

Electrolyte Replacement in Dogs Inquiry

CSDA Handler

My question is in regards to the need to use electrolyte replacement in dogs. My understanding is that it is not necessary because dogs do not sweat like people do and therefore do not have the same need to replacement "salts". Is that correct?

I have heard handlers say that their dog won't drink when he is working, and needs flavor to be incited. Do some dogs get so jazzed up they won't drink what they need, are are the handlers just over estimating the dogs require?

USAR Vet Group Responses Summary

Dogs do not sweat like humans. They do release a little bit of moisture from the foot pads and less haired areas (axillae/arm pits and inguinal/inner thighs). Their outer vessels dilate to promote radiant heat release. But by far the majority of their cooling system is via panting, which is in the form of water vapor. You will even see drops of water coming off their tongues.

This water vapor is just that....basically water, no electrolytes (sodium, chloride, potassium). The kidneys conserve water to try and maintain hydration, but water loss continues. Fluid replacement is therefore also 'just' water. Additional electrolytes in the liquid, unneeded by the body, are eliminated via the kidneys.

The danger is when simple dehydration continues into heat stress and ultimately heat stroke. Maintaining hydration is one very important aspect in preventing these more serious complications. Also cooling (shade, wet down coat, fans) and adequate rest periods, add to their overall health and increase their ability to prevent some serious problems.

These working dogs are high drive, and often do not drink adequately. Their excitement is also increased by the signals they get from their handlers. They often do not drink enough. Flavored solutions are fine to get them to increase water intake. But check the sodium content. Working kidneys will take care of excess, but advanced stages of heat stress may lead to high sodium and a number of other problems. Fluid replacement (one of several treatments needed) is then given intravenously, and is also mostly water.

Some handlers like some fluids to be given under their dogs' skin (subq fluids). These will be absorbed but will not meet all the hydration needs. They still need to drink, especially in the heat but also during cold weather.

Maintenance fluids for a canine are 2-4 ml/kg/day (about 3 liters for an 80-90 lb dog per day). Then additional needs are added for the time worked, difficulty of the search, and weather. This may increase the needed amount by 25%, 50%, 75%, even doubled!

From Dr. Otto:

We conducted a pilot study with SQ vs hydrolyte (one highly palatable oral electrolyte solution) and water with our police officers - we are waiting for DOD funding to complete the definitive study with Border Patrol this coming summer -but here is the abstract from the paper we are writing up

Prehydration Requirements of Working Dogs

Abstract:

Detection dogs work in adverse environments. In the field, dog handlers have used subcutaneous fluids and oral electrolyte solutions in addition to water to prevent dehydration; however, the efficacy of these strategies has not been studied. Our study aimed to determine the effects of 3 prehydration strategies on body weight, blood electrolytes and search performance in police canines working in hot environments. This field study tested 3 prehydration strategies in each of 3 police detection canines using a cross over design. Each dog was randomly assigned to 10ml/kg of water (W), subcutaneous balanced electrolyte solution (SQ), or chicken flavored oral electrolyte solution (OES) at the beginning of each work day. All dogs were offered water every thirty minutes; however, OES dogs were offered 10 ml/kg OES if they drank <3 ml/kg of water. At the beginning, middle, and end of each day, we measured body weight, serum electrolytes, lactate, and vital signs. A timed standardized search at the beginning and end of each day was conducted. Dogs in the W (n=3) and SQ (n=3) groups drank a combined mean of 5.0 ml/kg/hr, while the OES dogs (n=3) drank 18.6 ml/kg/hr. Only dogs in the OES group developed isosthenuria and gained weight. Hematocrit decreased by the end of the work day for dogs in the OES and SQ group. Regardless of the hydration strategy all dogs had a small but significant decrease in potassium, no hydration strategy resulted in a significant change in electrolyte values throughout the day. Only dogs in the OES group maintained blood bicarbonate concentrations and had significantly faster afternoon search times compared to the morning. In this study, police dogs performing light to moderate work in hot environments were able to maintain hydration. In addition to maintaining hydration, by then end of the work day dogs in the OES group had improved search times, a significantly decreased hematocrit, and were able to maintain a consistent level of bicarbonate.