ON THE DYNAMICS OF SOME ROENTGENOLOGICAL
CHANGES IN ACUTE PNEUMONIAE IN SUCKLINGS

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Classical ideas of the clinical course and roentgenological image of pneumoniae in sucklings which begin easily [2,7] and are often accompanied by respiratory failure underwent an outlined evolution in recent decade. Changes in the clinical course are related to more and more often established mixed viral-bacterial etiology [4,10,11] while rapidly changing roentgenological images are due to the influence of a series of factors [4,5]. There exists a more manifested relation between etiological agent and clinical course as well as between morphological and functional changes of roentgenological image [6,8,9]. However, this fact is still ignored [3-5]. That is why there is an incoincidence rate between preliminary clinical diagnosis and the final one in cases with acute bronchopulmonary inflammatory processes according to various investigations of approximately 60 per cent [1,5].

The purpose of this work is to present some peculiarities of roentgenological diagnosis originating from the dynamics and combination of roentgenological symptoms in acute pneumoniae in sucklings which can lead to diagnostic errors.

MATERIAL AND METHODS

An analysis is carried out of a total of 250 acute pneumoniae suckling's roentgenological data during a period of 3 years (from 1987 till 1989). Of these sucklings, 233 (or 93.2 per cent) are healed. Their mean age is 8 months. A total of 17 sucklings (or 6.8 per cent) have mean age of 9 months are deceased.

Roentgenological diagnosis of pneumoniae is mainly based on roentgenograms at facial and side projection. More seldom, laterograms, tomography and facial roentgenography at caudo-cranial roentgenological tube slope of 30° are applied. All sucklings have at least 2 roentgenograms, 117 have 3 roentgenograms each, 43 ones have 4 roentgenograms each but 23 ones - more than 4 roentgenograms each.

RESULTS AND DISCUSSION

A roentgenological diagnosis of pneumonia is made after the first X-ray examination in 176 sucklings (or 70.4 per cent of the cases). Pneumonia is provided after the second examination carried out between 2 and 4 days after the onset of the manifested clinical picture in 74 sucklings (or 29.6 per cent of the cases). This fact makes the evaluation of roentgenograms very responsible and requires a reinterpretation of roentgenological diagnosis of some borderline states such as bronchitis, bronchiolitis, and pneumonia.

In our opinion, main mistakes are due to underevaluation of some roentgenological symptoms observed in the beginning of pneumonia course. It is noteworthy that initial stages, particularly of interstitial pneumoniae, do not present any roentgenological symptoms even on qualitatively performed roentgenographs.

An essential moment for the roentgenological diagnosis presents the correct interpretation of changes of lung image. Vascular image is irregularly deformed, it has no sharp contours and there is no gradual becoming thin in direction to the periphery (fig. 1-1). Deformities can be established already in the first days of the disease. They disappear when it takes a favourable course or on
the background of altered vascular image roentgenological signs typical of pneumonia can be observed (fig. 1-2). However, changes of vascular image are not constant and thus they are not a pathognomonic symptom of beginning pneumonia.

Our observations show that independently of the presence or absence of vascular image changes there exists an interstitial involvement into the inflammatory process which is manifested to a different extent and in different consecutiveness in all sucklings with pneumonia. First roentgenological symptoms result from changes in the so-called "central core" of the interstitium reaching up to intralobular bronchioles. At this stage (fig. 2-1) shadows of little or medium intensity are laid on the hilus and cover its normal structure. Around the hilar region image is roughly band-shaped but more laterally it is neshlike band-shaped. These changes are often diagnosed falsely as "central" or "extrahilar" pneumonia. Vascular image deformity and extrahilar alterations in the interstitium develop back in cases of a favourable course. These changes are outlined about five days after the onset of the disease. Lung image is normalized on the 10th day.

Inflammatory process engages step by step after the "central core" the peripheral interstitial pulmonary tissue (fig. 2-2). Lung image can be followed-up almost till the axillar contours of the thorax. Alveolar image decreases and even disappears in these zones which is demonstrated by the appearance of small-spot shadows. In their proximity one establishes light areas limited by dense interobular septi. Changes of interstitial tissue lead to respiratory insufficiency which is, in our opinion, rather a pathophysiologial than a pathomorphological state.
Early vascular image alterations are differently detectable when there are symptoms of disturbed bronchial permeability diagnosed in 156 patients (62.4 per cent). We establish an acute pulmonary emphysema already by the first roentgenological examination in 163 patients (65.2 per cent). Anterior-posterior size of the thorax is increased on side roentgenograms and an "emphysematous triangle" in the form of a narrow and long wedge which apex shows up or down in dependence on emphysema localization in pulmonary lobi can be seen. There are anterior projections of "emphysematous wedges" from the upper and the right medial lobus (fig. 3-1) and posterior projection - from the lower lobi (fig. 3-2). Emphysema is preceded by the appearance of pneumonic foci in the same zones in 54.5 per cent of the sucklings. Emphysema reappears during the healing period in the regions of pneumonic alterations in 49.2 per cent of the sucklings. A particular carefulness is required to evaluate the irregular ventilation of single lung parts of one and same lung presented by the roentgenological image of hyperventilation, hypoventilation or atelectasis.

Segmental and semisegmental shadows are found out during the first roentgenological examination in 9.2 per cent of the sucklings. These shadows disappear for 2-3 days and even for hours. Roentgenological signs of pneumonia remain on their places. We accept that these rapidly transitory changes of roentgenological image are not an expression of a segmental oedema but they are due to atelectases by bronchial obstruction. Enlarged extrahilar lymph nodes as reasons for atelectasis followed by pneumonia are observed in 2 per cent of the cases.

Dynamic roentgenological examination establishes on the background of pneumonic alterations rapidly transitory pneumatoceles (in 6.8 per cent), pleurisies (in 8.4 per cent) and roentgenological signs of abscesses (in 14.4 per cent of the cases).

Roentgenological symptoms of acute pneumonia in sucklings can be established in most cases almost simultaneously with the appearance of clinical ones. The failure to detect pathological alterations in the lungs in cases of typical clinical picture of an acute pneumonia in the first days of the disease is most often a result from insufficiently precise interpretation of roentgenological findings. It is due to scanty pathological changes, small focal sizes, fine alterations of pulmonary image and its complexity determined by changes of interstitial tissue when a manifested emphysema or atelectasis is present which creates unfavourable conditions for their manifestation.

Roentgenological diagnosis of acute pneumoniiæ in sucklings presents a very difficult task.
because of the dynamics of the processes characterized by rapid changes of roentgeno-
morphological and roentgeno-functional image.

REFERENCES


К ВОПРОСУ О ДИНАМИКЕ НЕКОТОРЫХ РЕНТГЕНОЛОГИЧЕСКИХ ИЗМЕНЕНИЙ ПРИ ОСТРЫХ ПНЕВМОНИЯХ У ГРУДНЫХ ДЕТЕЙ

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РЕЗЮМЕ

Исследована динамика изменений легких 250 грудных детей, больных пневмонией. У 176 (70.4 %) грудных детей диагноз поставлен при первом рентгенологическом исследовании, а у 74 (29.6 %) - во время второго исследования, когда рентгенологическая картина заболевания приобрела типичный для заболевания образ.

Авторами анализируются ранние изменения рисунка легких в результате вовлечения в воспалительный процесс так называемого "центрального ядра" и периферической интерстициальной ткани легких. Выводится и подчеркивается значение детальной интерпретации этих изменений, предшествующих классический рентгеновский образ острых пневмоний. Подчеркивается также значение предшествующих пневмонии эмфизема легких или/и ателектаза в целях избежания неточностей в диагнозе.