Recurrent pneumonia

in a pediatric pulmonology outpatient unit:

concept and prevalence

Maria da Glória M.O. Mello,1 Jane S.P. David,1 Antônio J.L.A. Cunha,2 Maria de Fátima P. March,3 Sidnei Ferreira,3 Clemax C. Sant’Anna4

Abstract

Objective: this study aimed at determining the prevalence of recurrent pneumonia in patients referred to the pulmonary outpatient unit at the Pediatric Pulmonary Service of Instituto de Puericultura e Pediatria Martagão Gesteira, Universidade Federal do Rio de Janeiro, and to review the current definition of recurrent pneumonia.

Methods: data were obtained by reviewing the Institute’s records and selecting all first-time appointments from January 1, 1995, to April 30, 1997.

Results: one hundred and one out of 638 appointments with suspicion of recurrent episodes of pneumonia were studied. The suspected diagnosis was made based on criteria matching those of the service in 39.6% of the cases.

Conclusions: the definition of recurrent pneumonia should be further clarified and discussed among pediatricians, since these professionals are in charge of referring such patients to specialists. The importance of performing regular chest X-rays between acute episodes to characterize recurrent pneumonia should be emphasized. This may help identify patients who require subsequent evaluation by specialists for complementary diagnosis.

However, we also observe the application of this term to a range of conditions and compromises that actually translate different mechanisms of pulmonary disorders, such as slow developing pneumonia, recurrent pneumonia, viral pneumonia, bronchial asthma, and bronchiolitis. The distinction between persistent and recurrent radiographic infiltrates is important for the patient’s evaluation and care (even though these two clinical entities very often coexist).1

Because of the potential morbidity of recurrent pneumonia, we emphasize the importance of both the generic and etiologic diagnoses in pediatric patients. Thus, we reviewed the literature in search of definitions of recurrent pneumonia, and also in search of the reported prevalence of this entity in specialized services.

Therefore, the objective of this study was to determine the actual prevalence of recurrent pneumonia among children suspected of having this disease and referred to the outpatient unit of the Pediatric Pulmonary Service at Instituto de Puericultura e Pediatria Martagão Gesteira. In addition, we reviewed the current definition of recurrent pneumonia, aiming at a better understanding and definition of the subject.

Methods

We performed a crossover descriptive study at the outpatient unit of the Pediatric Pulmonary Service, Instituto de Puericultura e Pediatria Martagão Gesteira, Universidade Federal do Rio de Janeiro. We retrospectively evaluated 638 first-time appointments of patients referred to the service from November 1, 1995, to April 30, 1997.

Data on first-time appointments were obtained from the Institution’s medical records using a form to collect the following information: identification, gender, age, origin area, radiological study, chronology of probable pneumonias, and diagnostic impression of care and of the service. From a total of 638 first-time appointments, we studied 101 children referred to the service with a suspicion of recurrent pneumonia, regardless of posterior diagnostic confirmation.2

For the evaluation of the selected group, we adopted as the diagnostic criterion for pneumonia the presence of pulmonary infiltrates, gauged by a single observer through conventional radiographic exams, which were brought by the people responsible for the included children.

We defined as inclusion criteria the definition of recurrent pneumonia adopted by Instituto de Puericultura e Pediatria Martagão Gesteira: history of three or more episodes of pneumonia within 1 year, or five or more episodes over any time frame, with normal radiographic findings between the episodes.2

We excluded from the study patients who were referred to the service without radiographic exams of their acute episodes, and those whose pneumonia description did not match the proposed definition, or, in other words, patients without radiographic evaluations or with other diagnoses.

Statistical data were analyzed with the assistance of the Epi-Info 6 software. We calculated average, standard deviation, proportion and 95% confidence interval.

Results

Out of a total of 638 “first-time appointments” in the studied period, 344 (54.4%) children were male, and 294 (45.6%) were female (P=0.27), all under 12 years of age.

The majority of patients (75.25%) did not come from the programmatic area of the city of Rio de Janeiro that is attributed to Instituto de Puericultura e Pediatria Martagão Gesteira (3.1) (Figure 1).

Out of the total (101 children), 57 males (56.5%) and 55 females (43.6%) were referred to the service with diagnosis of recurrent pneumonia.

In 40/101 (39.6%) cases, the reason for searching the service matched the definition of recurrent pneumonia adopted by Instituto de Puericultura e Pediatria Martagão Gesteira. In regard to the remaining 61 (60.4%) cases, our first diagnostic impression was that these patients did not have recurrent pneumonia, therefore disagreeing with the reason of search for the service.

The ages of the 40 children with diagnosis of recurrent pneumonia ranged from 5 to 134 months (average of 51.4, and standard deviation of 35.2).

Figure 1 - Origin of children referred to the outpatient unit of the Pediatric Pulmonary Service - IPPMG, UFRJ/1995-97
Among the 61 children excluded from the study, bronchial asthma was the most prevalent disease (11%), followed by sinusitis (8%), gastroesophageal reflux (5%), acute pneumonia (2%), and others, such as tuberculosis, malformations and atelectasis (35%).

The prevalence of recurrent pneumonia matching the inclusion criteria was, thence, 6.27% (40/638).

The distribution of the 40 children with recurrent pneumonia according to gender and age group is described in Table 1.

Table 1 - Distribution of 40 children with recurrent pneumonia according to gender and age (IPPMG-UFRJ 1995-97)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age (in months)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;12</td>
<td>13-36</td>
</tr>
<tr>
<td>Males</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Females</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>14</td>
</tr>
</tbody>
</table>

Discussion

There are almost no available data in the literature regarding the prevalence of recurrent pneumonia in pediatric patients. In Saudi Arabia, 18 children, predominantly males (12 boys and 6 girls), between 3 months and 12 years of age (average of 5.7) were studied.3 In our study, we also had a prevalence of male children, although without statistical significance.

We observed that the inclusion criteria for the definition of recurrent pneumonia were not fulfilled by more than half of the patients who were referred to our service (60.4%). This shows that more information concerning this clinical entity must be made available, probably in medical schools and graduate programs in medicine. More attention to the performance and evaluation of conventional chest X-rays, as later discussed, might also contribute to this process.

It is difficult to find a universal definition for recurrent pneumonia. For Eigen,4 recurrent pneumonia occurs when the pathological process has been completely resolved, and then reappears one or more times. This would implicate at least one normal radiograph in the disease interval.

Listernick,1 in 1990, defined recurrent infiltrates as being those that may occur in different or in a sole pulmonary segment, for a certain period of time, with provably normal radiographs between the episodes.

Wald,5 in 1993, defined recurrent pneumonia as two episodes of pneumonia in a year, or three or more over any time frame.

Nakaie6 believes that recurrent pneumonia occurs when acute episodes happen in a frequency equal to or greater than three times in a year; the existence of an abnormal radiographic aspect for more than 12 weeks is fundamental.

To Paiva,7 recurrent pneumonia occurs when, after an acute pulmonary compromise, radiological and clinical regression is observed. Episodes that reappear three times in a year must be investigated.

The definition of recurrent pneumonia is not unanimous among the several authors analyzed, although there is a consensus in relation to the need of a time interval between the episodes, during which the patients are asymptomatic and their radiological studies are normal. The definition used at our service coincides with that of Nakaie6 and Paiva7 in regard to the minimal number of pneumonias in a year, and with the other authors in regard to the need for a normal radiograph between the episodes.2 However, we adopted the number of five episodes during any time frame because it seems more adequate to our reality, since we usually do not have the radiological studies that prove pulmonary alterations in children with recurrent pneumonia, but only reports, by family members, of “several pneumonias” or, in other cases, old prescriptions, supposedly for the treatment of pneumonia.

We emphasize, then, based on the criteria here appointed, the importance of radiological findings, not only to supporting the clinical impression, but also to define the pneumonic process - extent and location - and its resolution in the stage when the patient is asymptomatic.4,5

During the review of the conventional radiological exam, the physician must be careful while interpreting “chronic” infiltrates. Serial radiographs in the acute stage or even in the outcome of the disease become unnecessary if the patient evolves satisfactorily. Exemplifying, viral pneumonias may remain in radiological evidence for over 3 weeks in cases of infection by the respiratory syncytial virus, and up to 3 months in cases of adenovirus.8 On the other hand, in preschool children, normal vascular images, especially located in the right paracardiac region, may be usually misinterpreted as abnormal radiographic infiltrates.1

Technical mistakes in the performance of a simple radiological exam, such as radiographs in the expiratory phase (expired), low-voltage irradiation (badly penetrated), or incorrect positioning of the patient can generate images that may be wrongly interpreted as pneumonic processes or atelectasis. It is also important to remember the anatomic position of the thymus, mainly in infants, when it may be confounded with an image of hypopatency, usually in the upper right lobe. These alterations might reoccur in subsequent radiographs, creating a false impression of recurrent pneumonia.4 Therefore, we recommend a detailed review of all radiological exams.

It is also known that one of the limitations of the radiographic exam is the possible divergence between two
or more observers. Thus, many lesions, especially low-density infiltrates, end up being considered abnormal by some and disregarded by others.\textsuperscript{9}

We verified that many children with history of recurrent pneumonia routinely referred to our service had been exhaustively exposed to radiographs in very short time intervals, during which there would be no time for the resolution of the process. During the time children remained asymptomatic, none radiographs were asked. This same finding is described in the literature.\textsuperscript{10} In addition, radiographs with technical mistakes previously described were common, particularly in relation to the positioning of the child and to the voltage of the exam, thus severely impairing the evaluation and the diagnosis. It is also important to emphasize that most services do not have adequate technique to perform profile radiographs, which are very important, specially in the evaluation of pulmonary images of the posterior area.

We must stress that many children referred to Instituto de Puericultura e Pediatria Martagão Gesteira did not even present pneumonia, producing an unnecessary onus and preoccupation for the family and the health system. These cases were usually associated with normal vascular images located in the right paracardiac region. Additionally, 40.6\% of the patients came from different cities, probably demonstrating the difficulty in the access to health care services in their original communities, particularly in Baixada Fluminense.

Concluding, we observed that 11\% of the patients referred to our service with recurrent pneumonia actually presented bronchial asthma, which makes us believe that the radiological findings observed during acute episodes of asthma are often mistakenly identified as infiltrates compatible with pneumonic processes, which was also seen in the literature.\textsuperscript{11,12} In cases of uncomplicated asthma, the thickening of the bronchial wall is the most frequently observed abnormality in thoracic radiographs. In these patients, a careful study of their history will detect sibilance in each episode, and a review of the radiographs will reveal that the images diagnosed as pneumonia are, in fact, only areas of increase in bronchovascular disorders or atelectases.\textsuperscript{1}

Therefore, in patients with asthma, thoracic radiography must be indicated only when the symptoms are refractory to conventional treatment.\textsuperscript{12,13}

**Final considerations**

Recurrent statuses of cough, tachypnea, and pulmonary auscultation with adventitious sounds are often found in pediatric patients, especially those under 3 years of age. These statuses must be carefully evaluated so that they are not erroneously diagnosed as pneumonias, with the consequent abuse of antibiotics and other unnecessary measures.

We intended to emphasize the importance of a correct definition and understanding of recurrent pneumonia, as well as the value of the radiological exam in defining the normality or abnormality of findings, not only in the acute stage of pneumonic processes, but also during the periods when the child is asymptomatic.

To production of radiographs in every child who remains asymptomatic after each episode of pneumonia is onerous and, usually, unneeded. Thus, we would recommend waiting for a second episode, and then performing a simple chest X-ray when the patient is healthy (usually after 3 months). If the radiograph is normal, nothing should be done. However, if infiltrates are evidenced, new radiographs must be performed, with 1 to 3 months of interval, in order to evaluate the persistence or not of the images if necessary.\textsuperscript{4,14}

After a detailed evaluation, it would be wise for the pediatrician to refer the patient to a specialist if the case matched one of the definitions of recurrent pneumonia here presented.

The investigation of the etiology of recurrent respiratory disorder will become the goal in the treatment of these patients. As previously mentioned, recurrent pneumonia would be the consequence of disorders with different evolutions and prognostics. Therefore, late diagnosis may lead to irreversible pulmonary damages, such as bronchiectasis, sometimes only surgically corrected.

**Acknowledgements**

The authors thank Dr. Guilherme A. Sargenti, former intern at the Pediatric Pulmonary Service, Instituto de Puericultura e Pediatria Martagão Gesteira, for his support during data collection.

**References**


Correspondence:
Dra. Maria da Glória Moraes de Oliveira Mello
Rua Jardim Botânico, 700/309
CEP 22461-000 – Rio de Janeiro, RJ, Brazil
Phone/Fax: + 55 21 259.7639