Olhkovska O.N., Zharkova T.S., Olhkovskiy E.S. PECULIARITIES OF OBSTRUCTIVE BRONCHITIS IN CHILDREN OF YOUNG AGES

Kharkov National Medical University, Ukraine

Abstract. The features of obstructive bronchitis in infants were studied. Prognostic criteria of severity was identified, the expediency of using of antibiotics was substanti **Keywords.** Obstructive bronchitis, clinical symptoms, children.

Acute bronchitis remains among the most common diseases among children [1, 3]. For children of the first years of life the development of obstruction syndrome is a particularly dangerous, aided by the anatomical-physiological characteristics of the respiratory system of the child: a much smaller diameter of the bronchi compared to that of the adults; relatively high resistance to airflow during breathing, which requires substantial muscular effort; bronchial mucosal goblet cells producing large amounts of tenacious sputum; a rich blood supply, which contributes to the rapid development of mucosal edema [2, 3]. Important contributors to the development of obstruction is the increased sensitivity of the child to adverse environmental factors, the low mobility of children in the first year of life, overweight, a tendency to allergic reactions, etc [4].

In the recent years, of great interest has been the question about the dynamics of obstructive bronchitis (OB) in children with chronic lung diseases, among which broncho-pulmonary dysplasia (BPD) occupies an important place. This pathology is characterized in very premature newborns, who had been placed on artificial respiration. We owe the increase in percentage of children with BPD to the scientific-technological progress in perinatal and neonatal intensive medicine which helps in revealing and care of children with low birth weight [5]. Broncho-pulmonary dysplasia was first described by Northway et al in 1967 as a disease of prematurity, which is seen in children with respiratory distress syndrome who were placed on artificial lung ventilation (ALV) under high pressure and high concentrations of oxygen [6]. Previously, the pathogenic mechanisms of BPD was schematically represented as a formula by A. Philip (1975): «oxygen + pressure + time" [7]. In the recent times BPD has been considered as a poly-etiologic disease, the development of which is of great importance, the presence of immature lungs in premature babies in which there is toxic effects following oxygen therapy which includes: pulmonary baro-traumas, respiratory disorders, infections, pulmonary hypertension etc. [7, 8].

As already known, broncho-pulmonary dysplasia may be one of the reasons of lethality in children and increases the incidence of sudden death syndrome in such children by 7 times [9]. Therefore, it is so important to study the course of OB in young children, including those with BPD

The purpose of the study - to determine the characteristics of the clinical manifestations of acute obstructive bronchitis in infants at the present stage.

Materials and methods. We examined 46 children 1 month -2 years aged with acute severe OB, who were treated at the regional children's infectious diseases hospital in Kharkov. Along with the study of generally accepted clinical and laboratory parameters, we conducted virological, bacteriological, serological surveys and PCR diagnosis of patients. Statistical processing of the results was performed on a PC using the program "Excel". Reliable signs were evaluated using Student's t test.

Discussion of the results. On analysis of history, it was revealed that in the vast majority (35-76,09 %) the disease begins gradually - the mother indicated the presence of occasional dry cough for $4,54 \pm 1,24$ days. In 11 children (23,91 %) we observed an acute onset of the disease, in which the clinical manifestations of obstructive syndrome (shortness of breath) were one of the first signs in combination with mucous secretions from the nose, dry cough, loss of appetite or refusal of food and disorder of general condition. In 30 children (65,22 %) on the onset of the disease fever was not observed; these children underwent symptomatic treatment at home, while in 15 (32,61 %) cases the children's parents did not seek help from pediatrician. Before admission, 14 (30,43 %) children received antibiotics, which are

dominated by three generations cephalosporins (Cefixime, Ikzyme), macrolides (Sumamed).

Analysis of patients histories revealed that 20 children (43,47 %) had a tendency to allergic manifestations (including - hereditary), 12 (26,08 %) - overweight, 26 (56,52 %) - an early transition to mixture and mixed feeding, 29 (63,04 %) - respiratory infections in the first months of life, especially in the first six months, 22 (47,82 %) - hypoxic - ischemic CNS damage during childbirth, 6 (13,04 %) - bronchopulmonary dysplasia, which was diagnosed in the neonatal period. In the most cases one (33 - 71,73 %) smoking or both smoking parents (16-34,78 %) were found. Manifestations of atopic dermatitis on admission and during the hospital stay was observed in 8 (17,39 %) children.

The clinical picture of acute OB in all children characterized by the presence of bilateral bronchial obstruction syndrome: frequent dry cough, which later transformed into the wet with the release of viscous mucus; shortness of breath. Lung percussion noted band-box sound; auscultation depicted difficulty breathing with prolonged expiration, wheezing, dryness on both sides. Fever up to 38, 5-39,0 °C was observed in 41 (89,13 %) patients. High fever was observed in 18 (39,13 %) children. At all children (11-23,91 %) who had signs of obstructive bronchitis from the first day of the disease, the course of diseases has been very severe. These children were hospitalized in the intensive care unit where there were an average of $3,54\pm1,22$ days; obstructive syndrome was prolonged $(6,54\pm1,58 \text{ vs } 4,84\pm1,23 \text{ days in patients with a})$ gradual onset of the disease, p 0,05). In 12 (26,09 %) children prolonged course of the disease was diagnosed, characterized by the resumption of obstructive syndrome after a short $(3,24 \pm 0.62 \text{ days})$ clinical improvement. According to our data, in 4 children with BPD severe form of OB with protracted course was observed. The duration of obstruction in children with BPD was 7,54±2,46 days vs. 5,61±1,46 days, p 0,05 on average. In general, according to our findings in children with BPD obstructive bronchitis has a tendency to severe course (high probability of protracted course) accompanied by prolonged retention of obstructive syndrome.

In the study of mucus from the nasopharynx to determine the etiological factor of the disease in 13 children (28,89 %) RS-viral antigen, 11 (23,91 %) – adenoviral antigen, 7 (15,22 %) – parainfluenza antigen were found. By ELISA method in 7 (15,22 %) children high antibody titers to Chlamydia pneumonia class IgM was revealed, 4 (8,69 %) – *Mycoplasma pneumonia* antibody class IgM. We failed to define the etiology of OB in 4 (8,69 %) children by accessible for us methods of investigation.

Bacteriological examination of smears from the nasopharynx in 8 (17,39 %) patients showed *E. aerogenes*, 5 (10,87 %) - *S. epidermidis* with hemolytic properties, 4 (8,69 %) - *Strep. viridans*, 3 (6,52 %) - *S. aureus*, 3 (6,52 %) - *E. faecalis*, 2 (4.35 %) - fungi of the genus *Candid*a and 1 (2,17 %) - *P. aeruginosa*. The presence of two simultaneous pathogens was found in 7 children (15,22 %). The study indicated that, despite the detection of viral antigens predominantly in patients with OB (31-67,39 %), there was a high percentage of contamination of the mucous membrane of the oropharynx with bacterial flora, which can also play a significant role in the development of the pathological process of the child.

Bacteriological study of tracheobronchial lavage tube in children who were on artificial ventilators detected E. *aerogenes* in 4 (8,69 %), *S. aureus* in 3 (6,52 %), *S. epidermidis* with hemolytic properties in 3 (6,52 %) and *Strep. Viridans* in 2 (4,35 %) patients. Comparative analysis revealed the same type of pathogen isolation coincidence only in 3 children (6,52 %), which indicates that the nasal mucosa and tracheobronchial tract were contaminated by various microorganisms.

Study of peripheral blood of patients identified that the vast majority of patients (34-73,91 %) had leukocytosis ($12,04\pm1,22*10^9/L$), a shift to the left of blood formula with increased content of band ($7,05\pm1,34$ %) and segmented ($59,48\pm5,63$ %) neutrophils, accelerated ESR ($13,44\pm2,41$ mm/h). In 7 (15,22 %) children leukopenia ($4,05\pm1,55*10^9/L$), increased lymphocytes ($68,46\pm5,74$ %) and monocytes ($12,87\pm2,11$ %) were found. In 5 patients (10,87 %) - blood counts remained within the age norm. Noteworthy is the fact that, despite the prevalence of

viruses as pathogens of obstructive bronchitis, in most patients the changes in peripheral blood was like at a bacterial infection.

In our opinion, this is due to the activation of the bacterial flora of the upper respiratory tract. According to our research the nasopharyngeal bacterial flora was isolated in 26 children (56,52 %), which represents sufficiently high number. It can not be neglected when choosing treatment and is the reason for use antibiotics to young children with acute OB. Among the antimicrobial antibacterial preparations the most appropriate are using of macrolides, due to the sufficiently high frequency of detection of atypical flora (Chlamydia, Mycoplasma) as one of the factors of occurrence of OB.

Patients were treated according to conventional protocols and regimens for treatment of obstructive bronchitis. As is known, in the genesis of bronchial obstruction in young children predominate inflammatory edema and hypersecretion of viscous mucus. Therefore, pathogenetic and symptomatic therapies OB is anti-inflammatory, bronchodilator and mucolytic drugs, physiotherapy using inhaled, in the first place - using a nebulizer. In all children disease resolved with complete recovery.

Conclusion. Thus, in vast majority of young children (76,09 %) acute OB develops gradually. Regarding the development of symptoms in children in the first day of the disease, there appears as increased likelihood of a severe process. In infants with broncho-pulmonary dysplasia OB is characterizes the severity and unfavorable (undulating) course. The appropriateness of antibiotic therapy in children with OB was determined, primarily – macrolides. It is promising to monitor pathogens in the mucous membranes of the upper respiratory tract in OB which does not only identify the most common pathogens in this region, but will provide an opportunity to select the most appropriate treatment strategies that will prevent nosocomial infections and reduce the duration of stay in the hospital.

References. 1. : / // . – 2012. – 3-4. – . 18-25. . . Katylov AV. Bronchitis in children: modern presentation / AV Katylov, D. Dmitriev // Pediatrician. - 2012. -3-4. - P. 18-25. 2. / . . // . . . - 2005. - 4. - . 94-104. Zaitsev OV. Broncho-obstructive syndrome in children / O. Zaytseva // Pediatrician. -2005. -4. - P. 94-104. 3. / , . – 2009. – 6. [// . . http://www.mif-ua.com/archive/article/11386 Chernyshova OE. Acute bronchitis in children / OE. Chernyshova, LL. Popovychenko // Child's Health. - 2009. -6. 4. . . // / . . , . . , . . . – 2010. – 2(23). [: http://www.mifua.com/archive/article/12695 Yulysh EI. Broncho-obstructive syndrome in children of the first year of life and polypharmacy / EI. Yulysh, YA. Soroka, SI. Vakulenko // Child's Health. - 2010. -2 (23). 5. / . . // , . . .: , 2005. — . 5. . — 23-51. Ovseannicov D. Bronho-pulmonary dysplasia and its outcomes in children / D.

137

Ovseannicov D. Bronno-pullionary dysplasta and its outcomes in children / D.
Ovseannicov, LG. Kuz'menko, EA. Degtyareva // Lectures on pediatrics. Ed. VF.
Demyna etc. - M.: RSMU, 2005. - Vol 5. Diseases of breathing organs. - P. 23-51.
Norlhway W.H. Pulmonary disease following respirator therapy of hyaline-

membrane disease: bronchopulmonary dysplasia / W.H. Norlhway, R.C. Rosan, D.Y.Porter // N. Engi. J. Med. – 276:357-68, 1967.

7. Philip A.G. Bronchopulmonary dysplasia: then and now / A.G.Philip // Neonatology. – 2012;102(1):1-8.

/

8.

(VEGF, TGF- 1)

//

. - 2013. - 7(50). - .32-37.

. .

Senatorova AS. The role of growth factors (VEGF, TGF- 1) and cyclic guanosine monophosphate in the formation of pulmonary hypertension, bronchopulmonary dysplasia in children / AS. Senatorova. OL. Logvinova // Child's Health. - 2013. - 7 (50). - P.32-37.

, . .

9. . .

// .-2006.-1(2).-.20-26.Kharchenko MV. Clinico-functional and immunological criteria for the formation of bronchopulmonary diseases in children who were on mechanical ventilation in the neonatal period / MV. Kharchenko, JL. Mizernitsky, TV. Zabolotskikh // Questions

of Practical Pediatrics. - 2006. - 1 (2). - P. 20-26.

/ . .

Received: 10.04.2014

Accepted: 15.05.2014

, . .