Canine medicine

dosage pre-calculated prior to bronchoscopy. In some cases the veterinary surgeon may prescribe bronchodilators for 24 hours before the procedure.

Pneumothorax is a rare complication but can occur if diseased lung parenchyma ruptures. Various sizes of sterile syringes and needles should be prepared for emergency thoracocentesis.

KEY LEARNING OBJECTIVES

- Learn about efficient preparation: equipment and patient
- Understand the potential complications
- Understand prevention and treatment of complications

MULTIPLE CHOICE QUESTIONS

1. Which type of drug is it sensible to have calculated and ready to draw up prior to starting bronchoscopy?
(A) Antibiotic
(B) Anti-diuretic

- (C) Bronchodilator
- (D) Opioid

2. Why is a flexible endoscope most commonly used for bronchoscopy?
(A) It is a cheap piece of equipment so readily available in every practice
(B) It is manoeuvrable so allows evaluation of different parts of the airway
(C) It is easier to clean and maintain than a rigid endoscope
(D) There is no risk of bronchospasm when using a flexible endoscope
3. How long should a patient receive oxygen supplementation and have their oxygen saturation levels measured during recovery?
(A) Until extubation
(B) For 1 hour
(C) Until the respiratory rate is 16 per minute
(D) Until they are ambulatory and no longer tolerating it

All the maths: clinical calculations revisited and reworked

Sam McMillan

There are many reasons why math creeps into the every-day lives of veterinary nurses. It is imperative that drugs are administered accurately and calculations must be learnt and understood in order to enable this.

DRUG DOSE CALCULATION BASED ON PATIENT WEIGHT

Drug dose in mg = body weight in kg × drug dose prescribed in mg/kg.

Medications can be measured in both weight and volume, and both parts are needed to determine the concentration of the drug. A drug labelled as 5 mg/ml means that each millilitre (volume) of the drug contains 5 mg (weight) of the drug.

Drug dose in ml = drug dose in mg/concentration of drug in mg/ml (the drug concentration is always listed on the bottle or packaging).

Example:

- 22-kg dog, 4 mg/kg drug dose, drug concentration 50 mg/ml
- $22 \text{ kg} \times 4 \text{ mg/kg} = 88 \text{ mg}$
- $88 \text{ mg} / 50 \text{ mg/ml} = 1.76 \text{ ml}$ drawn up and administered.

PERCENTAGE SOLUTION CALCULATIONS

The easiest way to think about percentage solutions is to move the decimal point one place to the right (multiply it by ten) to establish the mg/ml concentration of the solution. For example, a 10% solution, decimal point moved one place to the right, 10.00 then it becomes 100.0 so it is a 100 mg/ml solution.

CONSTANT-RATE INFUSIONS

From mg/kg/h or µg/kg/h or mg/kg/min or µg/kg/min, the amount of drug to be administered per hour can be calculated. This is done in the same way as drug dosage.

Example:

- 10-kg dog to be administered intraoperatively at 10 µg/kg/min, so
- $10 \text{ kg} \times 10 \text{ µg} = 100 \text{ µg/min}$
- Concentration of ketamine is 100 mg/ml
- 1000 µg in a mg so $1000 \times 100 = 100,000 \text{ µg/ml}$
- $100 \text{ µg per min} / 100,000 \text{ µg per ml} = 0.001 \text{ ml/min}$ of ketamine at the current dilution.

If the dilution of the ketamine is considered and changed to 1 ml (100 mg) of ketamine to 499 ml of fluid then the drug concentration has been changed to 100 mg/500 ml:

- $100 \text{ mg} / 500 \text{ ml} = 0.2 \text{ mg/ml}$
- To get to µg: $1000 \times 0.2 \text{ mg} = 200 \text{ µg/ml}$
- To find out how much of the new dilution the dog needs: $100 \text{ µg per min} / 200 \text{ µg/ml} = 0.5 \text{ ml/min}$ of the new diluted ketamine
- Scale this down to avoid wastage, so for a 2-hour surgery
- $2 \times 60 \text{ min} = 120 \text{ min}$
- $120 \text{ min} \times 0.5 \text{ ml/min ketamine} = 60 \text{ ml of solution}$ required.

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This can be done for any drug with any volume of fluid.

KEY LEARNING OBJECTIVES

- Understand the importance of accurate medical maths calculations
- Be able to perform basic and more complicated drug calculations including continuous-rate infusion (CRI)
- Identify simplified ways of conducting calculations in practice

MULTIPLE CHOICE QUESTIONS

1. A 25-kg Labrador Retriever has been prescribed 2 mg/kg of an analgesic of concentration 25 mg/kg. How much of the drug should be administered?

- (A) 1 ml
- (B) 1.5 ml
- (C) 2 ml
- (D) 2.5 ml

2. What would the mg/ml concentration of a 20% solution be?

- (A) 20 mg/ml
- (B) 200 g/ml
- (C) 200 mg/ml
- (D) 2000 mg/ml

3. For a 15-kg dog requiring 2 mg/kg of a drug twice a day for 7 days, where the tablets required are 15 mg each, how many tablets should be dispensed?

- (A) 4
- (B) 7
- (C) 14
- (D) 28

Pet blood bank: overview and how practices can assist

Wendy Barnett

Established in 2007, Pet Blood Bank UK is the only charity providing blood products to veterinary practices across the UK. Practices can order blood products and ancillary consumables 24 hours a day, 365 days a year to store on site and administer to patients in need of transfusions.

The donor scheme is voluntary, and the number of donors is growing all the time as awareness increases and more practices benefit from easily available blood products. All donor dogs are blood typed and have a full biochemistry and haematology screen at their first donation and annually thereafter. In addition, testing is also carried out for quality purposes, such as infectious disease screening. The aim is to produce quality blood products and safeguard donor welfare and well-being throughout the collection process. All donors receive a full physical examination by a veterinary surgeon prior to each donation. Approximately 450 ml of fresh whole blood is collected by one of our trained phlebotomists taking an average of 5 minutes. All blood collections take place without chemical restraint using only fuss and reassurance with lots of treats.

The donated units are processed in the laboratory by centrifugation into packed red blood cells and plasma products with the range extending to platelet concentrate in 2020. Some plasma units undergo controlled defrosting and further centrifugation to create cryoprecipitate.

Pet Blood Bank also offers a crossmatch service and has advisors available to assist on the practicalities of transfusing products.

There are many ways that practices can assist Pet Blood Bank. These will be covered in the presentation and include focusing on the correct storage of blood products prior to administration, blood typing all transfusion recipients, administering compatible transfusions and ensuring traceability of units exists in-house, so that all the blood products administered can be traced back to the recipient.

Other ways to support Pet Blood Bank include joining a local collection team as a session volunteer, donor assistant, phlebotomist or veterinary surgeon. Each role has a specific and valued role to play in delivering the high-quality service the charity and the donor owners expect.

Pet Blood Bank hosts collection sessions in many areas within range of the processing centre to ensure blood products can be processed and storage temperatures maintained within safe limits. Practices may wish to provide support by hosting a collection session and the requirements for this will be explained. An important requirement to host a session is having a large pool of dogs signed up to donate, in-particular DEA1-negative breeds, as this blood is in high demand due to a lack of blood typing. Breeds more likely to be DEA1-negative include Greyhounds, Lurchers, German Shepherd Dogs, Flat-Coated Retrievers, Border Collies, Boxers and Weimaraners.

Increasing awareness about the charity is vitally important to generate new donors. Informing Pet Blood Bank of successful cases from practice that involved the transfusion of blood products is a great way to support the charity. Real-life cases make a genuine impact with owners and help us in creating the goodwill to encourage dog owners to get involved.

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