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PRACTICE VARIATIONS BETWEEN EMERGENCY PHYSICIANS AND PEDIATRICIANS IN TREATING ACUTE BRONCHIOLITIS IN THE EMERGENCY DEPARTMENT: A NATIONWIDE STUDY

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☐ **Abstract—Background: Although supportive care is the mainstay management for acute bronchiolitis, non–evidence-based diagnostic testing and medications remain common in emergency departments (EDs). Objective: Our aim was to compare emergency physicians (EPs) and pediatricians practice patterns in the management of acute bronchiolitis in the ED. Methods: A cross-sectional study was conducted by using registration and claims datasets from 2008 to 2011. Patients with acute bronchiolitis were divided into EP group and pediatrician group. Results: A total of 2174 patients were enrolled. The diagnostic tests used, including chest x-ray (63.7% vs. 46%; adjusted odds ratio [OR] = 2.27; 95% CI 1.77–2.91), complete blood count (33.2% vs. 21.8%; adjusted OR = 1.74; 95% CI 1.33–2.26), C-reactive protein (35.1% vs. 22.6%; adjusted OR = 1.79; 95% CI 1.38–2.33), blood culture (23.9% vs. 14.3%; adjusted OR = 1.79; 95% CI 1.33–2.39), and arterial blood gas (3.7% vs. 1.8%, adjusted OR = 2.38; 95% CI 1.21–4.67), were higher in the EP group than in the pediatrician group. Intravenous fluid administration was also higher in the EP group (20.8% vs. 3.5%; adjusted OR = 7.49; 95% CI 5.12–10.8). In addition, EPs more frequently arranged for hospital admissions (36% vs. 19.5%; adjusted OR = 2.51; 95% CI 1.15–3.26). Conclusions: Both EPs and pediatricians had high rates of ordering diagnostic testing for acute bronchiolitis patients in ED. Compared with pediatricians, EPs used more diagnostic tests for the patients with acute bronchiolitis in ED.** © 2015 Elsevier Inc.

☐ **Keywords—acute bronchiolitis; emergency physicians; emergency department; pediatricians; practice variations**

INTRODUCTION

Acute bronchiolitis is a distressing and potentially life-threatening respiratory disease that affects children <2 years of age. It is the leading cause of infant hospitalization in the United States and has been associated with

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increasing morbidity and costs in recent decades (1–3). The 2006 American Academy of Pediatrics (AAP) practice guidelines state that acute bronchiolitis does not require diagnostic testing. In addition, the routine use of many common medications, including bronchodilators; corticosteroids; ribavirin; and antibiotics, and chest x-ray study have not been shown to be effective in improving the clinical course of the illness (4,5). Although some of the recommendations are controversial because a recent randomized controlled trial study and Cochrane systematic reviews showed that oral dexamethasone can reduce time to discharge from observation unit and nebulized epinephrine can reduce hospital admission rate, routine use of diagnostic tests, such as chest x-ray study, white blood count, and viral test are still not recommended (6,7). However, recent research has shown that emergency departments (EDs) continue to use nonrecommended practices in patients presenting with acute bronchiolitis (8).

Emergency physicians (EPs) and pediatricians are key providers of pediatric services in the ED, but there are marked variations in their clinical practices (9–11). The aim of this study was to compare EP and pediatrician practice patterns in the management of acute bronchiolitis in the ED.

METHODS

A cross-sectional study was conducted using registration and claims data from 2008 to 2011 obtained through the Longitudinal Health Insurance Database 2010 (LHID2010), a subset of the National Health Insurance Research Database managed by the Taiwanese National Health Research Institutes. The LHID2010 contained all ambulatory, outpatient, and inpatient claims data for 1 million beneficiaries who were randomly sampled from the year 2010 registry for beneficiaries of the National Health Insurance Research Database.

We defined acute bronchiolitis based on International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes 079.6 (infections by respiratory syncytial virus), 466.11 (bronchiolitis by respiratory syncytial virus), and 466.19 (bronchiolitis, other). All patients with acute bronchiolitis aged <2 years who presented to the ED were included. Patients with asthma (ICD-9-CM code 493) were excluded. The patients who were born prematurely, had congenital heart disease, or were intubated and admitted to the intensive care unit were also excluded.

Patients who were enrolled in this study were divided into two groups according to the care provided in the ED by attending physician specialty status (i.e., EP or pediatrician). EPs were board certified and usually treated both adult and pediatric patients in the ED. In contrast, pediatricians treated pediatric patients only. In Taiwan, the physicians who are board-certified pediatric and emergency medicine specialists are limited because they have to achieve both emergency medicine and pediatric specialty certification after independent formal residency training. In Taiwan, most of the pediatric emergency care is provided by general EPs and pediatricians. Therefore, patients managed by pediatric emergency medicine specialists were excluded from the study.

From the LHID2010 database, complete blood count (CBC), C-reactive protein (CRP) level, blood culture, arterial blood gas analysis, and chest x-ray study were recorded. Therapeutic procedures and medications, such as intravenous fluid, corticosteroid (systemic or nebulized), and bronchodilator (systemic or nebulized) administration, were recorded. Clinical symptoms, such as fever (ICD-9-CM code 780.6), vomiting (ICD-9-CM code 787.01, 787.02 and 787.03), dehydration (ICD-9-CM code 276.5), and respiratory distress (ICD-9-CM code 786.xx) were also collected. The study protocol was reviewed by the local hospital's Institutional Review Board and the need for informed consent was waived.

Data Analysis

Categorical variables were presented as numbers and percentages and were compared using χ^2 or Fisher's exact test, where appropriate. Continuous data were presented as mean $\pm$ standard deviation and compared using independent Student's *t* test. To compare the rate of diagnostic tests, therapeutic procedures, medications, and disposition between two groups, multiple logistic regression analysis after adjustment for the confounding factors was used. Statistical analyses were performed with SAS software, version 9.2 (SAS Institute Inc, Cary, NC). A p value < 0.05 was considered significant for the study.

RESULTS

A total of 2174 patients with acute bronchiolitis were enrolled during the study period. Demographic data are shown in Table 1. The highest incidence of cases occurred during the winter season (31.8%). Mean age was 379 $\pm$ 187 days in the EP group and 347 $\pm$ 182 days in the pediatrician group. Clinical presentations, such as vomiting, dehydration, and respiratory distress, were similar in both groups. However, in patients in the EP group these were usually accompanied by fever (24.5% vs. 14.1%; $p < 0.001$). From the database, we knew that 41% of patients were treated at academic medical center EDs. The other patients were treated at community EDs.