

# Care and Management of Dogs in Summer season

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**Abstract:** As temperature is soaring, maintaining our pets hydrated, healthy and happy is not a cakewalk in this summer season. Protecting the pets from dehydration and heatstroke is the top priority to the pet parents. It is important to modify the routine with a summer-friendly diet and other activities to keep them cool and to have a happy summer season. Unlike humans, pets cannot sweat through their body surface; they depend completely on panting to cool themselves. Though some amount of sweating takes place through the paws and nose, it's minimal. Due to these differences, dogs are more prone to heatstroke.

## Introduction

Summer is a fun and exciting time for both dogs and their owners to enjoy their time outdoors. During the warmer months of the year, dog's most serious issue is dehydration and heatstroke/hyperthermia. Heatstroke is a life-threatening syndrome seen in human beings, dogs and other species. Dogs need much care to avoid heat stroke and stay healthy during summer. (Coris *et al.*, 2004; Bruchim *et al.*, 2006).

## Dehydration

Water is an important nutrient and our body organs rely on water for proper functioning. When dogs are losing more water than they are taking in, dehydration occurs. It refers to shortage of fluid in the body which also affects the delivery of oxygen to the body tissues and organs. Dehydration is a serious concern, which could be fatal in severe cases. The symptoms of dehydration include dizziness, agitation, weakness, excessive drooling,

xerostomia, sunken eyes, and loss of skin elasticity. The simplest way to test for dehydration in dogs is to pinch a little skin on the dog's back or top of their head using thumb and forefinger. If the animal is hydrated enough, it springs back to its original place immediately. If the dog is dehydrated, the folds of skin move back very slowly and in severe cases it doesn't spring back at all. To prevent dehydration, ensure that the dog has plenty of access to clean and fresh water and we must check the bowl after every few hours.

## Heat stroke

It is commonly referred as hyperthermia or elevated body temperature. If the dog's body temperature exceeds 39.5°C, it is considered hyperthermic. The high body temperature of the animal without any signs of previous illnesses is mostly due to high temperature of the external environment and is referred to as heat stroke. Dogs have a relatively small number of sweat glands, so they are not able to cool down themselves as easily as humans by sweating. Their primary way of regulating their body temperature is by panting. The dogs that are left in a yard with no access to shade or water on a hot day are more susceptible to heatstroke. The muzzled dogs are also at greater risk since their ability to pant is restricted by muzzle. Heatstroke is rare in dogs which are left free regardless of exercise and environmental temperature. Poor ventilation and dogs left in locked cars are the most critical factors for the development of heat stroke (Larson and Carithers, 1983). Neurogenic hyperthermia occurs due to

damage in hypothalamus, upper airway disease, paralysis of larynx, heart and/or blood vessel disease, nervous system and/or muscular disease and previous history of heat-related disease poisoning; Some poisonous compounds, such as strychnine, slug and snail bait can lead to seizures, which can cause an abnormal increase in body temperature.

### **Predisposing factors**

Heat stroke is more common in brachycephalic breeds (short-nosed and flat face), long thick hairy breeds, young ones, aged and previously affected animals. Other risk factors are obesity, poor heart or lung conditioning, hyperthyroidism, insufficient or restricted water intake and forced exercise during times of high environmental temperature.

### **Pathogenesis**

Heatstroke may increase the metabolic rate which depletes liver glycogen stores rapidly and further increases the endogenous metabolism of protein. Anorexia is due to respiratory embarrassment and dryness of mouth. Increased heart rate is due to an increase in blood temperature, decreased blood pressure and peripheral vasodilation. The increase in respiratory rate and depth is due to the direct effect of high temperature on respiratory centre, which indirectly cools by increasing the salivary secretion, and rate of airflow across the respiratory epithelial surface. Oliguria results from decreased renal blood flow and peripheral vasodilation. When the critical temperature is exceeded, there is circulatory failure due to myocardial weakness, depression of nervous system activity and respiratory centre. Respiratory failure leads to death. The imbalance between heat generation and dissipation is impacted by thermoregulation, acclimatization, acute phase response (APR), production of heat shock proteins (HSPs), and a patient's predisposing factors (Bouchama and Knochel, 2002).

### **Clinical signs**

Clinical signs vary based on the duration and degree of exposure to elevated environmental temperature. The clinical signs are panting, increased body temperature (105-107<sup>0</sup> F), drooling of saliva, haematemesis, black or tarry colour stools, seizures, muscle tremors, wobbling, incoordination, involuntary paddling, oliguria,

turbid and scanty brownish urine. Urine is described as "machine-oil" or "coke-colored", indicating myoglobinuria (Flournoy *et al.*, 2003). Dehydration, and tachycardia with a thready pulse are usually present due to extreme hypovolemia. Pulse deficits may be noted if there is an arrhythmia (Johnson *et al.*, 1999). Breathing distress, reddened gums, and small pinpoint areas of bleeding indicate disseminated intravascular coagulopathy. Shock, change in mental status and unconsciousness are also noticed. However, it should be pointed out that some animals may have a normal or even subnormal temperature at the time of examination. This occurs especially if the owners have initiated treatment to cool down the animal before presentation or if the patient is in an advanced stage of shock (Drobatz and Macintire, 1996). Clinical presentation can sometimes give clues as to whether the animal's elevated temperature is pyrogenic or nonpyrogenic. Pyrogenic hyperthermia includes infectious and noninfectious systemic inflammatory diseases. Systemic inflammatory diseases are characterized by elevated temperature without panting and hypersalivation in dogs. Pyrogenic animals will usually be ambulatory, whereas many heatstroke animals are unwilling or unable to rise (Miller, 2018).

### **Clinico-pathological findings:**

#### **Haematological changes**

Hemoconcentration (elevated hematocrit and total solids) associated with dehydration is commonly seen. Low total solids and anemia may be found in some dogs as a result of direct hyperthermic damage, gastrointestinal losses, vasculitis, or renal losses. Thrombocytopenia, prolonged activated partial thromboplastin time, prothrombin time, increased fibrin degradation products, decreased fibrinogen levels, and prolonged activated clotting time can be seen individually or in combination during DIC. Schistocytes may be present on a blood smear, lending support to a presumptive diagnosis of DIC. There may be increased leukocyte numbers; however, severely affected dogs may exhibit marked leukopenia. In addition, blood smears may reveal nucleated red blood cells however, this finding is transient.

#### **Biochemical changes**

Hypoproteinemia, decreased blood glucose concentration are noticed because of increased

metabolic demands, hepatic dysfunction or even sepsis. Elevated BUN and creatinine, especially during an acute renal failure crisis. In addition, prerenal factors may contribute to azotemia through dehydration, poor perfusion and hemoconcentration. Hepatocellular damage usually results in elevated liver enzyme concentrations, particularly aspartate transaminase, alanine transaminase and alkaline phosphatase. Mild hyperbilirubinemia may also occur. High levels of creatinine phosphokinase indicate rhabdomyolysis and may reach a peak at 24 to 48 hours before declining.

#### Urine analysis

In urinalysis increased urine specific gravity, proteinuria, and hematuria were observed. Urine sediment should be examined for casts (cellular casts, epithelial cells) indicating renal tubular damage. Myoglobinuria is occasionally noted on urinalysis and indicates rhabdomyolysis.

#### Electrolyte abnormalities

Hypernatremia is frequently present due to pure water loss. A mild hyperkalemia may also be present. Hypophosphatemia and hypocalcemia may occur as well, although the mechanism of these changes is unknown. Blood gas analysis may reveal respiratory alkalosis reflecting hypocarbia secondary to metabolic acidosis reflecting lactic acid production associated with poor tissue perfusion or excessive muscle activity. Metabolic acidosis in dogs with heatstroke may also be caused by diarrhea or acute renal failure. In addition, mixed acid-base disorders (e.g., respiratory alkalosis, metabolic acidosis) commonly occur. Frequent monitoring of blood gases or total carbon dioxide is recommended during the initial resuscitation of heatstroke patients.

#### Differential diagnosis

Heat stroke must be differentiated from eclampsia, hypoglycemia, encephalitis, convulsions and other similar conditions. The sudden onset of signs with high rectal temperatures (excess of 105°F) is usually sufficient for diagnosis (Diehl *et al.*, 2004). Ingestion of tremorgenic toxins such as hexachlorophene, mycotoxins on walnuts or moldy cheese, organophosphates, or metaldehyde has been reported to cause hyperthermia.

**Here are some tips to manage dehydration and heatstroke in dogs during the summer months:**

#### 1. Keep dogs hydrated

Dogs tend to overheat and get dehydrated during the warmer days. Make sure dogs have access to clean and fresh water at all times. We can also give them ice cubes or frozen treats to help them cool down. If you are going out for a walk or a hike, bring a water bottle and a bowl for your pet.

#### 2. Groom your animals

Brush your companions a few times a week to get rid of loose hair so that they feel lighter and are more comfortable in high temperatures.

#### 3. Avoid walking dogs during the hottest times of the day

The pavement and concrete can get very hot during the summer months and can burn your pet's paws. Try to walk your pets early in the morning or late in the evening when the temperature is cooler. You can also take your pets to a shaded park or if you are taking your pets on a walk or outing, bring a water bottle and a portable bowl to keep them hydrated.

#### 4. Avoid leaving pets in hot cars

Leaving pets in hot cars can be extremely dangerous and even deadly. Even if you think it will only be a few minutes, the temperature inside a car can rise rapidly and cause heatstroke.

#### 5. Avoid hot surfaces

Hot asphalt, concrete, and sand can burn pet's paws. Try to walk your pet on grassy areas to protect their paws. You can also walk your pet during cooler parts of the day, such as early morning or late evening.

#### 6. Feeding

Avoid feeding foods that are warm in nature. With rise in temperature, pets tend to lose appetite. Light, freshly prepared and easily digestible meals are beneficial in summer to maintain their nutritional intake. Pet foods are advised to be stored in a cool place and avoid leaving them outside as they can be spoiled easily. Watery fruits, buttermilk, yogurt and green leafy veg are summer-friendly to the pets.

#### Conclusion

Labored breathing and abnormal head movements are indications of heatstroke. Pour water at room temperature on the animal's body to cool them down and wipe them with a wet towel. Avoid sudden cooling like putting the animal in an ice bath.

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