Nephrotic Syndrome

Background

1. Definition
    - Characterized by massive proteinuria and lipiduria with varying degrees of edema, hypoalbuminemia, and hyperlipidemia

Pathophysiology

1. Pathology of disease
    - Increased permeability of glomerular membrane → leakage of large proteins in urine → hypoalbuminemia → edema (due to low plasma oncotic pressure)
2. Primary glomerular dz (90%)
    - Focal segmental glomerulosclerosis
        - 35% of primary cases
        - Most common in black pts
    - Membranous glomerular dz
        - 33% of primary primary cases
        - Most common in white pts
    - Minimal change glomerular dz
        - 15% of primary cases
    - Membranoproliferative glomerular dz (IgA nephropathy)
        - 14% pf primary cases
3. Secondary glomerular dz (10%)
    - Diabetic nephropathy
        - MC secondary cause
    - Amyloidosis
    - SLE
    - Myeloma
    - Drugs
        - Gold, NSAIDs, penicillamine
    - Infections
        - HIV, hepatitis, mycoplasma
4. Incidence
    - 3 per 100,000
5. Risk factors
    - Dependent on underlying dz
6. Morbidity, mortality
    - Variable
7. Complications
    - Renal failure
    - Hyperlipidemia
    - Hypercoagulable state (DVT)

Diagnosis

1. History
    - Focus on identifying a cause
    - Fatigue, shortness of breath

2. Physical exam
    - Edema
        - Dependent or generalized
    - JVP increased
    - Look for signs of DV
        - Calf tenderness, swelling
3. Labs
    - Complete blood count
    - Urinalysis
        - Proteinuria
        - Hematuria
        - Exclude UTI
    - Protein
        - Decreased
            - Total protein <6g/dL [60 g/L]
            - Albumin <3g/dL [30 g/L]
        - Quantification of proteinuria
            - Albumin to creatinine ratio
            - 24 hr urine for proteinuria
    - Comprehensive metabolic panel
        - Decreased serum albumin
        - Plasma glucose
        - Estimated GFR
        - Elevated BUN/Cr
    - Coagulation profile
    - Complement titers
        - Hepatitis panel
        - HIV
    - Look for systemic dz
        - ESR
        - C-reactive protein
        - Immunoglobulins
        - ANA
4. Dx imaging
    - Renal/abd ultrasound
        - Kidney size
        - Ascites
5. Other studies
    - Kidney biopsy
        - Look for underlying dz
    - Venous doppler
        - If DVT suspected

Differential Diagnosis

1. Congestive heart failure
2. Liver failure / cirrhosis
3. Protein losing enteropathies
4. Myxedema
5. Renal failure

Treatment

1. Best managed by or in consultation with a nephrologist
2. Underlying dz
    - Primary glomerular dz are best managed by or in consultation with a nephrologist
        - Pt may need steroids and/or immunosuppressants
    - Edema
        - Loop diuretics
        - Thiazide and spironolactone may need to be added
    - Proteinuria
        - ACEi + ARB
    - Hyperlipidemia
        - Statins
    - Hypercoagulability
        - Anticoagulation controversial in absence of DVT
3. Long-term care
    - Diet
        - Normal protein intake recommended
    - Renal failure
        - Best managed by or in consultation with nephrologist
    - Bone loss
        - Bone density testing and treatment of osteoporosis if needed

Follow-Up

1. Nephrology consult
2. In severe cases w/ hypotension, azotemia, nausea & vomiting, admit for stabilization

Prognosis

1. Variable, depends on underlying etiology

Prevention

1. If systemic dz process, controlling the dz may slow down nephrotic syndrome progression

Patient Education

1. http://www.patient.co.uk/showdoc/27000748/

References

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Evidence-Based Inquiry

1. What is the differential diagnosis of chronic leg edema in primary care?

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