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Clinical Features of Pneumonia in Newborn Infants

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Abstract

Congenital (CP) and neonatal (NP) pneumonia occupy a leading position in the structure of morbidity and mortality in newborns [1,6,9,15].

It is noted that the clinical presentation of pneumonia in newborns has a number of features and may be manifested only by respiratory distress without signs of focal or systemic inflammation. Some researchers consider the presence of fever and tachypnea to be an important diagnostic sign of pneumonia in newborns [7,8,10].

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According to WHO, the "gold standard" for the diagnosis of pneumonia is infiltrative changes on the X-ray. In our country, no studies have been conducted on the clinical features of congenital pneumonia.

According to WHO, intrauterine infection is the leading cause of infant mortality [4,5,12]. Congenital infections are found in 82% of stillbirths and premature infants [1,2,3]. In particular, the introduction of modern technological methods of treatment is necessary. This provides an opportunity for the treatment and care of newborns with a lag in morphological and functional development, profound respiratory failure associated with intrauterine infection. Early neonatal infection is transmitted vertically from the mother, and later acquired in the form of nosocomial infection, including horizontally [11,13,14].

Materials and methods. We studied the clinical features of 55 newborns with congenital pneumonia in the neonatology department of the VBKTTM. The diagnosis of congenital pneumonia was made within the first 72 hours after birth, with the development of clinical and laboratory data.

The severity of the condition was assessed by the presence of danger signs in newborns ("Pocket guide. Guidelines for providing care in the hospital for children", WHO, 2012). Danger signs indicating a very severe illness include: inability to breastfeed; convulsions; drowsiness or loss of consciousness; respiratory rate less than 30 per 1 min. or apnea; respiratory rate more than 60 per 1 min; wheezing, strong chest expansion during inspiration, central cyanosis. Respiratory failure was assessed according to the Downs scale according to 5 criteria: cyanosis of the skin, retraction of the corresponding areas of the chest, wheezing during inspiration, crying, respiratory rate, each indicator was rated from 0 to 2 points. Statistical analysis was performed using SPSS 17.0 software, comparing the means of two independent

samples, T-tests q, where p is the probability of error. The probability of error is p<0.05 significant (5% significance level - 95%), p<0.01 very significant (1% level or 99%), p<0.001 maximally significant (0.1% level or 99.9%).

Results and discussion. At the present stage, the clinic of congenital pneumonia is polymorphic and has a number of features. Thus, in most patients, a weak reaction is detected on examination (75.5%, p<0.05), 8.5% of children (p<0.01) have a comatose state. Fever, which is a characteristic manifestation of pneumonia, is present in 91.5% (p<0.001). There are no children with congenital pneumonia. A characteristic feature of the disease is the weakening (in 74.5%) or extinction (21.7%, p<0.01) of all physiological reflexes. Basically, sucking (78.3%), and in some children even swallowing (in 21.7%, p<0.01) disappear. Hypoxic encephalopathy (HIE) predominates in the clinic (92.45%). In addition, in equal proportions (p>0.05) and extinction syndrome (39.6%) and excitation syndrome (34.9%) are observed. Convulsive syndrome is noted in 17.6% of patients. Most children have acrocyanosis (71.7%, p<0.001), 28.3% have central cyanosis. Vascular meshwork on the anterior abdominal wall is detected in 42.5% of sick children. Typically, a decrease in muscle tone is often observed (in 88.7%, p<0.001) up to complete atony (5.7%).

On the part of the respiratory system, there are all the characteristic manifestations of pneumonia: difficulty breathing (in 98.1%, p<0.001) with the participation of all accessory muscles, in most cases, in newborns (72.6%, p<0.001) IVL is connected due to the severity of the condition. According to the Down's scale, 72.6% of patients (p<0.01) have a severe degree of DN (more than 8 points), 27.4% have a moderate degree (6-8 points). In the clinic, tachypnea predominates (91.5%, p<0.001), in 8.5% tachypnea turns into bradypnea. According to physical examination, weakened breathing is heard more often (p<0.01) (71.7%) than hard (28.3%) breathing. Auscultation data are polymorphic: no wheezing (27.4%), wet (17.9%) and watery (17.9%) wheezing of various sizes, and wet small bubble wheezing with crepitus are heard (36.7%, p<0.05).

Changes in the cardiovascular system (YQTS) are manifested by tachycardia (57.5% p<0.001), less often - bradycardia (3.8%), muffled heart sounds (84.0%, p<0.001), the appearance of systolic murmur. 18.9%. Some children have hepatomegaly (34.9%).

Complications of pneumonia are manifested in the form of brain edema (26.8%), hemorrhagic syndrome (24.4%), intraventricular hemorrhage (IVH) in 12.2%, and ulcerative necrotizing enterocolitis (UNEC) in 2.8%. The outcome of the disease is also different. Only 51.9% of sick children recovered and were discharged home, fewer (39.6%, p>0.05) were transferred to further medical care at the 2nd stage, and 8.5% ended in death.

In addition to studying the general symptoms of congenital pneumonia, we studied the clinical course of the disease depending on its severity. Patients were divided into 2 groups according to severity: 86 (81.1%) newborns had a severe course of the disease and 20 (18.9%) had a very severe course of the disease.

Table 1. Congenital pneumonia clinic

According to severity:	Heavy	Extremely heavy
Condition during examination:		
-Uneasy	17.4%	10.0%
-Low mobility	81.4%	50.0%
-Unhappy	1.2%	40.0%
Body temperature:		
-Mejorada	91.7%	95.0%
-Hyperthermia	9.3%	5.0%
-Hypothermia	-	-
Hypoxic encephalopathy:	83.71%	100%

-Extinction syndrome -Arousal, convulsive syndrome	37.2% 33.72%	50% 40%
Physiological reflexes: -Weak -Extinguished -Does not suck -It doesn't work.	 77.9% 17.4% 95.3%17.4%	 60% 40% 100% 40%
Leather covers: -White -White-gray color	 74.42% 24.42%	 55% 35%
-Acrocyanosis -Central cyanosis	91.86% -	10% 90%
Strengthening of the anterior abdominal vascular network:	40.7%	50%
Muscle tone: -Increased -Decreased -Atonia	 5.81% 93.1% 1.2%	 5% 70% 25%
Panting:	98.8%	95%
IVL	68.6%	90%
DN on the Downs scale: -6-8 points -Over 8 points	 31.4% 68.8%	 10% 90%
NS -Tachypnea -Bradypnea	 98.8% 1.2%	 60% 40%
Auscultation Breathing: -Hard -Slowed down Hilarious: -inaudible -Various calibers -Fine bubbling and crepitus -Ham	 70.9% 29.1% 31.4% 16.3% 32.5% 19.7%	 75.0% 25.0% 10% 25% 55% 10%
YTS: -Tachycardia -Bradycardia	 43.0% 5.5%	 30% 50%
Liver>1.5 cm	32.2%	50%
Complication: -Brain tumor -Hemorrhagic syndrome -YNEK -VJK	 10.46% 6.97% 3.48% 2.32%	 10% 20% 5% 15%
Result: -Responding to the house -Transfer to the next course of treatment -Death	 52.3% 41.9% 5.8%	 50% 30% 20%

Note: *- p<0.05, **- p<0.01, ***- p<0.001.

As can be seen from Table. 1, there are significant clinical differences between these two groups of sick children. Thus, children with a very severe degree of illness are significantly more likely to be in a coma ($p<0.001$). Protective temperature reactions are practically absent in all examined children. However, in very severe pneumonia, depression syndrome ($p<0.05$), agitation syndrome ($p<0.05$) and convulsive syndrome ($p<0.01$) are more often observed. In both groups, there is a weakening of physiological reflexes (77.9% and 60.0%, $p>0.05$). At the same time, fading is noted significantly more often with a very severe degree of illness (40.0% versus 17.4%, $p<0.01$). Most children do not suck (95.3% and 100% of weight, $p>0.05$, respectively). And with a very severe degree, children who cannot even swallow are 2 times more likely ($p<0.01$) and muscle atony is significantly more common ($p<0.001$). If in severe cases, pallor of the skin and acrocyanosis are observed as a sign of intoxication, then in extremely severe cases, central cyanosis ($p<0.001$) is observed with high accuracy as a sign of severe respiratory failure. A dangerous condition occurs that threatens the child's life. Most of the examined children have shortness of breath, apnea. Children are connected to the IVL apparatus with a very severe degree ($p<0.05$). When assessing the degree of respiratory failure (NE) on the Down scale, the number of children of group 2 is more ($p<0.05$). It should be noted that with the severity of the disease, tachypnea often ($p<0.001$) turns into bradypnea. Physical findings typical of pneumonia were noted in both groups. They were more likely to hear harsh rather than weak breath sounds. However, small-bubble rales and crepitations were significantly more common in group 2 ($p<0.05$).

Cardiovascular system: Tachycardia was more common in severe pneumonia ($p<0.001$) and bradycardia ($p<0.01$) in severe pneumonia. Muffled heart sounds were noted in both groups (81.4% and 95.0%, respectively, $p>0.05$), and some had systolic murmurs (23.25% and 25.0%, $p>0.05$). Liver enlargement was significantly more common in children with severe disease ($p<0.05$).

In severe cases, the disease is complicated by the development of hemorrhagic syndrome ($p<0.01$). Fatal outcome is 3 times more common in severe pneumonia ($p<0.001$).

Congenital pneumonia occurs against the background of comorbidities: intrauterine infection (IUI) in 29.2%, preterm birth (25.5%), congenital heart disease (20.0%), anemia (7.5%), and fetal growth retardation in 4.7%. However, there were almost no significant differences in the distribution of common diseases according to the severity of pneumonia.

Radiological examination of severe pneumonia reveals bilateral small-focal inflammatory infiltrates ($p<0.05$), and in severe pneumonia - segmental infiltrates ($p<0.05$). Consequently, severe pneumonia is characterized by more extensive inflammatory changes in the lung tissue.

Conclusion. The features of congenital pneumonia at the present stage are polymorphism of the clinical picture with many dangerous signs that threaten the life of children. Depending on the severity of the course of the disease, a weak reaction to examination prevails in the clinic. In very rare cases, an anti-inflammatory protective reaction in the form of hyperthermia is detected. Physiological reflexes weaken in the most severe course up to complete suppression, and in some children - the swallowing reflex. The most characteristic manifestation of the disease is a syndrome of depression, agitation and convulsions in children (92.45%). Most patients have acrocyanosis, and in severe cases, central cyanosis. It is characterized by a decrease in muscle tone up to complete atony. Pneumonia is manifested by a severe degree of NE and YQTE, complicated by cerebral edema, hemorrhagic syndrome. Moreover, these clinical manifestations are more pronounced and significantly more often observed with a severe degree of the disease. On the X-ray picture, severe pneumonia is characterized by more extensive inflammatory changes in the lung tissue. They also have a more complicated outcome of the disease, up to death.

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