VT-2610: VETERINARY ANESTHESIA, ANELGESIA, & DENTAL TECHNIQUES

Cuyahoga Community College

Viewing: VT-2610: Veterinary Anesthesia, Anelgesia, & Dental Techniques

Board of Trustees:
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Academic Term:
2017-08-24

Subject Code
VT - Veterinary Technology

Course Number:
2610

Title:
Veterinary Anesthesia, Anelgesia, & Dental Techniques

Catalog Description:
Fundamentals of veterinary anesthesia and analgesia. Students learn how to induce, maintain, and monitor anesthesia, administer and assess response to analgesics, and perform routine veterinary dental cleaning procedures.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
3

Requisites

Prerequisite and Corequisite
VT-1600 Veterinary Surgical Nursing and Assisting, VT-2300 Pharmacology for Veterinary Technicians, and VT-2200 Dentistry for Veterinary Technicians.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.
Coordinate and integrate all aspects of anesthetic management in a variety of domestic animal species.

Course Outcome(s):

Outcomes

III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students’ accounts.

Therefore, attendance is recorded in the following ways:

- For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.
- For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have "Never Attended" a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

IV. LEARNING OUTCOMES ASSESSMENT

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called ‘artifacts,’ for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

V. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdf. You must also comply with the College’s Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes

Course Outcome(s):

Coordinate and integrate all aspects of anesthetic management in a variety of domestic animal species.
Objective(s):
1. Compare and contrast the terms local anesthesia, regional anesthesia, general anesthesia, neuroleptanalgesia, sedation, tranquilization, and balanced anesthesia.
2. Describe and implement the principles of endotracheal intubation in a variety of animal species including tube selection, placement, monitoring, and avoiding complications.
3. Monitor a patient’s physiologic status using physical and machine-generated parameters used to gauge circulation, oxygenation, ventilation, and anesthetic depth.
4. Monitor the recovery of a dog, cat, horse, or cow from anesthesia and differentiate normal from abnormal anesthetic recovery.
5. Describe a general anesthetic event in a horse or ruminant, including ways in which an anesthetic procedure in these species differs from that of a small animal patient.
6. Explain the principles of special anesthetic procedures including local and regional anesthesia, neuromuscular blockade, and manual and mechanical ventilation.
7. Recognize common anesthetic problems and emergencies, and describe the associated causes, interventions, and prevention.
8. Discuss the objectives of anesthesia and techniques used to achieve these objectives.
9. Coordinate each aspect of patient preparation for anesthesia including acquiring a minimum patient database, physical assessment, patient stabilization, and physical status classification.
10. Explain general ways in which anesthetics and adjuncts are used to sedate and anesthetize veterinary patients.
11. Prepare patients for local, regional, and general anesthetic procedures.
12. Manage patients during all aspects of an anesthetic procedure including induction, maintenance, and recovery.
13. List the sequence of events required to take a small animal patient from consciousness to surgical anesthesia and back to consciousness.
14. Induce and maintain general anesthesia in small animal patients by IM injection, IV injection, mask or chamber, and constant rate infusion.

Course Outcome(s):
Administer anesthetics and adjuncts by common routes for local, regional, or general anesthetic procedures.

Objective(s):
1. List methods of classifying anesthetic agents and match classes with commonly used anesthetic agents in each class.
2. Describe the primary actions, effects, adverse effects, and properties of anesthetic agents including local anesthetics, anticholinergics, sedative/tranquilizers, opioids, injectable anesthetics, inhalant anesthetics, dissociatives, and anesthetic adjuncts.
3. Identify uses for, characteristics of, and principles for safe use of anesthetic agents and adjuncts.
4. Explain how the properties governing the action of inhalant anesthetics including vapor pressure, blood-gas partition coefficient, and minimum alveolar concentration affect the way these agents are used.
5. Perform anesthetic agent and adjunct dosage calculations.
6. Prepare, administer, and monitor responses to preanesthetic medications, general anesthetics, and anesthetic adjuncts given by a variety of routes.
7. Describe hazards associated with waste anesthetic gases and injectable agents, and implement OSHA standards to minimize these risks.

Course Outcome(s):
Select, operate, and maintain anesthetic delivery and monitoring instruments and equipment.

Objective(s):
1. Describe the characteristics of, use of, and maintenance of anesthetic equipment including endotracheal tubes, laryngoscopes, masks, and chambers.
2. Explain the structure, function, use, and maintenance of each component of an anesthetic machine including the oxygen supply, vaporizer, breathing circuit, and scavenging system.
3. Select, prepare, operate, and maintain anesthetic machines, breathing circuits, and associated equipment.
4. Calculate, select, and utilize appropriate oxygen flow rates and inhalant anesthetic settings for various animal species, breathing systems, and periods of an anesthetic procedure.
5. Identify and observe safety considerations when using veterinary anesthetic equipment including compressed gas cylinders and other oxygen sources.
6. Select, operate, and maintain ancillary anesthetic delivery equipment including chambers, masks, endotracheal tubes, laryngoscopes, and ventilators.
7. Select, operate, and maintain anesthetic monitoring equipment including heart, respiratory, blood pressure, and oxygen monitors and interpret data generated by these instruments.

Course Outcome(s):
Coordinate and integrate all aspects of pain management in a variety of domestic animal species.

Objective(s):
1. Use common physiologic and behavioral signs to evaluate patients for pain.
2. Coordinate, provide, and monitor pre-, intra-, and post-operative pain management for a variety of animal species.
3. Describe the primary actions, effects, adverse effects, properties, and usage of analgesics including opioids, NSAIDs, local anesthetics, alpha2 agonists, and NMDA antagonists.
4. Compare and contrast acute, chronic, inflammatory, neuropathic, somatic, and visceral pain, and hypersensitivity.
5. Describe and apply the principles of effective pain management including the concepts of pre-emptive and multimodal analgesia.

Course Outcome(s):
Coordinate and integrate all aspects of preventive and therapeutic dental cleaning and dental assisting procedures in small animal patients.

Objective(s):
1. Assess and prepare a patient for a therapeutic dental cleaning
2. Perform each step of a therapeutic dental cleaning using power and hand instrumentation, including supra and subgingival calculus removal, polishing, and client education.
3. Select, prepare, operate, and maintain hand and power equipment used to provide routine dental care.
4. Chart normal findings, dental pathology, and interventions using dental charting systems.

Methods of Evaluation:
1. Quizzes
2. Practical examinations
3. Unit examinations
4. Final examination
5. Participation
6. Skill Assessments
7. Homework assignments

Course Content Outline:
1. Introduction to anesthesiology
   a. Indications for anesthesia
   b. Terminology of anesthesia
   c. Patient evaluation and preparation
      i. Acquisition of the minimum patient database (MPD)
      ii. Assigning a Physical Status Classification
      iii. Preinduction patient care including fasting, stabilization, and fluid therapy
   d. Record keeping
      i. Controlled substance logs and anesthesia/surgery logs
      ii. Patient medical records
2. Workplace safety
   a. Dangers associated with exposure to waste anesthetic gases (WAGs)
      i. Regulation and monitoring of WAGs
      ii. Reducing risk
   b. Dangers associated with use of compressed gas cylinders
      i. Sudden release of gas
      ii. Fire and explosion
      iii. Torpedo effect
      iv. Handling compressed gas cylinders safely
   c. Dangers associated with injectable agents
      i. Injectable agents of concern
      ii. Handling agents used in the capture and restraint of wild animals
      iii. Preventing exposure
   d. Routes and methods of anesthetic administration
3. Anesthetic agents and adjuncts
   a. Classification of anesthetics and adjuncts
   b. Indications and uses
   c. Routes of administration
   d. Mode of action and pharmacology
   e. Chemical characteristics
   f. Effects and adverse effects
g. Handling and administration
h. Preanesthetic agents
   i. Anticholinergic agents
   ii. Sedatives/tranquilizers
      1. Phenothiazines
      2. Benzodiazepines
      3. Alpha2-agonists
      4. Reversal agents for sedatives/tranquilizers
   iii. Opioids
      1. Agonists
      2. Partial agonists and agonist-antagonists
      3. Antagonists
      4. Neuroleptanalgesia
   i. Injectable anesthetic agents
      i. propofol
      ii. alfaxalone
      iii. etomidate
      iv. barbiturates
j. Dissociatives
k. Guaifenesin
l. Inhalation anesthetics
   i. Physical and chemical properties
      1. Vapor pressure
      2. Partition coefficient
      3. Minimum alveolar concentration (MAC)
   ii. Halogenated organic compounds
      1. Isoflurane, sevoflurane, and desflurane
   iii. Nitrous oxide
4. Principles of endotracheal intubation
   a. Reasons for use
   b. Structure, function, and parts of endotracheal tubes
   c. Laryngoscopes
   d. Selecting and preparing the tube and patient
   e. Placing the tube
   f. Checking for placement and cuff inflation
   g. Removing the tube
   h. Complications of intubation
5. Inhalation anesthetic equipment
   a. Function and principles of operation
   b. Components of the anesthetic machine
      i. Oxygen supply
      ii. Anesthetic vaporizer
      iii. Breathing circuit
      iv. Scavenging system
   c. Compressed gas cylinders
      i. Parts, sizes, and capacities
      ii. Color coding and other safety features
   d. Alternative oxygen sources
   e. Tank pressure gauge
   f. Pressure reducing valve
   g. Line pressure gauge
   h. Flow meters
   i. Oxygen flush valve
   j. Anesthetic vaporizer
      i. Precision vs. non-precision
      ii. VOC vs. VIC
      iii. Factors affecting output
   k. Rebreathing circuit
i. Unidirectional flow valves
ii. Pop-off valve
iii. Reservoir bag
iv. Carbon dioxide absorber canister
v. Pressure manometer
vi. Air intake valve
vii. Breathing tubes

l. Non-rebreathing circuit
   i. Endotracheal tube connector
   ii. Fresh gas inlet
   iii. Reservoir bag
   iv. Overflow valve or port
   v. Breathing tubes
   vi. Mapleson classification system
   vii. Common names of non-rebreathing circuits
   viii. Universal control arm

m. Scavenging system
   i. Function
   ii. Passive vs. active systems
   iii. Waste gas port
   iv. Transfer tubing
   v. Interface
   vi. Gas evacuation system
   vii. Activated charcoal canisters

n. Operation of the machine
   i. Selecting a machine
   ii. Assembling the machine
   iii. Choosing a breathing circuit, bag, and tubes
   iv. Semi-closed vs. closed system
   v. Choosing oxygen flow rates
   vi. Daily set-up

6. Monitoring the anesthetized patient
   a. Overview of the anesthetic stages and planes
   b. Principles and frequency of monitoring
   c. ACVAA monitoring guidelines
   d. Physical assessment of vital signs
      i. Indicators of circulation
         1. Heart rate and rhythm
         2. Capillary refill time
         3. Pulse strength
         4. Arterial blood pressure
      ii. Indicators of oxygenation
         1. Mucous membrane color
         2. Oxygen saturation
         3. Blood gases
      iii. Indicators of ventilation
         1. Respiratory rate and tidal volume
         2. End-tidal carbon dioxide level
      iv. Body temperature
         1. Changes in thermoregulation during anesthesia
         2. Techniques used to maintain body temperature
         3. Malignant hyperthermia
   e. Assessment of anesthetic depth
      i. Reflexes
         1. Swallowing
         2. Laryngeal
         3. Palpebral
         4. Pedal
5. Corneal
6. Pupillary light reflex

ii. Other indicators of anesthetic depth
1. Spontaneous movement
2. Muscle tone
3. Eye position
4. Pupil size
5. Nystagmus
6. Salivary and lacrimal secretions
7. Response to surgical stimulation

f. Judging anesthetic depth

g. Monitoring equipment
i. Measuring heart rate and rhythm
1. Electrocardiograph
2. Esophageal stethoscope

ii. Measuring blood pressure
1. Systolic, diastolic, and mean arterial pressure
2. Causes and treatment of hypotension
3. Direct arterial blood pressure monitoring
4. Doppler blood flow detector
5. Oscillometric blood pressure monitor

iii. Measuring oxygenation
1. Physiology of oxygen transport
2. Pulse oximeter
3. Blood gases

iv. Measuring ventilation
1. Apnea monitor
2. Capnograph

h. Record keeping

7. Anesthesia of small animals (dogs and cats)
a. Anesthetic induction
i. IV induction
ii. IM induction
iii. Mask induction
iv. Chamber induction

b. Anesthetic maintenance
i. Inhalant maintenance
ii. Maintenance with repeat IV boluses
iii. Maintenance with constant rate infusion
iv. Maintenance with IM agent
c. Patient positioning, comfort and safety
d. Anesthetic recovery
i. Signs of recovery
ii. Factors affecting recovery
iii. Monitoring during recovery
iv. Extubation

8. Anesthesia of large animals
a. Equine anesthesia
i. General anesthesia
ii. Field anesthesia
iii. Standing sedation

b. Ruminant anesthesia
i. General anesthesia
ii. Local anesthesia
c. Swine anesthesia
d. Special problems associated with large animal general anesthesia
e. Differences from small animal anesthesia

9. Anesthesia of laboratory animals
a. Patient assessment and preparation
b. Techniques for induction and maintenance
   i. Anesthetic agents and protocols
   ii. Administering an IP injection
c. Monitoring laboratory animals
d. Anesthesia of ferrets
e. Anesthesia of rabbits
f. Anesthesia of rodents
g. Differences from small animal anesthesia

10. Special anesthetic procedures
    a. Local and regional anesthesia
       i. Local anesthetics
          1. Action and indications
          2. Effects and side effects
          3. Clinical use
       ii. Routes of administration
          1. Topical
          2. Infiltration
          3. Nerve blocks
          4. Regional blocks
          5. Epidural anesthesia
    b. Ventilation
       i. Normal ventilation
       ii. Indications for ventilatory support
       iii. Assisted vs. controlled ventilation
       iv. Manual ventilation
          1. Periodic and intermittent mandatory manual ventilation
       v. Mechanical ventilation
          1. Types of ventilators
          2. Intermittent mandatory mechanical ventilation
       vi. Risks of controlled ventilation
    c. Neuromuscular blockade
       i. Indications and use
       ii. Neuromuscular blockers

11. Anesthetic problems and emergencies
    a. Equipment issues
       i. Recognition and causes
       ii. Management and prevention
    b. Patient problems
       i. Recognition and causes
       ii. Management and prevention
    c. Managing high-risk patients

12. Analgesia
    a. Physiology of pain
       i. Nociception
       ii. Hypersensitivity
       iii. Consequences of untreated pain
       iv. Common conditions causing pain
    b. Classifications of pain
       i. Inflammatory
       ii. Neuropathic
       iii. Idiopathic
       iv. Visceral vs. somatic
       v. Acute vs. chronic
    c. Signs of pain
       i. Physiologic signs
       ii. Behavioral signs
    d. Assessment of pain
i. Assessment scales
ii. Frequency of assessment
iii. Assessing response to treatment

e. Pain control
   i. Preemptive analgesia
   ii. Goals of treatment
   iii. Multimodal therapy
   iv. Commonly used agents
      1. Opioids
      2. NSAIDs
      3. Ketamine
      4. Alpha2 agonists
      5. Local anesthetics
   v. Alternative modalities for treatment of pain

13. Veterinary Dental Techniques
   a. Performing a complete dental cleaning
      i. Safety issues
      ii. Performing an oral examination
         1. Assessing plaque and calculus
         2. Assessing periodontal disease
         3. Assessing occlusion
      iii. Probing the sulci
      iv. Removing supragingival calculus
         1. Ultrasonic scaling
         2. Hand scaling
      v. Removing subgingival calculus (subgingival curettage)
      vi. Checking for missed plaque and calculus
      vii. Polishing
      viii. Sulcus irrigation
      ix. Fluoride treatment
      x. Charting findings and interventions using symbols

Resources


Fletcher, Daniel, Manuel Boller, Benjamin Brainard, et al. "RECOVER evidence and knowledge gap analysis on veterinary CPR. Part 7: Clinical guidelines" Volume 22, Issue s1. 2012-06-01 00:00:00.0.


Bednarski, Richard, Kurt Grimm, Ralph Harvey, et al. "AAHA Anesthesia Guidelines for Dogs and Cats" 47:377-385. 2011-11-01 00:00:00.0.

Holmstrom, Steven, Jan Bellows, Stephen Juriga, et al. "2013 AAHA Dental Care Guidelines for Dogs and Cats" 49:75-82. 2013-03-01 00:00:00.0.

Resources Other

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