Preventing the negative effects of dystocia on the newborn calf

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Up to a third of dairy calves are born following dystocia. Dystocia can cause foetal trauma due to traction on legs and pressure on the body during pulling and while passing through a tight birth canal. As a result, rib fracture, haemorrhages and liver rupture are common. In addition, calves may suffer from hypoxia and subsequent acidosis due to early rupture of the umbilical cord. After they have been born, they have to adapt quickly to a much colder environment, while the body is struggling to maintain homeostasis. Above all that, they start life with an important deadline: the need to suckle colostrum within four hours in order to aid in the prevention of disease and death.

Is the calf in pain?

While it is often acknowledged by veterinarians that the cow suffers after dystocia, pain management hardly ever focuses on the calf. It is sometimes assumed the calf is not able to feel pain yet.

However, newborn calves may actually have an increased cerebral response to pain. This may be because of the increased blood oxygen and somatosensory stimulation, causing rapid activation of awareness at birth.

Failure of immune transfer

When calves are suffering from pain after calving assistance, they are less motivated to stand and suckle. Murray et al. (2014a) found that calves born following dystocia were more acidotic and took longer to attain sternal recumbency and stand, compared to calves born unassisted.

If the calf is not able to get up in a timely manner following birth, this may lead to a delay in colostrum intake. Thus, dystocia is a major cause of failure of transfer of maternal immunity.

Colostrum intake in calves with distress can be reduced by up to 74% during the first 12 hours. It seems, however, that not only the timing and quantity of colostrum ingested are important.

There are also some indications that the absorption of antibodies from colostrum may be impaired in calves with acidosis resulting from a difficult calving. Calves born following dystocia that were fed the right amount of good quality colostrum, had lower passive transfer of immunity, than calves born after normal calving.

Failure of passive transfer is the main reason why dystocic calves have increased morbidity and mortality. The increased susceptibility to disease is not limited to the days or weeks after birth. Even after weaning, these calves have a higher risk of respiratory disease or diarrhoea.

Several studies have also reported

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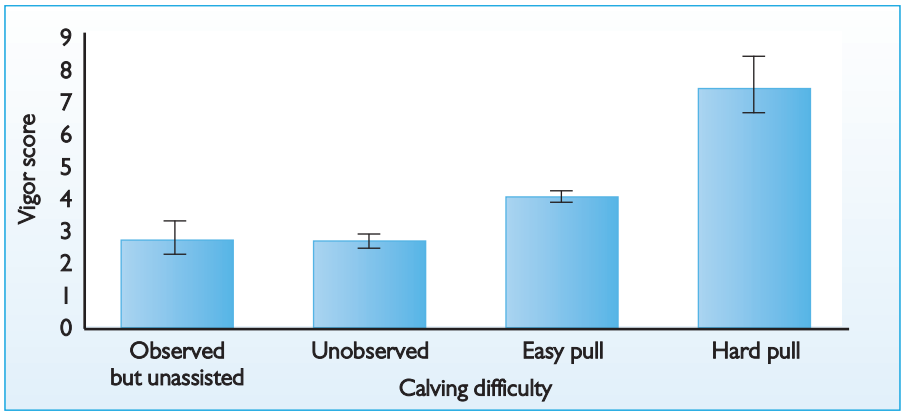
Fig. 1. Calves born following a hard pull have significantly worse vigor. Newborn vigor was measured using a scoring system developed by researchers at the University of Guelph (see Fig. 2). In this scoring system, higher score means worse vigor.



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decreases in milk production and increased culling rate during the first lactation.

Reduced average daily gain

Beef calves born after an assisted calving have reduced average daily gains until weaning. In dairy calves, a similar relationship has been found.

Calves born in a backwards position requiring assistance had lower average daily gains up to eight weeks of age, compared to calves born in a normal forward position. Furthermore, calves with lower vigor at birth had reduced weight gains up to six weeks of age.

Other factors that affect weight gain in pre-weaning dairy calves include:

- Being born in the winter.
- Receiving less than two litres of colostrum.
- Lower body temperature in first week.
- Reduced health.

Failure of passive transfer of immunity is linked to:

- Neonatal morbidity and mortality.
- Reduced average daily gain.
- Increased susceptibility to disease (intestine, lungs).
- Decreased milk production.
- Increased culling rate during the first lactation.

Fig. 2. Explanation of the VIGOR score as described by researchers at the University of Guelph, Canada.

Visual appearance
- Meconium staining
- Oedema of tongue and head

Initiation of movement
- Attempts to stand

General responsiveness
- Head shake in response to straw in nasal cavity
- Tongue pinch
- Eye reflex in response to touching eyeball

Oxygenation
- Mucous membrane colour
- Length of tongue

Rates
- Heart rate
- Respiration rate

NSAID's have been suggested to help the calf overcome pain and inflammation resulting from a difficult calving. This could reduce time to standing, increasing colostrum uptake and potentially calf survival.

Recently, two research trials have been conducted in Canada investigating the effects of dystocia on newborn calf vigor, as well as the efficacy of meloxicam NSAID therapy on the improvement of newborn vigor, health and performance in Holstein calves. In each of these trials, newborn vigor was assessed using a special scoring system at the time of discovery of a newborn calf. Following vigor assessment and before colostrum feeding, each calf received either a dose of the long acting NSAID meloxicam (Metacam, Boehringer Ingelheim) or a placebo solution, subcutaneously.

Two hours after treatment with meloxicam or placebo, a subset of calves were assessed again using the same vigor measures. Furthermore, health scores and weights were collected on all calves throughout the pre-weaning period.

Greater improvement

Calves that received Metacam following birth had a significantly greater improvement in vigor and suckling reflex from the first to the second assessment, two hours later.

In addition, Metacam treated calves had greater milk intakes. With improved vigor, suckling reflex and milk intakes in Metacam treated calves, it is logical that improved growth rates would follow.

In calves born with assistance, Metacam treatment resulted in improved weight gains from their first to second week of life.

Furthermore, calves treated with meloxicam had significantly better overall health up to six weeks of age, after accounting for other variables in a statistical model. Calves with better health also had improved weight gains. Thus, greater weight gains in meloxicam treated calves may be a result of improved calf health, vigor and milk intakes.

Conclusion

The negative effects of dystocia on a calf go beyond the first 24 hours of life. Pain following dystocia leads to reduced calf vigor and failure of passive transfer, leaving them susceptible to disease and death. Furthermore, failure of passive transfer has long term negative outcomes such as decreased production and higher risk of culling in the first lactation. NSAIDs, such as Metacam, may help calves that struggle in their first hours after birth. NSAID therapy may motivate calves to stand up earlier and drink more colostrum, improving health, growth and survival. ■

References are available from the authors on request

Fig. 3. Calves that received Metacam after birth had a better health score up to six weeks of age than placebo-treated animals (lower score = less disease events).