

ACVECC: Large Animal Program
EXPERIENCE AND SKILLS LIST

“Minimum Level of Proficiency” is defined in the same way that Angoff Scoring defines for examination purposes a “Minimally Qualified Candidate” i.e. a Resident/Fellow who has the *knowledge, experience, and skill* in any given task to be considered proficient at an entry level for board certification. The ACVECC expects that, during their career, each new Diplomate will build on this entry level of proficiency to become more proficient in the common tasks of our specialty (large animal emergency and critical care) and to become expert in their particular area of interest.

The Mentor is given wide latitude in interpreting the definition of “Minimal Level of Proficiency” and in applying this to each Resident/Fellow. The Mentor is expected to use the input from Resident/Fellow’s Supervisors to assess their Resident/Fellow’s proficiency. Resident/Fellows and Mentors may use this Experience and Skills List as a guide. A completed checklist is NOT part of final credentials.

Fellows: Fellows already boarded in another specialty (ACVIM, ACVS, ACVA) will be expected to cover all experiences and skills including those pertinent skills/techniques that may cross cover with their first specialty. However, focus towards heavily weighting skills/techniques that are not familiar to the Fellow’s primary specialty is strongly encouraged.

The ACVECC permits the Mentor wide latitude in how to accomplish this training and in how to evaluate their Resident/Fellows. The College, however, does NOT permit the Mentor to omit any of these tasks from their Residents’ training.

At the completion of the residency training period, as part of the submission of credentials, both the Mentor and Resident/Fellow will be required to sign a Statement of Proficiency that certifies that, in their opinion, the Resident/Fellow has reached a Minimum Level of Proficiency in each of the tasks.

There are strengths and weaknesses in each training facility and training program. Each Mentor will be responsible for finding the means to help the Resident/fellow gain proficiency in each task, including allowing the Resident/Fellow time away from their primary training facility to achieve the necessary experience and training elsewhere. Experience and Skills may be achieved on clinical patients, in cadaver laboratories, dry laboratories, wet laboratories, simulations, out-rotations, or any other means that permits the Resident/Fellow and Mentor to agree that the minimal level of proficiency has been achieved.

Terminology

“*Perform*” indicates that the skill can be readily performed by the resident on a clinical case.

“*Demonstrate*” indicates that the skill has been performed or simulated in a laboratory setting at least.

“*Understand*” indicates that the skill is able to be discussed in depth.

For any technique/skill that “perform” or “*demonstrate*” is required, “understand” is also implied and required.

This list does not include numerical requirements. As such, there is no list for the resident to maintain and submit for evaluation. It is highly recommended that individual Resident/fellows maintain a list of the skills/techniques they perform during their training period to reflect upon and identify potential deficiencies in training. The Resident/fellow and Mentor will submit a signed statement with each annual update indicating that progress towards completion of the Skills and Experience List is occurring.

Upon submission of credentials, the Resident/fellow and Mentor will sign a statement indicating completion or anticipated completion of the Skills and Experience List has been achieved, or will be achieved by the end of the training period.

*** This experience and skills list covers relevant diagnostics, medical/surgical techniques, and therapies related to the discipline of large animal emergency and critical care. Separate knowledge requirements regarding body systems, pathophysiology, literature etc are located elsewhere. Resident/fellows and Mentors are encouraged to review the knowledge requirements to complement the experience and skills list.

This list should be evaluated by the ACVECC LA RTC every 3 years to determine if skills should be added, modified or removed in future editions.

BASIC SURGERY SKILLS

1. Demonstrate knowledge of commonly used surgical instruments for colic surgery, basic arthroscopy, and laceration repair
2. Perform appropriate technical use of above described surgical instruments
3. Perform minimally traumatic tissue handling
4. Perform commonly used suture patterns and techniques
5. Perform appropriate suture selection
6. Perform surgical procedures following Halstead's principles. See individual systems for specific procedures.

DIAGNOSTIC IMAGING

PRINCIPLES. See also system specific requirements.

1. Demonstrate an understanding of the indications, contraindications, limitations of available imaging modalities in adult horses and foals.
2. Perform safe radiographic technique
3. Understand the principles of magnetic resonance image interpretation and pulse sequences (T1 weighted, T2 weighted, FLAIR)
4. Understand the principles of computed tomography and conventional x-ray technique including regional anatomy specific views and radiographic anatomy

GASTROINTESTINAL SYSTEM

DIAGNOSTICS.

1. Perform proficient patient assessment and rapid evaluation on patients presenting for acute abdominal disease
2. Laboratory tests
 - a. Interpret peritoneal fluid cytology and chemistry
 - b. Interpret fecal parasite egg count/parasite identification
3. Interpret abdominal radiographs
4. Perform and interpret transabdominal ultrasound
5. Interpret upper gastrointestinal contrast radiography (including esophagus) and barium enema radiography in foals
6. Perform esophagoscopy
7. Perform gastroscopy

MEDICAL TECHNIQUES

1. Perform abdominocentesis/abdominal paracentesis and analyze the sample
2. Perform gastric lavage
3. Understand cecal/colonic trocharization
4. Perform esophageal obstruction correction by medical management
5. Understand abdominal drain placement and peritoneal lavage in the conscious horse
6. Understand diagnostic proctoscopy to assess rectal pathology including rectal tear
7. Perform the appropriate use of prokinetic drugs
8. Perform the appropriate use of gastroprotectant drugs
9. Perform appropriate use of intestinal cathartic drugs

THERAPY

1. Perform ventral midline approach to the abdomen
2. Understand all approaches to the abdomen (paramedian, flank, etc.)
3. Perform complete exploratory celiotomy
4. Perform an enterotomy; understand implications of performing an enterotomy in different anatomical locations in the gastrointestinal tract
5. Perform small intestinal resection and anastomosis; understand the implications of performing a resection and anastomosis in different anatomical locations in the gastrointestinal tract
6. Demonstrate jejunal-cecal anastomosis (side-to-side and/or end-to-side)
7. Demonstrate appropriate use of intestinal stapling devices
 - a. TA-90, ILA-100/GIA-80, LDS
8. Demonstrate partial typhlectomy
9. Perform the techniques to correct displacements and volvulus of the ascending colon
10. Perform ascending colon lavage and evacuation
11. Perform non-surgical techniques for correction of a left dorsal displacement of the large colon
12. Understand colopexy
13. Understand surgical options for rectal tear repair
14. Understand the technique to drain and manage a perirectal abscess
15. Understand the technique to manage a rectal prolapse
16. Perform appropriate post-operative assessment and management of post-operative morbidity in GI patients

ANESTHESIA/ANALGESIA PROCEDURE/SKILLS

1. Perform pain assessment- localization and severity
2. Understand designing and implementing anesthetic protocol. A complete understanding of mechanisms of action, indications/contraindications, and adverse effects is expected.
 - a. Critically ill patient
 - b. Non-critical patient
 - c. Neonate
3. Perform designing and implementing different types of anesthesia delivery
 - a. TIVA
 - b. Injectable anesthetics
 - c. Inhalant anesthetics
4. Perform either nasotracheal and/or orotracheal intubation in foals and adult horses.
5. Perform intraarticular analgesia using various techniques
 - a. Intra-articular injection
 - b. Demonstrate use of a constant drug delivery device (i.e. Painbuster®).
6. Perform epidural for anesthesia/analgesia drug delivery
7. Understand placement of an epidural catheter
8. Understand placement of a subarachnoid catheter
9. Perform appropriate use of multimodal analgesia using continuous rate infusion (CRI) pumps
10. Understand the use of transdermal patches

11. Perform appropriate use of the following medications in providing analgesia. A complete understanding of mechanism of action, indications/contraindication, and adverse effects is expected.
 - a. Lidocaine
 - b. Opioids (i.e. Butorphanol)
 - c. α -2 agonists (i.e. Detomidine)
 - d. Ketamine
 - e. Gabapentin

RESPIRATORY SYSTEM

DIAGNOSTICS

1. Perform physical examination and assessment (initial and serial) of the patient in respiratory distress.
2. Interpret upper airway noise production
3. Interpret pulse-oximetry
4. Interpret co-oximetry
5. Analyze arterial and mixed venous blood gases
6. Interpret thoracentesis cytology and chemistry
7. Interpret TTW/TTA cytology and Gram stain
8. Calculate A-a (Alveolar-arterial) gradient, PaO₂:FiO₂, shunt fraction and demonstrate the use of these techniques in serial monitoring of the respiratory patient
 - a. Understand acute respiratory distress syndrome (ARDS), acute lung injury (ALI), neonatal respiratory distress syndrome (NRDS).
9. Interpret capnography
10. Interpret thoracic radiographs
11. Interpret thoracic ultrasonography
12. Interpret ventilator waveforms and scalars

MEDICAL TECHNIQUES

1. Perform transtracheal wash (TTW)
2. Perform thoracentesis and interpretation of pleural fluid cytology/Gram stain
3. Perform transthoracic ultrasonography
 - a. Pleura space evaluation
 - b. Lung parenchyma evaluation
 - c. Rib fracture assessment in foals
4. Perform upper airway endoscopy including guttural pouches
5. Understand bronchoscopy
6. Understand bronchoalveolar lavage
7. Understand removal of a tracheal foreign body
8. Understand the appropriate use of systemic and inhaled bronchodilators
9. Understand the appropriate use of systemic and inhaled corticosteroids

THERAPY

1. Perform techniques for oxygen support via
 - a. Mask (foals)
 - b. Nasal cannula (adult and foal)
 - c. Endotracheal tube (foal, anesthetized adult horse)

2. Demonstrate the set up, management, and monitoring of a foal on a ventilator.
3. Understand the indications for mechanical ventilation of foals
4. Understand the use of sedatives/neuromuscular blockers in ventilated foals
5. Understand how and when to wean a patient off the ventilator
6. Understand the appropriate use of the following ventilator modes
 - a. Positive end expiratory pressure (PEEP)
 - b. Continuous positive airway pressure (CPAP)
 - c. Intermittent positive pressure ventilation (IPPV)
 - d. Controlled mandatory ventilation (CMV/Assist CMV)
 - e. Synchronized intermittent mandatory ventilation (SIMV)
 - f. Pressure support ventilation (PSV)
7. Perform chest tube placement and maintenance for the following
 - a. Pneumothorax
 - b. Pleural effusion
8. Perform tracheostomy
9. Perform management of pleural space disease (pneumo, hydro, hemo, pyothorax)
10. Perform intermittent pleural drainage
11. Demonstrate continuous pleural drainage
12. Demonstrate manual positive pressure ventilation
13. Demonstrate manual ventilation with self-inflating (AMBU) bag (foal)
14. Demonstrate demand valve ventilation (adult)
15. Demonstrate management of open pneumothorax, closed pneumothorax and tension pneumothorax

MUSCULOSKELETAL SYSTEM

DIAGNOSTICS

1. Perform assessment and evaluation of acute severe lameness
2. Interpret joint/tendon sheath fluid cytology and chemistry
3. Interpret skeletal radiography
4. Interpret distal limb ultrasonography

MEDICAL TECHNIQUES

1. Perform lameness grade evaluation
2. Perform evaluation of acute laminitis
3. Perform diagnostic evaluation of acute non-weight bearing lameness
4. Perform musculoskeletal ultrasonography
 - a. Distal limb
 - b. Joint/tendon sheath
5. Perform correct application of splints and external coaptation for suspected and proven appendicular skeleton fracture.
6. Perform correct application of splints/external coaptation for tendonous/ligamentous injury
7. Perform appropriate local anesthesia for wound investigation and repair including nerve blocks and local infiltration/instillation.
8. Perform diagnostic arthrocentesis
9. Perform diagnostic tendon sheath aspiration

10. Demonstrate navicular bursa fluid collection
11. Perform distal limb radiography; understand digital venography
12. Perform positive contrast radiography (fistulogram, arthrogram and bursogram)
13. Perform wound assessment including any involvement of synovial structures and control of hemorrhage.

THERAPY

1. Perform placement of a bandage cast
2. Perform placement of a foot cast
3. Perform fasciotomy/myotomy for emergent septic processes
4. Perform appropriate management of cellulitis
5. Perform appropriate management of rhabdomyolysis
6. Perform through-and-through (non-arthroscopic, non-tenoscopic) joint and tendon sheath lavage
7. Perform wound debridement, cleaning and lavage
8. Perform wound closure and appropriate use of drains, tension relieving strategies and suture technique
9. Perform regional limb perfusion for antimicrobial delivery
10. Demonstrate appropriate use of wound dressings
 - a. Adherent
 - b. Non-adherent
 - c. Wet-to-dry
11. Demonstrate appropriate understanding of wound closure
 - a. Primary closure
 - b. Delayed primary closure
 - c. Second intention healing
 - d. Tertiary intention healing
 - e. Wound contracture
12. Perform appropriate management of acute laminitis and understand indications/contraindications for digital hypothermia, corrective shoeing, frog support and surgical procedures
13. Demonstrate appropriate usage and techniques for applying and maintaining a horse in a sling; understand different slings available

OPHTHALMOLOGY

DIAGNOSTICS

1. Perform intraocular pressure measurement
2. Perform fluorescein corneal staining
3. Perform direct ophthalmoscopy (including fundic examination)
4. Perform and interpret globe ultrasonography
5. Perform auriculopalpebral and supraorbital nerve blocks
6. Perform corneal scraping and cytology
7. Demonstrate slit lamp bi-microscopy

THERAPY

1. Understand appropriate medical treatment of acute uveitis
2. Perform appropriate medical treatment of acute ulcerative keratitis

3. Demonstrate the technique of a conjunctival pedicle flap
4. Understand the repair of a corneal laceration
5. Understand management of acute glaucoma
6. Demonstrate a temporary tarsorrhaphy
7. Perform correct repair of eyelid laceration
8. Perform therapeutic enucleation or exenteration
9. Perform entropion correction in neonatal foals
10. Perform correct placement of a subpalpebral lavage tube

ACID-BASE/ELECTROLYTE

DIAGNOSTICS.

1. Interpret blood gases (arterial and venous), including traditional methods, quantitative methods, and the Stewart approach.
2. Interpret measured osmolality and compare with calculated values.

MEDICAL TECHNIQUES

1. Understand the technique to obtain a mixed venous blood sample and demonstrate appropriate sample handling for blood gas analysis
2. Perform arterial blood collection and demonstrate appropriate sample handling for blood gas analysis (transverse facial a., decubital a., lateral metatarsal a., submandibular a., facial a.)

THERAPY

1. Perform appropriate therapy to correct acid-base derangements
2. Perform appropriate therapy for the following
 - a. Hyper/hyponatremia
 - b. Hyper/hypokalemia
 - c. Hypocalcemia
 - d. Hypophosphatemia
 - e. Hypomagnesemia

CARDIOVASCULAR SYSTEM (Including hemodynamic monitoring)

DIAGNOSTICS.

1. Perform physical examination and assessment (initial and serial) of the patient with cardiac disease including interpretation of heart sounds and murmurs.
2. Perform assessment of peripheral perfusion by physical examination findings
3. Interpret pulse pressure palpation
4. Interpret electrocardiography (adult and foal)
5. Perform and understand fetal electrocardiography
6. Perform fetal heart beat assessment by echocardiography
7. Interpret pericardial fluid cytology
8. Interpret echocardiography images (adult and foal)
9. Interpret CVP and direct arterial pressure waveforms and measurements
10. Calculate specific cardiovascular and oxygenation indices including delivery of oxygen, consumption of oxygen, oxygen extraction ratio, arterial/venous oxygen content.
11. Understand the Fick principle

12. Estimate the hydration status and effective circulating volume
13. Demonstrate methods of CPR efficacy including end-tidal CO₂

MEDICAL TECHNIQUES

1. Perform base-apex electrocardiography
2. Perform echocardiography including standard views and assessment of structure and function; calculation of LV fractional shortening; demonstration of color flow doppler (adult and foal)
3. Understand positive-contrast saline bubble echocardiography (foal)
4. Understand pericardiocentesis
5. Perform catheter placement of the following
 - a. Central venous catheter
 - b. Peripheral venous catheter
 - c. Jugular vein
 - d. Lateral thoracic vein
 - e. Cephalic vein
 - f. Transverse facial artery
 - g. Submandibular artery in an anesthetized horse
 - h. Lateral metatarsal artery in an anesthetized horse
6. Perform catheter placement using the Seldinger technique
7. Demonstrate placement of an intraosseous catheter/cannula
8. Perform measurement and interpretation of the following
 - a. Arterial blood pressure
 - i. Direct (including waveform analysis)
 - ii. Indirect
 - b. Central venous pressure (including waveform analysis)
9. Understand placement of a Swan-Ganz catheter and measurement of RAP, PAP, PCWP/PAOP.
10. Understand methods of determining cardiac output
 - a. Thermodilution, Indicator dilution
 - b. Non-invasive techniques

THERAPY

1. Perform appropriate use of Vaughan-Williams classes of antiarrhythmic drugs for hemodynamically significant dysrhythmias
2. Perform appropriate use of blood pressure support drugs (inotropes, pressors) in hypotensive patients
 - a. Dobutamine
 - b. Norepinephrine
 - c. Vasopressin
3. Understand appropriate use of therapeutics for congestive heart failure (diuretics, vasodilators, inotropes, volume-restriction strategies)
4. Perform closed chest CPR in a foal including mouth-to-nose respiration
5. Understand open chest CPR and emergency thoracotomy in a foal
6. Understand closed chest CPR in an adult horse
7. Demonstrate resuscitative drug usage including various routes of administration (venous, tracheal, intraosseous)
 - a. Epinephrine

- b. Vasopressin
- 8. Understand external defibrillation (foal) including knowledge of rhythms amenable to defibrillation and type of defibrillators (monophasic/biphasic)
- 9. Perform appropriate catheter site maintenance, assessment and treatment of complications

**HEMATOLOGY, COAGULATION & TRANSFUSION
DIAGNOSTICS.**

- 1. Perform physical examinations in the coagulopathic patient and assess petechiation, ecchymoses, and cavitory bleeds
- 2. Interpret complete blood count
- 3. Interpret coagulation testing including platelet count, partial thromboplastin time, prothrombin time, fibrin degradation products concentration, D-dimer concentration, anti-thrombin activity, thrombin-antithrombin concentration, fibrinogen concentration.
- 4. Interpret platelet function testing and viscoelastic coagulation tracings.
- 5. Interpret cross-match results
- 6. Interpret blood typing in horses and donkeys

MEDICAL TECHNIQUES

1. Perform collection of whole blood, packed red cells and/or plasma from a donor
2. Understand collection and storage of platelet rich plasma
3. Perform peripheral vascular ultrasonography and assess blood flow
4. Perform and understand transfusion monitoring rationale and techniques
5. Perform appropriate vessel ligation on bleeding vessels
6. Perform hypotensive resuscitative strategies in the patient with uncontrolled/internal hemorrhage.

THERAPY

1. Perform appropriate administration of whole blood, platelet rich plasma or packed erythrocytes in the hemorrhagic hypoxic/anemic hypoxic/thrombocytopenic patient
2. Perform appropriate administration of plasma product transfusion
3. Understand appropriate management for a patient experiencing a transfusion reaction
4. Understand the use of hemoglobin-based oxygen carrier (HBOC) products. An understanding of chemistry and use is sufficient
5. Perform appropriate use of antifibrinolytic drugs in patients with hemorrhage
6. Perform appropriate use of therapies for immune mediated disease (IHMA, ITP)
7. Understand autotransfusion
8. Perform appropriate management of peripheral venous thrombosis

NEONATOLOGY

DIAGNOSTICS

1. Perform physical examination and assessment (initial and serial) of the neonatal foal
2. Interpret clinicopathologic data of the newborn including CBC, biochemistry profile, inflammatory protein concentrations.
3. Perform blood culture to document bacteremia
4. Perform and interpret immunoglobulin G concentration
5. Interpret peritoneal fluid, joint/tendon sheath fluid, cerebrospinal fluid, and pleural fluid cytology and chemistry
6. Interpret diagnostic imaging studies
 - a. Ultrasound
 - b. Radiography
 - c. CT/MRI

MEDICAL TECHNIQUES

1. Perform specific body system evaluations of the newborn foal (neurologic examination, gait assessment, phenotypic stage of development, respiratory, musculoskeletal, cardiovascular, gastrointestinal).
2. Perform transthoracic ultrasound (pleural space, lung parenchyma, ribs)
3. Perform transabdominal ultrasound
4. Perform umbilical ultrasound
5. Perform abdominocentesis
6. Perform arthrocentesis

7. Understand atlanto-occipital cerebrospinal fluid collection
8. Perform thoracocentesis
9. Perform bladder catheterization (colt and filly)
10. Perform the appropriate method of a secure closed urine collection system
11. Understand indications and placement of a peritoneal catheter
12. Perform distal limb radiography
13. Perform thoracic radiography
14. Perform central line placement with an over-the-wire catheter
15. Perform arterial blood sample collection
16. Demonstrate intraosseous bone screw cannula placement

THERAPY

1. Perform placement of an indwelling nasogastric/nasoesophageal feeding tube
2. Perform therapeutic peritoneal drainage of uroabdomen
3. Perform appropriate use of immune support for hypogammaglobulinemia (colostrum, plasma)
4. Perform appropriate use of specific therapeutics including:
 - a. Anticonvulsant therapies
 - b. Antibiotics for septic processes/foci
 - i. Bacteremia/sepsis
 - ii. Omphalitis etc
 - iii. Meningitis
 - c. Parenteral nutrition (see nutrition/metabolic section)
5. Perform appropriate medical and surgical management of septic synovial structures
 - a. Joint lavage
 - b. Intra-articular therapy
 - c. Regional limb perfusion
6. Understand appropriate transfusion and critical care medicine for neonatal isoerythrolysis
7. Perform appropriate medical therapy for perinatal asphyxia syndrome/hypoxic-ischemic encephalopathy
8. Perform soapy water enema
9. Perform acetyl-cysteine retention enema
10. Demonstrate umbilical remnant resection
11. Perform leg splints for tendon contracture
12. Perform application of toe extension/heel extension/shoes for flexural deformity and angular limb deformity
13. Perform appropriate use of fluids (crystalloids, colloids), pressors, inotropes for resuscitation and hypotension in critically ill foals.
14. Understand the appropriate use of surfactant in NRDS
15. Understand EXIT procedure

REPRODUCTIVE SYSTEM

DIAGNOSTICS

1. Understand and interpret the various hormone concentrations in late gestation of the pregnant mare as it pertains to maintenance of gestation and prediction of parturition.

2. Interpretation of milk electrolytes as a means of predicting parturition

MEDICAL TECHNIQUES

1. Perform evaluation of the external genitalia in a stallion/colt
2. Perform evaluation of internal genitalia in a mare
 - a. Rectal palpation
 - b. Vaginal palpation
 - c. Speculum examination
 - d. Vaginoscopy/hysteroscopy
3. Perform ultrasound of ovaries/testes
4. Demonstrate methods of assessing soft tissue trauma to the penis, testis, scrotum
5. Perform ultrasound of uteroplacental unit and placenta

THERAPY

1. Perform treatment of post-castration complications
2. Demonstrate castration and understand its utility associated with inguinal / scrotal hernia
3. Understand uterine torsion correction
 - a. Plank and rolling under anesthesia
 - b. Standing flank laparotomy
 - c. Ventral midline laparotomy
4. Demonstrate uterine tear management
 - a. Medical
 - b. Surgical
5. Demonstrate the technique for caesarian section
6. Perform appropriate medical and supportive treatment of paraphimosis and penile trauma
7. Demonstrate dystocia correction
 - a. Assisted vaginal delivery
 - b. Controlled vaginal delivery
8. Understand the technique for fetotomy
9. Perform appropriate medical therapy for retained placenta and endo(metritis)
10. Perform appropriate stabilization and medical therapy for middle uterine artery rupture
11. Perform appropriate medical therapy for placentitis and premature placental separation
12. Understand appropriate supportive therapy for body wall hernia including prepubic tendon rupture

URINARY SYSTEM

DIAGNOSTICS

1. Interpret urinalysis
2. Calculate and interpret fractional clearances of electrolytes
3. Calculate serum and urine osmolality
4. Interpret urine output
5. Interpret quantitative urine culture

MEDICAL TECHNIQUES

1. Perform bladder catheterization
2. Perform bladder palpation
3. Perform transabdominal renal ultrasonography
4. Perform transrectal bladder ultrasonography
5. Understand positive contrast cystography (foal)
6. Understand cystoscopy

THERAPY

1. Demonstrate appropriate therapy for acute renal failure
 - a. Anuria
 - b. Oliguria
2. Perform appropriate supportive management of azotemia
3. Understand appropriate management of post-renal obstruction
4. Understand appropriate management of pigmenturia
5. Understand the techniques of hemodialysis continuous renal replacement therapy
6. Understand peritoneal dialysis

NEUROLOGY

DIAGNOSTICS

1. Interpret CSF cytology and chemistry
2. Interpret blood chemistry, electrolyte and ammonia concentrations
3. Interpret neurologic infectious disease test results
4. Interpret head and axial spine diagnostic imaging
 - a. Radiography (including myelography)
 - b. Computed tomography
 - c. Magnetic resonance imaging
5. Perform appropriate sample collection for specific infectious and toxicological neurologic diseases

MEDICAL TECHNIQUES

1. Perform complete neurologic evaluation (initial and serial) and lesion localization (adult and foal)
 - a. Recumbent
 - b. Non-recumbent
2. Perform appropriate recognition of seizure activity
3. Demonstrate collection of CSF AO and LS space
4. Understand the procedure to acquire intracranial pressure measurement

THERAPY

1. Perform appropriate isolation and quarantine for potential infectious and zoonotic neurologic diseases
2. Understand appropriate usage of anticonvulsant therapies and mode of action, indications/contraindication, and adverse effects
3. Demonstrate appropriate use of intracranial pressure reduction strategies and medications

4. Understand appropriate management for the following:
 - a. Traumatic head/brain injury
 - b. Traumatic spinal cord injury
 - c. Toxigenic neurologic disease (*Clostridial*, plant, other)
 - d. Infectious neurologic disease
 - e. Metabolic neurologic disease (hyperammonemia, electrolyte derangement)
 - f. Recumbent horse
5. Perform appropriate application and management of maintaining a horse in a sling

**NUTRITION/METABOLIC
DIAGNOSTICS & MEDICAL TECHNIQUES.**

1. Perform assessment of body condition score according to Henneke et al. (9 point scale)
2. Interpret serum biochemistry and metabolic hormone values
3. Understand the indication, contraindications for nutrition provision including strategies for delivery
4. Perform placement and management of indwelling nasogastric tube (adult and foal) or nasoesophageal feeding tube (foal)
5. Understand placement of an esophagostomy tube
6. Perform a complete oral examination including dental assessment
7. Perform pharyngeal & guttural pouch endoscopy to evaluate dysphagia
8. Interpret head, teeth, guttural pouch, pharyngeal radiographs

THERAPY

1. Perform calculation and delivery of parenteral glucose supplementation
2. Perform calculation and delivery of enteral nutrition
3. Perform calculation and delivery of partial parenteral nutrition
4. Perform calculation and delivery of total parenteral nutrition
5. Perform appropriate nutritional management of the emaciated/starved horse and demonstrate an understanding of ‘refeeding syndrome’
6. Perform appropriate management of equine hyperlipemia/hyperlipidemia
7. Perform calculation and delivery of regular insulin infusion

**ENVIRONMENT
DIAGNOSTICS.**

1. Understand burn severity classification (thermal and/or chemical)
2. Understand physical examination (initial and serial) of the patient with the following conditions:
 - a. Hypo- and hyperthermia
 - b. Exhausted horse syndrome
 - c. Smoke inhalation and respiratory distress

THERAPY

1. Understand appropriate management of chemical decontamination (dermal)

2. Understand appropriate management of burn injury including nutrition and analgesia provision
3. Understand appropriate respiratory support for smoke inhalation
4. Perform appropriate methods of external warming in the hypothermic patient
5. Understand the principles of internal warming strategies in the hypothermic patient
6. Demonstrate appropriate methods of external cooling in the hyperthermic patient
7. Understand the principles of internal cooling strategies in the hyperthermic patient
8. Understand appropriate management of the exhausted horse

DISASTER PREPAREDNESS

SKILLS

1. Understand appropriate biosecurity protocol in the ICU
2. Understand biosecurity and disease containment at equestrian events
3. Understand methods of containment and capture of escaped horses in public areas
4. Understand disaster relief and assistance: interfacing with authorities

SIRS, SEPSIS, ENDOTOXEMIA

DIAGNOSTICS.

1. Perform physical examination (initial and serial) in the patient with SIRS/sepsis or at risk of developing SIRS/sepsis
2. Interpret blood culture results
3. Interpret leukogram and peripheral blood cytology
4. Understand the pathophysiology of endotoxin signaling in horses and what clinical conditions are associated with SIRS/sepsis development.
5. Perform systematic approach to the patient with fever of unknown origin

MEDICAL TECHNIQUES

1. Perform appropriate aseptic sample collection and test submission for specific infectious disease
2. Perform initial and serial hemodynamic monitoring of the septic patient (see cardiovascular system)

THERAPY

1. Perform appropriate use of anti-endotoxin therapies and understand mechanism of action, indications, and adverse effects.

2. Perform appropriate use of antimicrobial therapy including choice of drug, method of delivery. An understanding of modes of action, indications, contraindications, spectrum of activity, pharmacokinetics and drug monitoring, and adverse effects is expected.
3. Perform appropriate hemodynamic support utilizing fluids, inotropes and/or pressor medications (see fluid therapy and cardiovascular system sections)

FLUID THERAPY DIAGNOSTICS.

1. Perform assessment of hydration status using clinical and clinicopathologic variables
2. Understand advantages of enteral fluid therapy vs. intravenous fluid therapy and associated clinical applications
3. Understand how to calculate fluid rates of administration based on conventional ml/kg rationale and the Holliday-Segar formula for neonates.
4. Understand what constitutes a replacement solution and a maintenance solution
5. Understand the chemistry (pharmacology and physiology) of fluid therapy solutions
 - a. Balanced and unbalanced crystalloid solutions
 - b. Colloids (synthetic)
 - c. Colloids (biological)

THERAPY

1. Perform calculation and administration of crystalloids for:
 - a. Hypovolemia
 - b. Deficit replacement
 - c. Maintenance
 - d. Diuresis (i.e. acute kidney injury, congestive heart disease)
 - e. Electrolyte and acid-base disorders
2. Perform appropriate administration of hypertonic sodium chloride
3. Understand use of sodium bicarbonate and implications in patients with significant sodium derangements
4. Perform appropriate administration of colloid solutions
5. Calculate a base deficit in a patient with metabolic acidosis and perform appropriate buffer base supplementation
6. Perform appropriate correction of serum electrolyte derangements (see electrolyte and acid-base section).