Turk J Gastroenterol 2005; 16 (2): 93-97

Chronic intestinal pseudoobstruction: Report of four pediatric patients

Kronik intestinal psödoobstrüksiyon: 4 çocuk olgunun sunumu

Buket DALGIÇ[1], Sinan SARI[1], İbrahim DOĞAN[2], Selahattin ÜNAL[2]

[1]*Department of Pediatric Gastroenterology,* [2]*Department of Gastroenterology, Gazi University Medical School, Ankara*

Chronic intestinal pseudoobstruction is a rare disorder of intestinal motility, characterized by recurrence of continuous symptoms and signs of intestinal obstruction in the absence of true mechanical obstruction. Congenital or systemic disorders are the causes of chronic intestinal pseudoobstruction. The term idiopathic is applied when there is no congenital or secondary cause. Early diagnosis of intestinal pseudoobstruction is important to avoid repeated laparotomies. Treatment of chronic intestinal pseudoobstruction is usually supportive. Besides the supportive therapy, prokinetic agents such as erythromycin and octreotide are used in the therapy. In this article, four pediatric patients diagnosed as chronic intestinal pseudoobstruction are discussed with their clinical findings and laboratory abnormalities. The etiology of chronic intestinal pseudoobstruction was visceral myopathy in one patient. Two had idiopathic chronic intestinal pseudoobstruction and the other patient developed chronic intestinal pseudoobstruction after cardiac surgery. Erythromycin was administered to all four patients, one of whom did not respond to this therapy. Octreotide was effective in this case.

Key words: Children, chronic intestinal pseudoobstruction, octreotide

Kronik intestinal psödoobstrüksiyon nadir görülen intestinal motilite hastalığıdır. Mekanik obstrüksiyon bulgusu olmaksızın intestinal obstrüksiyonun tekrarlayan veya devamlı bulguları ile karakterizedir. Konjenital veya sistemik hastalıklar etyolojide rol oynar. Konjenital veya sekonder bir sebep tespit edilemediğinde hastalık idiyopatik olarak isimlendirilir. İntestinal psödoobstrüksiyon tanısı erken konulduğunda gereksiz cerrahi girişimlerden kaçınılmış olur. Psödoobstrüksiyonun tedavisinde destekleyici tedaviler yanında oktreotid gibi prokinetik ilaçlar da kullanılmaktadır. Bu makalede kronik intestinal psödoobstrüksiyonlu dört çocuk olgunun klinik ve laboratuvar bulguları tartışıldı. Hastalardan birinde etyolojiden geçirilmiş kardiyak cerrahi, diğerinde viseral myopati sorumlu idi. Diğer iki hastada sebep bulunamadı ve idiyopatik olarak kabul edildi. Hastaların hepsine eritromisin tedavisi verildi. Bir olgu eritromisin tedavisine yanıt vermeyince oktreotid kullanıldı. Bu hastada oktreotid tedavisine çok iyi yanıt alındı.

Anahtar kelimeler: Çocuk, kronik intestinal psödoobstrüksiyon, oktreotid

INTRODUCTION

Chronic intestinal pseudoobstruction (CIP) is a rare, severe gastrointestinal disorder in which intestinal motility is impaired. CIP causes recurrent signs and symptoms of intestinal obstruction in the absence of true mechanical obstruction (1). It may occur as a primary disease or may be secondary to systemic disorders (i.e. muscular dystrophies, connective tissue disorders, endocrine and infiltrative diseases). Pseudoobstruction may occur in any part of the gastrointestinal tract. Clinical presentation may depend on the localization of disease. The most frequent symptoms are vomiting, abdominal distention, pain, constipation, weight loss and diarrhea. Extraintestinal abnormalities may also occur (i.e. megacystis, mega-urethra, recurrent urinary tract infection). Patient's history, physical examination, radiologic, manometric, electrogastrographic and histologic studies are useful methods for diagnosis (1-3).

In this article, four pediatric cases of CIP are discussed with their clinical findings and laboratory abnormalities.

CASE REPORTS

Case 1

An 11-year-old girl, the second child of nonconsanguineous parents, was referred to our center beca-

Address for correspondence: Buket DALGIÇ
Beyazgül Sitesi B/9 Koru Mah. Ümitköy, Ankara, Turkey
Phone: +90 312 202 51 30 • Fax: +90 312 215 01 43
E-mail: buketdalgic@yahoo.com

Manuscript received: 08.11.2004 **Accepted:** 08.02.2005

use of abdominal pain, abdominal distention and intermittent diarrhea without blood and mucus. She was operated for atrial septal defect 18 months previously and her complaints began one month after this operation. Her height and weight were 136 cm (10-25 percentile) and 27 kg (3-10 percentile), respectively. On physical examination, she had abdominal distention with diminished bowel sounds and an operation scar on sternum. Laboratory studies revealed normal blood count, sedimentation rate, electrolytes, blood glucose, and liver and renal function tests. Serum creatine phosphokinase (CPK), C-reactive protein (CRP) and C3, C4 levels were within normal levels. Stool analysis for fat globules, reducing substance and blood were negative. Investigations of stool for bacterial and parasitologic agents were also negative. Antigliadin (AGA) and antiendomysial (EMA) antibody assays for celiac disease, cytomegalovirus (CMV) serology, autoantibodies (ANA, anti dsDNA, anti SMA) and metabolic screening (urine and blood aminoacids, urine organic acids, plasma lactic acid) were negative. Plain and contrasted X-rays of the abdomen showed dilated loops of bowel with air-fluid levels (Figure 1). Abdominal ultrasonography and contrasted X-rays showed no mechanical obstruction. Abdominal tomography revealed dilated bowel loops with air-fluid levels and diffuse free air in the abdomen (Figure 2). Esophageal motility showed no abnormality and gastric dysrhythmia was assigned by electrogastrography.

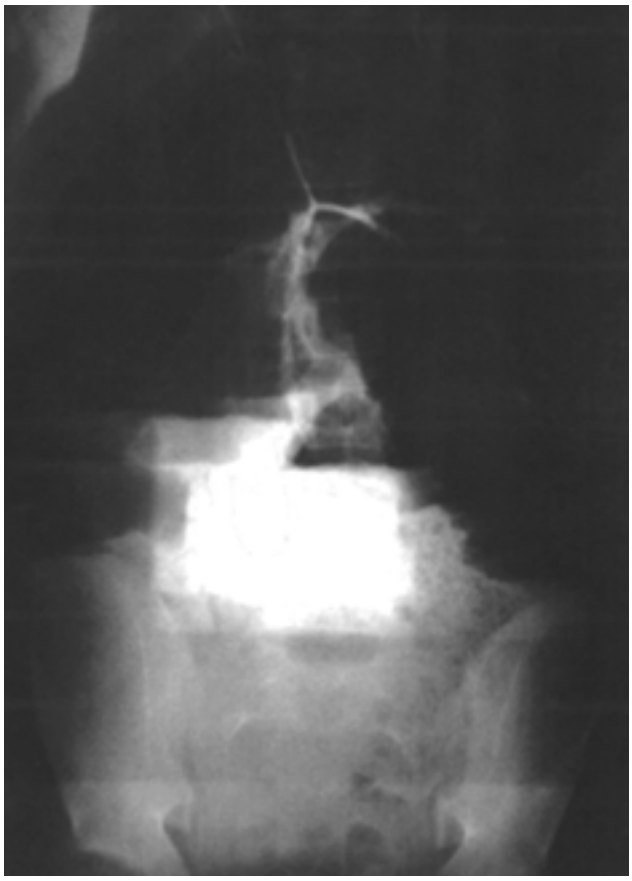

Figure 1. Direct and contrasted X-rays of the abdomen showed dilated loops of bowel with air-fluid levels

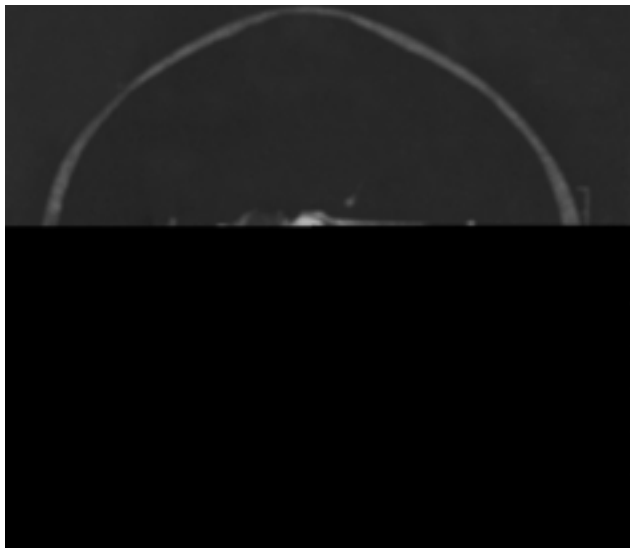

Figure 2. Abdominal tomography revealed dilated bowel loops with air-fluid levels and diffuse free air in the abdomen

Case 2

A 12-year-old girl who was the only child of unrelated parents was admitted to our clinic with the complaints of abdominal pain and distention for six months. Appendectomy was performed two years previously. She had abdominal distention on physical examination. Her height and weight were 157 cm (75-90 percentile) and 48 kg (50-75 percentile). Laboratory findings revealed normal complete blood count, sedimentation rate, electrolytes, and liver and renal function tests. CRP, CPK, parathyroid hormone level, C3, C4 levels, thyroid function tests and urine analyses were also within normal limits. Metabolic screening, viral markers, AGA, EMA and other autoantibodies (ANA, anti dsDNA, anti SMA) were negative. Contrasted X-rays of the abdomen showed gastric dilatation. Electrogastrography revealed gastric dysrhythmia and gastroesophageal reflux was assigned by 24-hour pH-monitorization. Abdominal tomography revealed no abnormalities.

Case 3

A 14-year-old boy with the complaints of abdominal pain, abdominal distention, diarrhea and vomiting for four years was referred to our clinic. He had one healthy brother. His height and weight were 136 cm (below 3 percentile) and 32 kg (3-10 percentile), respectively. On physical examination he had abdominal distention with diminished bowel sounds. Except for iron deficiency anemia, all other laboratory tests including renal and liver function tests, serum electrolytes, sedimentation rate, CRP, CPK, C3, C4 levels, thyroid function tests and urine analyses were within normal limits. Fat globules, reducing substance, blood, parasitic and bacterial agents were negative in stool analysis. Autoantibodies, viral markers and screening for metabolic disease were negative. Plain and contrasted X-rays of the abdomen showed dilated bowel loops and gastric dilatation. Mechanical obstruction was ruled out by the contrasted X-rays and abdominal ultrasonography. Gastric dysrhythmia was revealed by electrogastrography.

Case 4

An 11-year-old girl was consulted with the complaints of anorexia, abdominal pain and distention. Her complaints began three months previously. She had been hospitalized for acute gastroenteritis and dehydration one year previously. On physical examination she had abdominal distention. Bowel sounds were normal. Complete blood count, urine analysis, sedimentation rate, electrolytes, and liver and renal function tests were within normal limits. Stool analyses for fat globules, reducing substance and blood were negative. Investigations of stool for viral, bacterial and parasitologic agents were negative. Plain and contrasted X-ray of the abdomen showed dilated loops of bowel with air-fluid levels. Mechanical obstruction was ruled out by abdominal ultrasonography and contrasted X-rays. Abdominal and pelvic tomography revealed dilated bowel loops. Thyroid function tests were within the normal range. AGA and EMA, autoantibodies and viral markers were negative. Serum alpha-fetoprotein and carcinoembryonic antigen were assayed for paraneoplastic pseudoobstruction, and these results were within normal limits. Esophageal motility showed no abnormality. Gastric antral dysrhythmia had been assigned by electrogastrography. The full-thickness biopsy of the rectum revealed submucosal edema and slightly thickened muscularis propria. On the high power examination, smooth muscle cells showed vacuolar degeneration together with surrounding fibrosis (Figure 3).

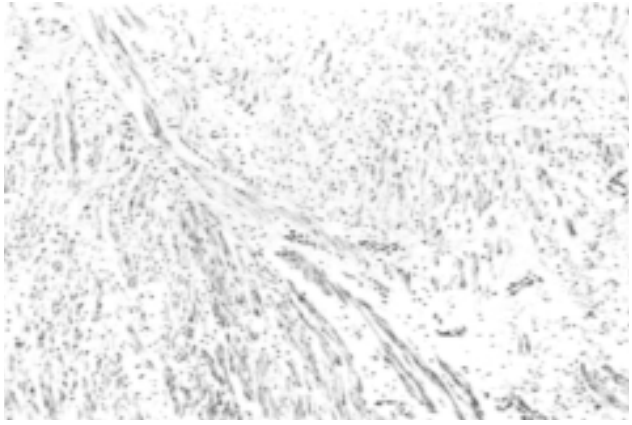

Figure 3. Smooth muscle cells showed vacuolar degeneration together with surrounding fibrosis

DISCUSSION

CIP is a rare disabling disorder characterized by recurrent or continuous symptoms and signs of bowel obstruction in the absence of a lumen obstructing lesion (1). The etiology of CIP is unknown. This syndrome is classified as primary or secondary. Primary CIP is classified either as congenital or acquired, based on the symptoms present at birth. Primary CIP is also classified as either myopathic or neuropathic depending on histopathology. This form is seen commonly in children and usually symptomatic during or immediately after birth. Extraintestinal abnormalities may also occur (i.e. megacystis, mega-urethra, recurrent urinary tract infection). The secondary or acquired form is more common in adults than children. The causes of secondary CIP are gastrointestinal smooth muscle and nervous system disease, and endocrinologic, metabolic, autoimmune disorders and infections (i.e., CMV, Epstein-Barr virus - EBV) (1, 2). Surgery, such as abdominal-pelvic, cardiovascular and neurosurgery, is the other etiologic factor in CIP (4). The term idiopathic is applied when the disorder does not fit a recognizable genetic syndrome, when there is no apparent secondary cause, and when affected tissues are unavailable or appear normal under histologic examination (1).

Diagnosis of CIP is possible with documentation of intermittent or persistent bowel obstruction-like findings on physical and radiologic examination (such as dilated bowel loops with air-fluid levels)

(1). But the most important factor for diagnosis of pseudoobstruction is to have a high index of suspicion. Patient's history may provide a clue that the patient does not have a mechanical obstruction. Coexistence of vomiting, abdominal distention, constipation or diarrhea, symptom-free intervals, chronicity of symptoms, weight loss, positive family history of visceral myopathies or neuropathies, and non-diagnostic laparotomy history suggest CIP (3). Besides the clinical findings, radiologic and manometric studies, electrogastrography, and histologic examination are useful for the diagnosis. The contrasted X-rays of the abdomen are useful in ruling out any mechanical obstruction. Radiologic findings include dilatation without stenosis, reduced intestinal peristaltic activity, delayed gastric emptying, and loss of haustral marking of the colon (1). Histologic studies (full-thickness biopsy of the intestinal wall) allow demonstration of the intrinsic nervous system and enteric musculature (5). For histologic analysis, full-thickness biopsies performed by surgery are useful. But full-thickness biopsies are not always necessary because more specific physiologic tests (e.g., manometry and transit studies) can be sufficient for the diagnosis. Surgery may cause adhesions, so interpretation of subsequent obstructive episodes is difficult. Furthermore, full-thickness biopsies may not alter the clinical management or impact the outcome of the disorder for the patient (1, 2). Thus, demonstration of histologic abnormalities is not required for diagnosis (3, 6).

If pseudo-obstruction is congenital and persists for the first two months of life, or if the disorder is acquired and persists for more than six months, it is considered chronic (1).

All of our patients had complaints of abdominal pain and distention persisting for more than six months. Medical history and clinical and radiologic findings were compatible with CIP in our cases. Gastric antral dysrhythmia had been demonstrated by electrogastrography in all patients. Full-thickness biopsy was performed only in one patient (Case 4). Histologic findings were compatible with visceral myopathy. Secondary CIP was ruled out (gastrointestinal smooth muscle and nervous system disease, endocrine and metabolic disorders, infections, autoimmune causes) in all patients. In the end, the etiology of two patients (Cases 2, 3) was considered as idiopathic and for the other (Case 1) post-operative (atrial septal defect correcting operation).

Treatment of CIP is usually palliative. The aim is to control the symptoms, thereby promoting adequate nutritional support for maintaining normal growth and development, improving the motility of the digestive tract and preventing complications (2, 3, 7). Treatment includes diet (frequent meals of low fiber, low lactose, elemental or polypeptide-predominant food), parenteral and enteral nutrition, antibiotics for preventing bacterial overgrowth, prokinetic agents (erythromycin, cisapride, metoclopramide, bethanechol, domperidone and neostigmine), octreotide, nasogastric decompression and surgery (gastrostomy, duodeno-jejunostomy, duodenoplasty, resection-bypass, colectomy and intestinal transplantation) (1-3, 8). We used nasogastric tube for intestinal decompression. The patients were given metronidazole for bacterial overgrowth. Erythromycin was used as a prokinetic agent. After four weeks of therapy, the symptoms of three patients (Cases 1, 3, 4) were resolved.

Prokinetic drugs stimulate antroduodenal motility and gastric emptying, and have been used for restoring the impaired gastrointestinal motility in patients with CIP, but with only limited success (9-12). Also, in one study it was shown that the efficiacy of erythromycin among patients carrying neurogenic CIP and presenting severe impairment of motility was not significant (13).

In the treatment of Case 2, we used octreotide (50 μg daily, subcutaneously) because of failure of therapy with erythromycin, metronidazole and nasogastric decompression. Her symptoms were resolved after two weeks. Octreotide was successfully used in CIP secondary to connective tissue diseases in adults. It is also reported that octreotide therapy is effective in children (14-20).

In this report we submit four cases who were admitted with intestinal obstruction findings and treated successfully by medical therapy. No enteral and parenteral nutrition and/or surgical therapy was needed in any case. Patients with neonatal onset (congenital CIP), acute onset, urinary tract involvement, short small intestine, midgut malrotation or myopathic histology are usually the most in need of total parenteral nutrition and surgery with poor prognosis in the pediatric age group (6, 13, 21-23). Late onset of symptoms, etiology, and lack of extraintestinal findings may have contributed to the good response to medical therapy in our series.

In the long-term follow-up: Case 1 was discharged from our hospital with good response to erythromycin therapy. But she was operated for suspected mechanical intestinal obstruction in another medical center and died in the postoperative period. Case 2 was followed for one year in our department with medical therapy. Because of poor response to erythromycin, octreotide was given for four months. After the cessation of octreotide therapy she had no recurrence. Case 3 was followed for 18 months. Because of the recurrence of the disease during the follow-up, he is still on erythromycin therapy. Case 4 was followed for six months, but after this period was lost to follow-up.

In conclusion, we emphasize the importance of recognition and accurate diagnosis of CIP in childhood. The most important step in the diagnosis is to consider this diagnosis early in order to avoid repeated laparotomies searching for bowel obstruction.

REFERENCES

1. Rudolph CD, Hyman PE, Altschuler SM, et al. Diagnosis and treatment of chronic intestinal pseudo-obstruction in children: report of consensus workshop. J Pediatr Gastroenterol Nutr 1997; 24: 102-12.
2. Smith DS, Williams CS, Ferris CD. Diagnosis and treatment of chronic gastroparesis and chronic intestinal pseudo-obstruction. Gastroenterol Clin N Am 2003; 32: 619-58.
3. Di Lorenzo C. Pseudo-obstruction: current approaches. Gastroenterology 1999; 116: 980-7.
4. Thiel ER, Bircks W. Acute pseudo-obstruction of the colon (Ogilvie's syndrome) following open heart surgery. Thorac Cardiovasc Surg 1990 Dec; 38(6): 371-3.
5. Rohrman CA, Ricci MT, Krishnamurthy S, et al. Radiologic and histologic differentiation of neuromuscular disorders of the gastrointestinal tract. Visceral neuropathies and progressive systemic sclerosis. AJR 1984; 143: 933-41.
6. Faure C, Goulet O, Ategbo S, et al. Chronic intestinal pseudo-obstruction syndrome: clinical analysis, outcome, and prognosis in 105 children. Dig Dis Sci 1999; 44: 953-9.
7. Almeida PS, Penna FJ. Chronic intestinal pseudo-obstruction in childhood - report of seven cases. J Pediatr 2000; 76: 453-7.
8. Goulet O, Talbotec C, Ricour JC. Nutritional management of pediatric patients with chronic intestinal pseudo-obstruction syndrome. J Pediatr Gastroenterol Nutr 2001; 32: 44-7.
9. Laustsen J, Harling H, Fallingborg J. Treatment of chronic idiopathic intestinal pseudo-obstruction. Dig Dis Sci 1987; 32: 222-3.
10. Berger SA, Keshavarzian A, DeMeo MT, et al. Erythromycin in chronic intestinal pseudo-obstruction. J Clin Gastroenterol 1990; 12: 363.
11. Camillieri M, Balm RK, Zinsmeister AR. Determinants of response to a prokinetic agent in neuropathic chronic intestinal motility disorder. Gastroenterology 1994; 106: 916-23.
12. Vargas JH, Sachs P, Ament ME. Chronic intestinal pseudo-obstruction syndrome in pediatrics: results of a national survey by members of the North American Society of Pediatric Gastroenterology and Nutrition. J Pediatr Gastroenterol Nutr 1988; 7: 323-32.
13. Cucchiara S, Minella R, Scoppa A. Antroduodenal motor effects of intravenous erythromycin in children with abnormalities of gastrointestinal motility. J Pediatr Gastroenterol Nutr 1997; 24: 411-8.
14. Soudah HC, Hasler W, Owyang C. Effect of octreotide on intestinal motility and bacterial overgrowth in scleroderma. N Engl J Med 1991; 325: 1461-7.
15. Marie I, Kerleau JM, Ducrotte P, et al. Intravenous immunoglobulins and octreotide as treatment of intestinal pseudo-obstruction revealing a recurrence of polymyositis. Rheumatology 2001; 40: 1072-3.
16. Perlemuter G, Cacoub P, Chaussade S, et al. Octreotide treatment of chronic intestinal pseudoobstruction secondary to connective tissue diseases. Arthritis Rheum 1999; 42: 1545-9.
17. Owyang C. Octreotide in gastrointestinal motility disorders. Gut 1994; 35 (Suppl 3): 11-4.
18. Di Lorenzo C, Lucanto C, Flores AF, et al. Effect of octreotide on gastrointestinal motility in children with functional gastrointestinal symptoms. J Pediatr Gastroenterol Nutr 1998; 27: 508-12.
19. Di Lorenzo C, Lucanto C, Flores AF, et al. Effect of sequential erythromycin and octreotide on antroduodenal manometry. J Pediatr Gastroenterol Nutr 1999; 29: 293-6.
20. Verne GN, Eaker EY, Hardy E, et al. Effect of octreotide and erythromycin on idiopathic and scleroderma associated intestinal pseudo-obstruction. Dig Dis Sci 1995; 40: 1892-1901.
21. Heneyke S, Smith VV, Spitz L, et al. Chronic intestinal pseudo-obstruction: treatment and long term follow up of 44 patients. Arch Dis Child 1999; 81: 21-7.
22. Mousa H, Hyman PE, Cocjin J, et al. Long term outcome of chronic intestinal pseudoobstruction. Dig Dis Sci 2002; 47: 2298-2305.
23. Goulet O, Jobert-Giraud A, Michel JL, et al. Chronic intestinal pseudo-obstruction syndrome in pediatric patients. Eur J Pediatr Surg 1999; 9: 83-90.