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CLINICAL AND DIAGNOSTIC FEATURES OF UPPER RESPIRATORY TRACT INFECTIONS IN CHILDREN

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Abstract. Upper respiratory tract infections (URTIs) are common in children and present with variable clinical and diagnostic features. This study aimed to evaluate the clinical presentation and diagnostic characteristics of URTIs in children. A prospective observational study included 120 children aged 3–12 years divided into three groups according to disease severity. Nasal congestion and rhinorrhea were the most frequent symptoms, while fever, cough, and sore throat were more common in moderate and severe cases. Increased leukocyte count and C-reactive protein levels were associated with greater disease severity. Combined clinical and laboratory assessment may improve diagnostic accuracy and support rational management of pediatric URTIs.

Keywords: upper respiratory tract infections; children; clinical features; diagnostic features; C-reactive protein; disease severity.

КЛИНИКО-ДИАГНОСТИЧЕСКИЕ ОСОБЕННОСТИ ИНФЕКЦИЙ ВЕРХНИХ ДЫХАТЕЛЬНЫХ ПУТЕЙ У ДЕТЕЙ

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Аннотация. Инфекции верхних дыхательных путей (ИВДП) широко распространены среди детей и характеризуются разнообразием клинических и диагностических проявлений. Целью данного исследования было изучение клинической картины и диагностических особенностей ИВДП у детей. В проспективное обсервационное исследование были включены 120 детей в возрасте от 3 до 12 лет, разделённых на три группы в зависимости от степени тяжести заболевания. Наиболее частыми симптомами являлись заложенность носа и ринорея, тогда как лихорадка, кашель и боль в горле чаще наблюдались при среднетяжёлом и тяжёлом течении. Повышение уровня лейкоцитов и С-реактивного белка было ассоциировано с увеличением тяжести заболевания. Комплексная клинико-лабораторная оценка может повысить диагностическую точность и способствовать рациональному ведению детей с ИВДП.

Ключевые слова: инфекции верхних дыхательных путей; дети; клинические особенности; диагностические признаки; С-реактивный белок; тяжесть заболевания.

Introduction. Upper respiratory tract infections (URTIs) are among the most common infectious conditions in children worldwide and constitute a leading cause of pediatric outpatient visits and hospital admissions [1,2]. These infections involve the nasal cavity, pharynx, larynx, and paranasal sinuses and are predominantly caused by viral pathogens, although bacterial agents may be implicated in certain cases [2,3]. According to the World Health Organization, acute respiratory infections remain a major contributor to childhood morbidity, particularly in low- and middle-income countries [1]. Children are especially susceptible to URTIs due to immune system immaturity, frequent exposure in childcare and school environments, and anatomical features of the upper airways [3,4].

Viruses such as rhinoviruses, respiratory syncytial virus, influenza viruses, adenoviruses, and coronaviruses account for the majority of pediatric URTIs [2,4,7], whereas bacterial pathogens including *Streptococcus pyogenes*, *Streptococcus pneumoniae*, and *Haemophilus influenzae* are less frequent but clinically significant because of their association with complications and the need for antibiotic therapy [3,6]. The difficulty in distinguishing viral from bacterial infections contributes to inappropriate antibiotic use, increasing the risk of antimicrobial resistance [5]. Current clinical guidelines emphasize rational antibiotic prescribing, symptomatic management, and preventive strategies, as outlined by the Centers for Disease Control and Prevention and the American Academy of Pediatrics [5,6].

The purpose of the study was to assess the clinical manifestations and diagnostic characteristics of upper respiratory tract infections in children.

Material and methods. A prospective observational study was conducted involving 120 children diagnosed with upper respiratory tract infections (URTIs). The study was carried out at a pediatric outpatient and inpatient department from January 2024 to December 2025.

Children aged 3 to 12 years were enrolled in the study. The diagnosis of URTIs was established based on clinical symptoms and physical examination findings in accordance with accepted pediatric guidelines.

All enrolled children were divided into three groups chaotically, without preliminary stratification by age, sex, or disease severity. Group allocation was performed consecutively at the time of presentation, reflecting routine clinical practice. Group I included 40 children with predominantly mild clinical manifestations of URTIs. Group II consisted of 42 children with moderate clinical symptoms. Group III comprised 38 children with more pronounced clinical

manifestations requiring closer medical supervision.

Clinical evaluation included assessment of general condition, body temperature, nasal congestion, rhinorrhea, sore throat, cough, pharyngeal hyperemia, and cervical lymphadenopathy. Disease severity was determined based on the intensity and combination of clinical symptoms. All patients underwent routine laboratory investigations, including complete blood count and measurement of inflammatory markers (C-reactive protein). Instrumental diagnostic methods were applied when clinically indicated. Diagnostic criteria were used to differentiate viral and suspected bacterial infections based on clinical presentation and laboratory findings.

Statistical analysis was performed using SPSS software (version 26.0). Quantitative variables were expressed as mean ± standard deviation, while qualitative data were presented as absolute numbers and percentages. Intergroup comparisons were performed using appropriate statistical tests. Differences were considered statistically significant at $p<0.05$.

Results and analyses. A total of 120 children with upper respiratory tract infections were included in the study. The mean age of the patients was 7.4±2.6 years, with no statistically significant difference between the groups ($p>0.05$). Boys accounted for 55.0% (n=66) and girls for 45.0% (n=54) of the study population.

The distribution of patients according to disease severity demonstrated a predominance of mild and moderate forms of URTIs, while severe manifestations were less frequent.

Table 1

Demographic characteristics of the study groups

Parameter	Group I (n=40)	Group II (n=42)	Group III (n=38)	Total (n=120)
Age, years (mean ± SD)	7.2 ± 2.4	7.5 ± 2.7	7.6 ± 2.8	7.4 ± 2.6
Boys, n (%)	22 (55.0)	24 (57.1)	20 (52.6)	66 (55.0)
Girls, n (%)	18 (45.0)	18 (42.9)	18 (47.4)	54 (45.0)

No significant differences in age or sex distribution were observed among the groups ($p>0.05$), indicating comparability of the study cohorts.

Clinical symptoms varied depending on disease severity. Nasal congestion and rhinorrhea were the most common symptoms across all groups, while fever, sore throat, and cough were more frequently observed in children with moderate and severe manifestations.

Table 2

Frequency of clinical symptoms in study groups, n (%)

Symptom	Group I	Group II	Group III
Nasal congestion	36 (90.0)	40 (95.2)	37 (97.4)
Rhinorrhea	35 (87.5)	39 (92.9)	36 (94.7)
Fever (>38°C)	10 (25.0)	26 (61.9)	30 (78.9)
Sore throat	18 (45.0)	30 (71.4)	32 (84.2)
Cough	22 (55.0)	33 (78.6)	35 (92.1)
Cervical lymphadenopathy	6 (15.0)	14 (33.3)	18 (47.4)

A statistically significant increase in the frequency of fever, cough, sore throat, and lymphadenopathy was observed with increasing disease severity ($p<0.05$).

Laboratory analysis revealed progressive changes in inflammatory markers corresponding to clinical severity. Children in Group III demonstrated higher leukocyte counts and C-reactive protein (CRP) levels compared to Groups I and II.

Table 3

Laboratory parameters in the study groups (mean ± SD)

Parameter	Group I	Group II	Group III
WBC ($\times 10^9$/L)	6.8 ± 1.2	8.4 ± 1.6	10.2 ± 2.1
Neutrophils (%)	45.2 ± 6.3	54.8 ± 7.1	62.5 ± 8.4
Lymphocytes (%)	42.6 ± 7.0	35.1 ± 6.8	28.4 ± 6.2
CRP (mg/L)	4.1 ± 1.8	11.6 ± 3.4	24.8 ± 6.2

Significant differences were observed between Group III and the other groups in terms of leukocyte count and CRP levels ($p<0.05$), suggesting a higher probability of bacterial involvement in severe cases.

Based on clinical presentation and laboratory findings, viral URTIs predominated in Group I, whereas suspected bacterial infections were more frequently identified in Groups II and III.

Table 4

Presumed etiology of URTIs in study groups

Etiology	Group I	Group II	Group III
Viral	34 (85.0)	26 (61.9)	18 (47.4)
Suspected bacterial	6 (15.0)	16 (38.1)	20 (52.6)

The proportion of suspected bacterial infections increased significantly with disease severity ($p<0.05$), emphasizing the importance of careful diagnostic

evaluation to guide therapeutic decisions.

The analysis demonstrated clear differences in clinical manifestations and diagnostic indicators among children with varying severity of URTIs. Mild forms were predominantly viral and characterized by limited systemic involvement, whereas moderate and severe cases showed more pronounced clinical symptoms and elevated inflammatory markers, suggesting possible bacterial etiology.

Discussion. The results of this study demonstrate that the clinical presentation of upper respiratory tract infections (URTIs) in children varies significantly depending on disease severity. Nasal congestion and rhinorrhea were the most common symptoms across all groups, which is consistent with previous reports identifying these features as the hallmark manifestations of pediatric URTIs [8,9]. In contrast, fever, cough, sore throat, and cervical lymphadenopathy were more frequently observed in children with moderate and severe disease, indicating greater systemic involvement.

Laboratory findings revealed a progressive increase in leukocyte count and C-reactive protein levels with increasing severity, supporting their role as useful indicators of inflammatory activity [10]. Elevated CRP values and neutrophil predominance in severe cases suggest a higher likelihood of bacterial involvement, although overlap between viral and bacterial infections remains a well-recognized diagnostic challenge [9,10]. Similar observations have been described in previous studies emphasizing the limited specificity of individual laboratory markers when used in isolation.

The predominance of viral etiology in mild URTIs observed in this study is in agreement with existing literature, which reports that most pediatric URTIs are caused by viral pathogens and do not require antibiotic therapy [8,11]. The increasing proportion of suspected bacterial infections in more severe cases highlights the importance of integrating clinical findings with laboratory data to support rational treatment decisions and reduce inappropriate antibiotic use [11].

Conclusion. Upper respiratory tract infections in children demonstrate variable clinical presentation and diagnostic findings depending on disease severity. The combined assessment of clinical symptoms and basic laboratory markers improves diagnostic accuracy and supports rational management of pediatric URTIs, helping to reduce unnecessary antibiotic use and prevent complications.

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