

Yves Patenaude
Chantal Bernard
Richard Schreiber
Anna B. Sinsky

Cow's-milk-induced allergic colitis in an exclusively breast-fed infant: diagnosed with ultrasound

Received: 23 April 1999
Accepted: 22 November 1999

Y. Patenaude (✉) · A. B. Sinsky
Department of Medical Imaging,
The Montreal Children's Hospital,
2300 Tupper Street, Montreal, Quebec,
Canada, H3H 1P3

C. Bernard
Department of Pathology,
The Montreal Children's Hospital,
Montreal, Quebec, Canada

R. Schreiber
Division of Pediatric-GI,
BC Children's Hospital,
Vancouver, BC, Canada

Abstract *Background.* An exclusively breast-fed 8-week-old boy presented with irritability and non-bilious projectile vomiting. He was referred to our Medical Imaging Department to eliminate pyloric stenosis.

Patient and methods. A diagnosis of colitis was strongly suggested by ultrasound. A more detailed history revealed that the patient also had episodes of colicky pain and bloody stools. An infectious colitis was subsequently excluded and rectal biopsy supported the diagnosis of allergic proctocolitis.

Results. The infant responded well to the withdrawal of cow's milk and

dairy products from the maternal diet.

Conclusion. Allergic proctocolitis should be included in the differential diagnosis of infants presenting with vomiting and/or bloody stools.

Introduction

Cow's-milk-induced allergic colitis, while common in later infancy, has rarely been described in the first weeks of life [1]. Cow's milk proteins ingested by the mother can be transferred via breast milk to a suckling infant, causing sensitization and an allergic gastroenteropathy [1–4]. To our knowledge, we describe the first case of allergic colitis where the ultrasonographic examination suggested the diagnosis. Moreover, ultrasound is a suitable tool to image the resolution of the colitis following appropriate dietary management.

Case report

An 8-week-old Caucasian male infant was admitted to The Montreal Children's Hospital with a 24-h history of projectile non-bilious vomiting and irritability. He was born at full term by normal

vaginal delivery after an uncomplicated pregnancy. He had been exclusively breast-fed since birth and was growing well. One week prior to admission, he had experienced several episodes of colicky pain with green stool containing a small amount of blood. The mother had been ingesting 4–5 glasses of milk per day, there was no history of allergy and no evidence of nipple fissure or bleeding.

The physical examination revealed a lethargic and pale, but well-nourished and well-developed infant. The vital signs were normal (temperature 36.50 C, RR 45, HR 160, BP 99/74). The abdomen was soft without distention or palpable mass. Bowel sounds were present and normal. The remainder of the physical examination was unremarkable.

Laboratory tests showed an elevated white blood cell count with mild peripheral eosinophilia (Hgb 132, HCT 353, WBC 17 with eosinophilia, $14 \times 10^9/l$, platelet 772). Lumbar puncture result and urine analysis were normal.

The abdominal series showed a non-specific bowel-gas pattern without evidence of obstruction (Fig. 1). Because of the non-bilious vomiting, an abdominal ultrasound was requested. No evidence of pyloric stenosis was seen; however, the examination revealed that the left colon and rectosigmoid were spastic and had wall thickening affecting predominantly the mucosa (Fig. 2). A di-



Fig. 1 Abdominal X-ray (supine only) showing a non-specific gas pattern without sign of obstruction, but with a mild increase in the distance between the bowel loops in the left upper quadrant

agnosis of proctocolitis was established. The infant was placed on antibiotics and a hypoallergenic formula (Alimentum) was introduced. Cow's-milk products were eliminated from the maternal diet and breast feeding was suspended, although the mother continued to pump her breasts. Stool for routine cultures including *Clostridium difficile* and repeated analyses for ova and parasites were negative. A rectal biopsy found normal ganglion cells in the submucosa, and there was a marked focal eosinophilic infiltration in the lamina propria (up to 25 eosinophils/HPF) with associated intraepithelial eosinophils (Fig. 3). The diagnosis of allergic proctocolitis was established. Three days after the beginning of treatment, because of slow improvement, the pediatric gastroenterologist requested ultrasound; a follow-up ultrasound confirmed a decrease in the inflammatory changes (Fig. 4). With improve-

ment of his clinical state, his feedings were advanced. Breast feeding was reintroduced 10 days later without sequelae.

Discussion

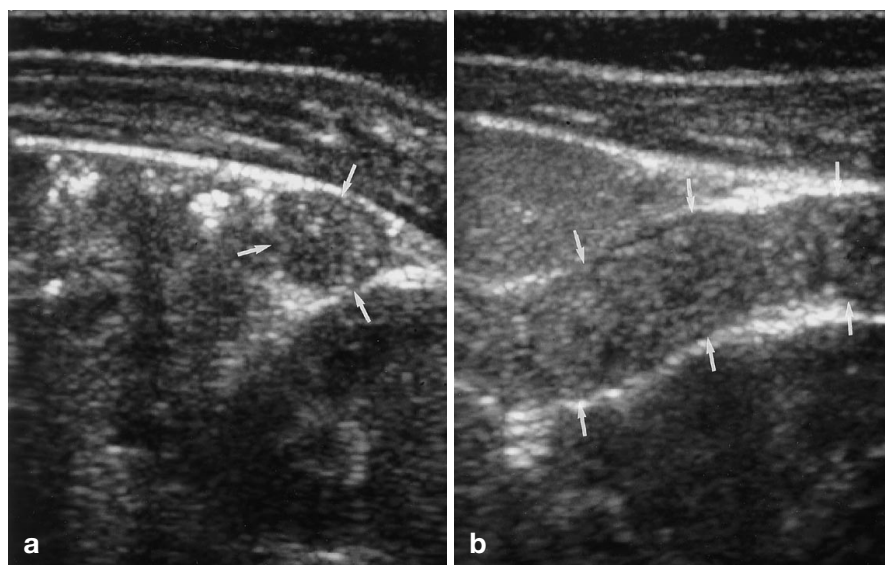
Allergic proctocolitis due to cow's milk, soy protein, and breast milk exposure is a major cause of colitis, as well as the most common cause of rectal bleeding in infants [5]. It has been established that in several mammalian species during the neonatal period, the gut is permeable to intact antigenic proteins [6]. As a result, it is believed that dietary antigens escape this immature gastrointestinal barrier and induce an immune-mediated enteropathy. It is usually a temporary disorder of early childhood [7].

Clinical presentation is variable, but often consists of bloody stools, diarrhea, vomiting, colicky pain with or without abdominal distention, and growth failure. Laboratory results include peripheral blood eosinophilia (25–50%), microcytic anemia (13–20%), mildly elevated serum IgE (43%) and low serum albumin [5, 8]. These findings are non-specific and unreliable indicators of allergic colitis [5, 8, 9].

At endoscopy, the rectal mucosa of an infant with allergic proctocolitis will appear inflamed. However, these gross mucosal features are non-specific and can mimic most any inflammatory colitis. The endoscopist therefore cannot visually distinguish between the various causes of proctocolitis.

The pathological features strongly supportive of a diagnosis of infantile allergic proctocolitis include a marked focal increase in the number of eosinophils in the lamina propria (> 60/10 HPF) with a predominance of eosinophils in cryptitis and crypt abscesses, as well as

Fig. 2a, b First ultrasound examination. **a** Transverse view and **b** sagittal view of the left colon showing a spastic colon with a loss of bowel-wall layer differentiation and thickening of mucosa and submucosa



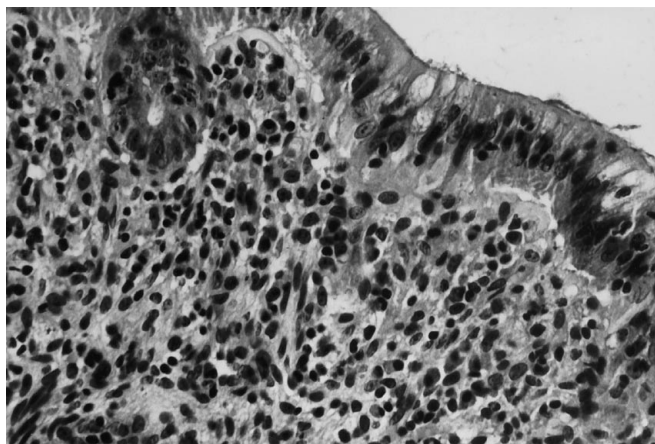


Fig. 3 Rectal biopsy shows a marked focal eosinophilic infiltration in the lamina propria with associated intraepithelial eosinophils

basal eosinophils with or without infiltration of the muscularis mucosa [10]. Signs of chronicity are typically absent, and an infectious etiology (mainly parasites) should be excluded.

The abdominal series is usually non-specific. However, at the Newhauser-Kirkpatrick Society (Montreal 1997), two cases of allergic proctocolitis were described with pneumatosis of the rectal area. Machicha et al. [9] reported that the double-contrast enema did not contribute to the diagnosis or management of these infants. Bloom et al. [11] reported four patients where the enema revealed irregular narrowing of the rectum with a caliber change to a larger sigmoid colon. The radiologist should be aware of these findings to avoid confusion with Hirschsprung's disease. However, this case report may suggest that sonographic examination can play a role in the diagnosis and follow-up if there is a slow im-

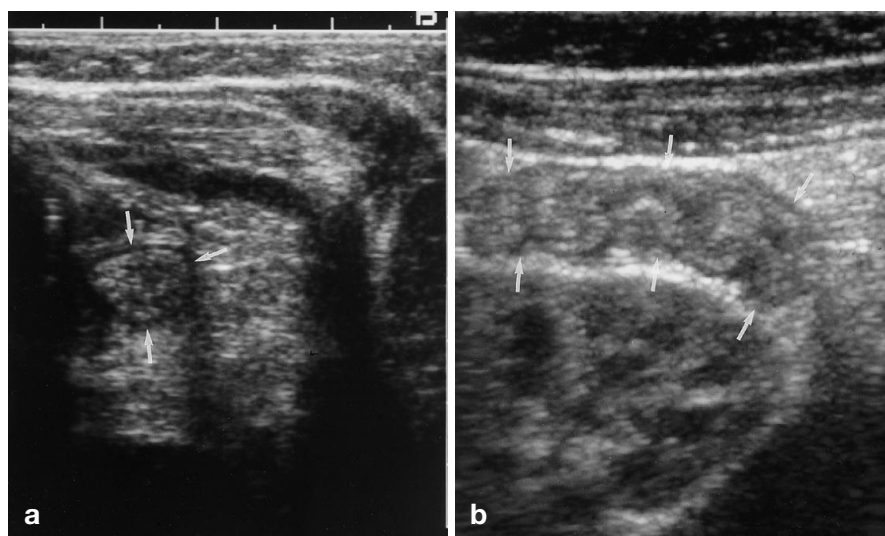
provement after treatment. Furthermore, ultrasound is a simple and inexpensive non-radiating method of examination. The study shows a spastic colon with wall thickening affecting predominantly the mucosa. The rectosigmoid and the left colon were involved in our case.

Histology is known to be unreliable in predicting the severity of the disease; perhaps ultrasound will be shown to be more successful. There is no predetermined protocol of treatment; the key to success is avoidance. The prognosis is good and spontaneous remission of cow's milk allergy occurs within the first 2 years of life, probably due to maturation of the immune and/or digestive systems.

Conclusion

Allergic colitis should be included in the differential diagnosis of any infant presenting with abdominal symptoms. It can occur in a breast-fed infant if the mother is ingesting a large amount of cow's milk and cow's milk products. An ultrasound examination can suggest the diagnosis of allergic proctocolitis in the appropriate clinical setting.

Fig. 4a,b Second ultrasound examination (5 days later). **a** Transverse view and **b** sagittal view of the left colon. They show that the colon remains spastic, but there is mild decrease in bowel-wall thickening with recognizable wall layers



References

1. Wilson NW, Self TW, Hamburger RN (1990) Severe cow's milk induced colitis in an exclusively breast-fed neonate. *Clinical Pediatr* 29: 77–80
2. O'Keefe ES (1920) The relation of food to infantile eczema. *Boston Med J* 183: 569
3. Shannon WR (1921) Demonstration of food proteins in human breast milk by anaphylactic experiments on guinea pigs. *Am J Dis Child* 22: 223
4. Kilshaw PJ, Cant AJ (1984) The passage of maternal dietary proteins into human breast milk. *Int Arch Allergy Appl Immunol* 78: 8–15
5. Goldman HG, Proujansky R (1986) Allergic proctitis and gastroenteritis in children: clinical and mucosal biopsy features in 53 cases. *Am J Surg Pathol* 10: 75–86
6. Pittschieler K (1990) Cow's milk protein-induced colitis in the breast-fed infant. *J Pediatr Gastroenterol Nutrition* 10: 548–549
7. Hills SM, Milla PJ (1990) Colitis caused by food allergy in infants. *Arch Dis Childh* 65: 132–140
8. Odze RD, Bines J, Leichtner AM, et al (1993) Allergic proctocolitis in infants: a prospective clinical-pathologic biopsy study. *Hum Pathol* 24: 668–674
9. Machicha HM, Catto Smith AG, Grant Gall D, et al (1994) Allergic colitis in infancy: clinical and pathological aspects. *J Pediatr Gastroenterol Nutrition* 19: 22–26
10. Antonioli DA (1997) Colitis in infants and children. In: Dahms BB, Qualman SJ (eds) *Gastrointestinal diseases (Perspect Pediatr Pathol, vol 20)*. Karger, Basel, pp 77–110
11. Bloom DA, Buonomo C, Fishman SJ, et al (1999) Allergic colitis: a mimic of Hirschsprung disease. *Pediatr Radiol* 29: 37–41

Pediatr Radiol (2000) 30: 382
© Springer-Verlag 2000

PICTORIAL INTERLUDE

Gerhard H. Mostbeck¹ (✉) · Jasmin Liskutin¹ · Roland Dorffner¹ · Barbara Bittmann² · Mathias Resinger³
Department of¹ Radiology and Nuclear Medicine, ²Paediatrics and ³Surgery, Hospital of the Brothers of St. John, Esterhazystr. 26, 7000 Eisenstadt, Austria

Ultrasonographic diagnosis of a bleeding Meckel's diverticulum

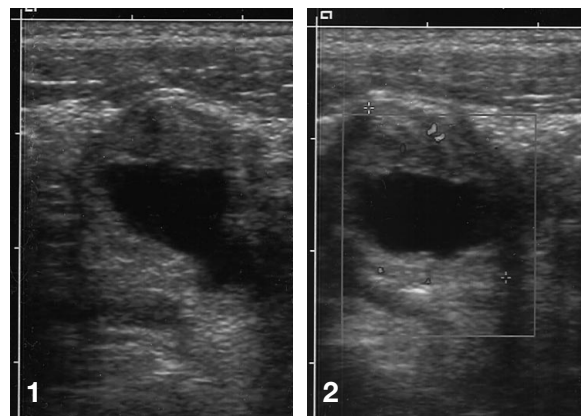
A previously healthy 12-year-old boy presented with a 1-day history of colicky periumbilical pain followed by severe rectal bleeding. High-resolution US demonstrated a 2-cm cystic lesion in the mid lower abdomen, having the appearance of a blind-ending thick-walled loop of bowel with a clear connection to a peristaltic, normal small-bowel loop (Fig. 1). The echo-free contents could not be compressed or expressed into the connecting bowel loop. Convergent colour Doppler did not reveal hyperperfusion of the thickened wall (Fig. 2). It was painless on compression. A diagnosis of Meckel's diverticulum (MD) was made.

At surgery, a thick-walled MD containing blood was found and resected. It contained ectopic gastric mucosa and a bleeding peptic ulcer. The postoperative course was uneventful.

In children, symptomatic MD usually presents with bowel obstruction, bleeding and inflammation. Diagnosis before surgery is considered difficult, and imaging is based on scintigraphic (Meckel scan) and barium techniques (enteroclysis), with angiography being an alternative in adults. There are only a few reported cases of the US findings of various complications of

Fig. 1 High-resolution US showing a cystic structure in the lower abdomen. A thickened wall is connected to normal, peristaltic bowel loop (in the 4 o'clock position)

Fig. 2 Colour Doppler US showing only a few dots of colour-encoded blood flow within the thickened bowel wall



MD, such as bleeding, inversion and inflammation [1–3]. As in this case, a thick-walled, blind-ending painless bowel loop with connection to normal bowel might be diagnostic of MD with ectopic tissue. Colour Doppler techniques do not seem to add additional information. High-resolution US should be considered as a non-invasive tool for diagnosing symptomatic MD.

References

1. Daneman A, Myers M, Shuckett B, et al (1997) Sonographic appearance of inverted Meckel diverticulum with intussusception. *Pediatr Radiol* 27: 295–298
2. Itagaki A, Uchida M, Ueki K, et al (1991) Double targets sign in ultrasonic diagnosis of intussuscepted Meckel diverticulum. *Pediatr Radiol* 21: 148–149
3. Poelman JO, Hupscher DN, Ritsema GH (1991) Sonographic manifestation of an inflamed Meckel's diverticulum: a case report. *Eur J Radiol* 12: 45–46