



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2014

Small Animal Surgery Paper 1

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

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

Answer **ALL FOUR (4)** questions

All four questions are of equal value.

Answer **FOUR** questions each worth 45 markstotal 180 marks

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Paper 1: Small Animal Surgery

Answer all four (4) questions

1. Answer **all** parts of this question:

- a) Neoplastic cells have defects in regulatory circuits that govern cellular proliferation and homeostasis. It has been suggested that the vast array of cancer genotypes is a manifestation of only six alterations in cellular physiology that collectively dictate malignant growth.

List the **six (6)** alterations in cellular physiology and how **each** contributes to oncogenesis as a molecular mechanism. (24 marks)

- b) Radiation therapy may be more effective and better tolerated when the radiation dose is delivered in multiple small treatments (fractions), as opposed to delivering the total radiation dose in one or several large fractions. This is commonly referred to as the '4Rs concept'.

Answer **both** of the following:

- i. Define the 4Rs concept and identify the 4Rs that it references. (5 marks)
- ii. Explain why fractionation of radiation dosing enhances tumour cell killing efficiency, and decreases potential adverse radiation effects to the patient. In your answer, contrast the effects of radiation on normal and tumour cell life-cycles. Diagrams may be used in your answer. (16 marks)

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2. Answer **all** parts of this question:

- a) Describe the blood supply to the cervical and thoracic trachea. *(4 marks)*
- b) Describe the normal physiology of air flow within the entire respiratory tract. *(5 marks)*
- c) Describe how upper airway obstruction impacts the structures of the upper airway. Briefly describe how the patient is systemically affected secondary to these anatomic changes. *(5 marks)*
- d) Discuss the pathogenesis of progressive tracheal collapse typically seen in small breed dogs. *(6 marks)*
- e) Define **and** explain the grading system for tracheal collapse first published by Tangner and Hobson (Veterinary Surgery 1982). *(8 marks)*
- f) List clinical signs associated with tracheal collapse and relate **each** clinical sign to underlying pathophysiological events. *(10 marks)*
- g) Discuss the effect of upper airway obstruction on intrathoracic structures. *(7 marks)*

Continued over page

3. Answer **all** parts of this question:

a) Define the term antiseptic as it applies to patient preparation for surgery. (2 marks)

b) List the properties of an ideal antiseptic. (5 marks)

c) For the following **four (4)** antiseptics, state their:

- mode and duration of action
- range of biological activity
- advantages **and** disadvantages for use in small animal clinical veterinary practice
 - i. iodine/iodophors
 - ii. isopropyl alcohol
 - iii. chlorhexidine
 - iv. triclosan.

Your response may be given as a table, or in written format. (12 marks)

d) Answer **both** of the following:

- i. With reference to recent literature, describe in detail current best practice recommendations for presurgical hand preparation techniques. Your answer should include antiseptic, time, technique and any other factors considered important. (8 marks)
- ii. How does your current, best practice recommendation compare to recommendations in recent history? (6 marks)

Question 3 continued over page

e) For **each** of the following sterilization methods, state their:

- mode of action
 - dependant variables in achieving sterilization
 - advantages in veterinary small animal practice
 - disadvantages in veterinary small animal practice.
- i. steam sterilization (4 marks)
 - ii. ethylene oxide gas sterilization (4 marks)
 - iii. plasma sterilization (4 marks)

4. Answer **all** parts of this question:

- a) Relate the gross and microscopic anatomy of the peritoneum to peritoneal cavity fluid dynamics and composition of peritoneal fluid. (10 marks)
- b) Peritonitis is defined as any inflammatory process involving the peritoneum. Using examples, discuss primary and secondary causes of peritonitis in the dog and cat and describe in detail localised and systemic physiological, immunological and pathological responses to peritonitis. (30 marks)
- c) Briefly discuss the reported risk factors for post-surgical dehiscence of small or large intestinal anastomosis in dogs and cats. (5 marks)

End of paper



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Answer **ALL FOUR (4)** questions

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Paper 2: Small Animal Surgery

Answer all four (4) questions

1. You are presented with a one-year-old female ovarioectomised Labrador retriever with a history of urinary incontinence. The owners first noted episodes of urinary incontinence when the dog was four months of age. The episodes are becoming more frequent and severe. The ovarioectomy surgery was performed when the dog was six months of age. The dog is otherwise considered in good health. You are requested to investigate the underlying cause and treat her urinary incontinence.

Answer **all** parts of this question:

- a) Outline your diagnostic approach to this patient. (5 marks)
- b) List at least **four (4)** causes for urinary incontinence in ranked order from highest to lowest likelihood in this patient **and** provide justification for your differential list and rankings. (5 marks)
- c) Following your investigations, you make a definitive diagnosis of congenital urethral sphincter mechanism incompetence (USMI).
 - i. Describe in detail the normal neurophysiological phases of micturition in the dog. Your answer should include a description of what structure(s) constitute the urethral sphincter mechanism. You may use diagram(s) if you wish. (10 marks)
 - ii. Multiple surgical techniques have been described to treat USMI. Describe **three (3)** different surgical techniques available for treating USMI. Include in your answer reported success rates and complications with reference to pertinent veterinary literature. Justify your technique(s) of preference. (25 marks)

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2. Answer **all** parts of this question:

- a) In relation to canine mast cell tumors, describe the reported breed and age predispositions, common clinical signs, and anatomic sites at which they occur. (6 marks)
- b) Describe the pathophysiology of the clinical signs resulting from mast cell tumors in dogs. (7 marks)
- c) Mast cell tumors are commonly graded to one of three histological grades (low, intermediate and high grade) described by Patnaik et al., (Veterinary Pathology 1984). These histological grades have been shown to have an impact on oncologic and survival outcome. Recently, a binary grading system has been developed.
Describe the main histological features of **each** Patnaik grade, rates of metastasis and the expected survival for the different grades. Describe the rationale for a new binary system, and the histologic classification scheme and how this correlates with median survival times in the new system. (6 marks)
- d) Describe the additional factors that have been proven to have an impact on oncologic and survival outcome. (10 marks)
- e) Define the following proteins, and explain their respective role (if any) in the aetiology, prognosis and treatment of canine mast cell tumors. (6 marks)
- i. Ki-67
 - ii. c-kit
- f) Surgical resection with complete grade-appropriate surgical and histological margins is the mainstay for treatment of canine cutaneous mast cell tumour. However, adjunctive treatments are sometimes recommended as part of therapy for MCT.
Discuss the main adjunctive treatments that might be used, including references to published evidence supporting their efficacy. (10 marks)

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3. Answer **all** parts of this question:

- a) State the **four (4)** properties that describe the basic tenets of bone regeneration with relation to the clinical application of bone grafting techniques. Define **each** property and provide an example tissue, compound, or chemical from clinical veterinary practice that promotes this property. (Do **not** use autogenous cancellous bone graft as an example.) (16 marks)
- b) Define **each** of the following terms:
- i. autograft (1 mark)
 - ii. allograft (1 mark)
 - iii. xenograft (1 mark)
- c) Describe a clinical scenario in which an autogenous cancellous bone graft is **not** the ideal material to promote bone healing. Provide an example **and** characteristics of the ideal graft agent that could be used in the clinical scenario described. (5 marks)
- d) Give a clinical scenario of when a cortical allograft might be used effectively in clinical practice **and** describe the recipient patient reaction to the implantation of a cortical allograft in the short and long term. (10 marks)
- e) Name **four (4)** cytokines that have been shown to encourage new bone formation **and** identify which of these are available commercially. Give an example of a clinical use for bone forming cytokine from the veterinary literature. (5 marks)
- f) Guerrero, et al., (Veterinary Surgery 2011) compared osteotomy healing in dogs with tibial tuberosity advancement (TTA) with and without autogenous cancellous bone graft. They did not find a significant difference in bone formation at the osteotomy between the two groups at either the six week or four month time points.
Give **three (3)** possible reasons for this finding. (6 marks)

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4. Answer **all** parts of this question:

- a) Thoracolumbar type I intervertebral disc herniation is a common cause of neurologic disease in dogs.
Identify the **two (2)** thoracolumbar intervertebral spaces most frequently affected by this condition in chondrodystrophic dogs and provide the anatomical explanation for the predilection for these locations. (5 marks)

- b) The pathophysiology of acute spinal cord injury (SCI) is typically divided into primary and secondary damage. Describe the events that occur during the primary damage phase of SCI. (10 marks)

- c) What are the major principles to apply when treating acute SCI in the primary phase? (6 marks)

- d) Discuss events that occur during the secondary damage phase of SCI and relate **each** event to the patient's outcome. (24 marks)

End of paper