

Pediatric radiology

In radiodiagnosis, it is more than ever necessary to take into account radiation load and the risk of carcinogenesis in paediatric patients.

Skiagraphy

 For more information see *Skiagraphy*.

Chest skiagraphy

Compared to adult patients, there are several diseases of the lung parenchyma that are typical for young children.

Including:

- **Moist lung syndrome:** delayed resorption of amniotic fluid from the lungs results in the first to second day after birth an image of extensive obscuration with striated shadows (enhanced axial interstitium) and pleural effusion.
- **Respiratory distress syndrome (RDS, respiratory distress syndrome):** affects immature newborns up to about three weeks, the cause is insufficient production of surfactant, on the chest skiagram an image from a reproduced drawing up to "white lung".
- **Bronchopulmonary dysplasia:** is caused by the toxic effect of a higher concentration of oxygen, manifests itself as coarse striated shadows and multiple small cystic clearings, especially perihilosis.
- **Congenital lobar emphysema:** valve closure, no. left upper lobe.
- **Pulmonary sequestration:** has a different vascular supply (from the abdominal aorta), typically basal to the left, shadowing looks like bronchopneumonia or atelectasis.

Other specifics are:

- **Lung metastases in children:** most often consist of nephroblastoma, hepatoblastoma, bone sarcoma.
- **Congenital heart defects** and their image on the heart shadow and pulmonary circulation.
- **Congenital diaphragmatic hernia:** Morgagni and Bochdalekov.

Nativní snímek břicha

Chest X-ray:
diaphragmatic
hernia in an
adult patient (
<http://atlas.mudr.org/Case-images-Left-diaphragmatic-hernia-111>)



Native belly shot

A native image of the abdomen (in suspension) is the basic examination method when a mechanical disorder of the passage is suspected. Some pathologies have a typical picture here.

Duodenal atresia

Atresia of the duodenum appears as a "double bubble" image on the native image of the abdomen (in suspension).

Meconium ileus

Meconium ileus more often affects newborns with cystic fibrosis. There is an accumulation of thickened puff in the aboral part of the ileum and its blockage. A picture of so-called dry ileus is created, when the loops are dilated, but without levels.

Bone skiagraphy

Children's bone is flexible, more resistant to bending. The clarification of the skeleton in the area of the growth plates must not be mistaken for a fracture line. Subperiosteal fractures are typical for children - willow twig fracture or torus, which are often manifested only by a bump on the contour of the bone. epiphyseolysis, which are classified according to Salter-Harris into 5 groups, the most common is type II, when the fracture line passes through the epiphysis towards the metaphysis. Typical for childhood is, for example, supracondylic fracture of the humerus, fractures of the forearm bones are common. The most common birth trauma to the skeleton is fracture of the clavicle.



Bone scan: willow stick fracture (<http://atlas.mudr.org/Case-images-Greenstick-fracture-of-radius-and-ulna-subperiosteal-fracture-331>)

Bone scan: willow stick fracture (<http://atlas.mudr.org/Case-images-Greenstick-fracture-of-distal-radius-462>)



Bone Age

Bone age is determined according to the time sequence of ossification of the bones of the hand.

Battered Child Syndrome

The finding of multiple fractures in different stages of healing (muscle formation) raises the suspicion of battered child syndrome (obligation to report). Fractures of the long limbs (including metaphyseal avulsions, epiphysiolysis), ribs, and calve are common. Subperiosteal hematomas are also specific for children, which can be observed as a thickened shadow of soft tissues at the contour of the bone, in a later stage with calcifications.

Skioskopy

 For more information see *Skioskopy*.

Esophageal atresia

Types of esophageal atresia are divided into 5 types (A-E) according to Vogt. The most common is type C, where the proximal stump is closed and the distal stump is connected to the lumen of the trachea. The disease is diagnosed fluoroscopy, a small amount of iodine contrast substance is applied to the esophagus, which must be aspirated after the image is taken. When the proximal stump communicates with the trachea, the contrast material penetrates into the airways. In the case of a blind distal stump, gas is absent in the loops of the intestine, when it is connected to the trachea, on the contrary, there is significant pneumatosis.

Esophageal reflux

An ultrasound is used to diagnose esophageal reflux in small children, and an X-ray examination of the esophagus is used to assess the degree.

Irigography

Contrast examination of the large intestine finds its application even in childhood. The image of "microcolon" arises in the case of congenital obstructions of the small intestine (meconium emptying disorders, atresia, etc.). In the case of disorders of meconium emptying, a rectal infusion (in a different composition) can also be used therapeutically. In immature children, the so-called narrow left colon syndrome can occur, which is caused by the immaturity of neuronal plexuses in the intestinal wall.

Hirschsprung's disease

In Hirschsprung's disease we find a narrowed aganglionic section with dilatation of the colon orally. The rectum is always affected, the transition point is most often located in the sigmoid. Rarely, the entire colon is affected.

Ultrasound

 For more information see *Ultrasound*.

Esophageal reflux

The method of choice for detecting esophageal reflux in young children is ultrasound, where the number of reflux periods in a 5-minute period is recorded. They can be recognized by the moving echogenicity in the lumen of the esophagus.

Pylorostenosis

The classic symptom of pylorostenosis is arch vomiting. The diagnosis is sonographic, a pyloric canal longer than 18 mm and a width of the muscle layer over 3 mm is displayed.

Anorectal malformation

Also here, the method of choice is ultrasound, which makes it possible to measure the depth of a blind-ended sac in the case of rectal atresia.

Invagination

Intussusception is caused by the insertion of one section of intestine (intususceptum) into another (insusciens). In childhood, it is most often idiopathic, without a guiding structure. Intussusception in small children can be reliably visualized by ultrasound, when it appears as a target-shaped formation in a cross section or as a layered cylinder in a longitudinal section. Desinvagination can also be performed under ultrasound (or fluoroscopy) control.

Brain ultrasound

Before closing the fontanelles, the brain can be examined ultrasonographically.

CT

 For more information see CT.

Computed tomography examination is burdened with a significant radiation burden and must be indicated very judiciously in pediatric patients. Special "children's" protocols are used, which have a lower voltage or current on the X-ray than routine protocols. Examinations of small (non-cooperative) children must be carried out with the cooperation of an anesthetist on classic devices. Device fy. The Siemens Somatom Definition Flash, which allows significantly faster movement of the examination table, allows the examination of uncooperative children without anesthesia.



Abdominal CT: Morgagni hernia in an adult patient (<http://atlas.mudr.org/Case-images-Diaphragmatic-hernia-Morgagni-hernia-700>)

MRI

 For more information see MRI.

MRI in small children has one disadvantage, which is that the assistance of an anesthesiologist is required.

Links

External links

- Images at atlas.mudr.org (<http://atlas.mudr.org>)
- Classification and tables in radiodiagnosis at mudr.org (<http://www.mudr.org/web/>)
- Learning portal 1. LF UK – Radiodiagnostics: Quiz Pediatric radiology (<https://el.lf1.cuni.cz/p82059095/>)