

## **Immuno-hematological features of the course of hemorrhagic vasculitis in children with nephropathy and improvement of prevention**

**Иммуно-гематологические особенности течения геморрагических васкулитов у детей с нефропатией и совершенствование профилактики**

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### **Abstract**

Hemorrhagic vasculitis is a systemic disease that often affects children and may cause complications such as nephropathy. The immune and hematological systems play an important role in the development and severity of this condition. This study investigates immuno-hematological characteristics in children with nephropathic forms of hemorrhagic vasculitis and offers strategies to improve prevention and management. Our results show the significance of early diagnosis and individualized preventive measures.

**Keywords:** Hemorrhagic vasculitis, nephropathy, children, immunology, hematology, prevention, immune response

### **Аннотация**

Геморрагический васкулит — это системное заболевание, часто встречающееся у детей и сопровождающееся осложнениями, такими как нефропатия. Иммунная и гематологическая системы играют важную роль в развитии и тяжести заболевания. В статье рассматриваются иммуногематологические особенности у детей с нефропатической формой геморрагического васкулита, а также предложены меры по совершенствованию профилактики и лечения. Результаты подтверждают важность ранней диагностики и индивидуального подхода.

**Ключевые слова:** Геморрагический васкулит, нефропатия, дети, иммунология, гематология, профилактика, иммунный ответ

### **Annotatsiya**

Gemorragik vaskulit — bu bolalarda tez-tez uchraydigan va nefropatiya kabi asoratlar bilan kechadigan tizimli kasallikdir. Immun va gematologik tizimlar bu kasallikning rivojlanishi va og‘irligida muhim rol o‘ynaydi. Ushbu maqolada bolalarda nefropatiya bilan kechayotgan gemorragik vaskulitning immun-gematologik xususiyatlari o‘rganildi hamda profilaktikani yaxshilash strategiyalari taklif qilindi. Natijalar erta tashxis va individual yondashuv muhimligini ko‘rsatdi.

**Kalit so‘zlar:** Gemorragik vaskulit, nefropatiya, bolalar, immunologiya, gematologiya, profilaktika, immun javob

### **Introduction**

Hemorrhagic vasculitis, also called Henoch-Schönlein purpura (HSP), is the most common type of systemic vasculitis found in children. This condition affects small blood vessels, leading to inflammation and bleeding under the skin, into the joints, digestive organs, and kidneys (Saulsbury, 2007). While most children experience a mild form of the disease, complications may arise when the kidneys are involved. In such cases, there is a higher risk of serious health problems, including the possible development of chronic kidney disease (CKD).

Children who develop nephropathy due to HSP often require long-term medical care and specialized treatment. The immune system plays a key role in this process by forming immune complexes that damage blood vessels and kidney tissues. Hematological markers, such as white blood cell and platelet counts, are useful in evaluating inflammation and predicting complications. For this reason, studying immuno-hematological features in children with nephropathy is important. It can improve early diagnosis, help reduce long-term effects, and contribute to better preventive care.

### **Methods**

This study involved 52 children between the ages of 4 and 12 diagnosed with hemorrhagic vasculitis. Out of this group, 20 children showed signs of nephropathy, while 32 did not. All participants underwent detailed clinical examinations and laboratory testing. Laboratory assessments included a complete blood count (CBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), levels of immunoglobulins A and G (IgA, IgG), and components of the complement system

(C3 and C4). Urinalysis and serum creatinine levels were checked to determine kidney involvement.

The children were monitored for six months, and the effectiveness of their treatment was evaluated. The study aimed to find links between immune and hematological markers and the development of nephropathy, and to suggest ways to improve prevention and management of the disease.

### Results

Our findings showed that immune system changes were more frequent in children who had nephropathy. These children had notably higher IgA levels ( $p < 0.05$ ), which supports the idea that immune complex deposits contribute to kidney damage (Davin & Weening, 2003). Additionally, lower levels of C3 complement were observed, indicating activation of the immune response.

Hematological results revealed increased leukocyte and platelet counts in the nephropathy group, reflecting inflammation and immune activity. ESR and CRP levels were also significantly higher, showing that the disease was more active. In some patients, symptoms such as microscopic hematuria and proteinuria lasted more than three months, raising the risk of developing chronic kidney problems.

Clinically, children with nephropathy experienced more frequent disease relapses and slower recovery times. Treatment with corticosteroids helped reduce kidney symptoms and improve health outcomes. Early administration of anti-inflammatory and immune-modulating therapy was found to be effective in managing the condition.

### Discussion

The results of this study confirm that immune and hematological factors significantly influence the course of hemorrhagic vasculitis, especially when kidney involvement is present. Higher IgA levels suggest that immune reactions contribute directly to kidney damage. The decrease in complement proteins, particularly C3, also supports this immune-mediated mechanism (Narchi, 2005).

Routine monitoring of blood markers may help identify children at greater risk in the early stages of the disease. This allows doctors to begin treatment earlier and avoid complications. Preventive measures should include minimizing exposure to infections and stress, which are common triggers for disease flare-ups. Parents and caregivers must also be informed about early warning signs such as skin rashes, stomach pain, or dark-colored urine.

Individual treatment plans based on each child’s immune and blood profile may lead to better results. Such a personalized approach can improve the child’s quality of life and lower the chance of developing long-term health issues.

### Conclusion

Hemorrhagic vasculitis in children, particularly when accompanied by nephropathy, requires close attention to the immune system and blood-related indicators. Early diagnosis, regular check-ups, and customized treatment plans can improve patient outcomes and reduce the risk of chronic kidney disease. Prevention should focus on education, timely screening, and targeted care for children at risk. Continued research is necessary to create more effective prevention strategies based on immune system profiles.

### References

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