



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2013

Veterinary Emergency and Critical Care Paper 1

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **ALL FOUR (4)** questions

Answer **FOUR** questions each worth 30 markstotal 120 marks

Veterinary Emergency and Critical Care Paper 1

Page 1 of 3

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Paper 1: Veterinary Emergency and Critical Care

Answer all four (4) questions

1. Answer **all** parts of this question:
 - a) Describe the pathophysiology of traumatic brain injury. (16 marks)
 - b) Describe the body position and change of mentation associated with decerebrate and decerebellate rigidity. Indicate the prognostic implications of these body positions. (3 marks)
 - c) Write an equation to show the relationship between intracranial pressure, mean arterial pressure and cerebral perfusion pressure. (1 mark)
 - d) Explain the modes of action of **each** of the following treatments in relation to their use in traumatic brain injury: (6 marks)
 - i. hypertonic saline
 - ii. mannitol.
 - e) List **four (4)** commonly used methods of reducing or preventing increased intracranial pressure (aside from hypertonic saline and mannitol) that are indicated in an animal with traumatic brain injury. Explain briefly the principle underlying the use of each method you have chosen. (4 marks)
2. Briefly describe the mechanism of toxicity and list **five (5)** clinical signs associated with **each** of the following three toxins.
 - a) sodium monofluoroacetate (1080) (10 marks)
 - b) paracetamol (acetaminophen) (10 marks)
 - c) cane toad (*Bufo marinus*) toxin. (10 marks)

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Veterinary Emergency and Critical Care Paper 1

Page 2 of 3

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3. Disseminated intravascular coagulopathy (DIC) is a possible consequence of serious diseases in veterinary emergency and critical care.
- a) List the components of Virchow's triad and briefly discuss the role these components play in the pathophysiology of thrombus formation. *(12 marks)*
 - b) Discuss the diagnosis of DIC. Include in your answer any difficulties associated with the diagnosis of DIC. *(6 marks)*
 - c) List **six (6)** diagnostic tests that may be performed to assist with a diagnosis of DIC. Outline the expected findings of these tests in DIC. *(12 marks)*
4. Answer **all** parts of this question:
- a) Describe in detail the compensatory mechanisms of congestive heart failure when it is associated with mitral valve insufficiency. (Your answer may include a diagram). Explain why these compensatory mechanisms are ultimately detrimental to the patient. *(22 marks)*
 - b) Briefly describe the mechanism of action for the following medications when they are used in a patient with congestive heart failure: *(8 marks)*
 - i. benazepril
 - ii. pimobendan
 - iii. frusemide
 - iv. nitroprusside.

End of paper



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Veterinary Emergency and Critical Care Paper 2

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **ALL FOUR (4)** questions

Answer **FOUR** questions each worth 30 markstotal 120 marks

Veterinary Emergency and Critical Care Paper 2

Page 1 of 6

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Paper 2: Veterinary Emergency and Critical Care

Answer all four (4) questions

1. An eight-year-old, 5 kg domestic short hair cat presents to your clinic with a one-month history of polyuria and polydipsia. It has been anorexic for the last three days and vomited once today.

On physical examination, the cat is obtunded and 10% dehydrated based on skin turgor and tacky mucous membranes. It has a body condition score of 3/9. There are no other abnormalities.

The results of an acid base panel, electrolyte panel and a biochemistry panel are shown below. Results outside the reference range are shown in bold.

Analyte	Result	Reference range
Sodium	140	146–157 mmol/L
Potassium	3.2	3.5–4.8 mmol/L
Chloride	109	115–126 mmol/L
Calcium (ionised)	1.21	1.1–1.4 mmol/L
Glucose	25	3.6–6.8 mmol/L
Lactate	1.5	<3 mmol/L
pH	7.18	7.34–7.46
PvO ₂	36.5	24–48 mmHg
PvCO ₂	37	36–44 mmHg
Bicarbonate	10	24–26 mmol/L
Base excess	-8.1	-3 to 0
Packed cell volume	32	30–45%
Total protein	80	60–86 g/L
Albumin	35	26–39 g/L
Alkaline phosphatase	45	14–111 U/L
Alanine transferase	136	12–130 U/L
Urea	16	5.7–12.9 mmol/L
Total calcium	2.2	1.9–2.8 mmol/L
Creatine kinase	89	0–314 U/L
Cholesterol	7.2	1.7–5.8 mmol/L
Creatinine	283	71–212 µmol/L
Total bilirubin	7.5	0–8.5 µmol/L
Globulin	46	28–51 g/L
Phosphorous	1.0	1.0–2.4 mmol/L

Question 1 continued over page

Answer **all** parts of this question:

- a) State the diagnosis you think is most likely and briefly explain your reasoning. (2 marks)
 - b) Briefly explain how the condition you have diagnosed in Question 1a) above leads to each of the abnormalities seen in the laboratory results. (15 marks)
 - c) Create a fluid therapy plan for the first 24 hours for this cat, and justify your choices. (13 marks)
2. A one-year-old cat presents to your practice with a five-hour history of muscle fasciculation and twitching. The owner of the cat had applied a topical flea treatment to the cat three hours prior to the onset of signs.

The cat is recumbent and seizing on arrival. It has a heart rate of 200 beats per minute, pink mucous membranes and a rectal temperature of 39.8°C.

Answer **all** parts of this question:

- a) List **six (6)** differential diagnoses that you should consider in this cat. (5 marks)
- b) You decide that synthetic pyrethrin is the most likely cause of this cat's seizing. Explain the mechanism of toxicity of synthetic pyrethrins in cats. (5 marks)
- c) Describe your management of this cat in the first 20 minutes of its arrival at your emergency centre. Assume your emergency centre is well-equipped and there are no financial constraints. Include in your answer any therapeutic interventions, monitoring and diagnostic tests you would perform. (12 marks)
- d) After your initial treatment the cat is mentally alert and is no longer seizing, however generalised moderate muscle twitching persists. List **four (4)** potential treatments that are indicated for management of this cat's neurological signs over the next 24 hours and briefly explain the mechanism of action of each treatment. (8 marks)

Continued over page

3. A four-year-old male neutered Labrador presents to you on a warm summer evening following recent rains. The dog has a 24-hour history of lethargy and depression and has been vomiting bile and froth for the past 12 hours. The dog has no previous history of illness and is not on any medication.

Clinical examination reveals the following:

- mucous membranes pale pink; capillary refill time two seconds
- HR 170 beats per minute; pulses weak
- RR 55 breaths per minute
- temperature 40.2°C
- hydration – 10% dehydrated
- mentation – obtunded
- abdomen – tense to palpate
- rectal examination – melena noted on examination glove

The results of a full blood count, biochemistry panel, electrolyte panel and urinalysis are shown below and over the page. Blood results outside the reference range are shown in bold.

Haematology:

Analyte	Results	Reference interval
RBC x10 ¹² /L	5.2	5.0–8.5
Hb g/dL	13.0	12.0–18.0
PCV %	39.0	37–55
MCV fL	66.1	60.0–80.0
MCH pg	23.2	19.0–23.0
MCHC g/dL	35.1	31.0–34.0
WBC x10⁹/L	22.2	6.0–15.0
Neutrophils x10⁹/L	18.0	3.0–11.5
Bands x10⁹/L	0.5	0.0–0.3
Lymphocytes x10 ⁹ /L	2.0	1.0–4.8
Monocytes x10⁹/L	1.7	0.0–1.3
Eosinophils x10⁹/L	0.0	0.1–1.25
Basophils x10 ⁹ /L	0.0	0
Platelets x10 ⁹ /L	110	200–500

Blood film comment

Platelet count appears low (6/hpf). RBC morphology is within normal limits. Neutrophils show mild toxic change.

Question 3 table and questions continued over page

Biochemistry:

Total protein g/L	80.0	54.0–77.0
Albumin g/L	30	25–38
Globulin g/L	50.0	23–48
Sodium mmol/L	140	139–154
Potassium mmol/L	5.10	3.6–5.6
Chloride mmol/L	110	105–122
Calcium mmol/L	2.93	2.30–3.00
Phosphate mmol/L	3.20	0.80–1.60
Urea mmol/L	46.7	1.7–7.4
Creatinine $\mu\text{mol/L}$	525	0–106
ALP U/L	2800	0–50
ALT U/L	174	0–25
GGT U/L	43.0	0–27
Total bilirubin $\mu\text{mol/L}$	98.0	0.0–16.0
Glucose mmol/L Flox	6.8	3.8–7.0
Amylase U/L	1200	100–900
Lipase U/L	365	0–250

Urine Analysis (Dipstick)

pH	7
SG	1.009
Protein	+
Glucose	Negative
Ketones	Negative
Urobilinogen	Negative
Bilirubin	++
Haemoglobin	Negative

Urine Microscopy

WBC cells/mm ³	<10 cells/mm ³
RBC/mm ³	Not seen
Epithelial cells	+/-
Bacteria	Not seen
Crystals	Not seen
Casts	++granular cast

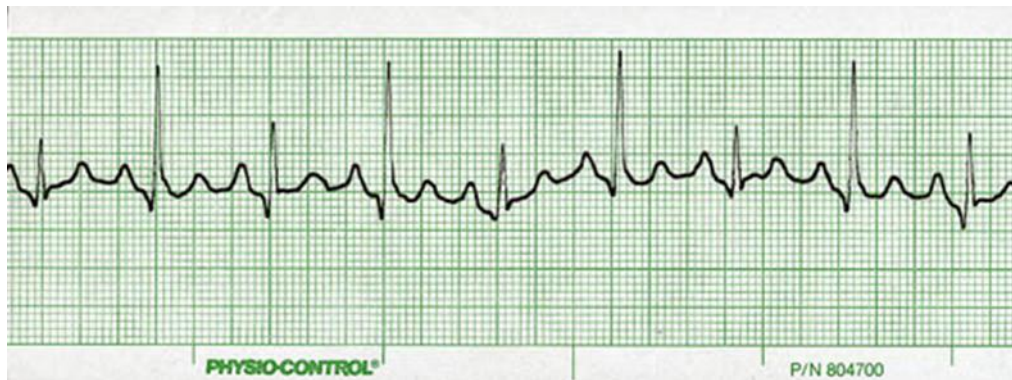
Question 3 questions continued over page

Answer **all** parts of this question:

- a) Interpret the haematology, biochemistry and urinalysis results. (16 marks)
 - b) Construct a differential diagnosis list for this dog based on history, clinical findings and the results of your laboratory tests. State which is your most likely diagnosis. (4 marks)
 - c) Briefly outline your plan for therapeutic management of acute oliguria in a dog within the first 12 hours of presentation. Assume your emergency centre is well-equipped and there are no financial constraints. Include in your answer any therapeutic interventions and monitoring you would perform. (10 marks)
4. A 10-year-old male neutered German shepherd dog is diagnosed with cardiac tamponade associated with pericardial effusion.

Answer **all** parts of this question:

- a) Explain how pericardial effusion causing cardiac tamponade results in weakness and collapse. (5 marks)
- b) State the term used for the fluctuating pulse pressure that may occur in some dogs with cardiac tamponade. (1 mark)
- c) State the term used for the abnormality on the ECG below and explain its cause. (2 marks)



- d) State the emergency procedure required for cardiac tamponade and briefly describe how to perform it in a dog. (10 marks)
- e) List the complications that may arise from the procedure you have described in your answer to Question 4 d) above and indicate how you would monitor for them. (8 marks)
- f) List **two (2)** common and **two (2)** uncommon aetiologies of pericardial effusion in dogs. (4 marks)

End of paper