Medical Imaging Module – 04th Year 1st and 2nd Semesters

From 2015/2016 Batch

Topic	Objectives	Time	Dept.	T / L Activity	Comments
Basic principles of interpretation of the radiographs of chest, abdomen, KUB, axial & appendicular skeleton	• Understand the principles of interpretation of commonly performed plain radiographs	1 hour	Dep. of Radiology	Lecture Demonstration	Recall the anatomy knowledge prior to the lecture
Basic principles of interpretation of ultrasonography, computerized tomography and magnetic resonance imaging	• Understand the principles of interpretation of ultrasonography, CT and MRI	1 hour	Dep. of Radiology	Lecture Demonstration	
Imaging of pulmonary nodules and cavities	• List common causes of solitary and multiple pulmonary nodules • Identify, characterize and describe nodular lung pathology in Chest radiographs • Appreciate nodular lesions in lung with respect to their sizes and number • Able to differentiate nodules from patches of alveolar or acinar shadowing (consolidations)	1 hour	Dep. of Radiology	Lecture Demonstrations	Recall lung segments
Application of CT in chest pathology	• Describe the selection of type of CT performed in different chest pathologies • List the indications for chest CT • Discuss the applications of chest CT • Identify the radiological signs of common chest diseases on CT	1 hour	Dep. of Radiology	Lecture Demonstration	

Imaging of pulmonary tuberculosis **(Extra pulmonary tuberculosis is covered with lectures on other systems)**	• Identify the radiological signs of various manifestations of primary and post primary pulmonary TB • Describe the radiological signs of active pulmonary TB • Describe radiological manifestations of pulmonary TB in immunocompromised patient	1 hour	Dep. of Radiology	Lecture Demonstration	
Imaging of congenital & acquired heart diseases	• List the methods of imaging • Describe radiological signs of common congenital & acquired heart diseases	1 hour	Dep. of Radiology	Lecture Demonstration	
Imaging of acute abdomen	• List the imaging modalities used in the assessment of the acute abdomen • Discuss the choice of methods of imaging in different conditions causing acute abdomen and limitations of each modality • Describe the radiological signs of the common conditions causing acute abdomen	1 hour	Dep. of Radiology	Lecture Demonstration	
Imaging of inflammatory & neoplastic bowel diseases	• List the methods of imaging in inflammatory and neoplastic bowel diseases • Explain the role of imaging in diagnosis of inflammatory & neoplastic bowel disease in current clinical practice • Describe radiological signs of manifestations of inflammatory and neoplastic bowel diseases with pathological basis	1 hour	Dep. of Radiology	Lecture Demonstration	Recall the pathology knowledge
Imaging in hepatobiliary diseases and pancreatic pathology	• List the methods of imaging modalities available to diagnose the hepatobiliary	1 hour	Dep. of Radiology	Lecture Demonstration	

	and pancreatic diseases • Discuss the choice of imaging in different hepatobiliary and pancreatic diseases and limitation of each modality • Describe the radiological signs of common pathological conditions				
Imaging in congenital anomalies of urinary tract & obstructive uropathy	• List the imaging modalities used to diagnose the congenital anomalies of the urinary tract & obstructive uropathy • Describe the radiological signs of the common congenital anomalies of the urinary tract & obstructive uropathy	1 hour	Dep. of Radiology	Lecture Demonstration	Recall embryology
Imaging of inflammatory & neoplastic diseases of urinary tract	• Recall clinical presentations of UTI & renal neoplasm • List the methods of imaging of UTI & renal neoplasm • Describe radiological signs of acute and chronic infections of the urinary tract & renal neoplasm in the above imaging methods • Discuss the role of imaging in acute and chronic infections of the urinary tract & renal neoplasm	1 hour	Dep. of Radiology	Lecture Demonstrations	
Imaging in neoplastic and inflammatory disease of CNS	• Recall the inflammatory and neoplastic conditions of CNS • Describe the role of imaging in common inflammatory & neoplastic pathologies of CNS including limitations • Describe the application of the concept of blood brain barrier disruption on imaging • Describe the radiological signs of	1 hour	Dep. of Radiology	Lecture Demonstration	

	common inflammatory & neoplastic pathologies of CNS				
Imaging in stroke & intracranial hemorrhage	• Recall the normal anatomy the cerebral vasculature • Discuss the role of imaging in stroke and intracerebral haemorrhage including selection of appropriate imaging modality • Describe the CT and MR appearances in ischemic stroke, haemorrhagic stroke and intracranial haemorrhages	1 hour	Dep. of Radiology	Lecture Demonstration	
Imaging of inflammatory, neoplastic diseases of bone and arthropathies	• Describe the role of imaging in the evaluation of bone pathology • State the modes of imaging, their application and limitations • Discuss the correlation of pathology with imaging	1 hour	Dep. of Radiology	Lecture Demonstrations	
Basic concepts of trauma imaging	• State the imaging modalities used in trauma • Describe the basic concepts in trauma imaging including the selection of appropriate imaging modality • Be able to identify the bone and soft tissue injuries in different organ systems in trauma	1 hour	Dep. of Radiology	Lecture Demonstrations	
Imaging in endocrine and metabolic disorders	• Discuss the application of imaging in common endocrine and metabolic disorders • Describe the radiological signs of common endocrine and metabolic disorders	1 hour	Dep. of Radiology	Lecture Demonstrations	Except thyroid

Imaging in obstetrics & gynaecology	• State the imaging modalities used in gynaecology and obstetrics • Describe the role of imaging in common gynaecological conditions • Describe the role of imaging in obstetrics - Diagnosis and assessment of early pregnancy - Determination of gestational age - Assessment of fetal growth & well being - To detect congenital anomalies	1 hour	Dep. of Radiology	Lecture Demonstrations	
Imaging of breast & thyroid diseases	• List the breast and thyroid imaging techniques • Describe the role of different imaging methods in breast and thyroid diseases • Identify the normal & abnormal imaging findings	1 hour	Dep. of Radiology	Lecture Demonstrations	
Imaging in paediatrics and neonatology	• Understand that the imaging of paediatrics and neonatology is different from adults with special emphasis on radiation protection. • Understand the appropriate use and limitation of each imaging modality in the evaluation of neonates and children • Identify the imaging features of common diseases of children and neonates in different imaging modalities.	1 hour	Dep. of Radiology	Lecture Demonstrations	
Imaging in peripheral vascular diseases (arterial & venous)	• State the role of application of imaging in the diagnosis and treatment of vascular pathology	1 hour	Dep. of Radiology	Lecture Demonstrations	

	• Identify arterial stenosis and occlusions on Doppler USS, DSA, CT and MRI images • State the application of ultra sound/ Doppler in diagnosis of DVT and varicose vein disease. • State the Radiologist role in the management of DVT and varicose vein disease				
Imaging in scrotum and prostate	• State the imaging modalities used to assess the scrotum and prostate. • To understand the choice of imaging methods in different conditions • Identify the imaging appearances of common pathological conditions	1 hour	Dep. of Radiology	Lecture Demonstrations	
Basic concepts of radiological interventions and radiation protection	• State the basic interventional radiological (IR) methods used in the management of patients • Describe the application of IR in current medical practice	1 hour	Dep. of Radiology	Lecture Demonstrations	

Topic	Objectives	Time	Dept.	T / L Activity	Comments
Principles of Nuclear Imaging and Radiation Protection Issues in NM	• Understand the basic principles practice in Nuclear Medicine and learn differences between functional imaging and structural imaging • List different types of common NM imaging equipment (planer, SPECT, PET Hybrid or molecular imaging, SPECT/CT, PET/CT and PET/MRI) • List different isotopes/ radiopharmaceuticals commonly used in medical practice and basis of their selection • Understand the radiation protection issues related to NM practice • Learn basic principles in radiation waste disposal	1 hour	Nuclear Medicine Unit	Lecture Demonstrations	
Nuclear Imaging of Urinary Tract Pathology and Obstructive Uropathy	• Learn basic principles behind isotope renal scans and pathophysiology of functional imaging • List indications for renal isotope scan • List different types of renal isotope scans(dynamic and static) and different radiopharmaceuticals in renal imaging (DTPA, MAG3/DMSA) • Patient selection, preparation and imaging procedure • Principles of interpretation of DTPA/ DMSA/ Captopril and Diuretics augmented renal scans	1 hour	Nuclear Medicine Unit	Lecture Demonstrations	

	• Isotope renal studies in Renal Donors, post-transplant evaluation • Isotope application in common testicular problems.(torsion testis/ epididymitis)				
Application of Nuclear imaging in Thyroid diseases other common endocrinopathies	• Recall anatomy, embryological development and physiology of common abnormalities of endocrine glands (thyroid, parathyroid, adrenal) • Describe the thyroid gland dysfunction and application of nuclear medicine in the management of common thyroid diseases • Understand different pathological types of thyroid cancers and basis behind the radioiodine based imaging and therapy • Learn parathyroid gland related diseases, MEN 1 and MEN 2 syndromes • Learn Nuclear imaging procedures available to confirm parathyroid adenoma and hyperplasia, different isotopes, radiopharmaceuticals used in parathyroid imaging • Learn isotope imaging procedures available to confirm adrenal hyperplasia / tumors • Somastostatin receptor imaging in pancreatic tumors	1 hour	Nuclear Medicine Unit	Lecture Demonstrations	
Application of Nuclear imaging in inflammatory and neoplastic bone diseases	▪ Understand the radionuclide bone scan as the cornerstone of skeletal nuclear medicine imaging	1 hour	Nuclear Medicine Unit	Lecture Demonstrations	

	▪ Learn radiotracers used in evaluation of bone formation in the skeleton related to malignant and benign disease, as well as physiological processes ▪ Learn different methods available for bone imaging and use of isotopes as the functional image to assess the bone pathologies ▪ Understand common clinical indications for bone scans ▪ Oncology (primary bone tumors, bone metastases) ▪ Rheumatology (small joint imaging ▪ Bone and joint infection ▪ Orthopedics, sports and traumatology including shin splints Spondylolisthesis (acute or subacute) & Radiological occult stress-related fractures (e.g. scaphoid, tarsals) or nonspecific symptoms osteoporotic vertebral or occult fractures, sacral fractures, femoral head or neck fractures, tibial plateau fractures, tarsal and metatarsal fractures & Septic loosening, prosthesis (hip, knee, ankle, or shoulder) &Pseudoarthrosis (delayed union, non-union) ▪ Metabolic bone diseases (Hyperparathyroidism (primary				

	and secondary) &Osteomalacia& Renal osteodystrophy & Rare skeletal manifestations of endocrine disorders, including hyperthyroidism and acromegaly & Vitamin D deficiency) ▪ Bone scans in children (Osteochondritis of the hip (Legg-Calvé-Perthes disease) & Transient synovitis of the hip & Osteoid osteoma & Battered child syndrome & Mandibular condylar hyperplasia & Bone infarction (osteomyelitis, sickle cell disease, thalassaemia) ▪				
Nuclear Imaging of myocardial perfusion and pulmonary embolism **Myocardial perfusion Imaging (MPI)**	• List different Imaging modalities use in Cardiology practice to assess the myocardial viability and understand the unique features of each modality • Understand the basic principles practiced in Nuclear Cardiology as a well-established technique to assess myocardial perfusion and ventricular function • Recall the normal coronary vascular pattern and common variations • Understand the cardiac cascade • Learn basic principles and basis of myocardial perfusion studies • Learn indications, common protocols, radiopharmaceuticals	1 hour	Nuclear Medicine Unit	Lecture Demonstrations	

Lung perfusion (V/Q scans)	use in MPI • Basis of Rest and Stress imaging and image interpretation • Understand the Radiation protection issues related to MPI studies • Understand different diagnostic tools use in the diagnosis of pulmonary embolism (PE) • Recall the pulmonary anatomy, perfusion andBroncho pulmonary segments • Common indications for VQ studies and common clinical presentations • Learn common protocols, radiopharmaceuticals use in V/Q scans • Learn PIOPED criteria and interpretation of VQ studies				
Nuclear imaging in gastro intestinal bleeding and hepatobiliary disorders **A. GIT bleeding**	• Learn frequent causes for GIT bleeding • Understand the basic principles behind red blood cell labeling, isotope / pharmaceutical's use in detection of GIT bleeding • Learn advantages of RBC labeling scan over endoscopy studies • Learn basis of Meckel's scan, indications, patient preparation and limitations	1 hour	Nuclear Medicine Unit	Lecture Demonstrations	

B. Hepatobiliary imaging	• Understand different imaging modalities and recall the anatomy of the liver and the biliary system • Learn common clinical indications for hepatobiliary studies • Learn patient preparation for HIDA scans • Image interpretation in different disease conditions • Other indications for Liver / spleen imaging – focal nodular hyperplasia, liver blood pool imaging for haemangiomas, denatured RBC scan to identify accessory spleen				
Nuclear Imaging in infections and inflammation	• Understand the natural process of acute Infection & Inflammation • Learn indications for infection imaging (while cell labelling, leucoscans, infecton scan) • Learn commonly used Isotopes and radiopharmaceuticals • Learn common indications for infection imaging – deep seated abscess • Patients with Irritable bowel syndrome (IBS), Ulcerative colitis and Crohn's disease	1 hour	Nuclear Medicine	Lecture Demonstrations	
Tutorials in Nuclear Medicine	• Recall different NM procedures available for clinical practice	1 hour	Nuclear Medicine	Discussions	

	• Group discussions based on Questions and answers • Read with expert and case discussion		Unit		
Tutorials in Radiology		1 hour	Dep. of Radiology	Discussions	

Number of Radiology Lectures: 22
Number of Nuclear Medicine Lectures: 7
Total Number of Lectures: 29