient. The induction of vomiting and watery diarrhea due to Vibrio gastroenteritis might have aggravated the severity of the DKA and dehydration, which in turn could have further aggravated the gastroenteritis. We speculate that these conditions finally provoked the development of the small bowel intussusception.

In this report, we described a case of intussusception in a patient with DKA and Vibrio gastroenteritis. As the major acute complications associated with both DKA and intussusception can be fatal if not managed promptly and effectively, physicians need to remain vigilant to the possibility of intussusception in patients with DKA and gastroenteritis who present with unusual colicky abdominal pain and current jelly stool. Intussusception may be resolved by a management of DKA and infection. Control of hyperglycemia is essential for the treatment of unexpected complications in diabetes patients.

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**References**