Outpatient Nephrology

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The 3 commonest patient groups seen in outpatient nephrology are Chronic Kidney Disease patients, Dialysis patients and Transplant patients. These patients are also likely to be the commonest renal patients you meet as trainees wherever you work. The aim of this session is to give you an overview of how to assess and manage these patients, in an outpatient setting.

CHRONIC KIDNEY DISEASE (CKD)

Common Issues:

1) Deteriorating Renal Function

Try to identify and correct any reversible causes such as:

- Hypovolaemia (eg due to vomiting, diarrhea, diuretic use, bleeding)
- Hypotension (eg due to myocardial dysfunction or pericardial disease)
- Infection
- Drugs (eg NSAIDs, ACE inhibitors, PPIs, Aminoglycoside antibiotics and radio-contrast material).
- Urinary Tract Obstruction (especially if history of prostate problems)

Hypovolaemia diagnosed by the history and physical examination – remember to check postural BP!

Drugs such as trimethoprim and cimetidine interfere with either creatinine secretion or the assay used to measure the serum creatinine, causing a falsely raised serum creatinine level. The lack of concurrent rise in the blood urea may help distinguish this from true renal failure.

2) Oedema / Volume Overload

Patients with mild to moderate CKD are less able to respond to rapid intake of sodium and are therefore more prone to fluid overload. Heart failure and low albumin can also contribute to oedema. Therefore a thorough history and examination is essential to rule out other such causes.

Management: Aim for sodium restriction <2 g/day and a loop diuretic
3) Hyperkalaemia

Common causes of hyperkalaemia in a CKD patient:

- Inability to excrete potassium (aggravated by high dietary potassium / oliguria)
- Drugs like ACEi / ARBs / Spironolactone
- Hyporeninaemic hypoaldosteronism with type 4 RTA – seen in the elderly and diabetics.

The dose of above drugs should be reduced with moderate hyperkalemia (serum potassium ≤6 mmol/L) and therapy discontinued if the serum potassium rises above 6 mmol/l.

Other management strategies include loop diuretics, a low potassium diet (eg, <40 mmol / day) and using a potassium binder like calcium resonium.

4) Metabolic acidosis

There is an increased tendency to retain hydrogen ions among patients with CKD, leading to metabolic acidosis. Metabolic acidosis contributes to complications like osteopenia, increased muscle protein catabolism, increased severity of acute intercurrent illnesses, impaired myocardial contractility and possibly progression of CKD.

Metabolic acidosis may be treated with oral sodium bicarbonate supplementation, which requires careful monitoring of volume status because of the sodium content.

Clinical assessment

A thorough history should include a family history. History of exposure to drugs, chemicals, toxins, solvents.

Should include blood pressure, fluid status assessment (JVP, peripheral, sacral oedema etc), cardiovascular status, signs of uraemia (pericardial rub, prurigo, flap etc).

Investigations:

1) Blood Tests:

- Anaemia – Exclude other causes of anaemia. Check iron, transferrin, ferritin, B12 and folate. If all normal and Hb<100 g/l, erythryopoitin should be considered (only approved by Consultants).
- Hyperphosphataemia : Treat with phosphate binders – calcium acetate, calcium carbonate, sevelamer or lanthanum
- Hypocalcaemia : treat with vitamin D analogues – alfacalcidol or calcitriol
• Low albumin: could reflect protein loss, eg. Nephrotic syndrome or poor nutritional status.

2) Urine dip.

If protein present, request urinary PCR.

3) Diagnostic work-up:

• Autoimmune profile: ANCA, A-GBMA (Anti Glomerular basement membrane antibody), ANA, complements
• Immunoglobulins
• Other specialist investigations as per senior advice

4) Imaging

• Abdominal Ultrasound - to rule out urinary tract obstruction; to estimate kidney sizes. It is diagnostic for polycystic disease.
• MR / CT renal angiography is undertaken in selected cases to look for renovascular disease.

**General Management** of the patient with chronic kidney disease (CKD) involves the following:

● Treatment of reversible causes of renal failure

● Preventing or slowing the progression of renal disease. This includes managing other causes which include systemic hypertension, hyperlipidemia, metabolic acidosis, and tubulointerstitial disease. It’s very important to attain the target blood pressure and in patients with proteinuric disease, to attain the proteinuria goal.

● Treatment of the complications of renal failure

● Adjusting drug doses when appropriate for the level of estimated glomerular filtration rate (eGFR)

● Identification and adequate preparation of the patient in whom renal replacement therapy will be required

**Hypertension in CKD patients**

Treating hypertension can both slow the progression of proteinuric CKD and reduce the rate of cardiovascular complications.
The desired degree of blood pressure control can usually be safely achieved with combined therapy, which usually begins with an ACE inhibitor or ARB in patients under the age of 60, particularly those with heavy proteinuria. The standard 2nd line drugs include beta blockers, calcium antagonists and alpha blockers. Very often 3-4 classes of drugs need to be combined in patients with CKD.

In the elderly >70 years of age, ACEi / ARBs should preferably avoided as first line, due to the high prevalence of ischaemic nephropathy in this cohort, where renal function deteriorates when exposed to this group of drugs. If they are used because of a compelling indication like nephrotic proteinuria or heart failure, extra care and caution needs to be taken in monitoring kidney function.

Increased intravascular volumes, even in the absence of overt oedema, contributes to hypertension in most forms of CKD. A common sense approach would be to attempt to attain “dry weight” first, by introducing (or increasing the dose of) diuretics. A loop diuretic is optimal. Thiazide diuretics produce an additive effect when administered with a loop diuretic for refractory oedema.

The optimal blood pressure in hypertensive patients with CKD is uncertain. In pre-dialysis patients the target BP is 120-140 / 70-90.

**DIALYSIS PATIENTS**

There are two forms of dialysis; peritoneal dialysis or haemodialysis. They are discussed in detail in separate talks. A good general approach with any dialysis patient would be to establish the following: volume status, blood pressure, target weight, dialysis adequacy, diet and nutritional status, clinical chemistry and haematology, any recent events like infections etc.

**PERITONEAL DIALYSIS (PD)**

When seen in clinic, check fluid status (JVP, peripheral oedema, any change in weight, general well being), blood pressure, ask about residual urine production, check biochemistry to see trend in renal Fn (check if bloods were pre or post dialysis), check compliance with dialysis, ask about any issues with PD dialysis.

A few key issues when dealing with PD patients:

1) Fluid overload: Assess fluid status. Remember cardiac failure and low albumin to be causes of oedema as well. Check compliance with PD dialysis.

2) Abdominal Pain: There are many causes of abdominal pain in these patients which include constipation, migration of PD catheter tip, adhesions, hernias and more serious complications.
like PD peritonitis and intestinal perforation. Peritonitis should be excluded by ensuring the fluid is clear.

Management:
- Prompt clinical examination to rule out other causes of abdominal pain
- Send a sample of the dialysis fluid to the lab for differential cell count and microscopy and culture.
- An AXR is handy to establish tip of the catheter, constipation and dilatation of bowel.
- If the fluid is cloudy, peritonitis is diagnosed and management consists of INTRA-PERITONEAL Vancomycin + Gentamicin (discuss with renal team first)

3) PD catheter not working: This is suspected when there is incomplete recovery of instilled dialysate. Common causes include constipation, catheter kinking or migration of the catheter tip, catheter occlusion secondary to thrombus or externally from omentum or adhesions.

Management:
- These patients are often accepted by renal team for further management. Management depending on the problem could include catheter change, catheter review through fluoroscopy or laproscopic exploration

HAEMODIALYSIS

This is usually done via an AV fistula or through lines (tunneled or temporary vascular catheters).

NOTE: Please do not use a patient’s tunneled line for any other purpose like blood sampling or administration of antibiotics.

Patients who have dialysis in dialysis centres usually have it three times a week (a small number of frail patients may manage on twice a week). Some patients are on home dialysis, which they undertake 5-6 times a week.

When seeing haemodialysis patients check fluid status, compliance with dialysis; any issues during dialysis. Your routine examination should include a feel of the fistula site to ensure you can feel a buzz/thrill. If tunneled line present, check under skin along path of tunnel line to rule out infections.

Some common issues one would come across in these patients are:
- Target weight: This is an estimate of the weight we aim for post dialysis. This is assessed using clinical examination assessing fluid status and blood pressure. Target weight is important because sometimes people put on flesh weight thus increasing their body weight, and if they were to be dialysed to a previous target weight, this leads to dehydration and hypotension –
the opposite means the patient who has lost flesh weight could end up oedematous and hypertensive. So a good assessment for target weight is important. Large swings in weight between dialyses could imply patients are not adhering to their fluid restriction.

-Line not working: Check with specialist. Might need urokinase to unblock clots or if fails, would need line change.

-AV fistula issues: No buzz or thrill in AV fistula is an emergency. An urgent call to the renal team should be made. Bleeds, infections, pseudoaneurysms are some potential complications.

- Infections: It’s important to think of line infections in people with lines for vascular access.

**TOP TIP:** Blood tests between haemodialysis sessions will show marked changes in renal function (check if bloods were done pre or post dialysis); there is no reason to be alarmed unless there is a concern clinically. If issues such as pulmonary oedema, hyperkalaemia (potassium > 6.5 mmol/l) or uraemic complications develop in between dialysis sessions then discuss with the renal team who will advice on whether these patients might need dialysis in the interim.

**TRANSPLANT PATIENTS**

There will be a separate talk on transplant patients. Here, we would like to mention a few key tips when seeing a transplant patient. A good functioning transplant kidney patient would have near normal renal function and good urine output. The important thing to note is that they would be on immunosuppression.

Assess: Fluid status, blood pressure, compliance with immunosuppression, recent infections, any change or addition/deletion to regular medications.

New medications are extremely important to consider as they may potentially interact adversely with immunosuppressants – examples include statins and certain antibiotics.

**TOP TIP:**

-During clinical examination: Always check for graft site tenderness – which might indicate rejection or acute infection.

-Abdominal Ultrasounds: When requesting ultrasounds, make sure you mention they have a transplant kidney and you would like renal vasculature dopplers as well.

The renal team will usually take over any patients with issues related to the transplant. But if you were to come across these patients, then remember:

1). Infections are quite common. They can become septic quickly. Thorough clinical examination, history and a septic screen must be requested. Start antibiotics in correct clinical context. Remember some antibiotics can interfere with immunosuppressant levels.
2) Immunosuppressants: If a patient says he has missed one or more immunosuppressant doses or has taken more, please liaise with the on call renal registrar or consultant for advice.

**TOP TIP:** In case of sepsis or if you suspect possible side effects of immunosuppressants PLEASE DON’T CHANGE OR ADVICE ON IMMUNOSUPPRESSION WITHOUT DISCUSSING WITH A SPECIALIST FIRST. Avoid drugs (like macrolides) which will interact with immunosuppressants.

3) Worsening Renal Function: It’s best to discuss with the Renal team immediately as every measure should be taken to salvage the transplanted kidney. As with normal kidneys worsening renal function can occur in state of hypovolaemia, hypotension or sepsis. Rejection and drug-toxicity are other major causes to be considered.