Certificate in Advanced Veterinary Practice

C-VDI.4 Large Animal Diagnostic Imaging A

Module Outline

Module Leader:

Dr Marianna Biggi DVM PhD FHEA DipECVDI MRCVS

Large Animal Radiologist, European Veterinary Specialist in Diagnostic Imaging

Royal Veterinary College
Hawkshead Lane
North Mymms
Hertfordshire
AL9 7TA
Tel: +44 (0)1707 666201
Email: certavp@rvc.ac.uk
www.rvc.ac.uk/certavp

April 2021

Enrolment guidance

The aim of the module is to enable you to extend and consolidate clinical knowledge and skills gained at undergraduate level, and to develop an in-depth understanding of the application of that knowledge in a practice environment in relation to Veterinary Diagnostic Imaging.

Before embarking on this module, you should fulfil the following criteria:

a) You ideally should have completed module B-EP.3 or B-PAP.2.
b) If you have completed a B Practice module at another institution, you may submit one imaging report for feedback by RVC assessors.
c) If you are only enrolling for the VDI C modules with RVC, it is highly recommended that you write one DI report from your relevant B Practice module and this will be reviewed by the assessors prior to assessment of any C module work.

Coverage of this module may be integrated with others, particularly other B and C modules. All candidates will normally have completed A-FAVP.1 Foundations in Advanced Veterinary Practice module and at least one of the practice B modules, before undertaking a C module, although you can choose to work through modules in a different order if you wish. In whichever order modules are tackled, compliance with best practice for all the topics covered by module A-FAVP.1 will be expected whenever these are appropriate in C modules. For example, awareness of, and compliance with, all relevant legislation, welfare and ethical principles will be required throughout.

You are advised to plan a structured programme of continuing professional development to help you achieve your objectives. Involvement in 'learning sets' and networks of other candidates working towards the same or similar modules is encouraged; this could be initiated by the candidates themselves via RVC Learn. The RCVS considers that candidates will need advisers/mentors to support them through the programme. You are free to choose your own advisers/mentors and the RCVS guidelines strongly advise you to seek advice from your mentor regarding 'seeing practice' with specialist surgeons.

You should develop the practical skills and knowledge that allow appropriate case selection for imaging studies, ensure the taking of diagnostic radiographs, while complying with the relevant legal requirements for safe radiographic practice, thorough assessment of radiographs and correct interpretation of radiographic findings.

For a designated Certificate in Advanced Veterinary Practice (Veterinary Diagnostic Imaging) you must complete this module, module C-VDI.1, one further C-VDI module, a fourth 10 credit module of your choice and the RCVS synoptic assessment.

Learning outcomes

The aim of the module is to enable you to extend and consolidate clinical knowledge and skills gained at undergraduate level, and to develop an in-depth understanding of the application of that knowledge in a practice environment in relation to Veterinary Diagnostic Imaging.

Specifically, this module relates to regions in which diagnostic images can be obtained with low power X-ray equipment in addition to more sophisticated units, i.e. the distal limb up to and including the carpus and tarsus, and the head.

Content

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

- Evaluate image quality including correct positioning and orientation of the x-ray beam, and how to improve it; recognise problems relating to density, contrast and sharpness, due to inadequate radiographic procedure; and recognise, from films, deficiencies in radiation safety procedures and correct labelling.
- Recognise and describe **normal radiographic anatomy** – you should possess a detailed knowledge of the relevant normal radiographic anatomy of the horse and its variation with breed and age
- 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 of the distal limb and head of the horse
- Understand the principles of and apply **diagnostic ultrasonography** to problems affecting the musculoskeletal system of the distal limb

- Identify if additional radiographic projections, including non-standard projections, are required for better evaluate the lesions identified and if additional diagnostic imaging techniques are required to reach/confirm the diagnosis.

Commentary on the content

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

The Head

- Common abnormalities affecting the skull, the nasal cavity, paranasal sinuses, oral cavity including teeth, guttural pouch, hyoid apparatus, pharynx and larynx.
- Abnormalities of the skeletal structures of the skull including traumatic injuries.
- Differential diagnoses

Musculoskeletal System

- Common abnormalities affecting bones and joints up to and including the carpus and tarsus
- Fractures, dislocations, inflammatory and degenerative conditions
- Congenital and developmental abnormalities, metabolic disorders
- Trauma
- Differential diagnoses

Soft Tissue

- Desmopathy/tendinopathy
- Trauma and wound
- Foreign bodies
- Sinuses
- Calcification
- The use of contrast media
- Differential diagnoses

Special techniques

You should be familiar with the general principles of contrast examinations and the performance and interpretation of the more commonly used techniques. You should

understand the principles of ultrasonography and, in particular, its application to soft tissue problems of the distal limb of the horse.

Note on choice of cases

The scope of the examination is related to those conditions likely to be encountered in general equine veterinary practice.

Assessment

- A single case report of up to 2,500 words in length, ensuring you discuss image quality, including film or digital radiology artefacts and radiation protection hazards, related to that case. This may be eligible to receive formative feedback prior to marking.

- A formal examination paper consisting of Multiple Choice Questions (MCQs) and Extended Matching Questions:
  - Section A (30 minutes) – principle of radiography, equipment, contrast media, principle of image formation and radiation safety (can be sat as part as C-VDI.5)
  - Section B (30 min) – Radiography, including special projection and techniques and diagnostic ultrasonography.

- 2 hour film reading exam to include 8 cases for radiograph interpretation, 2 individual examples of film faults and 2 radiographs to test anatomy.

Assessment weighting

1 x Case Report	2,500 words	33%
1 x Practical/Written Exam	Exam of up to three hours	67%

Annual assessment timetable

1st March	If you are submitting work for assessment **and** plan to sit the exam in the current year, please inform CertAVP team by 1st March.
1st April	You are given the opportunity to have one case report reviewed for either this module or C-VDI.5. It is recommended that the review be submitted for the first module you tackle. Please submit your report by this date if you haven't already had a review.
18th May	Case report feedback returned to you
Early July	Case report to be submitted on/by the date of the exam, exam date tbc
Early September	You will be notified of your case report result with accompanying feedback, and your exam result

Learning support

Learning support is provided to aid self-directed learning and to provide easy access to published articles. You will be given a username and password which will allow you to log on to 4 different systems:

- **RVC Learn (http://learn.rvc.ac.uk/)**
  - Imaging articles
  - Sample reports
  - Access to presentations from the CertAVP Induction Day
  - Discussion boards between other candidates enrolled on the module and with VDI tutors
  - Guidelines for mentors
  - Access to SCOUT, RVC's solution for the discovery and delivery of resources including books, ebooks, journal articles and digital objects, all in one single search. Log in to SCOUT using your RVC username and password to save items on your eshelf. If you are able to use the library in person, you can borrow a book for one week with photo ID. IT and Library support is available for this facility (email library@rvc.ac.uk or helpdesk@rvc.ac.uk).

- **RVC Intranet (https://intranet.rvc.ac.uk)**

Access to all information available to all RVC students and employees, for example, news, events, policies, committees, services, Library, IT helpdesk, etc.

- **Athens (http://www.openathens.net/)**

A huge amount of any library's information is now available online, e.g. electronic journals, e-books and databases. 'Athens' is a system used by UK universities for controlling access to these type of online services and with your username and password, you can access many of a library's online databases, electronic journals and e-books seamlessly.

- **Email (http://mail.rvc.ac.uk)**

You are given an RVC email address, which is compulsory to use for CertAVP communication and submission of work.

Guidance on writing the case report

This case should be selected by you to demonstrate your ability to use the diagnostic imaging competences that have been acquired to cope with a challenging situation, rather than necessarily using classic “textbook cases” of particular conditions. The case should be selected from the caseload seen by you during your CertAVP enrolment. It should be presented “editor-ready” in a format appropriate to one of the main veterinary journals. Illustrations should be in a digital format and demonstrate the important features of the case.

Previous submissions have occasionally failed because of failure to demonstrate the desired level of knowledge and understanding of the learning objectives. Although diploma-level detail is not expected, it is anticipated that to reach the required level to pass, you will have needed to attend some advanced level diagnostic imaging CPD, spent some time with a specialist in diagnostic imaging, or spent the suggested learning hours reading relevant textbooks and scientific literature at an advanced level.

Note that the case selected does not need to represent ideal or perfect management, and frequently well-written reports highlight where things went wrong or how they could have been done differently. You are in no way disadvantaged because of lack of availability of advanced equipment; you are supposed to make good use of low power portable or mobile machines if that is what you have at your disposal. However, discussion of how management could be improved if alternative equipment was available or if costs allowed may provide a valuable component of the case report. If included, this should be explained in the context of how it would be helpful, rather than merely listing all the additional equipment/drugs that would be used in a different setting.

The report (excluding Patient Identification) should follow the following outline:

- **Patient Identification**: Number, Date, Reference, Breed, Age, Sex
- **Reason for the Study**: A very brief account of the relevant history and clinical signs
- **Radiographic Appraisal**: Positioning, exposure, centering, processing, collimation, artefacts/faults, safety factors
- **Radiological Report**: A description of the radiographic findings using a systematic approach and using Roentgen signs, followed by the radiographic interpretation.
- **Diagnosis / Differential Diagnosis**: Differentials should be ranked in order of likelihood, with a brief justification for this ranking. The list of differentials is often short in equine orthopaedics and you should not try to come up with more

differentials just for the sake of it. However you should outline carefully why you have come to the diagnosis you have come to based on the radiographic findings in the context of all the information available in the specific case.

The factors that help to produce a good case report include:

- Keeping it simple when selecting a case and not trying to find a “weird and wonderful” case
- Good quality radiography: radiographs should be of diagnostic quality. Diagnostic quality does not equal textbook quality.
- Appropriate radiographic criticism; however, repeated instances of poor radiography, even when correctly criticised, would not be considered appropriate for a good casebook, as it would be expected that these errors would be corrected over time as you gain experience.
- The use of accepted radiological terminology where appropriate. This includes appropriate anatomical terminology as outlined in the Nomina Anatomica Veterinaria and appropriate naming of projections according to Smallwood et al 1985.
- A differential diagnosis list that is appropriate to the particular case after consideration of history, clinical findings and imaging findings.
- A justification of the differential diagnosis list that is brief and pertinent to that case.
- A brief discussion if and how practical constrains (e.g. financial situation) has influenced the choice of imaging procedure and how you would have managed this case if all imaging methods would have been available.

The factors that would contribute to producing a poor case report include:

- Failure to follow the required format outlined above
- Exceeding the word limit
- An inadequate series of radiographs to assess the region(s) of interest
- Misinterpretation of radiographic errors and faults, and deciding that they represent disease
- Not identifying significant lesions
- Inadequate radiographic description of changes seen
- Poor patient preparation (e.g. feet not picked out)
- Gloved or ungloved fingers or any other human body parts in the primary beam (results in a failure of the casebook)
- Inappropriate differential diagnosis list, particularly if this led to inappropriate further investigations or inappropriate treatment options

- Positioning and/or processing faults unrecognized and therefore uncorrected across the casebook
- Discussing radiographs that were not included in the films submitted with the casebook
- Plagiarism

References:

- We recommend using Harvard referencing as described by the Anglia-Ruskin University (http://libweb.anglia.ac.uk/referencing/harvard.htm).
- Avoided listing references that were not cited in the text or vice versa.
- You will find it very helpful to use a program such as Endnote®, Reference manager® or Mendeley to organise your references.

Appendices:

- You may include appendices but please note that the examiners are not obliged to read them (so please do not include essential case information).
- The original radiographs (or DICOM-format images where digital radiography is used) should accompany the report.
- Laboratory reports may be included here but all abnormalities need to be written in the text and reference ranges must be included. It is acceptable to scan printed reports rather than re-type them if you prefer, but any case details or details of your name or practice must be blanked out.

Instructions for submitting work

Each piece of work you submit must be anonymous and emailed to certavp@rvc.ac.uk. Dropbox may be used for large images, contact the CertAVP office for account details.

Please save and name your report like this:

CVDI4 Student Number – Case report review

CVDI4 Student Number – Case report

Please ensure that the beginning of your document includes:

1. your student number
2. module name
3. title
4. word count (excluding the above, tables, photo titles and references)

Tables, figure legends, appendices and reference list are NOT included in the word count. The report title and titles within the report ARE included. You should not put important information, such as the physical examination, in to a table to avoid the word count; only numerical data should appear within a table (such as laboratory results). In the interests of fairness to all candidates the word count is adhered to strictly and reports that exceed it will be returned unmarked.

All written work submitted to the Royal Veterinary College is passed through plagiarism detection software. Work submitted for this module should not have been submitted for any other courses at RVC or other institutions.

Recommended reading list

The following list is given as a guide as to where to start and for this reason cannot be considered 'complete'. We also don't expect you to read texts from cover to cover or to use all of the texts listed, however we do recommend you make use of the most recent edition of textbooks where available. We apologise if you feel a particular favourite is missing - feel free to use the Learn discussion board to pass on additional suggestions to other candidates.

Equine:

- Ross M and Dyson S (2011) Diagnosis and Management of Lameness in the horse, Elsevier-Saunders, St Louis
- Butler J A, Colles C M, Dyson S J, Kold S E and Poulos P W (2008) Clinical Radiology of the Horse; Blackwell Scientific Publications, Oxford.
- Dik, K J and Gunsser, I (2003) Atlas of Diagnostic Radiology of the Horse: Diseases of the Front and Hind Limbs. Schlutersche, Berlin
- Dyson, S J (Ed.) (2003) Equine Scintigraphy. Equine Veterinary Journal.
- Murray, R C (2010) Equine MRI. Wiley-Blackwell.
- Reef, V B (1998) Equine Diagnostic Ultrasound. W B Saunders Co.

Radiography and Physics:

- Thrall (2009) Textbook of Veterinary Diagnostic Radiology, Chapters 1-5. W B Saunders.
- Weaver, M and Barakzai, S (2009) Handbook of Equine Radiography. W B Saunders.

Bovine:

- Geissbuehler U et al Bovine Radiology digital Diagnostic Atlas http://www.vetsuisse-bern.ch/bovine_radiology/Radioatlas.html#
- Bargai, U, Pharr, JW and Morgan, JP. Bovine Radiology. Iowa State University Press. 1989

Journals, relevant imaging articles and case reports in the previous 5 years of:

- Equine Veterinary Journal
- Equine Veterinary Education
- The Veterinary Record

- In Practice
- Veterinary Radiology and Ultrasound *

* *Veterinary Radiology and Ultrasound* provides a comprehensive range of imaging articles much of which is beyond the scope of the modular assessment. However, you should be familiar with those articles relevant to the learning objectives set out in each module.