

A clinical case of community-acquired pneumonia of mycoplasmic etiology complicated by spontaneous mediastinal emphysema in a child with bronchial asthma

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Abstract

Introduction. In the period from October to December 2024, there was an increase in cases of community-acquired pneumonia in children caused by *Mycoplasma pneumoniae* in the Republic of Bashkortostan, which has important epidemiological and clinical consequences. Mycoplasma infections have a cyclical pattern of epidemics, frequent outbreaks in organized groups, and a significant seasonal pattern, which makes children particularly vulnerable. In children with bronchial asthma, mycoplasma infection can worsen the course of the disease, contributing to bronchial hyperreactivity and complications such as spontaneous mediastinal emphysema.

Objective. The aim is to perform a clinical and pathogenetic analysis of the course of community-acquired pneumonia caused by *Mycoplasma pneumoniae* in a child with bronchial asthma complicated by spontaneous mediastinal emphysema.

Presentation of the clinical case. The case of a 15-year-old boy with bronchial asthma and polyvalent sensitization, who developed community-acquired pneumonia of mycoplasmic etiology with a complication in the form of spontaneous mediastinal emphysema, is presented. The clinical picture of the disease included a dry cough, chest pain, difficulty breathing, and fever. The laboratory confirmed the diagnosis of mycoplasma pneumonia with a positive PCR result for *Mycoplasma pneumoniae*. X-ray examination revealed signs of inflammation and emphysema. Complex therapy included antibiotics, anti-inflammatory drugs and inhalation therapy, which contributed to the positive dynamics and improvement of the patient's condition.

Conclusion. The presented clinical case illustrates the specific course of community-acquired pneumonia of Mycoplasma etiology in a child with bronchial asthma complicated by spontaneous mediastinal emphysema. The combination of chronic airway inflammation and atypical bacterial infection contributed to the development of a severe complication. Timely diagnosis, including pathogen identification, comprehensive antibacterial and anti-inflammatory therapy, as well as maintenance of baseline asthma treatment, ensured a favorable clinical outcome and prevented adverse events.

Keywords: bronchial asthma, *Mycoplasma pneumoniae*, spontaneous emphysema of the mediastinum, children

Conflict of interest:

The authors declare no conflict of interest.

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Аннотация

Введение. В период с октября по декабрь 2024 года в Республике Башкортостан наблюдалось увеличение случаев внебольничной пневмонии у детей, вызванной *Mycoplasma pneumoniae*, что имеет важные эпидемиологические и клинические последствия. Микоплазменные инфекции обладают цикличностью эпидемий, частыми вспышками в организованных коллективах и значительным сезонным характером, что делает детей особенно уязвимыми. У детей с бронхиальной астмой микоплазменная инфекция может усугубить течение заболевания, способствуя бронхиальной гиперреактивности и осложнениям, таким как спонтанная эмфизема средостения.

Цель. Клинико-патогенетический анализ течения внебольничной пневмонии, вызванной *Mycoplasma pneumoniae*, у ребенка с бронхиальной астмой, осложненной спонтанной эмфиземой средостения.

Изложение клинического случая. Представлен случай 15-летнего мальчика с бронхиальной астмой, поливалентной сенной сенсибилизацией, у которого развилась внебольничная пневмония микоплазменной этиологии с осложнением в виде спонтанной эмфиземы средостения. Клиническая картина заболевания включала сухой кашель, боль в груди, затрудненное дыхание и повышенную температуру тела. Лабораторно подтвердился диагноз микоплазменной пневмонии с положительным результатом ПЦР на *Mycoplasma pneumoniae*. При рентгенологическом исследовании обнаружены признаки воспаления и эмфиземы. Комплексная терапия включала антибиотики, противовоспалительные препараты и ингаляционную терапию, что способствовало положительной динамике и улучшению состояния пациента.

Заключение. Представленный клинический случай иллюстрирует особенности течения внебольничной пневмонии микоплазменной этиологии у ребенка с бронхиальной астмой, осложненной спонтанной эмфиземой средостения. Сочетание хронического воспалительного заболевания дыхательных путей и атипичной бактериальной инфекции способствовало формированию тяжелого осложнения. Своевременная диагностика, включая верификацию возбудителя, комплексная антибактериальная и противовоспалительная терапия, а также поддержание базисного лечения астмы обеспечили положительную клиническую динамику и предотвращение неблагоприятных исходов.

Ключевые слова: бронхиальная астма, *Mycoplasma pneumoniae*, спонтанная эмфизема средостения, дети

Конфликт интересов:

Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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INTRODUCTION

Between October and December 2024, the Republic of Bashkortostan saw an increase in the incidence of community-acquired pneumonia among children and adolescents caused by the atypical pathogen *Mycoplasma pneumoniae*. *Mycoplasma* infections are characterized by epidemic outbreaks with a cycle of 3–7 years, spreading across large regions and individual countries [1].

Mycoplasma pneumoniae is transmitted by airborne droplets, but due to its low survival rate in the external environment, infection is only possible through close contact with patients who have clinically pronounced or subclinical forms of the disease. This determines one of the key epidemiological features of respiratory mycoplasmosis — the spread of infection in organized groups, especially in closed institutions (boarding schools, orphanages) [2]. The incidence of the disease is highly seasonal, peaking in the fall and winter, which contributes to the active spread of infection among children attending educational institutions. During this period, *Mycoplasma pneumoniae* becomes the leading etiological agent of community-acquired pneumonia in schoolchildren, being detected in 40–60% of cases, and in closed communities this figure can reach 70% [3, 4]. The transmission of *Mycoplasma pneumoniae* is slow — the incubation period is 1–3 weeks, and in some cases reaches 4 weeks. In addition to organized groups, there are also cases of infection within families, which is due to close domestic contact. However, unlike other respiratory infections, the spread of *Mycoplasma pneumoniae* within families is slow. [5].

The clinical manifestations of mycoplasma infection vary from asymptomatic to severe forms. *Mycoplasma pneumoniae* often causes atypical community-acquired pneumonia, which can be severe in children. The infection also plays a significant role in the pathogenesis of bronchial asthma, provoking its exacerbations and increasing the risk of complications. [6, 7].

In bronchial asthma, mycoplasma infection exacerbates chronic inflammation of the respiratory tract, induces bronchial hyperreactivity, suppresses γ -interferon production, and disrupts mucociliary clearance. This creates favorable conditions for the persistence of the pathogen and the progression of the disease. [8, 9].

In addition to damaging the bronchial tree, *Mycoplasma pneumoniae* has a pronounced effect on the

interstitial tissue of the lungs. Activation of innate and adaptive immunity is accompanied by the release of pro-inflammatory cytokines (IL-1, IL-6, TNF- α) and chemokines, which contributes to the intensification of the inflammatory process, increased vascular permeability, the development of edema, and cellular infiltration. Prolonged inflammation can stimulate fibroblast activity, increasing the risk of pulmonary fibrosis [10].

In patients with bronchial asthma, mycoplasma infection can lead to the development of subcutaneous emphysema, which is associated with structural changes in lung tissue. Rupture of the alveoli with subsequent migration of air into the interstitial space may be caused by inflammatory damage to the alveolar walls, barotrauma due to intense coughing, or destruction of the bronchial epithelium by an infectious agent. The combination of these factors exacerbates respiratory failure and reduces the effectiveness of supportive therapy. [11].

Thus, *Mycoplasma pneumoniae* in children with bronchial asthma contributes to the intensification of inflammatory processes in the lungs, disruption of the integrity of the alveolar-capillary membrane, and an increased risk of subcutaneous emphysema. This underscores the need for early diagnosis and a comprehensive approach to treatment.

OBJECTIVE: present a clinical case of community-acquired pneumonia of mycoplasmal etiology in a child with bronchial asthma complicated by spontaneous mediastinal emphysema, with an analysis of pathogenetic aspects, the effect of *Mycoplasma pneumoniae* on the course of respiratory pathology, and factors contributing to the development of complications.

CLINICAL CASE DESCRIPTION

The patient is a boy, born in 2010 (15 years old), delivered by an ambulance team to the emergency room of the city children's clinical hospital (CCCH, hereinafter referred to as the Clinic) in Ufa with the following referral diagnosis: "Community-acquired right-sided pneumonia, acute course, mild, uncomplicated, RF I. Bronchial asthma, allergic form, moderate severity, moderate exacerbation. Polyvalent sensitization (pollen, household, fungal)," with complaints of frequent, persistent, unproductive dry cough; sore throat and hoarseness; pain in the neck and chest,

worsening when breathing in and coughing; difficulty breathing during physical exertion; increased fatigue and body temperature up to 39 °C.

MEDICAL HISTORY. The child was born from the second pregnancy, which proceeded against the background of a threat of termination in the first trimester. The delivery was urgent, second, independent, without complications. Birth weight was 3400 g, length was 52 cm, Apgar score was 8/9 points. Breastfed for the first 6 months, then gradually transitioned to mixed feeding. Complementary foods were introduced on time, and tolerance of foods was satisfactory.

In early childhood, episodes of atopic dermatitis were noted. There is a family history of allergic diseases: the mother has hay fever. Living conditions are satisfactory: lives in a city apartment, no pets. Vaccinations were administered according to an individual schedule based on age and medical indications. Influenza vaccination was not administered due to parental refusal. Vaccination with Prevenar 13 was not administered. Since the age of 13, the child has been registered with a clinic with a diagnosis of bronchial asthma. At the time of admission to the hospital, he received anti-inflammatory therapy with a combination drug containing inhaled glucocorticosteroids and long-acting 2-agonists (IGCS/LABA) – fluticasone propionate/salmeterol at a dose of 125/25 mcg/dose per inhalation in the form of a metered dose inhaler as needed.

DISEASE HISTORY. The child fell ill seven days ago. The illness began with a rise in body temperature to 37.3–37.5 °C, a runny nose, sore throat, and headache. On the third day of the illness, a dry, persistent cough, difficulty breathing, and slight hoarseness appeared. Over the next two days, the condition worsened: dull chest pains appeared, intensifying with inhalation and coughing, radiating to the armpit area, and breathing difficulties increased, which led to a visit to a medical facility. On an outpatient basis, without consulting a pediatrician, the mother administered antiviral, inhalation, and symptomatic therapy, but no positive dynamics were observed with this treatment. On the seventh day after the onset of the disease, the patient was examined by a pediatri-

cian at his place of residence. Given the epidemiological history and worsening symptoms, it was decided to refer the patient for inpatient treatment for further examination and to prescribe the necessary therapy.

The epidemiological history shows that the patient has a younger sister, aged 6, who attends kindergarten. Three weeks ago, she had mycoplasma pneumonia, which was confirmed by laboratory tests: *Mycoplasma pneumoniae* was detected in a throat swab using PCR. In addition, the sister underwent serological testing (ELISA), the results of which confirmed the presence of specific antibodies to *Mycoplasma pneumoniae*. Cases of infection among other children have been reported at the childcare facility she attends.

The child had no injuries or bruises.

CLINICAL DATA. On admission: height—168 cm, body weight—51 kg (BMI 18.07). Body temperature—37.8 °C, respiratory rate—24 per minute, heart rate—102 beats per minute, blood pressure — 106/62 mm Hg, SpO2 — 95%. General condition upon admission — moderate severity. The child is active. Skin is pale, warm, with slight periorbital and perioral cyanosis, which intensifies with coughing and physical exertion. Nasal breathing is difficult, with mucous-serous discharge. The pharynx is moderately hyperemic, tonsils are loose and clean. Nasal breathing is free. The chest participates evenly in the act of breathing. Shortness of breath is expiratory in nature. Palpation above the jugular notch and in the subclavian areas reveals an area of subcutaneous emphysema (up to 60 cm²). Palpation of the chest reveals slight tenderness and a slight feeling of tension in the neck. Percussion over all lung fields reveals a boxy percussion sound, with shortening noted on the right. Breathing is stiff, with prolonged exhalation, dry rales are heard, scattered throughout all lung fields, weakened in the lower right sections, where small-bubble wet rales and crepitus are also heard. Auscultation of the patient reveals a positive Hamman's sign (crepitus in the precordial region, synchronous with heart contractions, intensifying on inspiration in the supine position). Heart sounds are rhythmic, slightly muffled. The abdomen is soft and painless. Stool is formed and regular.

Laboratory test results: complete blood count at the time of hospitalization: leukocytosis with a left shift in the leukocyte formula (WBC $12.7 \times 10^9/L$, NEUT 59% (eosinophils 52%, neutrophils 7%), increased ESR (24 g/L). In the general urine analysis, coprogram, biochemical blood analysis, and coagulogram — no pathology.

Increase in CRP levels: 13 mg/l, PCT: 0,024 ng/ml.

Overview X-ray of the chest (frontal and lateral projection): moderate reduction in lung field transparency, small focal shadows in the lower right lung field. Lung pattern is enhanced due to vascular-interstitial component, enriched. Lung roots are densified. The median shadow is not displaced, the contours are clear and even. The heart is not enlarged in cross-section. The domes of the diaphragm are clear and even. The sinuses are free, with thickening of the transverse interlobar fissure on the right.

Based on the complaints, medical history, and objective data, spontaneous mediastinal emphysema was suspected. A CT scan of the chest was performed. Conclusion: multiple areas of air were found in the neck, subclavian regions, and mediastinum. The lungs are airy, adjacent to the chest, and the density of the pulmonary parenchyma is 1003 Hu. The pulmonary pattern is enhanced, the roots of the lungs are not enlarged, and the bronchi are traceable to the subsegmental level. Linear accumulations of air (McLean's effect) are detected in the perivascular and peribronchial connective tissue, located mainly in the root zone. The pleura is unchanged, there are no signs of fluid accumulation in the pleural cavity. The lung fields are symmetrical, with inflammatory infiltration of the lung tissue measuring 27*17 mm in S4 of the right lung.

When conducting an external respiration test (FER) with a bronchodilation test (salbutamol 200 mg), the following results were obtained: initial FEV₁ — 73%, FVC₁ — 84% of the expected values, bronchodilation test positive (+18%) according to FEV₁.

Severe obstructive impairment of lung ventilation capacity.

Electrocardiography (ECG): rhythm with a heart rate of 122–130 beats per minute, vertical position of the electrical axis of the heart. To clarify the possible etiological nature of community-acquired pneu-

monia, the patient underwent molecular diagnostics using PCR of the nasopharyngeal and oropharyngeal mucosa: positive for *Mycoplasma pneumoniae*; *C. pneumoniae*, RS virus, parainfluenza virus types 1–4, metapneumoviruses, coronavirus, adenoviruses, bocavirus, rhinovirus — negative.

Bacteriological sputum culture for flora with determination of sensitivity to major antibiotics: *Streptococcus pneumoniae* growth obtained: 1×10^5 CFU/ml. Sensitive to: amoxiclav (amoxicillin/clavulanic acid), norfloxacin, imipenem, cefepime, cefoxitin, ceftazidime, linezolid, erythromycin, clarithromycin.

ELISA blood test to detect antibodies to *Mycoplasma pneumoniae*: IgM detected, IgG not detected.

Based on the combination of epidemiological history, clinical and laboratory-instrumental data, the child was given a clinical diagnosis:

Primary: community-acquired segmental (S4) right-sided pneumonia, acute course, mild, complicated, RF I.

Concomitant: bronchial asthma, allergic form, moderate severity, moderate exacerbation, partially controlled course. Polyvalent sensitization (pollen, household, fungal).

Complications: spontaneous mediastinal emphysema (pneumomediastinum), subcutaneous emphysema. Based on the diagnosis and identified pathogens, the child was prescribed comprehensive therapy, including antibacterial, anti-inflammatory, bronchodilator, and symptomatic treatment. A combination of β -lactams and macrolides was used for antibacterial therapy: amoxicillin/clavulanic acid at a dose of 50 mg/kg/day (1 g twice a day) orally, azithromycin 500 mg/day orally for 5 days. Ibuprofen 200 mg 3 times a day was prescribed to relieve pain during coughing. Inhalation therapy with a 3% hypertonic solution twice a day was prescribed. Basic therapy was continued with the use of a combination drug — fluticasone propionate/salmeterol at a dose of 125/25 mcg, one dose twice a day, in the form of a metered dose inhaler.

Against the background of the treatment, positive dynamics in the patient's condition are noted. The patient has no complaints, and the clinical manifestations of intoxication and respiratory symptoms have disappeared. Palpation of the neck and chest reveals no subcutaneous emphysema. Body temperature is 36.8 °C, respiratory rate is 18 per minute, heart rate

is 102 beats per minute, blood pressure is 96/60 mm Hg, SpO₂ is 98%. Laboratory tests (clinical and biochemical blood tests, urine tests) revealed no pathological abnormalities. Follow-up CT scans of the chest showed no signs of mediastinal, subcutaneous, or intermuscular emphysema. The total length of stay in the hospital was 12 days.

This clinical case illustrates the impact of *Mycoplasma pneumoniae* infection on the course of bronchial asthma in a child. The atypical pathogen exacerbated bronchial hyperreactivity and reduced the effectiveness of the immune response, leading to severe bronchial obstruction and deterioration of the patient's general condition. As a result of the complex combination of asthma and mycoplasma infection, the child developed a complication—spontaneous mediastinal emphysema. This case highlights the importance of timely diagnosis and a comprehensive approach to the treatment of infections in children with bronchial asthma in order to prevent the development of such complications. It is noteworthy that one of the most serious forms of respiratory mycoplasmosis, community-acquired pneumonia, was diagnosed in this family.

This case demonstrates the typical epidemiological characteristics of mycoplasma infection: seasonality (autumn-winter increase in incidence), slow spread and development of the disease with close family contact (within three weeks), and the patients' age.

DISCUSSION. This clinical case demonstrates the impact of *Mycoplasma pneumoniae* on the course of bronchial asthma in children and the development of complications, including spontaneous mediastinal emphysema. *Mycoplasma pneumoniae* is a common cause of atypical pneumonia in children and can contribute to the exacerbation of chronic respiratory diseases, including bronchial asthma. In this case, the infection led to the development of segmental pneumonia and severe bronchial hyperreactivity, which caused significant bronchial obstruction and deterioration of the general condition [10]. It is known that mycoplasma infection can induce hyperproduction of proinflammatory cytokines (IL-6, IL-8, TNF- α), which can exacerbate airway inflammation and reduce the effectiveness of basic asthma therapy [12].

Spontaneous mediastinal emphysema (pneumomediastinum) is a rare complication that occurs when intra-alveolar pressure increases, which can be observed against the background of intense coughing, severe bronchial obstruction, or enhanced lung ventilation [13]. The pathogenesis of this condition is explained by the Maclin effect: rupture of the alveoli followed by the spread of air through the perivascular and peribronchial spaces into the mediastinum. In this case, the development of emphysema was facilitated by severe bronchial obstruction against the background of an asthmatic process and mycoplasma pneumonia.

The diagnosis was based on a comprehensive examination, including molecular and serological methods for detecting *Mycoplasma pneumoniae*, as well as imaging methods (X-ray, chest CT scan). Hammann's sign, characteristic of spontaneous mediastinal emphysema, was of particular diagnostic significance. Computed tomography allowed for a detailed assessment of the extent of emphysema and ruled out other potential causes of mediastinal pathology. Treatment included antibiotic therapy with macrolides in combination with β -lactams, which ensured rapid elimination of the pathogen. An important aspect of treatment was the continuation of basic therapy for bronchial asthma, including inhaled corticosteroids and bronchodilators, which allowed for control of bronchial obstruction and reduced the risk of recurrence.

CONCLUSION. This clinical case demonstrates a complex combination of community-acquired mycoplasma pneumonia and bronchial asthma, complicated by the development of spontaneous mediastinal emphysema. The effect of the infection on the pathogenesis of asthma manifested itself in increased bronchial hyperreactivity, worsening disease control, and the development of severe bronchial obstruction. This case highlights the importance of timely detection of atypical respiratory infection pathogens in children with bronchial asthma and the need for a comprehensive approach to therapy, including antibacterial, anti-inflammatory, and bronchodilator treatment. In addition, the clinical case reflects the epidemiological features of mycoplasma infection: family clusters, a long incu-

bation period, and gradual development of the clinical picture. This emphasizes the need for epidemiological surveillance, timely diagnosis, and adequate antibiotic therapy to prevent complications, especially in patients with chronic respiratory diseases..

Further research into the impact of *Mycoplasma pneumoniae* on the course of bronchial asthma may contribute to the development of more effective strategies for the treatment and prevention of exacerbations in this patient group.

REFERENCES

1. Rachina S.A., Kupryushina O.A., Yasneva A.S., et al. What do we know about mycoplasmal pneumonia? Practical pulmonology. 2023; 3: 20–30. <https://doi.org/10.24412/2409-6636-2023-13021>. (In Russ.)
2. Zaplatnikov A.L., Girina A.A., Maykova I.D., et al. Clinic manifestations, diagnosis and treatment of respiratory M. pneumoniae infection in children. Meditsinskiy sovet. 2019; (17): 91–98. (In Russ.) <https://doi.org/10.21518/2079-701X-2019-17-91-98>. (In Russ.)
3. Bevza S.L., Molochkova O.V., Kovalev O.B., et al. Comparative characteristics of pneumonia caused by mycoplasma pneumoniae in children. Journal of Infectology. 2023; 15 (3): 110–118. <https://doi.org/10.22625/2072-6732-2023-15-3-110-118>. (In Russ.)
4. Tsareva A. Y. Epidemiological characteristics of community-acquired pneumonia at the present stage: literature review. Medicine. 2024; 12(4): 98–118. (In Russ.)
5. Nagovitsyna E.B., Knizhnikova E.V., Polubartseva V.V., et al. The case of respiratory mycoplasmosis in a family in autumn-winter season of morbidity increase. Bulletin of physiology and pathology of respiration. 2018; 70: 98–103. https://doi.org/10.12737/article_5c1276be8b0996.74411191. (In Russ.)
6. Gorina L.G., Krylova N.A., Goncharova S.A. et al. The role of microplasma infection in exacerbation of bronchial asthma in children. Infectious diseases. 2018; 16 (4): 16–21. <https://doi.org/10.20953/1729-9225-2018-4-16-21>. (In Russ.)
7. Bulatova E.M., Nesterenko Z.V. Community-acquired pneumonia in children with bronchial asthma and varying duration of steroid therapy. Pediatrician. 2019; 2 (10): 7–12. <https://doi.org/10.17816/PED1027-12>. (In Russ.)
8. Fayzullina R.M., Gafurova R.R., Chernyshova A.E. and others. Respiratory viral infections as a unified trigger of exacerbation of bronchial asthma in children and adolescents (literature review). Bulletin of physiology and pathology of respiration. 2023; 90: 160–169. <https://doi.org/10.36604/1998-5029-2023-90-160-169>. (In Russ.)
9. Geppe N.A., Dronov I.A. The role of respiratory infections in the development and course of bronchial obstruction and bronchial asthma in children: a literature review. Respiratory diseases. Appendix to the Consilium Medicum journal. 2016; 1: 71–74. (In Russ.)
10. Guo Z.Q., Gu S.Y., Tian Z.H., Du B.Y. A comprehensive review of Mycoplasma pneumonia infection in chronic lung diseases: recent advances in understanding asthma, COPD, and bronchiectasis. Front Med (Lausanne). 2024 Sep 25; 11: 1437731. <https://doi.org/10.3389/fmed.2024.1437731>.
11. Mitchell P.D., King T.J., O'Shea D.B. Subcutaneous Emphysema in Acute Asthma: A Cause for Concern? Respir Care. 2015 Aug; 60 (8): 141–143. <https://doi.org/10.4187/respcare.03750>.
12. Maes D., Boyen F., Devriendt B., Kuhnert P., Summerfield A., Haesebrouck F. Perspectives for improvement of Mycoplasma hyopneumoniae vaccines in pigs. Vet Res. 2021 May 8; 52 (1): 67. <https://doi.org/10.1186/s13567-021-00941-x>.
13. Ojha S, Gaskin J. Spontaneous pneumomediastinum. BMJ Case Rep. 2018 Feb 11; 2018: bcr2017222965. <https://doi.org/10.1136/bcr-2017-222965>.

ЛИТЕРАТУРА

1. Рачина С.А., Купрюшина О.А., Яснева А.С. и др. Что мы знаем о микоплазменной пневмонии? Практическая пульмонология. 2023; 3: 20–30. <https://doi.org/10.24412/2409-6636-2023-13021>.
2. Заплатников А.Л., Гирина А.А., Майкова И.Д. и др. Клиника, диагностика и лечение респираторной M. pneumoniae инфекции у детей. Медицинский совет. 2019; (17): 91–98. <https://doi.org/10.21518/2079-701X-2019-17-91-98>.
3. Бевза С.Л., Молочкова О.В., Ковалев О.Б. и др. Сравнительная характеристика пневмоний, вызванных Mycoplasma pneumoniae, у детей. Журнал инфектологии. 2023; 15 (3): 110–118. <https://doi.org/10.22625/2072-6732-2023-15-3-110-118>.
4. Царева А.Ю. Эпидемиологическая характеристика внебольничной пневмонии на современном этапе: обзор литературы. Медицина. 2024; 12(4): 98–118.
5. Наговицына Е.Б., Книжникова Е.В., Полубарцева В.В. и др. Случай семейного очага респираторного микоплазмоза в сезон осенне-зимнего подъема заболеваемости. Бюллетень физиологии и патологии дыхания. 2018; 70: 98–103. https://doi.org/10.12737/article_5c1276be8b0996.74411191.

6. Горина Л.Г., Крылова Н.А., Гончарова С.А. и др. Роль микроплазменной инфекции при обострении бронхиальной астмы у детей. Инфекционные болезни. 2018; 16 (4): 16–21. <https://doi.org/10.20953/1729-9225-2018-4-16-21>.
7. Булатова Е.М., Нестеренко З.В. Внебольничные пневмонии у детей с бронхиальной астмой и разной длительностью стероидной терапии. Педиатр. 2019; 2 (10): 7–12. <https://doi.org/10.17816/PED1027-12>.
8. Файзуллина Р.М., Гафурова Р.Р., Чернышова А.Е. и др. Респираторные вирусные инфекции как унифицированный триггер обострения бронхиальной астмы у детей и подростков (обзор литературы). Бюллетень физиологии и патологии дыхания. 2023; 90: 160–169. <https://doi.org/10.36604/1998-5029-2023-90-160-169>.
9. Геппе Н.А., Дронов И.А. Роль респираторных инфекций в развитии и течении бронхиальной обструкции и бронхиальной астмы у детей: обзор литературы. Болезни органов дыхания. Приложение к журналу Consilium Medicum. 2016; 1: 71–74.
10. Guo Z.Q., Gu S.Y., Tian Z.H., Du B.Y. A comprehensive review of Mycoplasma pneumonia infection in chronic lung diseases: recent advances in understanding asthma, COPD, and bronchiectasis. Front Med (Lausanne). 2024 Sep 25; 11: 1437731. <https://doi.org/10.3389/fmed.2024.1437731>.
11. Mitchell P.D., King T.J., O'Shea D.B. Subcutaneous Emphysema in Acute Asthma: A Cause for Concern? Respir Care. 2015 Aug; 60 (8): 141–143. <https://doi.org/10.4187/respcare.03750>.
12. Maes D., Boyen F., Devriendt B., Kuhnert P., Summerfield A., Haesebrouck F. Perspectives for improvement of Mycoplasma hyopneumoniae vaccines in pigs. Vet Res. 2021 May 8; 52 (1): 67. <https://doi.org/10.1186/s13567-021-00941-x>.
13. Ojha S., Gaskin J. Spontaneous pneumomediastinum. BMJ Case Rep. 2018 Feb 11; 2018: bcr2017222965. <https://doi.org/10.1136/bcr-2017-222965>.

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THE AUTHORS' CONTRIBUTION TO THE WORK

Rezeda M. Fayzullina — conceptualization, formulation or evolution of overarching research goals and aims.

Anastasia E. Chernyshova — conceptualization, formal analysis, formal analysis, visualization, writing — review & editing.

Rita R. Gafurova — conceptualization, formal analysis, visualization, writing — review & editing.

Vladislav B. Golubyatnikov — conceptualization, formal analysis, investigation.

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CONSENT FOR PUBLICATION

Written voluntary informed consent has been obtained from the patient's parents to publish the description of the clinical case, as well as to use its clinical and medical data (examination results, observation and therapy) exclusively for scientific purposes.

ИНФОРМИРОВАННОЕ СОГЛАСИЕ НА ПУБЛИКАЦИЮ

От родителей пациента получено письменное добровольное информированное согласие на публикацию описания клинического случая, а также на использование его клинических и медицинских данных (результатов обследования, наблюдения и терапии) исключительно в научных целях.