SYLLABUS FOR D.M.R.D. (RADIO-DIAGNOSIS & IMAGING SCIENCES).

GOAL:- The broad goal of the teaching & training of Post-graduate student in Radio-Diagnosis is tomake them understand & implement the knowledge regarding the role of various imaging modalities,helpful in the management of different clinical conditions. At the end of his/her training, he/she should be
capable to take up a career in teaching institution or in diagnostic center or in research..

OBJECTIVES :-

a) Knowledge:- At the end of the course the student shall be able to:
1) Explain the interaction of tile X-rays with mater to produce an image.
2) Fromiliarize with the principles of various imaging modalities (e.g. .US/CT/MRI) & their applications
in medicine.
3) Explain the biological hazards of ionizing radiation & protective measures.
4) Explain the normal Anatomy, Physiology of various organs and their deviation from normal) & its
consequences.
5} Summarize the fundamental aspects of embryology & alteration in development with reference to
congenital anomalies.
6) Select appropriate imaging modality for- study of specific condition.
7) Explain .the role of imaging, pre-operative, intra-operative & post-operative Conditions.
8) Evaluate role of imaging modalities in various therapeutic applications (lnterventional Radiology)
9) Update information about recent advances in imaging sciences.
10) Effectively organize & supervise the diagnostic proceduces to ensure quality control/assurances

b) Skills:-

At the end of the course the student shall be able to :
1) Make use of conventional & other imaging sciences to achieve definitive diagnosis.
2) Analyse & interpret imaging data.
3) Demonstrate the skills of solving Scientific & clinical problems & decision making.
4) Develop skills as a self:-directed learner recognize cointinuing educational needs, select & use
appropriate learning resources.
5) Demonstrate Comperence in basic concepts of research methodology & be able to critically aualyse
relevant literature.

c) Integration-

Knowledge acquired in Radio diagnosis shall help the students to integrate imaging techniques
with structure & function of the human body in health & disease.

D.M. R. D.

PAPER I :
Radiology Physics with Radiological Procedures

Radiation Physics, Protective measures and Physics involving imaging techniques and radiological procedures(IVP, barium procedures , antergrade pyelography and distal loopogram)

PAPER II :
Radiological Imaging in Congenital and Systemic Diseases.

a)Respiratory system
b)Cardio Vascular System
c)Gastro Intestinal Tract
d)Skeletal system
e)Genito Urinary System.

PAPER III :
Miscellaneous and Recent Advances

a) Hepato-biliary system
b) CNS
c) Interventional procedures.
    a. HSG & FTR
    b. 4 vessel angiography
    c. Biliary intervention(PTBD,PTC)
    d. PCN
    e. Laser ablation of varicose veins
    f. RFA/ chemoembolisation of hepatic tumour and malformations.
    g. Vertebroplasty.
    h. Hemangioma and AVM management.
d) Miscellaneous

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Syllabus for DMRD

A. RADIOLOGICAL PHYSICS & X-RAY TECHNOLOGY:

1. Radiation :
2. Production of X -Rays :
3. X- Ray Generators :
4. Basic Interaction between X- Rays and Matter :
5. Attenuation:
6. Filters :
7. X- Ray beam restrictors :
8. Physical characteristics of x- Ray films & film Processing :
9. Photographic characteristics of X- Ray films :
10. Fluroscopic imaging and image intensifier
11. Viewing & recording of the Fluroscopic Image :
12. The Radiographic Image :
13. Geometry of the Radiographic Image :
14. Body section Radiography:
15. Stereoscopy:
16. Xero - Radiography :
17. Computed Tomography:
18. Ultrasound
19. Atomic structure, Radioactive Isotopes & Gamma Camera :
20. Digital Subtraction Angiography:

B. DARK ROOM TECHNIQUES

1. Layout of Ideal Dark Room: maintenance and its accessories :
2. Developer: ingredients & their action :
3. Developer: exhaustion & methods of determination :
4. Replenisher & rapid development :
5. Fixer: ingredients & their action :
6. Fixer: exhaustion & methods of determination :
7. Intensifying screens /construction, types and advantages :
8. Intensification factor :
9. Cassette: .construction & care
10. Factors affecting image details :
11. Factors affecting image contrast & density :
12. Grids : construction & types
13. Cones & collimeter :
14. X Ray films -construction, types & storage :
15. Film fog :
16. Hangers:
17. Safe light :
18. Automatic developing unit :

C. BASIC RADIOLOGY

I. IMAGING TECHNIQUIES AND MODALITIES

Radiation Protection and patient doses in diagnostic radiology
Intravascular Contrast Media
Whole body Computed Tomography: Recent Advances
Ultrasound : general Principles
Functional and Physiological Imaging
Medicolegal issues in Diagnostic Radiology

II. RESPIRATORY SYSTEM :

Techniques of Investigations

Standard Techniques
Tomography:
a) Conventional film Tomography
b) Computed Tomography
Ultrasound
Angiography

Normal Chest:

The Lungs (Radiological Anatomy} & CT Terminology)
The Central Airways
The Lungs beyond Hila
The Hila
The Mediastinum : b) Plain film appearances
i) The junctional lines :
ii) The right Mediastinum above azygous vein
iii) The left Mediastinum above Aortic arch
vi) The supra aortic Mediastinum on lateral view
v) The right Middle Mediastinum border below azygous arch.
vi) The left cardiac border below aortic arch
vii) The para spinal lines
viii) The retrosternal line
The Diaphragm

Interpretation the Chest Radiograph :

Identification of the Radiograph
Technical Consideration
Detection and Description of abnormalities: i) Silhouette Sie
ii) Alterations
iii) Consolidation
iv) Collapse
v) Nodular Opacities
vi) Ring Opacities
vii) Linear/ Intestitial/ Pleural, /Chest Opacities.
viii) Abnormal Transradiancy

Pleura & Diphragm

The Pleura :

i) Normal Pleura
ii) Pleural Pathologies

The Diaphragm :

i) Height/ Eventration/Movements/Paralysis
ii) Hernias/Trauma/Neoplasm

The Mediastinum :

Mediastinal Masses: i) Thyroid/ Para Thyroid Messes/Thymic tumors/Tymic hyperplasia/Teratoma/ Cermcell Tumor.
ii) Mediastinal lymphadenopthy
iii) Neurogenic Tumors
iv) Extra medullar heamatopes/Mesenchymal Iumors

Differential Diagnosis:

Other Mediastinal Lesions: i) Acute/ fibrosing Medlastinitis

Pulmonary Infections in Adults .

Pneumonia
Associated features and complications of pneumonia
Pulmonary tuberculosis
HIV & AIDS

Pulmonary lobar Collapse essential considerations :

Pulmonary Neoplasms :

Bronchial Carcinomas
Benign Pulmonary Tumors
Malignant Lymphoma
Metastases
The solitary Pulmonary Nodule

Congenital Pulmonary Anamolies :

Abnormal Development of Lung Bud
Abnormalities of separation of the lung had from the foregut
Abnormalities of Pulmonary Vasculature
Ectopic of Hamartomatous Development

The Infant and Young Child :

Pathologies of Diaphragm
Pleural Abnormalities
Inflammation
Airway Obstruction
Diffuse Lung Disease .
Respiratory Distress in Newborn Baby

III. THE HEART AND GREAT VESSELS

Cardiac Anatomy and Enlargement- :

.1 Plain Radiography
.2 Enlargement of various chambers on Plain Radiography

Congenital Heart Disease :

1 General Principles
.2 Left to right shunts .
.3 Central Sinuses
.4 Other Congenital Heart Disease

Aquired Heart Disease : i) Non Rheumatic/ Rheumatic Mitral VD
ii) Tricuspid VD
iii) Aortic VD

IV .THE GASTROINTESTINAL TRACT:

The Abdomen: Plain Radiographic findings In acute abdomen
Normal appearances
Abdominal Calcification/Dilatation of bowel/Pneumoperitoneum
The Post Operative Abdomen
Inflammatory Conditions

The Esophagus
Anatomy .and Functions
Methods of Examination
Pathologies of Esophagus
Motility Disorders
Extrinsic lesions/ miscellaneous conditions

The stomach
Radiological anatomy and methods of examination
Inflammatory Diseases
Neoplastic Conditions

The Duodenum
Anatomy and Normal Appearances
Methods of Radiological Examination
Peptic ulceration
Gastro heterotopia /diverticula
Neoplasms benign and malignant

The Small Intestine
Anatomy and normal appearances
Methods of radiological examination
Crohns disease/Coeliac Disease/Neoplasms/various conditions

The Large Bowel
Anatomy and Normal Appearances
Methods of Radiological Examination
Tumors
Diverticular Disease
Colitis
Aids
Miscellaneous Conditions

V. Skeletal System :

Skeletal Trauma

Bone Tumors : Generals Characteristic & Benign Lesions

Bone Tumors : Malignant Lesions

Metabolic and Endocrine Disease of the Skeletal

Joints Diseases :
Rhumatiod Arthritis
Other Connective Tissue Disease
Crystal Deposition Arthropathy
Degenerative Joint Disorders/Degenerative spine

Bone Tumors in Children and adults

Imaging approach
Benign Bone Tumors
Malignant Bone Tumors

Bone and Soft tissue infection in Children and adults.

VI Genito Urinary Tract :

Methods of Investigation

Renal Parenchymal Disease

Normal Appearance
Renal Parenchymal Disease
Parasitic Infections

Renal Masses :

Methods of Analysis
Pathological Renal Masses
Neoplastic Renal Masses

Calculus Disease & Urothelial Lesions

Calculus Disease
Nephrocalcinosis
Urothelial Tumors

Urinary Obstruction:

Pathophysiology
Causes of Obstruction

Radiological Evaluation of Urinary Bladder, Prostrate & Urethra

Imaging of Paediatric Pelvis :

Imaging Techniques ;
Normal Anatomy
Congenital Anomalies
Pelvis Masses
Scrotal Disease

VII Liver, Biliary tract, Pancreas

The Liver

Normal and variant Anatomy
Liver Imaging Techniques
Diffuse Disease
Focal Disease
Intervention

The Biliary Tract

Anatomic Consideration
Methods of investigation
Biliary Disorders

The Pancreas

Embryology and Anatomy
Congenital Anomalies
Multisystem Diseases with Pancreatic involvement
Pancreatitis
Pancreatic Neoplasms
Trauma
Interventional Radiology in Pancreas

Reticuloendothenial Disorders: The Spleen
Imaging Techniques
Normal Anatomy
Splenomegaly
Benign Mass Lesions
Malignant Mass Lesions
Splenic Trauma

VIII. Central Nerve System :

Skull and Brain : Methods of Examination and Anatomy

Cranial and Intracranial Pathology : Tumors in Adults
Cerebro Vascular Disease and Non TraumaticIntracranial Haemorrhage
Infections, AIDS, Demyelinating and Metabolic
Disease

IX Spine: Method of Investigation
Imaging of Spinal Pathology

X. The Orbit; ENT; Face; Teeth:

The Orbit
Anatomy / Techniques
Intraoccular Abnormalities
Lacrimal Gland Tumors
Muscular Tumors
Intra/Extra Canal Tumors

Ear, Nose and Throat Radiology
The Ear
Nose and Paranasal Sinuses
Pharynx

XI. Interventional procedures.

1. HSG & FTR
2. 4 vessel angiography
3. Biliary intervention(PTBD,PTC)
4. PCN
5. Laser ablation of varicose veins
6. RFA/ chemoembolisation of hepatic tumour and malformations.
7. Vertebroplasty.
8. Hemangioma and AVM management