Certificate in Advanced Veterinary Practice

C-VA.1 Small Animal Anaesthesia and Analgesia

Module Outline

Module Leader:

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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 anaesthesia of small animal species.

You should fulfil the following criteria:

a) You should have completed module B-SAP.1.

b) If you are only enrolling for the C-VA modules, it is **highly recommended** that you complete the assessment task relevant to anaesthesia in module B-SAP.1. This will be reviewed by the assessors prior to assessment of any C Module work. This is to ensure you are aware of the standard required for C module work.

c) It is your responsibility to ensure that you have access to sufficient cases to produce adequate material for the module.

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 of 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.

Before embarking on any module, you are advised to plan a structured programme of continuing professional development to help them 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.

For a designated Certificate in Advanced Veterinary Practice (Veterinary Anaesthesia) you must complete this module, one further C-VA/C-LAS.1 module, two 'free choice' 10 credit modules and an RCVS synoptic assessment.

Learning outcomes

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

- Provide appropriate care for the unconscious patient, including support / maintenance of normal homeostasis

- Demonstrate a sound knowledge of the physiology, pharmacology and biophysics of relevance to anaesthesia

- Demonstrate knowledge of the anatomy of the thorax, abdomen, head and neck as they relate to anaesthesia

- Appreciate the impact of commonly encountered pathological processes in the various species, on the conduct of anaesthesia, and be able to appropriately modify the anaesthesia in light of these

- Understand the pharmacology and clinical use of drugs used for premedication and sedation

- Understand the pharmacology and clinical use of analgesic drugs (opioids, non-steroidal anti-inflammatories, local anaesthetic agents)

- Demonstrate familiarity with commonly performed regional nerve blocks

- Understand the pharmacology and clinical use of intravenous anaesthetic drugs, and their use in total intravenous techniques

- Appreciate how a generic anaesthetic machine and vaporiser function, and be able to perform appropriate safety checks

- Understand the pharmacology of the inhalational anaesthetic agents, and how this dictates their clinical use

- Understand the functional characteristics of anaesthetic breathing systems ("circuits")

- Understand the pharmacology and clinical use of neuromuscular blocking drugs

- Appreciate the advantages and disadvantages of intermittent positive pressure ventilation, and how this may be delivered

- Understand in general terms how the electronic monitoring systems used during anaesthesia function, and be able to interpret the information they provide

- Plan and deliver appropriate fluid therapy (including an awareness of the principles of blood transfusion) for the range of patients encountered in small animal practice

- Provide appropriate anaesthesia for specific clinical situations, for example, paediatric and geriatric anaesthesia, ophthalmological procedures, caesarean section, etc.

- Appreciate the unique characteristics of small mammals, birds, reptiles and fish which may complicate the anaesthetic process

- Recognise and deal with common anaesthetic emergencies

- Review and constructively criticise current literature on the speciality, to determine its relevance to their current practice

- Utilise their understanding of Evidence Based Medicine and Decision Analysis to develop practical treatment protocols for their patients

- Review the outcomes of at least part of their clinical work, using the process of clinical audit to improve performance

- Recognise when you require support from more experience anaesthetic colleagues for a particular case

Learning topics

Aspects of physiology including knowledge of the function of peripheral and autonomic nervous system, cardiovascular and respiratory systems and the transport of gases, the control of water, electrolytes, hydrogen ions and buffers in biological systems, hepatic and renal physiology and endocrinology, with particular reference to the changes in physiology that occur during anaesthesia, how physiological function is important to anaesthetic management, and the repercussions of altered physiology to the anaesthetized patient.

Pharmacology including awareness of the clinically relevant actions of all drugs used in anaesthesia and supportive care, and their pharmacokinetics (distribution, metabolism, elimination), and why these are important when devising an anaesthetic management plan.

Species specific anatomy (mainly dogs and cats but including an appreciation of small pet mammals and birds reptiles and fish): CNS, spinal cord and the main nerve trunks blocked in regional analgesic techniques and a knowledge of the anatomy of the thorax, abdomen, head and neck as they relate to anaesthesia.

Clinical small animal anaesthesia including pre-operative clinical assessment and stabilisation, sedation, analgesia (including local and regional techniques), premedication, induction and maintenance of general anaesthesia (using both intravenous and inhalant techniques), monitoring and supportive care (e.g. cardiovascular and respiratory support).

Anaesthetic apparatus including an understanding of anaesthetic machine (particularly where a lack of equipment knowledge may result in malfunction of the apparatus or patient harm), and breathing circuits.

Patient monitoring before, during and after the anaesthetic period, including selection of appropriate pre-anaesthetic assessments, monitoring indicators of anaesthetic depth, selection and interpretation of patient monitoring devices, and blood gas analysis.

Knowledge of the pathophysiology of common diseases and disorders of small animals as they affect anaesthesia, as well as the way anaesthesia may affect pathological processes, particularly those diseases which affect cardiovascular, respiratory and renal function and those which produce metabolic disturbances.

Assessment

- One case report can be submitted for review prior to being marked. This is only permitted once per candidate per discipline.

- A case diary that documents a broad range of cases requiring anaesthesia and documents your experiences over a minimum of 90 days and no fewer than 50 general anaesthetics. All cases should be those that have been directly managed by you. If you have chosen to spend time seeing practice with a diploma anaesthetist or in a more specialised exotics practice, those cases you observe being managed can be included in the case diary and may be mentioned in the synoptic essay but should be in addition to the minimum case requirements for this module.

- At the end of the case diary you should include a 500-1,000 word synopsis of what you have learned from the module. This might include what has changed in your approach to a case, any new procedures or investigations that are now considered, any additional reading which was helpful, and/or any unexpected features of a case which will influence decision making in the future.

- Ten cases from the diary should include brief (< 350 words per case) critical commentaries describing some of the learning resources used, and documenting how the learning process was applied to the case. **These should be principally reflective in nature; commentaries that are merely a literature review of aspects relevant to the case will not achieve a passing grade.**

- Four case reports, with a combined total word count of 6,000 words and each individual case book being a minimum of 1,000 words. In combination, these cases should be selected to demonstrate that you have developed proficiency in the skills and understanding of the learning objectives outlined in the module content. The cases used should be different from the ones used in the critical commentaries.

It is important that there is evidence from the case diary, critical commentaries and synoptic essay that you are familiar with and has reviewed all of the specified learning topics for the module.

Assessment weighting

- Case diary with synopsis   20%
- Critical commentary   30%
- Case reports   50%

Annual assessment timetable

1st November	Please inform the CertAVP office if you are intending on submitting work
12th November	You are given the opportunity to have one case report per discipline reviewed prior to marking (therefore only one for all C-VA modules). Please submit your report by this date if you haven't already had a review.
12th December	Case report feedback returned to you
31st January	All work to be submitted
31st March	You will be notified of your results

Learning support activities

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:

1. RVC Learn (http://learn.rvc.ac.uk/)

- Tips for module preparation with the case diary template
- Mixed anaesthesia and analgesia questions
- Articles on anaesthesia equipment, pharmacology and topics relevant to human and veterinary anaesthesia
- Access to discussion forums that are used by all CertAVP candidates as well as RVC tutors.
- Access to the RVC online library. This is invaluable when researching literature for writing up case reports. This means that (with rare exception) all journal articles that you want to view can be downloaded to your PC with a few mouse clicks. This includes original research articles as well as review articles and case reports. IT and Library support is available for this facility (email library@rvc.ac.uk or helpdesk@rvc.ac.uk).
- There are also several CPD courses run each year at the RVC that support some of the learning outcomes for C-VA modules. CertAVP candidates receive a 20% discount on RVC CPD courses – please contact the CertAVP office for further details.

2. 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.

3. 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.

4. 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.

Case diary guidelines

- Cases collected from up to 12 months prior to the date of enrolment on the CertAVP programme can be submitted for assessment.

- A suggested template is provided on Learn. Please note that this is not intended as a required format, and not all the information shown in the example need necessarily be included in case diary submissions. This should be taken as a guideline and adapted for the suitability of your caseload and practice. Similarly, the case examples that are included should not be taken as 'ideal' or recommended methods of case management, they are provided only as indicators of the type of information the examiners are looking for in the diary, and it is likely that you may find you wish to include additional information. Doses in mg/kg (or mcg/kg as appropriate) should be provided for all drugs administered. It should be easy to identify from the case diary which cases are the subject of a critical commentary or a case report.

- You may use well-known abbreviations as long as these are explained in an appendix.

Reflective synopsis guidelines

Guidelines for suitable material for the reflective synopsis are provided in the module description documents available on Learn. These tend to vary widely, and there is no set information that the examiners are looking for. Examples may include aspects of anaesthetic management that have been evaluated during the C module period, information you have learned or become particularly interested in during the process, or any changes that have been made as a result of undertaking the C module.

Critical commentaries guidelines

Each commentary should be <350 words in length and should be primarily reflective in nature. These are intended to demonstrate skills associated with applying various learning resources to case management. You are not intended to be literature reviews of how to anaesthetise particular patients, or complete case reports. Instead, it is expected that some case aspects will be discussed in the context of how your learning resources (e.g. journal

articles, online searches, book chapters, CPD events or advice/ discussion with colleagues) were useful in supporting or directing case management. An example critical commentary is provided at the end of this module outline.

Case reports guidelines

Case reports should demonstrate your ability to use the competencies that have been acquired to cope with a challenging situation, emphasising critical thinking, problem solving, patient assessment and application of knowledge. You should not be "textbook cases" describing how to manage particular conditions, nor do you need to represent perfect management (although it would be expected that discussion of possible improvements would form part of the report). The case reports may include comparative aspects of other cases and knowledge gained from other species as evidence of learning. To avoid repetition, it is permissible to cross-reference between the components of the module work, for example where the same principles have been applied to different cases. **It is imperative that you don't tell us only what you are doing but <u>why</u> you are doing it <u>and</u> furthermore that you understand the why. Justification/ explanation of case management that is based solely on non critical extracts from the literature is generally too descriptive and not indicative of understanding of case management, and therefore will usually not reach the standard required at this level.**

The following frame work should be used as a guide to the structure of the case report:

- Identification of patient
- History
- Clinical signs
- Problem list as this relates to anaesthetic management
- Pre-anaesthetic investigations
- Anaesthetic management
- Discussion
- References

You should be reminded that these are intended to be written at Master's degree level. 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 C module passing status, you will have

needed to attend some advanced level anaesthesia CPD, spent some time with a diplomate anaesthetist, or spent the suggested learning hours reading relevant textbooks and scientific literature at an advanced level.

It is challenging to include the level of detail required to reach this level within the word limit provided, however concise scientific writing is one of the skills necessary to work to this level. A few tips:

- Avoid repeating information, since however relevant it is, marks can only be awarded for a particular piece of information once. Common examples have been discussing pharmacology of the same anaesthetic agents, or reasons for anaesthetic circuit selection, in all case reports. Cross-referencing between different components of the module package is acceptable.

- Avoid including large chunks of information that are not relevant to clinical anaesthesia management. The reports are intended to demonstrate how you have applied information you have learnt to improve or support clinical cases. The most common example of this is anaesthetic pharmacology – however tempting, it is not necessary to include large paragraphs on anaesthetic pharmacology that are irrelevant to case management or agent selection, and marks will not be awarded for this. Instead, focus on aspects of pharmacology that help you decide which agents to use, or may present a problem. Agent selection for complicated cases is rarely ideal, and knowledge of pharmacology is used to explain how anticipated drug side effects are managed. Another example is the inclusion of large amounts of information on how anaesthetic monitors work – again, this information is important to learn during module preparation, but should be described in the context of how the information provided by monitors is useful.

- Avoid the temptation to select cases that are too complicated to adequately discuss in 1,000-1,500 words. Instead, choose cases where an underlying disease state, use of a particular technique (e.g. multimodal analgesia, total intravenous anaesthesia) or management of an anaesthetic complication contributed to the case being interesting and challenging, and where this can be discussed in detail. A 2 day old septic foal with a congenital heart defect, or a 17 year old brachycephalic Persian cat with renal disease undergoing complicated surgery, may provide a fascinating case example, but cannot possibly be discussed to the required level within the word limit! In these

situations, it would be highly likely that you would be penalised for failing to discuss important case information in sufficient detail.

Note that cases selected do 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 equipment or individual drugs. Discussion of how management could be improved if alternative equipment etc. was available or if costs allowed often provides a valuable component of the case report. This should be explained in the context of how it would be helpful, rather than listing all the additional equipment/ drugs etc. that would be used in a different setting.

Case reports should be written in the third person in a style suitable for publication in a Journal (for example Journal of Small Animal Practice). You are expected to demonstrate a high standard of literacy and please ensure that any spelling and grammatical errors have been corrected.

References:
- These should be properly cited in the text, in accordance with the style in the Journal of Small Animal Practice (JSAP). Do not list references that were not cited in the text or vice versa.
- We recommend using Harvard referencing.
- You will find it very helpful to use a program such as Endnote® or Reference manager® to organise your references.

Appendices:
- You may include appendices but please note that the examiners are not obliged to read them (so please don't include essential case information).
- Images may be included here or in the main body of text. Include any images that you think are relevant as these generally enhance your report and enable examiners to assess your interpretation. Normal ultrasound images need not be included unless you would like to do so but clear abnormal images should be included if possible.
- 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.

The word limit is 6,000 words for all four case reports. Tables, <u>figure</u> 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, into 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.

Instructions for submitting work

Each piece of work you submit must be anonymous and please ensure that your work includes this table on the front page:

Student number:	
Module:	C-VA.1
Piece of work:	*case diary synopsis, case report 1, case report 2 etc*
Word count:	

Contact the CertAVP office if you need a reminder of your student number (found on your Rover email when you first enrolled). All work is submitted online via Learn; you will be given further instructions when you enrol.

The case diary should be written in Excel and organised in such a way that it can be easily viewed on one page/screen in landscape view. Other work should be in Word.

The content of case reports must also be anonymous, e.g., removing practice details from discharge notes or laboratory reports.

Management of an 8 week old puppy with a portosystemic shunt for corrective surgery.

This case presented a number of challenges, as I had never previously anaesthetized a patient with a portosystemic shunt. I consulted the BSAVA manual (Bennett & Pascoe 1999) and found a useful case report that describes some of the implications for anaesthetic management (Schauvliege et al 2010). Both of these stated that hepatic metabolism of drugs may be impaired, and therefore anaesthetic and sedative agents that require minimal hepatic metabolism for elimination and recovery would be ideal. On the basis of this I selected propofol (which undergoes extra-hepatic metabolism) and isoflurane (which, compared to sevoflurane, undergoes minimal metabolism, recovery being almost exclusively by ventilation) for anaesthesia. Selection of a premedication was more challenging; I did not want to use ACP or medetomidine because of the negative effects on organ blood supply. Previously I would have selected methadone and midazolam in a case such as this, however the BSAVA manual states that benzodiazepines should be avoided in cases of portosystemic shunt. However Greene 1999 advocated the use of diazepam for premedication of patients with portsystemic shunts. As the dog was fairly quiet, I elected to premedicate her using methadone alone, but if she needed additional sedation (e.g. during recovery) or had a seizure, I would administer diazepam at that stage.

One of the references I read described anaemia as a pre-anaesthetic complication of portosystemic shunts, and all three commented on the increased risk of haemorrhage due to coagulopathy. We do not have the ability to administer a blood transfusion, but on the basis of these findings we performed a pre-anaesthetic haematology (there was no evidence of anaemia and red cell morphology was normal) and clotting tests (a PT and aPTT), which were within normal range. If the puppy had been anaemic or coagulopathic I would have recommended referral for this surgery. This had been discussed with the owners previously, however the puppy was not insured, which was why we were performing the surgery at our practice. Although we are unable to administer a blood transfusion, I made sure we had colloid (Voluven) as well as crystalloid (Hartmann's) fluids available in case of hypovolaemia during anaesthesia.

References

- Bennett RC and Pascoe PJ, 1999 Gastrointestinal and Hepatic Disease. In: BSAVA Manual of Small Animal Anaesthesia and Analgesia, Eds. Seymour, Gleed, pp. 197-209, BSAVA, Cheltenham, UK.

- Greene SA 1999 Anaesthetic management of patients with disease. In: Essentials of Small Animal Anesthesia and Analgesia, Eds. Thurmon, Tranquilli and Benson, pp. 422-476, Lippincott Williams & Wilkins, Baltimore, USA.

- Schauvliege S et al, 2010 Anesthesia for cystotomy in a dog with pancreatitis and a portosystemic shunt, Vlaams Diergeneeskundig Tijdschrift 79, 284-290.

Mentors

Candidates who study for the CertAVP medicine C modules with the Royal Veterinary College (RVC) are advised to find a mentor who can guide them. Finding a mentor, and maintaining appropriate and regular contact, are the responsibility of the candidate and mentors operate on a goodwill basis only. Suitable mentors may include holders of the RCVS CertVA or RCVS CertAVP qualifications or holders of American, European or RCVS Diploma qualifications. Individuals who are examiners for the CertAVP C modules (the module leaders) are not able to act as mentors.

What does the role of mentor involve?

The CertAVP is quite different from the previous RCVS certificate qualifications (see later), and therefore we encourage mentors to familiarise themselves with the guidance notes, learning objectives, assessment criteria and case guidelines for the C-VA modules. In addition, we consider that the role of mentor may include:

- Encouraging candidates to undertake continuing professional development and to 'see practice' at relevant centres appropriate to your strengths and weaknesses.
- Guide candidates on the level and amount of reading that they should be doing during your period of study. Most RVC CertAVP candidates choose to have access to the RVC library and have an Athens password for online journal access. For C module work we encourage use of primary research papers in addition to review articles and textbooks; one of the objectives includes the ability to critically review the literature and to attempt to have a balanced view of the literature where differing opinions exist.
- Encourage candidates to get support from other CertAVP candidates either through the RVC learning support discussion forums or by other means.

What is the mentor's role regarding submitted work?

We consider that a mentor can give general advice on preparation of a case log and selection of cases for writing up into full-length reports. We do not recommend that mentors give detailed written advice on case reports. However, one read through of one case report and some general feedback (ideally verbally) is acceptable. Candidates will be asked to confirm which report has been read at the time of submission. Candidates are given guidance notes on preparation and layout of case reports and these can be found in the relevant module outline documents.

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.

Textbooks

BSAVA Guide to pain management in small animal practice

- BSVA Guide to pain management in small practice (2019) I Self
- BSAVA Manual of Small Animal Anaesthesia and Analgesia 3rd edition (2016) Seymour and Duke
- Feline Anaesthesia and Pain Management- (2018)Steagall, Robertson-Taylo 1st edition
- Canine and feline anaesthesia and co-existing disease (2015) Snyder, Johson
- Small animal regional anaesthesia and analgesia 1st edition (2013) Campoy, Read
- Veterinary Clinics of North America: Small Animal Practice
    - Clinical Anaesthesia (1999) Haskins
    - Small Animal Pain Management (2000) Mathews
    - Critical Care Cardiovascular Focus (2001) Dhupa
    - Critical Care Respiratory Focus (2002) Dhupa
- Lumb and Jones' Veterinary Anaesthesia and Analgesia 5th edition (2015) Tranquilli, Thurmon and Grimm
- Fluid, electrolyte and acid base disorders in small animal practice (2011) Di Bartola
- BSAVA Manual of Emergency and Critical Care (2007) Boag and King
- Small Animal Critical Care Medicine (2008) Silverstein and Hopper

Journals:
- Veterinary Anaesthesia and Analgesia
- Journal of Veterinary Emergency and Critical Care
- Journal of Small Animal Practice
- Journal of the American Veterinary Medical Association