MJBU, vol 14, No. 1&2, 1996

THE VALUE OF SIGNS AND SYMPTOMS OF ACUTE RESPIRATORY TRACT INFECTION IN REQUESTING CHEST RADIOGRAPHY.

Imad Ouda Al-Sadoon, Mea'ad Kadhum Hassan and Hana Al-Sadoon.

Imad Ouda Al-Sadoon*, MBChB, FRCP, DCH.
Mea'ad Kadhum Hassan*, MBChB, CABP.
Hana Al-Sadoon**, MBChB, DMRD.

*Department of paediatrics, College of medicine, University of Basrah
**Department. of Radiology, Basrah Maternity and Child Hospital.

ABSTRACT

Chest radiography of 244 febrile children with respiratory signs and symptoms were reviewed. 219 (90%) patients had a combination of respiratory signs and symptoms. (cough, difficulty in breathing, tachypnea and crepitation). 223 (91%) patients had abnormal findings on chest radiography. 204 (93%) patients of those who had a combination of respiratory signs and symptoms had abnormal radiographic findings.

The positive predictive value was 91%.

INTRODUCTION

Certainly one of the most common radiographic examinations performed in an acutely ill child is chest radiography that is requested for the purpose of detecting pneumonia[2]. However the World Health Organization has stated that in the management of sick children without clinical evidence of cardiopulmonary disease, a chest radiograph is not helpful[2].

Previous studies were done to determine the clinical sign and symptoms that could serve as an index for obtaining chest radiographs in children suspected of having acute respiratory tract infections[3]. Therefore the aim of our study was

to assess the value of signs and symptoms suggestive of acute respiratory tract infection in requesting chest radiography.

PATIENTS AND METHODS

Febrile children with body temperature greater than 38Co in addition to symptoms and signs suggestive of an acute respiratory tract infection, admitted to pediatric wards during the period from October 1994 to March 1995, were included in the study. Children were excluded if they had chronic respiratory illness.

All patients were seen by pediatric residents. History and physical findings were recorded before obtaining the results of chest radiograph. The symptoms included fever, cough, rapid breathing in addition to other respiratory symptoms like wheezes and chest pain. The physical findings were tachypnea, chest retraction, rhonchi, crepitations and diminished air entry. The radiographic findings of each film were evaluated jointly with the radiologist which was blind to the clinical findings of each patient. The radiographic findings were recorded as normal or abnormal. The positive predictive value was estimated according to the following equation[3]:-

CLINICAL FINDING	RADIOGRAPH POSITIVE	RESULTS NEGATIVE
Present	a	b
Negative	b	d

Positive predictive value= a/(a+b)
(true positive rate)
Negative predictive value= c/(c+d)
(false negative rate)

RESULTS

244 Febrile children with respiratory signs and symptoms suggestive of acute respiratory tract infection who had chest radiographs after their admission to the hospital were included in the study.

There were 142 males and 104 females (M/F ratio 1.38:1). Their ages ranged from 2 weeks to 13 years. 142 (58.1%) of them being under 2 years of age. The presented signs and symptoms, in addition to fever, were summarized in table 1. It also shows the comparative analysis of sings and symptoms in children with normal and abnormal radiographic findings. About 219 (90%) of patients had a combination of respiratory signs and symptoms, 204 (93.3%) of those who had a combination of respiratory signs and symptoms had abnormal radiographic findings. 13 (5.3%) had fever and crepitations, 8 patients (3.3%) had fever and cough and 4(1.2%) patients had fever and difficulty in breathing (Table 2).

DISCUSSION

When a child presents with an acute illness, rapid evaluation by a variety of imaging techniques is often quite helpful in determining the nature of the problem and in planning appropriate therapy. Conventional radiography still serves as the best method of investigations in many instances[1]. About 90% of patients had a combination of respiratory signs and symptoms, 93.2% of them had abnormal findings on chest radiography, 84.6% of patients with fever and crepitations had abnormal radiographic findings, 75% of patients with fever and difficulty in breathing had abnormal radiographic findings and only 62.5% of patients with fever and cough had abnormal radiographic findings.

TABLE 1. Analysis of respiratory and signs in addition to fever with comparison of normal and abnormal radiographic findings.

Signs and symptoms	No. of patients (%)	No.of patients in subgroup(%)
COUGH	8 (3.3)	
normal CXR		3 (37.5)
abnormal CXR		5 (82.5)
CREPITATIONS	13 (5.3)	
normal CXR		2 (15.4)
abnormal CXR		11 (84.6)
DIFFICULTY IN BREATHING	4 (1.2)	
normal CXR		1 (25%)
abnormal CXR		3 (75%)
COMBINED	219 (90)	
normal CXR		15 (6.8)
abnormal CXR		204 (93.2)

TABLE 2.The sensitivity and specificity of combined respiratory signs and symptoms in predicting positive chest X-ray.

Combined respiratory signs and symptoms	Chest radiography abnormal	normal	Total
Present	204	15	219
absent	19	6	25
total	223	21	244

Sensitivity	91.5%
Specificity	28.6%
Predictive value	93.2

In our study the positive predictive value was 91% while the predictive value in a study in Saudi Arabia was 53.5% [4]. Several studies conducted in developed countries had used chest radiographs as the gold standard [5]. Grossman and Caplan found that no single symptoms, sign or laboratory test had a good sensitivity and specificity for predicting radiological pneumonia and that the general impression obtained by doctor was more useful than any other sign[6].

In conclusion our study shows that in evaluating febrile children with respiratory signs and symptoms, careful history and physical examination provide the basis to predict the likelihood of abnormal findings on chest radiograph and that the presence of a combination of pulmonary features such as tachypnea, respiratory distress, rales and diminished breath sounds were a useful predictors of a positive radiograph, and this is very important in the present situation in Iraq with shortage in radiographic films. This indicates that shortage in radiographic films due to the sanction imposed on Iraq may create a situation for doctors to increase their clinical skills. It also pointed out a reasonable approach of application of the program for the control of acute respiratory tract infections issued by the World Health Organization.

REFERENCES

1. Kirchner SG, Horev G. Diagnostic imaging in children with acute chest and abdominal disorder. Ped. Clin. North America 1983: 32 (6): 1363-80.

2. World Health* Organization Scientific group. A rational approach to radiodiagnostic inves tigations: a report of a WHO scientific group on the indications for and limitations of major X-ray diagnostic investigations. WHO Tech. Rop. Her 1983; 689 :17-9.*

3. Leventhal JM. Clinical Predictors of pneumo nia as a guide to ordering chest roentgeno grams. Cl. Pediatrics 1984; 21 (12): 730-4.

4. Ashong EF. Patel PJ, Jarallah A, et al. The role of chest roentgenoraphy in the manage ment of febrile children with respiratory signs and symptoms. Ann. Saud: Med 1989; 9(3): 267-71.

5. Lozano JM, Steinhoff M, Ruiz JG, et al. Clinical predictors of acute radiological pneumonia and hypoxaemia at high attitude. Arch. Dis. child. 1994; 71 (4): 323-327.

6. Grossman LK, Caplan SE. Clinical, laboratory and radiological information in the diagno sis of pneumonia in children Ann. Emery. Med 1988; 17: 43-6.

أهمية العوارض والعلامات لإلتهاب الجهاز التنفسي الحاد وعلاقتها مع أشعة الصدر

أ. عماد عوده السعدون ، أ.م ميعاد كاظم حسن
كلية الطب - جامعة البصرة / فرع طب الإطفال

تم دراسة اشعة الصدر (٣٤٤) طفل يعاني من ارتفاع درجة الحرارة واعراض وعلامات التهاب الجهاز التنفسي الحاد. وكان ٣١٩ (٩٠٪) منهم لديهم اكثر من عارض وعلامة لإلتهاب الجهاز التنفسي مثل (السعال، عسر التنفس، سرعة التنفس وطقطقة الرئة). ٢٢٣ (٩١٪) من الإطفال المرضى كانت اشعة الصدر لديهم غير طبيعية. ٢٠٤ (٩٣٪) من هؤلاء الإطفال الذين كانت لديهم علامة وعارض يدل على التهاب الجهاز التنفسي الحاد كانت اشعة الصدر غير طبيعية. وكانت القيمة التنبئية (٩١٪).