MET3B HANDBOOK
Renal, Endocrine and Infection

MODULE LEAD:
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Year 3
2011/12

Hanbury Dialysis Unit c. 1967

The London Hospital recieved its first artificial kidney in 1959 and renal transplants were performed at the hospital from 1968, at the same time as Hanbury Ward developed as a dialysis centre.

The information in this handbook was correct as of July 2011. In the unlikely event of substantial amendments being made to the material, the SMD will attempt to inform students of the changes which will also be posted on CE6. It is therefore advisable for students to check CE6 on a regular basis.

The College cannot accept responsibility for the accuracy or reliability of information given in third party publications or websites referred to in this Handbook.

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INTRODUCTION

Welcome to the MET3B module. This handbook should be used in conjunction with the MET3B Log Book and the Clinical Methods hand book which, together, describe details of the generic and module specific objectives to be achieved by Year 3 students.

Every student in Year 3 is expected to complete the MET3B module. In addition, we strongly suggest you refer back to your MET1 and MET2 notes thereby ensuring a good basic science foundation to your clinical knowledge

MET3B consists of an introductory week of module specific lectures and a further nine weeks of clinical attachments. Some of the curriculum will be delivered in the form of lectures, problem based learning (PBL), case based learning (CBL) and tutorials. Sessions in General Practice will offer further opportunities to meet patients in their home surroundings.

You will also be required to cover the MET3B learning objectives by private study and spending time on the wards talking to patients and medical staff. You should record the activities in the MET3B **log book** at regular interval

In the modern NHS it is important for medical students to adapt to make the most of any learning experiences available. Absence of formal teaching does not mean there are no learning opportunities. The successful student spends as much time on the ward as possible getting involved with all the activities of the team, examining and talking to patients and helping the junior staff; thinking of themselves as both an apprentice and a student.

We very much hope you enjoy you times with us.

Dr Raj Thuraisingham
Honorary Clinical Senior Lecturer and Consultant Nephrologist

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Clinical Senior Lecturer and Consultant Gastroenterologist
Head of Year 3

THE INTRODUCTORY WEEK AND CLINICAL PLACEMENTS

The introductory week has been designed with two key aims:

1. To ensure that when you start on your MET3B firm you have a basic understanding of the medical conditions you are likely to see on the firm.

2. To cover some of the key learning outcomes of the curriculum

Consultants on your firms will expect you arrive on the wards with a basic understanding of these topics and hence lack of knowledge is likely to be reflected in poor firm grades.

Attendance for the whole week is compulsory and will be monitored. In addition you will be tested on these subjects in your end of firm and Part 3 exams.

Rotation 1

Introductory Week	26th September – 30th September 2011
Placement	3rd October – 9th December 2011
	(Note: the PH week takes place during this placement)

Rotation 2

Introductory Week	9th January – 13th January 2012
Placement	16th January – 16th March 2012
	(Note: the PH week takes place during this placement)

Rotation 3

Introductory Week	26th March – 30th March 2012
Placement	16th April – 22nd June 2012
	(Note: the CCS2 week takes place during this placement)

MET3B: THE INTRODUCTORY WEEK LECTURES

The following subjects will be covered during the Introductory Week.

For full details please see the MET3B Introductory Week Timetable on CE6.

All sessions will take place at the Royal London Hospital and attendance is compulsory

Renal Lectures:

Nephrotic Syndrome and Glomerulonephritis

Causes and Complications of Chronic Renal Failure

Renal Replacement Therapies - including transplantation

Malignancies of the Renal Tract

Renal Stone Disease

Pre Renal/Renal/ Post Renal Acute Renal Failure – clinical features (I*nteractive Session)*

Bladder Dysfunction and Urinary Tract Infection

Organ donation

Endocrine Lectures:

Insulins and Hypoglycaemic Agents

Overview of Diabetes and Insulin Resistance

Complications of Diabetes

Diabetic Emergencies

Diabetes Insipidus and Hyponatraemia

Thyroid dysfunction

Pituitary Hypothalamic Axis

Adrenal Disease – Cushings and Addisons

Endocrine Hypertension

Breast disease

MET3B SPECIFIC LEARNING OBJECTIVES – An Overview

In addition to the learning objectives given in the main Year 3 Handbook, students are expected to achieve the following objectives whilst attending their MET3B placement;

The development of core clinical and communication skills as per the Clinical and Communication skills hand book

Core knowledge/skills in the metabolism system

Competency in relevant practical skills

Satisfactory completion of MET3B PBL/CBL sessions

Attendance at all MET3B lectures and teaching sessions during the introductory week

Attendance at all GP sessions

Satisfactory completion of the Year 3 SSC

Attendance at the half day hospice visit is compulsory.

NOTE: You should be aware that the majority of your knowledge should be gained from spending time on the wards; the set teaching is there to supplement this. Be aware that patients and their diseases do not behave as the textbooks imply - in neatly defined categories. Instead they may have many features and presentations that cross systems.

MET3B SPECIFIC CLINICAL SKILLS:

Please read the following in conjunction with the Clinical Methods Hand Book

EXAMINATION OF THE RENAL PATIENT

General Clinical Observations - Head to Foot

By the end of Year 3 a student should be able to stand at the foot of the bed and begin to identify common signs of renal disease including:

* Signs of hypo-albuminaemia
* Signs of uraemia
* Fluid overload
* Nephrotic / nephritic syndrome
* Signs of renal replacement
* Important observations – BP, HR, Temperature, Weight
* Urinalysis

General Clinical Observations – Hands and Upper Limbs

By the end of Year 3 a student should be able to:

Inspect the hands of a patient and acknowledge the presence or absence of common pathologies associated with renal disease including:

Vasculitic changes
Hypoalbuminaemia.
Anaemia

Inspect the upper limbs of a patient with renal disease and acknowledge the presence or absence of common clinical signs - including those of renal replacement.

Assessment of the Face, Neck and Chest

By the end of Year 3 a student should be able to:

* examine the face of a patient with renal disease and acknowledge the presence or absence of common clinical signs.
* look for, and acknowledges the presence, of new / old venous access around the neck and clavicular areas

General Examination of the Abdomen

By the end of Year 3 a student should be able to:

* correctly position and expose a patient to examine their abdomen.

* take into account the patient's underlying illness and degree of wellbeing or distress.
* make a systematic examination of the abdomen using appropriate technique
* be able to define a mass within the abdomen.

Examination for Hepatomegaly and Splenomegaly

(*See Clinical Methods handbook Abdominal Examination for full outcomes*)

By the end of Year 3 a student should be able to examine a well patient for the presence of hepatosplenomegaly

Examination for Enlarged and Transplanted Kidneys

(*See Clinical Methods handbook Abdominal Examination for full outcomes*)

By the end of Year 3 a student should be able to:

* examine a well patient for the presence of enlarged kidneys by balloting
* examine a well renal patient for the presence of a pelvic (transplanted) kidney

Examination for Ascites

By the end of Year 3 a student should be able to demonstrate the presence of ascites on a patient using an appropriate technique.

Examination for Vascular Abnormalities

On a well patient, by the end of Year 3 a student should be able to:

* demonstrate how to examine for arterial bruits and thrills.
* be able to examine and define an abdominal aortic aneurysm.

Examination of the Male External Genitalia

On a manikin in the Skills Centre, by the end of Year 3, a student should be able to:

* competently demonstrate how to examine the male genitalia.
* demonstrate professionalism including:
    - Requesting the presence of a chaperone
    - Maintaining patient dignity and privacy
    - Maintaining patient safety
* Hygiene – including hand washing

Completion of the Renal Examination

By the end of Year 3 a student should be able to:

* Competently complete the abdominal assessment of a renal patient, including assessment of:
    - PR / DRE examination

- The external genitalia (see intimate examination)
- Urinalysis
- Routine and specific observations e.g. BP, Pulse, temperature, O_2 sats, weight and fluid balance assessment

* Demonstrates their ability to act in a professional manner

EXAMINATION OF THE BREAST

Patients are usually nervous during this examination. Partly because it is socially uncomfortable; and partly because of fear of what the doctor might find. They therefore need special care with regard to their dignity and reassurance and explanation of findings.

1. Explain to the patient the need for the examination if you have not already done so.
2. Get verbal consent from the patient preferably in the presence of a chaperone (for male doctors).
3. Introduce and obtain consent for any others who may be present (medical students, clinical assistants etc)
4. Ensure privacy and freedom from interruptions as far as possible.
5. Allow the patient to undress to the waist in privacy and instruct her how to cover herself.

Observation:

Position yourself in front of the patient and observe the breasts with the patient's arms by her sides and also with them elevated above her head and pressed against her hips. Look for:

* Symmetry
* Contour
* Colour and texture of overlying skin

<u>Observe the nipples for:</u>

* Symmetry of position
* Inversion of nipple
* Discharge
* Colour difference between sides
* Obvious abnormalities (ulceration etc)

Talking to the patient while you examine her will allow her to understand what you are doing, will distract her and help her to relax.

Observation is of considerably less importance than palpation. It is likely to reveal <5% of lesions not also obvious by palpation.

Palpation:

Position: an effective technique depends on compressing the breast against the chest wall. The patient should be lying flat. The lateral part of the breast she should turn slightly on the contralateral hip and raise the ipsilateral arm to her forehead (Fig 1). To flatten the medial part of the breast she should lie flat on her back and raise her ipsilateral arm to her shoulder (Fig 2).

Breast boundaries: imagine this as a rectangular rather than a circular area. It stretches from the midline to the mid-axillary line and from the clavicle to the bra line inferiorly.

Examination pattern: start in the axilla and move down the mid-axillary line to the bra line (Fig 1). Move the fingers medially then continue palpating in a line up towards the clavicle. Continue up and down in a 'lawnmower pattern'. The rows should be overlapping. (This method is more thorough than a concentric or radial spoke pattern coming out from the nipple). The nipple is examined in the same way as the rest of the breast.

Fingers: use the pads of 3 fingers to make small rotary movements. Use light pressure, then moderate then firmer pressure to feel all the layers of the breast.

Duration: take at least 3 min to examine each breast of 'B' cup size, longer with larger sizes. Describe any lumps you feel in the following terms:

Number
Location, using quadrant or clock-face reference system
Size in cm
Shape
Consistency
Well circumscribed or not
Tenderness
Mobility
Attachment to skin or underlying muscle (see if mobility is reduced when patient presses hands on hips)

Examination of the Axillary Lymph Nodes
The axillary lymph nodes must be examined if breast pathology is suspected.

Ask the patient to relax their arm.

Support it gently at the elbow with one hand.

Use the other hand to feel for the central nodes against the chest wall at the apex of the axilla. If they are larger than 1cm they may be pathological and should be described in the same way as a breast lump.

If the central nodes are involved feel for the pectoral and subscapular nodes behind the pectoral and posterior axillary folds respectively. Also for the lateral nodes against the humerus.

Fig: 1

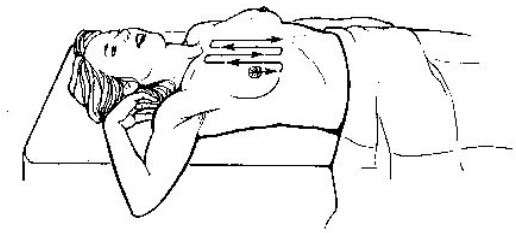
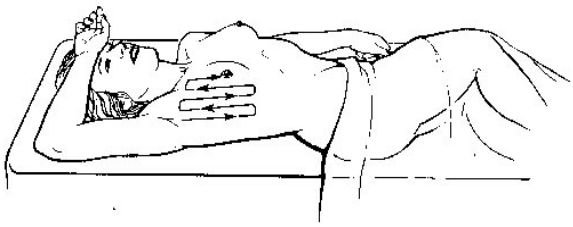


Fig: 2



Test Interpretation

Although malignant lumps are usually describes as hard, fixed and irregular and benign lumps as moveable, cystic, regular and soft, these features *cannot be relied upon*.

ALL breast lumps found on examination should be investigated further. Expression of fluid in women complaining of nipple discharge is not a useful diagnostic sign of cancer.

EXAMINATION OF A LUMP

Preparation

* Ask the patient to indicate the position of the lump(s) and any previous lumps
* Explain the procedure to the patient
* Ensure that exposure is adequate, including lymphatic drainage.
* Ensure patients dignity is maintained throughout
* Ask the patient if there is any tenderness
* Ask about any recent change in the lump

Procedure

This is divided into **1-Look**, **2-Feel**, **3-Move** (plane of attachment), **4-Specific tests**, and **5-Regional Lymph nodes**

LOOK (OBSERVATION)

* Location/position,
* Contour (regular or irregular),
* Pulsation (aneurism or high blood flow),
* Colour of skin (red, pigmented, etc)
* Abnormalities in skin (peau d'orange)
* Abnormal vessels

FEEL (PALPATION)

Note that the order of these is arbitrary, they have been listed alphabetically.

* Cough impulse
* Consistency (Soft, firm, hard, rubbery; uniform, varied, lobulated)
* Emptying
* Fluctuation
* Position (measured from a landmark)
* Surface (smooth, rough, irregular)
* Shape
* Size (tape measure)
* Tenderness
* Temperature
* Thrill or pulsation

MOVE (PLANE OF ATTACHMENT)

* Skin Tethering (attempt to pick up a fold of skin over the swelling and compare with other side)
* Deeper structures (attempt to move the swelling in different planes relative to surrounding tissues)
* Muscles and tendons (palpate the swelling whilst asking the patient to use the relevant muscle)

SPECIFIC TESTS

* Transillumination (if you suspect the mass is filled with clear fluid, eg a hydrocoele)
* Auscultation (for bruits or bowel sounds)

REGIONAL LYMPH NODES

You must be aware of the main routes of lymphatic drainage and the relevant regional lymph nodes. There are specific ways of examining different groups of lymph nodes, these are covered well in Macleods Clinical Examination

MET3B SPECIFIC INVESTIGATIONS

The following are some of the commonly used investigations which students should become familiar with:

* Thyroid function tests
* Auto-antibody screen
* Endocrine investigations including dynamic tests e.g: Synathen tests
* Plasma glucose
* Glycated haemoglobin

Chest X-Ray - become familiar with the changes associated with the following pathologies: LVF, lung tumours, pneumonias, retrosternal thyroid extension.

Be aware of the purpose of a Chest X-Ray in relation to pre-operative anaesthetic assessment and the acutely ill surgical patient both pre- and post-operatively.

Plain Abdominal X-Ray - develop an understanding of the findings seen in renal calculi

CT/MR Scanning – of the abdomen for renal and endocrine abnormalities and also of the brain for pituitary pathology

ECG - understand the basic principles and recognise the patterns seen in a normal ECG and with left ventricular hypertrophy and hyperkalaemia.

Understand the importance of the histopathology of common diseases relating to the Renal and Metabolic systems e.g. renal malignancies, thyroid tumours etc

Students should be familiar with the diagnostic value of the following investigations:

* Intravenous urography (IVU)
* Ultrasound, CT and MRI scanning
* Renal Angiography and whole body catheter venous sampling

EXAMPLE: HAEMATURIA

The presenting symptoms of haematuria are worked through as an example of depth of learning.

Objective: to be able to distinguish the following causes of haematuria:

* Renal calculi
* Renal parenchymal tumours
* Arteriovenous malformations
* Transitional cell carcinoma
* Prostatic malignancy
* Glomerulonephritis

To do this you must be able to:

Take an efficient history from the patient with haematuria

Elicit the relevant physical signs using basic physical examination techniques. Also, be able to recognise signs of generalised malignancy, systemic vasculitis.

Perform and interpret the following tests:

* Urinalysis
* Urine microscopy and cytology
* blood chemistry and immunology

Know how to use the following tests to discriminate between alternative causes of haematuria:

* Ultrasound
* renal biopsy
* CT

Management:

Of renal tract malignancies, renal calculi and common glomerulonephritis

Of the consequences of untreated calculi, malignancy and glomerulonephritis

You must understand and be able to manage the following problems in the same way:

* Peripheral oedema
* Pyrexia of unknown origin
* Abdominal swelling
* Swollen legs
* Difficulty in micturition and retention

EXAMPLE: ACUTE URINARY RETENTION

Objective: To understand the presentation and management of acute urinary retention

Associated Problems (Differential Diagnosis)

* Benign prostatic hypertrophy
* Adenocarcinoma of the prostate
* Transitional cell carcinoma of the bladder
* Urethral stricture
* Urethral calculi

The Disease

With respect to acute urinary retention, the student will be able to:

* Describe the pathology
* Relate pathology to symptoms and signs
* Describe the typical presentation of the disease and some of its variants
* Know the major differential diagnoses
* Describe the tests which can help to establish the diagnosis
* Understand the possible complications

The Treatment

Understand the principles of aseptic technique

Be aware of the steps and able to perform urethral catheterisation

Operating Theatres

Students should be familiar with Operating Theatres. They should understand the principles and practice of aseptic techniques and should learn, under supervision, how to scrub up and gown for theatre. They should witness and assist at both laparoscopic and open surgery and should understand the principles of the operative procedures for which their patients are submitted.

Please see the Clinical Methods Handbook or the MET3A Handbook for further information regarding Operating Theatres, scrubbing and gowning.

PRIORITIES FOR MET3B INDEX CONDITIONS

By the time you reach the Foundation Year, you will be expected to know about these conditions. The codes give you an idea of their importance.

***** Emergency, life threatening or serious condition. Essential to be able to recognise and know how to treat.

1 Have good knowledge of these conditions; be able to recognise them and be familiar with their treatment.

2 Have some knowledge of these conditions and their treatment.

3 Be aware of the existence of these conditions and know where to seek more information about them.

Renal System

Nephrotic Syndrome	1
Glomerulonephritis	2
Pre-Renal, Renal, Post-Renal, Acute Renal Failure	1
Chronic Renal Failure	1
Renal Replacement Therapies / Renal Transplantation	2
Malignancies of the Renal Tract	1
Renal Stone Disease and Renal Tract Calcification	1
Bladder Dysfunction and Urinary Tract Infection	1

Endocrine System

Diabetes and Insulin Resistance	1
Metabolic Syndrome	1
Insulin and Oral Hypoglycaemics	2
Diabetic Emergencies	*
Complications of Diabetes	1
Thyroid Lumps	1
Adrenal Disease – Cushing’s	2
Adrenal Disease – Addison’s	1
Diabetes Insipidus and Hypopnatraemia	2
Pituitary Hypothalamic Axis	2
Endocrine Hypertension	2
Breast Disease	2

MET3B LEARNING OUTCOMES: THE RENAL SYSTEM

NEPHROTIC SYNDROME AND GLOMERULONEPHRITIS

Lectures

1. Know the pathophysiology of oedema
2. Know and understand the diagnostic criteria for nephrotic syndrome
3. Know the differential diagnosis for nephrotic syndrome
4. Know the clinical signs and appropriate investigations of patients with nephrotic syndrome
5. Know and understand the principles that govern the treatment of nephrotic syndrome
6. Describe the pathogenetic mechanisms underlying glomerular injury and the tissue reactions of the glomerulus to injury
7. Define the terms nephrotic syndrome and nephritic syndrome
8. Describe the clinical syndromes associated with glomerulonephritis
9. Outline the clinico-pathological features of the common types of glomerulonephritis

Self Directed Learning and Clinical Work

1. Understand the mechanism of action of the different diuretics and where the act in the renal tubule
2. Know the differing diagnostic / treatment approaches to childhood and adult nephrotic syndrome
3. Be aware of the factors that indicate poor prognosis with any glomerulonephritis
4. Be aware of the concept of primary and secondary glomerulonephritis
5. Know the association between SLE and the kidney
6. Be aware of the concept of rapidly progressive glomerulonephritis and the relevant autoantibodies i.e. anti GBM and ANCA and their association with pulmonary haemorrhage
7. Understand the importance of proteinuria, how its measured and its clinical significance

PRE-RENAL/RENAL/POST RENAL ACUTE RENAL FAILURE

Lectures

1. Classify the causes of acute renal failure into pre-renal, renal and post-renal.
2. Outline the systemic effects and pathological changes in the kidney of acute renal failure.
3. Understand the cause and management of the diuretic phase during recovery from acute renal failure.
4. Understand the investigation of undifferentiated acute uraemia including the place of renal ultarasonography to exclude obstruction and renal biopsy if there is possibility of vasculitis, interstitial nephritis or crescentic glomerulonephritis.

5. Understand prevention and management of life-threatening complications of acute renal failure, especially hyperkalaemia, pulmonary oedema and severe uraemia including the place of methods of blood purification and fluid removal such as peritoneal and haemodialysis, continuous arteriovenous haemofiltration (CAVH) and CAVH/dialysis.
6. List the causes of acute renal failure.

Self Directed Learning and Clinical Work

1. Be able to carry out a fluid assessment of a patient – ie. Know if they are volume deplete or volume expanded
2. Understand the role of daily weight, lying and standing blood pressure and other clinical signs in the assessment fluid balance
3. Know the difference between crystalloid, colloid and blood products and the appropriate use of these solutions in managing patients with acute renal failure.
4. Understand how urinalysis and microscopy can help distinguish the various categories of acute renal failure

CAUSES AND COMPLICATIONS OF CHRONIC RENAL FAILURE

Lectures

1. List the common causes of chronic renal failure
2. Describe the pathological changes of chronic renal failure in the kidney
3. Describe the effects and management of complications of chronic renal failure such as anaemia, secondary hyperparathyroidism, bone disease and impaired immunity.
4. Understand the dietary management of chronic renal failure including some insight into the current controversy relating to the possible benefits of protein restriction on rate of decline of renal function.
5. Understand that fluid balance must be assessed clinically rather than by laboratory tests.

Self Directed Learning and Clinical Work

1. Understand the concept of hyperfiltration injury
2. Understand the role of proteinuria in the monitoring of patients with chronic renal failure and also its role in progression.
3. Understand the classification of chronic renal failure into the five class of CKD
4. Understand the importance of blood pressure control in attenuating the progression of chronic renal failure
5. Be aware of the use of drugs blocking the renal angiotensin system in the treatment of chronic renal failure

RENAL REPLACEMENT THERAPIES INCLUDING TRANSPLANTATION

Lectures

1. Understand the principles and practical aspects of haemodialysis and be aware of its limitations advantages and disadvantages.
2. Understand the principles and practical aspects of peritoneal dialysis and be aware of its limitations advantages and disadvantages.
3. Be aware of the prognosis, advantages and disadvantages of transplantation
4. Describe the basic principles of tissue typing and lymphocytotoxic cross matching
5. Describe the complications associated with anti-rejection therapy

Self Directed Learning and Clinical Work

1. Describe the MHC / HLA system and its role in the immune response
2. Describe the role of T cells and B cells in the immune response
3. Be aware of the mode of action of immunosuppressive drugs commonly used

MALIGNANCIES OF THE RENAL TRACT

Lectures

1. Describe the clinical features of patients with renal tract tumours.
2. Understand the significance of microscopic and macroscopic haematuria
3. Understand that pathogenesis of tumours of the renal tract and their risk factors
4. Be able describe the investigations available to establish a diagnosis including urine cytology, endoscopy and imaging
5. Understand the surgical approach to treating renal tract tumours
6. Be aware of the prognosis of patients with renal tract tumours.

Self Directed Learning and Clinical Work

1. Understand the use of PSA in the diagnosis and monitoring of prostate cancer
2. Understand the role of chemotherapy, radiotherapy, hormone and immune therapy in the treatment of renal tract tumours

RENAL STONE DISEASE AND RENAL TRACT CALCIFICATION

Lectures

1. Describe the clinical features of patients with renal calculi
2. Discuss the aetiology and pathological consequences of calculi in the kidney and ureter
3. Understand the investigations required to diagnose the underlying predisposition to renal calculi
4. Understand the role of diet in treating patients with renal calculi
5. Describe the surgical and non surgical approaches to treating renal calculi

Self Directed Learning and Clinical Work

1. Know the metabolic conditions that can result in renal tract calcification
2. Be aware of the various types of renal tubular acidosis and their biochemical basis

BLADDER DYSFUNCTION AND URINARY TRACT INFECTION

Lecture

1. Understand that UTIs are a common cause for prescribing antimicrobials
2. Know predisposing factors for urinary tract infections and know how to diagnose UTIs
3. Understand that clinical significance and duration of treatment of UTIs varies depending on group of patients you are treating e.g: paediatric patients, pregnant women, non-pregnant sexually active women, young men, the elderly and people with abnormal urinary tracts.
4. Understand the risk of UTI's in patients with congenital abnormalities of the renal tract
5. Understand principles of treatment and when prophylaxis may be indicated
6. Know the methods for investigating UTI in Children, Adult Males and Females and Pregnancy
7. Outline therapeutic options for UTIs.

MET3B LEARNING OUTCOMES: THE ENDOCRINE SYSTEM

OVERVIEW OF DIABETES AND INSULIN RESISTANCE

1. Classify the types of DM and list the causes of secondary DM
2. Describe the diagnostic criteria for diabetes mellitus (DM), impaired fasting glycaemia (IFG) and impaired glucose tolerance (IGT)
3. Know the presentations and management of diabetes
4. Recognise the contribution of genetic and environmental factors in aetiology of Type 1 and Type 2 Diabetes Mellitus.

METABOLIC SYNDROME

1. Understand the pathophysiology of obesity and metabolic syndrome
2. Understand the relationship between hepatic steatosis with obesity, metabolic syndrome and diabetes
3. Understand the following terms - insulin resistance, glucose tolerance and metabolic syndrome

INSULINS AND ORAL HYPOGLYCAEMICS

1. Describe the principles of management of the newly diagnosed diabetic patient including the role of diet.
2. Understand the indications of the various classes of oral hypoglycaemic agents and insulin therapies and first aid advice to the patient

DIABETIC EMERGENCIES

1. Be able to distinguish between the following terms and conditions: hypoglycaemia; diabetic ketoacidosis; lactic acidosis; hyperglycaemia; hyper-osmolar non-ketoacidotic state
2. Know how to manage a hypoglycaemic patient
3. Know how to manage a patient with diabetic ketoacidosis
4. Know how to manage a patient with a hyper-osmolar non-ketoacidotic state
5. Understand the precipitating factors in hyperglycaemic states
6. Apply "BRAINS & AIMS" when choosing, giving and monitoring the following medication for Hypoglycaemia: 50% Glucose; Glucagon (Are BRAINS & AIMS std for course?)
7. Apply "BRAINS & AIMS" when choosing, giving and monitoring the following medications for Hyperglycaemia: Soluble Insulin; IV Fluids; IV Potassium; Low Molecular Weight Heparin (LMWH) eg: Enoxaparin

COMPLICATIONS OF DIABETES

1. Describe the long-term complications of diabetes and recognise the importance of education, preventive medicine, early recognition and treatment of hypertension, retinopathy and other vascular risk factors.
2. Be aware of the fungal infections that may present in patients who have diabetes

THYROID LUMPS

1. Describe the position and anatomical relationships of the thyroid gland
2. Define goitre, list the causes and briefly describe the pathology.
3. Define the role of isotope scanning, ultrasound and fine needle cytology in the investigation of thyroid lesions.
4. Distinguish thyroid enlargement from other lesions in the neck by examination.
5. List the possible causes of thyroid enlargement in a euthyroid patient.
6. Be able to defined the various benign and malignant tumours of the thyroid
7. Be aware of the surgical and non surgical treatment options for thyroid tumours.

ADRENAL DISEASE (CUSHING'S AND ADDISON'S)

1. Describe the clinical syndromes, underlying causes and pathology associated with adrenocortical hypofunction.
2. Distinguish between adrenal failure and pituitary-adrenal failure by means of clinical features assisted by laboratory investigations.
3. Outline the maintenance treatment of adrenal insufficiency including precautions for intercurrent illness.
4. Describe the emergency management of acute adrenal insufficiency.
5. Discuss the clinical features, causes and pathology of Cushing's syndrome
6. Outline the laboratory and radiological investigations, which help to distinguish pituitary, adrenal and ectopic causes of Cushing's syndrome.

DIABETES INSIPIDUS AND HYPONATRAEMIA

1. Understand the causes of hypernatraemia and hyponatraemia
2. List the causes of thirst and polyuria.
3. Describe the initial investigations, which help to distinguish cranial and nephrogenic diabetes insipidus and psychogenic polydipsia.
4. Understand the principles of treating hypernatraemia
5. Understand the principles of diagnosing and treating hyponatraemia

PITUITARY HYPOTHALAMIC AXIS

1. Be able to describe the structural and functional relationships between the hypothalamus and the pituitary gland
2. Be able to list the hormones secreted by both the anterior and posterior pituitary and in each case explain the role of the hypothalamus in regulating their secretion
3. Using the concept of negative feedback, be able to explain the principles underlying clinical tests for pituitary hormone secretion
4. Be able to briefly outline the actions of the hormones of the posterior and anterior pituitary
5. Describe the clinical features of hypopitutarism, outline the treatment required.

ENDOCRINE HYPERTENSION

Describe the blood supply to the adrenal gland and the functional relationship between the adrenal medulla and the nervous system

Know the structure of the adrenal gland and relate the zones to production of hormones

Strategy for investigation of endocrine hypertension

Outline the laboratory and radiological investigation of suspected Conn's syndrome and phaecochromocytoma.

Describe the possible mechanisms of endocrine mediated hypertension with reference to phaeochromocytoma, Conn's syndrome and renal artery stenosis.

Describe the presenting clinical features of Conn's syndrome and phaeochromocytoma.

BREAST DISEASE

Appreciate the mammographic appearance of impalpable lesions.

Appreciate the need for clinical trials.

Assess potential sites of distant disease.

Be able to discuss in detail in professional and layman's terms the alternative surgical approaches in order to provide informed consent.

Choose and justify the alternative adjuvant modalities, e.g. radiotherapy, chemotherapy and hormone therapy.

Evaluate the role of screening programmes, Nurse Counsellors, pain control and terminal care. Appreciate the role of a multi-disciplinary team approach to breast cancer.

Examine, without supervision, breasts and lymph node drainage sites.

Identify features of breast cancer, e.g. skin attachment, peau d'orange, deep muscle attachment.

Interpret bone scan with supervision.

Interpret mammograms (with supervision).

Propose a diagnosis from clinical findings and plan management.

Recognise and justify the differing methods of surgical treatment of breast cancer.

Recognise features of benign breast disease, e.g. fibroadenoma, multi-duct nipple discharge, breast cysts, cyclical mastalgia.

Recognise normal and physiological findings.

Recognise the principles of and the need for staging disease prior to treatment.

Recognise the rationale of follow-up and identify the symptoms and signs of recurrent or metastatic disease.

Recognise the role of biopsy in equivocal cases.

Recognise the role of breast reconstruction after mastectomy.

Role of ultrasound, mammography and cytology.

Take a history of the breast symptoms.

Take a history to assess the risk factor for breast disease.

Be able to carry out examination of the breasts including examination of the axillary lymph nodes

Be able to carry out examination of the breasts including preparing and positioning the patient appropriately

Be able to carry out examination of the breasts using a systematic approach

Be able to recognise and diagnose the following conditions: lipoma, hernia; sebaceous cyst and abscess; thyroglossal cyst; thyroid lumps; lymph nodes; various breast lumps

Breast Cancer

Evaluate the role of screening programmes, Nurse Counsellors, pain control and terminal care. Appreciate the role of a multi-disciplinary team approach to breast cancer.

Examine, without supervision, breasts and lymph node drainage sites.

Identify features of breast cancer, e.g. skin attachment, peau d'orange, deep muscle attachment.

Recognise and justify the differing methods of surgical treatment of breast cancer.

Recognise features of benign breast disease, e.g. fibroadenoma, multi-duct nipple discharge, breast cysts, cyclical mastalgia.

Recognise the role of breast reconstruction after mastectomy.

Take a history of the breast symptoms.

Take a history to assess the risk factor for breast disease.

Has a tissue diagnosis been obtained? Eg: cytology / trucut biopsy of a breast tumour.

MET3B PBL/CBL: TITLES AND SCENARIOS

1. Hypercalcaemia
2. Type 2 Diabetes Mellitus
3. Pituitary Tumour
4. Addisons Disease
5. A Lump in the Neck
6. Haematuria
7. Obstructive Uropathy
8. Reproductive Endocrinology

NOTE: Case Based Learning

Please note that your Consultant may opt to choose patients on the ward to illustrate the PBL learning objectives instead of using the scenarios shown in this handbook

1. HYPERCALCAEMIA

A 69-year old man has noticed increasing symptoms of abdominal pain, constipation and headaches. He attended his GP surgery to complain about these symptoms but his wife also mentioned that she thought that he was depressed. His GP prescribed him some medication for his constipation and recommended paracetamol for his headaches. This helped for a period.

A few weeks later whilst lifting some furniture he developed sudden and severe back pain in the lower lumbar region. The pain was so severe that he called an ambulance that took him to A&E.

He was examined by the doctors there and investigations were organised and the results are shown

		Normal Range
Calcium	2.86 mmol/L	2.20-2.60
Phosphate	0.62 mmol/L	0.80-1.50
Alkaline Phosphatase	290 U/L	30-130
Albumin	39 g/L	36-53
Urea	7.8 mmol/L	2.5-7.5
Creatinine	80 umol/L	55-106
PTH	12.2 pmol/L	1.1-6.8
Urinalysis	Blood ++	

Lumbar spine X-ray showed a wedge fracture of L5, KUB showed a renal calculus.

He was treated with intravenous fluids and analgesia. He went on to have a DEXA scan indicating significant loss of bone mineral density, an ultrasound and a parathyroid nuclear medicine scan which co-lateralised and suggested a solitary left lower adenoma.

2. TYPE 2 DIABETES MELLITUS

A 67-year old widow who lived alone had been diagnosed with Type 2 diabetes three years ago following referral from Moorfield's Eye Hospital where she had attended for investigation of deteriorating visual acuity. She had since been attending a diabetic clinic at her local hospital.

Her recent weight was 75kg, height 1.60 m, body mass index 29.3. She was normotensive on an ACE inhibitor and no protein was detectable in her urine.

When first diagnosed she had been treated by diet alone in an attempt to lose weight. Since this was largely unsuccessful in the first year she had subsequently been treated with Metformin. Glycated haemoglobin at clinic visits were typically in the range of 8-9% (normal range 4.8-6.4%).

On his recent weekly visit to his mother, the patient's son had discovered her collapsed on the sofa, breathing but otherwise un-responsive, and dialled 999.

On arrival at A&E she was comatose. A finger-prick blood glucose gave a result of >22 mmol/l, her BP was 90/50 with a low jugular venous pressure. Blood was taken for laboratory analyses and treatment commenced immediately.

Within 40 minutes the following results were back from the laboratory.

Blood Results

Plasma glucose	45 mmol/l
Serum sodium	150 mmol/l
Potassium	4.8 mmol/l
Bicarbonate	22 mmol/l
Urea	20 mmol/l
Osmolality	362 mOsm/kg
pO_2	12.0 kPa
pCO_2	5.5kPa
pH	7.36 (H^+ 45nmol/l).

No detectable paracetamol, salicylate or alcohol

3. THE EXHAUSTED ACCOUNTANT

A 48-year-old accountant, was referred to the Endocrinology Clinic by her GP. Her main problem was persistent unremitting lethargy.

She was a partner in a firm of accountants, their two teenage children were doing well at school and the family had no financial or other domestic concerns.

During consultation, She described a number of other symptoms. She had headaches and had noticed some problems with her eyesight and recently she had stumbled into door posts on more than one occasion. Her husband noticed that she had started to move her head from side - to - side when reading the newspaper. She had also noticed milk like secretions from her nipples on a few occasions. Her periods were regular but she was on a combined oral contraceptive pill.

On examination:

She looked pale.

Heart 54 bpm

Careful examination of the visual fields revealed a bi-temporal hemianopia with optic atrophy.

She had slow relaxation of the tendon reflexes.

She was admitted to hospital and the following results were obtained.

Full blood count	Normal except Hb=10.8g/dl
U&Es, renal and liver function tests, blood glucose and calcium	Normal except sodium=128mmol/l
Free T4	4.5pmol/l (9 - 25)
TSH	0.3 mU/l (0.4 - 4)
Prolactin	987 mU/l (<400)
LH	<0.3 IU/L (1-20 IU/L)
FSH	0.1 U/L (5-30 premenopausal, 50-100 post menopausal)
2pm cortisol	124 nmol / L (9am: 140 – 700 nmol/L, midnight: 80 – 350 nmol/L)

She was commenced on appropriate endocrine replacement and a dedicated pituitary MRI scan was performed.

4. THE DIZZY SECRETARY

A 34 year old secretary, had noticed that she is getting progressively tired. She also had developed areas of depigmentation on her forearms. For these reasons she went to see her GP. Their tests revealed that she had hypothyroidism and she was prescribed thyroxine.

A few days after starting her new medication she noted that she was not feeling any better and over the subsequent week or 2 actually began to feel worse. She started feeling nauseated and she became especially concerned when she began to feel dizzy as she got out of bed in the morning.

Despite this she continued to work until whilst travelling on the underground in the morning during her commute she collapsed. She was taken to her closest A&E department.

On examination there she was alert, her JVP was not visible and she had no oedema. Her observations were as follows.

Pulse	108bpm
Lying BP	104/75
Standing BP	84/60

Her blood investigations were as follows

Full blood count	**Normal**
Na	122mmol/l (135-144)
K	6.5mmol/l (3.5 – 5.2)
Serum Bicarbonate	16mmol/l (24-28)

Appropriate endocrine tests were sent. She was treated with intravenous saline and high dose hydrocortisone replacement. This was then converted to standard hydrocortisone and fludrocortisone replacement. She was educated about dose adjustment in the event of illness and was issued with a steroid card and hydrocortisone emergency pack

5. A Lump in the Neck

A 62 year old patient who moved from Bangladesh to the UK 12 years ago. Since her arrival in the UK she has been seeing her GP regularly with various symptoms including muscular aches and pains, joint stiffness, burning sensations in her feet and headaches.

She attends again with a new complaint this time of swelling of her neck. She said that her family having been saying this for sometime but she had ignored them till she noticed a few weeks ago a fullness of her neck which she feels is new.

On examination her GP confirms a goitre, more marked on the right, that moves with swallowing. Concerned that her symptoms may be due to hypothyroidism and/or osteomalacia, she requests thyroid function test:

TSH	0.4mlU/l (0.3-4)
Free T4	13.7 pmol/l(10.5-24.5)
Total T3	2.4nmol/l (1-2.7)

An ultrasound of the neck is then requested which shows a small to modest multinodular goitre with no suspicious features and no apparent retrosternal extension.

She is adamant that she does not want any surgery and the GP discusses treatment options with her.

6. HAEMATURIA

A 65 year old woman with a long history of smoking, registers with a new GP and as part of her initial visit has her urine tested.

Urinalysis	Blood	++
	Protein	-
	Glucose	-
	Ketones	-
	Nitrites	-

She is referred to the local urology services but whilst awaiting an appointment she develops severe left sided colicky loin pain and begins to pass blood in her urine with clots. She attends the local A&E.

Following an initial assessment, she is admitted for investigations in order to determine the cause of her haematuria. Investigations requested by the admitting team include urine cytology, blood tests, imaging and a cystoscopy.

These investigations reveal a transitional cell tumour of her left ureter. She is counselled about the various treatment options. Given the limited nature of the tumour and the lack of evidence of spread she is offered a left nephrouretectomy.

She has an uncomplicated recovery from her operation and is discharged from hospital 7 days later and remains under follow up with her consultant urologist.

7. OBSTRUCTIVE UROPATHY

A 74 year old man, comes to A&E with severe lower abdominal pain. He also says that he has not been able to pass any urine for the last 12 hours. On closer questioning he gives a much longer history of poor urinary stream and worsening nocturnal urinary frequency. In addition he clearly describes episodes of marked urinary urgency as well.

On examination he appeared distressed and in pain. Initial observations indicated a pulse of 90/min, BP was 134/86. Abdominal examination indicated dullness to percussion in the suprapubic region. There also appeared to be a palpable bladder up to the level of the umbilicus. Rectal examination indicated a markedly enlarged smooth prostate.

His blood results were as follows

Urea	22 mmol/l
Creatinine	654 umol/l
Potassium	4.4 mmol/l
Sodium	139 mmol/l

He went on to have a ultrasound scan that confirmed an enlarged bladder and a urinary catheter was inserted. 1.2L of urine drained immediately and he required 4L of normal saline in the following 24 hours to keep up with his urine output. He was started on medical treatment and his catheter was removed a few days later and he was then discharged

On his subsequent outpatient visit he continued to complain of urgency and frequency. He went on to have urodynamic tests to determine the optimal treatment of his symptoms.

8. REPRODUCTIVE ENDOCRINOLOGY

A 30 year old canteen assistant is referred to the gynaecology clinic because of infertility. She and her partner had been trying for a baby for over 2 years without success. On closer questioning she reports irregular scanty periods for the last 18 months. She has a family history of type 2 diabetes with her father and paternal uncles affected.

On examination she is noted to be obese with a BMI of 31.4kg/m2. Her BP was 142/87mmHg.

The other clinic findings included a degree of facial hirsuitism. Investigations are requested and the results are shown below.

Fasting glucose	6.2mmol/l
Androstenedione	11.2 nmol/l(<8)
SHBG (sex hormone binding globulin)	12 nmol/m(>30)
T4 and TSH	normal
Prolactin	normal

She returns to the clinic for the results of her test to be told that she has polycystic ovarian syndrome. The doctor she sees suggests that she makes appropriate lifestyle changes to lose weight and counter the insulin resistance.

He suggests that she start Metformin. She initially protests saying that she is not diabetic but relents when it is explained to her that she has a degree of insulin resistance and Metformin may help her with her fertility.

MET3B RECOMMENDED READING LIST

Oxford Handbook of Nephrology and Hypertension
Steddon, S., Ashman, N., Chesser, Al, Cunningham, J. (Eds)
Oxford Handbook Series

Clinical Medicine
Kumar, P., Clarke, M. (Eds)
Elsevier Saunders

Clinical Endocrinology and Diabetes
Chew, S.L., Lesley, D. G.
Churchill Livingstone

