

Imaging examinations of complicated pneumonias in children



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IMAGING EXAMINATIONS OF COMPLICATED PNEUMONIAS IN CHILDREN

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Summary

Introduction: Within the context of an increasing pulmonary pathology incidence in young ages, this study aims at presenting complicated pneumonia cases in children. Among the cases presenting this type of pathology, we noticed a variability, concerning the age of the patients and the determinant factors in causing the complicated inflammatory pulmonary pathology. Consequently, we took into account elements related to the statute and the individual condition for the disease itself and its complications.

Methods; The study is retrospective, the cases of complicated pneumonias in children, being examined during the period 2004-2009. We examined the patients hospitalized within Brasov Children Clinical Hospital. For studying the complicated pneumonias in children, we used die imaging method. The standard pulmonary radiography was used together with the computer-tomography and, w hen applicable, with the echography. We examined 27 cases of complicated pneumonia in children, aged between 2 mondis and 8 years. Among the cases included within the study, we noticed the increase of the incidence of this pathology in males, 17 boys being diagnosed with complicated pneumonia.

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Results: On the grounds of the imaging investigations that we made, we established an increasing incidence of the complications of the pneumonias in children, caused by the foreign bodies aspirated within the respiratory tracts. We also noticed a high frequency of complicated pneumonias, caused by pulmonary abscesses and purulent pericarditis, among the investigated cases. We also found complications of the pneumonias with pneumato- cyst. Furthermore, we found a case of pulmonary aspergillum that was secondary to an immune deficit but also two cases of branch- pulmonary malformations.

Conclusions: The results of the study, by means of the imaging method, reveal different aspects of the complications of pneumonia in children that are produced by their determinant

Résumé

Examinations imagistiques des pneumonies compliquées chez les enfants

Introduction: A cause de l'incidence de la pathologie pulmonaire aux âges jeunes, cette étude vise la présentation des cas de pneumonie compliquée aux enfants. Parmi les cas investigués avec ce type de pathologie, on a observé une variabilité, concernant l'âge et les facteurs déterminants dans la production de la pathologie pulmonaire de type inflammatoire, compliqué. Dans ce contexte, on considère les aspects concernant le statut et le terrain individuel d'installation de la maladie et ses complications. Méthodes:

L'étude est rétrospective, les cas de pneumonie compliqués aux enfants, étant investigués durant la période 2004- 2009. On a investigué les patients hospitalisés dans l'Hôpital Clinique d'Enfants de BraÅŸov. Pour étudier les <https://assignbuster.com/imaging-examinations-of-complicated-pneumonias-in-children/>

pneumonies compliquées aux enfants, on a étudié la méthode imagistique. La radiographie pulmonaire standard a été complétée par la computer tomographie et peut-être par une échographie. On a investigué 27 cas de pneumonies aux enfants, âgés entre 2 mois et 8 années. Parmi les cas inclus dans l'étude, on a observé une augmentation de l'incidence de cette pathologie aux personnes de genre masculin et on a trouvé 17 cas de pneumonies compliquées, aux garçons.

Résultats: Les investigations imagistiques ont relevé une incidence des cas de complications des pneumonies aux enfants causées par la présence des corps étrangers aspirés dans les tracts respiratoires. Les complications des pneumonies avec des abcès pulmonaires et de péricardite purulente ont été très fréquentes parmi les cas étudiés. On a trouvé des complications des pneumonies avec pneumatocele pulmonaire. On a remarqué un cas d'aspergillose pulmonaire secondaire à un déficit immun mais aussi deux cas qui présentaient des malformations broncho-pulmonaires. Conclusions: Les résultats de l'étude, effectuée par la méthode

They mostly appear in the upper part of the back or on the neck, on the abdomen and on proximal portions of the extremities, being multiple in 5-10 % of the cases. (Nieto et al, 2001).

From the histological point of view, lipomas are made up of mature adipocyte, having very small form and size variations. The nucleus of this type of cells is eccentric, being relatively uniform in most of the adipocytes in the lipoma composition.

We frequently encounter the zoienuclear vacuole that should not be considered as simple test elements for the level of the lipoblastic activity (Enzinger et mi., 1995).

Other secondary changes are also often and they may determine diagnosis problems. The traumatism of a lipoma ꝑbrmation includes necrosis focus points in tie adypocite, featured by foam macrophage nests distributed in the zBiercellular spaces or around the lypocytes. These macrophages must be differentiated from the lipoblasts that have riyperchromatic nuclei, usually larger in size.

The studies show that despite their close resemblance to the normal adipose tissue, most of the lipomas feature anomalies of the karyotype, usually involving chromosome 12 (William, 2006).

Although considered as the most commune benign formation, the cause of lipoma is not completely understood, yet its occurrence tendency is inherited. A small lesion may influence the development of such formation.

Lipoma is diagnosed by its simple ispppearance, yet the doctor may want to extirpate it to make sure that is not malignant. Lipomas are classified in solitary, predominant in women, and multiple which are frequent in men (Becker Jilrgen et al, 2005).

Singular lipoma may occur with the same frequency both in men and in women. Multiple lipomas occur more frequently in men. Generally, lipoma does not require a specific treatment. As lipoma is not a cancer tumor and it

cannot turn into cancer, it is not necessary to remove it. So far there is no treatment to prevent the occurrence of lipoma or to prevent their growth.

Material and methods

To compare the morphological aspects of the white adipose tissue, we took such sample tissues from various types of human tissues and organs.

This study shows the case of male patient aged 41 years old who came to the plastic surgery service with lipoma in the right deltoid region.

By taking intraoperative biopsy, we extirpated a half-moon shape 42 cm long, 27 cm wide and 10-15 mm variably thick fragment, with smooth surface and bosselated appearance.

The pathologic anatomy diagnosis of lipoma was established by the description of a lesion made up of adipose tissue with mature adipocytes, crossed by fine conjunctive septa.

In this study we used the classical histological method, by hematoxylin – eosine staining (H-E), Van Gieson, Gomori argentic impregnation and cytochemical dyes to highlight the lipids, the sudanophilia method with Sudan III.

Until the processing and staining of the permanent preparations through the classical laboratory technique that aimed at the steps of sample taking, fixation, inclusion, sectioning, staining, assembling, labeling and keeping in histological products library, the taken samples were stored in formalin 10%.

The used classical and cytochemical histological methods allowed the observation of the white adipocytes, of the conjunctive septa and of other structures of the lipoma and of the white adipose tissue by biopsies taken from other regions of the human body, such as the tegument, the adjacent area of the appendix and the adrenal of the human being.

causes. From this point of view, the presence of the foreign bodies within the respiratory tract together with other types of malformations, among which we mention the bronchogenic cyst, play a major role in the occurrence of complicated pneumonia in children. The study that we made revealed complications of the pneumonia in children, caused by purulent pleurisy, pulmonary abscess, purulent pericarditis and pneumatocyst and broncho-pleural fistula.

Key words: child, pneumonia, complications, standard pulmonary radiography, computed-tomography

Introduction

The pathology of the inferior respiratory tracts comprises different types of pneumonias.

Among the diversity of the infectious pneumatic syndromes, the pneumonias define inflammatory type processes of the distal pulmonary parenchyma [14, 15]. These may be caused both by infectious type factors and also by non-infectious factors, as the inflammation of the pulmonary parenchyma, implying the respiratory bronchiole, alveolar spaces and the interstitial [13, 14]. We consider that the process is determined by the invasion of the above

mentioned structures, that represent the effect of the invasion of the anatomic structures, mainly of an infectious type agent [3, 10].

The exactness of diagnosing the type of pneumonia may be determined by the association of certain complementary medical information [6, 7]. These may indicate the condition of occurrence of the infection that determines the disease, the agent type and species, that causes the disease, the type of clinical syndrome, the affected anatomic structure, the mechanism of causing the disease, together with the individual status and condition of the disease occurrence [2, 4].

Being a frequent pathology type for all the ages, pneumonias imply a rapid and correct establishment of the diagnosis for the purpose of determining the adequate treatment for healing. From this point of view, the imaging examinations play an extremely important role.

The risk of occurrence of the infection depends on the host organism or on its residence [1].

Against the different types of aggressions that cause the installation of the pneumonia, we used a defense mechanism system of the respiratory tract.

Among the defense lines against bacteria, the first place is taken by the mucociliary clearance. This is formed out of cells that are provided with cilia, which hinder the respiratory tracts, of secretory cells seromucous glands and mucus [3], The efficiency of the mucociliary clearance is strictly dependent on maintaining a normal quantity and viscosity of the bronchial mucus. The

coordinated modality of developing the cilia activity is also highly important [13, 10].

imagistique, relèvent des aspects divers des complications de la pneumonie aux enfants, qui sont produites par les causes déterminantes de ceux-ci. De ce point de vue, la présence de corps étrangers dans les tracts respiratoires mais aussi de certains types des malformations, dont on a mentionné le kyste bronchogène, ont un rôle important dans l'apparition des cas de pneumonie compliquée aux enfants. L'étude a relevé des complications de la pneumonie aux enfants, causées par la pleurésie purulente, l'abcès pulmonaire, la suppuration pulmonaire, la péricardite purulente, la pneumatocele et la fistule broncho-pleurale. Mots-clés: enfant, pneumonie, complications, radiographie pulmonaire standard, tomographie computerisée

The rapidity and the exactness of the clinical and para-clinical diagnosis facilitate the adequate treatment recommendation for the purpose of the rapid healing.

The imaging examinations play a major role in the rapid and correct diagnosis of the pathology of the child and of the adult, in the case of the complicated pneumonias in children [9, 12], Because the clinical diagnosis of the acute pneumopathy in children is seldom atypical, frequently occurring general non-respiratory symptoms as irritability, alternate general state, abdominal pains, cephalgia, thoracic pains and non-suggestive physical examination, pulmonary radiography is considered a basic diagnosis method.

Pulmonary pathology is frequent in children, presenting diverse causes.

Caused by amnesia, by the objective clinical examination, completed by <https://assignbuster.com/imaging-examinations-of-complicated-pneumonias-in-children/>

paraclinical investigations, pneumonias allow the institution of the adequate treatment, for the treatment and the healing of the disease.

The pulmonary radiography must reveal the following: if the affection is viral or bacterial; if associated with an underlying pathology; which are the causes that determined the persistence and the progression of the symptoms; the manner of evaluating the complications.

The causes of the evolution of the pneumonia are represented by the progressive lesion of the pulmonary sequestration type, congenital cystic adenomatoid malformation, bronchogenic cyst, bronchogenic obstruction by the foreign bodies aspirated within the respiratory tract, gastroesophageal reflux, systemic diseases, immunodeficiency syndromes, other types of complications [14, 15].

The complications of pneumonia are determined by purulent pleurisy, by pulmonary abscess, pulmonary suppuration, purulent pericarditis, pneumatocyst, bronchopleural fistula.

The thoracic Ultrasonography provides us the possibility of differentiating the pleural collections and the simple pericardial ones, as transudate, of the septal ones, encysted or with fiber ones, as exudades, that are different in terms of therapeutic abort and also in terms of prognosis [8, 11].

The thoracic computed-tomography examination provides us supplementary data, emphasizing lesions that were registered before the occurrence of the pneumonia or complications that occur during the evolution of the disease [2, 5].

Material and Methods

This study implies the investigation of the cases of [pneumonia and its complication forms. For this purpose we used the imaging method. Carrying on a conventional radiological examination, the standard pulmonary radiography was completed by the computed-tomography examination and by the Ultrasonography. Using these imaging methods, we investigated cases of complicated pneumonias in children, found at the children who were Hospitalized within Brasov Children Clinical Hospital during the period 2004 - 2009 for the children aged between 2 months and 8 years. The investigated cases revealed the frequency of the disease in males, the children from the rural environment being represented by 17 cases.

Results

The standard pulmonary radiographics together with the computed-topographies provide the accuracy of the diagnosis.

We identified 8 children presenting foreign bodies . Inspired within the respiratory tracts, 2 children presenting bronchopulmonary malformations, 4 pulmonary abscesses, 2 cases of multiple phonemic pulmonary abscesses in staphylococci as osteomyelitis, 4 purulent pleurisies, 1 purulent pericarditis, 5 children presenting pneumatocyst and a case presenting pulmonary aspergilla secondary to an immune deficit. The cases that were found by the imaging examinations, by means of the computed-tomography and the standard pulmonary radiography are given within the following images, numbered from figure 1 to figure 7.

Discussion and Conclusion

The study revealed the existence of certain types of pneumonia that got worse because of the pulmonary abscess that together with the pulmonary gangrene and the bronchiectasis constitute the category of the pulmonary suppurations.

In children, we found as causes of the complications of pneumonia, the presence of foreign bodies within the respiratory tracts but also of certain types of malformations as the bronchogenic cyst.

The pulmonary abscess defines a process of parenchymal necrosis. In this context, a neofomat cavity presenting purulent content is formed.

Irrespectively of the diffuse type suppurations, as the case of the pulmonary gangrene, the pulmonary abscess represents a type of parenchymal suppuration that is usually located at the level of a pulmonary segment.

The identification of the pulmonary abscess may be achieved at the level of an initial parenchyma, which was affected by a pre-existent suffering. By definition, the pulmonary abscess represents a complication of the acute bacterial pneumonia, by contamination with the anaerobe bacterial agents.

The pulmonary abscess constitutes an advanced progressive stage of the aspiration pneumonia. This may appear consequently to the alteration of the immunity mechanisms and of the infected inoculum size. The inflammatory process that is specific to the pneumatic condensation is characterized by a tendency focus on necrosis and soft-mindedness, presenting an important exudate composition. From the anatomic-pathologic point of view, the

bronchial epithelium is infiltrated and presenting an edema and the bronchial
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lumen is partially obstructed and covered by purulent secretions. The wall of the pulmonary abscess is constituted of fibrin deposits, pus, fibrin or purulent alveolus and granulates tissue areas.

The radiological aspect within the initial state is of round consolidation that determines the bulging of the fissure.

The computed-tomography reveals a consolidation that presents a hypodense center that is charged with contrast only peripherically.

In evolution there are registered gas bulls at the level of the central area, the vox vomica identifying a hydro-air

image aspect, presenting a thick wall and a horizontal level, consequently to the evacuation by the bronchia. Sometimes the abscess can break within the pleural cavity causing the purulent pleurisy.

The computed-tomography may reveal information concerning the differentiation of the peripheral pulmonary abscess, sub-pleural of a possible pleural empyema located at the thoracic level, which presents a hydro-air level, by bronchopleural fistula. The computed-tomography examination allows also the mention of the anatomic sub-layer of the secondary pulmonary abscesses.

The Pneumatocyst are air bulls that occur in the evolution of the bacterial pneumopathies, especially staphylococcal ones, as a consequence to the occlusive effect of the exudate and of thickening of the mucous, determining the effect of " air trapping". These decrease spontaneously in several weeks

or days. A reducible complication that might appear is represented by the pneumothorax produced by the

rupture of a tensioned pneumatocyst, which determines pleural drainage.

The bronchopulmonary malformations occur within the 1. imaging examination as consolidations or cystic images, which persist after the treatment and after the disappearance of the inflammatory syndrome.

The treatment consists in the surgical abort.

The cavitory necrosis is a pneumatic complication in which the area dominated by necrosis contains a variable number of cavities with fluid or air. The Pathologic Agents involved are the staphylococcus and the streptococcus. The 5. pulmonary radiography is not suggestive, the computed-Tomography examination with contrast substance, being the election investigation. The occurrence mechanism consists in the production of some thrombosis in the vascularization of the alveoli, which lead to the apparition of the necrosis and at the formation of certain cavities. Initially the cavities contain liquid that may be evacuated by bronchia, the place or the liquid being taken by air. Even if the imaging aspect is impressive, most of the cases heal without any specific sequelae. Very few cases need surgical interventions.

Pneumonia in children is frequent, even if most of the cases heal rapidly without sequelae. However there are

situations when the evolution is dragging on, difficult and marked by complications. This difficult evolution is given by the aggressiveness of the

pathogen germ, of the defense 14. capacity of the organism or pre-existent pulmonary lesions.

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The imaging investigations and the correct surgical abort ^ given in imposed situations, adapted to each case, by multi- iisciplinary co-operation, determine the best results in solving the described pathology.