

+ EMERGENCY ACTION GUIDELINES

ETHYLENE GLYCOL POISONING

SUSPECTED / CONFIRMED / WITNESSED INGESTION (MINIMAL LETHAL DOSE: CATS: 1.5ML/KG; DOGS 4ML/KG¹)

ASYMPTOMATIC

INDUCE EMESIS

(very fast absorption therefore may not be useful if > 30min post ingestion; however, food may slow down absorption²)

Cats: Alpha 2 Agonist³

Dogs: Emedog @0.1mg/kg SC
UNLESS CONTRAINDICATED

EFFECTIVE

CRI

Calculate how much ethanol you need to add to a 1000ml bag of fluids, to make a 7% solution:
Number of mls to be added = $7\% \times 1000\text{ml} / \%$ of available ethanol (e.g. 40% vodka)

(to achieve 7% ethanol solution one needs to add 175ml of 40% ethanol to the 1000ml bag of fluids, removing 175ml of fluid from the bag first)

Give 8.6ml/kg of 7% ethanol as an initial bolus and follow by CRI at 1.43ml/kg/hr for 24-36 hours
Consider use of dextrose (Ethanol can cause hypoglycaemia)

BOLUSES

Make 20% ethanol solution (dilute vodka 40% 1:1 with IV fluids)

DOGS: 5.5ml/kg of 20% ethanol IV q 4hrs for 5 treatments then q 6hrs for 4 treatments⁴.

CATS: 5ml/kg of 20% ethanol q 6 hrs for 5 treatments then q 8hrs for 4 treatments⁴.

CONTINUE IV FLUIDS AND TREATMENT

- For at least 48 hrs:
- until clinically normal for at least 24hrs
- normal kidney parameters
- normal acid-base balance

+ IMPORTANT EARLY LABORATORY FINDINGS:

- CHANGE IN OSMOLALITY** Reference range for osmolality: For dogs: 290-310mOsm/kg; For cats: 290-330mOsm/kg. Therefore consider hyperosmolar sample if osmolality is: > 320mOsm/kg in dogs and > 330mOsm/kg in cats.
- HIGH ANION GAP AND A NORMOCHLORAEMIC METABOLIC ACIDOSIS** (develops within 3 hrs, peaks at 6 hrs and may last up to 48hrs) very low serum bicarbonate
- CALCIUM OXYLATE CRYSTALLURIA** (can be seen within 3 hrs of ingestion in cats and 4-6hrs in dogs - duration is highly variable but can last days)
- SERUM ETHYLENE GLYCOL** concentration peaks 1-6hrs after ingestion and it is rarely present in the blood or urine after 48-72hrs

LATER LABORATORY FINDINGS:

- HYPERPHOSPHATAEMIA** and **AZOTAEMIA** - observed with progression of AKI (phosphorus levels can also increase initially due to phosphorus containing rust-inhibitors in anti-freeze)
- HYPERKALAEMIA** is seen with progression into oliguria/anuria and can be exacerbated by metabolic acidosis
- IONISED HYPOCALCAEMIA** - thought to be secondary to chelation with oxalic acid and formation of calcium oxalate crystals
- HYPERGLYCAEMIA** is thought to be related to aldehyde-induced inhibition of glucose metabolism, increased epinephrine and endogenous cortisol, and uraemia.
- URINE: ISOSTHENURIA** often within 3 hrs due to osmotic diuresis and polydipsia, at later stages related to **AKI: GLUCOSURIA, HAEMATURIA, PROTEINURIA, PYURIA, GRANULAR AND CELLULAR CASTS.**
- FLUORESCENCE MAY BE PRESENT** (on the coat or in a urine sample) - check with a Wood's lamp

INEFFECTIVE OR CONTRAINDICATED

CONSIDER GASTRIC LAVAGE

IV CATHETER PLACEMENT + BLOOD & URINE SAMPLING

(BLOOD: acid-base, osmolality, pH, electrolytes, BUN, Creat, Phosphorus, Ca^{2+} , PCV/TS
URINE: SG, dipstick, calcium oxalate crystaluria)

IV FLUIDS

@ 2-3x MAINTENANCE to induce diuresis²
(till the rate can be adapted to hydration and urine production).

START TREATMENT

ETHANOL CRI OR BOLUSES

OR

4-METHYLPYRAZOLE (FOMEPIZOLE¹)

CONSIDER VITAMIN B1 + B6^{5,6}
THIAMINE @ 100mg/dog IM/SC/PO q24h and
PYRIDOXINE @ 1-2mg/kg SLOW IV q 6hrs (consider separate line for vitamin B to ethanol as stability not established)
Dose & efficacy of supplemental Thiamine and Pyridoxine has not been fully established

- MONITOR URINE OUTPUT + BLOOD PARAMETERS
- GLUCOSE q 4-6hrs whilst on ETHANOL
- SUPPORTIVE CARE
 - anti-emetics, gastroprotectants, managing hypothermia
 - continue fluids and treatment

NO

DETERIORATION OF BLOOD VALUES AND/OR DECREASED URINE OUTPUT

YES

ACUTE RENAL FAILURE

Treat accordingly.

SYMPTOMATIC

LETHARGY, ATAXIA, DISORIENTATION, VOMITING, SEIZURES

Any cat presented with an acute onset of clinical signs during the "anti-freeze season" should raise a suspicion of ethylene glycol toxicity

INEBRIATION PHASE

30min-12hrs²

(Some animals may appear to 'recover')

CARDIOPULMONARY STAGE

12-24hrs metabolic acidosis²

OLIGURIC KIDNEY INJURY

24-72hrs (as early as 12hrs in cats²)

SEIZURES

NO

YES

TREAT WITH ZIAPAM (DIAZEPAM)

@0.5mg/kg IV, repeated up to 3 times, 10min apart

DOG

20mg/kg IV followed by 15mg/kg 12 and 24hrs after the initial dose, then 5mg/kg q12h until recovery.

CAT

125mg/kg IV initially, followed by 31.25mg/kg IV at 12, 24 and 36hrs after the initial dose (may cause ataxia and depression).

THIS DOCUMENT IS INTENDED FOR USE AS A GUIDELINE ONLY. DOSES ARE REFERENCED AS AT THE PUBLICATION DATE. INDIVIDUAL CASES AND TOXIC DOSES MAY VARY.

+ USEFUL CONTACTS

DÔMES PHARMA

Your partner in poisoning.

www.domespharma.co.uk

T 0800 0385868 | E help@domespharma.com

VETERINARY PATHOLOGY GROUP

Toxicology testing.

www.thevpg.co.uk | T 0113 2870175

VETERINARY POISONS INFORMATION SERVICE (VPIS)

Dedicated poisoning information service.

www.vpisglobal.com | T 0207 30 55 055

TOX BOX/ELIXIR SERVICE

Immediate access to emergency poisoning products

www.vpisglobal.com | T 0207 30 55 055

+ PRODUCTS

EMEDOG

- Veterinary licensed apomorphine for dogs
- Packs of 5 or 20x 1ml vials, with a 3-year, unopened shelf life

ZIAPAM

- The first veterinary licensed injectable diazepam for dogs and cats
- Packs contain 6 x 2ml vials of 5mg/ml

