

The NEPHROTIC SYNDROME

Leakage of 3 grams of protein per day.

Pathophysiology

You have a charge barrier and a size barrier. Normally nothing larger than 70kD and nothing polyanionic can get through. With GBM damage, both of these barriers can be disrupted.

SEQUELAE and STRATEGIES FOR THE MANAGEMENT THEREOF

Oedema: due to protein loss uncompensated by liver synthesis and tissue mobilisation of albumin

Sodium Retention: due to increased distal resorption; ? due to activated RAAS?

Must get rid of the extra sodium. Loop diuretics and salt restriction are the go.

Might even want to combine frusemide with a thiazide or a K-sparing diuretic.

NOTE: frusemide has a short half life. Use it 2-3 times a day in large doses.

BEWARE: abrupt natriuresis can cause a sudden hypovolemia and even ARF!

Plus by excreting so much water you will hyperconcentrate the blood, so give these diuretics in tandem with heparin and TED stockings.

Loop Diuretics

Thromboembolic Complications: especially renal vein thrombosis! This is due to a number of factors, only one of which is the increased excretion of anticoagulation proteins (eg. antithrombin III) into the urine. There is also unexplainable thrombocytosis (? Due to hyperconcentration of blood cells? Remember, all that water moving out into the interstitial spaces leaves behind the cells in the blood.);

Must prevent thromboembolism. Just give them heparin, evidence shows that the number of fatal emboli prevented is greater than the number of fatal bleeding events induced. Also consider aspirin (because much of the antithrombin III has been excreted and heparin has fewer targets to bind with).

Heparin

Aspirin

Infectious Complications: you are peeing out all of your immunoglobulins and complement cascade components. Especially dangerous in children.

Sadly, still no justification for prophylactic antibiotics, as you may end up simply selecting for resistant organisms. Use ad-hoc intravenous antibiotics.

Hyperlipidaemia: due to overproduction and under-catabolism of LDLs. Undercatabolism seems to result from urinary excretion of ..something. Something vital to lipid catabolism. Exactly what it is has not been determined yet. Nor do we know what causes the increased synthesis of blood lipids.

Manage this with a soy-based low fat diet and statins. ACE-inhibitors also help indirectly, by reducing protein excretion.

**Low-fat Diet
Statins
ACE-inhibitors**

ACE Inhibition: indicated even in normotensive patients. The BP-lowering effects take place within 24hrs, but the antinephrotic protein-saving effects take a month. The anti-nephrotic effect is totally unrelated to the blood-pressure effects, its a completely different poorly understood mechanism. It can be enhanced with a low-sodium diet and diuretics.

Common Causes

- **Diabetic Nephropathy**
- **Minimal Change Glomerulopathy (idiopathic)**
 - Loss of charge selectivity
- **Membranous glomerulonephritis (often linked to neoplasia)**
 - Carcinomas, lymphoma, leukaemia, myeloma, sarcoma...
 - Loss of size selectivity
- **Primary Renal Amyloidosis**
- **HIV**
- **Preeclampsia**