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BASICS OF RADIATION DIAGNOSTICS OF THE LUNG IN CHILDREN (REVIEW)

Ахмедов Я. А.,
Шодикулова П. Ш,
Бахриева Д. Ш.
Самаркандский государственный медицинский университет, Самарканд, Узбекистан

Abstract
Radiation diagnostics of the lungs in children has its own characteristics. These features depend both on the technical aspects of radiation examination and on the anatomical structure of the child's respiratory system. In modern pediatrics, among a large number of various methods, the diagnosis of radiation methods is very important and often dominant. Therefore, the pediatrician should be well acquainted with the basics of radiation diagnostics of the lungs in children and the latest advances in it.

Keywords: Radiation imaging methods, X-ray methods, X-ray anatomy, X-ray physiology, semiotics of diseases.

Introduction

In recent years, more than 30% of children are admitted to hospitals due to pneumonia. Pneumonia is especially common in children in the first year of life "from 3 to 9 months" in the range from 10-19.8% to 80%.
Non-specific pathological processes in the lungs "atelectasis, hyaline membrane disease, edemato-hemorrhoidal syndrome, etc.", called pneumopathy in newborns, are the cause of early death of children from infectious diseases in 90% of cases. Congenital malformations and abnormalities of the lungs are also not uncommon in children and often cause chronic non-specific lung diseases.
In the structure of children's diseases, especially at an early age, one of the first places is occupied by acute respiratory diseases, which reach 80% of all registered viral lesions. In children, especially older children, all the same methods of radiation diagnostics are used that are used in adults. Methods of radiological diagnostics include:
1. X-ray method, including X-ray computed tomography
2. Radionuclide.
3. Ultrasonic.
4. Thermographic.
5. Magnetic resonance.
Historically, the X-ray method is one of the first to be used for chest examinations. This became possible because conditions of natural contrast are created in the chest, when against the background of the transparency of the lung tissue, the organs and tissues of the chest cavity are revealed in the form of shadows. The X-ray method is still widely used for the examination of the lungs in children and accounts for up to 30% of all X-ray examinations in children.
Conventional X-ray examinations include primary, additional, special and contrast techniques. The main methods include fluoroscopy, which in children, especially at an early age, is used

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extremely rarely and only with an "X-ray image intensifier", and in principle is not recommended, due to the high radiation exposure in this type of study

X-ray imaging is the main method of X-ray examination in children of any age, which makes it possible to identify both morphological "shadows of inflammatory and tumor diseases" and functional "air filling, diaphragm mobility, reaction of the vessels of the small circulation, especially when using functional tests. X-rays can reveal details as small as 0.3 mm, whereas fluoroscopy can only reveal more details. The most favorable position for a sick child to examine the chest is an upright, orthostatic position.0.5 мм

At present, the main X-ray examinations include tomography of the lungs, which is used in case of suspected tuberculosis, lesions of the lymph nodes of the lungs and mediastinum, tumor lesions, etc.

Tomography is also associated with a fairly high radiation exposure, so the indications for it must be strict. Additional X-ray examination techniques in childhood are less used. Large-frame fluorography is not used in children as a preventive study, except for special epidemiological situations in the region. Fluorography has a higher resolution than fluoroscopy, but slightly lower than radiography.

Electroradiography is not used in children due to radiation exposure 2.5 times higher than X-ray. Determination of the functional state of pulmonary ventilation by the method of pneumatic polygraphic examination can be carried out only according to clinical indications and when other methods provide less information.

Special and contrast techniques in pulmonology are associated with the study of those structures that are poorly or not detected at all during a conventional X-ray examination. These include bronchography, a technique for contrasting large and medium-sized bronchi up to the 3rd order, which under normal conditions cannot be detected on conventional radiographs. The angiopulmonography technique is a contrast of the vessels of the small circulation, which is used in the diagnosis of thrombo-embolism, congenital anomalies and malformations of the lung vessels, tumor lesions, etc.

In recent decades, the method of endobronchoscopy has been developed, which makes it possible to examine the internal state of the bronchial tree with the collection of biopsy material under the control of radiation examination.

For successful X-ray diagnosis of respiratory diseases, it is necessary to know the X-ray anatomy of the chest skeleton and thoracic cavity organs, as well as the physiology of a healthy child. This will facilitate the differential diagnosis of normal, borderline and pathological conditions. At the same time, it is necessary to take into account the age-related variability of the organs and systems of the growing body. At different ages, a child has certain anatomical and physiological patterns. In this way, Age-related X-ray anatomy, physiology in general and thoracic organs in particular are the main criteria in assessing the results of the X-ray examination of the child. X-ray anatomical and physiological features are most pronounced at an early age, in the period from birth to 1 - 1.5 years.

At the age of up to 1 year, the following features of the anatomical structure of the chest and respiratory organs are observed:

The sternum has a large number of segments at birth. At 7 months, 6-7 segments remain, which gradually merge with each other. The shape of the chest is conical with a wide base, the ribs have a horizontal direction, the position is as if on a "breath".

In the diaphragm, muscular elements predominate over tendon elements, which explains its greater mobility and displacement. The dome of the diaphragm is located at the level of the IY rib and drops lower with age.
The trachea in a child under one year of age begins at the lower edge of the ring-shaped cartilage at the level of 3-4 cervical vertebrae, the length of the trachea is 3.2 cm. The main bronchi are completely within the median shadow, in the anterior projection.
The bronchi are narrow, poor in muscle and elastic fibers, and their mucous membrane is rich in blood vessels.
In the lungs of newborns, the capillary system is well developed, the lungs are fuller than in adults, the elastic tissue is poorly developed, on the contrary, the interstitial, interstitial tissue of the lung is better developed than in older children, it is more abundantly supplied with vessels, the capillaries and lymphatic clefts are wider than in adults. The type of breathing is diaphragmatic. Lung boundaries - the apex of the lungs is projected along the posterior surface of the 1st rib, the lower border descends to the 10-11th rib. The pleura is thin, easily displaced; The pleural cavity is easily extensible due to the weak attachment of the parietal pleural sheets to the chest. This explains the displacement of the mediastinal organs from even a small accumulation of fluid in the pleural cavity. The pulmonary pattern is a fan-shaped bundle of delicate twigs (arteries and veins) extending from the root of the lungs. The bronchi are normally not visible in both children and adults. Vessels with a small diameter are not clearly depicted in the middle pulmonary fields. The root of the lung, which consists of large vessels, bronchi and interstitial tissue, is somewhat smaller in length and width on the left throughout life than on the right. The root on the left is lower than the root. The mediastinum is wide and occupies 1/3 of the thorax volume. Between the mediastinal sheets of the pleura in the anterior mediastinum is the thymus gland, the shadow of which in direct projection can start from the shadow of the clavicle, goes down to the root and shadow of the heart (left), merging with these structures. The shadow of the thymus gland is visible in 33 to 63% of infants.
At the age of 1-3 years, the trachea begins at the level of the 4th-5th cervical vertebra. From 1.5 to 2 years of age, the distal end of the right main bronchus begins to extend beyond the right edge of the median shadow, and the left main bronchus remains within this shadow all the time, the intermediate bronchus also protrudes beyond the median shadow. Thymus gland occurs at this age and up to 14 years in 5.8% of children.
At the age of 3-7 years, chest breathing is clearly manifested, which prevails over diaphragmatic breathing. The process of growth and differentiation of the functional elements of the lung - in the lobules, acinuses and intralobular bronchi - is completed by the age of 7 years. At this age, the root of the lung on the right and left is at the same level.
A feature of chest X-ray anatomy at the age of 7-10 years is the structuring of the root and the location of the left root above the right. In subsequent age periods, the thoracic organs correspond to the structure of the adult form.
Computed tomography is in addition to a conventional X-ray examination. For example, in 40% of cases, CT scan provides information that is not detected by traditional X-ray examination. At the same time, in 16% of CT cases, the information changes the treatment tactics in cancer patients. In 90% of patients, CT scan can determine the inoperable stage of the lesion, and operability in 94% of patients. CT examination is most appropriate for studying the structure of the pathological shadow in the lungs and mediastinum, for detecting lymph nodes, which are much better seen on CT than on conventional radiographs and linear tomograms. Symptomatic and syndromic

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diagnosis on CT is similar to conventional X-ray, except that CT uses data from the density of the test objects. In terms of lung parenchymal density, it is -730-780 units of Hounsfield/N/, areas of lung tissue swelling are from -820 to -890 units, hypoventilation gives from -570 to -630 units, atelectasis from + 23 to + 50 units. Lung cysts usually correspond to a density of + 5 to + 15 units. Radionuclide diagnostics of lung diseases is based on quantitative and qualitative indicators of accumulation, distribution and passenger radiopharmaceuticals in the system of pulmonary structures.

The radionuclide method includes the following techniques, which are still used in children to a greater or lesser extent:

1. Pulmonary perfusion scintigraphy. The purpose of this technique is to study the capillary blood supply by temporary embolization of the capillary bed of the lungs. Embolization does not exceed 0.12% of the vessels of the small circulation and therefore does not affect the functional state of the lungs. I-131, Ip-113m and Ts-99m are used as launch vehicles. They are included in the radiopharmaceuticals. The radiopharmaceutical, in the form of a macroaggregate state or microspheres of human serum albumin (ASF/, 90% of which have a size of 15-30 μm), is administered intravenously. These microparticles are trapped in smaller capillaries, suppressing the radiation captured by scintillation detectors.
2. Aerosol scintigraphy can determine the location, nature, and extent of lung ventilation disorders and bronchial obstruction. radiopharmaceuticals are injected into the bronchial tree by inhalation. Radiopharmaceuticals settle on the walls of the bronchial tree and alveolar ducts. RFP-ASF labeled In-113m or Tc-99m. Inhaler - UI-2 is used.
3. Radiopulmonography is a complex method of sequential examination of regional ventilation and then capillary blood flow.

Stage 1 is carried out with the use of radiopharmaceuticals labeled with He-133, which is practically not absorbed during inhalation, does not bind to blood elements during intravenous administration, quickly diffuses into the lumen of the alveoli and is quickly excreted.

Stage P – examination of capillary blood flow according to the above technique /according to the technique of perfusion pulmonary scintigraphy/

In a gamma camera examination, after xenon injection, it is possible to obtain an image of the lungs in the deep inhalation and exhalation phases with visualization of the reduced ventilation areas. The disadvantage of the method is that children do not perform breathing acts well.

Perfusion scintigraphy normally produces a uniform rather intense image of the blood stream of the lungs in four projections: anterior, posterior, and two lateral. In the presence of pulmonary vascular obstruction in the relevant areas, the number of retained particles decreases and the image of the lungs on the scintigrams has a reduced intensity.

In pediatric pulmonology, radionuclide diagnostics is expedient and competitive with the X-ray method only in two diseases: congenital hypoplasia of the pulmonary vessels and thromboembolism.

Radionuclide studies have proven to be very effective in clarifying the severity of lung damage and have become especially widespread in determining indications for surgical treatment. According to perfusion pulmonary scintigraphy, it is possible to determine the area of distribution and the degree of damage to the capillary network and, in some cases, to determine the extent of surgical intervention without the use of angiopulmonography.

Using RIA cortisol complexes of total and specific immunoglobulin, it is possible not only to detect atypical forms of bronchial asthma, especially in cases where it is difficult to conduct and

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evaluate conventional allergological tests (for example, in neurodermatitis), but also to monitor the state of immunological reactivity during treatment. Radiation exposure during RNI is equal to or slightly higher than a conventional X-ray examination, but not higher than fluoroscopy.

Ultrasound examinations make it possible to detect exudate in the pleural cavity in children, to determine separately the parietal and visceral pleural sheets due to the echo-free space, to detect subcutaneous emphysema and fluid in the pleural cavity in quantities up to 15-20 ml in case of chest trauma, which is significantly less than the amount detected by X-ray (within 100-200 ml or more).

It is not difficult to identify cysts and abscesses. In 30% of children after pneumonia, ultrasound conduction remains elevated. Diagnosis of tumors is very effective in relatively large tumor sizes in the periphery, in atelectasis. In peripheral tumors, an echodensive formation of a heterogeneous echostructure is revealed.

Thermography is not widely used in pediatric pulmonology. But it can be used as a screening method and as a method for monitoring the dynamics of the pulmonary process. The sensitivity is quite high, but the specificity is low. Thermographic changes in pneumonia, bronchial asthma and malignant tumors with abundant blood supply are well detected.

Magnetic resonance imaging in pulmonology has no advantages over X-ray computed tomography and therefore does not have much practical application at present.

The radiological manifestations of lung diseases, i.e. the radiological symptoms of these diseases, are very diverse. But among them, three groups of signs are of particular importance: firstly, it is the darkening of lung tissue, the replacement of air tissue with a pathological substrate, and secondly, it is an increase in the transparency of lung tissue due to an increase in the air content in emphysema. Such a sign is called enlightenment. Thirdly, a change in the lung pattern as a sign of lung pathology. Opacity can be considered as a syndrome because it is associated with a single pathogenesis – the replacement of airborne tissue with airless tissue. The anatomical substrate of this syndrome is either a thickening of the lung tissue of any origin, or the presence of fluid contents in the pleural cavity, or, more rarely, thickening of the pleural sheets due to fibrotization or calcification. The differential diagnosis of these conditions is based mainly on two decisive radiographic signs: the first is the position of the mediastinum, which in atelectasis shifts to the diseased side, and in total pleurisy to the opposite side. The second sign is the detection of the structure (a homogeneous structure is characteristic of atelectasis and liquid contents, heterogeneous - for destructive pneumonia or total foci). Dimming can be limited. This syndrome is seen in many lung diseases. Limited opacity is characteristic of the lesion of a lobe, segment or part of it and occurs in pneumonia, tumors and metastases.

Opacities can be focal - single and multiple. Based on the size of the foci, they are divided into 4 types: large foci - up to 1 cm / occur in pneumonia of various etiologies, tumors, metastases, etc. Middle foci are characteristic of focal pneumonia and metastases. Small foci - up to 3 - are characteristic of small focal pneumonia in children. Miliary- 1- are characteristic of miliary tuberculosis, carcinomatosis, hemosiderosis, pneumoconiosis, alveolitis, etc.0,5 см4 мм2 мм

However, based on these characteristics alone, it is extremely difficult to make a differential diagnosis of opacities, which occur in 200 different pulmonary diseases. Therefore, all blackouts are characterized by 8 main features of the painting. This includes:

1. Number/quantity/ of dimmings,
2. Localization,
3. Shape,

4. Magnitude,
5. Contour,
6. Structure,
7. Shadow intensity,
8. Dimming displacement, changing the shape of the shading under the conditions of gravity tests.

According to the number (number), they are divided into single, which are more common in primary malignant and benign tumors, cysts, croupous pneumonia, etc., and multiple-dissemination, involving a limited area of lung tissue or spreading completely to the entire lung.

Localization has a certain diagnostic value, especially in typical topics. For example, the localization of foci in the apical region or in the YI segment is more characteristic of tuberculosis, paravertebral localization may suggest a neuroma. An opacity of a certain shape, located in the projection of the main or additional pleural interlobular cleft, sometimes unequivocally indicates interlobular pleurisy. Localization of opacities in the root area, especially those with polycyclic external contours, will directly indicate lymph node involvement. Parietal localization, proven by multiprojection examination, is characteristic of sumptuous pleurisy or pleural tumor (mesothelioma). Opacity associated with the diaphragm and shifting with it during breathing indicates diaphragm lesions (tumor, cyst, sumptuous diaphragmatic pleurisy).

The shape of the opacity is determined mainly by the nature of the pathological process and the freedom of propagation in the lung tissue (with or without obstructions). The most common form of opacity is a rounded shadow, which is known as the rounded shadow syndrome. Globular formations are found in more than 100 different lung diseases, which makes differential diagnosis extremely difficult, and sometimes impossible, if not for one circumstance related to their frequency. Rounded Pathological formations in the lungs in practical work require differential diagnosis among 5 to 10 diseases. These are peripheral cancers, lung metastases, cysts, tuberculomas, benign tumors, less often pneumonia, sumptuous pleurisy, etc. Wedge-shaped The opacity is characteristic of limited lesions of the lobe, segment and occurs in segmental and lobar pneumonia, atelectasis of the lobe and segment, in infarction of the subsegment of the lungs. Lenticular shadow, Located in a typical location, it is indisputably indicative of interlobular pleurisy. Linear shadows give pleural overlays, fibrous cords, of course, more often against the background of other pulmonary-pleural changes.

The magnitude of the opacity has a lower diagnostic value and is more indicative of the neglect of the disease, the intensity of growth and the prevalence of the process. As a rule, large opacities are found in benign tumors and cysts, less often in sarcoma, which do not manifest themselves clinically for a long time, sometimes reaching huge sizes, filling the entire half of the thoracic cavity. The contours define the stage, the nature of growth and spread. It should be borne in mind that the nature of the contour depends mainly on the nature of the anatomical substrate. For example, clear, even contours of a benign tumor or cyst without perifocal changes will give clear and even contours on an X-ray. Fairly clear but bumpy contours are more characteristic of peripheral cancer. Indistinct contours indicate infiltration in the inflammatory process or infiltrative growth of a malignant primary or secondary tumor. Blurred contours can occur due to projection distortion

The opacity structure is also related to the structure of the pathological focus and can be homogeneous or heterogeneous. A homogeneous opacity structure is characteristic of pulmonary processes that cause continuous replacement of air lung tissue, such as croupous pneumonia in the

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stage of liverization, atelectasis, pleurisy, empyema, lobar and segmental pneumonia without decay.

A heterogeneous structure occurs in the summation of focal shadows, in the disintegration of tumor or inflammatory infiltration, in the presence of multiple cysts with perifocal changes in lung tissue. In terms of intensity, there are low, medium and significant.

1. A low intensity opacity is considered when a pulmonary pattern is visible through the opacity. This intensity is typical for small volumes of opacity and for initial infiltration.

2. The average intensity is determined by the lack of visibility of the lung pattern on the Darkening Background. Such intensity is characteristic of many pathological processes of medium volume and prevalence. 3.Significant intensity is associated with large lesion volume and prevalence, and is also found in calcifications in the lungs.

The last indicator that characterizes the peculiarity of dimming is the sign of displacement. If the opacity shifts along with adjacent organs and structures during inhalation and exhalation, we can talk about the connection of this opacity with nearby organs and tissues (diaphragm, heart, ribs). A change in the shape and sometimes size of the opacity, usually rounded, with a change in the position of the body (gravitational or orthostatic test) indicates to a certain extent a loose pathological substrate of opacity or the presence of liquid contents in the pathological focus. In order to assess the size and shape of the opacity, it is necessary to use the radiometric method, i.e. to quantitatively confirm these changes.

The second important syndrome of lung pathology is the lucid syndrome, which occurs both together with the darkening syndrome and separately. Enlightenment is divided according to its extent and spread into diffuse, extended to one lung or to both, which occurs. In case of emphysema. At the same time, X-rays (in addition to an increase in the transparency of the pulmonary field), more objective signs of emphysema are also revealed: an increase in the size of the pulmonary field, widening of the intercostal spaces, depletion of the pulmonary pattern, its becoming smaller per unit area compared to the norm, flattening of the diaphragm dome and its low standing. The state of ventilation is determined more objectively when using the pneumopolygraphy technique, when in emphysema there are no significant changes in transparency during inhalation and exhalation, which is recorded on an X-ray.

Local, limited lumen is more difficult to diagnose and is identified on the basis of illumination in the opacity or by taking into account the identification of a restrictive rim around the local lucidity. Limited enlightenment occurs during the disintegration of the pathological focus (destruction of lung tissue in staphylococcal pneumonia, caseous pneumonia, tumor and tuberculous infiltrate, etc.). Limited lucinations are given by cysts, emphysematous bullae, and local pneutorax. The latter is distinguished by its structureless, opaque transparency without a lung pattern. To clarify the presence of limited lumen, it is necessary to use lenei or X-ray computed tomography.

No less, and perhaps the most important sign of lung tissue pathology is the nature of changes in the lung pattern. Normally, the pulmonary pattern, the anatomical substrate of which is the vessels (arteries and veins), is characterized by a uniform thinning of its branches towards the periphery with a fairly clear pattern of contours. In the middle and especially in the lower parts of the pulmonary fields, in the middle and especially in the lower lobes, the pulmonary vascular pattern is much richer, because it is larger per unit volume and area than in the upper lobe (in the vertical examination of the lungs).

A distinction is made between limited, widespread, and total change in the lung pattern. In the first case, the zone of changes extends to no more than two adjacent intercostal spaces.

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In widespread involvement, the pattern is altered in a significant portion of one or both pulmonary fields or throughout one lung field. In the case of a total lesion, the pattern is necessarily changed along the entire length of both pulmonary fields, which is common in systemic diseases.

The syndrome of pathological changes in the pulmonary pattern is difficult to decipher. First of all, this is due to the fact that it is observed in many diseases - congenital and acquired, blood and lymph circulation disorders, bronchial diseases, in all inflammatory and dystrophic lung lesions, in many tumor processes, etc.

There are three main types of pathological changes in the pulmonary pattern. The most common of these is the enhancement and enrichment of the lung pattern. It manifests itself in an increase in the number of elements of the pattern per unit area of the pulmonary field. The pattern is enriched mainly in the inner zones of the pulmonary fields. This variant is especially pronounced in arterial congestion. In other cases, the enrichment of the pattern is associated with changes in small vessels, with thickening of the interlobular and interalvevlar septa. X-rays reveal a pulmonary pattern in the peripheral parts of the pulmonary fields, where it is normally practically not detected. Enhancement and enrichment of the pulmonary pattern, first of all, in inflammatory diseases, in congenital and acquired heart defects, in pneumosclerosis of various origins, in compensatory increase in blood filling of one lung with a pronounced lesion of the second lung (cirrhosis, effusion pleurisy or after its removal).

Another common type of change in the lung pattern is its deformity. It is usually combined with the intensification of the pattern, but it differs in the change in the course of the vessels, the absence of constriction of the vessels to the periphery, the prairie of these shadows, and the unevenness of their contours. The pattern becomes erratic and is supplemented by bronchial and interstitial seals, which increase the number of elements of the pulmonary pattern. Such changes in the lung pattern are mainly associated with chronic inflammatory processes that cause overgrowth and sclerosis of the interstitial tissue of the lung. If the patency of the bronchioles is impaired, the swollen pulmonary lobules give the pattern the appearance of a large mesh or the appearance of a honeycomb pattern, which is characteristic of chronic bronchitis, bronchiectasis and small multiple cavities. Much less common is a change in the lung pattern in the form of its impoverishment. At the same time, there are fewer elements in a unit area of the pulmonary field than normal. This occurs when the swelling of part or all of the lung increases the area of the pulmonary field with the same number of twigs. Depletion of the pulmonary pattern is also observed in malformations of the arterial network of the lung and in thromboembolism of the pulmonary vessels.

Of great diagnostic importance in lung disease in children is the state of bronchial permeability in lung diseases in children and especially in newborns.

X-ray diagnosis of acute inflammatory processes in young children is based on primary and secondary, or indirect, signs. Primary signs include changes in the vascular pattern and the appearance of additional shadows, while secondary signs include symptoms of impaired bronchial permeability. Symptoms of bronchial permeability disorders in young children are found in acute various respiratory diseases, but manifest themselves differently depending on the type of bronchial obstruction. The inflammatory process in the bronchi, first of all, is expressed in hyperemia and edema of the mucous membrane, which reduces the lumen of the bronchus and, accordingly, the volume of inhaled air passing through the bronchus. As a result, less air enters the area of the lung ventilated by this bronchus. Radiographically, areas of the lung with reduced pneumatization or hypoventilation will appear to be of reduced transparency compared to the

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norm, which is determined by the nature of the clearing of the opposite, healthy lung. The vascular pattern under conditions of hypoventilation is less differentiated, more thickened and enhanced.

Another variant of bronchial permeability disorder is due to the formation of a valve or valve mechanism. The valve can be an edematous fold of the mucous membrane or a mucous plug formed as a result of hypersecretion of mucus. At the same time, there is a free intake of air at the time of inhalation, and its difficult exit, due to the valve mechanism of the blockage of the bronchus. In the area of the lung ventilated by this bronchus, increased transparency and localized swelling appear. Radiographically, the symptom of bloating is characterized by increased transparency compared to other parts of the lung, the disappearance of small vascular structures and the thinning of larger branches of the lung pattern, i.e. there is a sign of its impoverishment. The valvular mechanism is more commonly seen in the lobular bronchi or in the bronchi supplying a group of lobules. Under these conditions, the swollen lobules on the radiograph correspond to a limited area of increased transparency, the contours of which are rounded, scalloped, displaying the stretched walls of the lobules. The size of lobular swellings varies from 1 to 2 cm and is directly related to the age of the child. This pathogenetic mechanism underlies the obstructive syndrome seen in bronchiolitis in young children, which is sometimes mistaken for an asthmatic component.

The third variant of bronchial permeability disorder is complete obstruction of the bronchus lumen, ending with the resorption of air in the ventilated area with the formation of atelectasis in it. In young children, obturation is observed mainly at the level of small bronchi, as a result of which breathing is turned off in small areas of the lungs. Therefore, radiologically, atelectasis has a disc-shaped or lamellar shape, with a length of 1.5-2 cm or more. The direction of atelectasis can be different, from horizontal to vertical, depending on the location of the segment and the direction of the bronchus to be obstructed. The width of discoid atelectasis varies from 1–2 to 5–8 mm. During obturation, lobular atelectasis is formed at the level of lobular and terminal bronchioles, which are radiographically displayed as small focal formations.

Of the secondary signs of bronchial obturation, the symptom of interstitial pneumonia or the sign of general pulmonary distension is also important, the development of the latter is based on morphological and functional immaturity and is a sign of toxicosis in a severe course of the disease. The presented pathogenetic mechanisms of bronchial permeability disorders are observed in the first months of a child's life, but by a year and older, the conditions for their manifestation disappear and in older children the obturation syndrome occurs only when the large bronchi are blocked as a result of tumor obturation or a foreign body. Therefore, atelectasis can involve a lobe, segment, segments and appear as a triangular shadow according to an anatomical element with concave contours due to the loss of a lobe or segment. Hypoventilation also involves a large area, corresponding to the ventilated bronchus. The valvular mechanism in older children and adults usually occurs in the presence of a foreign body or tumor in the large bronchi, and in compression from the outside, due to compression of the bronchus by enlarged lymph nodes. Therefore, the swelling will cover a larger area.

References

1. Abdurakhmanovich, K. O. (2023). Options for diagnosing polycystic kidney disease. Innovation Scholar, 10(1), 32-41.
2. Abdurakhmanovich, K. O., & Javlanovich, Y. D. (2023). COMPARISON OF MRI WITH DIAGNOSTIC KNEE ARTHROSCOPY FOR EVALUATING MENISCAL TEARS. Zeta Repository, 4(04), 10-18.

3. Alimdjanovich, Rizayev Jasur, et al. "Start of Telemedicine in Uzbekistan. Technological Availability." Advances in Information Communication Technology and Computing: Proceedings of AICTC 2022. Singapore: Springer Nature Singapore, 2023. 35-41.
4. Gaybullaev S. O., Fayzullayev S. A., Khamrakulov J. D. Cholangiocellular Cancer Topical Issues of Modern Ultrasound Diagnosis //Central Asian Journal of Medical and Natural Science. – 2023. – Т. 4. – №. 3. – С. 921-928.
5. Gaybullaev Sh.O., Djurabekova A. T. and Khamidov O. A. 2023. MAGNETIC RESONANCE IMAGRAPHY AS A PREDICTION TOOL FOR ENCEPHALITIS IN CHILDREN. Boffin Academy. 1, 1 (Oct. 2023), 259–270.
6. Khamidov O. A. and Dalerova M.F. 2023. The role of the regional telemedicine center in the provision of medical care. Science and innovation. 3, 5 (Nov. 2023), 160–171.
7. Khamidov O. A., Shodmanov F. J. Computed Tomography and Magnetic Resonance Imaging Play an Important Role in Determining the Local Degree of Spread of Malignant Tumors in the Organ of Hearing //Central Asian Journal of Medical and Natural Science. – 2023. – Т. 4. – №. 3. – С. 929-939.
8. Khamidov Obid Abdurakhmanovich and Gaybullaev Sherzod Obid ugli 2023. Telemedicine in oncology. Science and innovation. 3, 4 (Aug. 2023), 36–44.
9. Khamidov Obid Abdurakhmanovich, Gaybullaev Sherzod Obid ugli 2023. COMPARATIVE ANALYSIS OF CLINICAL AND VISUAL CHARACTERISTICS OF OSTEOMALACIA AND SPONDYLOARTHRITIS. Science and innovation. 3, 4 (May 2023), 22–35.
10. Khamidov Obid Abdurakhmanovich, Gaybullaev Sherzod Obid ugli 2023. COMPARATIVE ANALYSIS OF CLINICAL AND VISUAL CHARACTERISTICS OF OSTEOMALACIA AND SPONDYLOARTHRITIS. Science and innovation. 3, 4 (May 2023), 22–35.
11. Khamidov Obid Abdurakhmanovich, Gaybullaev Sherzod Obid ugli and Yakubov Doniyor Jhavlanovich 2023. Moving from myth to reality in e-health. Boffin Academy. 1, 1 (Sep. 2023), 100–114.
12. O., Gaybullaev S., Fayzullayev S. A., and Khamrakulov J. D. 2023. “Cholangiocellular Cancer Topical Issues of Modern Ultrasound Diagnosis”. Central Asian Journal of Medical and Natural Science 4 (3), 921-28.
13. Yakubov, D. J., & Pirimov, U. N. (2023). Comparison of the results of ultrasound and MRI in the diagnosis of damage to the meniscus of the knee joint. New Central Asian Science Journal, 6(5), 3-11.
14. Vasiliev A.Y., Olkhova E.B. Radiation Diagnostics.Textbook for Students of Pediatric Faculties.M, GEOTAR-MEDIA,2OO8,-680 p.
15. Korolyuk I.P., Lindenbrpten L.D. Radiation diagnostics.M.BINOM, 2013,- p.17O-220.
16. Lindenbraten L.D., Korolyuk I.P. Medicine, 2000, pp. 165-230
17. Radiation diagnostics in pediatrics.Ed. by A.Yu.Vasiliev.M,GEOTAR-MEDIA,2O10-368 p.
18. Radiological Diagnostics.Ed.Prof. G.E.Trufanov.Volume 1.Textbook for Higher Educational Institutions,M.. GEOTAR-MEDIA, 2OO7-416 p.
19. Radiation Diagnostics.Educational Obedience to Practical Problems for Medical University Students.Ed. by B.N.Sapranov, Izhevsk, 2010, pp.69-89.
20. Fundamentals of Radiation Diagnostics - Educational and Methodological Manual for Students of Medical Universities.L.P.Galkin, A.N. Mikhailov,-2nd ed.. Additional and revised - "Gomel-UO Gomel State Medical University", 2OO7, C.87-145

Web of Medicine: Journal of Medicine, Practice and Nursing
webofjournals.com/index.php/5

Volume 2, Issue 01, January 2024 **ISSN (E):** 2938-3765

21. X-ray diagnostics in pediatry, edited by Prof. V.F.Baklanova.M.A. Handbook for Physicians, 164-171p.
22. Trufanov G.E. Radiation diagnostics .Volume 1.-M. GEOTAR-MEDIA, 2012, pp. 151-186.
23. ugli, Khimmatov Islom Khairullo, Suvonov Zufar Kahramon ugli, and Umarkulov Zabur Zafarjonovich. 2023. "Visualization of multiple myeloma". Central Asian Journal of Medical and Natural Science 4 (3), 906-16.
24. Khamidov O.A., Akhmedov Y.A., Yakubov D.Zh., Ametova A.S., Ataeva S. Radiation diagnostics of respiratory and mediastinal diseases. Monograph. Samarkand: TIBBIYOT KO'ZGUSI, 2021. 136 p. (in Russian).