ประมวลรายวิชา (Course Syllabus)

รังสีวิทยาวินิจฉัย

Diagnostic Imaging

นิสิตแพทย์ปีที่ 5

Fifth year Medical Students

1.	**รหัสรายวิชา**	**3011512**
	Subject code	3011512
2.	**จำนวนหน่วยกิต**	2**(1-3-2)**
	Course Credit	2(1-3-2)
3.	**ชื่อวิชา**	**รังสีวิทยาวินิจฉัย**
	Course Title	Diagnostic Imaging
4.	**คณะ/ภาควิชา**	**แพทยศาสตร์/รังสีวิทยา**
	Faculty/Department	Medicine/Radiology
5.	**ภาคการศึกษา**	**ภาคต้น - ภาคปลาย**
	Semester	Year course
6.	**ปีการศึกษา**	**2547**
	Academic year	2004
7.	**ผู้สอน**	
	Instructor	
8.	**เงื่อนไขรายวิชา**	**---------**
	Condition	
9.	**สถานภาพของวิชา**	**วิชาบังคับ**
	Status	Compulsory
10.	**ชื่อหลักสูตร**	**แพทยศาสตรบัณฑิต**
	Curriculum	Medicine
11.	**วิชาระดับ**	ปริญญาตรี
	Degree	
12.	**จำนวนชั่วโมงที่สอน/สัปดาห์**	**35 ชั่วโมง/สัปดาห์ x 2 สัปดาห์**
	Teaching hours/week	35 hours/week x 2 weeks

13. เนื้อหารายวิชา

Course Description

Basic principles, indications, contraindications, limitations, complications and selection of diagnostic imaging procedures including conventional radiography; computed tomography; ultrasonography and magnetic resonance imaging. Principles of interpretation and diagnosis of normal and abnormal conditions in these procedures.

14. ประมวลการเรียนรายวิชา (Course Outline)

14.1 วัตถุประสงค์ทั่วไป และ/หรือ วัตถุประสงค์เชิงพฤติกรรม (General objectives)

At the end of the course, the student should be able to :

14.1.1 Describe basic principles of

14.1.1.1 X-ray equipment

14.1.1.2 Radiography and fluoroscopy

14.1.1.3 Computed tomography (CT scan)

14.1.1.4 Ultrasonography

14.1.1.5 Magnetic resonance imaging (MRI)

14.1.1.6 Interventional radiology

14.1.1.7 Radiation hazards & protection

14.1.2 Describe indications, contraindications, limitations and complications of

14.1.2.1 Radiography and fluoroscopy

14.1.2.2 Computed tomography (CT scan)

14.1.2.3 Ultrasonography

14.1.2.4 Magnetic resonance imaging (MRI)

14.1.2.5 Interventional radiology

14.1.3 Select appropriate diagnostic imaging procedures

14.1.4 Describe patient preparations for special radiological examinations, ultrasonography, computed tomography and magnetic resonance imaging

14.1.5 Describe and interprete normal and abnormal findings of common disorders in

14.1.5.1 Diagnostic imaging of the central nervous system

14.1.5.2 Diagnostic imaging of the head and neck (excluding the brain)

14.1.5.3 Diagnostic imaging of the heart and great vessels

14.1.5.4 Diagnostic imaging of the respiratory system

14.1.5.5 Radiology of the abdomen (plain film)

14.1.5.6 Diagnostic imaging of the gastrointestinal system

14.1.5.7 Diagnostic imaging of the hepatobiliary system, pancreas and spleen

14.1.5.8 Diagnostic imaging of the urinary system

14.1.5.9 Obstetrical and gynecological imaging

14.1.5.10 Diagnostic imaging of the musculoskeletal system

14.1.5.11 Diagnostic imaging in pediatrics

14.1.6 Describe about contrast media

14.1.6.1 Basic principles and physiology of contrast media.

14.1.6.2 Applications.

14.1.6.3 Contraindications.

14.1.6.4 Adversed reactions.

14.1.7 Analyse & synthesize diagnostic imaging findings including clinical data to solve the problems effectively

14.2 เนื้อหารายวิชาต่อสัปดาห์

Division of Diagnostic Radiology

Topic : Basic Principles of Medical Imaging

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the students should be able to

1. describe the basic principle of radiography
2. describe the basic principle of fluoroscopy
3. describe the basic principle of tomography
4. describe the basic principle of ultrasonography
5. describe the basic principle of computed tomography
6. describe the basic principle of magnetic resonance imaging
7. describe radiation hazards and principle of radiation protection for personnels and patients

Learning experience **3 hrs.**

Learning Contents :

1. X-rays production

2. X-ray film and processing, cassette, screen and grids.
3. Basic principle of fluoroscopy
    3.1 Image intensifier
4. Basic principle of computed tomography (CT scan)
5. Basic principle of ultrasonography
6. Basic principle of magnetic resonance imaging (MRI)
7. Radiation hazards and their controls in diagnostic radiology

Topic : Diagnostic Imaging of the Central Nervous System

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the session, the students should be able to

1. describe basic principles, clinical applications, contraindications, complications and preparations of various neuroimaging procedures.
    1.1 Conventional radiography
    1.2 Tomography
    1.3 Myelography
    1.4 Angiography
    1.5 Ultrasonography
    1.6 Computed tomography
    1.7 Magnetic resonance imaging
2. describe normal anatomy, principles of interpretation of neuroimagings and abnormal findings of common disorders and diseases
3. analyze and synthesize findings of neuroimaging including clinical data to solve the problems effectively

Learning experience 4 hrs.

Learning contents :

1. Plain radiography
    1.1 Techniques and projections for radiographic examination of the skull
    1.2 Techniques and projections for radiographic examination of the spine
        1.2.1 Craniovertebral and atlanto-axial areas
        1.2.2 Cervical spine

1.2.3 Cervicothoracic spine

1.2.4 Thoracic spine

1.2.5 Thoracolumbar spine

1.2.6 Lumbar spine

1.2.7 Lumbosacral spine

1.2.8 Coccyx

1.3 Principles of interpretation of radiographs of the skull and spine

1.4 Normal reontgenographic findings of the skull and spine

1.5 Abnormal roentgenographic findings of the skull in :

- Trauma
- Increased intracranial pressure
- Intracranial calcification
- Radiolucent area of the skull in various conditions and diseases
- Increased density of the skull in various conditions and diseases
- Craniovertebral abnormalites

1.6 Abnormal roentgenographic findings of the spine in :

- Trauma
- Inflammation
- Tumor
- Spondylosis
- Spondylolysis
- Spondylolisthesis
- Spinal canal abnormalities
  - Widening of the spinal canal
  - Spinal stenosis

2. Myelography

2.1 Indications, contraindications, limitations, complications and preparations

2.2 Technique and contrast medium

2.3 Normal roentgen anatomy

2.4 Principles of interpretation :

2.4.1 Extradural lesion

2.4.2 Intradural lesion

2.4.3 Intramedullary lesion

3. Cerebral angiography, conventional and digital subtraction angiography (DSA)
   - 3.1 Indications, contraindications, limitations, complications and preparations
   - 3.2 Technique :
     - 3.2.1 Femoral puncture
     - 3.2.2 Retrograde brachial angiography
     - 3.2.3 Catheterization
   - 3.3 Normal roentgen anatomy
   - 3.4 Principles of interpretation :
     - 3.4.1 Abnormality of the blood vessel
     - 3.4.2 Displacement of the blood vessel
     - 3.4.3 Increased vascularity, decreased vascularity
     - 3.4.4 Circulation time, normal and abnormal
4. Ultrasonography
   - 4.1 Clinical applications and limitations
   - 4.2 Normal anatomy of the brain
5. Computed tomography (CT scan)
   - 5.1 Clinical applications, contraindications and limitations
   - 5.2 Normal anatomy of the skull, brain, spine and spinal cord
   - 5.3 Principles of interpretation
   - 5.4 Findings in common CNS disorders and diseases
6. Magnetic resonance imaging (MRI)
   - 6.1 Clinical applications, contraindications and limitations
   - 6.2 Normal anatomy of the brain, spine, and spinal cord
   - 6.3 Principles of interpretation
   - 6.4 Findings in common CNS disorders and diseases

Topic : Diagnostic Imaging of the Head and Neck (Excluding the brain)

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe basic principles, clinical applications, contraindications, preparations, and complications of various diagnostic imagings of the head and neck (excluding radionuclide imaging)
    1.1 Conventional radiography
    1.2 Sialography
    1.3 Dacryocystography
    1.4 Angiography
    1.5 Ultrasonography
    1.6 Computed tomography
    1.7 Magnetic resonance imaging
2. Describe basic imagings of orbits, paranasal sinuses, nose, mandible, nasopharynx, oropharynx, hypopharynx, larynx, temporomandibular joint and temporal bones
3. Describe normal imaging anatomy and abnormal findings of common disorders
4. Analyze and synthesize abnormal findings including clinical data in order to solve the problems effectively

Learning experience

Learning contents **3 hrs.**

1. Techniques and projections for radiographic examinations of the followings :
    1.1 Orbits
    1.2 Paranasal sinuses and nose
    1.3 Mandible
    1.4 Nasopharynx
    1.5 Oropharynx, hypopharynx and larynx
    1.6 Temporomandibular joints
    1.7 Temporal bones
2. Principles of radiographic interpretation of
    2.1 Orbits
    2.2 Paranasal sinuses and nose
    2.3 Mandible
    2.4 Nasopharynx
    2.5 Oropharynx, hypopharynx and larynx
    2.6 Temporomandibular joints

2.7 Temporal bones

3. Normal roentgenographic findings of

3.1 Orbits

3.2 Paranasal sinuses and nose

3.3 Mandible

3.4 Nasopharynx

3.5 Oropharynx, hypopharynx and larynx

3.6 Temporomandibular joints

3.7 Temporal bones

4. Abnormal roentgenographic findings of orbit, paranasal sinuses, nose, mandible, temporal bone in the followings :

4.1 Common congenital anomaly

4.2 Trauma

4.3 Inflammation

4.4 Tumor

5. Sialography

5.1 Indications, contraindications, limitations and complications

5.2 Normal roentgen anatomy

5.3 Sialolithiasis

6. Dacryocystography :

6.1 Indications, contraindications, limitations and complications

7. Angiography :

7.1 Indications, contraindications, limitations, complications and clinical applications

7.2 Technique

7.3 Normal anatomy of vascular structure of head and neck (excluding intracranial vessels)

7.4 Principles of interpretation

8. Ultrasonography :

8.1 Clinical applications of ultrasonography

9. Computed tomography

9.1 Clinical applications of computed tomography

9.2 Indications, contraindications, limitations

9.3 Normal anatomy of orbit, paranasal sinuses, temporal bone, base of skull, suprahyoid neck and infrahyoid neck

9.4 Principles of interpretation

10. Magnetic resonance imaging (MRI)

10.1 Clinical applications of MRI

10.2 Indications, contraindications and limitations

Topic : Diagnostic Imaging of the Heart and Great Vessels

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe basic principles of radiographic techniques of cardiac examination
2. Describe and interprete roentgenographic findings in normal and abnormal cardiac silhouette and great vessels
3. Analyze and synthesize roentgenographic findings including clinical data in order to interpret common cardiac disorders
4. Define principles and clinical applications of special radiological examinations of the heart and great vessels

Learning experience **2.5 hrs.**

Learning contents

1. Radiographic techniques of cardiac examination

1.1 Tele PA view (Teleroentgenography)

1.2 RAO (Right Anterior Oblique) view with and without barium swallow

1.3 LAO (Left Anterior Oblique) view with and without barium swallow

1.4 LL (Left Lateral) view

1.4.1 PA chest radiograph.

1.4.2 LL chest radiograph.

2. Normal roentgen anatomy of the heart and great vessels :

2.1 Cardiac and aortic measurement

2.2 Cardiac chamber boundary

2.2.1 Right atrium

2.2.2 Right ventricle

2.2.3 Left atrium

2.2.4 Left ventricle

2.3 Great vessel boundary :

2.3.1 Aorta

2.3.2 Pulmonary trunk and vessels

2.3.3 Superior vena cava

2.3.4 Inferior vena cava

2.4 Normal pulmonary vascularity

2.5 Anatomy and physiology in cardioangiography

3. Principles of interpretation of cardiac silhouette enlargement and abnormal pulmonary vascularity

3.1 Generalized cardiac enlargement

3.2 Pericardial effusion

3.3 Isolated cardiac chamber enlargement

3.3.1 Left atrium

3.3.2 Left ventricle

3.3.3 Right atrium

3.3.4 Right ventricle

3.4 Abnormal pulmonary vascularity

3.4.1 Increased pulmonary vascularity :

3.4.1.1 High flow pattern

3.4.1.2 Pulmonary arterial hypertension pattern

3.4.1.3 Pulmonary venous hypertension pattern

3.4.2 Decreased pulmonary vascularity

4. Abnormal roentgenographic findings in common cardiac disorders :

4.1 Rheumatic heart disease

4.2 Hypertensive heart disease

4.3 Cardiomyopathy

4.4 Congenital left to right shunt :

4.4.1 Atrial septal defect (ASD)

4.4.2 Ventricular septal defect (VSD)

4.4.3 Patent ductus arteriosus (PDA)

4.5 Tetralogy of Fallot (TOF)

4.6 Pulmonary stenosis (PS)

5. Principles and clinical applications of special imaging modalities of the heart and great vessels :

5.1 Echocardiography

5.2 Cardioangiography

5.3 Aortography and visceral angiography

5.4 Venography

5.5 CT scan of the heart and great vessels

5.6 MRI of the heart and great vessels

Topic : Diagnostic Imaging of the Respiratory System

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe the conventional chest x-ray technique.
2. Select the appropriate imaging examination
3. Describe the normal roentgenographic anatomy of respiratory system
4. Describe the abnormal roentgenographic patterns and differential diagnosis
5. Describe the abnormal roentgenographic findings of common chest diseases

Learning experience **6 hrs.**

Learning contents :

1. Basic principle and methods in :

1.1 Routine chest x-ray and special plain radiograph

1.2 Special investigation :

1.2.1 Tomography.

1.2.2 Angiography

1.2.3 Computed tomography.

1.2.4 Ultrasonography

1.2.5 Magnetic resonance imaging

2. Normal roentgenographic anatomy :

2.1 Respiratory tract

2.1.1 Larynx.

2.1.2 Trachea.

2.1.3 Bronchi.

2.1.4 Alveoli

2.2 Mediastinum.

2.3 Pleura, chest wall, diaphragm

2.4 Thoracic cage.

3. Describe abnormal pulmonary roentgenographic patterns and differential diagnosis of the pulmonary diseases :

3.1 Diffuse coalescent densities

3.2 Reticular densities

3.2.1 Fine

3.2.2 Coarse

3.3 Diffuse fine nodular densities.

3.4 Pulmonary nodule (mass).

3.4.1 Single

3.4.2 Multiple.

3.5 Cavitary nodule.

3.5.1 Single

3.5.2 Multiple.

3.6 Pleural effusion.

3.7 Atelectasis

4. Abnormal roentgenographic findings in common chest diseases :

4.1 Congenital diseases.

4.2 Neonatal diseases :

4.2.1 Respiratory distress syndrome

4.3 Foreign body

4.4 Traumatic chest :

4.4.1 Fracture and dislocation

4.4.2 Lung contusion

4.4.3 Pneumothorax, hydropneumothorax, hemothorax

4.4.4 Soft tissue emphysema (subcutaneous and mediastinum)

4.5 Inflammatory diseases :

4.5.1 Pulmonary tuberculosis

4.5.2 Non-tuberculous infection (bacteria, virus, protozoa, fungus, mycoplasma)

4.5.3 Empyema

4.5.4 Lung abscess

4.5.5 Chemical disease

4.5.6 Allergic disease

4.6 Neoplastic diseases (lung, mediastinum, pleura, chest wall) :

4.6.1 Benign

4.6.2 Malignant

4.7 Miscellaneous :

4.7.1 Occupational disease, silicosis, pneumoconiosis

4.7.2 Environmental disease, anthracosis

4.7.3 Degenerative change, emphysema

4.7.4 Connective tissue diseases

Topic : Diagnostic Imaging of the Abdomen (plain radiograph)

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe basic principle of radiograph of abdomen
2. Describe normal roentgenographic anatomy of abdomen
3. Describe and differentiate abnormal roentgenographic findings in the common abdominal disease
4. Analyse and synthesize roentgenographic findings including clinical data in order to solve the problems effectively

Learning experience : 1 hr.

Learning contents

1. Basic principle of radiograph of abdomen :

1.1 Radiograph techniques :

1.1.1 Supine

1.1.2 Upright

1.1.3 Lateral decubitus

1.1.4 Crosstable lateral

1.1.5 Lateral

1.1.6 Lateral upright

1.1.7 Acute abdomen series

1.2 Indications of acute abdomen series :

1.2.1 Gastrointestinal obstruction

1.2.2 Gastrointestinal perforation

1.2.3 Peritonitis

1.2.4 Abdominal trauma

1.2.5 Other acute abdominal conditions

1.3 Basic principle of interpretation :

1.3.1 Mass

1.3.2 Stone (Urinary and biliary)

1.3.3 Fluid in abdominal cavity

1.3.4 Abscess

1.3.5 Bowel gas pattern

1.3.6 Foreign body and misplaced IUD

2. Normal roentgenographic anatomy of abdomen :

2.1 Location and pattern of

2.1.1 Stomach

2.1.2 Duodenal cap

2.1.3 Small bowel

2.1.4 Cecum colon and rectum

2.2 Solid organs

2.2.1 Liver and hepatic angle

2.2.2 Spleen

2.2.3 Kidneys

2.2.4 Uterus

2.3 Boundaries

2.3.1 Abdominal wall

2.3.2 Properitoneal fat

2.3.3 Diaphragm

2.3.4 Psoas shadow

2.4 Gall bladder

2.5 Urinary bladder

3. Abnormal roentgenographic findings :

3.1 Abnormal bowel pattern :

3.1.1 Abnormal position

3.1.2 Displacement

3.1.3 Dilatation

3.1.4 Edematous wall

3.1.5 Airless abdomen

3.2 Abnormal gas :

3.2.1 Free intraperitoneal gas

3.2.2 Localized fluid

3.3 Intraperitoneal fluid

3.3.1 Free intraperitoneal fluid

3.3.2 Loculated fluid

3.4 Organomegaly and mass

3.5 Abnormal calcification :

3.5.1 Radiopaque stone

3.5.2 Pancreatic calcification

3.5.3 Calcified adrenal gland

3.5.4 Vascular calcification

3.5.5 Calcified lymph node

3.6 Foreign body

4. Common diseases or conditions diagnosed by plain abdominal radiograph :

4.1 Adynamic or paralytic ileus

4.2 Obstruction

4.2.1 Gastric outlet

4.2.2 Small bowel

4.2.3 Large bowel

4.3 Inflammation :

4.3.1 Peritonitis

4.3.2 Acute pancreatitis

4.3.3 Intra-abdominal abscess

4.3.4 Acute appendicitis

4.3.5 Acute cholecystitis

4.4 Perforation :

4.4.1 Peptic perforation

4.5 Trauma :

4.5.1 Solid organ

4.5.2 Gastrointestinal tract

4.5.3 Diaphragm

5. Selection of imaging modalities in evaluation of abdomen in additional to abdominal radiograph

5.1 Radiographic contrast study of abdome

5.2 Ultrasonography

5.3 Computed tomography

5.4 Magnetic resonance imaging

Topic : Diagnostic Imaging of the Gastrointestinal System

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to

1. Describe basic principles and fundamental techniques of various radiological examinations of the gastrointestinal system
2. Describe the indications, contraindications, preparations, and complications of various radiological studies of the gastrointestinal system
3. Describe and identify normal roentgenographic anatomy of the gastrointestinal system
4. Define, interprete and differentiate abnormal findings in the common diseases of the gastrointestinal system
5. Analyze and synthesize roentgenographic findings including clinical data in order to solve the problems dffectively

Learning experience **5 hrs.**

Learning contents

1. Normal roentgenographic anatomy and physiology of the gastrointestinal system

2. Basic principle of the radiogical examinations of the gastrointestinal system including indications, contraindications and complications in :
    2.1 Pharyngography
    2.2 Esophagography
    2.3 Upper gastrointestinal study
    2.4 Small bowel study
    2.5 Barium enema.
        2.5.1 Single contrast barium enema
        2.5.2 Double contrast barium enema
    2.6 Angiography.
3. Abnormal findings in the contrast study of the gastrointestinal system :
    3.1 Abnormal collection of contrast medium.
    3.2 Filling defect.
    3.3 Stenotic lesion.
    3.4 Dilated lesion.
    3.5 Alteration of mucosal pattern.
    3.6 Abnormal position.
4. Roentgenographic findings in common diseases of the gastrointestinal system :
    4.1 Congenital anomaly.
        4.1.1 Esophageal web.
        4.1.2 Esophageal atresia with and without tracheoesophageal fistula
        4.1.3 Achalasia cardia.
        4.1.4 Hiatal hernia.
        4.1.5 Hirschsprung's disease.
        4.1.6 Congenital hypertrophic pyloric stenosis
        4.1.7 Congenital megacolon
        4.1.8 Imperforate anus
        4.1.9 Diaphragmatic hernia
    4.2 Ulceration.
        4.2.1 Benign
        4.2.2 Malignant
    4.3 Tumors

4.3.1 Benign

4.3.2 Malignant

4.4 Infection and inflammation

4.4.1 Tuberculosis

4.4.2 Esophagitis

4.4.3 Gastritis

4.4.4 Regional ileitis

4.4.5 Colitis

4.4.6 Diverticulitis

4.5 Gastrointestinal bleeding

4.6 Varices

4.7 Corrosive stricture

4.8 Intussusception

4.9 Diverticulosis

Topic : Diagnostic Imaging of the Hepatobiliary System, Pancreas and Spleen

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe the basic radiography of the hepatobilary system, pancreas and spleen.
2. Describe the basic principles, indications, preparation, limitations,complications and contraindications of the various imaging procedures in the hepatobiliary system, pancreas and spleen
3. Describe and identify normal imaging anatomy of the hepatobiliary system, pancreas and spleen.
4. Describe and interpret the abnormal imaging findings in the common diseases of the hepatobiliary system, pancreas and spleen.
5. Analyze and systhesize imaging findings including clinical data in order to solve the problems effectively.

Learning experience **4 hrs.**

Learning contents

1. Basic radiography of the hepatobiliary system, pancreas and spleen.

1.1 Left anterior oblique position.

1.2 Right posterior oblique position.

1.3 AP supine position

2. The basic principles, indications, contraindications, preparations, limitations and complications of the various imaging procedures in the hepatobiliary system, pancreas and spleen.

2.1 Ultrasonography.

2.2 Computed tomography.

2.3 Magnetic resonance imaging.

2.4 Endoscopic retrograde cholangiopancreatography (ERCP).

2.5 Percutaneous transhepatic cholangiography (PTC).

2.6 Intraoperative cholangiography.

2.7 T-tube cholangiography.

2.8 Angiography.

3. Normal imaging anatomy of the hepatobiliary system, pancreas and spleen.

3.1 Ultrasonography.

3.2 Computed tomography.

3.3 Magnetic resonance imaging.

3.4 Cholangiopancreatography.

3.5 Angiography.

4. Abnormal imaging findings in the common diseases of the hepatobiliary system, pancreas and spleen :

4.1 Ultrasonography

4.1.1 Inflammation

4.1.1.1 Acute cholecystitis

4.1.1.2 Liver abscess

4.1.1.3 Acute pancreatitis

4.1.1.4 Splenic abscess

4.1.2 Neoplasm

4.1.2.1 Hepatocellular carcinoma

4.1.2.2 Cholangiocarcinoma

4.1.2.3 Carcinoma of the gallbladder

4.1.2.4 Carcinoma of the pancreas

4.1.2.5 Metastasis

4.1.2.6 Hemangioma

4.1.3 Injury

4.1.3.1 Liver

4.1.3.2 Spleen

4.1.3.3 Pancreas

4.1.4 Congenital anomaly

4.1.4.1 Choledochal cyst

4.1.4.2 Biliary atresia

4.1.5 Other common conditions

4.1.5.1 Biliary cllculi

4.1.5.2 Biliary ascariasis

4.1.5.3 Polyp in the gallbladder

4.1.5.4 Liver cyst

4.1.5.5 Liver cirrhosis

4.2 Computed tomography

4.2.1 Hepatocellular carcinoma

4.2.2 Cholangiocarcinoma

4.2.3 Carcinoma of pancreas

4.2.4 Liver abscess

4.2.5 Metastasis

Topic : Diagnostic Imaging of the Urinary System

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe the basic radiography of plain KUB
2. Describe the basic principles, techniques, indications, contraindications, preparations, limitations and complications of various urological imagings
3. Describe and identify normal imaging anatomy of the urinary system.
4. Describe and differentiate abnormal imaging findings in the common diseases and disorders of the urinary system

5. Analyze and synthesize imaging findings including clinical data in order to solve the problems effectively

Learning experience **3 hrs.**

Learning contents

1. Basic radiography of the plain KUB :
    1.1 Technique
    1.2 Interpretation
2. Basic principle, techniques, indications, contraindications, preparations, limitations and complications of various urological imagings :
    2.1 Excretory urography.
    2.2 Nephrotomography
    2.3 Retrograde pyelography.
    2.4 Cystography including voiding cystourethrography and retrograde cystography
    2.5 Urethrography including retrograde urethrography and voiding urethrography
    2.6 Utrasonography.
    2.7 Computed tomography.
    2.8 Magnetic resonance imaging.
    2.9 Angiography.
3. Normal imaging anatomy of the urinary system :
    3.1 Plain KUB.
    3.2 Excretory urography.
    3.3 Retrograde pyelography.
    3.4 Cystography.
    3.5 Urethrography.
    3.6 Ultrasonography.
    3.7 Computed tomography.
    3.8 Magnetic resonance imaging.
    3.9 Angiography.
4. Abnormal imaging findings in the common diseases and disorders of the urinary system
    4.1 Obstructive uropathy.
        4.1.1 Opaque and nonopaque urinary calculi.
        4.1.2 Infection

4.1.3 Tumor

4.1.4 Vesico-ureteral reflux

4.2 Infection

4.2.1 Acute and chronic pyelonephritis

4.2.2 Renal abscess

4.2.3 Perirenal abscess

4.2.4 Cystitis

4.2.5 Tuberculous infection

4.3 Urinary tract injury

4.3.1 Renal and perirenal

4.3.2 Ureter

4.3.3 Bladder

4.3.4 Urethra

4.4 Congenital anomaly

4.4.1 Ureteropelvic junction obstruction

4.4.2 Duplication of the collecting system

4.4.3 Polycystic kidney

4.4.4 Horseshoe kidney

4.5 Renal masses

4.5.1 Renal cyst

4.5.2 Renal tumor

4.6 Bladder tumor

Topic : Diagnostic Imaging of the Obstetrics and Gynecology

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe the basic radiography of the obstretics and gynecology.
2. Describe the basic principles, techniques, indications,contraindications, preparations, limitations and complications of hysterosalpingography, pelvimetry, ultrasonography, computed tomography, magnetic resonance imaging and mammography in obstetrics and gynaecology

3. Analyze and synthesize imaging findings including clinical data in order to solve the problems effectively.

Learning experience **1 hr.**

OBSTRETIC IMAGING

Learning contents

1. Basic radiography of abdomen :
    - 1.1 Supine position
    - 1.2 Lateral position
2. Radiation effect on fetus :
    - 2.1 Carcinogenic effect
    - 2.2 Genetic effect
3. Abnormal radiographic findings in obstetrics :
    - 3.1 Fetal death
        - 3.1.1 Spalding's sign
        - 3.1.2 Gas translucencies
        - 3.1.3 Abnormal attitude
        - 3.1.4 Duel's halo sign
        - 3.1.5 Failure to grow
        - 3.1.6 Disparity between the clinical and radiological estimation of maternity
        - 3.1.7 Constancy of fetal position
    - 3.2 Multiple pregnancy
        - 3.2.1 Number and size of fetuses
        - 3.2.2 Lock twins
        - 3.2.3 Conjoined twins
4. Pelvimery
    - 4.1 Technique
    - 4.2 Indications

GYNECOLOGY

Learning contents

1. Basic principles, techniques, indications, contraindications, preparations, limitations and complications of gynaecological imagings :

1.1 Plain radiography

1.2 Ultrasonography

1.3 Hysterosalpingography

1.4 Computed tomography

1.5 Magnetic resonance imaging

1.6 Mammography

2. Normal imaging anatomy of gynaecological system :

2.1 Plain film; type of pelvis

2.2 Ultrasonography

2.3 Hysterosalpingography

2.4 Computed tomography

2.5 Magnetic resonance imaging

3. Abnormal imaging findings in the common diseases and disorders of gynaecological system

3.1 Abnormal calcification

3.1.1 Infection

3.1.2 Tumor

3.2 Tumor mass

3.2.1 Dermoid or teratoma

3.2.2 Fibroid

3.2.3 Ovarian tumor

3.3 IUD perforation

3.4 Tubal obstruction

3.5 Infection

3.6 Endometriosis

3.7 Congenital anomaly

Topic : Diagnostic Imaging of the Musculoskeletal System

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Explain the basic principles of routine diagnostic imaging, bone survey, and scannography.

2. Describe and identify normal diagnostic imaging anatomy of the bones and joints
3. Describe and differentiate abnormal diagnostic imaging findings of the common musculoskeletal disease
4. Analyze and synthesize imaging findings including clinical data in order to solve the problem effectively.

Learning experience **4 hrs.**

Learning contents

1. Principles of musculoskeletal radiography and other imaging modality
2. Basic principles of special studies :
   - 2.1 Bone survey
   - 2.2 Scannography
   - 2.3 Imaging of the joints
   - 2.4 Bone mineral densitometry
3. Normal diagnostic imaging anatomy of bones and joints
4. Abnormal diagnostic imagings of common musculoskeletal diseases :
   - 4.1 Fracture and dislocation.
     - 4.1.1 Types of fracture
       - 4.1.1.1 Open vs closed
       - 4.1.1.2 Incomplete vs complete
       - 4.1.1.3 Comminuted
       - 4.1.1.4 Epiphyseal
     - 4.1.2 Common fracture and dislocation of
       - 4.1.2.1 Upper extremities
       - 4.1.2.2 Lower extremities
       - 4.1.2.3 Pelvis
     - 4.1.3 Union of fracture
   - 4.2 Infection
     - 4.2.1 Pyogenic infection
     - 4.2.2 Tuberculous infection
     - 4.2.3 Syphilitic infection
   - 4.3 Common arthritic conditions
     - 4.3.1 Degenerative joint disease (osteoarthritis)

4.3.2 Rheumatoid arthritis

4.3.3 HLA-B27 spondyloarthropathies

4.3.4 Crystal - induced arthritis

4.3.5 Neuropathic joint

4.3.6 Avascular necrosis

4.3.7 Osteochondritis dissecans

4.4 Common bone tumors.

4.4.1 Benign bone tumor and tumor-like lesions.

4.4.1.1 Simple bone cyst.

4.4.1.2 Aneurysmal bone cyst.

4.4.1.3 Fibrous dysplasia.

4.4.1.4 Osteoid osteoma.

4.4.1.5 Osteoblastoma.

4.4.1.6 Fibrous cortical defect.

4.4.1.7 Non-ossifying fibroma.

4.4.1.8 Chondroblastoma.

4.4.1.9 Osteochondroma.

4.4.1.10 Enchondroma.

4.4.2 Malignant bone tumor.

4.4.2.1 Osteosarcoma.

4.4.2.2 Chondrosarcoma.

4.4.2.3 Fibrosarcoma.

4.4.2.4 Multiple myeloma.

4.4.3 Metastatic tumor.

4.4.3.1 Osteolytic metastasis.

4.4.3.2 Osteoblastic metastasis.

4.4.4 Diagnostic imaging criteria in diagnosis of benign and malignant bone lesion

4.5 Metabolic bone diseases

4.5.1 Osteoporosis

4.5.2 Osteomalacia

4.5.3 Osteopetrosis

4.6 Haematologic diseases

4.6.1 Thalassemia

4.6.2 Haemophilia

Topic : Diagnostic Radiology, Contrast Media

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe types, chemical structures, physiochemical and biological properties of commonly used contrast media
2. Describe clinical uses of contrast media in common radiological examinations
3. Select appropriate contrast media for common radiological examinations

Learning experience **1 hr.**

Learning contents

1. Types of contrast media.
2. Chemical structures
3. Physiological and biological properties.
4. Clinical uses and selection of contrast media in common radiological examination
   - 4.1 Indications.
   - 4.2 Contraindications.
   - 4.3 Dosage
   - 4.4 Side effect and toxicity.
   - 4.5 Management of side effect and toxicity.

Topic : Introduction to Interventional Radiology

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe basic principles of interventional radiology.
2. Describe basic principles of simple interventional procedures.

Learning experience **2 hrs.**

Learning contents :

1. Definition and type of interventional radiology.

2. Basic principles, indications, contraindications, limitations and specific procedures

2.1 Vascular interventional radiology.

2.1.1 Embolotherapy or embolization.

2.1.2 Percutaneous transluminal angioplasty.

2.1.3 Thrombolytic therapy.

2.1.4 Percutaneous retrieval of intravascular foreign bodies.

2.1.5 Miscellaneous.

2.2 Non vascular interventional radiology.

2.2.1 Fine needle aspiration biopsy (FNA).

2.2.2 Percutaneous abscess drainage.

2.2.3 Percutaneous nephrostomy (PCN).

2.2.4 Percutaneous biliary drainage (PTBD).

2.2.5 Miscellaneous.

Topic : Diagnostic Imaging in Pediatrics

Code : Diagnostic Imaging 3011512

Learning objectives

At the end of the course, the student should be able to :

1. Describe and interpret normal radiographic findings in pediatric chest and abdomen
2. Describe and interpret radiographic findings in common or important pediatric diseases
3. Describe indication for special imaging study in pediatric patients

Learning experience **2 hrs.**

Learning contents

1. Pediatric respiratory system

1.1 Normal chest radiography

1.2 Abnormal radiographs in respiratory distress in the newborn in common or important disorders

1.2.1 Respiratory distress syndrome

1.2.2 Transient tachypnea in the newborn

1.2.3 Meconium aspiration syndrome

1.2.4 Congenital diaphragmatic hernia

1.3 Radiographic findings in conditions producing unilateral large hyperlucent lung

1.4 Abnormal radiographs in pneumonia

1.4.1 Viral pneumonia

1.4.2 Bacterial pneumonia

1.4.3 Primary pulmonary tuberculosis

1.5 Imaging of respiratory system

2. Pediatric alimentary tract

2.1 Normal plain abdominal radiograph

2.2 Radiographic findings in diseases causing obstruction of the gastrointestinal tract in pediatric patients

2.3 Radiographic findings of necrotizing enterocolitis

2.4 Imaging of the alimentary tract

3. Pediatric urinary system

3.1 Role of imaging in pediatric abdominal mass

3.2 Role of imaging in urinary tract infection in pediatric patients

4. Role of imaging in pediatric cardiovascular system, musculoskeletal system and central nervous system

5. Positions of tube and catheter in pediatric patients

6. Awareness of radiation effect in pediatric patients