

## A Comprehensive Overview on Membranous Lupus Nephritis

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### DESCRIPTION

Membranous Lupus Nephritis (MLN) is a distinctive form of kidney involvement in Systemic Lupus Erythematosus (SLE), an autoimmune disorder that can affect multiple organ systems. It represents a specific pattern of glomerular injury where the immune system attacks the kidneys, leading to the thickening of the Glomerular Basement Membrane (GBM) due to the deposition of immune complexes. This condition can range from mild to severe, potentially leading to End-Stage Renal Disease (ESRD) if left untreated. Early recognition, accurate diagnosis, and appropriate treatment are important for improving long-term outcomes in patients with MLN.

MLN occurs when the body's immune system produces autoantibodies, particularly Antinuclear Antibodies (ANA) and Anti-Double-Stranded DNA (anti-dsDNA) Antibodies, which form immune complexes. These immune complexes get deposited in the glomeruli, the filtering units of the kidneys, triggering an inflammatory response. The deposits predominantly affect the glomerular basement membrane, causing it to thicken and leading to the characteristic pathological features of membranous nephritis.

In MLN, immune complexes are mostly deposited along the outer surface of the glomerular basement membrane. The deposition activates the complement system, which promotes further inflammation. This process results in damage to the glomerular filtration barrier, leading to protein leakage into the urine (proteinuria) and other signs of kidney dysfunction. Over time, the damage can progress, causing scarring (glomerulosclerosis) and impaired kidney function. The clinical features of membranous lupus nephritis can vary, and in many cases, the disease may remain asymptomatic for long periods. However, when symptoms do occur, they are primarily related to kidney dysfunction.

One of the characteristic symptoms of MLN is proteinuria, which can range from mild to nephrotic-range proteinuria (greater than 3.5 grams of protein per day). Proteinuria occurs as a result of glomerular damage, where the filtration barrier becomes permeable to larger proteins such as albumin. This can

lead to significant protein loss through the urine. Fluid retention due to nephrotic syndrome is common, especially in the legs, ankles, and around the eyes. Edema is typically seen when proteinuria becomes severe and the body loses large amounts of albumin, leading to hypoalbuminemia (low levels of albumin in the blood). While less common than proteinuria, some patients with MLN may experience hematuria (blood in the urine), which is often microscopic. Hematuria can be a sign of glomerular inflammation. Elevated blood pressure is frequently observed in patients with membranous lupus nephritis, particularly as kidney function deteriorates. Hypertension in these patients may be difficult to control and can further exacerbate renal damage.

In some cases, MLN may be accompanied by systemic symptoms of lupus, such as fatigue, joint pain, rashes, and fever. However, it is important to note that the renal symptoms can occur without the full range of systemic lupus features, which can make diagnosis challenging. The diagnosis of membranous lupus nephritis involves a combination of clinical evaluation, laboratory tests, and kidney biopsy. Given the nonspecific nature of symptoms, particularly in the early stages, a high index of suspicion is necessary for accurate diagnosis.

Urine tests are essential in detecting proteinuria and hematuria. Persistent proteinuria, especially in the nephrotic range, raises suspicion for membranous nephritis. Blood tests for specific autoantibodies, including ANA and anti-dsDNA, can help confirm the diagnosis of lupus. Elevated levels of these antibodies are common in lupus nephritis, particularly in patients with MLN. The definitive method for diagnosing membranous lupus nephritis is a kidney biopsy. The biopsy reveals characteristic changes in the glomeruli, including thickening of the glomerular basement membrane and the presence of immune complex deposits along the GBM. The biopsy can be analyzed using light microscopy, immunofluorescence, and electron microscopy to confirm the diagnosis. Complement proteins, particularly C3 and C4, are often decreased in active lupus nephritis due to their consumption during the formation of immune complexes. Monitoring complement levels can help assess disease activity and guide treatment decisions. Lupus nephritis is classified into

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different classes based on the degree of kidney involvement, with Class V being the category that includes membranous lupus nephritis. The World Health Organization (WHO) classification of lupus nephritis includes 5 types.

The goal of treatment for membranous lupus nephritis is to control inflammation, reduce proteinuria, and prevent progression to End-Stage Renal Disease (ESRD). The treatment approach is tailored to the severity of the disease and the extent of kidney damage. The prognosis for membranous lupus nephritis has improved over the years due to advances in early diagnosis and treatment. However, the outcome varies depending on the severity of the disease and the response to treatment. Some patients may achieve complete remission with appropriate therapy, while others may progress to ESRD, requiring dialysis or kidney transplantation. Factors influencing prognosis include the extent of proteinuria at diagnosis, the

presence of hypertension, and the degree of kidney function at the time of diagnosis. Regular monitoring of kidney function, proteinuria, and other biomarkers is essential to assess disease progression and adjust treatment as needed.

## CONCLUSION

Membranous lupus nephritis is a significant manifestation of lupus that can lead to serious kidney damage if not properly managed. Early detection, accurate diagnosis, and appropriate treatment are important for improving outcomes in affected individuals. With the right combination of immunosuppressive therapies, supportive treatments, and close monitoring, many patients with membranous lupus nephritis can achieve stable kidney function and avoid long-term complications.