

# Practical Tips for Resuscitation of the Newborn Calf

Dr Dinesh Kumar Singh

Associate Professor and Head of Department of Pathology and Clinics, IAAS, Rampur, Chitwan

Newborn calf is the future cow. Adequate resuscitation of the newborn is critical to decreasing calf losses in dairy herds. Despite the importance, there is little critically evaluated data available to aid in protocol development. Life of calf in utero to an outside environment is the initiation of respiratory movements which involve lung inflation and subsequent oxygenation of blood. The circulatory system changes from one that delivered oxygen from the placenta via the umbilical veins to an adult pattern relying on pulmonary oxygenation of blood. Dystocia is the measure risk factors of perinatal losses, around 70% losses occurs at or after calving. For calves born with no heart beat, resuscitation is likely to fail. Other calves will be born with a heartbeat, but will not be breathing these calves are good candidates for resuscitation. Before going to practical consideration of resuscitation, basic pathophysiology should be clear.

## Acid-base pathophysiology at birth

At time of birth, after rupture of umbilicus, there is hypoxia and increase in partial pressure of carbon dioxide causing stimulus for lung inflation, thus mild respiratory acidosis is common during normal birth. But during dystocia, normal acid base is compromised and there is severe hypoxia causing less tissue perfusion leading to anaerobic respiration and formation of lactic acid and thus metabolic acidosis developed. Severe metabolic acidosis together with respiratory acidosis leads to death. Severe acidosis has a bad effect on both respiration and cardiac function. It also reduces calf vigor, strength of the suck reflex and impairs absorption of immunoglobulin, hence lessening the chances of long-term survival. The chief signs in the newborn calf are neurological in nature. In the healthy calf, respiration should be initiated

within 30 seconds of delivery. The healthy calf will raise its head within a few minutes and soon achieve sternal recumbency within 2 to 6 minutes. A sternal recumbency greater than 15 minutes is indicative of bad prognosis. The presence of muscle tone and a pedal reflex is indicative of a well oxygenated calf with a fairly normal acid-base status. The presence of petechial haemorrhages in the sclera and conjunctiva is indicative of severe hypoxia and acidosis and carries a guarded prognosis.

## Practical tips for resuscitation

Before inflating lungs, the airways should be clear and this can be done with passing cuffed endotracheal tube having size of 7.0 to 9.5 mm. Alternatively hanging the calf upside down over a gate or stable door and allowing fluid to drain out, but latter procedure sometime cause pressure on compromised lungs. After that positive pressure ventilation (PPV) should be done. Calf should be placed in sternal recumbency so the both side 8. lungs field are ventilated. The simplest way of performing PPV is by blowing into the endotracheal tube and gently inflating the lungs while taking care not to overinflate them. Hopefully, the calf will convert to a normal neonatal respiratory pattern after a few inflations although some calves will require ventilation for longer. It must be stressed that an oxygen giving set is not required for PPV because the primary objective of PPV is to establish a respiratory rhythm rather than to treat hypoxia. Once the calf breathing normalizes, the other objective is to correct metabolic acidosis due to lactic acid production. One thing to keep in mind that before correcting metabolic acidosis, the calf breathing should be normal because administering the soda-bicarbonate for correcting metabolic acid produces

carbon-dioxide which worsen the respiratory acidosis. The bicarbonate should be measured before administration but it is not possible in the fields. It may be administered safely as a bolus injection of 50 to 100 ml of 8.4 per cent (M) sodium bicarbonate solution (35 g dissolved in 400 ml of lukewarm water). A 16 gauge 3.5 inch catheter should provide adequate access in any size calf for intravenous fluid therapy.

In animals with profound hypovolemia, dropping the head below the level of the heart may help to facilitate jugular filling for catheter placement. Administration of hypertonic (7%) saline (4 ml/kg IV slowly) will temporarily increase intravascular volume and aid in IV catheter placement. If there is poor response of above treatment or hemorrhage before or after birth, the volume expansion is needed. For this, 500 ml colloids like Haemaccel (Hoechst) and Seraccel (serum international) can be given. Latter crystalloids like lacted ringers's solution can be given intravenously.

If animal is suffering from hypoglycemia, glucose may be administered intravenously as a 10 percent solution at a dose rate of 3.5 ml/kg. Administration of colostrum soon after birth will reduce the likelihood of hypoglycemia development. In the field, human glucometer can be used to measure glucose concentration in blood. It is recommended that all calves are given adequate amounts (2 to 3 litres) of colostrum within the first six hours of life. Since a calf that has had a hard time during birth is unlikely to suck during this period, it is advisable to feed colostrum via a stomach tube within one hour of birth if there is any doubt about the calf's vitality.

#### **Additional procedure**

1. Using a clean, dry towel, rub the calf from rump to head along the backline.
2. Using a clean, dry towel, rub the calf's head by the ears and eyes.
3. Take a piece of clean straw and place it in the forefront of the calf's nostrils.

4. Take a piece of clean straw and, using the end, poke it in the center front of the calf's nose.
5. Dribble ice water on the back of the calf's head or just a small amount inside the calf's ear
6. Acupuncture insertion and rotation of a needle in the Jen Chung acupuncture point, one third of the way down the nasal philtrum (nasal septum) may stimulate respiration
7. Attempts to create negative intrathoracic pressure by 'pumping' the chest and costal arch with the foreleg while the calf is in lateral recumbency.
8. Attention must be paid to keep the calf warm in order to avoid the development of hypothermia. A recent study revealed that calves exposed to an infrared heater for 24 hours postpartum had significantly improved rectal temperature. In our condition heating of calf can be done with local methods.

#### **References**

- Nagy, DW, 2009. Resuscitation and critical care of neonatal calves. CVC IN KANSAS CITY PROCEEDINGS WHITE, D G, 2000. Resuscitation of the new born calf. In Practice, November 13
- Radostitis OM, Gay CC, Blood DC and Hinchclife KW, 2003. Veterinary Medicine. A text book of the disease of cattle, sheep, pigs, goat and horses. 9th ed.