Dystocia in cattle: effects on the calf

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A difficult birth can negatively impact the health, performance and survival of dairy calves, so reducing overall levels and severity of dystocia is important to animal welfare as well as to the economics of the farm

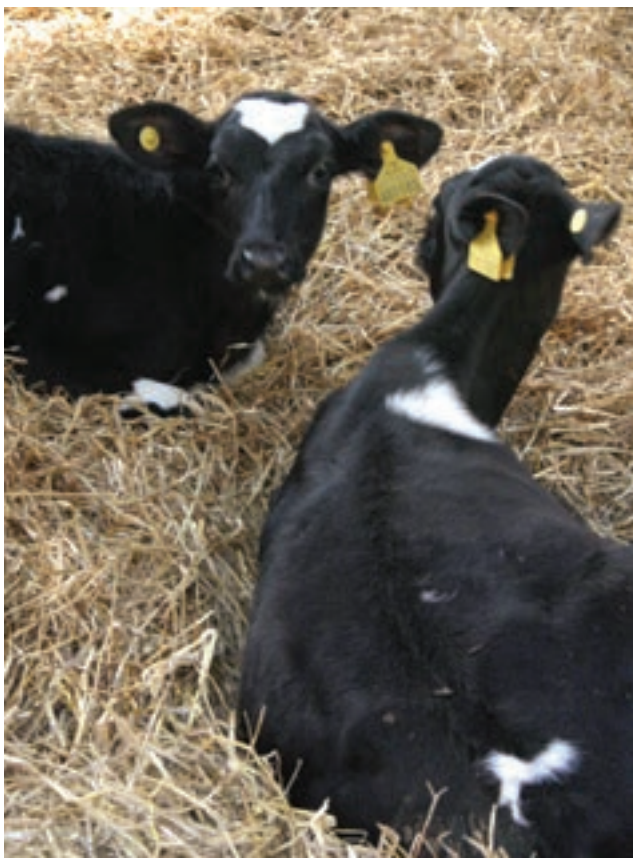
INTRODUCTION

On any dairy farm, the birth of a calf marks the start of the productive period of lactation. At this time, most farmers are focused on the health and productivity of their lactating cows. This is clearly very important, but it is also important not to overlook the health and wellbeing of the calves, as some of these animals will eventually enter the milking herd. In calves, respiratory and digestive disorders are major health and welfare problems. However, this article will describe the findings of a series of studies investigating the effect of a dystocial birth on the health, growth and welfare of dairy calves.

DYSTOCIA

A difficult or dystocial birth often means that assistance must be provided during delivery. It is difficult to assess the internal state of the cow in terms of what pain or discomfort she experiences so, from a practical point of view, dystocia is normally described in terms of the level of assistance that is required. The scale typically ranges from no assistance (or unobserved), to some assistance by the farmer or vet and through to caesarean section. Internationally, reported prevalence of severe difficulties in dairy cattle varies from two per cent to 22 per cent. However, assistance at calving (including lower degrees of difficulties) is much more prevalent, varying from 10 per cent to over half of calvings across countries, breeds and farms.[1] In the UK, 16 per cent of calvings are assisted on average.[2] There is a notable difference between the prevalence of dystocia in heifers and older cattle, with difficult calvings more frequent in heifers than in cows.[1] The most common cause of dystocia is a physical incompatibility between the pelvic size of the dam and the size of the calf (foeto-pelvic incompatibility). Because of this, a high calf birthweight is known to be an important risk factor for dystocia, as well as the choice of sire, breed and length of gestation. It also follows that male calves are also more likely to experience a dystocial birth because of their higher birthweight. Pelvic size is influenced by the stage of maturity of the cow, so a smaller size of pelvis contributes to the higher prevalence of dystocia in heifers. Foetal malpresentation, incomplete dilation of the vulva and cervix, and the presence of twin calves are also major risk factors.[3]

The effects of dystocia on the cow have been studied quite extensively. Dystocia is associated with a reduction in milk yield in the subsequent lactation, and poorer cow fertility.[4,5,6] Higher culling rates have also been observed, which have negative consequences for farm economics as well as for cow welfare.[1,4] In general, however, there has been less attention paid to the effects of a dystocial birth on the surviving calf. There are a number of areas where the calf might be affected by a dystocial birth, and studies have investigated growth, survival, health and welfare. Some of the results presented here are from a project run at Scotland's Rural College (SRUC) at the Dairy Research Centre, Dumfries, Scotland, investigating the effects of dystocia on the health, performance and welfare of dairy calves and cows.



SURVIVAL AND GROWTH

A number of studies have shown that the calf or twin calves are more likely to be stillborn or die shortly after a difficult birth.[7,8] The main causes of perinatal death following dystocia are asphyxia or trauma.[3] In our study,

stillbirth rates were up to seven-to-eight times higher in calves delivered after a very difficult calving than calves born from a normal birth.[8] Other studies have shown that assisted deliveries may result in rib and vertebral fractures.[3] In a study from our project, post-mortem examination of stillborn calves born with and without assistance showed that large bruises were only exhibited in assisted calves and a greater proportion of these animals had haemorrhages compared to non-assisted calves.[8]

In the longer term, survival to weaning is also affected.[7] Even if the calf is not stillborn, we found that liveborn calves from dystocial births have a 2.8 times greater risk of dying compared to calves from a normal birth.[9] Figure 1 shows that mortality was much higher in the assisted groups in the study in the period from birth to weaning in liveborn calves. Survival to the age of first breeding or service has also been shown to be affected, with higher mortality rates among animals experiencing a dystocial birth.[10,11]

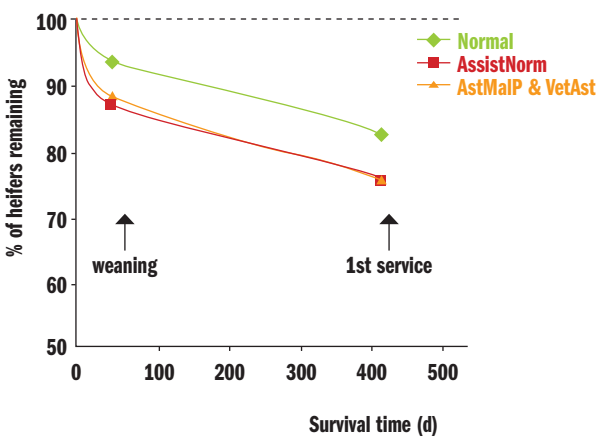


Figure 1: Graph showing percentage survival from birth to first breeding of live-born heifer calves from three levels of dystocia (normal; assisted with normal presentation [AssistNorm]; and assisted with malpresentation [AstMalP] and assisted by vet [VetAst] grouped together).

In contrast to survival, growth rates did not appear to be affected by dystocia, as we found no evidence of an effect of a difficult birth on growth from birth to first breeding.[9] We assume this might have been because calves that survive to first breeding were least affected by a dystocial birth, or that good calf care and management on the farm compensated for any lasting effects of dystocia. Alternatively, the sample became too small over time to detect an effect in our study as there was also a large variation in growth and survival in calves from a normal birth.

CALF VIGOUR AND NEONATAL STRESS

We can assume that the increased mortality in the early neonatal period is due to impacts on the biological functioning of the animal. Dystocia can cause hypoxia and acidosis in the calf, which can be fatal. For those that survive, there may be other effects that adversely affect functioning and health. We assessed levels of stress hormone in neonatal calves and found that calves born with assistance had up to four times higher cortisol levels in the first 24 hours of life, compared to calves born without assistance (Figure 2), indicating higher biological stress in the dystocial calves as they adapt to their postnatal environment.[9]

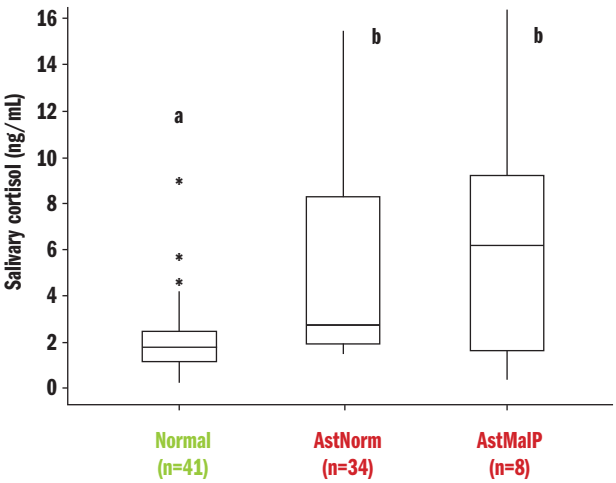


Figure 2: Box plot showing levels of salivary cortisol in calves born from a normal birth (Normal), an assisted birth with a normal presentation (AssistNorm) and an assisted birth with malpresentation (AssistMalP). Different letters indicate statistically significant differences between the groups.

In the neonate, passive immunity is acquired from immunoglobulins in the colostrum, but the capacity of the gut to absorb immunoglobulins decreases rapidly after birth. Prompt suckling after birth maximises the acquisition of passive immunity. Therefore, good neonatal vigour is vital to allow the calf to stand and reach the udder. This is important even on dairy farms where artificial colostrum is fed, as the timing of the birth may not always allow colostrum to be fed within the few critical hours after birth. High neonatal vigour has been associated with improved survival and growth in lambs.[12] We used video recordings to compare the behaviour of calves from non-assisted and dystocial births in the first three hours after birth. The results showed that assisted calves were less vigorous and took longer to attempt to stand, to achieve standing, to walk and to reach the udder than unassisted calves (Table 1). Assisted calves were not less likely to suck, nor was there a difference in the time taken to achieve a successful suck than non-assisted calves. However, only a third of assisted animals achieved successful suckling within three hours of birth, which is very low. These differences were not due to the behaviour of the dam, as there was no difference between assisted and unassisted dams in the level of maternal behaviour shown.[13] This suggests that calves from a difficult birth have lower vigour. Although this did not prevent suckling in this study, it does suggest that after a difficult birth, calves have difficulty getting to the udder, which will have adverse effects on nutrition and immune status.

Table 1: Differences between calves from assisted and non-assisted births in time from birth to first performance of important 'landmark' neonatal behaviours.

Median latency to first event (min)	Non-assisted	Assisted	P-value	Difference between the groups (mins)
Sternal recumbency	9	9	n.s	0
Attempt to stand	12.1	36.7	0.009	+24.6
Stand	70.1	99.4	0.025	+29.3
Walk	86.4	166.4	0.034	+80.0
Reaches udder	102.1	>180	0.016	>77.9

Reinforcing the role that dystocia has on the ability of the calf to get adequate access to colostrum, a zinc sulphide turbidimetry test showed that assisted calves had lower levels of immunoglobulins in the blood than non-assisted calves. However, all calves, assisted or not, had relatively low levels, indicating non-optimal transfer of passive immunity. By following the calves through the first months of life, it was also shown that calves born from a more severe dystocial birth (malpresentation) received more health treatments from the farm staff than those with normal births or less severe dystocia,[9] indicating an overall poorer standard of health.

CONCLUSIONS AND IMPLICATIONS

In conclusion, a dystocial birth can have profoundly negative effects on the survivability, health and welfare of the calf. Reducing overall levels of dystocia, or severity of dystocia, will have positive impacts on the health and welfare of calves but also on the economics of the farm. This can be achieved by choice of sires with good calving ease ratings. Surveillance at calving time may allow appropriately timed intervention, which is particularly important for malpresentations. Calves born from difficult births may require extra care, in the form of colostrum, thermal support and healthcare.[3,14] There is also the possibility that calves from difficult births could benefit from some form of therapeutic treatment or extra care in the postnatal period. Murray et al[15] showed that use of a non-steroidal anti-inflammatory drug (NSAID; Metacam) at birth improved calf health in the first weeks of life. This perhaps suggests that the bruising and trauma seen in dystocial calves causes pain, which is reflected in the low vigour and subsequent poorer transfer of immunity that have been illustrated here. The long-term effects of a dystocial birth on the health and behaviour of calves clearly illustrates that prevention or mitigation of the effects will improve calf survival and, ultimately, farm sustainability.

ACKNOWLEDGEMENTS

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CLARIFICATION

- **In the Continuing Education article, "Eradication and control of lameness in sheep", published in the July 2014 issue of *Veterinary Ireland Journal*, the photographs of CODD, foot rot/cherry toe and scald were published courtesy of William FitzGerald.**
- **The article, "Ringworm in horses" published in the Focus section of the July issue was written by Liz O Flynn MVB Cert WEL MRCVS.**