2026
CCS VETS
PREPPING FOR PRIVATE PRACTICE

TREATMENT PROTOCOLS

Khula

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Allergic reaction

Presentation:

History of insect sting/bite, vaccination or drug exposure; acute urticaria (wheals), facial/limb angioedema and/or pruritus. Patient remains haemodynamically stable with no significant respiratory compromise.

Treatment:

1. **Antihistamine**
   - Dogs: Mepyramine maleate 1 mL/10 kg SC OR Diphenhydramine 1–2 mg/kg IM/SC, then PO q8h for 24-48hrs
   - Cats: Cetirizine 5mg/cat or 2.5mg/tiny cat PO
2. **Glucocorticoid** – if marked or rapidly progressing swelling
   - Dexamethasone 0.1–0.2 mg/kg IV/IM
   - May follow with Prednisone/Prednisolone 0.25–0.5 mg/kg PO q24h × 2–3 days if needed
3. **Monitor closely for progression to anaphylaxis**

Anaphylaxis

Presentation:

Acute systemic hypersensitivity reaction with hypotensive shock, pallor, urticaria, angioedema, stridor/bronchospasm, tachycardia, vomiting/diarrhoea ± urination, seizures or coma. Common triggers include multiple stings, vaccination or drug exposure.

Treatment:

1. **Airway + O_2**
   - Ensure patent airway and provide O_2
   - intubate and ventilate with ambu-bag if required
2. **Adrenaline – FIRST LINE**
   - Adrenaline 1 mg/mL (1:1000) 0.01 - 0.02 mg/kg IM (= 0.1 mL/10 kg)
   - Repeat q5–15 min if required
3. **IVFT**
   - Isotonic crystalloids – bolus to effect and reassess perfusion/BP
4. **Corticosteroid**
   - Dexamethasone 0.5 mg/kg IV ONCE (if bronchospasm/angioedema persists)
5. **Bronchodilator** – if required
   - Aminophylline: Dogs 5–10 mg/kg; Cats 5 mg/kg
   - NB: dilute 1:3 in sterile water and give SLOW IV

KEY POINT

Adrenaline is the drug of choice in anaphylaxis. Antihistamines, corticosteroids and bronchodilators are adjunctive and should not delay adrenaline administration.

REFERENCES:
1. Heinrich NA. Urticaria in Animals. Merck Vet Manual. 2024.
2. Ilie L, Thomovsky E. Basic triage in dogs and cats: Part II. Can Vet J. 2024;65:278–288.
3. Almenta Serrato J. Anaphylaxis in small animals. Vet Ireland J. 2026.

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Adrenal (Addisonian) Crisis

Presentation:

Lethargy, inappetence, weight loss, vomiting/diarrhoea – often waxing and waning, with exacerbations following stress or transient improvement with fluids/steroids. May also present with GI bleeding, collapse/severe weakness and hypovolaemic shock.

Diagnosis:

- Electrolytes: *hyponatraemia/hyperkalaemia* – Na:K ratio <25:1
- ACTH stimulation test

KEY POINT

Dexamethasone can be given before the ACTH stimulation test as it does not interfere with cortisol measurement.

Treatment:

1. **Correct shock + hyperkalaemia**
   - 0.9% Saline – give boluses to effect, reassessing perfusion/BP frequently
   - Continue fluids according to dehydration, ongoing losses and patient response
   - Monitor electrolytes closely
2. **Correct hypoglycaemia + reduce serum potassium**
   - Add dextrose to isotonic fluids to create a 1.25–5% solution
   - 50 mL of 50% dextrose added to 1 L fluids = 2.5% solution
   - Severe hypoglycaemia: 1 mL/kg 50% dextrose IV, diluted 1:1 with 0.9% saline
   - Dextrose stimulates endogenous insulin release, driving K intracellularly
3. **Provide glucocorticoid**
   - Dexamethasone 0.25 mg/kg IV – does not interfere with the ACTH stimulation test
   - Continue dexamethasone 0.07–0.15 mg/kg q12h until oral prednisone can be given
   - Prednisone 0.5 mg/kg PO q12h, started after the ACTH stimulation test
4. **Provide mineralocorticoid**
   - DOCP (Zycortal – Section 21 permit): 2.2 mg/kg IM/SC q25d; adjust according to electrolyte monitoring (preferred during crisis)
   - Lower initial DOCP doses (1.1–1.5 mg/kg) may be appropriate
   - OR Fludrocortisone (Florinef) 0.01 mg/kg PO q12h
   - Start mineralocorticoid therapy once diagnosis is confirmed
   - Will need adjustments based on electrolytes assessed q1-2w

OTHER MEASURES TO CONSIDER:

1. **Insulin** – for significant hyperkalaemia
   - NovoRapid 0.2 IU/kg IV
   - Add dextrose to IV fluids to create a 2.5–5% solution and monitor blood glucose closely
2. **Cardioprotection** – severe/life-threatening hyperkalaemia
   - 10% calcium gluconate 0.5–1.5 mL/kg SLOW IV over 15–20 min
3. **Gastric protectants** – if GI bleeding
   - Omeprazole/pantoprazole ± sucralfate
4. **Antibiotics**
   - Consider only with severe GI disease/concern for bacterial translocation – use judiciously (e.g. ampicillin/amoxicillin)

REFERENCES:

1. Bugbee et al. 2023 AAHA Selected Endocrinopathies Guidelines. JAAHA. 2023;59:113–135.
2. Merck Vet Manual. Addison Disease (Hypoadrenocorticism). 2024.
3. Niessen et al. ALIVE consensus definitions: hypoadrenocorticism. Vet Sci. 2025;12:761.

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Diabetic Ketoacidosis (DKA)

Presentation:
Hyperglycaemia, ketonaemia, ketonuria, acetone odour on the breath, weak/collapsed, thin, vomiting, tachypnoea, dehydrated, hypovolaemic shock (hx of PU/PD and weight loss)

Diagnosis:

- UA, biochemistry and electrolytes
- NB: hyperglycaemia (average of 25 mmol/L), hypokalaemia, hyponatraemia, hypophosphataemia, hypomagnesaemia, glucosuria/ketonuria

Treatment:

1. **IVFT**
   - Aggressive IVFT: RLS vs 0.9% NaCl depending on electrolyte/acid-base profile and clinician assessment
2. **Potassium supplementation**
   - Supplement according to requirements – see Appendix 1
   - Insulin dose may need to be reduced by 50% or delayed if significantly hypokalaemic, as insulin drives K intracellularly
3. **Insulin**
   - Begin 2–6 h after initiating fluid therapy
   - Ideally use short-acting regular/neutral insulin: 0.2 IU/kg IM initially, then 0.1 IU/kg IM q1–2h until BG reaches ~13.9 mmol/L
   - Then transition to longer-acting insulin (e.g. Caninsulin – dog; Lantus – cat)
   - For a "healthy" DKA patient: short-acting insulin q8h; feed ⅓ daily caloric requirement with each insulin injection and adjust dose according to BG
1. **Monitor blood glucose**
   - Check q1–2h
   - Add dextrose when BG falls below ~13.9 mmol/L – use a 5% solution (see Appendix 1)

OTHER MEASURES TO CONSIDER:

1. **Check and supplement other electrolytes if necessary**
   - Phosphate: if serum PO4 is below 1.5mg/dL +- haemolytic anaemia develops
   - Magnesium: for persistent weakness, anorexia and refractory hypokalaemia/hypocalcaemia despite IVFT and insulin therapy for 24-48h
2. **Monitor urine daily:**
   - Volume: to keep track of renal function (especially in hyperosmolar patients)
   - Dipstick: to keep track of glucosuria/ketonuria (response to treatment)
3. **Electrolyte monitoring** q6-12h
4. **PCV, blood pressure** and **body weight** daily

KEY POINT

Correct dehydration and assess potassium before starting insulin. Insulin can rapidly worsen hypokalaemia and hypophosphataemia.

REFERENCES:

1. Gal & Odunayo. Diabetic ketoacidosis and HHS. Vet Clin Small Anim. 2023;53:531–550.
2. Merck Vet Manual. Diabetes Mellitus in Dogs and Cats. 2026..
3. Thomovsky E. Fluid & Electrolyte Therapy in DKA. Vet Clin Small Anim. 2017;47:491–503.

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Babesiosis: Canine

Presentation:

Lethargic, inappetant, weak, pale/icteric, febrile, rapid waterhammer pulse, increased respiration rate, enlarged spleen, ± ticks present/history of inadequate ectoparasite control.

Diagnosis:

- Blood smear: Intracellular *B*abesia parasites in red blood cells (teardrop/round)
- Ht/ISA:
  - Ht below 12-15% - high risk - consider blood transfusion based on *clinical appearance*.
  - ISA (1 drop blood : 6 drops saline) - assess for RBC agglutination
    i. If ISA positive - supports IMHA
    ii. If ISA negative
      1. check blood smear for *spherocytes* = hallmark of IMHA
      2. consider Coomb's test if still suspicious

KEY POINT

Accurate weight and treatment history are essential before giving Berenil. Diminazene has a narrow safety margin and toxicity can be severe or fatal.

Treatment:

1. **IVFT/Blood transfusion:**
   - Volume of blood = (Desired Ht – Patient Ht)/Donor Ht X 90 X Weight
   - Aim for a Desired Ht of 20-25%
   - Piggy-back blood on 0.9% NaCl (NOT Ringers), change fluids to RLS afterwards
2. **Berenil® (diminazene):**
   - 3,5mg/kg (= 1ml/20kg) IM (NEVER GIVE IV)
   - Ensure accurate weight of patient
   - Always establish whether Berenil has been given previously – toxicity can be severe/fatal
   - *DO NOT REPEAT*
3. **Forray 65® (imidocarb dipropionate):**
   - 6.6mg/kg (= 1ml/20kg) IM/SC once and then 7-14 days later
   - Usually used for biliary reinfection/persistence following previous Berenil administration
   - Do not use simultaneously with Berenil
4. **Doxycycline:**
   - 10mg/kg PO q24h for 28 days
   - Consider for suspected *Ehrlichiosis* – i.e. low platelets, increased/active monocytes OR pancytopenia
   - PCR can confirm if needed as some cases can be *refractory/chronic*
5. **Prednisone:** (if IMHA suspected)
   - 1mg/kg q12h initially
   - Taper SLOWLY - reduce dose every 2-4 weeks if PCV remains stable
6. **Gastric protectants:** only if indicated
   - *Newer evidence does not support routine gastroprotection with high-dose corticosteroids; consider only with GI ulceration/bleeding or additional risk factors.*
   - Omeprazole @ 0.5-1.5mg/kg PO BID – give 1hr after other oral meds
7. **Liver support:** if indicated
   - Heptonic, SAMe, silymarin (milk thistle); ursodeoxycholic acid where appropriate.
8. **Monitor for complications:**
   - *12 complications of babesiosis:* acute renal failure, cerebral babesiosis, coagulopathy, icterus/hepatopathy, immune-mediated haemolytic anaemia (IMHA), peracute babesiosis, ARDS, haemoconcentration, hypotension, myocardial pathology, pancreatitis and shock.

REFERENCES:

1. Malinovská Z. Canine Babesiosis & Therapy Options. Folia Vet. 2024;68.
2. Köster et al. Canine babesiosis: complications & treatment. Vet Med Res Rep. 2015;6:119–128.

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Babesiosis: Feline

Presentation:
Lethargy, anorexia, weight loss, weakness, pale/icteric mm, *TYPICALLY NOT ASSOCIATED WITH PYREXIA* (unless concurrent infection). Predominantly seen in coastal regions of South Africa.

Diagnosis:
- Blood smear: Intracellular *B. felis* parasites in red blood cells (small signet ring)
- Ht/ISA:
  - Ht below 12-15% - high risk - consider blood transfusion based on clinical appearance.
  - ISA (1 drop blood : 6 drops saline) - assess for RBC agglutination
    i. If ISA positive - supports IMHA
    ii. If ISA negative
      1. check blood smear for *spherocytes* = hallmark of IMHA (*difficult to see in cats because of morphology of feline RBCs*)
      2. consider Coomb's test if still suspicious

Treatment:
1. **IVFT/Blood transfusion:**
   - MUST *crossmatch/blood-type* in cats FIRST to avoid either life-threatening haemolytic reactions or shortened survival of transfused cells.
   - Volume of blood (ml) = desired Ht increase (%) x BW (kg) x 2
   - Aim for Ht of *at least* 20%
   - Piggy-back blood on 0.9% NaCl (NOT Ringers), change fluids to RLS afterwards
2. **Primaquine:**
   - 0.5mg/kg PO
   - 3 doses at 72-hour intervals, then 1x weekly for 3 weeks
   - Recrudescence is common - Primaquine DOES NOT STERILISE THE INFECTION, so a chronic carrier state can persist for years; BUT it allows for *clinical cure*
   - Narrow therapeutic window – doses >1 mg/kg may be lethal. Weigh accurately.
3. **Doxycycline:** if concurrent *Mycoplasma haemofelis* suspected
   - 10mg/kg PO q24h for 21 days
4. **Prednisolone:** (if IMHA is suspected)
   - 1mg/kg q12h initially
   - Taper SLOWLY - reduce dose every 2-4 weeks if PCV remains stable
5. **Gastric protectants:** only if indicated
   - *Newer evidence does not support routine gastroprotection with high-dose corticosteroids; consider only with GI ulceration/bleeding or additional risk factors.*
   - Esomeprazole (Nexium): 0.5-1.5mg/kg PO q24h – give 1hr after other oral meds
6. **Nutritional support:**
   - High protein + high fat diet: 70-90kcal/kg/day
7. **Monitor for complications/recrudescence:**
   - Icterus/hepatopathy, IMHA and concurrent infections including FIV, FeLV and haemotropic Mycoplasma
   - Repeat blood smears every 2-3 months for asymptomatic, parasitemic cases - treat clinical disease/anaemia rather than persistent parasitaemia alone.

KEY POINT

Primaquine has a narrow therapeutic window. Weigh accurately – doses >1 mg/kg may be lethal in cats.

REFERENCES:
1. Penzhorn et al. Feline babesiosis in South Africa. Ann NY Acad Sci. 2004;1026:183–186.
2. Penzhorn & Oosthuizen. Babesia species of domestic cats. Front Vet Sci. 2020;7:134
3. Hartmann et al. ABCD Feline Babesiosis Guidelines. JFMS. 2013;15:643–646.

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Immune-Mediated haemolytic anaemia (IMHA)

Presentation:

History: Progressive weakness, collapse, inappetence, vomiting, discoloured urine
Clinical signs: anaemia, dyspnoea/tachypnoea, icterus, pulmonary thrombo-embolism, ±heart murmur

Subtypes:

1. *Primary*: no underlying trigger identified
2. *Secondary*: associated with infection, neoplasia, drugs, inflammatory disease, etc.

Diagnosis:

- Diagnosis based on anaemia + evidence of haemolysis + evidence of immune-mediated RBC destruction
- **Blood smear** - polychromasia; *spherocytes* are a hallmark finding
- Haematology - regenerative anaemia; elevated WCC (band neutrophils), low platelets (concurrent IMTP)
- ISA - only positive in 42-66% of cases
- Consider Coombs/DAT where diagnosis remains uncertain

Treatment:

1. **IVFT/Blood transfusion:**
   - Volume of blood = (Desired Ht – Patient Ht)/Donor Ht X 90 X Weight
   - Aim for a Desired Ht of 20-25%
   - Piggy-back blood on 0.9% NaCl (NOT Ringers), change fluids to RLS afterwards
2. **Corticosteroids:**
   - Prednisone/Prednisolone:
     - <25kg: 1–1.5mg/kg PO q12h
     - 25–40kg: 0.75–1mg/kg PO q12h
     - >40kg: 0.5–0.75mg/kg PO q12h.
   - Dexamethasone 0.15-0.25mg/kg IV q12h
   - DO NOT TAPER TOO QUICKLY - some animals need to stay on therapy for up to 8 months
   - Once Ht >30% and stable for 2 weeks → reduce dose by ~25%; thereafter reduce by ~25% q3 weeks if stable
3. **Gastric protectants**: only if indicated
   - Newer evidence does not support routine gastroprotection with high-dose corticosteroids; consider only with GI ulceration/bleeding or additional risk factors.
   - Omeprazole 0.5-1.5mg/kg PO BID – give 1hr after other oral meds
4. **Antithrombotic:**
   - Recommended in ALL dogs with IMHA unless severely thrombocytopenic (<30,000/µL)
   - *Anticoagulant:* Low-MW Heparin: 150iu/kg SC q8-12h; Regular Heparin: 150-300iu/kg q6-8h
   - *Antiplatelet:* Clopidogrel: 1-2mg/kg PO q24h
5. **Adjunctive immunosuppressants:**
   - Consider with severe/life-threatening disease, inadequate response, ongoing transfusion requirement or significant steroid adverse effects
   - Azathioprine: 2mg/kg PO q24h x10d; then q48h (dogs only)
   - Cyclosporine: 5mg/kg PO q12h
   - Mycophenolate: 10mg/kg PO q12h
   - Leflunomide: 2-4mg/kg PO q24h (dogs only)

KEY POINT

Thromboembolism is a major cause of mortality in canine IMHA – thromboprophylaxis is recommended unless severely thrombocytopenic (<30,000/µL).

REFERENCES:

1. Garden et al. ACVIM IMHA Diagnosis Consensus. J Vet Intern Med. 2019;33:313–334.
2. Swann et al. ACVIM IMHA Treatment Consensus. J Vet Intern Med. 2019;33:1141–1172.
3. Merck Vet Manual. Immune-Mediated Haemolytic Anaemia. 2026.

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Congestive Heart Failure (CHF)

Presentation:

History: Coughing (dogs), exercise intolerance, syncopal episodes
Clinical Signs: Coughing (dogs), tachypnoea, dyspnoea, pale mucous membranes, prolonged CRT, hypothermia, heart murmur, delayed/weak femoral pulses, arrhythmia

- LEFT SIDED FAILURE: Pulmonary oedema (lung crackles)
- RIGHT SIDED FAILURE: Ascites; pleural effusion
- IN CATS: Pleural effusion may occur with either left- or right-sided CHF

Diagnosis:

1. **Thoracic Radiographs:**
   - *Enlarged cardiac silhouette* = the average *VHS* in the dog is 9.7 v (range *8.5 - 10.5* v)
   - *Pulmonary oedema* = alveolar-interstitial infiltrate (commonly perihilar/Right caudal lobes)
2. **Echocardiogram:**
   - Recommended to characterise underlying cardiac disease where available
3. **Electrocardiogram (ECG):**
   - If arrhythmia is present/suspected
4. **Serum NT-Pro-BNP**:
   - If available, may help distinguish cardiac from primary respiratory disease

Treatment:

1. **O_2 supplementation:**
   - Provide oxygen with minimal handling/stress – oxygen cage/tent, flow-by or nasal oxygen as appropriate.
2. **Furosemide (Diuretic):**
   - First-line for acute pulmonary oedema
   - 2-4mg/kg IV/IM initially
   - If respiratory rate does NOT improve: repeat 2 - 4mg/kg dose in 45-60 minutes
   - If respiratory rate improves: reduce to 1-2mg/kg q1-6h (lower doses at more frequent intervals are preferred as furosemide has relatively short-lived effects)
   - Severe/life-threatening pulmonary oedema or inadequate response → consider furosemide CRI 0.66–1 mg/kg/h after initial bolus
3. **Inotropes:**
   - *Pimobendan:* 0.25mg/kg PO q12h; for *valvular insufficiency* and *DCM cases* (CHRONIC)
   - *Dobutamine*: 2-15mcg/kg/min IV CRI; for systolic dysfunction and reduced cardiac output (i.e. *persistently low BP)*
4. **Reduce stress:**
   - *Environment:* Minimal restraint; reduce noise/excitement
   - *Anxiolytic:*
     - Midazolam: 0.15mg/kg IM/IV (only if needed)
     - Buprenorphine: 0.01mg/kg sc/iv (if further sedation required)

KEY POINT

In a severely dyspnoeic patient, stabilise first – oxygen, furosemide and minimal handling. Delay non-essential diagnostics until respiratory distress improves.

REFERENCES:

1. Keene et al. ACVIM MMVD Consensus Guidelines. J Vet Intern Med. 2019;33:1127–1140.
2. Merck Vet Manual. Heart Failure in Dogs and Cats. 2025.
3. Wess G. Screening for dilated cardiomyopathy in dogs. J Vet Cardiol. 2022;40:51–68.

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Dyspnoea

Patterns:

1. **Obstructive:** LONG respiratory cycles with increased EFFORT (inspiratory vs expiratory)
   - *Inspiratory* → upper airway obstruction
   - *Expiratory* → lower airway obstruction
   - *Fixed obstruction* → dyspnoea during both phases
2. **Restrictive:** SHORT, SHALLOW, RAPID breaths - this pattern is due to inability of the lungs to expand (due to *pulmonary parenchymal* disease or *pleural space* disease)
3. **Hypoventilation:** Reduced CHEST WALL movement or FISH MOUTH breathing - this pattern is seen with chest wall trauma or neuromuscular disorders

Presentation:

- *Nasal:* stertor, sneezing, dyspnoea improves with open mouth breathing
- *Upper airway:* stridor, hyperthermia, inspiratory wheezes
- *Obstructed airway:* gasping, dyspnoea on inspiration + expiration
- *Tracheal collapse:* honking cough, terminal retch
- *Lower airway:* cough, expiratory wheezes, abdominal effort, abducted elbows
- *Pulmonary parenchyma disease:* Tachypnoea, increased effort, crackles/harsh lung sounds
  - Pneumonia: fever, nasal discharge, harsh lung sounds
  - Cardiogenic oedema: heart murmur, arrhythmia, pulse deficits, crackles
- *Pleural space disease:* diminished breath sounds (ventral = fluid; dorsal = air)
- *Thoracic wall disease:* paradoxical breathing, visible trauma

Management:

1. **O_2 supplementation:**
   - Stabilise BEFORE stressful diagnostics
   - Provide O_2 immediately – flow-by, oxygen cage/tent or nasal O_2 depending on patient tolerance
   - Pulse oximetry can help assess flow rate required
2. **Secure the airway:** (this must be done immediately for a severely dyspnoeic animal that is *unable to move air* ± panicking/cyanotic)
   - Endotracheal intubation: Use a smaller tube if necessary & ventilate/oxygenate (ambu-bag)
   - Emergency tracheostomy if intubation is not possible due to an upper airway obstruction
3. **Sedation:** *(if required to control stress)*
   - Butorphanol: 0.1-0.4 mg/kg IM/IV
   - Midazolam: 0.15-0.2mg/kg IM/IV (add in severely stressed animals)
4. **Temperature:**
   - Monitor closely
   - Begin active cooling if hyperthermic
5. **Investigation:**
   - Auscultation ±TFAST
   - Chest radiographs – Only once stable. Always do a DV view FIRST (*sternal recumbency is the safest*) to assess type/location of pathology before deciding on appropriate lateral views
   - Oral/pharyngeal exam - may require sedation (if FB suspected)

Continued on next page →

REFERENCES:

1. Ilie & Thomovsky. Basic triage: respiratory distress. Can Vet J. 2024;65.
2. Mazzaferro. Respiratory Emergencies. Vet Emerg Crit Care Procedures. 2024.
3. Loewen et al. Respiratory distress in small animals. J Vet Emerg Crit Care. 2022.

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Dyspnoea

Thoracocentesis: (indicated for pleural effusion or pneumothorax)

1. Perform with patient **sternal** + **O_2** where possible
2. Clip and aseptically prepare
3. Use ultrasound to identify/localise air or fluid where available
4. Thoracocentesis is usually performed at the ***7th or 8th intercostal space***
   - Unless radiography or ultrasonography indicates otherwise.
   - To identify the 7th or 8th intercostal space, count cranially from the most caudal intercostal space which is the 12th.
5. The **site of needle insertion** is:
   - *AIR & FLUID:* Half way up the thoracic wall
   - *FLUID:* In the *ventral third* of the thorax
   - *AIR:* In the *dorsal third* of the thorax
   - Enter immediately cranial to the rib to avoid the intercostal neurovascular bundle.
6. **Advance the needle slowly** into the pleural space. Once the needle is through the skin, turn the 3-way stopcock to the 'on' position and apply slight negative pressure. If air or fluid enters the syringe, the needle is in the pleural space.
7. Once the pleural space is entered, direct the tip of the needle to lie **parallel to the thoracic wall** to minimise the risk of pulmonary lacerations.
8. Turn the 3-way stopcock to the 'on' position and drain the pleural space of fluid or air. Excessive negative pressure should be avoided.
9. Fluid or air can be expelled from the syringe when full, after closing off the 3-way stopcock to the pleural space.
10. Drainage is complete when no further fluid or air can be drained, or when you can feel the lung rubbing against the tip of the needle.
11. For recurrent/continuous pneumothorax or rapidly recurring effusion → consider **thoracostomy tube**

OTHER MEASURES TO CONSIDER:

1. **Upper airway** - nebulisation where appropriate
2. **Lower airway** - bronchodilators, corticosteroids
3. **Pulmonary parenchyma**
   - Pneumonia - antibiotics (antimicrobial based on C&S)
   - Cardiogenic oedema - diuretics (furosemide)
4. **Pleural space disease** - thoracocentesis/chest tube + drain
5. **Thoracic wall disease** - penetrating chest wounds (cover/bandage); surgery (flail chest)

KEY POINT

Stabilise before you investigate. O_2 + minimal handling first. If pleural air/fluid is suspected in a severely dyspnoeic patient, perform thoracocentesis BEFORE radiographs.

REFERENCES:

1. Ilie & Thomovsky. Basic triage: respiratory distress. Can Vet J. 2024;65.
2. Mazzaferro. Respiratory Emergencies. Vet Emerg Crit Care Procedures. 2024.
3. Loewen et al. Respiratory distress in small animals. J Vet Emerg Crit Care. 2022.

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FLUTD (Obstructed)

Presentation:

Frequent attempts at urination, prolonged squatting/straining with little or no urine produced. Painful, firm, distended and non-expressible bladder. May present depressed, weak, hypothermic, bradycardic or collapsed in severe cases.

Initial Assessment & Diagnosis:

- Full UA, biochemistry, electrolytes
- ECG if bradycardic/significant hyperkalaemia suspected and available
- Radiographs/US to assess for uroliths/underlying disease
- NB: post-renal azotaemia, hyperkalaemia and metabolic acidosis may occur → risk of cardiac arrest

Treatment:

1. **IVFT:**
   - RLS preferred – balanced/alkalinising crystalloid; appropriate even in hyperkalaemic cats
   - 0.9% NaCl is an acceptable alternative
   - Tailor rate to hydration/perfusion status and ongoing losses
   - Shock: 5–10 mL/kg boluses over 15–30 min, reassessing response
   - Lukewarm fluids are ideal for hypothermic patients
   - Cats are less tolerant of high fluid rates – monitor closely and adjust to response
2. **Decompressive cystocentesis** – if indicated
   - Consider if the bladder is markedly overdistended and unblocking cannot be performed immediately, needs to be delayed for stabilisation, or initial catheterisation attempts are unsuccessful
   - Use a 21G needle (1.5inch) attached to extension tubing, a 3-way stopcock and syringe: this allows decompression without repeated puncturing of the bladder wall.
   - Remove as much urine as possible
   - Use aseptic technique and avoid repeated unnecessary bladder puncture
3. **Correct hyperkalaemia:**
   - *Dextrose:*
     - Stimulates endogenous insulin release → drives K^+ intracellularly
     - Add 50% dextrose to isotonic fluids to create a 2.5-5% solution (50ml of dextrose 50% into 1l bag = 2.5% solution);
     - For more rapid K^+ reduction: 50% dextrose 1mL/kg IV, diluted 1:4 with 0.9% Saline
   - *Insulin + dextrose:* for significant/persistent hyperkalaemia
     - Regular insulin 0.2–0.5 U/kg IV + 2 g dextrose/unit insulin
     - Monitor BG closely for up to 24 h
     - 2.5% dextrose CRI may be required for 6–12 h
   - *10% Calcium Gluconate*: For severe hyperkalaemia with bradycardia/ECG changes
     - Cardioprotective – does NOT lower serum K^+
     - 0.5–1.5 mL/kg IV SLOWLY over 10–20 min
4. **Sedation/anaesthesia:**
   - Stable: Diazepam 0.2–0.3mg/kg IV + morphine 0.2mg/kg IV/IM + ketamine 0.5–1mg/kg IV/IM
   - Compromised: Diazepam 0.2–0.3mg/kg IV + morphine 0.02mg/kg IV/IM + alfaxalone 2–5mg/kg IV + top-up boluses 1–1.5 mg/kg q10min, as required.
   - Correct significant bradycardia, hypotension/hypovolaemia and hyperkalaemia before GA where possible.

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REFERENCES:

1. Taylor et al. iCatCare LUT Disease Guidelines. JFMS. 2025;27.
2. Steagall et al. ISFM Acute Pain Guidelines. JFMS. 2022;24.
3. Weese et al. ISCAID UTI Guidelines. Vet J. 2019;247.
4. Splittstoesser et al. Lorazepam & feline UO recurrence. JAVMA. 2026;264.

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FLUTD (Obstructed)

5. **Catheterisation:**
   - **Extrude the penis** by applying gentle pressure each side of the prepuce with two fingers.
   - **Massage the tip** with lubricating gel – mucous plugs may sit at the urethral opening.
   - A **22 G IV catheter** with stylet removed can be used initially. Once the catheter passes easily, change to a firmer catheter if required.
   - Gently introduce the catheter into the urethra.
   - Pull the prepuce and penis **caudally and dorsally towards the tail** to straighten the urethra over the pelvic brim
   - If urethral spasm is making catheterisation difficult, small-volume intraurethral lidocaine may help.
   - Once the catheter tip enters the urethra, **flush** several times with saline/lube mix + retropulse gently while slowly advancing the catheter - **NEVER force the catheter.**
   - Once unblocked, collect a urine sample and flush the bladder with sterile saline, particularly if significant sandy sediment/debris is present.
   - Carefully **suture/tape the indwelling catheter** in place.
   - A **T-port/T-piece** can be attached to the catheter. It allows a straight connection towards the tail, reducing traction on the catheter/prepuce.
   - Connect to a **closed collection system** *(urine collection bag or empty drip bag)*
   - Allow enough slack in tubing so tail movement does not pull on the penis/prepuce.
   - Generally **maintain catheter for 24–36 h**; azotaemic cats may require >48 h, depending on severity and response
   - *Catheter maintenance*: Wear gloves, maintain a closed system, minimise handling/disconnections, avoid routine flushing unless indicated, keep the collection bag below bladder level and off the floor, and clean collection tubing 2–3 × daily with an appropriate disinfectant (e.g. alcohol/chlorhexidine).
6. **Pain Management**
   - *Buprenorphine*: 0.02 mg/kg SC/IV q6–8h
   - *Gabapentin:* 5–10 mg/kg PO q8–12h – additional analgesia + may improve catheter tolerance
   - *Ketamine* may be considered for additional analgesia
   - *NSAIDs*: avoid while azotaemic/dehydrated; consider once unblocked and renal perfusion/function is appropriate
7. **Nursing:**
   - Buster collar + measure urine output q4h – monitor for post-obstructive diuresis.
   - Recheck electrolytes q4–6h until K^+ normal, then q12–24h.
   - After catheter removal, ensure comfortable urination before discharge.
   - Warn owners of re-obstruction risk after catheter removal.

NEW EVIDENCE

Lorazepam may substantially reduce the risk of re-obstruction following feline urethral obstruction.

A 2026 prospective, randomised study reported 0% re-obstruction with lorazepam vs 15.7% with placebo over 30 days.

OTHER MEASURES TO CONSIDER:

- *Antibiotics*: only if UTI present, ideally based on culture & sensitivity.
- *Urethral spasm/re-obstruction:* Lorazepam 0.25 mg/cat PO q12h for 30 days
- *Detrusor atony:* Bethanechol 1.25–5 mg/cat PO q12h – only once urethral patency is confirmed; keep bladder as empty as possible while function recovers.
- *Long-term:* Encourage increased water intake + appropriate urinary diet + multimodal environmental/stress management.

REFERENCES:

1. Taylor et al. iCatCare LUT Disease Guidelines. JFMS. 2025;27.
2. Steagall et al. ISFM Acute Pain Guidelines. JFMS. 2022;24.
3. Weese et al. ISCAID UTI Guidelines. Vet J. 2019;247.
4. Splittstoesser et al. Lorazepam & feline UO recurrence. JAVMA. 2026;264.

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Chronic Kidney Disease (CKD)

Presentation:

History: Weight loss, hypo/anorexia, vomiting, PU/PD, lethargy, halitosis

Clinical signs: Dehydration, poor BCS/MCS, pallor, uremic ulcers, abnormal kidney palpation, retinal vessel tortuosity/haemorrhage or detachment (suggestive of systemic hypertension)

Diagnosis:

1. *Confirm:*

- Early CKD / Stage 1–2: One or more of the following (often no clinical signs – incidental finding):
  - Consistent elevations in serial creatinine & SDMA readings (even if still within reference range)
  - Persistently elevated SDMA (15–17 µg/dL = Stage 1; ≥18 µg/dL = Stage 2+)
  - Abnormal kidney imaging (size on rads/internal appearance on US)
  - Persistent renal proteinuria (>0.5 in dogs; >0.4 in cats)
  - Persistently low USG without an identifiable extra-renal cause
- Azotaemic patients/Stage 2-4:
  - Assess USG – <1.030 dogs; <1.035 cats supports inadequate concentration (often isosthenuric)
  - Interpret creatinine/SDMA in light of hydration status + muscle mass
  - Exclude pre-renal and post-renal causes
  - Establish that abnormalities are persistent/stable before diagnosing/staging CKD

2. *Stage:*
   - Stage using **creatinine** and/or **SDMA** in a stable, hydrated patient
   - If creatinine + SDMA indicate different stages → reassess patient factors/recheck; persistent discordance generally favours the higher stage
   - Refer to current IRIS CKD staging guidelines

3. *Substage:*
   - Check **BP** + **UPC**
   - Assess for target-organ damage if hypertensive

4. *Other findings:*
   Uraemia, hyperphosphataemia, hypoalbuminaemia, hypokalaemia, hyperkalaemia (rare), hypercalcaemia, non-regenerative anaemia, UA - pyuria/bacteriuria, RTE cells, casts

QUICK REFERENCE

Use the current IRIS CKD staging guidelines to determine CKD stage + substage using creatinine/SDMA, UPC and blood pressure.

IRIS CKD Staging Guidelines 2026 – PDF

Treatment:

1. **Azotaemia/Dehydration:**
   - IVFT – balanced crystalloid (e.g. RLS); rate based on hydration deficit + maintenance + ongoing losses
   - Correct dehydration gradually, with regular reassessment of hydration, body weight, urine output + electrolytes
   - Avoid fluid overload – CKD patients cannot necessarily excrete excess fluid effectively
2. **Antinausea:**
   - *Maropitant* 1 mg/kg SC q24h
   - *Ondansetron* 0.1–0.2 mg/kg IV q6–8h may be added/used if nausea persists
3. **Gastroprotectants:** (for suspected GI bleeds)
   - Only if GI ulceration/bleeding is suspected – not routinely for uraemia alone
   - *Omeprazole* 0.5–1 mg/kg PO q12h
   - *Pantoprazole* 1 mg/kg IV q12h

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REFERENCES:

1. RIS. CKD Staging Guidelines. 2026.
2. IRIS. CKD Treatment Recommendations. 2026.
3. Bestwick & Geddes. Early diagnosis and intervention in feline CKD. Vet J. 2025;313:106416.

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Chronic Kidney Disease (CKD)

4. **Normalise potassium:**
   - *Hypokalaemia:* Supplement according to deficit (see Appendix 1)
   - *Hyperkalaemia:* May occur with advanced/end-stage CKD, particularly if oliguric/anuric – treat as indicated; insulin + dextrose can shift K^+ intracellularly
5. **Hyperphosphataemia:**
   - *Renal diet* – dietary phosphate restriction is first-line
   - If phosphate remains above the IRIS stage-specific target, add a *phosphate binder* with meals
     - Aluminium hydroxide (Amphojel) 10–30 mg/kg PO q8h (with meals)
     - Sevelamer (Renvela) 30–40 mg/kg PO q8h (1hr before or 3h after other medications)
6. **Antibiotics:**
   - Only if clinically relevant infection present, ideally based on culture & sensitivity
   - Broad-spectrum, kidney-safe cover: Amoxiclav @ 8.75mg/kg IV q8h sc q24h
   - NB: Antimicrobial stewardship!
7. **Hypertension:**
   - Treat persistent systolic BP ≥160 mmHg and/or evidence of hypertensive target-organ damage
   - Reduce BP gradually; ensure patient is stabilised/adequately hydrated
   - *Cats:* Amlodipine 0.625–1.25 mg/cat PO q24h
   - *Dogs:* Benazepril 0.25–0.5 mg/kg PO q12–24h ± Amlodipine 0.05–0.1 mg/kg PO q12–24h
8. **Proteinuria:**
   - Treat persistent renal proteinuria once hydration/volume status is stable
   - *Cats:* Telmisartan (Semintra®) 1 mg/kg PO q24h
   - *Dogs:* Telmisartan (Semintra®/Micardis®) 0.5–1 mg/kg PO q24h
   - Monitor UPC to assess response
   - If using an ACEi: monitor K^+, BP, urea + creatinine
9. **anaemia:**
   - Consider an erythropoiesis-stimulating agent (ESA) for persistent CKD-associated anaemia:
     - Cats: Hct <25%, or persistent anaemia at 25–28%
     - Dogs: Hct <30%, or persistent anaemia at 30–35%
   - *Darbepoetin* (Aranesp®): Cats 1 µg/kg SC q7d; Dogs 0.45–1.5 µg/kg SC q7d until target Hct reached, then extend dosing interval as required
   - Assess iron status and supplement if indicated
   - Monitor Hct/PCV + BP
10. **Appetite stimulant:**
    a. Address underlying causes of inappetence first – nausea, dehydration, uraemia
    b. Mirtazapine: Cats 1.88 mg/cat PO q48–72h; Dogs 0.6 mg/kg PO q24–48h
    c. Cyproheptadine: Cats 1–2 mg/cat PO q12h
    d. Do not use mirtazapine + cyproheptadine concurrently
11. **Renal diet:**
    - Consider from IRIS Stage 2; recommended in Stages 3–4
    - Renal diet is a cornerstone of long-term CKD management
    - Avoid introducing a new diet while the patient is nauseous/unwell in hospital
    - Once clinically improved, transition gradually at home – up to 3–4 weeks if required
12. **Long-term management::**
    - SC fluids: for advanced CKD patients prone to dehydration; individualise volume/frequency
    - Rechecks: q2–4 weeks initially until stable; thereafter q3–6 months, or sooner depending on stage, progression + treatment.

REFERENCES:

1. IRIS. CKD Staging Guidelines. 2026.
2. IRIS. CKD Treatment Recommendations. 2026.
3. Bestwick & Geddes. Early diagnosis and intervention in feline CKD. Vet J. 2025;313:106416.

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Gastric Dilatation-Volvulus (GDV)

Presentation:

History: Large, deep-chested breed; rapid eating or large meals; non-productive retching; restlessness

Clinical signs: Non-productive retching, severe abdominal distension with tympany, shock, tachycardia, tachyarrhythmias, hyperthermia, poor peripheral perfusion, respiratory distress

Diagnosis:

- *Abdominal radiographs* once sufficiently stable
  - Right lateral and DV views; avoid VD positioning
  - Displaced pylorus with "double bubble/reverse C" or "boxing glove" appearance
- *Bloods:* PCV/TS, glucose, electrolytes, lactate
- *ECG:* assess for arrhythmias

Treatment:

1. **Aggressive IVFT:**
   - Crystalloid Fluids: place 2 large bore catheters, give RLS 20ml/kg rapidly, then reassess perfusion and repeat boluses as required.
   - Fluid resuscitation and gastric decompression should occur concurrently where possible.
2. **Analgesia/Sedation:** use opiates/benzodiazepines
   - *Morphine* 0.1–0.4 mg/kg IV q4h
   - *Midazolam* 0.2–0.5 mg/kg IV once-off
3. **Antibiotics:**
   - Risk of bacterial translocation due to gastric ischaemia/mucosal compromise
   - *Ampicillin* 20 mg/kg IV q6h OR Amoxiclav 8.75–25 mg/kg IV q8h
   - *Metronidazole* 10–15 mg/kg IV q12h (severe sloughing/necrosis)
4. **Anaesthesia:**
   - Induction: *Propofol* 1–4 mg/kg IV or *Alfaxalone* 1–2 mg/kg IV, titrated to effect
   - Place a cuffed endotracheal tube to reduce aspiration risk during gastric lavage
5. **Decompress:**
   - *Gastric lavage:*
     i. Measure stomach tube from nose → xiphoid and mark with tape
     ii. Insert the lubricated stomach tube into the animal's mouth, down the oesophagus and into the stomach (rotating the stomach tube gently about its long axis may aid passage through the gastro-oesophageal junction)
     iii. If difficult to pass, percutaneous decompression first may relieve pressure on the cardia and allow tube passage
     iv. Smell/listen at the end of the tube for fetid-smelling gas/bubbling to ensure you are in the stomach (depending on the gas distension, you may be able to palpate the other end of the tube in the stomach)
     v. Remove gas, then instil warm water and manually agitate the stomach
     vi. Lower the tube and patient's head to allow fluid to drain; repeat until fluid is relatively clear
     vii. Blood in gastric fluid may indicate gastric necrosis → prompt surgery
     viii. Adequate lavage is important to reduce rapid re-dilatation after tube removal
     ix. If the tube still cannot be passed → surgical decompression

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REFERENCES:
1. Mazzaferro & Monnet. Gastric dilatation volvulus. Small Animal Soft Tissue Surgery, 2023.
2. Bruchim & Kelmer. Postoperative management of GDV. Top Companion Anim Med, 2014.
3. MSD Vet Manual. Gastric Dilatation and Volvulus in Small Animals. 2025.

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Gastric Dilatation-Volvulus (GDV)

- *Trocharisation* (if tube is not able to pass):
  i. Identify the area of greatest tympany on the *RIGHT abdominal wall* by percussion
  ii. Clip and aseptically prepare the site
  iii. Insert a *14–16 G needle or large-bore IV catheter* percutaneously into the stomach
  iv. *Release gas* through the needle/catheter – a hissing sound should be heard
  v. Allow gas to escape until gastric distension is reduced
  vi. Remove needle/catheter once adequate decompression is achieved

6. **Surgery &Gastropexy:**
   - Proceed to surgery as soon as sufficiently stabilised, even if successfully decompressed
   - *Decompress and derotate* stomach and confirm normal positioning
   - Assess stomach and spleen for ischaemia/necrosis; resect/remove non-viable tissue as required
   - Perform a permanent gastropexy to reduce risk of recurrent GDV
7. **Perioperative considerations:**
   - *Hypokalaemia:*
     - Check level and supplement *(see Appendix 1)*
   - *Hypoglycaemia:*
     - Check level and supplement *(see Appendix 1)*
   - *Hypomagnesaemia:*
     - Consider with persistent weakness, anorexia or refractory hypokalaemia/hypocalcaemia
   - *Tachyarrhythmias:*
     - Continuous ECG monitoring, particularly 12–36 h post-op
     - Correct fluid and electrolyte abnormalities first
     - Treat if compromising cardiac output (poor pulses, prolonged CRT, persistent HR >160–180 bpm)
     - Lidocaine 2 mg/kg IV bolus, then CRI 0.05 mg/kg/min, titrate to effect
   - *Gastric ulceration:*
     - Pantoprazole 0.7 mg/kg IV q24h or
     - Omeprazole 0.7 mg/kg PO q12h
   - *Recurrent bloating or ileus:*
     - Metoclopramide CRI 1–2 mg/kg/day
   - *Feeding:* offer food/slurry approximately 12 h post-op if not vomiting
8. **Post-operative monitoring:**
   - Monitor H*R, RR, temperature, BP, urine output* and *perfusion*
   - Recheck *PCV/TS, electrolytes, glucose* and *lactate* as indicated
   - Monitor for *sepsis/peritonitis, DIC* and ongoing *gastric necrosis*
   - Continue *ECG* monitoring for at least 24–36 h

TOP TIP

Discuss costs and prognosis with the owner early.
GDV requires emergency surgery and often intensive peri-operative care and can carry a poor prognosis, particularly with delayed treatment or gastric necrosis.

KEY POINT

Successful decompression does not replace surgery.
GDV requires surgical derotation, assessment of gastric and splenic viability, and permanent gastropexy once the patient is sufficiently stabilised.

REFERENCES:

1. Mazzaferro & Monnet. Gastric dilatation volvulus. Small Animal Soft Tissue Surgery, 2023.
2. Bruchim & Kelmer. Postoperative management of GDV. Top Companion Anim Med, 2014.
3. Sharp & Rozanski. Gastric dilatation-volvulus. MSD Vet Manual, 2025.

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Gastrointestinal Obstruction

Presentation:

History: Known or suspected foreign body ingestion, vomiting, anorexia, depression,
Clinical signs: Abdominal pain, palpable object or mass, dehydration; severe cases may progress to shock, endotoxaemia, gut necrosis, perforation and peritonitis.

Differential Diagnoses:

- Foreign body
- Mass
- Linear foreign body
- Intussusception
- Volvulus/torsion
- Trichobezoar

KEY POINT

Assess the entire GI tract at surgery. Check for additional foreign bodies and carefully assess intestinal viability before closure.

Diagnosis:

- **Abdominal Radiographs:**
  - Look for foreign material, intestinal dilation, abnormal gas/fluid patterns and intestinal plication
  - *Dogs:* small intestinal diameter should be <2× rib width or <1.6× L5 height
  - *Cats:* small intestinal diameter should be ≤12 mm or <2× L2 endplate height
  - Segmental intestinal dilation with normal/collapsed bowel distally supports obstruction
  - Consider contrast or serial radiographs if initial radiographs are inconclusive
- **Ultrasound:**
  - Assess for foreign body, intestinal dilation, plication, mass or intussusception
  - In dogs, jejunal diameter >1.5 cm supports suspicion of mechanical obstruction
  - Can help assess intestinal viability and peritoneal effusion
- **Bloods:**
  - Chemistry + Electrolytes - hypoglycaemia, hypokalaemia, hyponatraemia, hypochloraemia, hypoalbuminaemia
  - CBC: assess for inflammation, anaemia and haemoconcentration as indicated

Management:

1. **Fluid & Electrolyte replacement:**
   - Correct dehydration, perfusion deficits and electrolyte abnormalities according to deficit (see Appendix 1)
   - Stabilise significant shock and electrolyte abnormalities before anaesthesia where possible
2. **Endoscopy:**
   - May be an option if location of obstruction is proximal and equipment is available
   - Avoid if perforation is suspected or the object cannot be safely retrieved endoscopically
3. **Exploratory Laparotomy:**
   a. *Pre-medication/Induction:*
      - *Midazolam 0.2 mg/kg IV/IM and Buprenorphine 0.01–0.02 mg/kg IV/SC*
      - *Avoid NSAIDs until dehydration and shock are resolved*
      - *Induce with Propofol 1–4 mg/kg IV, titrated to effect*
   b. *Gastrotomy:*
      - Make the gastric incision in a *hypovascular* area of the ventral aspect of the stomach
      - Close the stomach with *4-0 or 3-0 absorbable* suture material
      - Use a *two-layer inverting seromuscular* closure

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REFERENCES:
1. Lopez et al. Enterotomy vs intestinal resection for foreign bodies in dogs. JAVMA. 2021;258:1378–1385.
2. Cola et al. GI foreign body removal and recovery. Vet Surg. 2024;53:1266–1276.
3. O'Marra & Campbell. Perioperative management of septic peritonitis. Vet Surg. 2026;55:39–58.

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c. *Enterotomy:*
- Make the incision into the intestinal lumen on the *antimesenteric* border, in the healthy-appearing tissue *distal* to the foreign body
- To close, use a *monofilament, absorbable* (e.g. Maczyn) suture material *4-0 or 3-0* with a swaged-on round *taperpoint* needle
- To close, place *simple-interrupted* sutures through *all layers* of the intestinal wall, 2 mm from the edge and 2 to 3 mm apart with extraluminal knots
- Leak-test the closure with sterile saline

d. *Enterectomy:*
- Recommended for removing ischemic, necrotic, perforated or neoplastic bowel
- Resect back to healthy, viable intestine
- Perform an end-to-end anastomosis using 3-0 or 4-0 monofilament absorbable suture
- In animals with peritonitis, consider using a more *slowly* absorbable monofilament suture
- Use a single-layer appositional pattern, ensuring good apposition at the mesenteric border
- Leak-test the anastomosis with sterile saline

e. *Biopsies:*
- Obtain biopsies of abnormal tissue or organs where indicated
- Consider GI biopsies if underlying chronic or infiltrative disease is suspected

f. *General:*
- Examine the entire GI tract for additional foreign bodies and assess intestinal viability
- Omentum or serosal patch may be placed to reinforce suture line
- Change gloves and surgical instruments before abdominal lavage and closure to minimize contamination

4. **Post-op care:**
- *Fluids:*
  - Continue correction of hydration, electrolyte and acid-base abnormalities
- *Feeding:*
  - Offer a small amount of water within a few hours of full anaesthetic recovery
  - Offer a small meal 6–12 h post-op if stable and not vomiting; increase as tolerated
  - Use a highly digestible recovery/GI diet (eg Hill's i/d)
  - If not voluntarily eating within 24 h, consider enteral feeding via a feeding tube
- *Antibiotics:*
  - Ampicillin 10–20 mg/kg IV q6–8h or
  - Amoxiclav 8.75–25 mg/kg IV q8h in severe cases, contamination or peritonitis
- *Gastric protectants - if indicated:*
  - Pantoprazole 0.7 mg/kg IV q24h or
  - Omeprazole 1 mg/kg PO q12h
- *Antiemetics*:
  - Maropitant 1 mg/kg SC q24h;
  - Metoclopramide 0.2–0.4 mg/kg IV/SC q6h (prokinetic)
- *Monitor for dehiscence/peritonitis:*
  - Particularly *3–5 days post-op*
  - Look for signs of vomiting, abdominal pain, fever, deterioration or abdominal effusion
- *Monitor for ileus:*
  - Look for signs of inappetence, vomiting and failure to pass faeces

REFERENCES:
1. Lopez et al. Enterotomy vs intestinal resection for foreign bodies in dogs. JAVMA. 2021;258:1378–1385.
2. Cola et al. GI foreign body removal and recovery. Vet Surg. 2024;53:1266–1276.
3. O'Marra & Campbell. Perioperative management of septic peritonitis. Vet Surg. 2026;55:39–58.

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Gastroenteritis

Vomiting

Causes:
Diet, parasites, infection, toxins, drugs, liver, kidney, pancreas, bloat, FB, intussusception

Diagnostics:
- Systemically well, acute case: often no diagnostics initially
- Investigate if persistent/recurrent, systemically unwell, painful or dehydrated
- Faecal float: If parasites are suspected
- Bloods: CBC, biochemistry and electrolytes as indicated
- Radiographs/Ultrasound if foreign body, obstruction or abdominal disease is suspected
- Additional tests guided by findings (e.g. cPL/fPL, ACTH stimulation)

Treatment:
1. **Acute:** Systemically well case
   - Maropitant (Cerenia) 1mg/kg SC q24h
   - Deworm with broadspectrum dewormer
   - Small, frequent, bland & highly digestible meals with a GI diet (eg Hill's i/d)
2. **Chronic, recurrent or systemically unwell:**
   - Full diagnostic work-up to identify the underlying cause
   - IVFT – correct dehydration and electrolyte abnormalities
   - Antiemetics
     - Maropitant (Cerenia) 1mg/kg SC q24h
     - add Metoclopramide (Clopamon) 1-2mg/kg/day CRI once FB ruled out
   - Gastric Protectants:
     - Sucralfate (Ulsanic) 500mg/dog (<20kg) or 1-2g/dog (>20kg) PO q6-8h; 250mg/cat PO q8-12h – for reflux oesophagitis
     - Omeprazole 1–2 mg/kg PO q12h where acid suppression is indicated
   - Treat underlying cause

Diarrhoea

Causes:
Worms, dietary indiscretions, drug-induced, toxins, infections, metabolic disorders, intestinal obstructions (acute); malassimilation syndrome, PLE, IBD, Addisons (chronic)

Diagnostics:
- Systemically well, acute case: diagnostics often not required initially
- Faecal float ± Giardia testing where indicated
- Parvovirus test in puppies/unvaccinated dogs or where clinically suspected
- Bloods: if significant dehydration, persistent/recurrent diarrhoea or systemically unwell
- Chronic diarrhoea: characterise small vs large bowel and investigate the underlying cause

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REFERENCES:
1. Jessen et al. Canine acute diarrhoea: ENOVAT guidelines. Vet J. 2024;307:106208.
2. Scahill et al. Antimicrobial and nutraceutical treatment of canine acute diarrhoea: systematic review. Vet J. 2024;303:106054.
3. Ettinger et al. Textbook of Veterinary Internal Medicine. 9th ed. Elsevier; 2024.

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Gastroenteritis

Treatment:

- **Acute:**
  - Small, frequent, bland & highly digestible meals with a GI diet (eg Hill's i/d)
  - Oralade/Prolyte if outpatient. IVFT if severe fluid loss
  - Antiemetic if vomiting/inappetent: Maropitant (Cerenia) 1 mg/kg SC q24h
  - Pre/probiotic/anti-diarrhoeal paste
  - Deworm with broadspectrum dewormer
  - Antibiotics only if severe disease with evidence of sepsis/systemic bacterial involvement - NB Antimicrobial stewardship!
  - Further investigation as indicated by clinical presentation and response to treatment
- **Chronic:** >3 weeks or recurrent/persistent signs
  - Characterise as predominantly small bowel, large bowel or mixed
  - Review diet, deworming, medications and previous treatments
  - Faecal testing: flotation ± Giardia testing
  - Bloods: CBC, biochemistry and electrolytes; include albumin/total protein
  - Consider cobalamin/folate, cPL/fPL and resting cortisol based on presentation
  - Abdominal ultrasound if persistent signs, weight loss, hypoalbuminaemia or other abnormalities
  - Consider a strict diet trial before more invasive diagnostics in stable patients
  - Persistent/unexplained cases may require GI biopsies ± referral

Acute haemorrhagic Diarrhoea Syndrome (AHDS)

Previously Haemorrhagic Gastroenteritis (HGE)

Presenting:

Toy breeds, strawberry jam diarrhoea, sometimes vomiting (with/without blood)

Diagnostics:

- Ht usually above 60%, but diagnosis often based on clinical exam
- Rule out parvovirus, particularly in young or inadequately vaccinated dogs
- Check electrolytes and glucose in moderate/severe cases

Treatment:

1. **IVFT:** RLS; correct hypovolaemia with boluses, then replace dehydration and ongoing losses
2. Correct **hypokalaemia** and **hypoglycaemia** as required
3. **Anti-emetics**
   - Maropitant (Cerenia) 1mg/kg sc q24h
   - Metaclopramide (Clopamon) 1-2mg/kg/day CRI
4. **Pro/prebiotic/anti-diarrhoeal**
5. **Gastroprotectant:** If haematemesis
6. **Diet**: Small, frequent, bland & highly digestible meals with a GI diet (eg Hill's i/d)
7. **Antibiotics:** not routinely indicated, even with haemorrhagic diarrhoea; reserve for severe disease with evidence of sepsis/systemic bacterial involvement
8. **Recurrent AHDS:** always rule out Addisons and parasites

KEY POINT

Haemorrhagic diarrhoea ≠ antibiotics.
Most AHDS cases require aggressive supportive care, not antimicrobials; reserve antibiotics for severe disease with evidence of sepsis.

REFERENCES:
1. Jessen et al. Canine acute diarrhoea: ENOVAT guidelines. Vet J. 2024;307:106208.
2. Scahill et al. Antimicrobial and nutraceutical treatment of canine acute diarrhoea: systematic review. Vet J. 2024;303:106054.
3. Ettinger et al. Textbook of Veterinary Internal Medicine. 9th ed. Elsevier; 2024.

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Parvoviral Enteritis

Presentation:
History: Usually young dogs, particularly puppies; often unvaccinated or incompletely vaccinated.
Clinical Signs: Lethargy, anorexia, vomiting and diarrhoea, which may or may not be haemorrhagic. Severe cases may present dehydrated, hypovolaemic, hypoglycaemic or septic.

Diagnosis:
- Faecal CPV antigen test (IDEXX SNAP/rapid test)
- Blood smear/CBC, faecal float - on admission
- Ht, TP, blood glucose, electrolytes - *monitor daily*
- Consider albumin/biochemistry in moderate–severe cases
- NB: A negative faecal antigen test does not completely exclude parvovirus if clinical suspicion is high – false negatives may occur early or later in infection; repeat testing/PCR can be considered.

Treatment:
ISOLATION & strict biosecurity

1. **IVFT:**
   - Balanced isotonic crystalloid (e.g. RLS)
   - If hypovolaemic: give boluses to effect and reassess perfusion/BP
   - Then replace dehydration + maintenance + ongoing vomiting/diarrhoeal losses
   - Consider plasma/natural colloid support only with significant hypoalbuminaemia and clinical indication
   - Monitor carefully for fluid overload
2. **Correct electrolyte/glucose abnormalities:**
   - Add dextrose and KCl according to measured requirements (*see Appendix 1*)
   - Monitor blood glucose + electrolytes closely
   - If hypokalaemia remains refractory despite appropriate supplementation → check magnesium
3. **Antibiotics:**
   - Ampicillin 22mg/kg IV q8h or Amoxiclav 8.75-25mg/kg IV q8h
   - Metronidazole 10-15mg/kg SLOW IV q12h (can be added for profuse haemorrhagic diarrhoea). Continue for 2 days post resolution.
4. **Anti-emetics**
   - Maropitant (Cerenia) 1 mg/kg SC/IV q24h
   - Metoclopramide (Clopamon) 1–2 mg/kg/day IV CRI – also prokinetic
   - Ondansetron 0.5 mg/kg IV q8h for persistent/refractory nausea/vomiting
5. **Analgesia:**
   - Buprenorphine 0.02 mg/kg IV q6h
   - Paracetamol (Perfalgan) 10 mg/kg IV q12h if additional analgesia required
6. **Antiparasitic:**
   - Fenbendazole (Panacur) 50 mg/kg PO q24h × 5 days
   - Treat coccidiosis specifically if identified/suspected

Continued on next page →

REFERENCES:
1. Zersen K. Canine parvovirus update. Vet Clin Small Anim. 2026.
2. Mazzaferro EM. Canine parvoviral enteritis update. Vet Clin Small Anim. 2025;55:405–425.
3. Mylonakis et al. Canine parvoviral enteritis. Vet Med. 2016;7:91–100.

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Parvoviral Enteritis

7. **Pro/prebiotic/anti-diarrhoeal**
8. **Gastroprotectants** – only if indicated:
    - Pantoprazole 0.7–1 mg/kg IV q12h OR
    - Omeprazole 1 mg/kg PO q12h
9. **Nutrition:**
    - Start early enteral nutrition once haemodynamically stable – do not wait for vomiting to completely resolve.
    - If not eating voluntarily, place a nasogastric/nasoesophageal tube and feed a liquid recovery/GI diet.
    - RER = 70 × BW(kg)^0.75 kcal/day
    - Start at 25–33% RER/day, divided into 4–6 small feeds; increase gradually over 2–3 days to 100% RER as tolerated.
    - Keep individual tube feeds ≤10 mL/kg; reduce/hold and reassess if vomiting, regurgitation or significant gastric residual/distension occurs.
    - Once eating voluntarily, offer small, frequent amounts of a highly digestible recovery/GI diet.
10. **Nursing:**
    - Keep patient clean, warm and comfortable
    - Monitor body weight, hydration/perfusion, urine output, vomiting/diarrhoea, glucose + electrolytes
    - Monitor abdomen for intussusception, especially with persistent/recurrent vomiting
    - Maintain meticulous isolation/biosecurity
    - Remove faecal contamination/bathe before discharge and use an appropriate parvocidal disinfectant (F10 shampoo) for the environment

Owner Advice / Discharge:

- Check vaccination status of all in-contact dogs; vaccinate susceptible/incompletely vaccinated dogs as appropriate.
- CPV is *highly resistant* and may persist in the environment for months–years. Avoid introducing unvaccinated/incompletely vaccinated puppies to the property.
- *Environmental cleaning:* Remove organic material, then disinfect with F10SC 1:100; wash/soak contaminated bedding, bowls and equipment.
- Continue to isolate from other dogs for 2 weeks after recovery.
- Review the recovered puppy's vaccination history and complete core vaccinations once clinically recovered, as appropriate for age/history.

TOP TIP

CPV can persist in the environment for months to years. Advise owners to avoid bringing inadequately vaccinated puppies onto a contaminated property.

KEY POINT

Even with ongoing vomiting, small amounts of enteral nutrition support enterocyte health and intestinal barrier function, helping the damaged gut recover.

REFERENCES:

1. Zersen K. Canine parvovirus update. Vet Clin Small Anim. 2026.
2. Mazzaferro EM. Canine parvoviral enteritis update. Vet Clin Small Anim. 2025;55:405–425.
3. Mylonakis et al. Canine parvoviral enteritis. Vet Med. 2016;7:91–100.

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Pesticide Poisoning (organophosphate/carbamate)

Presentation:

History: Known/suspected pesticide exposure or ingestion; black granules may suggest aldicarb ("Two Step") exposure in SA.
Clinical signs: SLUDDE - salivation, lacrimation, urination, diarrhoea, dyspnoea, emesis.
Also: miosis, bradycardia, bronchial secretions, muscle tremors/fasciculations, weakness, seizures and respiratory failure.

KEY POINT

Atropine treats muscarinic signs only.
Tremors, fasciculations and weakness require separate management.

Treatment:

1. **Stabilise:**
   - Clear airway/suction excessive secretions; O_2 supplementation
   - Intubation + ventilation if respiratory failure
   - IV access + supportive IVFT as indicated
2. **Atropine (parasympatholytic):**
   - To reverse *muscarinic* effects (SLUDDE/miosis/bradycardia)
   - Atropine 0.2–2 mg/kg parenterally to effect; cats use lower end of range
   - Initially give ¼ dose IV + remainder SC
   - Repeat according to clinical response
   - Endpoint: bronchial secretions controlled, improved breathing/perfusion; avoid excessive atropinisation
   - NB: atropine does not control nicotinic signs such as muscle fasciculations/weakness.
3. **Pralidoxime (2-PAM):** ORGANOPHOSPHATES ONLY
   - to control *nicotinic* signs (tremors/weakness/paralysis)
   - Pralidoxime chloride 20–50 mg/kg slow IV over 5–10 min
   - May repeat at ½ the initial dose as required if no improvement after 3 doses – discontinue
   - Give as early as possible, ideally within 24–48 h
4. **Seizure control:**
   - Diazepam 0.5–1 mg/kg IV, repeat as required
   - Methocarbamol 20–45 mg/kg PO q8h for significant tremors
5. **Decontamination:** (only once stable)
   - Induce emesis (in asymptomatic animals with confirmed ingestion where aspiration risk low)
     - *Dogs:* Apomorphine 0.03mg/kg IV or crush 1/4 -1 tablet, place in a syringe (without a needle), dissolve with a few drops of saline, and administer into the conjunctival sac (reverse with naloxone 0.04mg/kg iv if needed)
     - *Cats:* Xylazine 0.44mg/kg IM (reverse with yohimbine 0.1-0.25mg/kg slow IV once vomiting is complete)
   - Gastric lavage consider if ingestion of a large amount of poison OR when emesis is contra-indicated, i.e. animal not fully conscious. Protect airway with a cuffed ET tube.
   - Dermal exposure: Wear gloves/PPE. Wash with dishwashing liquid, rinse thoroughly and dry.
   - Activated charcoal: 1-2g/kg PO initially, repeat in 8 hours (half the dose), continue for 8 treatments in total.
6. **Supportive care/ Monitoring:**
   - IVFT according to hydration/perfusion requirements
   - Monitor HR/rhythm, RR/SpO_2, temperature, BP and neurological status
   - Maintain thermoregulation
   - Nutritional support if required (Tube/syringe feeding if needed)

REFERENCES:
1. Gupta & Doss. Organophosphate/carbamate toxicosis. Merck Vet Manual. 2024.
2. Klainbart et al. Organophosphate/carbamate intoxication in dogs. Vet J. 2019;251:105349.
3. Arnot et al. Aldicarb poisoning in dogs. J S Afr Vet Assoc. 2011;82:232–238.

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Rodenticide Toxicosis (anticoagulant)

Presentation:

Animals usually present *asymptomatically* after owners witness ingestion of the toxin, however, if not treated; they will present within 4-7 days of ingestion with generalised haemorrhage, pale mucous membranes, haematomas, anorexia, lethargy, swollen joints, melaena/haematochezia, tachycardia, dyspnoea, weakness or sudden death

Diagnosis:

- Confirm active ingredient/product where possible – not all rodenticides are anticoagulants.
- CBC/PCV + TP
- PT ± aPTT – PT increases first and is most sensitive for early anticoagulant rodenticide toxicity.
- Imaging/POCUS if internal haemorrhage suspected.
- Crossmatch if transfusion may be required.

Management:

NO OVERT CLINICAL SIGNS

1. **Decontamination** (recent ingestion)**:**
   - Induce emesis
     - Dogs: Apomorphine 0.03mg/kg IV or crush 1/4 -1 tablet, place in a syringe (without a needle), dissolve with a few drops of saline, and administer into the conjunctival sac (reverse with naloxone 0.04mg/kg iv if needed)
     - Cats: Xylazine 0.44mg/kg IM (reverse with yohimbine 0.1-0.25mg/kg slow IV once vomiting is complete)
   - Activated charcoal 1-2g/kg PO + Lactulose 0.5-1ml/kg PO
2. **Coagulation monitoring:**
   - Assess PT/PTT (PT increases first and is more sensitive than PTT)
     - Do baseline and at 48 and 72 hours
     - If normal after 72 hours - no further treatment necessary
     - If elevated - follow Vitamin K1 protocol specific to type of rodenticide (see below)
3. **Vitamin K1:** (give with high fat food)

   No proof that injectable superior to oral so can go straight to oral.
   - *Known 1st generation coumarin (warfarin) toxicity:*
     - Initially 2.5mg/kg SC in several sites, then 1–2.5mg/kg PO q8–12h for 5–7 days
   - *Known 2nd generation coumarin (brodifacoum) toxicity:*
     - *I*nitially 5mg/kg SC in several sites, then 2.5mg/kg PO q12h for 3 weeks
     - Recheck PT 48 h after final dose. If prolonged → treat for another week and recheck PT 48 h after stopping.
     - Restrict activity for 1 week after treatment; reassess coagulation at 3 weeks after cessation of treatment.
   - *Known inandione (diphacinone) or unknown anticoagulant toxicity:*
     - *I*nitially 2.5–5mg/kg SC over several sites, then 2.5mg/kg PO divided q8–12h for 3–4 weeks.
     - Re-evaluate PT 48 hours after stopping therapy.
       - Prolonged: continue Vitamin K1 for another 2 weeks.
       - Normal: repeat PT in 2 days; if still normal, restrict activity for 1 week and recheck.
       - If PT subsequently becomes prolonged → resume Vitamin K1 and reassess as above.

Continued on next page →

REFERENCES:

1. BSAVA Small Animal Formulary. 9th ed. Vitamin K1 (phytomenadione). 2017.
2. Paulin et al. Anticoagulant rodenticide toxicity in 349 dogs. Can Vet J. 2024;65:496–503.
3. Kanivets et al. Anticoagulant rodenticide poisoning: review. Sci Prog Innov. 2025;28:244–248.

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Rodenticide Toxicosis (anticoagulant)

HAEMORRHAGING PATIENTS

1. **Stabilisation / blood products:**
   - O_2 if dyspnoeic; minimise handling.
   - IVFT as indicated – avoid excessive crystalloid administration in active haemorrhage.
   - Fresh whole blood: for significant blood loss/anaemia + provides clotting factors.
   - pRBC: for significant anaemia where RBC replacement is required.
   - FFP: for significant active haemorrhage/coagulopathy – replaces clotting factors; does not replace RBCs.
   - Calculate whole blood volume:
   - (Desired Ht - Patient Ht) ÷ Donor Ht × 90 × BW (kg)
   - Aim for Ht 20–25% initially.
2. **Vitamin K1:**
   - Treat according to regimen above.
   - Give PO doses with a fatty meal once able to eat.
3. **Haemothorax:**
   - Thoracocentesis if causing respiratory compromise - see Respiratory Distress protocol for procedure.
   - Significant blood removed/lost may require replacement with transfusion.
4. **Nursing / monitoring:**
   - Strict cage rest; minimise handling/trauma.
   - Thermoregulation.
   - Serial PCV/Ht + TP and PT/aPTT according to clinical status.
   - Monitor RR/effort, HR, perfusion and evidence of ongoing haemorrhage.

KEY POINT

Vitamin K1 ≠ Vitamin K3.
Only Vitamin K1 (phytomenadione) is effective for anticoagulant rodenticide toxicity.

TOP TIP

Oral Vitamin K1 is effective.
There is no proven benefit to injectable over oral Vitamin K1, so start PO where appropriate. Give with a fatty meal to improve absorption.

REFERENCES:

1. BSAVA Small Animal Formulary. 9th ed. Vitamin K1 (phytomenadione). 2017.
2. Paulin et al. Anticoagulant rodenticide toxicity in 349 dogs. Can Vet J. 2024;65:496–503.
3. Kanivets et al. Anticoagulant rodenticide poisoning: review. Sci Prog Innov. 2025;28:244–248..

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Seizures

Presentation:

- *Generalised seizure (Grand mal):* loss of consciousness & generalised tonic/clonic activity.
- *Focal seizure (partial):* Localised motor/autonomic/behavioural signs; consciousness may be preserved.
- *Status epilepticus:* Seizure ≥5 min OR repeated seizures without recovery of consciousness.
- *Cluster seizures:* ≥3 self-limiting seizures within 24 h with recovery between episodes.

Management:

1. **Antiseizure medication**
   - Benzodiazepines are used for emergency management of seizures; repeat up to 3 times if necessary
     - Midazolam 0.1-0.3mg/kg IV or intranasal or 0.2-0.5mg/kg IM if IV access unavailable
     - Diazepam 0.5-1mg/kg IV/intranasal/per rectum = *1-2ml/10kg*
   - Follow up with a second-line / loading antiseizure medication (longer acting)
     - Phenobarbital 4-6mg/kg slow IV/PO (repeated q15–30 min until a loading dose of 15-20mg/kg is achieved)
     - Levetiracetam (Keppra) 60 mg/kg IV over 5–15 min.
     - Cats: phenobarbital total loading dose 10–15 mg/kg IV, in smaller increments.
   - Refractory seizures - anaesthetic agents will need to be considered:
     - Propofol should be used first: Bolus 1-4mg/kg IV to effect; then CRI of 0.1-0.6mg/kg/min
     - Ketamine 5mg/kg IV; then CRI of 5mg/kg/hr
     - Intubate + monitor ventilation closely if anaesthetic CRI required.
2. **Manage complications**
   - Take the *temperature* and start passive cooling techniques if temp is over 40 degrees (stop once 39 degrees is reached)
   - Check *blood glucose + electrolytes + ionised calcium* and supplement if necessary
     - hypoglycaemia: 50% dextrose 0.5g/kg = *1ml/kg* (bolus diluted 1:1 with 0.9% NaCl) SLOW IV
     - Hypocalcaemic: 10% calcium gluconate 0.5-1.5ml/kg SLOW iv (over 20-30 minutes)
3. **Once stabilised – investigate the cause**
   - Rule out reactive/extracranial causes:
     - Seizure profile should be run: This includes a Chem 10, NH_3, Ca, Ht and UA
     - Always perform a blood smear to check for blood parasites
     - Confirm vaccination status and screen for worms.
   - If reactive causes are excluded → consider intracranial causes:
     - *Idiopathic epilepsy:*
       - Diagnosis of exclusion; typically 6 months–6 years with normal interictal neurological exam.
       - Start long-term treatment if ≥2 seizures/6 months, clusters/status epilepticus, severe post-ictal signs or increasing frequency/severity.
       - Phenobarbital 2.5–3 mg/kg PO q12h; monitor levels + bloodwork and titrate to response.
       - Imepitoin (Pexion) 10–30 mg/kg PO q12h – alternative first-line option.
       - Adjuncts: levetiracetam, potassium bromide, zonisamide.
     - *Structural brain abnormalities* (rule out with MRI)
       - Usually in older patients (neoplasia) or very young animals (congenital causes)
       - If raised intracranial pressure is suspected:
         - Mannitol 0.5-1g/kg IV over 15–20 min
         - OR hypertonic saline (7.5% = 4ml/kg; 3% = 5.3ml/kg)slow IV
     - *Meningitis*
       - Diagnose with MRI and CSF tap
       - Treatment dependent on cause - infectious vs immune-mediated.

KEY POINT

Always investigate the cause – a seizure is a clinical sign, not a diagnosis.

REFERENCES:

1. Charalambous et al. ACVIM seizure emergency consensus. JVIM. 2024;38:19–40.
2. Bhatti et al. Canine epilepsy treatment consensus. BMC Vet Res. 2015;11:176.
3. BSAVA Small Animal Formulary. 11th ed. 2023.

Snake Bites

General

- Identify the snake *if safely possible* – photo is ideal; never risk another bite.
- If unidentified, treat according to the *clinical syndrome* and monitor closely.
- Venom effects may be cytotoxic, neurotoxic, haemotoxic or mixed.

Puff Adder (predominantly cytotoxic)

Presentation:

Painful, progressive swelling and bruising ± bite marks; facial/neck swelling may compromise the airway.

Treatment:

1. Start **IVFT** as clinically indicated.
2. Check baseline **Ht/platelet count/ISA**
3. **Polyvalent antivenom** – administer SLOW IV
4. **Analgesia** – *Morphine* 0.1-0.4mg/kg IV q4h or *Buprenorphine* 0.02mg/kg IV/SC q6h
5. **Antibiotics** if infection/necrosis present or in critically ill patients – Amoxiclav 8.75-25mg/kg IV q8h
6. **Shave bruised area** – warm & cool packing for swelling
7. Monitor **urine output/renal parameters** (especially around day 3)
8. Give a **blood transfusion** if patient is deteriorating (check Ht daily)
9. **Secure airway early** (tracheostomy tube) if progressive facial/neck swelling threatens obstruction.

Night Adder:

Treatment:

1. Supportive care - IVFT, analgesia and wound management is usually sufficient
2. Polyvalent antivenom is ineffective.

Cobra/Mamba (predominantly neurotoxic)

Presentation:

Progressive weakness, flaccid paralysis, respiratory failure/arrest

Treatment:

1. Start **IVFT** as clinically indicated.
2. **Polyvalent antivenom** – administer SLOW IV
3. **Intubate & mechanical ventilate** (on a respirator ideally)
4. **Sedation/anaesthesia** as required to tolerate ventilation: Propofol CRI 0.1-0.4mg/kg/min,
5. **Check eyes:** if venom spat into eyes, flush out with saline then treat corneal injury/uveitis according to findings (Atropine, Exocin, Acular). Check fluorescein uptake 48-72h later
6. Tape eyes closed
7. **Analgesia** – Morphine 0.1-0.4mg/kg IV q4h or Buprenorphine 0.02mg/kg IV/SC q6h
8. **Antibiotics** only if infection/necrosis present or in critically ill patient– Amoxiclav 8.75-25mg/kg IV q8h or SC q24h
9. **Nursing:** turn patient regularly, bladder expression/catheterisation, regularly suction fluid from the ET tube, keep the head down, eye lubrication/protection.
10. **Monitor respiratory function** closely and wean from ventilation/sedation as neuromuscular function returns.

KEY POINT

Antivenom dose is determined by the amount of venom, not the size of the patient.

REFERENCES:

1. Leisewitz et al. Snakebite in dogs. JSAVA. 2004;75:7–13.
2. Lobetti & Joubert. Snake envenomation in 155 dogs. JSAVA. 2004;75:169–172.
3. de Cramer et al. Night adder envenomation in dogs. JSAVA. 2012;83:205.

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Intervertebral Disc Disease (IVDD)

Presentation:

History: Acute onset pain, weakness, reluctance to move/jump para/tetra- paresis/paralysis
Clinical Signs: Weakness, ataxia knuckling over on limbs

- Cervical disc: Neck pain, low head carriage, guarding, tetraparesis.
- Thoracolumbar disc: Spinal pain, referred 'abdominal' pain, arched back, reluctance to walk, paraparesis

Diagnosis:

1. **Neurological examination:** (do a *full neuro*, but focus on the following)
   - *Conscious Proprioception* - delayed/absent (superficial spinal cord penetration)
   - *Superficial/Deep pain* - delayed/absent (loss of deep pain carries a poorer prognosis.)
   - *Panniculus reflex* - loss of reflex = 2 vertebral spaces caudal to the lesion
   - *Bladder/Bowel function* - ability to urinate/defecate (history from owner)
   - *Anal/Tail tone*
2. **Radiographs:** (not the best modality to localise IVDD)
   - May show narrowed/mineralised disc spaces but cannot confirm spinal cord compression.
   - Useful to rule out fractures, luxation and some neoplastic/bony lesions.
3. **CT/Myelogram/MRI:**
   - Diagnostic, but require referral to specialist facility
   - MRI provides the best assessment of the spinal cord and non-mineralised disc material.

Treatment:

1. **Surgery:** (refer to a specialist to perform)
   - Patient presenting with *moderate-severe neurological deficits*
     - non-ambulatory paraparesis
     - loss of motor function
     - loss of nociception (deep/superficial pain)
   - Patient who has been treated medically but has:
     - recurrent signs of neurological dysfunction
     - persistent spinal pain despite appropriate medical management
     - progressive/ deteriorating neurological signs despite appropriate medical management
2. **Medical:**
   - STRICT *cage rest* for 4-6 weeks despite perceived improvement
   - *Anti-inflammatory* (NSAID > Cortisone): Meloxicam 0.1mg/kg SC/PO q24h in dogs
   - *Analgesia:*
     - Opioids:
       - Buprenorphine 0.02mg/kg SC/IV q6h (for moderate-severe pain)
       - Morphine 0.1-0.4 mg/kg IV q4h (for severe pain)
     - Neuropathic pain:
       - Ketamine 0.5mg/kg SC/IM q12-24h (initially, for hyperaesthesia/wind-up pain) (Contraindicated in patients with hx of seizures)
       - Pregabalin (Lyrica) DOGS: 4mg/kg PO q12h; CATS: 1-2mg/kg PO q12h
       - or Gabapentin 5 - 25mg/kg PO BID
   - *Muscle relaxant:* Methocarbamol 15-20mg/kg PO q8h (for muscle spasm)
   - *IVFT:* where indicated to maintain hydration/perfusion.
   - *Nursing:* bladder expression/catherisation; soft bedding; frequent turning; cleaning
   - *Physiotherapy:* Massage, stretching, passive range of motion (PROM), hydrotherapy or underwater treadmill as appropriate.

NEW EVIDENCE

Surgery is not required for every IVDD case. A 2024 prospective study found 96% of non-ambulatory dogs with intact deep pain recovered walking with conservative management. Treatment choice should consider neurological grade, progression + pain.

REFERENCES:

1. Khan et al. Conservative management of canine IVDD. JVIM. 2024;38:2603–2611.
2. Olby et al. ACVIM IVDD consensus. JVIM. 2022;36:1570–1596.
3. BSAVA Manual of Canine & Feline Neurology. 5th ed. 2026.

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Trauma

Presentation:
Bite wounds, MVA, falls from height or other blunt/penetrating trauma.

Treatment:

1. **Rapid assessment:**
   - Assess mentation, airway/breathing, circulation/perfusion + major injuries.
   - Check HR/pulse quality, RR/effort, MM/CRT, temperature; auscultate chest + palpate abdomen.
   - O_2 if indicated.
   - Control severe external haemorrhage immediately with direct pressure/pressure bandage; ligate/suture if required.
2. **Shock/resuscitation**
   - Establish IV access.
   - Balanced isotonic crystalloid boluses:
     - Dogs: 10–20 mL/kg IV over 15–30 min
     - Cats: 5–10 mL/kg IV over 15–30 min
   - Reassess after each bolus and repeat as required to reach resuscitation endpoints: mentation, HR/pulse quality, MM/CRT, BP and lactate where available.
   - Consider blood products early with significant haemorrhage/ongoing blood loss.
   - Monitor temp AND fluids while rewarming – normothermic animals may become fluid overloaded if fluid given while hypothermic
3. **Analgesia**
   - *Opioids:* Buprenorphine 0.02 mg/kg IV/SC q6h OR Morphine 0.1–0.4 mg/kg IV q4h.
   - *Paracetamol* 10 mg/kg IV/PO q12h – DOGS ONLY.
   - *Ketamine* 1 mg/kg SC/IM q12–24h as adjunctive analgesia.
   - NSAIDs: only once haemodynamically stable, adequately hydrated + renal perfusion is adequate.
4. **Antibiotics** – if indicated
   - Amoxiclav 8.75–25 mg/kg IV q8h OR SC q24h, then 12.5–25 mg/kg PO q8–12h.
   - Broaden antimicrobial cover according to wound type, contamination + severity.
5. **Further assessment/treatment once stabilised**
   - TFAST/AFAST to assess for thoracic/abdominal injury where available.
   - Radiographs/ultrasound as indicated.
   - Wound care.
   - Fracture/luxation assessment + temporary stabilisation.
   - Repeat examination – some traumatic injuries may only become apparent over time

KEY POINT

Treat the patient in front of you
– avoid blanket "shock dose" fluid therapy.
Give small fluid boluses and reassess after each.

REFERENCES:
1. Pardo et al. AAHA Fluid Therapy Guidelines. JAAHA. 2024;60:131–163.
2. Drobatz et al. Textbook of Small Animal Emergency Medicine. 1st ed. 2018.
3. Silverstein & Hopper. Small Animal Critical Care Medicine. 3rd ed. 2022.

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Appendix 1: CALCULATIONS

Potassium supplementation

- What is the patient's potassium?
- How much KCl does the table indicate to add to the drip?
- Remember a bag of RLS already contains 4 mEq/L K^+
- Remember maximum potassium allowed is *0.5meq/kg/hr*
- *Never bolus KCl-containing fluids; mix the bag thoroughly before administration.*

Serum K^+ *(mEq/L)*	**KCl added per litre** *(mEq/L)*	**Max fluid rate** *(mL/kg/hr)*
3.5–5.5	20	25
3.0–3.4	30	16
2.5–2.9	40	12
2.0–2.4	60	8
<2.0	80	6

Dextrose supplementation

- What is the patient's blood glucose?
- If hypoglycaemic: 50% dextrose 0.5–1 mL/kg IV, diluted at least 1:1 with 0.9% NaCl; give slowly.
- Follow with 1.25–5% dextrose supplementation as required.
- Monitor blood glucose + adjust supplementation to response.
- Ensure dextrose-containing fluids do not extravasate or run SC.

Amount of fluid (ml)	**Amount of 50% Dextrose to add: For a 1.25% solution**	**Amount of 50% Dextrose to add: For a 2.5% solution**	**Amount of 50% Dextrose to add: For a 5% solution**
250 mL	6.25 mL	12.5 mL	25 mL
500 mL	12.5 mL	25 mL	50 mL
1000 mL	25 mL	50 mL	100 mL

KEY POINT

Supplementation is never "set and forget".
Monitor the patient and recheck values regularly; adjust supplementation to response.

Continued on next page →

REFERENCES:

1. Pardo et al. AAHA Fluid Therapy Guidelines. JAAHA. 2024;60:131–163.
2. Merck Vet Manual. Guideline for Potassium Supplementation in Dogs and Cats.
3. iBartola SP. Fluid, Electrolyte, and Acid-Base Disorders in Small Animal Practice. Elsevier. 2005.

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Appendix 1: CALCULATIONS

CRI calculation

- What is the required dose (mg/kg/hr or mg/kg/24 hrs)?
- Calculate the total dose required for the patient.
- Convert this to the dose required per hour (mg/hr).
- Determine the appropriate fluid rate based on the patient's requirements + ongoing losses.
- Calculate the required drug concentration in the fluids (mg/mL).
- Use the injectable drug concentration (mg/mL) to calculate the volume of drug to add to the fluid bag.
- If the fluid rate changes, recalculate the CRI to ensure the correct drug dose is delivered.

EXAMPLE:
Metoclopramide (Clopamon) CRI Dose = 2mg/kg/24hrs

Step 1:
Calculate dose for the animal in mg/24hrs
e.g. For a 20kg dog = 40mg/24hrs

KEY POINT

The drug dose is tied to the fluid rate.
If the fluid rate changes, recalculate the CRI to ensure the correct dose is delivered.

Step 2:
Convert that to mg/hr
e.g. 40mg÷24hr = 1,67mg/hr

Step 3:
Determine the appropriate fluid rate based on the patient's requirements + ongoing losses:
e.g. 45ml/hr = maintenance rate

Step 4:
Calculate required concentration: Divide mg/hr by ml/hr to get mg/ml
e.g. 1,67mg/hr ÷ 45ml/hr = 0,037mg/ml

Step 5:
Convert to mg/L: Multiply by 1000 to get mg/L (1L = 1000ml)
e.g. 0.037mg/ml x 1000 = 37mg/L

Step 6:
Calculate volume of drug to add:
Divide that by the concentration of the drug (i.e. 5mg/ml for Clopamon injectable) to get the amount needed in a 1L RLS bag
e.g. 37mg/L÷5 = **7,4ml**

ANSWER = 7,4ml of metoclopramide into a 1L RLS bag

REFERENCES:
1.Martin-Flores et al. Metoclopramide bolus & infusions. JSAP. 2026.
2.Plumb. Veterinary Drug Handbook. 10th ed. 2023.

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