

Fluid Therapy for Wildlife

What is Dehydration? Dehydration is the loss of water and salts essential for normal body function.

Assessing Dehydration: Skin (Turgor) Tent Test

- Definition: The time it takes for skin pulled away from the body to fall back into a normal resting position.
- Where to Pinch
 - **Mammals:** skin between shoulder blades
 - **Birds:** skin over the toes or eyelids
 - **Reptiles:** skin tenting is not a reliable test
- Dehydration is present when it takes longer than one second for the skin to return to a normal resting position.

Assessing Dehydration: Capillary Refill Time (CRT)

- Definition: The time it takes for the capillaries to refill after applying enough pressure to blanch the surrounding area.
- Where to Apply Blanching Pressure
 - **Mammals:** perform on the gums (can be difficult with aggressive patients)
 - **Birds:** use the basilic/ulnar vein (inside of elbow)
 - **Reptiles:** difficult
- A Capillary Refill Time (CRT) of greater than 2 seconds indicates dehydration greater than 7%.

Assessing Dehydration: Mucous Membranes

- Definition: Visually examining the color and texture of the mucous membranes.
- Where to look
 - Can evaluate oral membranes, eye conjunctiva, vulva or cloaca.
- What is normal
 - Pale pink to pink membrane color, but know your species not all animals have pink membranes.
 - Glistening and moist.
 - If membranes are pale and tacky or the animal has thick mucous strands in mouth they are dehydrated.

Routes of Administration

Route	Advantages	Disadvantages
Oral (PO)	Cheap, very effective, most natural. Helps flush the GI system.	Must be conscious, holding head up and swallowing. Risk of aspiration.
Subcutaneous (SC)	Simple, cheap, effective, can give a large bolus to minimize handling.	Minimal absorption if animal is in shock. Must be administered using sterile technique.
Intravenous (IV) Intraosseous (IO)	Delivers fluid directly into blood volume.	Risk of infection. Stress from catheter placement; can fall out. Risk of fluid overload.
Peritoneal (IP)	Can give a large bolus, absorbed slowly over time.	Risk of infection, puncturing an internal organ.

Clinical Signs of Dehydration: Birds

Clinical Signs	Percent Dehydration
No obvious signs, but assume all injured or orphaned birds have a fluid deficit.	< 5%
Skin may appear tight, especially over the keel. It may also appear dry and wrinkly. The skin forms a temporary tent if pulled up. Eyes look dull and eyelids tent. Inside of mouth is tacky, mucous strands.	5-10%
Inside of mouth is dry. Extremities are cold. Skin remains tented when pulled up. Heartbeat is rapid. Bird looks ill, listless and depressed.	10-15%

Clinical Signs of Dehydration: Mammals

Clinical Signs	Percent Dehydration
No obvious signs, but assume all injured or orphaned mammals have a fluid deficit.	< 5%
Skin appears tight; forms temporary tent if pulled up. Inside of mouth is dry. Decreased capillary refill time. Eyes starting to appear dry and sunken. Urine is concentrated and decreased volume.	5-7%
Pulse is weak and rapid. Eyes are sunken. Extremities are cold. Skin remains tented when pulled up. Mucous membranes are pale. Life threatening.	7-10%

Clinical Signs of Dehydration: Reptiles

Clinical Signs	Percent Dehydration
Increased thirst, slight lethargy, decreased urates.	3%
Increased thirst, anorexia and dullness. Dry loose wrinkled skin; slowly returns to normal when tented. Dull eyes. Dry, often sticky mucous oral membranes. Will start to see dysecdysis (abnormal shedding.)	7%
Dull to comatose. Skin remains tented after pinching. Animal feels light. Dry mucous membranes. Sunken eyeballs. No urates.	10%

Normal Laboratory Values

Test	Birds	Mammals	Reptiles
PCV (Packed Cell Volume)	35-55%	35-55%	20-40%
Total Protein	3.5-5.5 g/dl	5.5-7.5 g/dl	3.0-8.0 g/dl

Fluid Calculations

Patient is a 1.2 kg Red-tailed Hawk that is 8% dehydrated and is losing 7 ml of blood per day as a result of an actively bleeding wound.

Step	Formula	Example
Step 1	Convert the weight to g 1 kg = 1000 g 1 lb = 454 g	1.2 kg Red-tailed Hawk 1.2 kg x 1000 g = 1200 g
Step 2	BW (g) x (Maintenance Fluids + Fluid Deficit) = BW = Body Weight in g Maintenance Fluids = 6% Fluid Deficit = % Dehydration	BW (g) x (Maintenance (6%) + Fluid Deficit (8%)) = 1200 g x (6% + 8%) = 14% = 0.14 1200 g x (0.14) = 168 ml
Step 3	Add the ongoing losses to the answer from step two 7 ml of daily blood loss Answer from step two + ongoing losses =	 168 ml + 7 ml = 175 ml
Step 4	Calculate fluid capacity. Normal Crop or Stomach Capacity Body Weight (g) x 5% = Maximum crop/stomach capacity Debilitated Crop or Stomach Capacity Body Weight (g) x 2.5% = Debilitated capacity Total Subcutaneous (SC) Capacity Body Weight (g) x 3% = Maximum SC capacity	Body Weight (g) x 5% = Normal crop/stomach capacity 1200g x 0.05 (5%) = 60 cc or ml Gavage 60 ml per feeding
Step 5	Divide the total ml of total fluid requirement by the total fluid capacity. Total fluid requirement (ml) / fluid capacity = fluid frequency per 24 hours	175 ml for 24 hours / 60 ml = 2.9 Gavage 60 ml of fluids 3 times per 24 hours

Therapeutic Fluid Types

Oral Rehydration Solutions

- Commercial products for human pediatric use or calf diarrheal treatments.
- Should contain sodium and some glucose to maximize the rate of water absorption.
- Can be given PO only.

Crystalloids

- Can enter cells and all body fluid compartments.
- Stay in the bloodstream for shorter period of time than colloids.
- Used for replacement or maintenance of blood volume.
- **Isotonic Fluids:** Having the same concentration of dissolved particles as normal body fluid.
 - Can be given PO, SQ, IV.
 - Lactated Ringers Solution, 0.9% Sodium Chloride, Normosol-R, 2.5% Dextrose, Plasma-LTE
- **Hypertonic Fluids:** Having a higher concentration of dissolved particles than normal body fluid.
 - Can be given PO or IV only.
 - >5% Dextrose

Colloids

- Large molecular weight substances that are restricted to bloodstream.
- More of this fluid remains in the bloodstream.
- Ideal for animals in shock.
- Must be given IV or IO.
 - Hetastarch
 - Oxyglobin
 - Whole blood or plasma

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