

**DUBAI HEALTH AUTHORITY**

**CLINICAL FACULTY - DUBAI MEDICAL COLLEGE**

**UNDERGRADUATE CURRICULUM COURSE - MEDICINE**

## **CLINICAL HAEMATOLOGY**

### **ANAEMIAS**

- Anaemias due to deficiency (iron, B12, folate)
- Thalassaemia
- Sickle cell disease and other hemoglobinopathies
- Red blood cell membrane disorders (e.g. Spherocytosis)
- Red blood cell enzymopathy (e.g. G-6PD)
- Acquired immune hemolytic anaemias.
- Acquired aplastic anaemia
- Primary hemochromatosis
- Secondary hemochromatosis.

### **MYELOPROLIFERATIVE AND MYELOYDYSPLASTIC NEOPLASMS**

- Erythrocytosis (other than PV)
- Polycythemia vera
- Essential thrombocythemia
- Primary myelofibrosis
- Myelodysplastic disorders.

### **LEUKAEMIAS**

- Acute leukaemias
- Chronic myeloid leukemia
- Chronic lymphocytic leukemia
- Plasma cell neoplasms
- Plasma cell myeloma (Multiple myeloma)

### **PLATELET DISORDERS**

- Thrombocytopenias
- Immune thrombocytopenia
- Acquired platelet function disorders.

## **THROMBOSIS AND HEMOSTASIS**

### **ACQUIRED BLEEDING DISORDERS**

- Disseminated intravascular coagulation
- Bleeding related to anticoagulants and antithrombotic therapy
- Acquired bleeding disorders in adults (inhibitors to F VIII and vWF).

### **CONGENITAL BLEEDING DISORDERS**

- Mechanisms in hemostasis
- Hemophilia A & B
- Von Willebrand disease.

### **THROMBOTIC DISORDERS**

- Thrombophilia
  - Congenital (e.g. F V Leiden, II G20210A)
  - Acquired thrombotic tendency (e.g. APS)
- Adverse reactions to anticoagulant, antiplatelet and thrombolytic therapy
- Blood and blood product transfusion.

## **RESPIRATORY MEDICINE**

### **STRUCTURED TRAINING PROGRAMME**

- Respiratory physiology and pathophysiology, including cardiological aspects of respiratory disease
- Respiratory anatomy and imaging techniques
- Respiratory pharmacology
- Respiratory pathology
- Respiratory microbiology
- Asthma (including patient education and self management)
- Chronic obstructive pulmonary and extra-pulmonary, and opportunist mycobacterial disease
- Pulmonary disease in the immunocompromised host
- Bronchiectasis
- Diffuse parenchymal lung disease
- Sleep breathing related disorders
- Pulmonary vascular diseases
- Allergic lung disorders and anaphylaxis
- Disorders of pleura and mediastinum
- Pulmonary manifestations of systemic disease
- Cystic fibrosis
- Pulmonary disease in the HIV patient
- Occupational and environmental lung disease
- Genetic and developmental lung disorders
- Lung transplantation
- Hospital at home schemes and early discharge
- Imaging Techniques
- Smoking cessation
- Pulmonary rehabilitation
- Intensive Care (ICU)
- Palliative care Medicine
- Dysfunctional Breathing and Psychological Aspects of Respiratory Syndrome
- Acute and chronic respiratory failure.

## **NEUROLOGY**

- Headache
- Disorders of consciousness
- Disorders of sleep
- Disorders of higher function and behaviour
- Epilepsy and loss of consciousness
- Cerebrovascular disease
- Tumours of the NS, neurological complications of systemic cancer, complications of treatment of cancer
- CSF Disorders
- Demyelination and Vasculitis
- The neurological complications of immunosuppression
- Parkinsonism & Movement Disorders
- Motor Neurone Disease
- Toxic and Metabolic States
- Disorders of the Visual System
- Disorders of the Cranial Nerves
- Disorders of Spine, Spinal Cord, Roots and Spinal Injury
- Disorders of Peripheral Nerve
- Disorders of Autonomic Nervous System
- Disorders of Muscle
- Pain.

## **RENAL MEDICINE**

### **A. Common Nephrological Presentations:**

1. Urinary Abnormalities:
  - Haematuria
  - Proteinuria
2. Fluid and Acid Base Balance Disorders
3. Glomerulonephritis and Tubulo-Interstitial Disease
4. Acute Kidney Disease (AKI)
5. Chronic Kidney Disease (CKD)
  - Renal Bone Disease
  - Renal Anaemia
  - Cardiovascular Disease
6. Hypertension
7. Renovascular Disease
8. Diabetes and Kidney Disease
9. Urological Presentations
10. Renal Stone Disease
11. Urinary Tract Infection
12. Urinary tract obstruction and neurogenic bladder
13. Inherited and Rarer Diseases, including Polycystic Kidney Disease.

### **B. Management of Advanced Kidney Disease**

1. Active Supportive (Non-Dialysis) Care
2. Renal Replacement Therapies:
  - Dialysis Therapies: - Peritoneal Dialysis  
- Haemodialysis
3. Dialysis in patients with acute kidney injury:
  - Acute dialysis and Plasma Exchange
4. Renal Transplantation:
  - Pre-Transplant Evaluation
  - Acute Stage
  - Long-Term Care

### **C. Special Situations**

1. Sexual Health Issues:
  - Male sexual health
  - Female sexual health; Renal disorders in pregnancy
2. Adult-Paediatric Interface
3. Nutrition in renal patients.

### **D. Investigational and Procedural Competencies**

1. Native Kidney Biopsy
2. Renal Transplant Biopsy
3. Insertion of temporary haemodialysis catheters.

# **INFECTIOUS DISEASES**

## History Taking

- Ability to take appropriate history.

## Clinical Examination

- Ability to perform appropriate physical examination.

## Investigations

- Ability to perform appropriate investigations.

## Diagnosis and Management

- Ability to achieve an appropriate specific or differential diagnosis and initiate appropriate management.
- A broad knowledge of clinical presentation of general medical and infectious diseases including unusual infections.

## Extensive knowledge of common conditions and syndromes in Infectious Diseases including:

- Pyrexia of unknown origin
- Fever in the returning traveler
- Blood-borne virus infections (HIV, hepatitis B/C)
- Tuberculosis, including MDRTB
- Infective endocarditis
- Bone and joint infection
- Severe skin and soft tissue infection
- Community-acquired pneumonia
- Gastroenteritis
- Infective hepatitis
- Sepsis syndrome
- Uro sepsis
- Meningo-encephalitis
- Infections in injecting and other drug users
- Envenomation and bites.

## Infection in the immune-compromised patient

- Ability to recognize infection in the immune compromised patient

## Immune Deficiency

- Ability to understand the causes and risk factors leading to immune deficiency.

## Specific HIV Diagnostics

- Competence in the use of specific HIV diagnostics.

## Healthcare-Acquired and Intensive Care-related Infection

- Ability to recognize and manage healthcare-acquired infection (HAI) and intensive care-related infection.

## Basic Microbiological Benchwork

- Basic microbiological benchwork including critical interpretation of laboratory procedures in relation to laboratory diagnosis.

## Antimicrobial Prescribing

- Competence in antimicrobial prescribing.

# **GASTROENTEROLOGY**

## **A. Upper Gastrointestinal Tract Disorders**

### Oesophageal Symptoms

- Gastro-oesophageal Reflux
  - To understand the mechanisms of reflux and its clinical management.

### Dysphagia and Non Cardiac Chest Pain

- To understand the causes of non-cardiac chest pain and dysphagia, and how patients are managed.

## **B. Gastro-Duodenal Diseases**

### Dyspepsia and Peptic Ulcer

- Understand the clinical management of patients with ulcer and non-ulcer dyspepsia.

### Upper Gastrointestinal Bleeding

- Understand the presentation and management of patients presenting with haematemesis and/or melaena.

### Significant Upper Gastrointestinal Symptoms

- Understand the range of symptoms arising from the upper GI tract and how patients with these are managed.

## **C. Intestinal Disorders**

### Abdominal Pain

- Understands the causes of acute and chronic abdominal pain and how patients with these symptoms are managed.

### Diarrhoea

- Understands the causes of acute and chronic diarrhoea and their management.

### Functional Gut Disorders: Irritable Bowel Syndrome

- Understands functional gut disorders and the approach to their treatment.

### Inflammatory and Infective Conditions

- Understands the presentation and management of infective and inflammatory disorders.

### Large Intestinal Tumours

- To recognize the presentation of colorectal tumours, how they are diagnosed and managed.

### Rectal Bleeding and Perianal Conditions

- Know the causes of rectal bleeding and their management.

## **D. Inflammatory Bowel Disease**

### Diagnosis and Investigation

- To recognize and understand the differential diagnosis of inflammatory bowel disease, and the investigations required to investigate and diagnose it.

### Treatment

- To understand the treatment options available for IBD especially in the acute situation, and to recognize the importance of involving the patient and appropriate healthcare professionals and in decision making.

### Complications and Special Situations

- To recognize long-term complications of IBD, and their treatment including medical and surgical treatment.

## **E. Weight loss and Anorexia**

- To be able to identify, explain and manage patients with significant weight loss and/or anorexia.

### Obesity

- To be aware of the health consequences and different management strategies for obesity and to be able to identify and manage the complications of such treatments.

### Malabsorption and Anaemia

- To understand the pathology and clinical features of malabsorption and anaemia and how to investigate and manage it.

### Nutritional Screening and Assessment

- To be able to detect under and over nutrition and manage appropriately.

### Artificial Nutritional Support

- Percutaneous Endoscopic Gastrostomy (PEG)
  - To understand the role of PEG in enteral feeding and be able to competently assess patients in terms of appropriateness and risks for procedure, as well as being able to insert a PEG tube safely follow-up care.

## **F. Hepatology**

### Basic Principles

- Basic Anatomy, Micro-Anatomy in Liver Physiology
  - To understand the pathophysiology of liver disease and hepatocellular dysfunction
- Clinical Evaluation and Investigation of Liver Disease
  - To understand the range of symptoms and risk factors for liver disease and its investigation.



## **Jaundice**

- To understand jaundice, how it is classified, investigated and severity measured.

## Complications of Cirrhosis

- Portal Hypertension
- Oesophageal Varices : Risk of haemorrhage
- Oedophageal Varices : Acute Bleeding
- To be able to carry out assessment, resuscitation, diagnosis and treatment of gastrointestinal bleeding patients with chronic liver disease.

## **Variceal Bleeding: Secondary Prophylaxis**

- To be able to carry out assessment of patients with chronic liver disease.

## **Ascites and Spontaneous Bacterial Peritonitis (SBP)**

- To be able to carry out assessment and treatment of patients with ascites in chronic liver disease and its complications.

## **Hepatorenal Syndrome**

- To be able to carry out assessment and diagnosis or renal impairment/dysfunction in patients with chronic liver disease.

## Hepatic Encephalopathy (HE)

- To be able to carry out assessment of altered consciousness in the patient with chronic liver disease.

## Acute Liver Disease

- To recognize acute and acute on chronic liver disease. To understand the causes and differential diagnosis of acute hepatitis and chronic liver disease.

## Alcohol and the Liver

- To be able to carry out assessment of alcohol-related liver disease, this includes:
  - Management of acute alcoholic hepatitis and decompensated liver disease with associated complications
  - Alcohol withdrawal syndromes, Wernicke's encephalopathy
  - Psychological dependence on alcohol and relevance to long-term management.

## Viral Hepatitis

- To be aware of hepatitis C & B, those individuals at risk and the principles of treatment.

## Auto-Immune Liver Disease, including Auto-immune hepatitis, PBC, PSC, and Overlap Syndromes.

- To understand the importance of diagnosis and treatment for autoimmune liver disease.

## Metabolic Liver Disease

- Drug-Induced Liver Disease
  - To recognize drug-induced liver injury (DILI), its severity and management.

## **G. Pancreatic and Biliary Disorders**

### Gallbladder Disease

- To understand the formation of gallstones, the complications to which they give rise and the means by which they are managed.

### Acute Pancreatitis

- To learn to make an early accurate diagnosis.

### Chronic Pancreatitis

- To recognize the presentation of chronic pancreatitis and learn how the disease is managed.

### Pancreatic Tumours

- To learn the presentation and multi-disciplinary management of patients with pancreatic tumours.

### Complications of Cholestatic Liver Disease

- To be able to carry out assessment, investigate, diagnose, initiate treatment of patients with cholestatic liver disease (e.g. PBC,PSC) and exclude large duct obstruction.

## **H. Malignant Liver Tumours, Hepatocellular Carcinoma (HCC)**

- Importance of HCC screening in cirrhosis, diagnosis and treatment.

### Cholangiocarcinoma

- Investigation and treatment options for bile duct tumours.

### Surgery and IBD

- To understand the indications for surgery in IBD.

### Novel Therapies

- Experience novel therapies in IBD.

### ERCP

- To ensure knowledge of the principles and details of safe endoscopy practice in the area of ERCP and associated therapeutic procedures.

## **MEDICAL ONCOLOGY**

- Management of Breast Cancer
- Management of Colorectal Cancer
- Management of Lung Cancer
- Management of Ovarian Cancer
- Management of Oesophagogastric Cancer
- Management of Lymphoma
- Management of Prostate Cancer
- Management of Cervical Cancer.

## DERMATOLOGY

1. History Taking
2. Clinical Examination
3. Time Management
4. Decision Making and Clinical Reasoning
5. Prioritisation of Patient Safety in Clinical Practice
6. Infection Control
7. Relationships with Patients and Communication within a Consultation
8. Basic Science of the Skin
9. Medical Dermatology
10. Dermatological Pharmacology and Therapeutics
11. Infectious Diseases and Infestations of the Skin.

### 12. Core Presentations

- Pruritis
- Eczema
- Viral Warts
- Common bacterial and fungal infections
- Psoriasis
- Immunobullous disease
- Lichen planus
- Acne vulgaris and Rosacea
- Cutaneous Lupus
- Connective tissue diseases
- Urticaria/angio oedema
- Vasculitis
- Leg ulcers
- Cutaneous Lymphoma
- Systemic diseases presenting in the skin
- Drug reactions
- Emergency presentations.

### 13. Genitourinary Medicine

- To be able to detect sexually transmitted infection (STI) in patients - Clinical features, investigation, diagnosis and management of STIs, including:
  - Genital HPV
  - Candidosis
  - Genital herpes
  - Gonorrhoea
  - Syphilis
  - HIV AIDS
  - Premalignant and malignant diseases of the genitalia
  - Explain contact tracing in STI
  - Perform sexual history taking appropriately and thoroughly
  - Recognise requirements of patient confidentiality.

## ACUTE MEDICINE

### Emergency Presentations

- Cardio-respiratory Arrest
- Shocked Patient
- Unconscious Patient
- Anaphylaxis.

### Common Medical Presentations

- Abdominal Pain
- Acute Back Pain
- Acute kidney injury and chronic kidney disease
- Blackout/Collapse
- Breathlessness
- Chest Pain
- Confusion, Acute/Delirium
- Diarrhoea
- Falls
- Fever
- Fits/Seizure
- Haematemesis & Melaena
- Headache
- Jaundice
- Limb pain and swelling
- Palpitations
- Poisoning
- Rash
- Weakness and Paralysis.

### Other Important Presentations

- Abdominal Mass/Hepatosplenomegaly
- Abdominal Swelling and Constipation
- Abnormal Sensation (Paraesthesia and Numbness)
- Aggressive/Disturbed Behaviour
- Alcohol and Substance Dependence
- Anxiety/Panic Disorder
- Bruising and Spontaneous Bleeding
- Dyspepsia
- Dysuria
- Genital Discharge and Ulceration
- Haematuria
- Haemoptysis
- Head Injury
- Hoarseness and Stridor
- Hypothermia
- Joint Swelling

- Involuntary Movements
- Loin Pain
- Neck Pain
- Physical Symptoms in Absence of Organic Disease
- Polydipsia
- Polyuria
- Pruritis
- Rectal Bleeding
- Skin and Mouth Ulcers
- Speech Disturbance
- Suicidal Ideation
- Swallowing Difficulties
- Syncope & Pre-Syncope
- Unsteadiness/Balance Disturbance
- Visual Disturbance (diplopia, visual field deficit, reduced acuity)
- Weight Loss.

## **CARDIOLOGY**

Cardiology Curriculum Course - Separate document attached in the coming pages.

Dated : January 06, 2013

MM/aa

## **Cardiology Curriculum Course**

**Organizer**

**Professor J M Muscat-Baron**

**Course given in 2<sup>nd</sup> half, 3<sup>rd</sup>, 4<sup>th</sup> & 5<sup>th</sup> Years**

## **Cardiology Curriculum General**

### **Objectives**

#### **The program is designed to give the student:**

1. A concise review of the essential anatomy and physiology of the cardiovascular (CV) system.
2. An understanding of the altered anatomy and physiology in disease
3. An ability to take a good and comprehensive history of CV disorders.
4. An ability to carry out a good and adequate examination of the CV system and an ability to correlate this with the basic pathology and altered function.
5. An understanding of the essential investigations, their appropriate choice and their limitations and relative cost.
6. Familiarization with the appropriate pharmacological methods of management .
7. Familiarization with other possible non-pharmacological methods of management.
8. An ability to explain the clinical phenomena on a basic understanding of the mechanisms involved in cardiac function, dysfunction and their management.
9. Communicate adequately and sensitively with the patient and relatives.

### **Organizers and Coordinators**

- Professor J M Muscat-Baron
- Professor Afzalhussein Yusufali
- Dr Ghazi Radaideh
- Dr Nooshin Bazargani
- Dr Obaid Jassim

### **The CV Course**

Organization into 7 modules (see below)

- Each module is taught by
  - Lectures – approximately 5 hours per module (Total of 35 hours)
  - Clinical attachments – 5 weeks, 5 days per week, approximately 4 hours per day (Total of 100 hours)
- Clinical attachments involve:
  - Attending at ward rounds
  - Demonstration of physical signs.
  - Clarking and examining patients
  - Discussion of clarked patients
  - Tutorials
  - Attending and watching investigations such as ECG, Echoes, cardiac catheterizations
  - All this carried out in small groups, no larger than 6 students.



## **Modules**

1. Cardiac function and dysfunction – cardiac failure
2. Hypertension
3. Ischaemic Heart Disease
4. Cardiac Arrhythmias
5. Heart Disease – Valvular Heart Disease
6. Congenital Heart Disease
7. Other conditions
  - Heart disease in pregnancy
  - Thromboembolic disease

## **Essential Components of Modules**

1. Relevant anatomy
2. Relevant physiology
3. Description of the pathological process
4. Clinical presentation – Symptoms, signs, demonstration of physical signs
5. Relevant investigations – enumerate, describe and justify
6. Management – Preventive, pharmacological, non-pharmacological, and surgical.

## **Modes of Instruction**

- Morning attachments (5 weeks – 8 a.m. to 12 noon)
  - Clinical cases, ward rounds, tutorials, and small group teaching
  - Lectures – 3 hours

## **Morning Sessions**

The following staff is responsible to supervise the morning attachments (between 8 a.m. to 12 noon) and to conduct the discussions and tutorials during the 5-week attachment to the cardiology unit at Dubai Hospital and Rashid Hospital.

Emphasis should be on seeing cases, taking histories and examinations. Particular attention to be given to physical examination methods.

Detailed discussion of cases seen and presented by students.

### **Morning Tutorials**

- The morning tutorial and discussions to cover the following subjects mainly but not exclusively. Allowance made to take advantage of clinical material present on the wards;
  - Week 1 – Cardiac function and failure
  - Week 2 – Hypertension
  - Week 3 – Ischaemic heart disease
  - Week 4 – Arrhythmias
  - Week 5 – Congenital heart disease and thromboembolic disease.

### **Module 1 - Cardiac Function & Dysfunction**

#### Anatomy

- General description of the heart
- Cardiac muscle – the structure of the myocardial cell
- Differentiation of myocardial cells and their function
- Conduction system of the heart
- Cardiac contractile proteins – myosin and troponin.

#### Physiology & Pathophysiology

- The function of the myocardial cell
  - Automaticity
  - Contractility
- The nervous control of the heart
  - Sympathetic
  - Parasympathetic
- Humoral control of the heart
  - Sympathetic system
  - RAAS
  - Vasopressin
- Frank – Starling relationship
- Concept of preload, after load and contractility
- The contribution of atrial contraction to ventricular function
- Ventricular contractility
- Cardiac output
  - Ejection Fraction (EF)
  - Importance of cardiac rate and stroke volume
- Adaptive mechanisms of the failing heart
  - Dilatation
  - Hypertrophy

### Dysfunction and Pathology

- Conceptual mechanisms of cardiac failure
- Maladaptive mechanisms
- Effect of hypertrophy
- Effect of dilatation
- Effect of over activation of the sympathetic system and the renin-angiotensin aldosterone system (RAAS)
- Effect of depression of parasympathetic function
- Effect of decreased cardiac output on renal function
- Concept and mechanism of cardiac cachexia
- Concept of Right and Left sided failure
- Concept of backward and forward failure.

### Clinical Symptoms

- May be asymptomatic or symptomatic
- Functional Class – NYHA classification
- Main symptoms and signs
- Fluid retention
- Increase in weight
- Oedema
- Fatigue
- Decreased exercise tolerance
- Decreased appetite
- Loss of weight
- Concerns of the patient
  - How is the condition affecting his life and activities
  - What are his main worries about the condition?

### Clinical Signs

- General appearance
- Blood pressure
- Arterial pulse
- Venous pulse – Jugular venous pulse
- Precardium
  - Apex – position, character
  - Auscultation
- Oedema
  - Lower limbs, sacrum
  - Ascites
  - Lung bases
- Enlarged tender liver.

### Investigations (describe and assess)

- ECG
- Chest x-ray
- Echocardiography
- Other imaging techniques
- Other investigations may be required to establish cause such as cardiac catheterization and angiography.

### Management

- Prevention

Seek and control main causes of Heart Failure (HF)

- Hypertension
- Ischaemic heart disease
- General Measures
  - Educate and involve patient and family in the management
  - Salt intake
  - Regular weighing
  - Exercise
  - Rest
  - Compliance
  - Follow-up.
- Pharmacological
  - Diuretics
  - ACE Inhibitors
  - ARBs
  - Beta Blockers
  - Spironolactone
  - Digoxin
- Find and treat underlying cause, if possible.
- Non-Pharmacological
  - Treat underlying cause
  - Biventricular synchronized pacing
  - Surgery
  - Cardiac transplantation
  - Support the circulation in acute heart failure – Balloon counter pulsation

## **Module 2 - Hypertension**

### Definition

- Different classifications
- Guideline – JNC VII
- Other Guidelines such as European
- Concept of a disease entity or dynamic variable

### Anatomy

- Anatomy of the arterial system
- The anatomy of the arterial wall
- The blood supply of the arterial wall
- Elastic and resistance arteries
- Concept of the transformation of the intermittent ejection of the blood from the LV into a continuous flow in the arteries.

### Physiology and Pathophysiology

- The need for a BP
- $BP = CO \text{ (cardiac output)} \times PR \text{ (peripheral resistance)}$
- Factors affecting the CO
- Factors affecting the peripheral resistance
- Neurogenic control of the BP – sympathetic, etc.
- Humoral control of the BP – noradrenalin, RAAS, vasopressin, other endocrine, paracrine and autocrine factors
- Salt intake, weight, alcohol, exercise, and BP.

### Pathology

- Effect on arterial wall
- Effect on LV
- Effect on target organs – brain, eyes, vascular tree, heart, and kidneys
- Classification into primary and secondary hypertension.

### Clinical

- Almost always a silent disorder
- Need for regular check of BP at regular intervals throughout life
- Standardize method of taking BP and learn technique well. Korotkoff's sounds, record BP readings, set and aim for targets.
- Clinical effects on the various target organs
- Record the clinical finding at the first examination to act as a baseline
- Need for family history
- Need for regular follow-up to aid control
- Involve patient in the control of his condition – self-monitoring.

### Investigation

- Full blood count
- Urinalyses
- Blood urea and electrolytes
- ECG
- Chest X-rays
- Echocardiogram
- Other investigations as needed.

### Management

- Can present as an urgency or emergency, when it requires acute and urgent treatment
- Great majority, a chronic presentation requiring slow titration of medication
- Can be prevented from developing by the adoption of lifestyle measures
- Confirm high BP by several readings after periods of rest
  - Concept of regression towards the mean
- Adopt lifestyle modifications
- Start drugs in low doses and increase gradually until target BP are reached
- Consider combinations with low doses of individual drugs
- Regular follow-up
- Decide and record target to aim for (look up guidelines)
- Lifestyle modifications and education
- Drug therapy – Pharmacology of main classes of anti-hypertensive agents – diuretics, beta blockers, calcium channel blockers, ACE inhibitors, angiotensin receptor blockers (ARBs)
- Choice of initial agent or agents
- Addition of drugs
- Importance of diuretics in overall management
- Combination therapy
- Problems of compliance
- Guidelines – JNC, European, International, etc.
- Main trials – efficacy of drug therapy; head to head comparisons
- Beneficial effects of lowering the BP.

## **Module 3 - Ischaemic Heart Disease(IHD)**

### Anatomy

- Detailed anatomy of the coronary arteries
- Concept of end arteries
- Superficial coronary arteries and their penetrating branches
- Effect of myocardial contraction on coronary flow
- Territorial supply of the LAD, LCX and RCA
- Concept of Lt. and Rt. Dominance.

### Physiology

- Concept of O<sub>2</sub> supply and O<sub>2</sub> demand
- Factors affecting O<sub>2</sub> demand
- Factors affecting O<sub>2</sub> supply
- The bi-product (rate x SBP)
- Normal myocardial metabolism and oxygen extraction
- Neurogenic and Humoral control of heart rate and BP.

### Pathology

- Causes of imbalance of O<sub>2</sub> demand and supply
- Pathology of atheroma
- Risk factors – established and new. Fundamental importance of lipid abnormalities, high BP and cigarette smoking
- Concept of stable and unstable plaque
- Fissuring of the plaque
- Consequences of fissuring
- Platelet activation.

### Clinical Syndromes

- Presentation as:
  - Chest pain
  - Cardiac arrhythmias
  - Cardiac failure
  - Combinations of the above
- Chest pain – Classical description
- Importance of a good and detailed history
- Physical examination
- Stable angina
- Unstable angina
- Myocardial infarction
- Concept of acute coronary syndrome (ACS)

### Investigations

- Resting ECG
- Stress ECG
- Echo and Stress Echo
- Thallium Scan
- Angiography.

### Management

- Regression of the disease
- Symptomatic treatment
- Treatment of complications
- Prevention of the development and progression of the disease
  - Global control of risk factors
  - Importance of cholesterol control
  - Lifestyle modifications
  - Statin trials
- Drug control of Ischaemia
  - Beta blockers
  - Calcium channel antagonists
  - Nitrates
  - ACEI
- Platelet activation
  - Aspirin
  - Thienopyridines – clopidogrel and ticlopidine
  - Heparin
  - GPIIb/IIIa receptor inhibitor
- Protection of the myocardium in acute MI
  - ACEI – acutely and long term
- Re-establishing the circulation as soon as possible in ST segment elevation MI
  - Fibrinolytic agents
  - Balloon angioplasty
  - CABG
- Chronic Ischaemia
  - Pharmacological
  - Balloon angioplasty
  - CABG



## **Module 4 - Cardiac Arrhythmias**

### Anatomy

- Conducting system of the heart
- Sino atrial (SA) and atrio-ventricular (AV) nodes
- Bundle branches
- Purkinje's tissue
- Pacemakers to the heart
- Blood supply to the conduction system
- Neural and Humoral control of pacemakers and conduction.

### Physiology

- Concept of working cells and conducting cells
- Action potentials of working and conducting cells
- Electrolyte movements across cell membranes contributing to the action potential
- Concept of automaticity
- Factors affecting automaticity
- Function of SA and AV nodes
- Detailed understanding of sinus rhythm and normal conduction.

### Pathophysiology

- Increased automaticity – causes and effects
- Abnormal conduction
- Circus movement
- Effect of neuro and humoral input

### The ECG

- Fundamental importance in the assessment of arrhythmias
- Detailed understanding of the ECG in sinus rhythm
- Learn to read ECG systematically – Rate, locate and describe P, measure the PR interval, locate measure and describe the QRST complex, and describe the relationship of the various components to each other.

### Heart Blocks

- SA
- AV nodal – types
- Bundle branch blocks

### Classifications

- Clinical – Tachycardias and Bradycardias
- Pathological

### Clinical Presentation

- Asymptomatic
- Palpitations – fast, slow, regular, or irregular
- Decrease in cardiac output
  - Dizziness and other neurological symptoms including loss of consciousness
  - Loss of energy
  - Cardiac failure
- Establish underlying cause

### Clinical Examination

- Arterial pulse
- Venous pulse
- Apical pulse
- Examination of the heart

### Investigations

- ECG
- 24-Hour Holter monitoring
- Electrophysiological studies.

### Management

- Pharmacological
  - Pharmacological properties of main anti-arrhythmic agents
  - Classification
  - Side effects
  - Effect on symptoms and survival
  - Important clinical trials
- Non-Pharmacological
  - Pacemakers
  - Anti-tachycardia pacemakers
  - Implantable defibrillators
  - Defibrillation

## **Module 5 - Valvular Heart Disease**

### Anatomy

- Heart in general
- Individual valves – leaflets and rings
  - Mitral
  - Tricuspid
  - Aortic
  - Pulmonary
- Structure of the valve leaflet
- Blood supply of the valve cusps

### Physiology & Pathophysiology

- Function of the valves
- Concept of pressure and volume
- Stenosis and incompetence and their effects on pressures and volumes

### Pathology

- Abnormal structure of the valves according to pathology
  - Stenosis
  - Incompetence (Regurgitation)
- Conditions likely to lead to pathology
  - Rheumatic fever
  - Congenital
  - Infections
  - Trauma.

### **Mitral Stenosis**

- Aetiology – almost always rheumatic
- Description
- Relation of symptoms to valve area.

### Pathology and Pathophysiology

- Structure – effect on cusps, commissures, and subvalvular apparatus
- Effect on pressure and volumes of LA and LV and other chambers
- Pulmonary congestion and pulmonary hypertension
- Consequences of pulmonary congestion
- Consequences of abnormality of structure of valve.

### Clinical Features – Symptoms

- Dyspnoea – classification
- Tendency to chest infections
- Tendency to atrial fibrillation with all its consequences
- Pulmonary hypertension
- Right sided failure.

### Clinical Features – Signs

- Position patient to hear relevant signs
- Use bell stethoscope at the apex to listen for apical murmur
- Description of mid diastolic and late diastolic murmur
- Loud first sound
- Opening snap
- P2 increased.

### Complications

- Pulmonary congestion
- Right sided cardiac failure
- Infective endocarditis

### Investigations

- ECG
- Chest X-rays
- Echocardiography
- Cardiac Catheterization

### Prevention

- Prevention of rheumatic fever
- Prevention of recurrence of rheumatic fever
- Prevention of infective endocarditis.

### Management

- Treat symptoms particularly dyspnoea
- Control ventricular rate particularly in AF by Beta-blockers.
- Prevent systemic embolisation particularly in AF
- Assess degree and determine time for mechanical relief of stenosis by balloon valvotomy or surgical valvotomy.

## **Mitral Regurgitation**

### Causes

- Rheumatic
- Degenerative
- Myxmatous
- Endocarditis
- Ischaemic
- Functional

### Pathophysiology

- Increased chronic LV volume overload
- Increased LV enlargement leading to increased mitral regurgitation
- Backflow

### Symptoms

- Similar to mitral stenosis.

### Physical Signs

- Displaced AB
- Apical pansystolic murmur radiating to axilla.

### Investigations and Prevention

- As for MS

### Treatment

- Symptomatic diuretics
- If Sx or LV dilatation, dysfunction, AF, or pulmonary hypertension, surgery to be considered
- Surgical treatment – valvuloplasty or valve replacement.

## **Aortic Valve Disease**

### Aortic Stenosis

- Causes :
  - Rheumatic
  - Congenital
  - Degenerative

### Description of Physical Signs

- Decreased loudness of 2<sup>nd</sup> aortic sound
- Ejection systolic murmur radiating to carotids
- Importance of pulse examination
- Importance of BP examination
- Signs of LV failure.

### Methods of Management

- Valve replacement
- Surgery
- Via catheter.

### **Aortic Regurgitation**

- Causes:
  - Rheumatic
  - Congenital
  - Other causes

### **Physical Signs**

- Early diastolic murmur
- Collapsing pulse – large pulse pressure with a low diastolic reading.

### **Management**

- Medical
- Surgical
  - Valvuloplasty
  - Valve replacement

### **Tricuspid Incompetence**

**Etiology** : Mostly 2<sup>o</sup> (> 90%) → Functional TR due to pulmonary hypertension

- Left side heart failure
- MS and/or MR
- Primary lung disease
- Left to right shunt
- Eisenmenger syndrome
- Hyperthyroidism.

### **Very rare 1<sup>o</sup> causes**

- Pacemaker/ICD catheter induced
- Infective endocarditis
- Rheumatic fever
- IHD

### Symptoms

- When TR is severe – mostly vague signs or asymptomatic
- Sensation of pulsation in the neck
- Signs of right side heart failure
  - Painful right flank
  - Ascites
  - Peripheral oedema
- Low output sign – fatigue/weakness/shortness of breath.

### Signs

- Cachexia, chronic illness and occasionally cyanotic/jaundiced
- JVP distended with V waves
- Parasternal heave + pansystolic murmur in tricuspid area
- Ascites and peripheral oedema
- Hepatomegaly - may be pulsatile

### Investigation

- Echocardiogram

## **Module 6 - Congenital Heart Disease (Adult)**

### **1. Atrial septal Defect (ASD)**

- Several types:
  - I. Secundum most common – region of fossa ovalis
  - II. Primum – at the AV cusion
  - III. Sinus venosa – Superior, inferior vena cava and coronary sinus.
- Most adult ASD are asymptomatic for a long time – RV can tolerate volume overload for a long time. Eventually they will present with CHF, pulmonary hypertension or AF. Very rarely strokes or TIA from paradoxical embolisation.
- Patients regardless of age with a significant ASD should be closed.
- Catheter closure possible in certain seondum ASDs and is preferred to surgical treatment. All others require surgical treatment.

#### Reasons to keep ASD Open:

1. Small ASD - Not haemodynamically significant
  - RV is not enlarged
2. ASD with pulmonary vascular disease (↑ Pulmonary Vascular Resistance)
3. ASD with ↑ LA pressure

Patient with ASD closed in patients > 25 years of age especially with PH should be followed up closely – higher chance of CHF/AF stroke.

### **2. Ventricular Septal Defect (VSD)**

- Varying size and shape anywhere in the ventricular septum
- Haemodynamically significant if there is increased LV volume overload and varying degrees of pulmonary hypertension
- Can be associated with other congenital heart disease or acquired abnormalities including AR, PHT
- Echo most important modality of imaging for decision of treatment options and indication
- Varying prognosis
  - Small VSD without complication – Excellent (95% 20-year survival)
  - Eisenmenger – only 50% 20-year survival.
- Repair or subcutaneous closure not required for
  - Small uncomplicated VSDs
  - Those with irreversible PHT
- Those with repaired VSD who have significant residual shunt, heart failure, AR, pulmonary hypertension should be followed up at least yearly.
- Patients with Eisenmenger should avoid pregnancy.



## **Module 7 - Other Conditions**

### **Pulmonary Embolism**

#### Classification:

- 1) Massive : Systemic BP < 90 mmHg or a drop of SBP > 40 mmHg from baseline for > 15 minutes.
- 2) Submassive : All Others.

#### Prognosis :

- Without treatment, 30% mortality.
- Accurate diagnosis and effective anticoagulation reduces mortality to 2 – 8%

#### Symptoms :

- Very variable and nonspecific and common in patients with PE or without PE
- Dyspnoea at rest, on exertion
- Pleuritic chest pain
- Cough
- > than 2 pillow orthopnoea
- Calf or thigh pain or swelling

#### Signs :

- Tachypnoea, tachycardia
- Rales
- Loud P2 and raised JVP.

#### Diagnosis :

1. Clinical probability – assessment most important (Well's Criteria)
2. D-dimer as screening test for low or medium risk clinically.
3. V/Q scan or CT pulmonary angiogram as confirmatory test depending on availability.
4. Prognostic Markers : Troponin, Brain Natriuretic Peptide (BNP), right ventricular dysfunction on Echo.

#### Treatment :

Anticoagulation mainstay of treatment

Other treatment strategies include thrombolytics especially in massive PE

Inferior venacaval filters and embolectomy.

## **Pulmonary Hypertension**

### Symptoms:

- Vague, i.e., exertional dyspnoea, lethargy and fatigue, therefore delayed clinical diagnosis
- Peripheral oedema, exertional chest pain, exertional syncope

### Signs:

Loud P2, parasternal heave,  $\pm$  TR, RV heart failure.

### Diagnosis and Investigation:

- For confirmation of PH and to look for the causes
- Chest x-ray, ECG, Echo, Pulmonary Function Test
- Overnight oxymetry, polysomnography, V/Q scan, AWA, RAF, ANCA, HIV, LFT.
- Right side catheter.

Primary Pulmonary Hypertension is a diagnosis of exclusion.

### Treatment:

- Difficult
- Reverse the causes
- New drugs now coming into market.

## **Outcomes**

On completion of this programme, students will be able to

- Analyse, evaluate and manage cardiac cases
- Work as part of a medical team.
- Practical Skills - They will be able to:
  - Take a focused clinical history relevant to the patient's complaint
  - Carry out a relevant clinical examination
  - Generate a differential diagnosis
  - Order relevant investigations to clarify the diagnosis
  - Prepare a therapeutic plan for management of the clinical situation.
- Transferable Skills - They will be able to:
  - Communicate effectively with colleagues, both senior and junior, and paramedical staff the findings and therapeutic plan
  - Communicate effectively using plain language rather than use of jargon
  - Communicate the plan of management to the patient presenting all possible options and obtaining informed consent for procedures and therapeutic actions
  - Communicate with patients and relatives in a respectful and sympathetic manner.