Diabetic Ketoacidosis and Melioidosis in a Child†

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Abstract

A case of 5 year old diabetic girl with melioidosis was reported. She presented with the symptoms and signs of intraabdominal infection, septicemia and diabetic ketoacidosis. Abdominal ultrasonography showed multiple splenic and liver abscesses, melioidosis was suspected. Hemoculture and pus culture yielded *Burkholderia pseudomallei* which was susceptible to ceftazidime and cotrimoxazole. Correction of fluid and electrolyte combined with insulin therapy and proper antibiotics resulted in a good outcome in this patient.

Diabetic ketoacidosis (DKA) is a common acute complication of insulin-dependent diabetes mellitus (IDDM), and is frequently precipitated by infections especially of the respiratory and genitourinary tract. In endemic areas such as southeast Asia and northern Australia, melioidosis is very common in diabetic adults resulting in a high mortality rate, however it is rare in children[1-3]. We report a case of a 5 year old IDDM girl who came down with DKA precipitated by *Burkholderia pseudomallei* infection.

CASE REPORT

A 5 year old girl from Nong Khai province presented with the symptoms and signs of DKA, abdominal pain, hepatomegaly and high grade fever for 9 days. She was diagnosed IDDM 8 months ago and had been controlled with subcutaneous insulin twice daily. One week before admission to our hospital, she was admitted at Nong Khai provincial hospital with the diagnosis of DKA with intraabdominal infection. She was treated with low dose intravenous insulin infusion, fluid and electrolyte therapy. Parenteral antibiotics (ceftriaxone and metronidazole) were also administrated. One week after treatment she still had high blood glucose levels, persistent metabolic acidosis, ketonuria, abdominal pain, hepatomegaly and high grade fever, she was then referred to our university hospital. Physical examination on admission revealed a thin girl with 15 kg body weight, restless, tachypnea and hyperpnea. Her body temperature was 40.0°C, both lungs were clear, soft abdomen with generalized tenderness and palpable liver at 2.0 cm below right costal margin with the span of 8.0 cm, spleen was not palpable and bowel sound was

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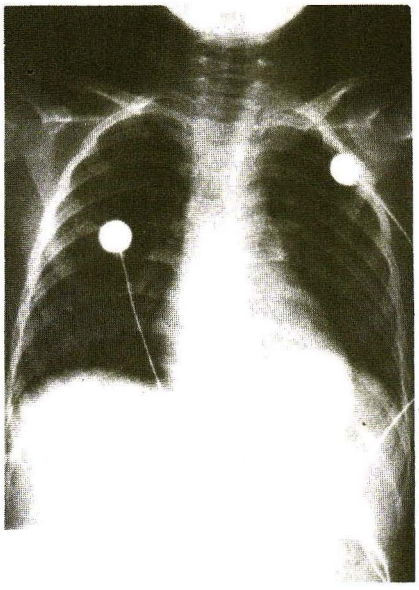

Fig. 1. Chest roentgenography showed elevation of the left side of the diaphragm.

decreased on auscultation. Complete blood count showed leukocytosis and shift to the left. She had high blood glucose level (371 mg%) and severe metabolic acidosis (serum *p*H 6.993, base excess -26.8 mmol/L). Treatment of DKA was started by fluid and electrolyte correction combined with low dose intravenous insulin infusion. She still had metabolic acidosis and abdominal pain. Chest roentgenography showed elevation of the left side of the diaphragm (Fig. 1), thus abdominal ultrasonography was carried out and showed multiple splenic and liver abscesses. (Fig.2) Melioidosis was suspected and the antibiotics were changed to intravenous ceftazidime 150 mg/kg/day and cotrimoxazole 10 mg/kg/day. Splenectomy was perfomed on the third day of admission because of persistent high fever. Hemoculture and pus culture from splenic abscess yielded *Burkholderia pseudomallei* which was susceptible to both antibiotics. Antibiotics were continued for 3 months with subcutaneous insulin injection twice daily. Her diabetic status has been well controlled.

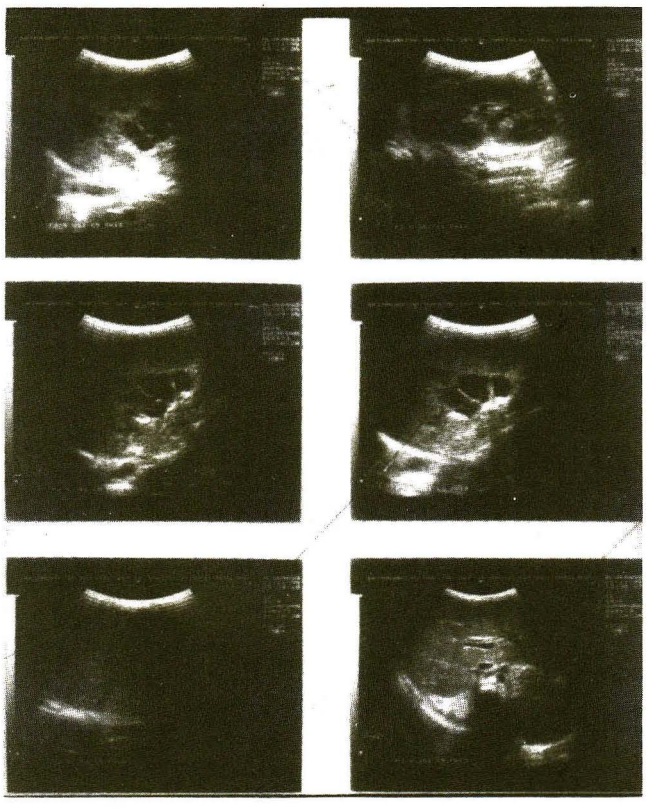

Fig. 2. Abdominal ultrasonography showed multiple splenic abscesses.

DISCUSSION

DKA is frequently precipitated by infections. There are alterations in monocyte receptor function in type I diabetic patients that cause increased susceptibility to infection[4]. In endemic areas, melioidosis in diabetic adults is very common. Woods et al demontrated that insulin markedly inhibits the growth of *B. pseudomallei in vitro* and *in vivo*, so the bacteria grows significantly better in diabetic human serum than in controlled human serum[5]. Charoenwong et al studied the indirect hemagglutination test (IHA) for melioidosis in children in endemic areas (Khon Kaen) and found that 83 per cent of healthy children had an IHA titer of at least 1:10 or greater and 22 per cent had a titer of 1:80 or greater[6]. The mean titer was higher in the older age group. This supports the evidence that there is a high chance of exposure to this organism in this region of Thailand. Many cases of melioidosis have been reported in children from Thailand but it was not as commonly associated with diabetes as in adults[7-11]. In septicemic melioidosis, multiorgan involvement especially of the lungs (75%), spleen (20%) and liver (15%) are common[11]. Melioidosis was suspected in this patient because of the findings of splenic and liver abscesses. The regimens of treatment for septicemic melioidosis were trimethoprim-sulfamethoxazole and kanamycin with or without doxycycline or ceftazidime with or without trimethoprim-sulfa methoxazole. Imipenem therapy also yielded good results[12].

Because of the high mortality rate, melioidosis should be suspected in all diabetic children from endemic areas who present with DKA and severe systemic infections. Correction of fluid and electrolyte in DKA combined with insulin therapy and prompt treatment with proper antibiotics are necessary in these patients for improvement of the outcome.

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เบาหวานชนิดพึ่งอินสุลินที่เกิดคีโตอะสิโดสิสร่วมกับเมลิออยโดสิสในเด็ก

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รายงานผู้ป่วยเบาหวานเด็กอายุ 5 ปี ซึ่งมีอาการและอาการแสดงของคีโตอะสิโดสิสร่วมกับการติดเชื้อในช่องท้องและกระแสโลหิต การรักษาโดยการให้สารน้ำ, อินสุลิน และยาปฏิชีวนะ (Ceftriazone และ metronidazole) ไม่สามารถควบคุมภาวะอะสิโดสิสได้ จากการตรวจพบฝีที่ม้ามและตับทำให้คิดถึงเมลิออยโดสิส ซึ่งพบได้บ่อยในผู้ป่วยเบาหวานผู้ใหญ่ในภาคตะวันออกเฉียงเหนือ ได้ให้การรักษาด้วย ceftazidime และ cotrimoxazole ร่วมกับการตัดม้าม ผลการเพาะเชื้อจากกระแสโลหิตและฝีที่ตับและม้ามเป็นเชื้อ *Burkholderia pseudomallei* ซึ่งไวต่อยาปฏิชีวนะทั้ง 2 ตัว ผู้ป่วยตอบสนองดีต่อการรักษา

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