School of Medicine

Nephrology clinical undergraduate training

All care is taken to ensure that the information in this handbook is correct at the time of going to print.

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Introduction – 3rd Medical Year

In addition to developing your generic clinical skills by seeing patients with kidney disease, our aim is that you consolidate the following skills in a stimulating, interactive and responsive environment:

1. Taking a structured renal history and performing a physical examination
2. Surface anatomy of the abdomen
3. Construction of a synopsis or problem list based on the clinical assessment of a patient
4. The relevance of cardiovascular physiology, including:
   a. Pulse and blood pressure as a guide to fluid status
   b. Abnormalities in pulse and blood pressure as indicators of severity of illness
   c. The JVP as a measure of right heart pressure
5. An understanding of renal physiology, including:
   a. Renal blood flow
   b. Glomerular filtration and its measurement
   c. Tubular function
6. A basic understanding of the following renal conditions:
   a. Acute kidney injury
   b. Chronic kidney disease
   c. Glomerulonephritis
7. Normal regulation of body water and sodium by the RAAS and ADH - how abnormalities of RAAS and ADH arise and then give rise to changes in water and sodium homeostasis
8. Immunology:
   a. The normal immune system
   b. Autoantibodies: what are they and how they might cause damage?
   c. ELISA
   d. Drugs which alter the immune response in transplantation and auto-immunity
9. Basic pharmacology

Teaching structure: 3rd Medical year clinical medicine attachments

Early clinical training is delivered by means of the clinical skills lab and rotations through various medical and surgical specialties for a period of 4 weeks each. In general, 2-3 students will be attached to the Nephrology service at any one time. Your immediate point of contact and mentor during the attachment will be the consult registrar, who manages the inpatient consult service with a senior house officer. This ensures that your primary exposure is to new inpatient and emergency department referrals with kidney disease. One of the nephrology consultants (Dr Peter Lavin, Dr Catherine Wall, Prof George Mellotte and Prof Mark Little) will be running the on call service and they will have overall responsibility for your teaching during the attachment. You will be expected to present one such case each week at the Monday morning acid base / electrolyte / kidney disease teaching rounds (see below). In addition, you will have the opportunity to attend a range of nephrology outpatient clinics and the haemodialysis unit.
Acid base / electrolyte / kidney disease teaching rounds

Location
Tutorial Room, Osborne Ward at 11.30 am for 1 hour

Attendees
All 3rd meds attached to renal, any 5th med attached to renal, interns and SHOs of renal firm

SpR Coordinator
Consult registrar

Consultant Coordinator
Rotates, often the consultant on call

2 cases to be prepared weekly, 1 covering an acid base or electrolyte disorder referred to the renal team (consult service or inpatient service) and 1 dealing with a kidney disorder (acute kidney injury / glomerular disease / etc). Cases are to be chosen in discussion with the consult registrar / renal registrar on Osborne Ward no later than the previous Friday afternoon. On the first Monday of the attachment, cases will need to be prepared on Monday morning.

The presentation should include a relevant brief history and results of preliminary investigations. The case should be presented as a diagnostic challenge with information withheld to allow for discussion around potential diagnosis / differentials / further diagnostics and interpretation of same. You will need an up to date medication list for the patient including drugs taken prior to admission / OTCs and drugs discontinued. This list should not be presented until the facilitator questions you regarding drug therapy. One person should present each case and the consultant will review the data and bring the group through the diagnostic process by asking for their input as well as requesting results of further investigations / medications etc. It is therefore essential that not all results are presented at the outset, rather a summary of the problem.

It is not necessary to present these cases electronically – but a typed synopsis of the case to be discussed will be useful for the group. The consultant will use the white board / flip chart to annotate.

Case example 1
You are asked to see a 51 year old man with a serum potassium of 6.7mmol/l and sodium of 129mmol/l. He has newly diagnosed inoperable pancreatic neuroendocrine tumour. His creatinine has risen from 60 to 160 over the last 10 days. Can you please see and advise on the likely cause of the above as well as recommend appropriate treatment.

Case example 2
You are consulted on a 72 year old woman with worsening leg swelling for the last 3 weeks. The initial working diagnosis was of CCF but her ECHO is normal and BNP is <500. She has a creatinine of 110umol/l and urine dip reveals 2+ protein. She is anaemic with a Hb of 9.7g/dl. Can you please see and advise

Contact details
Consult registrar pager
Introduction – 5th Medical Year

Lists of your learning objectives and suggested background reading are included in this book, but we hope that we might stimulate you to explore the subjects further. Inevitably the nature of clinical teaching will mean that some areas may not be covered; please read as widely as you can to complement the course work. We will cover most of the curriculum but additional reading around the subjects covered is expected.

Before starting you should ensure that you have revised/reviewed the following basic knowledge and skills. This minimum level of understanding and competence will be assumed.

1. Taking a structured renal history and performing a physical examination
2. Surface anatomy of the abdomen
3. Construction of a synopsis or problem list based on the clinical assessment of a patient
4. The relevance of cardiovascular physiology, including:
   a. Pulse and blood pressure as a guide to fluid status
   b. Abnormalities in pulse and blood pressure as indicators of severity of illness
   c. The JVP as a measure of right heart pressure
5. An understanding of renal physiology, including:
   a. Renal blood flow
   b. Glomerular filtration and its measurement
   c. Tubular function
6. A basic understanding of the following renal conditions:
   a. Acute renal failure
   b. Chronic renal failure
   c. Nephrotic syndrome
   d. Nephritic syndrome
7. Normal regulation of body water and sodium by the RAAS and ADH - how abnormalities of RAAS and ADH arise and then give rise to changes in water and sodium homeostasis
8. Immunology:
   a. The normal immune system
   b. Autoantibodies: what are they and how they might cause damage?
   c. ELISA
   d. Drugs which alter the immune response in transplantation and auto-immunity
9. Basic pharmacology

Teaching structure: 5th Medical year

The final medical year Nephrology teaching is delivered in Tallaght hospital by Prof George Mellotte, Dr Catherine Wall, Dr Peter Lavin and Prof Mark Little, as well as by senior members of the NCHD team and nursing staff.

Michaelmas Term

Four full class lectures covering the following topics:

Acute Kidney Injury
Clinical specialty rotations

You will shadow the consult registrar and will be expected to see and assess new nephrology consults on the wards or emergency department. There may also be one or more third medical year student attached to the firm. Your primary supervising consultant will be the on call consultant, which rotates every two weeks. The cornerstone of the teaching week is the Monday morning teaching rounds described below.

Acid base / electrolyte / kidney disease teaching rounds

Location  Tutorial Room, Osborne Ward at 11.30 am for 1 hour

Attendees  All 3rd meds attached to renal, any 5th med attached to renal, interns and SHOs of renal firm

SpR Coordinator  Consult registrar

Consultant Coordinator  Rotates, often the consultant on call

2 cases to be prepared weekly, 1 covering an acid base or electrolyte disorder referred to the renal team (consult service or inpatient service) and 1 dealing with a kidney disorder (acute kidney injury / glomerular disease / etc). Cases are to be chosen in discussion with the consult registrar / renal registrar on Osborne Ward no later than the previous Friday afternoon. On the first Monday of the attachment, cases will need to be prepared on Monday morning.

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It is not necessary to present these cases electronically – but a typed synopsis of the case to be discussed will be useful for the group. The consultant will use the white board / flip chart to annotate.

Case example 1
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Case example 2
You are consulted on a 72 year old woman with worsening leg swelling for the last 3 weeks. The initial working diagnosis was of CCF but her ECHO is normal and BNP is <500. She has a creatinine of 150.
110umol/l and urine dip reveals 2+ protein. She is anaemic with a Hb of 9.7g/dl. Can you please see and advise

Hilary Term

Nephrology CPC
Usually in February or March, this is a full day interactive session where a detailed discussion of one or more cases is linked to didactic teaching on this topic. It is held in Tallaght and St James’s Hospital on alternate years.

Clinical teaching, Tallaght Hospital.
There is a mix of larger group tutorials (involving 1/4 of the class) and small group bed-side tutorials (8-12 students).

On Thursdays at 11am Prof Mellotte and Dr Lavin lead sessions in the Trinity Centre covering the theoretical aspects of clinical Nephrology. The group in Tallaght is split into two for these, with half attending sessions with Prof Mellotte and half with Dr Lavin, each for a period of 6 weeks. Therefore, every student should receive 6 of these sessions. They will cover the following topics:

- Acute Kidney Injury: pathophysiology, clinical assessment, differential diagnosis, investigations and initial management (including indications for urgent dialysis)
- Chronic renal failure: pathophysiology, importance of blood pressure and proteinuria, strategies to slow progression and management of metabolic complications arising, renal bone disease, renal anemia
- Electrolyte disturbances: disorders of sodium and potassium balance, emergency management of severe hyperkalemia, acid/base disturbances
- Dialysis: principles of haemodialysis and peritoneal dialysis, preparing the patient for dialysis including creation of access, acute and chronic complications of dialysis, management of the dialysis patient presenting with another medical condition
- Transplantation: principles and complications of immunosuppression, causes and management of acute graft dysfunction
- Specific renal conditions: rapidly progressive glomerulonephritis, genetic renal disease, diabetic nephropathy, dysproteinemias and the kidney, reflux nephropathy, ischemic nephropathy

These semi-didactic sessions will be consolidated with small group tutorials delivered by Dr Wall (Monday 2pm, Osborne ward) and Prof Little (Friday 2pm, Haemodialysis unit). Each small group of 8-12 students should receive one tutorial from both Dr Wall and Prof Little. These tutorials will focus on clinical examination of the patient with renal disease, with emphasis on dialysis, transplant kidney palpation and volume status assessment.

Learning Outcomes

| 1. Elicit details of the following when taking a history of renal disease: | a. alterations in pattern of micturition; frequency, nocturia, dysuria | b. uremic symptoms; including anorexia, lethargy, pruritus |

Nephrology
### 1. Past Medical History
- c. past medical history; hypertension, diabetes, peripheral vascular disease, urinary tract infection, malignancy
- d. evidence of systemic disease; rash, joint pains, nose bleeds, infection
- e. family history
- f. drug history

### 2. Examine the Patient to Identify and Describe the Following:
- a. blood pressure
- b. hydration / fluid overload
- c. renal enlargement
- d. shunts, fistulae for venous access
- e. transplanted kidneys

### 3. Demonstrate an Understanding of the Rationale and Procedure for Undertaking the Following Renal Investigations and an Ability to Interpret the Results:
- a. Urea and electrolytes
- b. serum creatinine and estimated glomerular filtration rate
- c. ultrasound of the renal tract
- d. MRI of the renal tract
- e. renal biopsy

### 4. Demonstrate an Understanding of the Following Renal Problems:
- a. acute and chronic renal failure
- b. transplantation
- c. systemic disease and the kidney
- d. nephrotic syndrome
- e. diabetic nephropathy
- f. link between renal and cardiovascular disease

### 5. Demonstrate an Understanding of the Importance of the Following Measures in Preventing Renal Disease:
- a. control of blood pressure
- b. reduction in proteinuria

### 6. Demonstrate an Understanding of the Effects and Side Effects of the Following Therapeutic Options in Relation to Renal Disease:
- a. dialysis
- b. immunosuppression

### 7. Ten Clinical Pearls You Should Endeavour to Observe When Attached the Nephrology Service
- 1. Feel and auscultate an arteriovenous fistula
- 2. Observe use of a tunneled haemodialysis catheter
- 3. Palpate a transplant kidney
- 4. Assess the volume status of at least 5 patients
- 5. Perform a urinalysis
- 6. Witness a patient being attached to a haemodialysis machine
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<td>7</td>
<td>Witness a peritoneal dialysis exchange</td>
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<td>8</td>
<td>Assess and present a patient presenting with acute kidney injury</td>
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<td>9</td>
<td>Meet with the anaemia nurse to get an introduction to erythropoietin prescribing</td>
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<td>10</td>
<td>Present a case at Monday morning teaching rounds</td>
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Reading List and Websites

Comprehensive Clinical Nephrology, 2nd edition. ISBN 0723432589 · Mosby · Published July 2003

http://www.renal.org/
http://www.kdigo.org/