Non-Iatrogenic Pneumomediastinum in Infancy and Childhood

William J. Mc Sweeney* and David A. Stempel**

Departments of Pediatrics and Radiology, University of Cincinnati College of Medicine; Division of Roentgenology, The Children’s Hospital, Cincinnati, Ohio, USA

Abstract. This report reviews forty-one cases of non-iatrogenic pneumomediastinum in children beyond the neonatal period. In about one-third of the children, the adventitious air was associated with asthma. Respiratory infection, unrelated to asthma, was found to be of significance in about one-fourth of the remaining patients. Another twenty-five percent of the patients had a history of recent injury, which in the majority of instances was minor accidental neck trauma. Reported for the first time is the association of leukemia and adventitious air in the mediastinum. Hamman’s sign was heard in only 10 percent of the patients and invariably led to a misdiagnosis of pericarditis since it was usually interpreted as a pericardial friction rub. In our experience the course was benign. Surgical drainage was unnecessary and effective treatment of the associated illness resulted in rapid clinical improvement within days, and radiologic evidence of resorption of the air usually within a week.

Key words: Pediatrics, pneumo-mediastinum, mediastinal emphysema, Hamman’s sign asthma.

Adventitious air within the mediastinum with or without subcutaneous emphysema of the soft tissues of the neck and thorax is a relatively uncommon pediatric problem. Recent reports have stressed specific associated illnesses, but have failed to define the prevalence of this entity as part of a pediatric experience. Excluding the neonate in whom pneumomediastinum may have a different significance [18], we were able to find 175 cases of radiologically diagnosed pneumomediastinum during a 10 year experience studied from 1962 to 1972 at the Cincinnati Children’s Hospital. By excluding such causes of pneumomediastinum as thoracotomy, tracheostomy, intubation, etc., and by excluding those cases which we felt to be equivocal on a clinical and particularly a radiologic basis, we found 41 patients with non-iatrogenic mediastinal emphysema available for review. This clinical and radiologic experience constitutes the basis for this report.

Results

Our selection rested on radiographic interpretation; the criteria we used to diagnose mediastinal emphysema were as follows: 1) definition of mediastinal anatomy, i.e., thymus, great vessels and heart; and/or 2) obvious mediastinal linear lucencies extending into the soft tissues of the neck (Fig. 1). A substernal lucency seen only in the lateral projection was not considered diagnostic of mediastinal emphysema.

Four broad categories of associated conditions were found in these patients with mediastinal emphysema (Fig. 2). The figures in parentheses indicate the number of patients in each group.

1. Asthma [13]

This somewhat homogeneous group of patients showed no sexual predominance and the median age was 91/2 years with a range of 2 1/4 to 16 years of age. In 3 of the patients, pneumomediastinum occurred with the first bout of asthma and at the other extreme, one patient had suffered with asthma for 13 years prior to the appearance of this complication. In general, the development of pneumomediastinum was preceded by 1 to 3 days of increasing cough, wheezing and respiratory distress. Subcutaneous emphysema was present in 11 of the 13 patients. Two mothers suggested the diagnosis by noting a sudden acute swelling at the base of the neck. Another important clinical clue was the sudden onset of chest pain exacerbated by cough and inspiration which was found in 5 of 13 children. One of the asthmatics with chest pain but without palpable subcutaneous emphysema, was diagnosed as having pericarditis prior to radiographic examination of the chest. In this case, there was a question of a friction rub and the ECG showed a right bundle branch block. This patient was the only asthmatic who demonstrated what in retrospect was probably a Hamman’s sign [9].

2. Respiratory infections [9]

Although infection probably played a precipitating role in many of the asthmatics who developed pneumomedia-
Fig. 1 a and b. 1 1/2 year old boy, with an upper respiratory infection and severe cough. Note the anatomic definition of the left lobe of the thymus in both the AP and lateral radiographs.

Fig. 1 c and d. A somewhat more extensive pneumomediastinum demonstrates elevation of both the right and left lobes of the thymus on the AP projection and significant separation of the sternum and cardiac silhouette on the lateral film in a 3 year old with bronchiolitis. Note the rather extensive subcutaneous emphysema overlying the thorax, base of the neck and right axilla.

Pneumomediastinum these patients are not included in this category. Rather here are those children without any clinical findings suggestive of asthma either on history or on physical examination. The age span of this group was from 3 months to 13 1/2 years with a median of 2 years 10 months, significantly lower than that of the general population of our study.

A. Pneumonia [3]. Five children had radiologically demonstrable pneumonia, but 2 were included with the asthematics because of other clinical findings. Of the remaining 3 patients, 2 were of particular interest. One 3 month old with a recessive form of agammaglobulinemia had a diffuse alveolar infiltrate consistent with an unusual infection though a specific etiologic agent was never found. The other child, a 1 1/2 year old male, had two episodes of pneumomediastinum separated by a period of radiologic and clinical normality of 7 months. In both instances, he had radiologic and clinical evidence of pneumonia.