

C-VDI.1 Imaging in Practice

Credits: 10 (100 hours)

Provider: Veterinary Postgraduate Unit – School of Veterinary Science

RCVS Content Covered

The following outlines the modular content as set out by the RCVS.

At the end of the module, candidates should be able to:

- Produce **good quality radiographic images** through a comprehensive knowledge of: exposure assessment; the factors influencing the choice of kV, mA, time, film type, use of grid, etc; formation of technique charts; correct positioning of patients, and the limitations that may be imposed in domestic animals; the need for compliance with “The Ionising Radiations Regulations 1999”; the need for restraint using appropriate methods, including the advantages and disadvantages of the use of sedation and anaesthesia.
- Ensure satisfactory **radiation protection** – the relevant legal requirements including familiarity with the current “Guidance notes for the protection of persons against ionising radiations arising from veterinary use”, the risks involved in the use of radiographic procedures; the methods which can be used to minimise these risks; hazards arising from poor design of X-ray rooms; the control of hazards arising from secondary radiation; the correct use of protective aprons and gloves; familiarity with current radiation monitoring services; the instruction of lay staff in radiation discipline.
- Use **contrast media** appropriately, through an understanding of the nature of the more frequently used media and indications for their use; the procedures for performing basic contrast techniques.
- Understand the principles and apply **diagnostic ultrasonography** in veterinary practice – physical principles of ultrasound; image production; display modes; artefacts; normal ultrasound appearance of the major organs (heart, liver, kidney, spleen, bladder, prostate and uterus); recognition of major alterations to the normal architecture of these organs and the possible diagnostic significance of these changes.
- **Identify and process films** and recognise faults due to defects in processing and film handling;
- Recognise faults due to **inadequate radiographic procedure** and how these affect image density, contrast and sharpness.
- Recognise and describe **normal radiographic anatomy**. (Candidates should possess a detailed knowledge of the normal radiographic anatomy of the dog, cat and horse and of their variations with breed and age, as appropriate to the case log. In other species a knowledge compatible with current use would be expected.)
- Apply the **principles of radiological interpretation** – the recognition of tissue types; formation of shadowgraphs; effects of superimposition and multiple shadows. Changes in opacity, size, shape, position and function of organs. The use of simple positional and contrast aids to elucidate radiographic problems. The applications of these basic principles to the evaluation of radiological signs in relation to clinical problems.

COMMENTARY ON THE CONTENT

Interpretation applies to the diagnostic radiological features of the more commonly encountered clinical conditions seen in veterinary practice:

Digestive system Common abnormalities affecting the teeth, pharynx, oesophagus and gastrointestinal tract. Obstructive lesions and functions disturbances. The significance of gas shadows. The use of contrast media. Differential diagnoses.

Abdomen Recognition of changes in outline, position and opacity of organs. Abdominal masses and displacements caused by them. The presence of free gas or fluid. Differential diagnoses.

Urogenital System Common abnormalities affecting the kidneys, ureters, bladder, urethra, male and female genital organs. Intravenous urography, retrograde, cystography and urethrography (positive and negative). Differential diagnoses.

Cardiovascular System Common abnormalities affecting the heart and blood vessels and evidence of cardiovascular disease which may be recognised on plain films. The principles of cardiac catheterisation and angiocardiology. Differential diagnoses.

Respiratory System Common abnormalities affecting the nasal cavity, sinuses, guttural pouch, hyoid apparatus, larynx, trachea, thoracic wall, pleural cavity, mediastinum, diaphragm and lungs. Pulmonary patterns. Differential diagnoses.

Musculoskeletal System Common abnormalities affecting bones and joints. Fractures, dislocations, inflammatory and neoplastic conditions. Congenital and developmental abnormalities, metabolic disorders. Trauma. Differential diagnoses.

Axial Skeleton and Central Axial Nervous System Common abnormalities affecting the skeleton and the central nervous system. Fractures, dislocations, congenital and developmental abnormalities. Degenerative conditions. Inflammatory and neoplastic changes. The principles and problems associated with the use of contrast media to demonstrate lesions of the brain and spinal cord.

Soft Tissue Trauma. Foreign bodies. Sinuses. Calcification. The use of contrast media. Differential diagnoses.

Special techniques Candidates should be familiar with the general principles of contrast examinations and the performance and interpretation of the more commonly used techniques. They should understand the principles of fluoroscopy with image intensification and Doppler ultrasonography including colour flow and the types of conditions in which these techniques may be usefully employed.

Aim of the Module

To advance candidates knowledge and understanding of diagnostic imaging and to develop new and advanced skills to practice diagnostic imaging safely and effectively;

To enable the candidate to critically evaluate their own standards of practice and develop strategies for continuous improvement in the future.

Learning Outcomes

At the end of the module, candidates should be able to:

1. develop a systematic understanding of safe and effective radiographic practice in order to exercise initiative and personal responsibility with relation to safety of patients and personnel, positioning, processing and image quality;
2. develop a comprehensive understanding of diagnostic imaging techniques and apply them appropriately as part of the overall investigation of a case;
3. critically appraise current diagnostic imaging techniques and outline strategies for improvement;
4. critically evaluate the literature in order that evidence based medicine underpins their decision making processes.

Module Structure

The syllabus will be divided into 3 study units

Study Unit 1 Clinical Radiology

Producing good quality radiographic images through a comprehensive understanding of equipment physics and settings.

Radiation safety: recognising and minimising the risks involved with radiographic procedures, and correct use of protective equipment.

Correct positioning of patients, including use of restraint methods, to obtain good quality images.

Use of contrast media, and procedures for performing basic contrast techniques.

Identifying and minimising faults due to film processing and handling.

Study Unit 2 Radiographic anatomy and principles of interpretation

The normal radiographic anatomy of large and small animal patients: including the abdomen, thorax, axial and appendicular skeleton.

The principles of radiological interpretation, and the application of these principles when evaluating radiological signs in relation to clinical problems.

Study Unit 3 Ultrasound and advanced imaging

The principles of diagnostic ultrasonography and its application in veterinary practice.

Normal ultrasound appearance of the abdomen and thorax of large and small animals; recognising ultrasonographic changes in the normal architecture of the major organs and the significance of these changes.

Normal ultrasound appearance of the distal limb of the horse.

The principles of computed tomography, magnetic resonance imaging and scintigraphy and their use and application in veterinary practice.

Assessment Strategy

Portfolio of cases (60 case log book), 3 x short answer question and/or MCQ tests, 1 x reflective case report at the end of the module (1500 words) and 1 x journal critique/journal club presentation (pass/fail).