

Topical Review

Topics in the Routine Assessment of Newborn Puppy Viability



Flávia Gardilin Vassalo, DVM, MSc^a, Carla Regina Barbieri Simões, DVM, MSc^b, Mateus José Sudano, PhD^c, Nereu Carlos Prestes, PhD^b, Maria Denise Lopes, PhD^b, Simone Biagio Chiacchio, PhD^a, Maria Lúcia Gomes Lourenço, PhD^{a,*}

Keywords:
neonate
small animals
canine
Apgar score
blood gas
neonatal reflexes

Neonatal veterinarians still observe higher mortality rates among their patients than those observed among humans. Establishment of a neonatal assessment protocol is fundamental to the identification of the medical status of the neonate and the need for medical intervention. The neonatal Apgar score evaluation, which is commonly used in clinical practice, should be complemented by other methods of analysis. This study proposes, in addition to an Apgar score analysis, the evaluation of laboratory parameters and weight. We believe that knowledge of these reference values is essential for diagnosing at-risk neonates and for establishing suitable treatments.

© 2015 The Authors Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

^aDepartment of Veterinary Clinical Sciences, State University of São Paulo, Botucatu, Brazil

^bDepartment of Animal Reproduction and Veterinary Radiology, State University of São Paulo, Botucatu, Brazil

^cLaboratory of Genetics and Animal Breeding, School of Veterinary Medicine, Federal University of Pampa, Urugaiana, Rio Grande do Sul, Brazil

*Address reprint requests to. Maria Lucia Gomes Lourenço, Department of Clinical Veterinary, School of Veterinary Medicine and Animal Science, Rubião Júnior District, 18618-970, Botucatu, São Paulo, Brazil.

E-mail: mege@fmvz.unesp.br (M.L.G. Lourenço)

Introduction

In veterinary medicine, the neonatal mortality rate ranges from 17%–30% in dogs and is the highest during the first 7 days of life.^{1–4} Neonatal mortality is associated with several factors, including stillbirths, maternal neglect, and agalactia as well as congenital and acquired conditions³; however, many losses are a result of inadequate reproductive management and could be avoided. A study of 1342 neonates reported that 91% of the pups were alive until weaning, which presumably reflects adequate reproduction management.¹ The survival rate is related to the qualifications of the medical staff involved, the number of neonatologists, and the hospital infrastructure in humans.⁵

The evaluation of human neonates is performed based on the Apgar score, which aims to facilitate the clinical evaluation of the newborn at the time of delivery and to target neonatal resuscitation interventions. It is the method most employed in the immediate identification of the status of the child at birth.^{6,7} The index is based on the evaluation of 5 vital clinical signs, including heart rate, spontaneous breathing, muscle tone, grimace, and the appearance of the mucous membranes, and each criterion is evaluated on a numerical scale from 0–2. A score of 7–10, obtained by the sum of all vital signs, is considered adequate, a score of 4 to 7

indicates that resuscitation may be required, and a score below 3 is an indication for emergency care. Low scores are associated with congenital anomalies, low birth weights, and higher mortality rates.^{6–9}

The Apgar score in pups from eutocic births reflects an initial depression of the vital functions immediately after birth, possibly because of the transition to extrauterine life. However, adequate recovery occurs within 5 minutes and is maintained an hour after birth.¹⁰ It is proposed that newborns require a short period of time to adapt to extrauterine life, during which spontaneous respiration and organic adaptation of the functions previously performed by the placenta can be established.^{11,12} However, the mortality rate 2 hours after birth is higher in newborn canines with an Apgar score of 0–6 compared with those with a score between 7 and 10.⁶

The objective of the present study was to describe an evaluation protocol based on the Apgar score in association with clinical and laboratory parameters.

Materials and Methods

This study was approved by the Ethics Committee of the Faculty of Veterinary Medicine and Animal Science, State University of São Paulo.

The study included 27 adult dogs of various breeds, 1–10 years of age. Female dogs were divided into 2 groups: those who had a

This research was supported by FAPESP, Brazil Grants 2012/03234-0 and 2012/10689-3.

Table 1
The Modified Apgar Scoring System Used in This Study⁶

Parameter	Weak (0 Score)	Moderate (1 Score)	Normal (2 Score)
Heart rate	< 180 bpm	180-220 bpm	> 220 bpm
Respiratory rate	No crying/ < 6 mpm	Mild crying/ 6-15 mpm	Crying/ > 15 mpm
Reflex irritability	Absent	Grimace	Vigorous
Motility	Flaccid	Some flexions	Active motion
Mucus color	Cyanotic	Pale	Pink

normal birth ($n = 11$, 49 newborns) and those that required a cesarean delivery ($n = 16$, 55 newborns).

Normal birth was defined as puppies born spontaneously without any type of assistance, including obstetrical assistance. All females were monitored during labor.

Females were submitted for cesarean delivery if there was no response to drug therapy or to obstetric maneuvers to correct dystocia. Anesthetic induction was performed with propofol followed by epidural anesthesia with lidocaine and maintenance with isoflurane diluted in oxygen. During the cesarean delivery, fetuses were separated from the placenta, and the umbilical cord was cut and cross-clamped. Neonatal assistance was provided immediately after birth.

The evaluation of neonatal viability was similar in the 2 groups. We evaluated the modified Apgar score proposed by Kustritz¹³ and Veronesi et al.⁶ The evaluation of heart rate was performed using a vascular Doppler ultrasound. The respiratory frequency and breathing patterns of the neonate were noted, and reflex irritability was checked by a painful stimulus. Muscle tone was determined with the neonate in a supine position by observing active movements and responses to passive movements of the limbs. The appearance of the mucous membranes was assessed by

visualization of the oral mucosa. Each parameter was scored on a scale from 0–2, and the total score was the sum of these (Table 1).

Neonatal reflexes (suckle, rooting, and righting reflexes) were also assessed at birth and 60 minutes later (Fig). The suckle reflex was elicited by inserting the clean tip of the smallest digit of the examiner into the mouth of the neonate and assessing the suckling force; the righting reflex of the neonate was assessed by placing it on its back on a soft surface and verifying that it returned to the right recumbence. The rooting reflex was assessed by approaching the nose of the neonate with a hand shaped into a circle with the forefinger and thumb and checking whether the neonate inserted its nose into the circle. The reflexes were scored on a scale from 0–2, and the total score was their sum. Joint analysis of all reflexes was used because the presence of one reflex alone does not ensure neonatal survival. The interpretation of the score was as follows: 0–2, weak viability; 3 and 4, moderate viability; and 5 and 6, normal viability (Table 2).

The rectal temperature was measured with a digital thermometer, and the neonates were weighed using scales (in grams) both at birth and 60 minutes later.

After determination of the Apgar score and neonatal reflexes, a blood sample (0.1 mL) was drawn by jugular puncture with a 1-mL syringe and a 26-G needle. All laboratory assessments were performed at the site of the birth, and the results were used to determine whether the newborns required emergency treatment.

The evaluations were performed with an i-STAT Portable Clinical Analyzer (ABBOTT) with an EG7 cartridge for blood gas analysis (ABBOTT). The following parameters were assessed: blood pH, partial pressure of oxygen and carbon dioxide (pO_2 and pCO_2 , mmHg), sodium (Na, mEq/L), potassium (K, mEq/L), ionized calcium (iCa, mmol/L), hematocrit (Hto), hemoglobin (Hgl, g/dL), base excess (BE, mmol/L), sodium bicarbonate ($NaHCO_3$, mmol/L), total carbon dioxide (TCO_2 , mmol/L), and oxygen saturation (SO_2). A determination of lactate (mmol/L) and glucose (mg/dL) levels

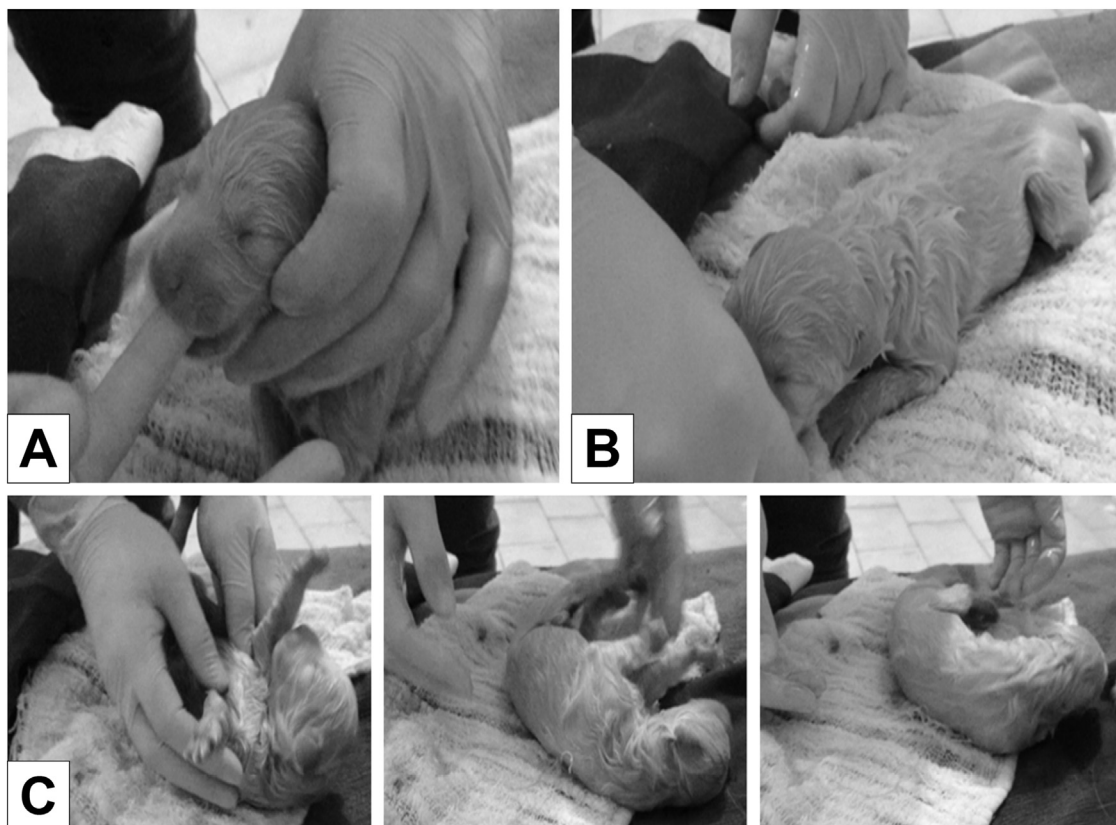


Fig. Demonstration of suckling (A), rooting (B), and righting reflexes (C) in a neonate.

Download English Version:

<https://daneshyari.com/en/article/10961924>

Download Persian Version:

<https://daneshyari.com/article/10961924>

[Daneshyari.com](https://daneshyari.com)