The Welfare of Dairy Calves

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Abstract

In this review, we address calf welfare from three perspectives: improving health, reducing pain and distress and facilitating natural behavior. Four major areas of concern are reviewed: 1) calf morbidity and mortality resulting especially from poor colostrum feeding practices; 2) chronic calf hunger resulting from outdated feeding practices; 3) social isolation from other calves that can be avoided by keeping calves in small, well-managed groups; and 4) procedures such as dehorning that cause considerable pain that can be avoided using the right techniques and analgesics, or tail docking that prevents the animal from performing natural fly avoidance behaviors, and fails to provide clear advantages to either the animal or the producer. In each example, we show how research can identify solutions that improve calf welfare while remaining practical for dairy producers.

Keywords: calf, welfare, pain, health, behavior

Résumé

Dans cet article, nous présentons le bien-être des veaux à trois niveaux: l'amélioration de la santé, la réduction de la douleur et de la détresse et la facilitation des comportements naturels. Nous faisons le point au niveau de quatre sujets d'importance: 1) la morbidité des veaux et la mortalité en raison surtout de mauvaises méthodes d'administration de colostrum, 2) la faim chronique des veaux en raison de pratiques d'alimentation désuètes, 3) l'isolation sociale des veaux qui peut être évitée en gardant les veaux dans des petits groupes sous contrôle, et 4) les procédures comme l'écornage, qui engendre beaucoup de douleur que l'on peut éviter en utilisant les bonnes techniques et les bons analgésiques, et l'amputation de la queue, qui empêche l'animal de faire des comportements naturels d'évitement des mouches et qui n'est pas nécessairement avantageuse tant pour l'animal que pour le producteur. Pour chaque exemple, nous allons montrer comment la recherche permet d'identifier des solutions qui améliorent le bien-être des veaux tout en restant pratiques pour les producteurs laitiers.

What is Animal Welfare?

In this review we discuss some of the major welfare concerns for intensively managed dairy calves. But before we get into the details, let us begin with a short introduction to what is meant by 'animal welfare'. Concerns about animal welfare can be roughly divided into three categories: those that involve the biological functioning of the animal (such as its health or productivity); those that involve how the animal is "feeling" (such as the amount of pain it is suffering); and those that involve the ability of the animal to live a "natural" life.[8] Producers, and arguably many veterinarians, are typically most concerned with the biological functioning of the animal and generally focus on disease, injury, poor growth rates and reproductive problems. However, many consumers tend to be concerned more with the affective state, or emotions of the animal, and focus upon whether the animals are suffering from unpleasant feelings such as pain, fear or hunger. For others (including many consumers of organic products), a key concern is whether the animal is able to live a relatively natural life. These different types of concern can conflict. For example, housing dairy calves in groups allows them to engage in natural social interactions, but when poorly managed can lead to increased incidence of certain diseases or aggressive interactions. Different people can therefore reach different conclusions about the relative advantages of different housing systems by favoring different welfare indicators. Clearly the best solutions will be those that address all concerns, for example, by creating group-housing systems that allow calves to interact socially but avoid competition and allow calves to stay healthy. In this way, the three types of concerns can be considered as a checklist, with researchers working to identify and solve the different types of welfare issue.

Death and Disease

We can all agree that welfare is poor when animals are ill. Although death is not necessarily a cause of suffering, death as a result of illness is often preceded by pain and distress. Unfortunately high levels of morbidity and mortality are still common on dairy farms.[13,18] There

are many reasons why calves succumb to illness, but the main causes are also among the easiest to address: inadequate colostrum management; inadequate quantity, quality, or timing of colostrum intake, resulting in a reduced concentration of circulating immunoglobulins (Ig) in the blood of the calf. It is estimated that more than 30% of mortality in calves within the first three weeks of life can be attributed to this 'failure of passive transfer'.[26]

Hunger

The large majority of dairy calves are reared in a way that causes chronic hunger.[3] Calves are typically fed milk twice daily at 10% body weight, but when provided the opportunity, calves drink many times a day and consume more than twice as much milk.[1,11,24] Recent studies under commercial conditions show that higher milk intakes lead to higher weight gains, better feed conversion and reduced age at first breeding.[4,15] The extra milk can be provided by bucket, but calves are highly motivated to suck and providing milk by teat allows calves to express this natural behavior. Calves fed this way are much less likely to express abnormal sucking behavior, such as sucking on pen fixtures or other calves. This latter effect is especially important if housing calves in groups (see below).

The issue of hunger arises almost as soon as calves are separated from the cow. Vocalizations by newly separated calves can be essentially eliminated simply by providing calves more milk (or colostrum) in the hours following separation.[19] Indeed, almost all calling by calves can be associated with hunger. The greatest peak in calling happens when calves are weaned from milk onto solid feed. Using weaning methods that ease this transition to solids reduces this weaning distress, for example, weaning calves gradually over a period of several days.[25]

Social Isolation

In nature, calves spend months in close association with their mothers, but on most commercial dairies they are separated from the cow just hours after birth. Although this early separation is often put forward as a welfare problem, the research shows that early separation causes less distress to cow and calf than separation at older ages.[7]

Once calves are separated from the cow they are typically reared individually in pens or hutches. The European Union effectively banned individual housing for calves over eight weeks of age, stimulating interest in group housing systems. As reviewed below, group housing requires extra management skills to do well, but under the right conditions this can provide welfare benefits for the calf and economic advantages to the producer.[12]

Although individual housing is often recommended as a means of reducing disease transmission between milk-fed calves, large-scale epidemiological studies of health problems in milk-fed dairy calves failed to show an advantage of individual housing, although there is clear evidence that health problems can occur when group size is large.[13,18] Smaller scale studies that have isolated the effects of group housing by controlling for feeding or management have supported the epidemiological results. Two experimental studies[2,10] have examined the health and growth of calves kept either in individual pens or in group pens (with either two or four calves), but which were fed and managed identically. Neither study found a difference in growth rate, but one[10] found that the incidence of diarrhea was lower in the group-housed calves. Thus controlled studies show that milk-fed calves can be kept in small groups without increased health problems, providing that housing, feeding and management are appropriate.

Pain

Causing avoidable pain and distress is of major concern to the public and one of the most contentious animal welfare issues, but dairy producers continue to perform painful procedures like branding and dehorning without benefit of pain relief.

Few disagree that intensively reared cattle should be kept without horns: the horns of cattle can be a threat to workers and other animals if they are not removed. However, considerable research has now shown that all methods of dehorning cause pain to calves.[17] Local blocks help control the pain, but it is now clear that use of local anesthetic alone does not fully mitigate the pain. For example, local anesthetic does not provide adequate post-operative pain relief. The most popular local anesthetic, lidocaine, is effective for two to three hours after administration, and calves treated with local anesthetic actually experience higher plasma cortisol levels than untreated animals after the local anesthetic loses its effectiveness.[17] However, use of non-steroidal anti-inflammatory drugs (such as ketoprofen), in addition to a local anesthetic, can keep plasma cortisol and behavioral responses close to baseline levels in the hours that follow dehorning.

A second consideration is that animals respond to both the pain of the procedure and to the physical restraint. Calves dehorned using a local anesthetic still require restraint, and calves must also be restrained while the local anesthetic is administered. The use of a sedative (such as xylazine) can essentially eliminate calf responses to the administration of the local anesthetic and the need for physical restraint during the admin-

istration of the local anesthetic and during dehorning.[9] Thus a combination of sedative, local anesthetic and a non-steroidal anti-inflammatory drug reduces the response to the pain both during dehorning and in the hours that follow. Unfortunately, such a combination of treatments may be impractical for farmers and may itself have drawbacks for the animal. For example, an effective local block requires repeated injections (around the cornual nerve within the occipital groove of each eye and a ring block around each horn bud) that are themselves painful.

One common alternative to hot-iron dehorning is using caustic paste to cause a chemical burn. This method of dehorning is still painful for the calves,[14] but this pain is easier to control.[23] Calves treated with only the sedative xylazine showed no immediate response to application of the paste, and little response in the hours that followed. This research shows how methods of pain treatment can be developed that are both effective and practical for use on farm.

Tail docking provides an interesting contrast to dehorning, as this procedure seems to cause relatively little immediate pain to calves when performed with either elastic rings that restrict blood flow and kill the distal portion of the tail or with a docking iron that both cuts the tail and cauterizes the stump.[20,21] However, tail docking may have longer lasting effects on the animals' welfare. Sectioning the nerves in the tails of both young calves and adult cattle results in neuroma formation and chronic pain, similar to the phantom pain felt following limb amputation.[6] In addition, docked animals have more flies on them and show more fly avoidance behaviors.[5]

Moreover, multiple large scale, controlled experiments have shown that docking tails provides no systematic advantage in terms of cow cleanliness or udder health.[16,22] The most recent National Animal Health Monitoring System (NAHMS) survey actually shows that farms that dock cattle have dirtier cows than farms that keep the tails intact! Given the obvious disadvantages to the cow, including reduced ability to control flies, we ask cattle veterinarians to join us in working to eliminate the use of docking on dairy farms.

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