Australian College of Veterinary Scientists

Fellowship Examination

June 2010

Equine Surgery

Paper 1

Perusal time: **Twenty (20)** minutes

Time allowed: **Three (3)** hours after perusal

Answer **six (6)** from the seven questions **only.**

Recommended time allocation: 30 minutes per question.

All questions are of equal value (thirty marks).

Subsections of questions are of equal value unless stated otherwise.

Paper 1: Equine Surgery

Answer six (6) from the seven questions only.
Recommended time allocation: 30 minutes per question.

1. Answer **each** of the following:

   a) Discuss the pathogenesis of post-operative ileus and nasogastric reflux with reference to the recent literature. (15 marks)

   b) A 500 kg thoroughbred mare has had a small intestinal resection and anastomosis 24 hours previously and has started refluxing eight litres of fluid every two hours by nasogastric tube.

   Five days later, the mare has stopped refluxing and is eating. She develops profuse watery diarrhoea, becomes depressed and develops tachycardia.

Venous Blood Gas

		Reference Range
Lactate	**3.9 mmol/L**	< 2.0 mmol/L
pH	**7.23**	7.34 – 7.43
P_vCO_2	43 mmHg	38 – 45 mmHg
P_vO_2	45 mmHg	36 – 46 mmHg
HCO_3^-	**18 mEq/L**	24 – 30 mEq/L
Base excess	**-8 mEq/L**	-4 – +4 mEq/L
Anion gap	**21.1 mEq/L**	7 – 15 mEq/L
K^+	3.1 mmol/L	3.0 – 5.0 mmol/L
Na^+	**127 mmol/L**	133 – 150 mmol/L
Cl^-	**91 mmol/L**	97 – 105 mmol/L
Ca^{2+}	**1.3 mmol/L**	1.4 – 1.6 mmol/L
Albumin	**23 g/L**	28 – 38 g/L
Total protein	**50 g/L**	65 – 75 g/L

Question 1 (b) Continued over page

Haematology	**Results**	**Reference Value**
		Hot blood
Haemoglobin	16.8 g/dL	13.0 – 17.0 g/dL
PCV	**0.49 L/L**	0.32 – 0.45 L/L
Red cell count	11.5 x 10^{12}/L	8.2 – 12.2 x 10^{12}/L
MCV (PCV/RCC)	39 fL	36 – 50 fL
MCH (Hb/RCC)	14 pg	13 – 19 pg
MCHC (Hb/PCV)	35 g/dL	33 – 39 g/dL
White cell count	**3.6 x 10^9/L**	8.0 – 14.2 x 10^9/L
Atypical cells	0	0
Metamyelocytes	0	0
Bands	**0.6 x 10^9/L**	0 – 0.1 x 10^9/L
Neutrophils	**0.6 x 10^9/L**	2.3 – 8.6 x 10^9/L
Lymphocytes	1.9 x 10^9/L	1.5 – 7.7 x 10^9/L
Monocytes	0.3 x 10^9/L	0 – 1.0 x 10^9/L
Eosinophils	0.1 x 10^9/L	0 – 1.0 x 10^9/L
Basophils	0.1 x 10^9/L	0 – 0.3 x 10^9/L
Platelets	150 x 10^9/L	100 – 500 x 10^9/L
NRBC /100 WBC	0	0
Total solids	**52 g/L**	60 – 80 g/L
Fibrinogen	**5.5 g/L**	2.0 – 4.0 g/L
Comments: **Red cell morphology**: normal **White cell morphology**: toxic changes ++ neutrophils		

Question 1 (b) Continued over page

Biochemistry	Results	Reference Values
Sodium	**127 mmol/L**	133 – 150 mmol/L
Potassium	**2.7 mmol/L**	3.0 – 5.3 mmol/L
Chloride	**89 mmol/L**	97 – 109 mmol/L
Calcium	3.09 mmol/L	2.50 – 3.15 mmol/L
Phosphate	1.7 mmol/L	0.8 – 1.8 mmol/L
Urea	**10.3 mmol/L**	3.6 – 8.9 mmol/L
Creatinine	**0.21 mmol/L**	0.11 – 0.17 mmol/L
Glucose	**7.6 mmol/L**	3.4 – 6.7 mmol/L
Total bilirubin	**60 µmol/L**	0 – 40 µmol/L
Conjugated bilirubin	0 µmol/L	0 – 10 µmol/L
GLDH	**35 U/L**	<12 U/L
AP	169 U/L	40 – 400 U/L
GGT	40 U/L	<50 U/L
AST	**680 U/L**	150 – 400 U/L
CK	361 U/L	50 – 400 U/L
Total protein	**54 g/L**	58 – 76 g/L
Albumin	**23 g/L**	28 – 38 g/L
Comments: None.		

Answer **both** the following:

i. List the abnormal clinical pathological findings and give a detailed interpretation of these in the light of the clinical condition of the horse. (7.5 marks)

ii. Design an appropriate fluid management plan for this mare and justify your choices. (7.5 marks)

2. A 450kg two-year-old warmblood gelding is presented with unilateral hindlimb lameness localised to the stifle using local anaesthesia techniques.

List **all** the non-surgical diagnostic imaging techniques that may assist in further defining the cause of the lameness. Discuss the advantages and limitations of **each** technique in this case, citing evidence from the relevant published literature.

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3. Discuss how you would arrive at an evidence-based prognosis for an adult horse with a septic synovial structure. In your answer use the relevant published literature and explain the limitations of the information derived from the literature upon which you rely to formulate the prognosis.

4. Anaesthetic recovery of horses remains one of the risk periods after many equine surgical procedures. Answer **both** of the following:

   a) Discuss what can be done to minimise adverse events including pre-operative and intra-operative measures as well as strategies during the recovery period. (10 marks)

   b) Discuss assisted anaesthetic recovery techniques in horses and the published evidence that exists to support the use of these techniques. (20 marks)

5. Answer **each** of the following:

   a) Discuss the chemical, physical and in vivo properties of **each** of the following biomaterials, in conjunction with their clinical applications:

      i. polytetrafluoroethylene (6 marks)

      ii. polyglecaprone (6 marks)

      iii. polyester felt (6 marks)

      iv. polypropylene mesh. (6 marks)

   b) Describe the chemical, physical, biomechanical and in vivo properties of the stainless steel broad 3.5 mm dynamic compression plate in conjunction with its clinical use in equine surgery. (6 marks)

6. Answer **each** of the following:

   a) Describe in detail, the anatomy of fore and hind limb equine superficial digital flexor tendons and the pathophysiology of equine tendon injury. Use diagrams where appropriate and cite the relevant published literature. (20 marks)

   b) Explain how **each** of the following affect the biomechanics of the equine tendon and ligament: (10 marks)

      i. a full limb hind limb cast

      ii. a distal limb (foot/slipper) cast of the forelimb

      iii. mild to moderate heel elevation is a normally conformed hind foot.

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7. Answer **each** of the following:

a) List the types of bone encountered in equine surgery. For **each** type of equine bone, describe the gross and ultrastructural anatomy using diagrams where appropriate. (15 marks)

b) Explain in detail, how bone repairs in **each** of the following circumstances:

i. a closed fracture of the equine frontal sinus (5 marks)

ii. an incomplete lateral condylar fracture of equine metatarsus, treated with lag screw repair (5 marks)

iii. an open, infected fracture of the fourth metatarsal bone in a foal. (5 marks)

End of paper

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Paper 2

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Answer **six (6)** from the seven questions **only.**

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Paper 2: Equine Surgery

Answer six (6) from the seven questions only.

1. During exploratory laparotomy, a 720 degree large colon torsion is identified at the level of the caecocolic ligament and then de-rotated. Answer **both** of the following:

   a) Based on evidence from the published literature, list the pre-operative, intra-operative and post-operative variables which may be useful in determining the prognosis for survival in cases of colon torsion. (10 marks)

   b) What methods have been used to assess the viability of the colon during surgery? Describe how you would assess the colon during surgery and decide if a colon resection is indicated, using an evidence-based approach. (20 marks)

2. For **each** of the following cases: list all reasonable surgical treatment options, describe the treatment option you consider most appropriate, and justify your choice.

   a) A strangulating condition of the small intestine in a 20-year-old gelding which has necessitated the resection of 3 m of ileum and jejunum leaving 30 cm of viable distal ileum.

   b) A 450 kg, 10-year-old thoroughbred gelding with a 7 cm, type 1 cystic calculus.

   c) A 250 kg pony diagnosed with a splenic malignancy resulting in moderate splenic enlargement. A decision has been made to perform a splenectomy.

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3. A four-year-old 430 kg standardbred racehorse gelding has previously undergone a left prosthetic laryngoplasty and left sacculectomy. He performed well after that surgery for 18 months but now has again reduced performance and some increase in upper respiratory noise is reported. Endoscopy of the upper respiratory tract at rest reveals the left arytenoid is fixed in a partially abducted position (Dixon Grade 3-4) and a small granulomatous lesion is observed near the left arytenoid cartilage. He has mild bilateral hindlimb lameness.

   a) Describe how you would continue to investigate this case to establish the cause of the poor performance and to assess the laryngeal abnormalities. (10 marks)

   b) If partial upper airway obstruction is the cause of the poor performance in this case, list the available surgical treatments that may be suitable to improve performance. Discuss the published evidence which supports the use of the different treatment options. (20 marks)

4. An eight-year-old breeding thoroughbred stallion is presented with colic signs that began soon after covering a mare. A diagnosis of herniation of small intestine through the inguinal region is made using rectal and ultrasonographic examinations. The stallion normally covers at least 120 mares each breeding season and the animals main value is breeding. Answer **all** the following:

   a) Outline the surgical options in this case. (5 marks)

   b) Describe the advice you would give the stud manager regarding the stallion's short and long-term breeding potential? (5 marks)

   c) Describe in detail the surgical approach you would use if the most important consideration is to maximise his breeding potential. Justify your choice of technique citing the relevant literature. (20 marks)

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5. You are presented with a complete, closed, minimally displaced spiral fracture of the radius in a 480 kg adult horse, whose owner is very motivated to achieve the best possible outcome. Describe in detail your management of the case including how you would justify each of your decisions.

6. For **both** the following synovial structures, give a detailed description of the endoscopic surgical technique. Describe the indications for endoscopic surgery and for **each** indication, give a prognosis. Use diagrams where appropriate and cite the relevant published literature.

   a) the common calcaneal bursa

   b) the temporomandibular joint.

7. Describe your surgical treatment of **each** of the following conditions and justify your choice.

   a) penetration of the navicular bursa and digital flexor tendon sheath via the sole with a metallic foreign body

   b) deep digital flexor tendinitis in the pastern of the forelimb of a 350 kg riding pony

   c) chronic sepsis of the carpal tunnel in a show hunter

   d) traumatic rupture of the middle oesophagus in a thoroughbred yearling.

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