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Abdominal pain as a result of intermittent hydronephrosis

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Abstract. – OBJECTIVE: We report a minority of cases presented with abdominal pain due to intermittent hydronephrosis, to improve the recognition of this condition.

PATIENTS AND METHODS: We retrospectively studied 1152 children complained of abdominal pain in our center from January 2010 to December 2015. Also, we analyzed the clinical presentation, treatment experience, examination results, and image features in detail.

RESULTS: 14 patients received a diagnosis of intermittent hydronephrosis including 11 boys and 3 girls. 9 patients were affected on the left kidney and other 5 on the right side. All children presented recurrent abdominal pain, and the ultrasound images varied during different stages. All patients had been misdiagnosed and delayed treatment.

CONCLUSIONS: Abdominal pain caused by intermittent hydronephrosis is easily misdiagnosed; all preschool children with a history of recurrent abdominal pain should be suspected of this condition.

Key Words:
Abdominal pain, Intermittent hydronephrosis, Ureteropelvic junction obstruction, Pre-school children.

Introduction

Abdominal pain is one of most common complaints of the preschool children seeking for medical help. In most cases, pain is caused by a variety of reasons like gastrointestinal diseases or extra-abdominal diseases[1]. However, we noticed that a small portion of cases may present abdominal pain caused by intermittent hydronephrosis. The description of intermittent hydronephrosis can be traced back to 1672 by Nicholaes Tulpius[2], the condition is unfamiliar to the majority clinicians, especially for the young physicians, and we found these cases are easily misdiagnosed. We described a series of patients presenting abdominal pain caused by intermittent hydronephrosis to improve the recognition of this condition.

Patients and Methods

We retrospectively studied 1152 children complained of abdominal pain in our center from January 2010 to December 2015. According to the final diagnosis, 14 patients were diagnosed with intermittent hydronephrosis. Intermittent hydronephrosis mainly performed as recurrent abdominal pain associated with ureteropelvic junction obstruction (UPJO) during an acute attack while no abnormalities during symptom-free intervals[3]. For these patients, we reviewed the clinical presentation, treatment experience, examination results, and image features in detail. A telephone call or e-mail follow-up was made when the information was not complete.

Results

From January 2010 to December 2015, 14 patients received a diagnosis of intermittent hydronephrosis in our center. The 14 subjects included 11 boys and 3 girls, their ages ranged from 3.1 to 8.2 years, and the median age is 4.6 years. 9 patients were affected on the left kidney and the other 5 were on the right one (Table I). Recurrent abdominal pain was the main presentation. In most cases, the pain was sudden onset without any identifiable precipitating factor, while we found the pain attack can be initiated by increased fluid intake or vigorous physical activity in 3 children. The pain was acute and sharp, which was similar to intestinal colic; the episodes typically lasted minutes to hours, followed by symp-

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tom-free intervals ranged from couple days to some months. Our patients hardly could tell us the sensation accurately; they predominantly located the pain in the renal area, upper abdominal, and periumbilical area. In addition to abdominal pain, 9 children had nausea and vomiting; other accompanied signs included palpable abdominal mass, gross hematuria, urinary frequency, urinary urgency, and hypertension can be found in half of the children. Laboratory tests were normal in almost all patients, while the image features of ultrasonography varied depending on the different period of the disease. During acute attack period, nearly all of the patients had either moderate or severe hydronephrosis on ultrasonography, while during symptom-free stage the patients had only mild hydronephrosis or pelvic dilation. Renal pelvic wall thickening can be detected in all patients during convalescence; it usually persisted for 6-9 days and then disappeared. 8 children conducted MR to show the renal image and to rule out extrinsic lower polar vessels. 3 patients also took a MAG3 scan to show the function of the affected kidney. In most cases, the abdominal pain can relieve spontaneously without any medical intervention. Only when the attack occurred many times or in severe conditions, the parents took the children to the hospital for medical help. Unfortunately, all of the 14 children were misdiagnosed at the first visit to hospital. In our group, 10 children (71.4%) were diagnosed with acute gastroenteritis or inflammatory bowel disease, 3 children were diagnosed with urinary tract infection and the other one was diagnosed with urinary stone. As a result of misdiagnose, most of our patients didn't receive the correct treatment on time. Symptomatic treatment as analgesic and antibiotics have been most frequently used. The oral administration was effective in most cases, but in severe condition intravenous administration was necessary (Table II).

Table I. Characteristic of the patients.

Total cases	42
Median age (year)	4.7
M:F ratio	38:4
Affected side	
Left	35 (83.3%)
Right	7 (16.7%)
Operation	
Open surgery	30 (71.4%)
Laparascopic	12 (28.6%)
Postoperative complications	1 (2.63%)

Discussion

In our work, the majority of patients were boys (78.6%) and the left kidney was affected more than the right one. Intermittent pain, ureteric colic with vomiting, and hematuria are the most common symptoms, also known as Dietl's crisis. It was first described in patients with lower polar vessels causing intermittent hydronephrosis by Dietl in 1864[4]. However, only a minority of patients possesses the diagnosis of intermittent hydronephrosis[5]. A study of school-aged children showed that UPJO was the cause of abdominal pain in about 1 of 100[5]. Besides, the pain of in-

Table II. Clinical features of the patients.

Clinical features	No. (%)	Clinical features	No. (%)
Quality of pain		Duration of acute episode (d)	
Cramping	26 (61.9%)	< 1	33 (78.6%)
Dull	16 (38.1%)	1-2	6 (14.3%)
Precipitating factors		2-3	3 (7.1%)
None identified	24 (57.1%)	Frequency of attacks	
Increased fluid intake	13 (31.0%)	Every 1 week	5 (11.9%)
Vigorous exercise	5 (11.9%)	Every 2 weeks	7 (16.7%)
Location of pain		Every 1 month	12 (28.6%)
Flank/abdominal	28 (66.7%)	Every 2-3 months	18 (42.8%)
Periumbilical	8 (19.0%)	Accompanied symptoms and signs	
Epigastric area	6 (14.3%)	Nausea and vomiting	28 (66.7%)
Course of disease (month)		Palpable abdominal mass	5 (11.9%)
1M-6M	19 (45.2%)	Gross hematuria	4 (9.5%)
6M-12M	14 (33.3%)	Urinary frequency	2 (4.8%)
>12M	9 (21.5%)	Hypertension	3 (7.1%)

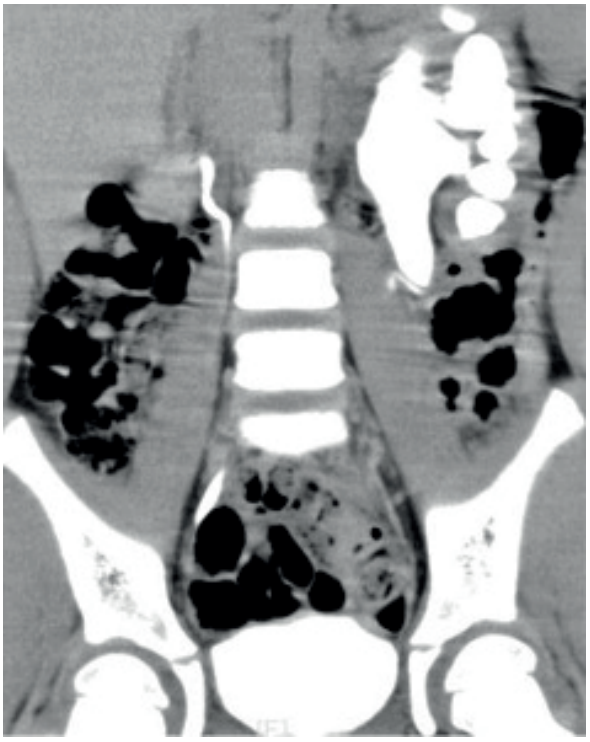

Figure 1. CT scan showing the aberrant vessel crossing the left renal pelvis.

termittent hydronephrosis has no specific nature, it can mimic almost any intra-abdominal pathology, so it is easy to miss the diagnosis unless a high index of suspicion. Compared with classic UPJO, intermittent hydronephrosis is a special condition that requires a different diagnostic strategy. A detailed history is the key to distinguish this condition; any pre-school children who had the history with recurrent abdominal pain should be suspected with the intermittent hydronephrosis. As the obstruction usually leads no loss of renal function, so the laboratory tests are unlikely helpful in the diagnosis. An immediate ultrasound is required when the next abdominal pain occurs, and another ultrasound during the symptom-free stage as a comparison. Further examinations like MAG3 scan, MR angiography, intravenous urography, retrograde pyelogram, and biopsy of the lesion, can all help in the diagnosis[6]. The pain of intermittent hydronephrosis is due to an intermittent obstruction. The actual pathophysiology is not clear so far. The possible etiologies have been separated into extrinsic and intrinsic categories. Extrinsic etiology may be associated with improper rotation of kidney, or crossing lower pole renal vessels inhibiting the proper flow of urine[7]. Aberrant vessels crossing ureteropelvic junction are the most common extrinsic causes of UPJO. The incidence has been reported to range from 11% to 15% in children[8], but the rate may reach up to 58% in older children with symptomatic UPJO[9]. Intrinsic causes included congenital narrowing of the proximal ureter or abnormal peristalsis at the ureteropelvic junction[10]. Patel et al[11] had reported a child presented with recurrent attacks of Dietl's crisis caused by upper ureteral polyp. Most of mild or moderate hydronephrosis may resolve spontaneously or improve with conservative treatment, but severe hydronephrosis can lead to glomerulosclerosis, medullary dysplasia or interstitial fibrosis. Therefore, earlier diagnosis of intermittent hydronephrosis can prevent acute or chronic dysfunction. Once diagnosed, surgical is the best treatment.

Conclusions

Abdominal pain caused by intermittent hydronephrosis is easily misdiagnosed; all preschool children with a history of recurrent abdominal pain should be suspect with this condition.

Conflict of Interest

The Authors declare that they have no conflict of interest.

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