

ORIGINAL ARTICLE

# Rapid Increase in the Height and Width of the Upper Chest in Adolescents with Primary Spontaneous Pneumothorax



Pei-Yeh Chang <sup>a,\*</sup>, Kin-Sun Wong <sup>b</sup>, Jin-Yao Lai <sup>a</sup>,  
Jeng-Chang Chen <sup>a</sup>, Tai-Wai Chin <sup>c</sup>, Ke-Chi Chen <sup>d</sup>,  
Chao-Jan Wang <sup>e</sup>, Chee-Jen Chang <sup>f</sup>, Wen-Ming Hsu <sup>g</sup>,  
Nien-Lu Wang <sup>h</sup>

<sup>a</sup> Division of Pediatric Surgery, Department of Surgery, Chang Gung Memorial Hospital, Chang Gung University, College of Medicine, Taoyuan, Taiwan

<sup>b</sup> Department of Pediatrics, Chang Gung Memorial Hospital, Chang Gung University, College of Medicine, Taoyuan, Taiwan

<sup>c</sup> Department of Pediatric Surgery, Veteran General Hospital, Taipei, Taiwan

<sup>d</sup> Division of Pediatric Surgery, Department of Surgery, Tri-Service General Hospital, Taipei, Taiwan

<sup>e</sup> Department of Radiology, Chang Gung Memorial Hospital, Chang Gung University, College of Medicine, Taoyuan, Taiwan

<sup>f</sup> Chang Gung Memorial Hospital, Resources Center for Clinical Research, Graduate Institute of Clinical Medical Sciences, College of Medicine, Chang Gung University, Taoyuan, Taiwan

<sup>g</sup> Division of Pediatric Surgery, Department of Surgery, National Taiwan University Hospital, Taipei, Taiwan

<sup>h</sup> Department of Pediatric Surgery Mackay Memorial Hospital, Taipei, Taiwan

Received Nov 27, 2013; received in revised form Jun 30, 2014; accepted Jul 28, 2014

Available online 12 September 2014

## Key Words

adolescents;  
anthropometry;  
primary spontaneous  
pneumothorax;  
radiography;  
thoracic wall

**Background:** We determined the chest height in a cohort of patients with primary spontaneous pneumothorax (PSP) who had received chest radiographic examinations prior to the attack. The aim of this study was to determine when their chest height began to change and how this was related to the PSP.

**Methods:** From June 2009 to February 2012, the chest posteroanterior radiographs of 156 patients with PSP (Group 1) were reviewed. Among another 3134 patients with PSP, we identified 52 patients who had a chest posteroanterior radiograph prior to the attack (Group 2). We also recruited 196 controls for comparison (Group 3). The chest height and chest width at different levels were measured and analyzed.

\* Corresponding author. Department of Pediatric Surgery, Chang Gung Memorial Hospital, 5 Fu-Hsing Street, Linkou, Taiwan.  
E-mail address: [pyjchang@cgmh.org.tw](mailto:pyjchang@cgmh.org.tw) (P.-Y.Chang).

**Results:** Before 14 years of age, the chest height of patients in Group 2 was no different from that of patients in Group 3. By the age of 14 years, however, the chest height and upper chest width of patients with PSP was significantly higher than that of the normal controls. The difference from normal chest height did not increase at adulthood.

**Conclusion:** The rapid increase in chest height and upper chest width is a unique finding in patients with PSP. It might be attributable to the occurrence of PSP. This finding may also help to identify patients who are at risk of PSP.

Copyright © 2014, Taiwan Pediatric Association. Published by Elsevier Taiwan LLC. All rights reserved.

## 1. Introduction

Patients with primary spontaneous pneumothorax (PSP) are characteristically thin with a low basal metabolic index and male adolescents are the most frequently affected.<sup>1–3</sup> As early as 11–14 years of age, the body height (BH) of patients with PSP is higher than that of normal individuals.<sup>4</sup> Several studies have provided dimensions on chest wall (CW) development in adolescents in addition to their BH growth. The chest height (CH) of adolescents with PSP has been reported to be significantly higher than that of age-matched controls.<sup>5,6</sup> The aim of our study was to compare the CH on chest radiographs of patients with PSP and those who had undergone chest radiographic examinations prior to their PSP to determine when CH begins to change and how it is related to the appearance of PSP.

## 2. Materials and methods

### 2.1. Patients and controls

From June 2009 to February 2012, the chest posteroanterior radiographs (chest PA) of 156 consecutive patients with PSP (Group 1) were collected. The control group comprised 392 age-matched pediatric patients who had undergone appendectomy or cleft lip surgery, or participants in school health examinations (Group 3) in the Chang Gung Children's Hospital, Taoyuan, Taiwan. Patients with asthma, cardiac disease, and other major congenital anomalies were excluded. We matched data using the one by two exact match method<sup>7</sup> in age for the three groups. All analyses were conducted using R statistical software, version 3.0.1 from the R Foundation for Statistical Computing (<http://www.r-project.org/foundation/>). These two groups were recruited and data on their CW dimensions were collected. To determine when CW growth begins to deviate from normal, we also enrolled patients with PSP who had undergone plain chest radiograph examinations prior to PSP for the purpose of comparing their pre- and post-PSP radiographs. We reviewed 3134 consecutive patients with PSP from five collaborating hospitals between June 2005 and August 2011. Fifty-five patients underwent chest PA prior to PSP and 52 had qualified radiographs for measurement and were assigned to the pre-PSP group (Group 2). These hospitals were tertiary referral centers in northern Taiwan. All chest PA radiographs were retrieved from the PACS system. The parameters on the radiographs in each

group were measured and compared. There were no overlapping cases in Groups 1 and 2.

### 2.2. Selection of chest radiographs for measurement

The radiographs selected for measurement had to show complete re-expansion of the lung with clear costophrenic angles. These were usually the radiographs taken 1–2 weeks after the PSP episode. All PSP radiographs were reviewed and chosen for measurement by the first author.

### 2.3. Measurements

The PACS system digitizer was used by an independent radiology research assistant to measure the maximum transverse distance at the levels of the 2<sup>nd</sup>, 6<sup>th</sup>, and 9<sup>th</sup> rib pairs (R2, R6, and R9), representing the upper, middle, and

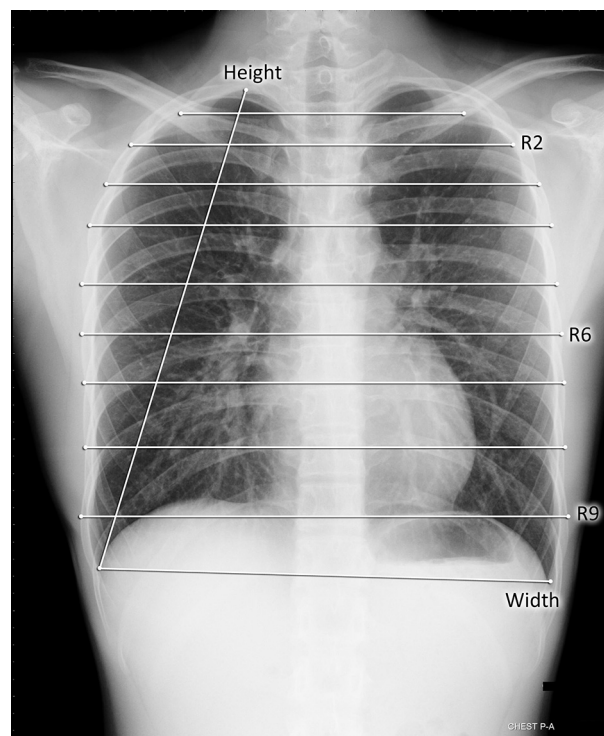


Figure 1 Radiographic measurement of chest wall dimensions.

Download English Version:

<https://daneshyari.com/en/article/4175017>

Download Persian Version:

<https://daneshyari.com/article/4175017>

[Daneshyari.com](https://daneshyari.com)