

NEONATAL TRIAD IN DOGS AND CATS

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ABSTRACT

The present study aims to approach the neonatal triad, taking into consideration its components that are corresponded by dehydration, hypothermia and hypoglycemia, and to evidence the clinical signs of each alteration, obtained through physical examination of the newborn, facilitating the diagnosis. However, the Veterinarian when attending a newborn should take into consideration the unique physiology of this phase and the specific requirements of a newborn, bearing in mind that 75% of neonatal deaths occur in the first three weeks of life and therefore it is important to reproduce in the best possible way the necessary care for the return of homeostasis of the individual, which includes thermoregulation and room humidity, rehydration and proper nutrition.

Palavras-chave: Dehydration. Hypothermia. Hypoglycemia. Neonate.

neonates have four critical periods that affect their survival, birth, the first 24 hours of life, the first week and weaning, respectively, such periods being evidenced by the development of this newborn and consequently the decrease in mortality rate.

However, it is necessary to point out that among neonatal deaths, 50% occur during the first three days of life of this puppy, 65% during the first week and 75% during the first three weeks (FEITOSA, 2014), since due to its immaturity many problems are common and constant, one of these problems being the neonatal triad, a disease that affects mainly orphaned neonates and is composed of hypothermia, dehydration and hypoglycemia (SANCHES et al., 2017).

The physical examination of puppies during the neonatal period is essential and through it and the information obtained during the anamnesis, the identification of the first signs of abnormalities can be performed and with this measures can be taken to prevent the incorrect development of this animal or even its death (FEITOSA, 2014). Faced with the facts, the neonatal triad is one of the pathologies that can be identified from the execution of the physical examination.

Thus, the objective of this work is to emphasize the components of the neonatal triad (dehydration, hypothermia and hypoglycemia) and its characteristics, as well as to expose the main means of identification of each one of these components and their identifiable symptomatologic manifestations during the clinical examination of a newborn.

INTRODUCTION

According to Jericho, Neto and Kogika (2015) an animal is considered newborn until about the first 30 days of life, a period in which the puppy is still dependent on its mother, as for obtaining food and body heat, but with time the animal ceases to be considered newborn, because it begins to acquire autonomy and physical and physiological maturity.

Neonatology aims to care for the needs of neonates who inherently have physiological characteristics that make life difficult to maintain (JERICÓ; NETO; KOGIKA, 2015). According to Feitosa (2014)

General physical examination in newborn puppies

The physical examination evaluates the newborn in a complete way, observing its body temperature, state of hydration, cardiovascular system, respiratory system, neurological system and sensory organs. For the exam to occur efficiently, it is necessary to understand that the neonates have their particularities, whether they are the existence of age-specific patterns (which vary from week to week during the neonatal period) or their limitations, in view of their incomplete development (PETERSON, 2011).

In order to identify the neonatal triad, it is necessary that the Veterinary Doctor is familiar with this disease, which is composed by dehydration, hypothermia and hypoglycemia. The level of hydration of a neonate is verified from the humidity of its mucosa and the coloration of its urine, where the dry looking mucosa and dark urine are signs of dehydration, however, the use of turgor and skin elasticity are less efficient identification factors, due to the small amount of subcutaneous fat present in the neonate (PETERSON, 2011).

Regarding the body temperature of a newborn, it should be noted that it has inability to perform thermogenesis by tremor during the first six days of life and its thermoregulation is inefficient during the first two weeks, and these factors cause the body temperature of this animal to vary according to room temperature, favoring cases of hypothermia and hyperthermia. In the neonatal triad the animal presents hypothermic, when its temperature is below 33°, in this case some symptoms can be evidenced, such as cold skin to the touch, muscular flaccidity and bradycardia, confirming the picture through the temperature measurement, which can be done with the use of rectal thermometer (JOHNSTON; ROOT KUSTRITZ; OLSON, 2001).

Finally, we have the hypoglycemia, which happens due to a blood glucose level lower than 30-40 mg/dL. This value can be defined through the use of glucometer, and a hypoglycemic animal presents as symptoms the incoordination, weakness, flaccidity or coma. This condition is more susceptible to occur in neonates compared to adult animals, due to its incomplete development evidenced by its hepatic immaturity, lower muscle mass extension, and lower glycogen reserve index (FEITOSA, 2014).

Hypothermia

Hypothermia is a term referring to the reduction of body temperature and this factor is intrinsically linked to the newborn, since the puppy does not have the capacity for thermoregulation. The fact is that the hypothalamus is still in puerility (CHAVES, 2011).

In view of the Key's approach (2011), the ratio of body size to reduced weight, the non production of tremors as a reflection of low temperature in the first week of life and the non-erection of hair prevents thermoregulation.

This physiological parameter makes up the neonatal triad and has the capacity to interfere in an unfavorable way in the maintenance of the animal's life, causing the organism's functions to be affected, such as a reduced sucking reflex, which makes breastfeeding difficult and also promotes maternal distance (VANNUCHI; ABREU, 2017).

The inactivity of this body operation during the first fifteen days of life leads the puppies to depend entirely on their mother's body heat (OSORIO, 2016) and on the thermal comfort that is generated during breastfeeding, which helps to maintain the temperature (FEITOSA, 2014), in view of this, the maternal distance and the environment directly affect the thermal regulation.

According to Osório (2016), when a hypothermic puppy is noticed by its mother, she keeps him away from others and from herself, which inevitably generates an even bigger problem for the animal.

In cases where the newborn is deprived of maternal coexistence, it is necessary to offer him/her a propitious environment for his/her survival, with ideal humidity and temperature, preventing heat loss (VANNUCHI; ABREU, 2017).

Based on the review by Peixoto and Junior (2010), the temperature of a newborn is 35.5oC to 36.1oC, but after seven days of life it increases to 37.8oC, but still the thermogenesis remains inactive until the fifteen days of life. Therefore, neonates need external systems for their thermoregulation.

Citing the study conducted by Chaves (2011), when the puppy is deprived of maternal coexistence the ideal is to promote an environment with a temperature of 32oC for dogs and 33oC for felines so that they can keep to a minimum with 36oC, from this, the temperature should be reduced progressively until the fourth week of life, reaching 26oC in the environment.

To avoid a hypothermic state incubator, thermal bags, gloves with hot water, boxes with cloths and lamps can be used (CHAVES, 2011). However, the use of these media should be cautious, avoiding hyperthermia, which is also a risk factor for the maintenance of life. The management to obtain heat must be carefully observed, reducing the risk of generating hyperthermia.

A hypothermic animal may have cold skin, flaccid muscles and reduced heart activity. On the other hand, when hyperthermic, they may pant (FEITOSA, 2014).

Dehydration

Dehydration occurs when the body loses an excessive amount of liquid, which regulates the levels of salts and sugars in the blood, thus preventing its proper functioning. Physiologically, neonates are predisposed to dehydration because they retain 80% of their weight in water. The extracellular liquid of these animals is high since they have an extensive body surface. Moreover, they have low renal capacity and a more permeable skin that may be secondary to water loss (LAWLER, 2008).

In neonates dehydration may be associated with prematurity, diarrhea, pneumonia, high environmental temperature (humidity below 55%) or inadequate breastfeeding. These conditions, when not identified early and corrected, can lead to the death of these animals (HOSKINS, 2001).

To identify the degree of hydration of the puppies, the urine stain should be evaluated, the yellowish color is indicative of dehydration, the neonates should have translucent colored urine (WILBORN, 2008). In practice, moistened cotton is used to stimulate urination through gentle massage in the pelvic region (PETERSON, 2011)

Another important parameter to be observed is the humidity of the ocular and oral membranes, with dehydration they may be pale and dry (RICHARD, 2011). This evaluation cannot be performed after breastfeeding, because the milk will leave the mucous membranes greasy, simulating a false hydration.

Skin turgor is not as precise an indication to identify hydration as in adult animals, because neonates have little subcutaneous fat. According to Peterson (2011), canine and feline puppies well hydrated with clear pigmentation, usually present the belly, snout and oral mucous membranes in a slightly pinkish tone.

Naturally, in the first 24 hours of life canine and feline puppies can suffer a slight dehydration and weight loss because they defecate for the first time (PETERSON, 2011). However, the low weight of neonates is related to the low chance of survival, requiring much attention from the veterinarian and owner (VASSALO, 2015). For this, after the living conditions are established, the litter should be weighed daily, the ideal is 10% gain in weight per day of these animals (PETERSON, 2011)

Hypoglycemia

Hypoglycemia being one of the components of the neonatal triad, it is the drop in glucose concentration in blood circulation that contributes to the mortality of neonates, which can be less than 30 - 40 mg/dL (DAVIDSON, 2003). Furthermore, females with

malnutrition, placental insufficiency, or who have had a dystocic or premature delivery makes the neonate susceptible to hypoglycemia (LAWLER, 2008; MOON, 2001), as well as the same presenting portosystemic deviation, endotoxemia or septicemia (DAVIDSON, 2003).

Clinical signs of hypoglycemia include incoordination, flaccidity, weakness, absence of the suction reflex or coma. The mean arterial pressure of a newborn with hypoglycemia decreases about 19%, and although there is no variation in heart rate there are other changes such as hypoxia in the nervous tissue causing cerebral vasodilatation and later signs of the nervous system such as tremors and seizures (MOON, 2001; MUJSCE, 1989).

Due to the clinical manifestations mentioned and the reduced glycemic value measured by the glucometer, the diagnosis of neonatal hypoglycemia is obtained. The ideal treatment is the application of dextrose of 5-10% intravenously (0.5 to 1.0 g/kg for 1 minute), however the intervention of glucose (2 to 4 mL/kg) through the nasogastric tube is allowed. The glycemic index should be monitored constantly when treatment is established to avoid overdoses that cause hyperglycemia in the newborn (MOON, 2001).

It is noteworthy the immaturity of neonates in relation to low aptitude for hepatic gliconeogenesis, absence of lipolysis due to low muscle mass, scarce metabolic capacity and limited glycogen reserve (IDOWU, 2018), therefore such reduced factors make the neonate require glycogen from feeding immediately after birth (DAVIDSON, 2003; MOON, 2001).

FINAL CONSIDERATIONS

In the neonatal routine there is a high mortality rate of puppies and the knowledge of the peculiarities of the physiology of the newborn contributes to the early perception of any disorders that may occur with these animals, such as the neonatal triad, which is a severe disease that can cause hypothermia, hypoglycemia and dehydration and its diagnosis can be made through general physical examination. To avoid an erroneous evaluation of the clinical signs that can compromise all the health status of the puppy the veterinarian must be aware of the body temperature, degree of hydration and glycemic level, with that, he must take all the appropriate measures so that the homeostasis returns and the death is avoided. Therefore, veterinary neonatology requires a lot of effort and perspicacity from professionals, in order to guarantee all the demands that the neonate requires to develop..

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