School of Medicine
and Public Health
UNIVERSITY OF WISCONSIN–MADISON

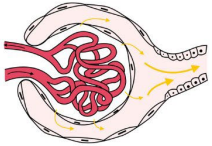
FSGS and Minimal change disease

Tripti Singh, MD
Associate Professor of Medicine (CHS)
Division of Nephrology
University of Wisconsin-Madison

KDIGO Clinical Practice Guideline for the Management of Glomerular Diseases

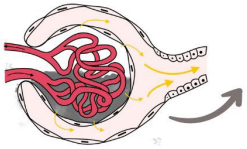
FOCAL SEGMENTAL GLOMERULOSCLEROSIS (FSGS)

Normal



Blood is filtered by the glomerulus

FSGS



Scarring in the glomerulus impairs kidney function

World Kidney Day

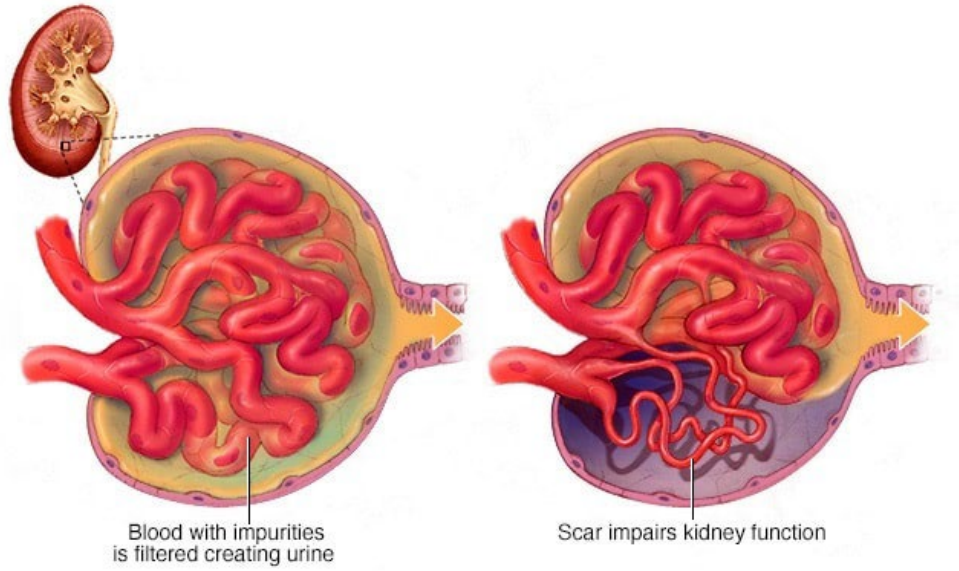
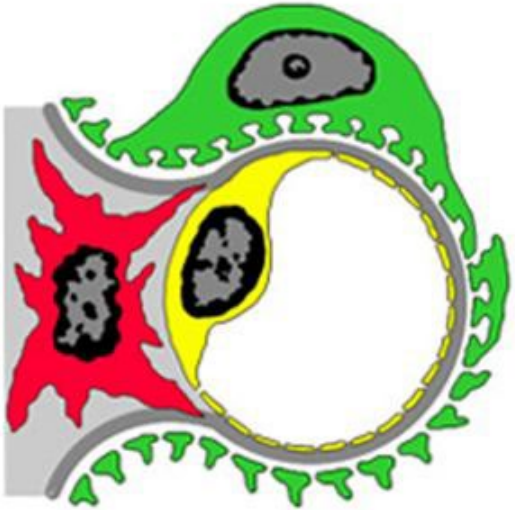
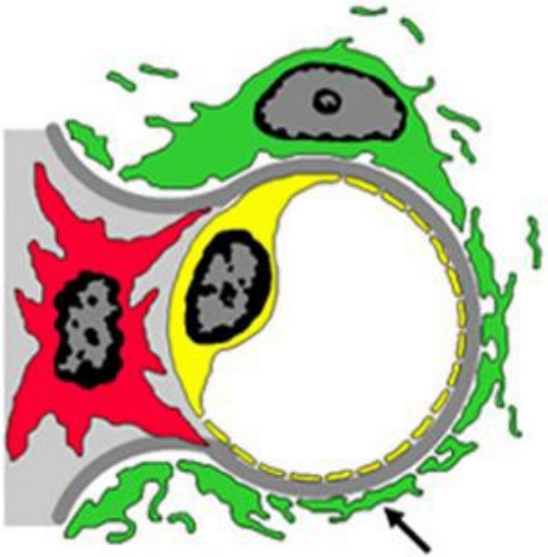


Image Courtesy: International Society of Nephrology, Mayo Clinic

Normal Capillary



Minimal Change Glomerulopathy



foot process effacement

Diagnosis

Blood tests: Assessing Kidney Function

- serum creatinine and or serum cystatin C
- Calculate eGFR

Urine tests:

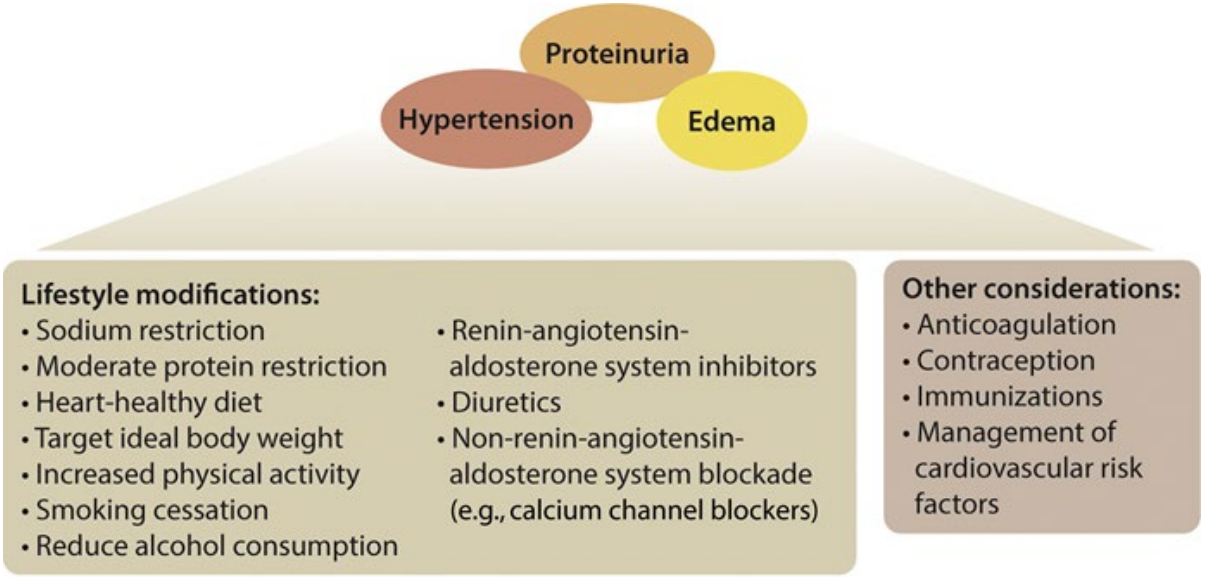
- Protein in urine- either by urine protein creatinine ratio or 24-hour urine protein

KIDNEY BIOPSY

Practice Point 1.1.1: The kidney biopsy is the "**gold standard**" for the diagnostic evaluation of glomerular diseases.

Practice Point 1.1.3: Repeat kidney biopsy should be performed if the information will potentially alter the therapeutic plan or contribute to the estimation of prognosis

General treatment guidelines



KDIGO 2021 guidelines

Lifestyle Modifications

- Sodium restriction
- Increase physical activity
- Smoking cessation
- Reduce alcohol consumption

Edema

- Sodium restriction
- Diuretics- water pills
- Need monitoring of electrolytes and creatinine by blood tests

Decreasing proteinuria

- Low salt intake
- Good BP control <120/80 mm Hg
- ACE-I/ARB- lisinopril/losartan
- SGLT2i- dapagliflozin, empagliflozin
- Mineralocorticoid receptor antagonist- spironolactone
- Smoking cessation
- Weight normalization (to ideal body weight)

Complications of Protein in urine

Hyperlipidemia

- Checking serum cholesterol levels
- Starting statin

Hypercoagulability

- Increased risk of blood clots
- Blood thinners if develop blood clot

Complications of protein in urine: Infections

- Pneumococcal vaccine to prevent Pneumonia
- Patients and household contacts should receive the influenza vaccine.
- Screening for tuberculosis (TB), hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), and syphilis in clinically appropriate patients is suggested.

Treatment of Minimal Change disease

Minimal Change Disease

Diagnosis

Practice Point 5.1.1: MCD in adults can be diagnosed only with a kidney biopsy

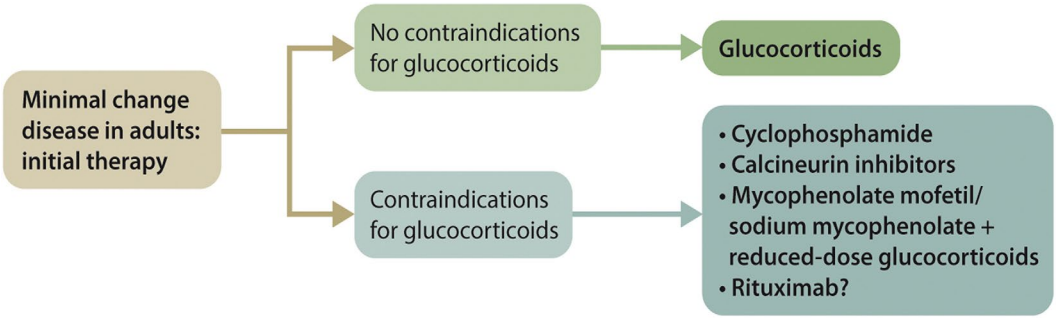
Prognosis

Practice Point 5.2.1: Long-term kidney survival is excellent in patients with MCD who respond to glucocorticoids, but less certain for patients who do not respond

Minimal Change Disease

Recommendation 5.3.1: We recommend high-dose oral glucocorticoids for initial treatment of MCD (1C)

Practice Point 5.3.1: Algorithm for the initial treatment of MCD in adults

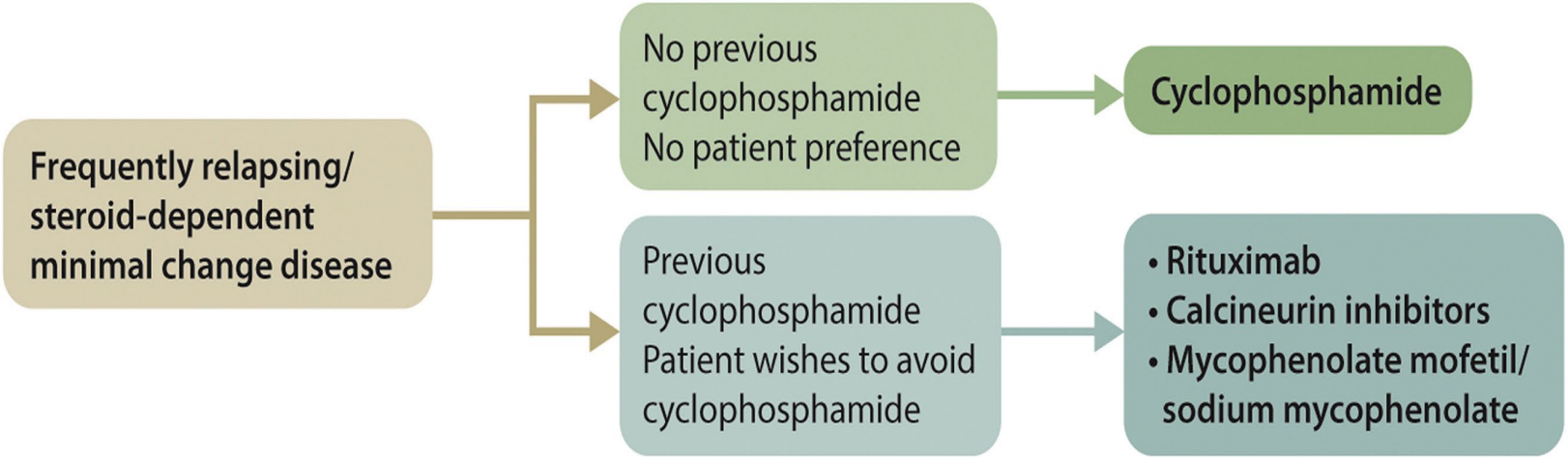


CNI: tacrolimus or cyclosporin

Practice Point 5.3.2: High-dose glucocorticoid treatment for MCD should be given for no longer than 16 weeks.

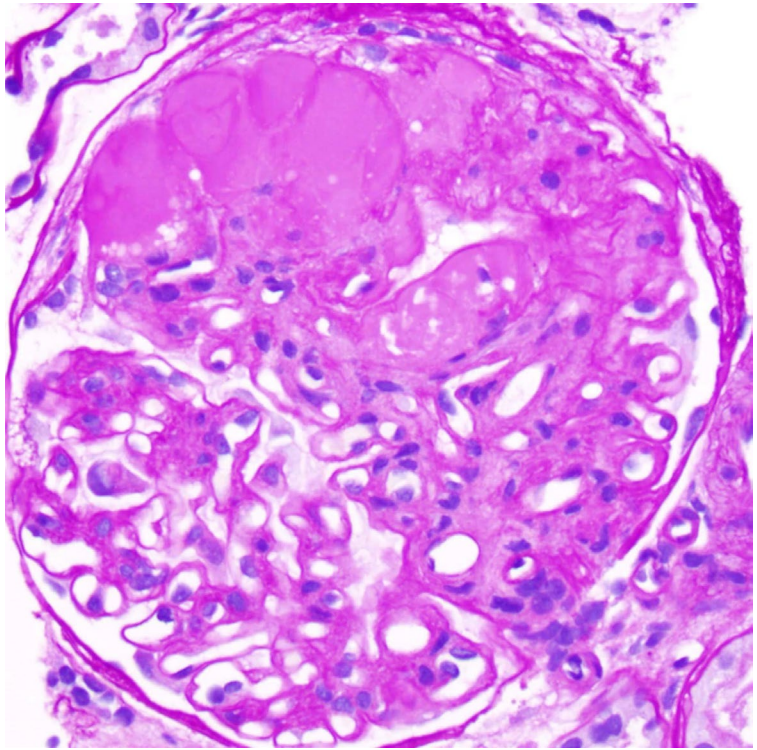
Practice Point 5.3.3: Begin tapering of glucocorticoids 2 weeks after complete remission

Minimal Change Disease: Relapse

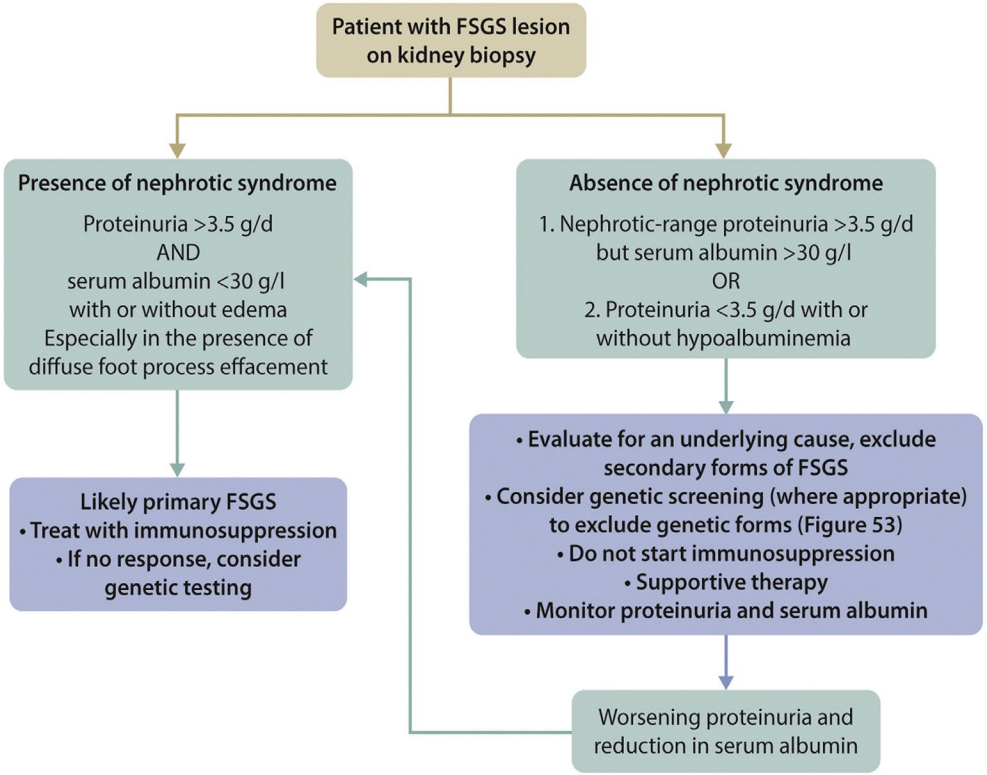


CNI: tacrolimus or cyclosporin

FSGS



FSGS


Patient with FSGS lesion on kidney biopsy
Presence of nephrotic syndrome
Proteinuria >3.5 g/d
AND
serum albumin <30 g/l
with or without edema
Especially in the presence of diffuse foot process effacement
Absence of nephrotic syndrome
1. Nephrotic-range proteinuria >3.5 g/d but serum albumin >30 g/l
OR
2. Proteinuria <3.5 g/d with or without hypoalbuminemia
Likely primary FSGS
• Treat with immunosuppression
• If no response, consider genetic testing
• Evaluate for an underlying cause, exclude secondary forms of FSGS
• Consider genetic screening (where appropriate) to exclude genetic forms (Figure 53)
• Do not start immunosuppression
• Supportive therapy
• Monitor proteinuria and serum albumin
Worsening proteinuria and reduction in serum albumin

Causes of FSGS

Secondary to alterations of glomerular epithelial cells	
Viral infections	HIV (established) CMV (probably) Parvovirus B19, EBV, HCV (possibly) Hemophagocytic syndrome (possibly) SARS-COV-2 (with *APOL1* risk genotype)
Drug-induced	Direct-acting antiviral therapy mTOR inhibitors, CNIs Anthracyclines Heroin (adulterants) Lithium Interferon Anabolic steroids NSAIDs
Secondary to adaptive changes with glomerular hypertension	
Reduced nephron number	Reflux nephropathy Renal dysplasia Oligomeganephronia Sickle cell disease Age-related FSGS
Normal nephron number	Obesity-related glomerulopathy Primary glomerular diseases Systemic conditions, e.g., diabetic nephropathy, hypertensive nephrosclerosis

Genetic Causes of FSGS

Genetic forms of FSGS	
Genetic mutations of podocyte and glomerular basement membrane proteins	• Familial • Sporadic • Syndromic

Considerations for genetic testing in adults with FSGS

- When there is a strong family history and/or clinical features suggestive of a syndromal disease
- Aiding in diagnosis, especially if the clinical features are not representative of a particular disease phenotype
- Limiting immunosuppression exposure, especially in situations where patients appear to be resistant to treatment
- Determining the risk of recurrent disease in kidney transplantation
- Allowing for risk assessment in living-related kidney donor candidate, or where there is a high suspicion for *APOL1* risk variants
- Aiding in prenatal diagnosis

Treatment of FSGS

Immunosuppression should not be used in adults with secondary FSGS

Recommendation 6.2.2.1: We recommend that high-dose oral glucocorticoids be used as the first-line immunosuppressive treatment for primary FSGS (1D)

For adults with steroid-resistant primary FSGS, we recommend that cyclosporine or tacrolimus be given for ≥6 months rather than continuing with glucocorticoid monotherapy or not treating

Treatment of FSGS

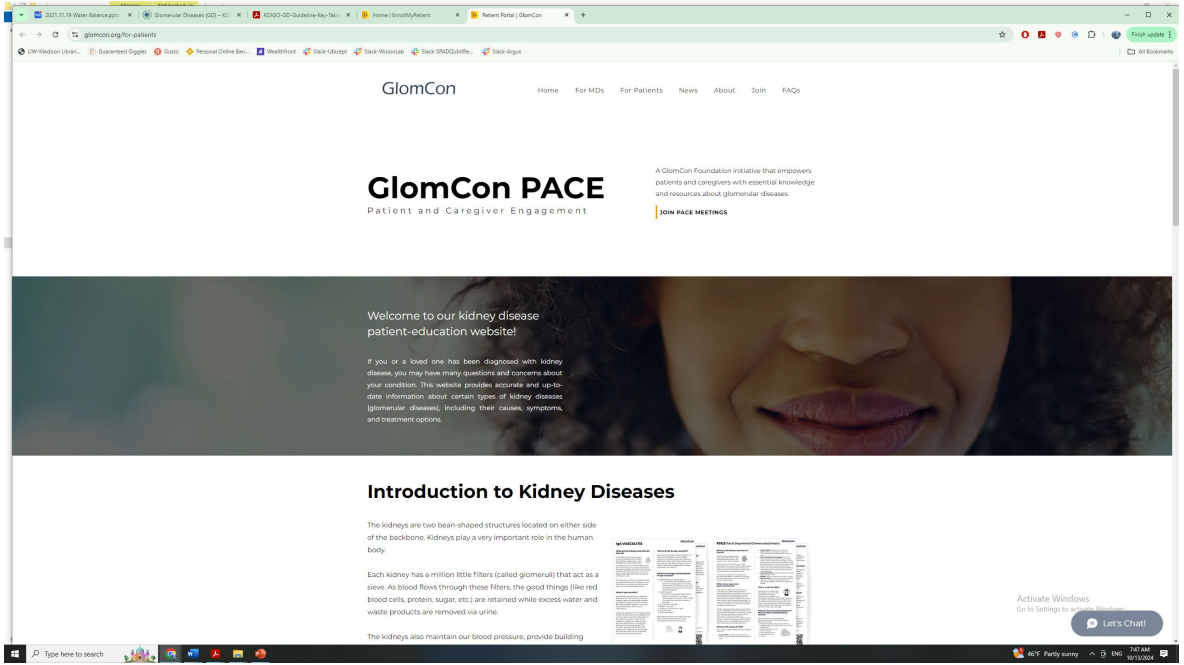
High dose prednisone

- Steroid responsive
- Steroid dependent
- Steroid resistant

Practice Point 6.3.5.1: Adults with previous steroid-sensitive primary FSGS who experience a relapse can be treated using the same approach as that for adults with relapsing MCD

- Tacrolimus/Cyclosporine

Practice Point 6.3.4.1: Adults who have steroid-resistant primary FSGS with resistance to or intolerance of CNIs should be referred to specialized centers for consideration of re biopsy, alternative treatment, or enrollment in a clinical trial.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Patient and Caregiver Engagement
A GlomCon Foundation initiative that empowers patients and caregivers with essential knowledge and resources about glomerular diseases.
JOIN PACE MEETINGS
Welcome to our kidney disease patient-education website!
If you or a loved one has been diagnosed with kidney disease, you may have many questions and concerns about your condition. This website provides accurate and up-to-date information about certain types of kidney diseases (glomerular diseases), including their causes, symptoms, and treatment options.
Introduction to Kidney Diseases
The kidneys are two bean-shaped structures located on either side of the backbone. Kidneys play a very important role in the human body.
Each kidney has a million little filters (called glomeruli) that act as a sieve. As blood flows through these filters, the good things (like red blood cells, protein, sugar, etc.) are retained while excess water and waste products are removed via urine.
The kidneys also maintain our blood pressure, provide building
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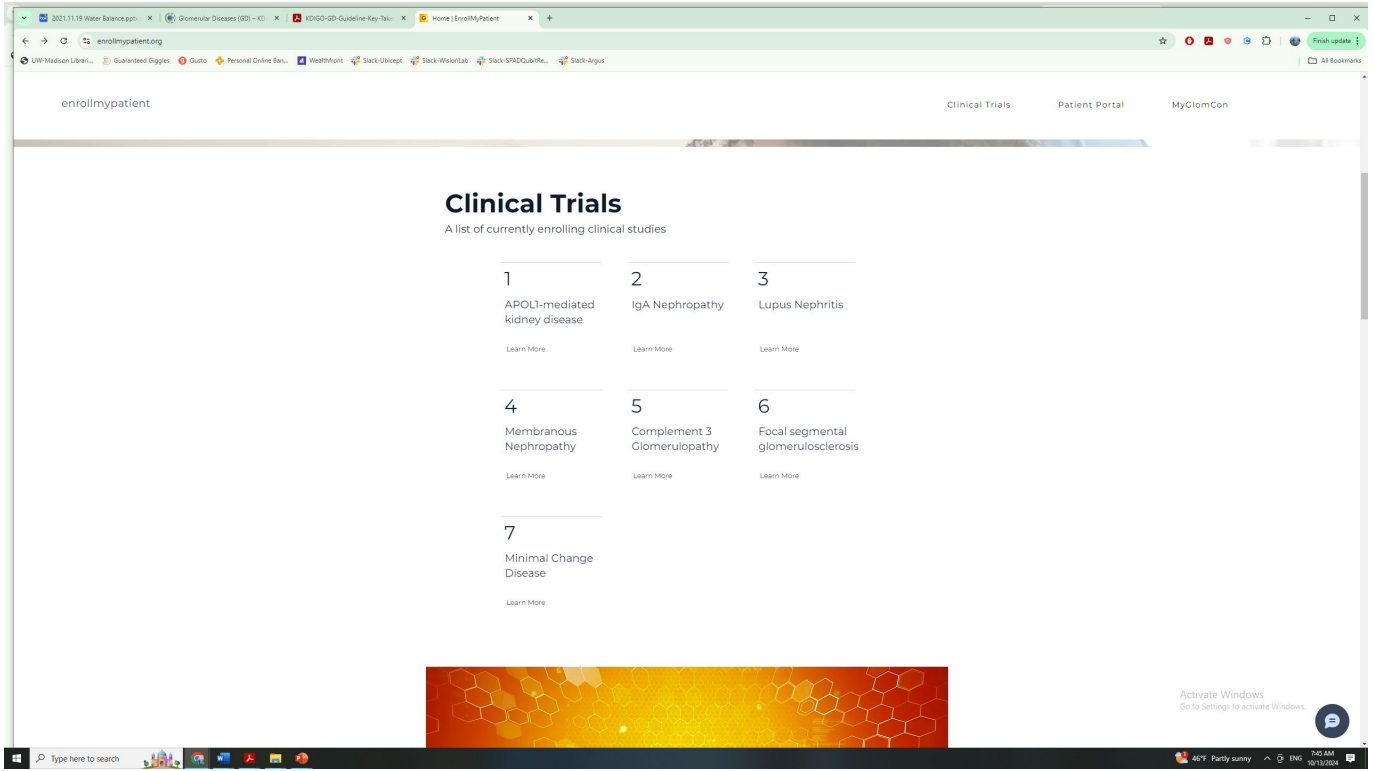
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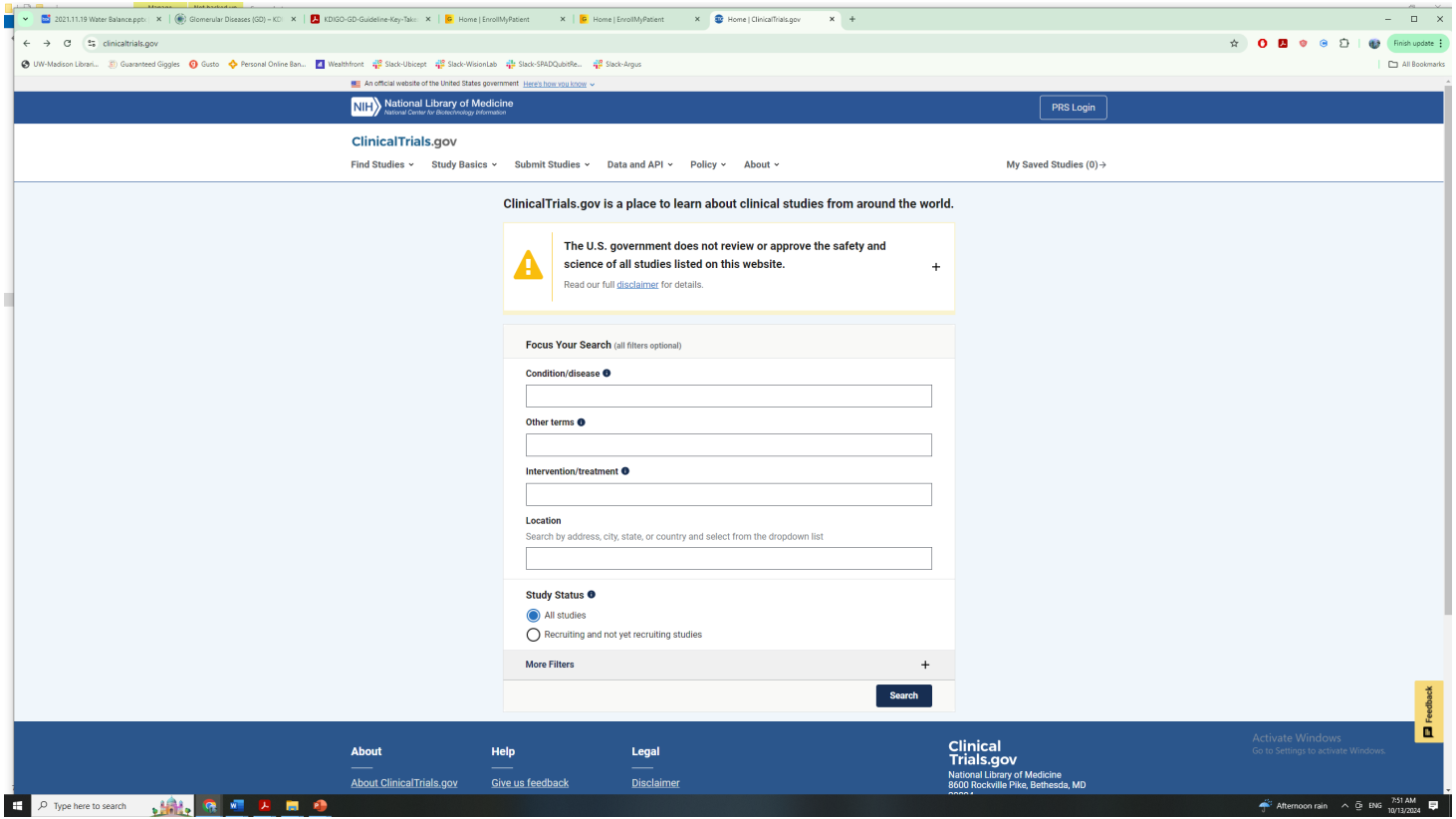
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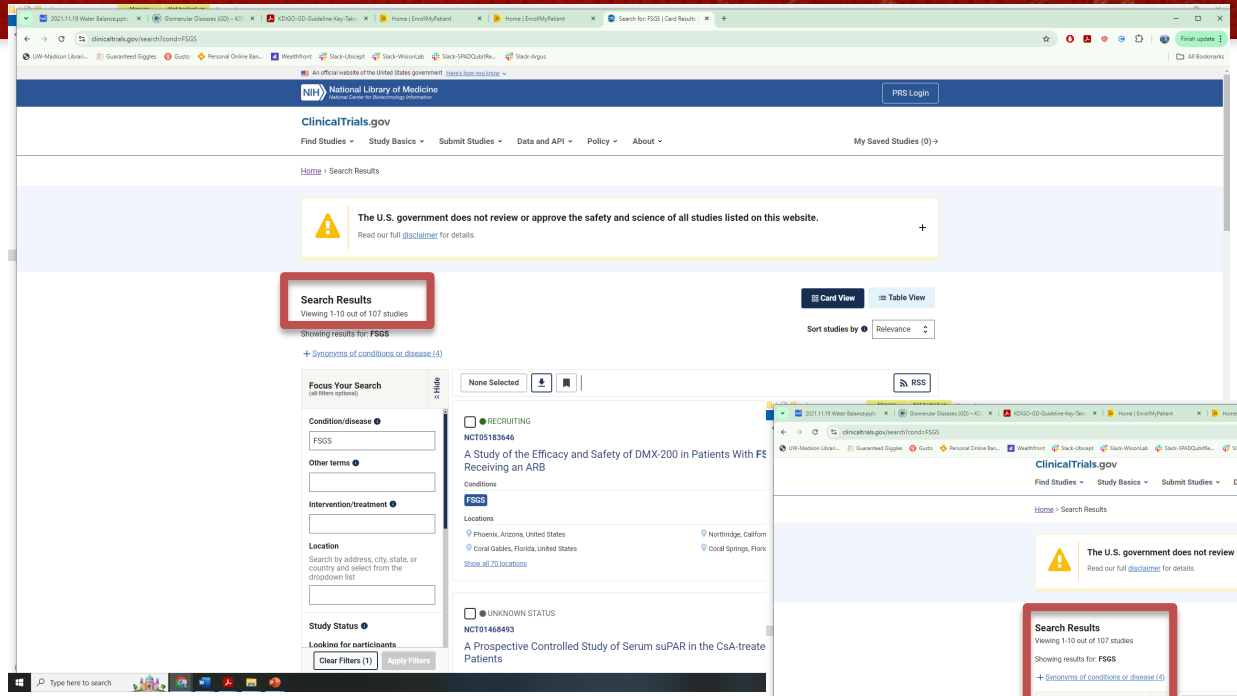
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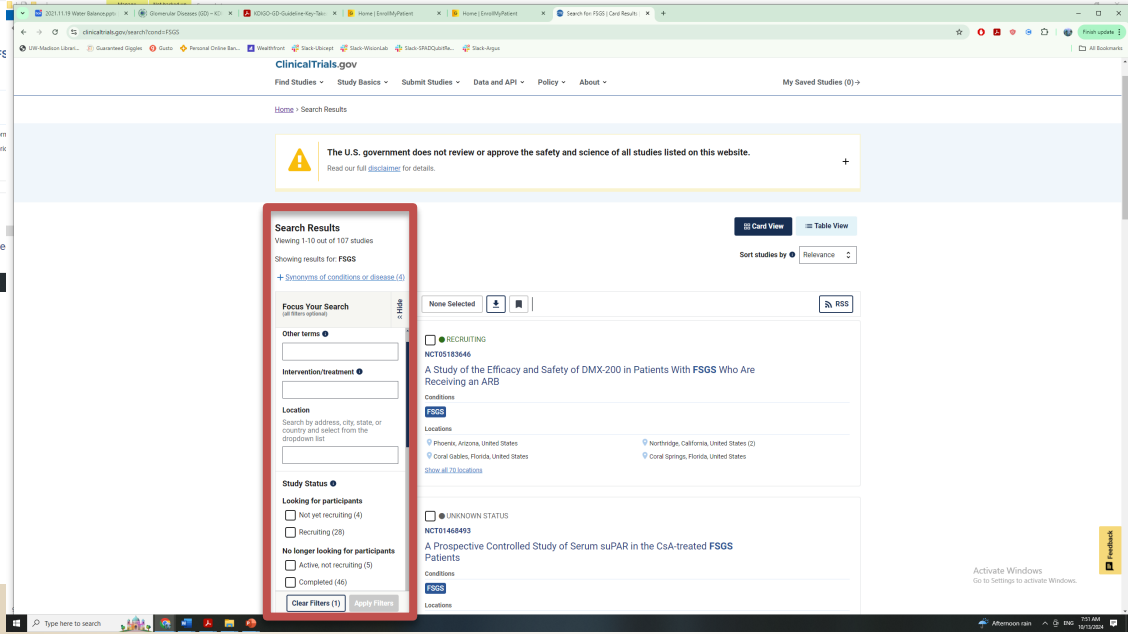
Patients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Take Home Points

Kidney biopsy is needed to diagnose Minimal Change Disease or FSGS

Steroids/Prednisone remain the main stay of treatment

Non-immunosuppressive treatment is very important as well

Thank you

Contact: tsingh@medicine.wisc.edu