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THE ROLE OF PROCALCITONIN AS A MARKER IN CHRONIC RHEUMATIC HEART DISEASE

Turayev Telmon Temirovich

DSc, Associate Professor of the 1st Pediatric department of the Bukhara State Medical Institute

Bobojonov Khurshid Jumaniyozovich

Master of the 1st Pediatric department of the Bukhara State Medical Institute

Resume: Chronic rheumatic heart disease (CRHD) remains one of the leading causes of acquired heart defects in children and adolescents in developing countries. Procalcitonin (PCT), a peptide precursor of calcitonin, is a sensitive marker of systemic inflammatory response and may reflect the activity of rheumatic inflammation and secondary bacterial infection. Determining serum procalcitonin levels may improve the early diagnosis, prognosis, and management of CRHD during exacerbations.

Key words:chronic rheumatic heart disease, procalcitonin, biomarkers, inflammation, children.

Relevance

Rheumatic fever and its chronic consequence chronic rheumatic heart disease (CRHD) remain a significant medical and social problem in pediatric cardiology. Despite preventive therapy, exacerbations continue to lead to progressive valvular defects. Traditional markers such as ESR and CRP are often nonspecific. Procalcitonin (PCT) is a more specific biomarker of bacterial and systemic inflammatory activation. Elevated PCT levels are associated with bacterial infections and immune-mediated inflammation in the myocardium and endocardium, making it a promising indicator for monitoring disease activity.

Purpose of the study

To assess the diagnostic and prognostic value of serum procalcitonin levels in children with chronic rheumatic heart disease during periods of remission and exacerbation.

Materials and methods

A clinical and laboratory study was conducted in 87 pediatric patients (aged 6–17 years) with diagnosed CRHD, hospitalized in the pediatric cardiorheumatology department of the Bukhara Regional Children's Multidisciplinary Medical Center from 2022 to 2025. Patients were divided into two groups: Group I (n=48) CRHD in active phase; Group II (n=39) in remission. The control group consisted of 30 healthy children. Procalcitonin was measured by VIDAS® B·R·A·H·M·S PCT assay, and ESR and CRP were determined. Echocardiography and ECG were used for cardiac assessment. Statistical analysis was performed using the Student's t-test and Pearson correlation.

Results

In patients with active CRHD, serum PCT levels were significantly elevated (mean 1.02 ± 0.25 ng/mL) compared to remission (0.19 ± 0.07 ng/mL) and control (0.05 ± 0.02 ng/mL). A direct correlation was found between PCT and CRP ($r = 0.74$, $p < 0.01$). Persistently elevated PCT after therapy was associated with early recurrence of rheumatic activity. No significant correlation was found between PCT and ESR, indicating greater specificity of PCT.

Discussion

The study confirms that procalcitonin is a sensitive and specific biomarker for evaluating inflammatory activity in CRHD. Unlike CRP and ESR, PCT responds more rapidly to changes in inflammatory status and may help differentiate bacterial infection–associated exacerbations from autoimmune activity.

Monitoring PCT together with echocardiography improves management and reduces risk of complications.

Conclusion

1. Serum procalcitonin is a valuable biomarker reflecting inflammatory activity in children with CRHD.
2. Elevated PCT (>0.5 ng/mL) correlates with clinical and echocardiographic signs of activity.
3. Monitoring PCT improves early diagnosis of exacerbations and therapy adjustment.
4. Further studies are needed to standardize PCT thresholds for pediatric CRHD.

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