

FWT Cheng 鄭偉才
TF Leung 梁廷勳
N Lee 李禮舜
F Yap 葉曉怡
J Hui 許鍾妮
TF Fok 霍泰輝
PC Ng 伍百祥

Fever, pulmonary haemorrhage, and acute renal failure in a young girl

一宗女童併發出現發燒、肺出血和急性腎衰竭的病例

Leptospirosis is rarely reported in children. It is easily treated with antibiotics but can be fatal if treatment is delayed. A 12-year-old girl was diagnosed with Weil syndrome, a severe form of leptospirosis, 10 days after returning from Mainland China. She presented with fever, hypotension, jaundice, and acute renal failure. She had used well water for bathing and swum in freshwater.

兒童患上鉤端螺旋體病的病例非常罕見。其病發後只須施用抗生素即可治癒，但延誤治療則可致命。本病例的女童12歲，從內地回港10天後，被診斷患上韋爾氏綜合症，一種嚴重的鉤端螺旋體病。女童出現發燒、低血壓、黃疸和急性腎衰竭的症狀，她之前曾在內地用井水洗澡及在河流游泳。

Introduction

Leptospirosis is a zoonotic spirochetal disease caused by the bacterium *Leptospira*. Between 2001 and 2003 four cases of leptospirosis were reported in Hong Kong. A further six cases were reported in 2004, one of which was imported. Four of these cases, which occurred in adults, were epidemiologically linked to rafting.¹ More cases may occur but remain unreported due to ignorance of the condition. Infected patients usually present with non-specific features. Prompt diagnosis and treatment is vital to prevent serious complications and death.

Case report

A 12-year-old girl was admitted to the Prince of Wales Hospital in August 2004 with a 2-day history of malaise and dizziness. On admission, she was pyrexial and complained of headache, vomiting, photophobia, myalgia, and arthralgia. Her condition rapidly deteriorated and after 5 days she developed severe respiratory distress, haemoptysis, haematuria, hypotension, and hyperbilirubinaemia. Multi-organ failure necessitated her transfer to the intensive care unit of a tertiary referral centre. Acute respiratory distress syndrome and acute renal failure were diagnosed and confirmed by laboratory and radiological findings (Table, Fig). Mechanical ventilation, inotropic support, and continuous veno-venous haemofiltration were commenced.

Assessment on admission revealed that she had travelled to Ping Hoi, a rural area of Guangdong, 10 days prior to onset of symptoms. She had bathed with well water and swum in freshwater. She had not walked barefoot. Her aunt, who had travelled with her, was asymptomatic and no other family members became ill.

Empiric treatment with third-generation cephalosporin and macrolide was prescribed. After 1 week, her condition deteriorated and piperacillin-tazobactam was commenced in place of cephalosporin. Renal function

Key words:

Child;
Leptospirosis;
Weil disease

關鍵詞：

兒童；
鉤端螺旋體病；
韋爾氏病

Hong Kong Med J 2005;11:408-10

The Chinese University of Hong Kong,
Prince of Wales Hospital, Shatin,
Hong Kong:

Department of Paediatrics

FWT Cheng, MB, ChB, MRCPCH

TF Leung, MD, MRCPCH

J Hui, FRACP, FHKAM (Paediatrics)

TF Fok, MD, FRCPE

PC Ng, MD, FRCPC

Department of Medicine and Therapeutics

N Lee, MRCP, FHKAM (Medicine)

Department of Anaesthesia and Intensive Care

F Yap, FHKAM (Anaesthesiology)

Correspondence to: Dr TF Leung
(e-mail: leung2142@cuhk.edu.hk)

Table. Laboratory findings

Laboratory finding	Reference range	Before CVVH*	Day 9 [†]	Day 15 [†]
Haemoglobin (g/L)	132-167	93	93	101
Platelet count (x 10 ⁹ /L)	140-380	13	87	679
White cell count (x 10 ⁹ /L)	4.0-10.8	23.4	20.6	6.4
Urea (mmol/L)	3.4-8.9	15.5	13.6	6.4
Creatinine (μmol/L)	44-80	177	80	61
Total bilirubin (μmol/L)	<15	44	29	23
Alanine transaminase (IU/L)	<58	26	28	34
Alkaline phosphatase (IU/L)	105-335	236	119	128
Blood gas pH	7.35-7.45	7.13	7.45	7.42
PCO ₂ (kPa)	4.7-6.0	7.6	4.7	5.1
PO ₂ (kPa)	10.0-13.0	16.2	22.1	15.2
Base excess (mmol/L)	-2 to +2	-11	0	0

* CVVH continuous veno-venous haemofiltration

[†] Days from onset of symptoms (29 August 2004), after commencement of CVVH

returned to normal 15 days after admission. Antibiotics were continued for 10 days. Three weeks following admission, she had made a complete recovery and was discharged home.

Various differential diagnoses were excluded: severe acute respiratory syndrome, malaria, rickettsiosis, dengue haemorrhagic fever, and hantavirus cardio-pulmonary syndrome. Seroconversion to *Leptospira* was demonstrated by macroscopic agglutination test and *Leptospira*-specific immunoglobulin M (IgM) was confirmed positive by enzyme-linked immunosorbent assay.

Discussion

Leptospirosis is a re-emerging zoonotic disease with a worldwide distribution. It was first described in the early 18th century by Adolf Weil and his colleagues.² Very few cases have been reported in Hong Kong, and paediatric cases are extremely rare. Leptospirosis is nonetheless likely to be underreported because of the lack of awareness of the disease, its non-specific clinical presentation, and lack of a rapid diagnostic test. Leptospirosis is endemic in most tropical countries and continues to occur sporadically in developed countries, especially in travellers who participate in water sports.

Leptospira are harboured in the proximal renal tubules of a wide range of wild and domestic animals including rodents, cattle, pigs, horses, and dogs. Infected animals are asymptomatic but the organisms are shed in the animals' urine for a prolonged period and can remain viable in soil and water for weeks or months. In humans, contact of mucosal surfaces or abraded skin with contaminated soil, water, or animal tissue can result in infection. Farming, walking on

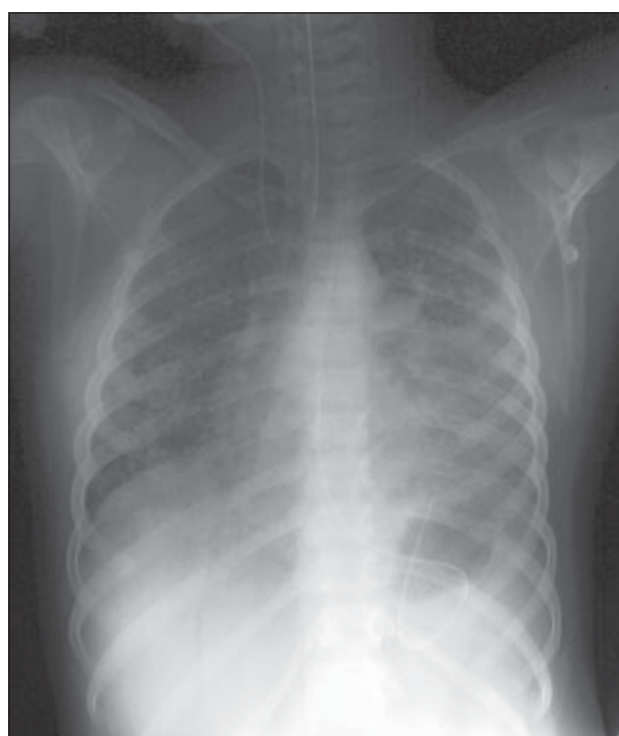


Fig. Chest radiograph showing acute respiratory distress syndrome

barefoot, and exposure of open wounds to contaminated water are risk factors. The patient in this report could have contracted the disease from well water or freshwater in Ping Hoi.

Most infections caused by *Leptospira* are subclinical or mild, and patients usually do not seek medical attention.³ In a series of 139 infected children with leptospirosis, renal failure occurred in only 1.5%. Fever was present in 96%, headache and myalgia in 24%, and jaundice in 18%.⁴ Our case demonstrated clinical features suggestive of aseptic meningitis (such

as fever, headache, photophobia, and vomiting), a common presentation in children with leptospirosis. A previous review noted that 62% of children aged younger than 14 years presented with aseptic meningitis. The same was true for only 31% of those aged 15 to 20 years.⁵ A more severe form of leptospirosis known as Weil syndrome accounted for 5% to 10% of cases, and its symptoms consisted of jaundice, renal dysfunction, and abnormal clotting. Mortality rates of 5% to 15% have been reported.⁶ The prevalence of Weil syndrome in the paediatric population is unknown.

A high index of suspicion is the key to diagnosis. A recent history of travel to an endemic area and exposure to potentially contaminated freshwater together with symptoms of fever and aseptic meningitis followed by complications of hyperbilirubinaemia, hypotension, and acute renal failure suggest a diagnosis of leptospirosis. Differential diagnoses in this 12-year-old girl included malaria, hantavirus cardiopulmonary syndrome, rickettsiosis, and dengue haemorrhagic fever. Severe acute respiratory syndrome was also considered because of prominent respiratory signs and symptoms and travel history.

Most cases of leptospirosis are diagnosed serologically. The definitive serological test is the microscopic agglutination test. Detection of IgM and macroscopic agglutination test are also sensitive and specific for leptospirosis.^{7,8} Serology may nonetheless be negative in the first week of illness, it must be repeated in the second week if there is a high index of clinical suspicion. *Leptospira* can also be cultured from peripheral blood during the early phase of disease and from urine after day 7 to 10 of illness, although sensitivity of such tests is low because special media and techniques as well as a prolonged incubation period are required. A polymerase chain reaction technique developed to detect *Leptospira* is available only in research laboratories.⁹

A 7- to 14-day course of penicillin G or amoxicillin is the recommended treatment for leptospirosis in children.¹⁰ In our patient, third-generation cephalosporin was initially prescribed, then changed to piperacillin-tazobactam. Both should be effective to treat leptospirosis.

Avoidance of contact with and adequate disposal of urine from an infected patient is vital because *Leptospira* can still be detected in urine several months after the onset of the disease.¹¹ In endemic areas, measures to prevent leptospirosis include strict rodent control and avoidance of contact with contaminated water and soil. When necessary, protective clothing, boots, and gloves should be worn, and open wounds should be adequately covered.

Conclusion

Leptospirosis is rarely reported in children. A high index of suspicion is necessary to ensure prompt diagnosis. Patients' condition can deteriorate rapidly if treatment is delayed. Leptospirosis should be considered in febrile patients with a history of exposure to freshwater.

References

1. CHP investigating patient with initial positive results for leptospirosis. Centre for Health Protection website: http://www.chp.gov.hk/content.asp?lang=en&id=6&info_id=1674. Accessed 9 Oct 04.
2. Faine S, Adler B, Bolin C. *Leptospira* and leptospirosis. 2nd ed. Melbourne, Australia: MediSci; 1999.
3. Ashford DA, Kaiser RM, Spiegel RA, et al. Asymptomatic infection and risk factors for leptospirosis in Nicaragua. *Am J Trop Med Hyg* 2000;63:249-54.
4. Rajajee S, Shankar J, Dhattatri L. Pediatric presentations of leptospirosis. *Indian J Pediatr* 2002;69:851-3.
5. Alston JM, Broom JC. Leptospirosis in man and animals. Edinburgh: E. & S. Livingstone; 1958.
6. Levett PN. Leptospirosis. *Clin Microbiol Rev* 2001;14:296-326.
7. Cumberland P, Everard CO, Levett PN. Assessment of the efficacy of an IgM-elisa and microscopic agglutination test (MAT) in the diagnosis of acute leptospirosis. *Am J Trop Med Hyg* 1999;61:731-4.
8. Brandao AP, Camargo ED, da Silva ED, Silva MV, Abrao RV. Macroscopic agglutination test for rapid diagnosis of human leptospirosis. *J Clin Microbiol* 1998;36:3138-42.
9. Smythe LD, Smith IL, Smith GA, et al. A quantitative PCR (TaqMan) assay for pathogenic *Leptospira* spp. *BMC Infect Dis* 2002;2:13.
10. Leptospirosis. In: Pickering LK, editor. Red book: 2003 Report of the Committee on Infectious Diseases. 26th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2003:403-5.
11. Feigin RD, Anderson DC. Human leptospirosis. *CRC Crit Rev Clin Lab Sci* 1975;5:413-67.