A REVIEW ON MESANGIAL PROLIFERATIVE GLOMERULO NEPHRITIS

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ABSTRACT

Mesangial proliferative glomerulo nephritis-a relatively uncommon disorder is a type of glomerulo nephritis associated primarily with the mesangium. It is a very rare kidney disorder characterized by swelling and blood in urine due to the inflammation of glomerulus-an internal kidney structure and an increase mesangial cell number accompanied by antibody depots in the mesangial layer of the glomerulus. The factors that triggers the disorder is unknown till date but is considered to be a type of immune response as it is associated with antibody deposits. Symptoms such as edema, anorexia, Hematuria, Proteinuria and high blood pressure can be seen. It is categorized into three types-MPGN Type 1, MPGN Type 2, MPGN Type 3 based on the inflammation pattern seen in the filters. Several health complications include renal failure, congestive heart failure, atherosclerosis, fluid overload etc. different diagnostical methods include blood and urine analysis to reveal blood/protein levels in urine, analysis BUN and serum creatinine and analysis of lipid levels. Renal biopsy can be done for the confirmation of the disorder. The treatment therapy should be aimed to relieve symptoms and to prevent complications and also improving the kidney function. Therapy includes treatment with Immunosuppressive, corticosteroids, renal dialysis, antibiotics, and diuretics, erythropoietin agonists, anti-platelet therapy, plasma exchange and micro Chinese herbal medicine. However diagnosis should be done carefully and drugs have to be chosen based upon their efficacy and condition of the patients as misdiagnosis can lead to arousal of new infections which lead to further complications.

Keywords: Mesangium, Hematuria, Proteinuria, proliferative, Biopsy, MPGN, IGA.
INTRODUCTION
Mesangial Proliferative Glomerulo Nephritis is a rare kidney disorder characterized by the expansion of the mesangial matrix and mesangial hypercellularity associated with swelling and blood in urine caused by inflammation of an internal kidney structure\(^1\). All these changes can occur in immune complex mediated diseases such as IgA nephropathy or class 11 lupus nephritis or non-immune diseases such as early diabetic Glomerulo sclerosis. Abnormalities of immune system results in abnormal immune deposits in mesangium of kidney. These cells become bigger and they increase in number as well thus giving the glomeruli a lumpy appearance\(^2\). This is a relatively uncommon disorder. The term mesangial proliferative GN is actually a description of the microscopic pattern of this disease. It may be seen more commonly in lupus patients who develop glomerular nephritis, and in patients who have IgA mediated kidneydisease(see IgA nephropathy). It can affect both adults and children. Men may be affected slightly more often than women.

CAUSES
The actual mechanism that triggers the disorder is unknown but it is believed to be some type of immune response as inflammation is associated with deposits of antibodies\(^2\). Some believe that the main cause is glomerular mesangial proliferation which occurs in response to the Platelet Derived Growth Factor (PDGF) responsible for the release and expression of PDGF A and B chain mRNAs. PDGF expression was increased in some forms of glomerulo nephritis characterized by mesangial proliferation which suggests that PDGF may be a major contributor to mesangial proliferation seen in proliferative glomerulo nephritides\(^3\).

SIGNS & SYMPTOMS\(^4\)
The disorder causes nephrotic syndrome which may be present as acute, chronic or rapidly progressing glomerulonephritis and can progress to kidney failure. General symptoms associated with MPGN are

- Hematuria
- Proteinuria
- Edema near
  - Eyes
  - Extremities like feet and ankle
  - Abdomen
  - General
• Foamy appearance of urine
• Weight gain
• Anorexia
• High blood pressure

Call your physician if:
• You see any symptoms indicating mesangial proliferative glomerulo nephritis
• Decreased urine output or any other new symptoms develop

TYPES

MPGN is classified into three groups, MPGN type 1, MPGN type 2, MPGN type 3 based on the pattern of inflammation seen in the filters. It is hard to define a specific type of MPGN in some cases as there is an overlap of features in different patients.

Type 1

In this case, the immune complexes are deposited under endothelium of renal capillaries. An obvious thickening of glomerular basilar membrane is seen. The immune complexes are inserted between the mesangium and endothelium which causes the broadening of mesangium.

Type 2

This is a type of kidney disorder which stops the kidneys from filtering waters from blood. For those with MPGN 2, the immune system doesn’t work properly to get rid of immune complex deposits which are located in the filtering parts of kidneys or glomerulus. As a result the glomerular cells are inflamed and impaired. It is also known as Dense Deposit Disease (DDD) as the immune complex deposits are massive in this MPGN type 2.

Type 3

Massive immune complex deposits are seen under glomerular endothelium, epithelium or glomerular mesangium. It is of two sub-types namely Burkholder type and Strife-Ander type. Electron dense deposits are detectable on endothelium and epithelium in Burkholder type whereas in Strife-Anders subtype, electron dense of various sizes penetrates the layer of glomerular basement membrane.

With recent medical research advancements, it is accepted by most researchers that type 2 MPGN differs from the other two types in various histological characteristics, electron
structural changes and pathogenesis. MPGN type 2 is a special type of glomerular nephritis which is caused by abnormal activation of complements and alternate pathways.

**POTENTIAL COMPLICATIONS**

- Renal failure (acute & chronic)
- Several infections including pneumococcal pneumonia
- Malnutrition
- Congestive heart failure & related heart disease
- Pulmonary edema
- Fluid overload
- Atherosclerosis

**PATHOPHYSIOLOGY**

Cells of the mesangium in renal glomerulus use endocytosis to take up and degrade the circulating immunoglobulins. This process normally stimulates mesangial cell proliferation and matrix deposition. It is therefore during times of elevated circulating immunoglobulin (i.e. lupus and IgA nephropathy), an increased number of mesangial cells and matrix in the glomerulus are seen. This is the general characteristic of nephrotic syndrome.

![Fig-1: The pathogenesis of membrano-proliferative glomerulonephritis (MPGN)](image)

Abnormalities in immune system results in abnormal immune deposits in mesangial cells of kidneys in which case the mesangial cells become bigger and increase in number as well due to excess immune complex deposits. Generally, the glomerular cells are responsible for filtering blood stream. Disorder of the immune system usually leads to many immune
complexes like IgA built up in mesangial cells of kidneys. Even though the specific trigger of this disorder is unknown, experts have ensured that it is an autoimmune disorder.

**DIAGNOSIS**

It is a non-specific examination except for edema. Low urine output, high blood pressure, fluid overload and signs that acute or chronic renal failure may be present. Some of the tests include

- Analysis of blood and urine may reveal blood or protein amounts
- Fat deposits can be found in urine
- If renal failure is present, BUN and serum creatinine may be elevated
- Elevated lipid levels in blood
- Confirmation of MPGN is renal biopsy

**TREATMENT**

The goals for treating MPGN should be to relieve symptoms and prevent complications as well as to improve kidney function. It requires prolonged treatment as the disorder is usually chronic. Seek professional medical advice always about any treatment or change in treatment plans. Treatment strategies upon the cause of disease whether acute or chronic, severity of renal impairment, age and comorbidities of patient should be considered. Various treatments include

- **Antibiotics** which are used for treating MPGN associated with infections.
- **Fish oil** is used for treating progressive IgA nephropathy.
- **Antihypertensives** are used for managing high blood pressure both in acute and chronic cases.
- **Diuretics** should be used for preventing fluid overload and fluid restriction is necessary for treating edema including reduced salt and water intake.
- **Renal dialysis** is used when there are manifestations of uremia and GFR is <10mL/min.
- **Erythropoietin** agonists are recommended for managing anemia associated with chronic renal failure.
- **Phosphate binders** for managing hyperphosphataemia, calcium supplements for hypocalcaemia are recommended along with sodium bicarbonate for acid-base disturbances.
- **Corticosteroids and immunosuppressive** agents can be used for maintenance therapy. Though the presence of antibodies indicate there is some type of immune response causing
disorder, suppression of immune system with these agents may not reduce the symptoms in all cases.

- **Triglycerides levels and high blood cholesterol treatment** is recommended to reduce the development of atherosclerosis. Limitation of cholesterol and saturated fats through diet is of limited benefit only as the disorder is caused by overproduction of liver than excess intake of fats.

- **Plasma exchange**: success has been reported for treatment of MPGN Type 2 recurring after transplantation. Evidence is shown that patients with Factor H deficiency may benefit from plasma exchange.

- **Anti platelet therapy**: rationale behind anti platelet therapy is that platelet consumption is increased in MPGN which play a role in glomerular injury. Hence a combination of aspirin (975 mg/day) and dipyridamole (275mg/day) was found to have useful effects of renal function in patients including children.

- **Micro Chinese medicine**: this herbal medicine helps to alleviate symptoms and complications also as well as to improve kidney function naturally. Newly developed Chinese herbal medicine helps to lower blood pressure, relieves anorexia and insomnia etc. it also helps to improve the damaged kidney tissue to self-cure.

**MISDIAGNOSIS**

**Chronic digestive conditions often misdiagnosed**: When diagnosing chronic symptoms of the digestive tract, there are a variety of conditions.

- **Intestinal bacteria disorder may be hidden cause**: One of the lesser known causes of diarrhea is an imbalance of bacterial in the gut.

- **Antibiotics often causes diarrhea**: The use of antibiotics are very likely to cause some level of diarrhea in patients.

- **Food poisoning may actually be an infectious disease**: Many people who come down with "stomach symptoms" like diarrhea.

- **Mesenteric adenitis misdiagnosed as appendicitis in children**: Because appendicitis is one of the more feared conditions for a child with abdominal pain, it can be over-diagnosed.

- **Interstitial cystitis an under-diagnosed bladder condition**: The medical condition of interstitial cystitis is a bladder condition that can be misdiagnosed.

- **Celiac disease often fails to be diagnosed cause of chronic digestive symptoms**: One of the most common chronic digestive conditions is celiac disease, a malabsorption disorder with a variety of symptoms.
**Chronic digestive diseases hard to diagnose:** There is an inherent difficulty in diagnosing the various types of chronic digestive diseases. Some of the better known possibilities are peptic ulcer, colon.

**CONCLUSION**

MPGN is believed to be caused by inflammation associated with deposition of antibodies which interfere with the normal filtration function of the mesangial cells. The other cause is meant to be due to the response of PDGF which release and express PDGF A& B chain mRNAs. This result in acute or chronic nephrotic syndrome associated with many other potential complications. Hence it is to be properly diagnosed and treated appropriately.

Immunosuppressives, corticosteroids, anti hypertensives and diuretic medications can be given in an attempt to control symptoms and retard progress of disorder. Proteins, sodium and fluid intake should be restricted. Antiplatelet therapy is also highly recommended. Chinese herbal medicine also helps to reveal blood pressure and anorexia. Appropriate treatment for the disease includes the principle of repairing the injured renal cells and the stoppage of further worsening of illness condition along with diet regulation under the supervision of health care professional.

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