Neonatal Care in Camelids

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The newborn goes through dramatic changes in its physiology during the first few hours after parturition but it has been progressively prepared for these changes during the last few days of pregnancy and during the process of birth. The process of fetal maturation or readiness for birth, involves all the organs and especially the respiratory and cardiovascular systems. Therefore, any complication during the last phases of pregnancy or during parturition can compromise the ability of the newborn to survive. The early detection of compromised respiratory and cardiovascular functions, and the prevention of complications due to exposure to physical and infectious factors from the environment, increases the chances of survival. Thus the importance of evaluation and primary care for the newborn is essential for the reduction of neonatal mortality, the major cause of production loss in camelidae.

All camelidae are born in a relatively advanced stage of development and should be relatively active and capable of holding their heads up high as well as standing, nursing and walking unaided within a few minutes to one hour after birth. The offspring should be evaluated as soon as it is expelled and the initial examination at this time should focus on its maturity since a premature or dysmature newborn is often weak and may have a silky coat, floppy ears and exhibit hyperextension of the limbs and neck and dyspnea (Fig. 1).

Figure 1. Premature dromedary. Typically recognized by small size, silky hair coat and extreme laxity of the joints. - To view this image in full size go to the IVIS website at www.ivis.org.

A unique characteristic of camelids is the development of an extra membrane of fetal epidermal origin called "the epidermal membrane" [1,2]. This membrane covers the neonate and is attached at muco-cutaneous junctions but does not cover the nostrils or mouth so there is little danger of suffocation. It is also very friable and can be easily removed with only the slightest friction. Close examination of this epidermal membrane is very helpful in evaluating prematurity and the degree of stress in the newborn dromedary. In premature camelidae the membrane is firmly attached to the extremities, and in case of dystocia or prolonged birth, the epidermal membrane becomes yellow because of the increased defecation and even diarrhea of the fetus [3,4].

The most important parameters in the evaluation of the newborn are birth weight, heart rate, type and rhythm of respiration and body temperature. The average normal birth weight ranges from 30 to 42 kg in the dromedary and Bactrian camels respectively. The heart rate is usually very high at birth 80 to 120 beats, but respiration should be a regular 20 to 30 breaths per minute. Signs of respiratory distress include open mouth breathing (gasping for air), or heavy breathing due to collapsed lungs, presence of fluids or choanal atresia. Normal body temperature varies from 37.5°C to 39°C but the newborn may show shivering during the first few hours after birth, which is quite normal. The suckling reflex is usually shown within the first half-hour after birth with increased salivation and it is important to regularly weigh the calf (every day for the first 2 weeks and every other week thereafter) in order to determine the adequacy of milk intake. All newborns should also be examined for any signs of congenital abnormalities in particular abnormal limb development, atresia ani, cleft palate, abnormal reflexes and blindness [4].
Adequate postnatal care increases the chances of survival of the newborn and should include preventive measures against infection and exposure to environmental stress. Prevention of infection in the newborn starts before birth and should be continued during and after birth. All dams should be vaccinated against tetanus and *Clostridium perfringens* (type C and D) during the last month of pregnancy to insure adequate amount of colostral antibodies at parturition. Prevention of infection during birth relies on good management of the parturient including a clean environment at parturition and aseptic obstetrical manipulation. The parturition pen should be regularly cleaned and close to a source of light in case manipulation is required. Immediately after delivery, the umbilicus should be tied and dipped in 7% iodine tincture for protection against umbilical infections (Fig. 2). If the birth does not occur in a clean area, it is advisable to clean the umbilicus with chlorhexidine solution or soapy water and dip or spray it with regular strength betadine solution. The umbilicus should be examined regularly in the first few hours for the presence of abnormalities (herniation or hemorrhage).

Figure 2. Initial newborn care includes, disinfection of the umbilical cord with iodine tincture, regular observation for umbilical hemorrhage and sufficient colostrum intake in the first 18 hours of life. - To view this image in full size go to the IVIS website at www.ivis.org . -

*Camelidae* are born agammaglobulinemic because of the lack of placental transfer of immunoglobulins. They rely exclusively on passive immunity absorbed from maternal colostrum for their protection against infection during the first weeks of their life. The lack of transplacental transmission of immunoglobulins and the importance of colostrum intake is well illustrated in the newborn camelid by the increase in total protein and serum IgG and IgM concentrations by 24 hours after birth [3,4]. The duration of the ability of the intestine to absorb colostral immunoglobulin is not known exactly in the *camelidae*, however, work in llamas and alpacas suggests that absorption is possible during the first 24 hours of life, with the maximum absorption being achieved during the first 8 to 12 hours. Failure of passive transfer of colostral immunoglobulin is the major factor in neonatal mortality in alpacas and probably also in other *camelidae* [5-8]. Therefore, evaluation of the passive transfer of immunity is very critical in the management of newborn *camelidae*. Measurement of total serum proteins (refractometry) can be a useful quick test to estimate colostral transfer of immunoglobulin, however, this test can be affected by several factors such as dehydration and all should be compared to a positive control (dam serum or normal newborn). Single radial immunodiffusion (SRID) is a quantitative test that specifically measures serum IgG concentrations and is available in kits for llamas and alpacas [9]. Such tests are species-specific and are not yet available for camels. Semi-quantitative tests include sodium sulphite precipitation, measurement of total serum protein and globulin concentration, total solids by hand-held refractometer, zinc sulphate turbidity, and glutaraldehyde coagulation.

The minimum amount of colostrum needed by camelids is not known and recommendations are made based on research done in calves, which require 100 grams of IgG. Newborn camel calves should receive 10% of their body weight in colostrum, preferably within the first 12 hours after birth, with half of this amount given in the first 6 hours after birth. Many factors such as cold weather or heat stress, lack of mothering, delivery by caesarean section and metabolic disturbances can can negatively affect the absorption of immunoglobulin. If the dam does not have enough colostrum, and no other camel colostrum is available, then cow or goat colostrum may be used as a substitute.

In normal circumstances, the calf is left with the dam once it has been determined that the dam is producing colostrum. This is important because maternal bonding enhances absorption of colostrum. The pair should be discretely monitored to ensure that the calf learns to latch on to the teats, especially if it is a primiparous dam or a dam with an engorged, painful udder. If the calf is not seen suckling by 3 hours after birth, then colostrum should be milked out and bottle-fed to the calf and if the calf has a poor suckling reflex, administration of colostrum should be done via intubation. If failure of passive transfer is suspected after the first 12 hours of life, a plasma transfusion is recommended. Plasma (10 to 20 ml/kg) can be given either intravenously (i.v.) or intraperitoneally (i.p.) at a rate of 100 - 200 ml/hr (i.v.). The calf is at high risk for developing infection and should receive prophylactic broad-spectrum antibiotics such as Ceftiofur sodium. Intensive care may be necessary in severely depressed newborn *camelidae*. The severity of hypoglobulinemia as well as state of hydration should be estimated, and the animal should be examined for any signs of retardation or abnormal development including congenital abnormalities, which will preclude this treatment. A venous catheter should be placed immediately, and in a sterile manner, in the jugular vein and should be changed every 72 to 96 hours. Compromised newborns require immediate attention for respiratory distress, hypothermia, hypoglycemia and hypoglobulinemia. In the absence of nursing blood glucose is very low and should be treated by infusion of 10% and then frequent monitoring and re-evaluation of electrolytes, acid-base status and glucose of the neonate is required. Dysmature animals are usually hypokalemic and hypochloremic with sometimes a mild hyponatremia, but most of these imbalances can be corrected by 0.9% saline solution or a balanced electrolyte solution with potassium (10 to 20 mEq/l) and (5 to 10%) added to the intravenous fluids. Serum potassium levels usually underestimate replacement requirements, so in severe hypokalemia, additional KCl should be given.
orally. There are no clear guidelines as to the amount of fluids to be administered to the neonate, therefore, treatment should be accompanied by close monitoring of the state of hydration, urination, weight gain and pulse quality. Parental nutrition should be substituted progressively by oral feeding with milk or milk replacer. Metabolic acidosis is the most common acid-base disturbance in the neonate and is promptly corrected by volume expansion with a balanced electrolyte solution. Normal arterial blood gas values have not been established for camelidae neonates but hypoxia is a common component of prematurity, dysmaturity, prolonged recumbency, pneumonia and septicemia. These conditions may require oxygen therapy by face mask, oxygen cage, or nasal catheter and even positive pressure ventilation if the neonate is severely affected. Administration of nonsteroidal anti-inflammatory drugs should be kept to a minimum because of the risks of development of gastroduodenal ulcers. The immuno-compromised neonate is very susceptible to infection and septicemia and many practitioners suggest antibiotic therapy as part of the intensive care management. However, some antibiotics and in particular aminoglycosides can severely impair renal function. Vitamin E-selenium preparations can be given intramuscularly to neonates born in selenium deficient regions [3].

References


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