Prevention and Treatment of Down Cows: a Continuum

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The point where a down cow is no longer considered to be down temporarily but has become a "real" downer is at best arbitrary. Therefore, the line between prevention and treatment is also arbitrary. This terminology matter is only an academic issue, but it is useful to point out a general principle. That is: many of the measures used to prevent downers are the same ones used to manage downers in order to prevent them from getting worse and thereby provide time for healing. The major management tools[1] for both prevention and treatment are:

1. Providing a good non-slip surface to make it possible for cows to stand unassisted whenever possible.
2. Providing a means to minimize compression damage due to recumbency. The 2 main tools here are comfortable and clean bedding and a variety of lifting or support methods.

Prevention and treatment of the primary causes of recumbency *per se* are beyond the scope of this paper and will be covered in detail by other participants. Much can be done to prevent metabolic problems by good dry cow dietary management, but the more mundane matter of providing a safe environment for calving is often overlooked.

Providing safe surfaces

At parturition a cow is undergoing profound hormonal and metabolic changes which make it especially important that it be housed under conditions which are supportive and don't add additional stress to an already "stressed-out" individual. The ligaments of the pelvis are loose to facilitate passage of a calf through the birth canal but this also makes the hip joints more vulnerable to luxation if the cow should slip and fall. A periparturient cow that goes down due to hypocalcemia or other metabolic problem will be susceptible to compression damage within a few hours of being down. Therefore, providing safe surfaces for the periparturient cow is an important management tool for prevention and treatment of the downer problem.

As with the more common problem of foot care, the best surfaces for cows are not easy to clean, and concrete, the easiest surface to clean, is hardest on cows. The management challenge is to balance these two extremes. Ideally, calving stalls should be provided for all parturitions and they should provide adequate space and a safe surface. In the absence of such an ideal situation, managers should attempt to prioritize their best calving facilities for the cows most likely to need them such as those with a history of hypocalcemia.

Careful monitoring of "at risk" cows is an important factor in prevention and early treatment of downers. Periparturient cows should be watched carefully for both dystocia and metabolic problems. One farm in Minnesota uses a video camera with wide angle lens in the calving area to monitor cows without making frequent trips to the area.[1] Such equipment is readily available for retail store surveillance. Managers and all cow attendants must realize that any cow which is involuntarily down is an emergency case which should get prompt attention to prevent further damage. When a cow is treated for hypocalcemia it is good to have enough help available so that if a cow is having difficulty rising, assistance can be given before injury makes the animal reluctant to try again. Likewise, a ketotic cow which receives more than one dose of isofluopredone should be monitored carefully for signs of weakness and recumbency due to hypokalemia.[2]

Equipment and a protocol for using it should always be in place to move a recumbent cow off concrete and on to the best possible surface as quickly as possible. The easiest way to move a down cow is to manually slide her on to a half inch thick piece of plywood and then drag the plywood rather than putting ropes directly on the cow.

Research in Minnesota has demonstrated several distinct advantages of sand as a bedding for calving stalls and as a surface for rehabilitation of down cows.[3,4] Sand provides much better footing than lighter materials such as wood shavings or straw because it is not easily displaced. Lighter materials are easily pushed aside by a cow's feet and soon the feet are on the slippery wet con-

crete under the shavings unless the depth of the shavings is prohibitively great. The displacement problem is less with straw due to the tendency of straw to form a loosely woven fabric. This makes straw less likely to displace and expose underlying concrete but more difficult to clean without discarding large amounts of bedding in order to remove a single pile of manure. It may sound like a throw back to yesteryear to be using a shovel to manually move manure but managers must know that downer cow management is a labor intensive task and if they are not willing to do so they should make that decision early. Manure removal is usually fairly easy because manure production is reduced and it is often dryer than normal due to restricted water intake. Keeping water and feed in front of a downer is another essential task in good downer cow management. It is best to use large rubber tubs for feed and water to prevent spilling especially with "creepers" which are sometimes found laying on top of a feed or water tub.

Sand has several distinct advantages over organic beddings in that it is not easily displaced, and it is easy to clean out individual manure piles. Better yet, urine quickly drains through the sand away from the surface while organic materials have a wick like action which holds urine and results in skin irritation that can further debilitate a downer cow. If manure is regularly removed urine can be periodically flushed out with clean water making sand a unique washable bedding. Repeated cultures of sand versus wood shavings has shown that sand is a more hygienic bedding for downer cows.[3] Additionally, sand is inexpensive and does not have the dust problems of organic bedding. The major drawback to the use of sand is that it is heavy to move. Sand has come into increased use as a bedding for free stalls which hopefully will make it more widely used for calving stalls. Research at Michigan State University has made possible large scale commercially available equipment for on-farm washing and recycling of sand used as a bedding material.[5]

Use of lifting equipment

Because of tissue pressure damage from recumbency itself,[6] lifting devices have been used to reduce compression of the hind limbs. The problem is that any external support method merely transfers pressure damage from one part of the body to another. Hip clamps are the most dangerous because so much weight is borne by such a small area of the body resulting in tissue damage in the area where the clamps are applied. Therefore, hip clamps should be used with great caution and only for brief examinations. Padding should be added if not present. Foam pipe insulation available at any hardware store is easy to apply to the clamps and can be secured with bandage tape or duct tape. Belly bands and air bags are not particularly dangerous but are ineffective due to compression of the abdomen. This results in forcing the abdominal viscera against the diaphragm making respiration difficult. Respiratory stress and discomfort make a downer cow unwilling to attempt standing. The Munks sling utilizes webbing which spreads out the support area to include the brisket, and the region between the thigh muscles and udder making it the most effective sling on the market. Although the straps lateral to the udder are well padded with tubular foam, cows with extra large udders may be painful in the sling.

Cow lifts are most useful for what could be called the marginal downer.[1] These downers are unable to stand without assistance, but once up, they can stand unassisted. Clinical impressions are that these individuals usually recover and that lifting improves their chances of recovery and speeds the process. These cases typically stand longer after each lifting and eventually are able to get up on their own.

The most effective method of lifting is water floatation which distributes the weight over the largest amount of body surface area making it the most gentle of all lifting methods. The AquaRise floatation tank which was developed in Denmark is now distributed in North America by an eastern distributor, Sandy Ingraham in Vermont and a western distributor and maker, the Kirby Company, in California. The east coast units are made by Amish craftsmen in southern Pennsylvania.

These units have detachable wheels which make them easy to transport at highway speeds being pulled by nothing more than a small pickup truck. Both ends of the tank are removable for moving the down cow into the tank. The open tank is positioned in front of the cow which is slid on to a flexible rubber mat which is then pulled over a self contained ramp into the tank. Either a tractor or a winch can be used to pull the cow into the tank. Once in the tank the ends of the mat are secured so that it does not move when the cow attempts to stand. The ends of the tank are fastened in place and then the tank is filled with warm water as quickly as possible so that the cow is not thrashing around in the tank with insufficient water for floatation support (Fig. 1). To permit rapid filling, a two inch hose is recommended but a quick fill while desirable is not essential for success. Once the tank is full the cow can remain in the tank for 6 hours or more. Because body heat is lost to water more rapidly than to air, the water temperature should be maintained near body temperature (about 95° F). Some units have been outfitted with propane heaters to provide warm water. A constant influx of warm water will not only maintain the temperature but also wash out urine and debris. One of the side benefits of the floatation process is a clean cow rather than the

typical downer which is often smeared with urine and manure. When the cow exits the tank it should be able to go directly onto good footing such as sand. Depending on the selection of cases for floatation, recovery rates can be as high as 78%.[7] As with other methods, the earlier floatation is started, the better the recovery rate.

From a theoretical viewpoint, there is no proof that lifting is essential for recovery. There are numerous reports of cows being down for weeks or months and eventually regaining standing.[4,8,9] This, however, never happens to a cow on concrete. Downer cow prevention should have pre-eminence over treatment and treatment should be swift. Downer treatment is far too labor intensive for much veterinarian involvement. The role of the veterinarian is to preach the principles of hygiene and restorative care. Some veterinarians have purchased floatation tanks for rental to clients. Large dairy operations should be encouraged to have their own units.

References

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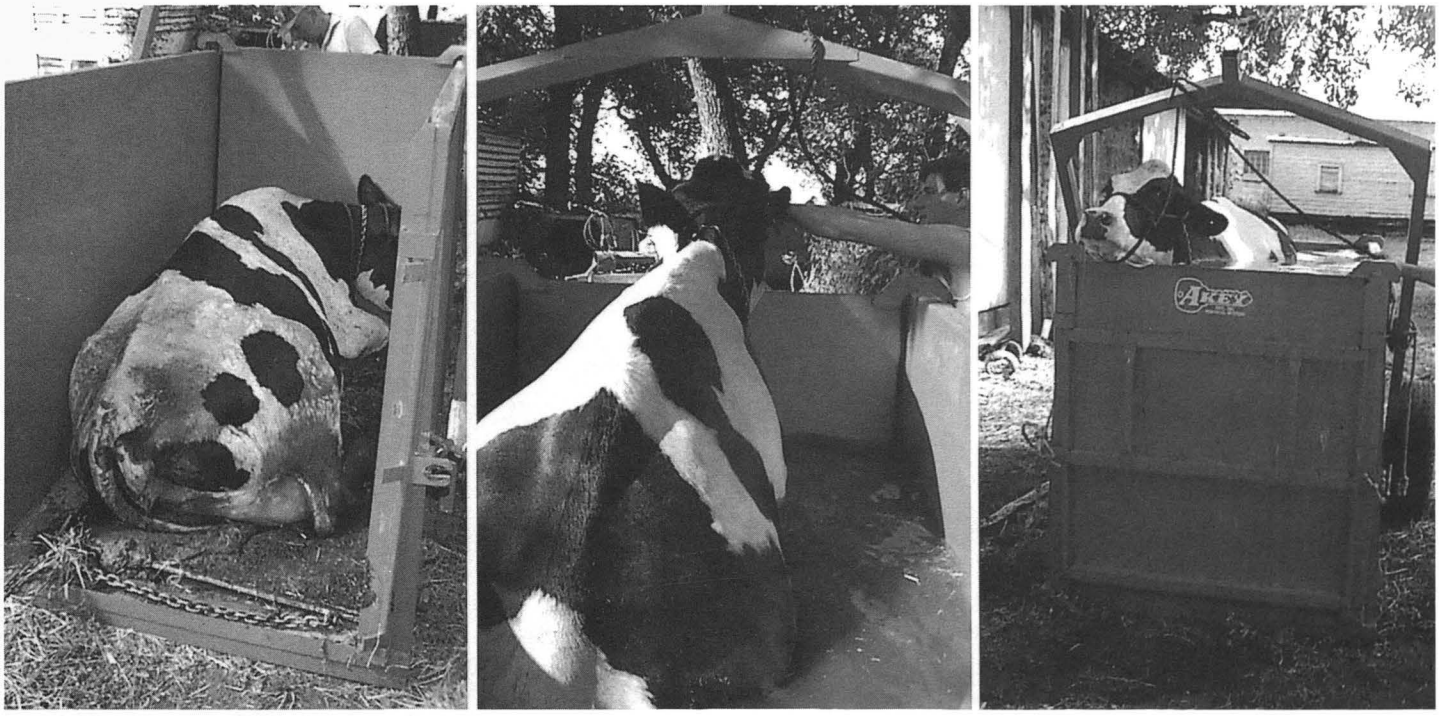

Figure 1. Use of the AquaRise floatation tank for a downer cow. Left: after being pulled into the tank, one end panel fastened, Middle: tank more than half full of water, Right: after filling. This cow was down a week before being put into the tank and required several weeks of floatation before recovery.