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ORIGINAL ARTICLE

Pyogenic liver abscess among children in a medical center in Central Taiwan

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KEYWORDS
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Background: Pediatric pyogenic liver abscess is uncommon. This study aimed to investigate the clinical characteristics, radiologic features, pathogens, duration of hospitalization, and management of pediatric pyogenic liver abscess.
Methods: Pediatric patients with pyogenic liver abscess admitted to the China Medical University Hospital from 1995 to 2011 were reviewed. Their clinical characteristics, radiological features, laboratory data, clinical management, and outcomes were analyzed. Those with liver abscess due to the complication of oncologic disease were excluded.
Results: Fifteen patients were diagnosed with pyogenic liver abscess. Their most common symptoms were fever and abdominal pain. Eight (53.0%) had leukocytosis (>15000/μL) and elevated C-reactive protein (CRP) level (>10 mg/dL). The main imaging presentation was a single abscess in right lobe of the liver (13/15, 86.7%). Blood culture were mainly negative (12/15, 80.0%). Pathogenic microorganisms cultured from pus revealed *Klebsiella pneumoniae* (6/15, 40.0%) and *Streptococcus* spp. (6/15, 40.0%) as the two most common pathogens. Percutaneous abscess drainage followed by adequate parenteral antibiotics were effective interventions. Hospitalization of at least 2 weeks was needed in most cases. There were no mortalities.
Conclusion: Pyogenic liver abscess should be considered in children presenting with fever, abdominal pain, and leukocytosis with a high CRP level. Most cases involve a single lesion on right lobe of the liver. *K. pneumoniae* and *Streptococcus* spp. are the two most common pathogens. Drainage with adequate antibiotics has significantly good response.

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Introduction

Pyogenic liver abscess (PLA) is an infrequent infection in children although majority (80%) of pediatric hepatic abscesses refers to pyogenic liver abscess, followed by amebic liver abscess.[1] The incidence of PLA is much higher among children in developing countries than those in developed countries. Incidence is reported to be one in 138 admissions in Brazil,[2] 78.9 per 100,000 admissions in South India,[3] down to 25 per 100,000 admissions in the United States of America.[4] In Taiwan, the incidence is between 8.9 and 20 per 100,000 pediatric admissions.[5,6]

Staphylococcus aureus is the most common isolated pathogen of pediatric PLA both in developed and developing countries.[2,7] In Taiwan, *Klebsiella pneumoniae* is recognized as the most frequent cause, both in adults and children.[5,6,8]

The gold standard of treatment remains debatable owing to the varying opinion on the modes of medical and surgical treatment. There is also less experience on PLA in children in Taiwan due to its low incidence. Thus, this study aimed to investigate the clinical characteristics, radiologic features, pathogens, duration of hospitalization, and management of pediatric PLA among children in central Taiwan.

Materials and methods

Fifteen children aged between 0 and 18 years old were admitted to the China Medical University Hospital with a diagnosis of pyogenic liver abscess from 1995 to 2011. All of the patients satisfied at least one of the following criteria: (1) Demonstration of intra-hepatic hypo-echoic or anechoic lesions on imaging that resolved with antibiotic treatment, and positive pus or blood culture; (2) positive percutaneous aspiration of purulent material from an intra-hepatic lesion; and (3) surgically-proven liver abscess.[6] Liver abscess due to complications of oncologic disease was excluded. Prolonged fever was defined as fever for 7 days or longer before the diagnosis of liver abscess.[6] The clinical characteristics, radiological features, laboratory data, clinical management, and outcome were analyzed.

Results

During the 16-year study period, 15 children were diagnosed with PLA, including nine (60.0%) females and six males. Thirteen (86.7%) were older than 10 years of age (Fig. 1).

Six patients had associated comorbidities. Three had secondary liver abscess: two were related to acute appendicitis and one was from small intestine rupture. The other three patients had risk factors of liver abscess, including type 2 diabetes mellitus (DM) in two and type 1 DM in one. One of the two children with type 2 DM had comorbidity with thalassemia major, status post-splenectomy, and negative pus culture findings. *Klebsiella pneumonia* was noted in the other two DM patients. Twelve patients (80%) were cryptogenic in origin, which meant primary liver abscess.

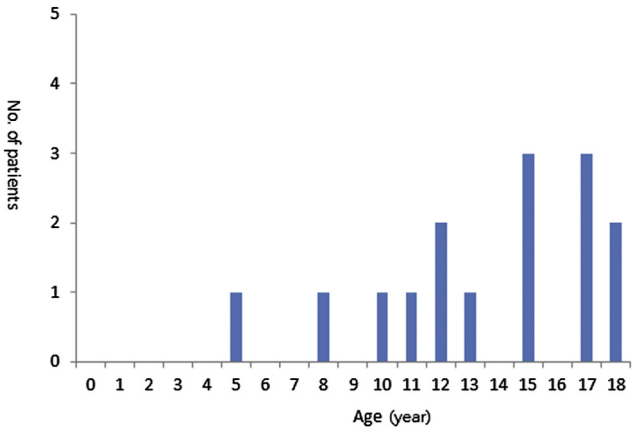

Figure 1. Age distribution of children with pyogenic liver abscess.

Fourteen children (93.3%) initially presented with fever. Seven (46.7%) suffered from prolonged fever. Abdominal pain was noted in 13 patients (86.7 %), including five children with local tenderness on the right upper quadrant and three with tenderness on the epigastric area. Five patients (33.3 %) complained of cough (Table 1).

Nine patients (60%) had leukocytosis (>15000 /μL), with an average of 16353.3 ± 5305.5 /μL. Twelve patients (80%) had elevated C-reactive protein (CRP) level (>10 mg/dL), with an average of 19.2 ± 11.7 mg/dL. Eight children (53%) had combined leukocytosis and elevated CRP. Increased serum glutamic pyruvic transaminase (GPT) was observed in six patients (50%) (Table 2).

All of the patients received either abdominal sonography or contrast-enhanced computed tomography (CT) scan. The sensitivity rate of these two imaging techniques for detecting liver abscess reached 100%. Thirteen children had a solitary abscess in the right lobe. The remaining two had multiple abscesses: one occupied the left lobe only, and the other implicated both lobes. The average diameter of the solitary liver abscess ($n = 11$) was 6.6 ± 2.3 cm (range: 3.6-11.0 cm). For aspiration of the abscess, 12 patients had CT-guided percutaneous drainage regardless of liver abscess size, one had ultrasound-guided aspiration, and the patient with comorbid small intestine perforation had surgical intervention.

Table 1 Clinical presentations of children with PLA ($n = 15$)

Clinical presentations	$n = 15$
Fever	14 (93.3%)
Prolonged fever	7 (46.7%)
Abdominal pain	13 (86.7%)
Right upper abdominal pain	5 (33.3%)
Cough	5 (33.3%)
Diarrhea	4 (26.7%)
Vomiting	2 (13.3%)
Body weight loss	2 (13.3%)

PLA = pyogenic liver abscess.