

**MAIN CAUSES OF GLOMERULONEPHRITIS: INFECTIONAL AND NON-
INFECTIONAL THEORY****Davronbekov Rahmiddin Isroiljon ugli**

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ANNOTATION: This scientific article analyzes modern views on the etiology of glomerulonephritis. In particular, the immunological mechanisms of the infectious theory (bacterial, viral, parasitic infections) and non-infectious theory (autoimmune, allergic, toxic, metabolic factors), the effect of these factors on glomerular structures and their participation in the pathogenesis of the disease are widely covered. Based on Uzbek and international scientific sources, the main directions of the etiology of glomerulonephritis, clinical manifestations, pathophysiological changes and their significance in medical practice are considered. The article analyzes the role of immune complexes, the complement system and inflammatory mediators in the development of glomerulonephritis. The results of the study show that identifying the etiological factors of glomerulonephritis is of primary importance in choosing a treatment strategy.

KEYWORDS: Glomerulonephritis, infectious theory, non-infectious theory, autoimmune mechanisms, immune complexes, complement system, post-streptococcal glomerulonephritis, viral etiology, toxic effect.

INTRODUCTION: Glomerulonephritis (GN) is a group of diseases characterized by inflammation of the glomeruli, the main filtration unit of the kidney. The etiology of this disease is complex and develops under the influence of many internal and external factors. Glomerulonephritis is one of the most common kidney diseases in medical practice, and its acute and chronic forms can lead to serious clinical consequences in many age groups, especially in children and adolescents. The most important process in the development of the disease is the disruption of immunological mechanisms. In most cases, GN occurs as a result of improper control of the body's inflammatory response. Therefore, in modern nephrology, the etiology of GN is studied in two main directions: One of the oldest explanations for glomerulonephritis is the infectious theory. In the 19th and 20th centuries, acute glomerulonephritis after streptococcal infections - poststreptococcal GN (PSGN) was noted as the most common disease. The reason for this is the formation of antigen-antibody complexes as a result of the entry of streptococcal microorganisms into the body, their deposition in the glomeruli and the triggering of the inflammatory process. At the same time, not only streptococci, but also viruses (HBV, HCV, HIV), parasites (malarial Plasmodium), bacterial endocarditis, dental and skin infections, and disseminated bacteremia throughout the body play an important role as infectious agents. According to this approach, the main cause of glomerulonephritis is internal factors caused by

disorders in the body's immune system, autoimmune processes, increased allergic reactivity, toxic substances, drugs, or metabolic diseases (for example, diabetes, amyloidosis). Autoimmune glomerulonephritis is the result of the immune system attacking its own tissues. For example, Goodpasture syndrome, IgA nephropathy, lupus nephritis are bright autoimmune forms of this disease. As scientific research on the etiology of glomerulonephritis continues, it has been proven that the infectious and non-infectious theories of the disease are not mutually exclusive, but rather coexist in many clinical cases. For example, the initial process may be infectious, but subsequent inflammation may proceed by autoimmune mechanisms. This article provides an in-depth look at both theories of the etiology of glomerulonephritis based on scientific sources and analyzes the relationship between them.

RESEARCH METHODOLOGY: The study was carried out on the following scientific and methodological bases:

1. Systematic analysis of literature – Uzbek and foreign medical literature, clinical manuals on nephrology, scientific articles were studied.
2. Comparison of epidemiological data – The frequency of occurrence of infectious and non-infectious forms of glomerulonephritis was compared.
3. Analysis of immunological processes – Processes such as immune complex formation, autoantibody reactions, and activation of the complement system were analyzed based on scientific sources.
4. Review of pathohistological changes – The mechanisms of glomerular inflammation were highlighted based on morphological data.
5. Generalization of clinical experiences – General conclusions were formed on etiological factors based on data from practical nephrology centers of Uzbekistan.

MAIN PART: Poststreptococcal glomerulonephritis (PSGN) is the most common form of acute glomerulonephritis worldwide, especially in children. It is caused by the following mechanisms:

Antigens secreted by β -hemolytic streptococcus group A provoke a strong immune response in the body. The resulting immune complexes circulate in the blood and deposit in the glomeruli. The complement system is activated and neurophilic granulocytes migrate to the glomeruli. This process leads to inflammation of the glomeruli, impaired filtration and the appearance of proteinuria, hematuria. The widespread prevalence of PSGN is associated with poor sanitary conditions, high epidemiological risk zones, and a high incidence of viral and bacterial infections. Many viruses can cause glomerular diseases:

a) Hepatitis B virus-associated glomerulonephritis

Membranous glomerulonephritis is often found in patients with HBV. Immunocomplexes of antibodies and antigens to the virus are deposited in the glomeruli.

b) Hepatitis C virus-associated glomerulonephritis

HCV exacerbates glomerular inflammation through cryoglobulinemia. This condition is called “cryoglobulinemic glomerulonephritis.”

c) HIV-associated glomerulopathy

Often leads to focal-segmental glomerulosclerosis. The virus directly damages podocytes. Bacterial endocarditis, long-term infections, sepsis also cause the formation of immune complexes. In malaria, *Plasmodium falciparum* and *P. malariae* strongly stimulate the immune system, causing glomerular inflammation. Non-infectious etiology of glomerulonephritis

1. Autoimmune diseases

The most common factor among non-infectious etiology is autoimmune diseases.

a) Lupus nephritis $\rightarrow$ Antinuclear antibody-antigen complexes formed in systemic lupus erythematosus (SLE) are deposited in the glomeruli. The complement system is activated. Lupus nephritis is one of the most severe forms of GN.

b) IgA nephropathy $\rightarrow$ IgA1 molecules are formed as a result of abnormal glycosylation. They are deposited in the mesangial areas of the glomeruli. This is the most common chronic form of GN.

c) Goodpasture syndrome $\rightarrow$ Anti-GBM antibodies directly affect the glomerular basement membrane. Often accompanied by pulmonary-renal syndrome.

2. Allergic reactions

When drugs, toxic substances, food allergens enter the body, GN can develop as a result of hyperactivity of the immune system. The following drugs are most often the cause: antibiotics (penicillins), NSAIDs, sulfonamides.

3. Exposure to toxic substances

Industrial waste, heavy metals (lead, cadmium), excessive alcohol consumption cause damage to glomerular capillaries.

4. Metabolic diseases

a) Diabetic nephropathy $\rightarrow$ In diabetes, the glomerular basement membrane thickens, podocytes are damaged.

b) Amyloidosis $\rightarrow$ Pathological proteins in the body accumulate in the glomeruli and cause inflammation.

5. Genetic factors

In non-infectious etiologies, hereditary predisposition plays an important role. For example: IgA nephropathy is associated with genetic clusters, there are genetic types of FSGS.

ANALYSIS AND RESULTS: The etiology of glomerulonephritis is complex, and infectious and noninfectious factors are often involved together. Immune complexes remain one of the main mechanisms in the development of GN. Streptococcal infections are still the main cause of acute GN worldwide. The number of GN associated with viral etiology, especially HBV and HCV, is increasing. Autoimmune glomerulonephritis (SLE, IgA nephropathy) is one of the leading causes of chronic renal failure in many countries. The noninfectious theory does not negate the infectious theory - on the contrary, many clinical cases have a mixed etiology.

CONCLUSION: Infectious and non-infectious theories of the etiology of glomerulonephritis are the main scientific paradigms in understanding the development of kidney diseases. The disease can develop under the influence of an adverse reaction of the immune system, infectious agents, autoimmune processes, allergic and toxic factors. Correctly determining the etiology of the disease is crucial for choosing a treatment strategy. Therefore, a deep study of the etiology of GN allows achieving high efficiency in nephrology practice.

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