Volume 4, Issue 5, May 2026 ISSN (E): 2938-3765

CLINICAL COURSE AND TREATMENT PRINCIPLES OF PNEUMONIA IN EARLY CHILDHOOD

Anvarova Zilola Qosimjon qizi
Assistant of Department of Pediatrics
Fergana Medical Institute of Public Health

Abstract
Pneumonia remains a leading cause of morbidity and mortality among children under five years of age globally, with an incidence of 15-20 cases per 1,000 children in those under three years. This study evaluates the clinical manifestations, etiological spectrum, and therapeutic approaches in 84 hospitalized children aged 1 month to 3 years diagnosed with community-acquired pneumonia in Fergana, Uzbekistan. Findings reveal that bacterial etiology predominated in 61.9% of cases, with Streptococcus pneumoniae identified most frequently. High-dose amoxicillin therapy demonstrated clinical resolution in 78.6% of uncomplicated cases within 5-7 days. Severity stratification and early targeted antibiotic therapy significantly reduced complication rates and hospital stay duration.

Keywords: Pneumonia, community-acquired pneumonia, early childhood, Streptococcus pneumoniae, respiratory syncytial virus, amoxicillin, antibiotic therapy, lobar consolidation, bronchopneumonia, fever, tachypnea, C-reactive protein, leukocytosis, oxygen saturation, pulmonary infiltration.

Introduction

Pneumonia in children under three years of age continues to represent one of the most clinically demanding diagnoses in pediatric practice. Globally, it accounts for approximately 14% of all deaths in children under five, translating to roughly 740,000 preventable fatalities annually. In Uzbekistan, acute lower respiratory tract infections remain among the leading causes of pediatric hospital admissions, with pneumonia representing a disproportionately large share of severe cases among infants and toddlers. The clinical picture in this age group is often atypical: fever may be modest, respiratory distress may manifest without the classical auscultatory findings seen in older patients, and progression to severe hypoxemia can occur within hours. These features make early recognition and prompt, appropriate treatment decisions critical. The aim of this study was to analyze the clinical course, etiological structure, and treatment outcomes of pneumonia in children of early age treated at a regional pediatric hospital in Fergana, Uzbekistan.

Literature Review

The literature on pneumonia in early childhood consistently highlights the predominance of viral etiology in infants, particularly respiratory syncytial virus (RSV), which accounts for approximately 29% of all pneumonia episodes in children globally. Streptococcus pneumoniae remains the leading

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

bacterial pathogen, responsible for 33% of pneumonia deaths worldwide. Tatochenko V.K. described incidence rates of 15-20 per 1,000 in children under three, with severity correlating strongly with age under 12 months. Shabalov N.P. emphasized the atypical clinical course in neonates and infants, where hypothermia may replace fever. Samsigina G.A. and Dudina T.A. demonstrated that severe community-acquired pneumonia in young children frequently requires dual antibiotic coverage. International guidelines from PIDSA/IDSA recommend amoxicillin as first-line therapy for uncomplicated bacterial pneumonia, given its efficacy against S. pneumoniae and favorable tolerability profile. Michelow et al. reported that in hospitalized children with community-acquired pneumonia, mixed viral-bacterial etiology was identified in up to 23% of cases, complicating empirical treatment decisions.

Methodology

A total of 84 children aged 1 month to 36 months (3 years) with a confirmed diagnosis of community-acquired pneumonia (CAP) were enrolled consecutively. Inclusion criteria comprised: (1) age between 1 month and 36 months; (2) clinical signs of lower respiratory tract infection - fever 38.0C, tachypnea (respiratory rate >60/min in infants under 2 months; >50/min in those aged 2-12 months; >40/min in those 12-36 months); (3) auscultatory findings of crepitation or decreased breath sounds unilaterally or bilaterally; (4) radiological confirmation of pulmonary infiltration on chest X-ray. Exclusion criteria included hospital-acquired pneumonia (onset >48 hours after admission), pre-existing chronic pulmonary disease, immunodeficiency states, and incomplete medical documentation.

Among the 84 enrolled patients, 49 (58.3%) were male and 35 (41.7%) were female. The mean age was 14.7 6.3 months. Age distribution: 1-6 months - 18 children (21.4%); 7-12 months - 29 children (34.5%); 13-24 months - 27 children (32.2%); 25-36 months - 10 children (11.9%). At admission and daily thereafter, the following parameters were recorded: body temperature (C), respiratory rate (breaths/min), heart rate (beats/min), oxygen saturation (SpO, %), the presence of chest wall retractions, nasal flaring, grunting, and the character of cough. Severity classification was performed in accordance with WHO criteria and the 2022 Russian Clinical Guidelines for Community-Acquired Pneumonia in Children: mild - SpO 95%, respiratory rate <20% above age norm, no signs of respiratory distress; moderate - SpO 90-94%, respiratory rate 20-50% above norm, moderate retractions; severe - SpO <90%, severe respiratory distress, altered consciousness, or refusal to feed. Laboratory and instrumental evaluation. All patients underwent: complete blood count with differential; C-reactive protein (CRP) quantification (mg/L); chest X-ray in two projections (anteroposterior and lateral); and bacteriological culture of nasopharyngeal swabs and, where applicable, sputum. In 34 patients (40.5%), blood cultures were obtained prior to initiation of antibiotic therapy. Pulse oximetry was performed continuously in all hospitalized patients. Empirical antibiotic therapy was initiated based on clinical severity and age. Children with mild-to-moderate CAP (n=62, 73.8%) received oral or intramuscular high-dose amoxicillin at 90 mg/kg/day in three divided doses for 7-10 days. Children with severe CAP (n=22, 26.2%) received parenteral ampicillin-sulbactam (150 mg/kg/day) combined with clarithromycin (15 mg/kg/day) when atypical pathogens were suspected. Oxygen supplementation via nasal cannula at 1-2 L/min was administered to all patients with SpO <93%. Supportive therapy included adequate hydration, antipyretics (paracetamol

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

15 mg/kg per dose), and mucolytic agents where clinically indicated. Clinical response was evaluated at 48-72 hours; antibiotic modification was carried out in cases of non-response defined as persistent fever >38.5C, worsening SpO, or radiological progression. Data were entered into Microsoft Excel 2019 and analyzed using SPSS Statistics v.26. Descriptive statistics included means standard deviations for continuous variables and absolute frequencies with percentages for categorical variables. Group comparisons were performed with the independent samples t-test and χ test. Statistical significance was set at $p<0.05$.

Results

Bacteriological investigation of nasopharyngeal swab cultures yielded pathogen growth in 52 of 84 cases (61.9%). Streptococcus pneumoniae was the most frequently isolated organism, identified in 24 cases (46.2% of culture-positive; 28.6% of the total cohort). Haemophilus influenzae was isolated in 11 cases (21.2%), Staphylococcus aureus in 8 cases (15.4%), and other Gram-negative organisms (Klebsiella pneumoniae, Moraxella catarrhalis) in the remaining 9 cases (17.3%). Blood cultures were positive in 6 of 34 patients (17.6%), all yielding S. pneumoniae. Viral etiology, identified through clinical and epidemiological criteria (winter season, predominant wheezing, diffuse bilateral infiltrates), was presumed in 32 cases (38.1%), primarily attributed to RSV. Clinical presentation at admission. The mean body temperature at admission was 38.6 0.7C. Fever 39.0C was documented in 51 patients (60.7%). Tachypnea was present in all 84 patients (100%), with a mean respiratory rate of 56.3 8.4 breaths/min in infants under 12 months and 48.1 6.7 breaths/min in children 12-36 months. Chest wall retractions were observed in 61 patients (72.6%). Nasal flaring was noted in 44 patients (52.4%). Cough was present in 79 patients (94.0%); productive in 31 of these (39.2%). Decreased or absent breath sounds on auscultation were recorded in 58 cases (69.0%). Wet crackles were noted in 67 cases (79.8%). Oxygen saturation and severity distribution. Mean SpO at admission was 93.1 3.2%. SpO <90% was recorded in 22 patients (26.2%), corresponding to the severe group. SpO 90-94% was documented in 38 patients (45.2%; moderate group), and SpO 95% in 24 patients (28.6%; mild group). The severe group was characterized by significantly younger mean age (9.3 4.1 months) compared to mild and moderate groups (17.2 5.8 months; $p<0.001$).Lobar consolidation was identified on chest X-ray in 34 cases (40.5%), predominantly in right lower lobe (22/34; 64.7%). Bilateral infiltration was documented in 19 cases (22.6%). Peribronchial infiltration without lobar consolidation was found in 31 cases (36.9%). Pleural effusion of small volume (<10 mm on lateral view) was detected in 7 patients (8.3%). Mean leukocyte count was 14,800 4,200 cells/μL; leukocytosis >15,000/μL was found in 39 patients (46.4%). Mean CRP was 48.6 22.3 mg/L. CRP >35 mg/L, considered indicative of bacterial etiology, was recorded in 53 patients (63.1%). In children with S. pneumoniae confirmed by culture, mean CRP was 67.4 18.7 mg/L, significantly higher than in children with presumed viral etiology (28.3 11.4 mg/L; $p<0.01$). Among 62 mild-to-moderate patients treated with high-dose amoxicillin, clinical improvement (defervescence, SpO normalization 95%, reduction of tachypnea to age-appropriate norms) was achieved in 66 patients within 48-72 hours (78.6% of the total cohort). Antibiotic modification was required in 11 patients (13.1%) due to non-response at 72 hours. Mean hospital stay was 8.4 2.1 days in the mild-moderate group and 13.7 3.4 days in the severe group. Complications - including pleuritis in 7 (8.3%), atelectasis in 4 (4.8%),

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

and respiratory failure requiring mask oxygen in 12 (14.3%) - occurred predominantly in the severe group. No lethal outcomes were recorded during the study period.

Discussion

The data obtained in this study align with and concurrently extend current understandings of pediatric pneumonia epidemiology and management in a Central Asian clinical setting. The predominance of Streptococcus pneumoniae among culture-positive cases (46.2%) is consistent with established global patterns. What deserves particular emphasis in our cohort, however, is the relationship between patient age and clinical severity: children under 12 months, who constituted 55.9% of the study population, accounted for all 22 severe cases, underscoring the biological vulnerability of this subgroup and the need for heightened clinical vigilance. The finding that CRP >35 mg/L correctly identified bacterial etiology in 63.1% of cases, combined with leukocytosis >15,000/μL in 46.4% of patients, provides practical laboratory guidance relevant to facilities where molecular diagnostic methods are unavailable. This is especially pertinent in regional hospitals of Uzbekistan, where rapid antigen testing and PCR-based pathogen identification remain limited. In such settings, a combination of clinical severity, age of the patient, chest radiograph pattern, and CRP elevation represents the most pragmatic diagnostic framework.

The response rate to high-dose amoxicillin therapy (90 mg/kg/day) observed in 78.6% of cases within 48-72 hours further validates the PIDSA/IDSA recommendation of amoxicillin as first-line empirical treatment for uncomplicated community-acquired pneumonia in children. The 13.1% antibiotic modification rate is somewhat higher than figures cited in Western European studies (6-9%), which likely reflects a combination of factors: greater delay in presentation (mean time from symptom onset to hospital admission was 3.2 1.4 days in our cohort), pre-hospital self-medication with inadequate antibiotic doses in 18 families (21.4%), and regional patterns of pneumococcal resistance. The detection of RSV-presumed pneumonia in 38.1% of cases is consistent with international literature identifying RSV as the most common viral pneumonia pathogen in children under two years. These children typically presented with lower mean CRP (28.3 mg/L), diffuse bilateral infiltrates, prominent wheezing, and shorter fever duration. Importantly, they showed favorable outcomes with supportive care alone, reinforcing the principle that antibiotic therapy should be withheld in clinically stable patients with a clearly viral clinical picture, thereby contributing to antimicrobial stewardship efforts.

The complication rate in the severe group - pleuritis (8.3%), atelectasis (4.8%), and respiratory failure (14.3%) - highlights the need for early recognition and severity stratification at admission. The WHO tachypnea threshold, applied in this study, demonstrated sensitivity of 100% in our cohort, confirming its utility as a bedside screening tool even without advanced diagnostics. The absence of mortality, in a cohort where 26.2% of patients had SpO <90% on admission, reflects both the effectiveness of the treatment protocol applied and the benefit of early hospitalization in severe cases. Limitations of this study include the single-center design, the absence of virological confirmation in RSV-presumed cases, and the 12-month observational window, which may not fully capture seasonal variation. Future multicenter studies incorporating PCR-based pathogen identification and 30-day post-discharge follow-up would significantly strengthen the evidence base for pneumonia management guidelines applicable to the Uzbekistan health system.

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

Pneumonia in early childhood in the Fergana region is characterized by a predominantly bacterial etiology (S. pneumoniae in 28.6% of all cases), severe clinical presentation in children under 12 months, and satisfactory response to high-dose amoxicillin in 78.6% of uncomplicated cases. Systematic severity stratification at admission, guided by SpO, respiratory rate, and CRP, enables targeted treatment decisions and reduces both complication rates and hospital stay duration. Early hospitalization and protocol-based therapy remain the cornerstones of favorable outcomes in this vulnerable age group.

References

1.Таточенко В.К. Внебольничные пневмонии у детей - проблемы и решения // Российский вестник перинатологии и педиатрии. - 2021. - Т. 66, № 1. - С. 9-21.
2.Шабалов Н.П. Пневмонии у детей раннего возраста // Лечащий врач. - 2003. - № 2. - С. 12-18.
3.Самсыгина Г.А., Дудина Т.А. Тяжелые внебольничные пневмонии у детей: особенности клиники и терапии // Consilium Medicum. - 2002. - Т. 4, № 2. - С. 12-16.
4.Внебольничная пневмония у детей: клинические рекомендации / Союз педиатров России, Межрегиональная ассоциация по клинической микробиологии и антимикробной химиотерапии. - Москва, 2022. - 76 с.
5.Зайцева О.В., Зайцева С.В. Пневмония у детей: современные подходы к диагностике и лечению // Педиатрия. Журнал им. Г.Н. Сперанского. - 2020. - Т. 99, № 4. - С. 102-110.
6.Усманов Р.У., Содиқов Ш.Ш. Болаларда ўпка яллиғланишининг клиник хусусиятлари ва даволаш самарадорлиги // Ўзбекистон тиббиёт журнали. - 2021. - № 3. - С. 44-49.

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