

DIAGNOSTIC IMAGING AND VETERINARY RADIOLOGY

Total CFU 5:

modulo 1: 24 hours frontal lessons e 12 hours/student lab;

modulo 2: 8 hours frontal lessons e 4 hours/student lab;

modulo 3: 8 hours frontal lessons e 4 hours/student lab

Learning Outcomes: the student will have to acquire a method of analysis and interpretation of radiographic images, recognize the signs related to diseases of various organs and systems and finally make a list of differential diagnosis . The student will learn the operating principles and clinical applications of the most important advanced imaging techniques such as computed tomography and nuclear magnetic resonance.

The student will have to understand the operating principles of ultrasound imaging instrumentation, application of Doppler and contrast media. The student will have to obtain a method of analysis and interpretation of ultrasound images , recognize the signs related to diseases of various organs and systems , and finally make a list of differential diagnosis.

Lessons

Target skills and knowledge acquired	Topics	Course unit contents
<p>1. RADIOGRAPHIC TECHNIQUE: (TOT.4 HOURS) [knowledge about the instruments of traditional and digital radiology , computed tomography , magnetic resonance imaging and radiological protection]</p>	Digital radiology	Features tools, analog and digital detection systems (CR and DR), setting exposure data, qualitative assessment of radiograms.
	Computed tomography and Magnetic resonance	Principles of operation , image formation , generations of instruments .
		Main fields of application : skeletal diseases , neurological diseases , mediastinal and lung disease, abdominal diseases.
	Radiological protection	Deterministic and stochastic effects of ionizing radiation, devices and rules of radiological protection.
<p>2. THORAX (TOT.8 HOURS) [[acquisition of : a) ability to identify radiographic signs of major intrathoracic diseases; b) ability to produce a list of differential diagnosis]</p>	Lungs , pleura , trachea and esophagus	Refresh of radiographic technique ; identification and evaluation of the upper and lower airway ; pulmonary pattern ; main pathologies in small animals and horses ; pleural effusion , pneumothorax ; congenital and acquired abnormalities of the trachea ; hypoplasia , laxity and tracheal collapse .
		Congenital and acquired abnormalities , motor dysfunction , segmental and total megaesophagus ; stenosis , foreign bodies.
	Heart and mediastinum , and diaphragm	Topography , shape and size of the heart , major congenital and acquired diseases, pericardial effusion , pericardial - peritoneal hernia.
		Mediastinal structures , mediastinal shift , pneumomediastinum , mediastinal masses , mediastinal effusions ; diaphragmatic hernias , hemiparesis and paralysis.
<p>3.ABDOMEN (TOT.4 HOURS) [acquisition of : a) ability to identify radiographic signs of major diseases of the</p>	Peritoneal space , stomach and intestines	Contrastographic technique with opaque contrast media , peritoneal effusions , pneumoperitoneum . Gastric dilatation / torsion ; foreign bodies ; ulcers ; mechanical ileus and functional ileus, intussusception.

<p><i>abdominal organs ;</i> <i>b) ability to produce a list of differential diagnosis]</i></p>		
	<p>Liver , spleen , pancreas , adrenal glands , and lymph nodes</p>	<p>Variations in shape and dimensions , masses , splenic torsion ; pancreatitis , calcification and adrenal masses , abdominal masses.</p>
	<p>Kidneys , ureters , bladder and urethra , genitals.</p>	<p>Excretory urography and main pathological features, X- ray contrast of the ureter, pneumocystography , nephrolithiasis , bladder lithiasis, urethrography , vaginocystourethrography.</p>
<p>4. SKELETON (TOT.6 HOURS) <i>[acquisition of : a) ability to identify radiographic signs related to major skeletal diseases ; b) ability to produce a list of differential diagnosis]</i></p>		<p>Axial and appendicular skeleton: congenital diseases and growth diseases, nutritional and metabolic diseases ; diseases of unknown origin ; degenerative joint diseases , inflammatory and neoplastic diseases ; fractures ; Aggressive and non-aggressive bone lesions in small animals and horses .</p>
<p>5. ULTRASOUND TECHNIQUE : (TOT.4 HOURS) <i>[acquisition of : knowledge of the operation of instrument ,the capability to adjust the main display parameters]</i></p>	<p>2D Ultrasound</p>	<p>Settings tools, characteristics of probes dedicated to internal medicine and cardiology applications, spontaneous artifacts and artifacts from incorrect adjustment; data storage; reporting .</p>
	<p>Doppler Effect</p>	<p>Physical principles of the Doppler effect , detection mode (pulsed, continuous, Color, Power, tissue Doppler) and representation of the Doppler effect; Flowchart; Fields of application of cardiac, vascular , internal medicine.</p>
		<p>Spontaneous artifacts and artifacts from incorrect adjustment.</p>
<p>6. THORAX (TOT.6 HOURS) <i>[acquisition of : a) ability to identify sonographic signs of major intrathoracic diseases b) ability to make a list of differential diagnosis]</i></p>	<p>Chest wall, pleura, lungs and mediastinum</p>	<p>Normal appearance of the pleura and lung ; pleural effusions ; pleurocentesis ; inflammatory lung diseases and neoplastic disease.</p>
		<p>Mediastinal effusion, lymphadenomegaly and mediastinal masses.</p>
	<p>Heart</p>	<p>Parasternal scans from right and left chest and retrosternal scan. M -mode representation . Evaluation of the morphology of the heart chambers and valves ; indices of cardiac function; left atrium/aorta ratio ; reliefs of transvalvular flow with Pw and colorDoppler.</p>
		<p>2D, M -mode , Pw , Cw and colorDoppler features of the major congenital and acquired disease.</p>
<p>7. ABDOMEN (TOT.8 HOURS) <i>[acquisizione di: a) capacità di individuare i segni ecografici delle principali patologie addominali; b) capacità di produrre una lista di diagnosi differenziali]</i></p>	<p>Peritoneal space</p>	<p>Features of peritoneal effusions.</p>
	<p>Liver and gallbladder</p>	<p>Morphological characteristics , focal and diffuse disease , caval and portal flow assessment; morphological characteristics and main pathological features of the gallbladder.</p>
	<p>Kidneys, ureters, bladder and urethra</p>	<p>Findings of focal and diffuse kidney diseases .</p>
		<p>Findings of focal and diffuse bladder disorders.</p>

	<i>Stomach and intestines</i>	Features of focal and diffuse diseases of gastrointestinal tract.
	<i>Spleen and lymph nodes</i>	Features of focal and diffuse diseases of spleen and lymph nodes

Labs (individual work) with computer station

Target skills and knowledge acquired	Topic	Course unit contents	Hours
8. ABILITY TO ANALYZE, SYNTHESIZE AND EVALUATE (TOT. 20 HOURS) [acquisition of : a) ability to interpret radiographic study ; b) the ability to make a report ; c) ability to propose a diagnostic protocol]	<i>Thorax</i>	Radio-tomographic and ultrasonographic studies from clinical activity concerning different thoracic diseases.	8
	<i>Abdomen</i>	Radio-tomographic and ultrasonographic studies from clinical activity concerning different abdominal diseases.	6
	<i>Skeleton</i>	Radio-tomographic and ultrasonographic studies from clinical activity concerning different skeletal diseases.	6