LETTERS TO THE EDITOR

Khamapirad radiologic criteria as a predictor of pneumonia's bacterial etiology[☆]

Critérios radiológicos de Khampirad como variável preditora da etiologia da pneumonia bacteriana

Dear Editor,

As the authors propose in their study, the chest X-ray has a significant role in the differentiation and identification of the bacterial etiology of pneumonia.[1] The main findings of chest X-ray suggesting a pathology of bacterial origin are: lobar or segmental consolidation, pneumatocele and the presence of a pulmonary abscess. These findings are significantly associated with a typical bacterial infection.[1]

Despite this, in most cases typical bacterial pneumonia – mainly in the early stages of the disease – is not accompanied by those classic radiographic patterns.[2] On the other hand, some viral infections are capable of showing similar radiological patterns; for example, a consolidation pattern can be observed in an adenovirus infection.[2] This scenario is a barrier to the etiological diagnosis based solely on the chest X-ray. Virkki et al., in a study of 215 children with Acquired Pneumonia in the Community (NAC), of which 62% had bacterial etiology and the rest were exclusively viral, found that the alveolar infiltrates had a sensitivity of 72% and a specificity of 51% to identify a bacterial etiology.[3] They also reported that the specificity increased up to 85% when the alveolar infiltrates were of the lobar type, mainly in children under 2 years of age. The interstitial infiltrates, on the other hand, failed to adequately differentiate between viral and bacterial pneumonia. The hyperaerial, atelectasis and small pleural effusion also had no significance for this differentiation.[2]

In contrast, Moreno et al. found in children with NAC a great correlation of the interpretation of chest radiographs in those read both by a pediatrician and by radiologists, which translated into excellent diagnostic accuracy. The radiological scale they used was the Khamapirad scale,

which showed a sensitivity of 100% (95% CI: 90–100%), specificity of 98% (95% CI: 93–99%), a positive predictive value of 96% (95% CI: 85–99%), and a negative predictive value of 100% (95% CI: 96–100%) to predict bacterial pneumonia with a simple chest plaque X-ray.[4] This study strongly reinforces the usefulness of an X-ray for the etiological diagnosis of bacterial pneumonia as well as its usefulness to rule it out when the result is negative.

In addition to this, Torres et al., also using the Khamapirad scale, found in their study of children hospitalized by NAC a sensitivity of 100% (95% CI: 83–100%), specificity of 94% (95% CI: 88–97%), a positive predictive value of 77% (95% CI: 58–90%), and a negative predictive value of 100% (95% CI: 96–100%) to predict bacterial pneumonia.[5] This corroborates the findings of all the aforementioned authors and shows us the capacity of bacterial etiological identification through the use of a chest X-ray and an adequate scale.[5] Ultimately, Guanoluisa and Geovanny obtained a kappa index of 0.87 which represents a very good accordance. In this study, they also used the Khamapirad scale to evaluate chest radiographs of children.[6]

Based on the findings of the study by Andrade et al., and in addition to the reviewed literature, it can be concluded that the use of the Khamapirad scale on a chest radiograph to identify the bacterial etiology of pneumonia is quite accurate, both for the confirmation of the etiology and to dismiss it according to the radiologic score. The use of an evaluation score like that of Khamapirad allows a better sensitivity and specificity of the chest X-ray. In this way, it is recommended that these criteria be introduced to physicians in order to improve the etiological identification and therapeutic management of pediatric patients with a diagnosis of pneumonia, especially in areas where pediatricians are not found.

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Conflicts of interest

The author declares no conflicts of interest.

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Radiologic scales as a tool for the etiologic diagnosis of pediatric community-acquired pneumonia☆

Escalas radiológicas como uma ferramenta para o diagnóstico etiológico de pneumonia adquirida na comunidade pediátrica

Dear Editor,

The use of chest radiograph as an adjunct method for the diagnosis of pediatric community-acquired pneumonia (CAP) has been highly debated over the past decades. So far, current evidence has demonstrated that specific radiological findings cannot be reliably used for the etiological diagnosis of CAP.[1,2] Nevertheless, in our study, we demonstrated that the presence of a normal chest radiograph has a high negative predictive value for infection by *Streptococcus pneumoniae*, the most common typical bacterial agent of CAP. As viral agents are the most common etiologic agents of pediatric CAP, this finding may aid in the clinical management of children with signs and symptoms of CAP by selecting those who might benefit from empiric antibiotic therapy.[3]

Standardized protocols for the evaluation of the chest radiograph are useful in the interpretation of this exam. In our study, we used the recommended criteria defined by the World Health Organization.[3,4] However, alternative scales have been described and partially validated for clinical practice. Heinsohn has mentioned the Khamapirad scale,[5] which is a grading system based on radiologic characteristics such as the presence, type and location of pulmonary infiltrates, pleural effusion, abscesses and atelectasis. Although high

sensitivity and specificity have been described for the use of this scale,[6] it is important to note that further validation in a clinical setting is required, including the use of reliable and sensitive techniques for the etiologic diagnosis of bacterial and viral agents of CAP. Nevertheless, the recognition of radiological patterns, particularly the normal chest radiograph, as a tool for the management of pediatric CAP is valid and merits further investigation.

In conclusion, chest radiographs provide indirect evidence of etiologic agents of CAP. Radiologic scales or grading systems that aid in the differentiation between a normal chest radiograph and radiological pneumonia may be a useful tool for the management of pediatric CAP cases but should be adequately validated before inclusion in the clinical practice.

Conflicts of interest

The authors declare no conflicts of interest.

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