

The significance of radiological examination in the diagnosis of pneumonia in children

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Relevance: Pneumonia remains one of the leading causes of morbidity and mortality among children worldwide, particularly in developing countries. Early and accurate diagnosis is essential for timely treatment and prevention of serious complications. Although clinical examination and laboratory tests play an important role in the diagnostic process, chest radiography remains the most widely used imaging modality for confirming pneumonia and assessing the extent of pulmonary involvement. Radiological examination allows visualization of characteristic pulmonary infiltrates, detection of complications, and differentiation of pneumonia from other respiratory diseases. Therefore, evaluating the diagnostic significance of radiological examination in pediatric pneumonia is of considerable clinical importance.

Objective: to assess the diagnostic value of chest radiography in the detection and evaluation of pneumonia in children and to determine its correlation with clinical and laboratory findings.

Materials and Methods: A retrospective study was conducted on 118 pediatric patients who were admitted to the hospital with clinical suspicion of pneumonia between January 2024 and December 2025. The study population included 67 boys (56.8%) and 51 girls (43.2%), with a mean age of 5.9 ± 3.4 years.

All patients underwent standard posteroanterior and lateral chest radiography upon admission. Radiographic findings were evaluated for the presence of focal consolidation, interstitial infiltrates, pleural effusion, and bilateral pulmonary involvement. Clinical parameters, including body temperature, respiratory rate, oxygen saturation, and laboratory markers such as leukocyte count and C-reactive protein (CRP), were also recorded.

Results: Chest radiography revealed radiological signs of pneumonia in 101 of 118 children (85.6%). Focal lobar consolidation was the most common finding, observed in 59 patients (50.0%), followed by patchy bronchopneumonic infiltrates in 28 patients (23.7%) and interstitial changes in 14 patients (11.9%).

Pleural effusion was detected in 12 children (10.2%), while bilateral pulmonary involvement was observed in 18 cases (15.3%). Radiographic findings showed a significant association with elevated CRP levels (>40 mg/L) and leukocytosis ($>12 \times 10^9/L$) ($\chi^2 = 14.72$, $p = 0.001$). The sensitivity of chest radiography for

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diagnosing pneumonia was 92.7% (95% CI: 85.8–97.0%), specificity was 82.4% (95% CI: 56.6–96.2%), PPV was 95.0%, and NPV was 73.7%. The overall diagnostic accuracy reached 91.5%. Children with bilateral radiographic involvement demonstrated significantly lower oxygen saturation levels ($92.1 \pm 2.8\%$) compared with those having unilateral lesions ($95.4 \pm 1.9\%$; $p < 0.001$). A moderate positive correlation was observed between the extent of radiographic lung involvement and duration of hospitalization ($r = 0.61$, $p < 0.001$).

Conclusion: Chest radiography remains a highly valuable imaging modality for the diagnosis and assessment of pneumonia in children. It demonstrates high sensitivity and diagnostic accuracy in detecting pulmonary infiltrates and identifying disease-related complications. Radiographic findings correlate significantly with clinical severity and laboratory indicators of infection, making chest radiography an essential component of comprehensive evaluation and management of pediatric pneumonia.

Keywords: pediatric pneumonia, chest radiography, pulmonary infiltrates, diagnostic accuracy, children, respiratory infection, radiological examination, sensitivity, specificity, statistical analysis.