Down Cows: Causes and Treatments

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Cows which are unable to rise to a standing position are referred to as down cows, downer cows, downers, or cows with periparturient paresis or weakness. Down cattle can be divided into (1) those with abnormal vital signs and/or altered state of awareness, and (2) those which are willing and able to eat and are alert, but are not able to rise. The alert downer cow is in sternal recumbency. The first group often presents a diagnostic and therapeutic challenge, as it is composed of animals with a diverse group of diseases including hypocalcemia, toxic mastitis, septic metritis, perforating or bleeding abomasal ulcers, or severe peritonitis. If the primary condition is successfully treated, the animal often moves from group 1 to group 2. Many people consider only group 2 animals to be downers in the commonly used sense.

In addition to the causes already described, such conditions as hypophosphatemia,[1] primary musculoskeletal injuries, pelvic swelling from dystocia (calving paralysis; obturator paralysis), and spinal cord compression may result in an alert downer. The alert downer cow is often a result of secondary muscle and/or nerve damage associated with recumbency, particularly if the animal was down on a hard surface in one position for several hours. Heavy cows down on concrete are particularly susceptible to pressure ischemia of the muscles and nerves, and to muscle and ligament tears secondary to struggling and slipping. The degree of pressure damage depends on regional anatomic factors and the duration of compression.

Periparturient downer cows are usually treated for hypocalcemia with one or more doses of calcium. Those failing to respond by standing after 1 or 2 doses are then classified as alert downer cows. It is reported that from 3.8 to 28.2%[2-5] of all milk fever cases become alert downers, with a mortality rate of 20 to 67%.[2,3,5,6] The incidence of downers (24 hours or longer) was 21.4 cases per 1000 cow years in Minnesota dairy herds, with a 33% recovery rate.[7] Fifty-eight percent of downers occurred within a day of calving, and 97% occurred within the first 100 days after calving.[7]

Since the pressure damage done to muscles and nerves is aggravated by recumbency, it is desirable to have the animal on soft bedding or grass, and to have the animal stand as soon as possible. Eight of 16 normal cows anesthetized for 6 to 12 hours in sternal recumbency with the right hind limb under the body were unable to stand upon recovery, and became alert downers.[8] Those which could stand exhibited swelling and stiffness, and/or peroneal nerve deficits and paresis in the right hind limb.[8] These signs are commonly seen with cows which have been recumbent for several hours on a hard surface. As pressure applied to a nerve increases, nerve conduction is impaired and eventually lost.[9] Serum creatine kinase (CK) values in experimental downer cows rose starting at 12 hours and continued up for the first 48 hours, then decreased even though the cow remained down.[8] The CK values at 12 and 24 did not differ statistically for the cows which could rise after anesthesia and the downers. After 48 hours and 96 hours, the downers had higher mean CK values than the ambulatory group, but there was a great range in values.[8] In another study of downers, aspartate amino transferase (AST) levels were markedly elevated on days 4-7, even after CK levels fell.[10] The clinical difference between those cows that recovered and those that remained downers was attributed to damage to the sciatic nerve or its branches, particularly the peroneal nerve.[8] Peroneal nerve damage results in knuckling over at the fetlock.

Devices to aid and promote standing traditionally include hip lifters (hip clamp), slings and inflatable bags. While these devices help the less severely affected animals to stand temporarily, they frequently fail to allow for hours of comfortable standing, and they may even induce additional trauma in struggling animals. For these reasons, the use of water flotation was explored as a tool in the management of downer cows. The idea of water flotation is not new. Rasmussen reported on the use of a warm water flotation system in 1982.[11]

A prototype for a simple flotation tub system for cows was used. It is a metal box with inside dimensions

92" long, 43" wide, and 51" deep. The system is now commercially available as the Aqualift® flotation tub for cows (Kirby Manufacturing, PO Box 989, Merced, CA 95341-0989). It is affordable ($3950), portable (on detachable wheels, pulled on any trailer hitch), durable, effective, and simple to use. Other manufacturers are licensed in different areas of the work. Sandy Ingraham distributes the Aqua Cow Rise System in the eastern half of the U.S. (802-633-4331). In cold climates some units are sold with their own hot water heater. The cart with water heater, propane tank, pump and hoses costs approximately $1000.

After examining the animal to determine that it is a candidate for flotation and to rule out fractures, severe spinal cord compression, and severe systemic illness, (1) the Aqualift® is brought up near the down cow, (2) the wheels and tongue are detached and both ends of the tub are removed, (3) a mat is pulled from the tub to a position beside the cow, and the down cow rolled or slid onto the mat, (4) the mat is winched or otherwise pulled into the tub and the ends of the tub are put in place. They easily seal with rubber gaskets and large turnbuckles. (5) With the cow's head held up a few inches by a rope halter, a hose is inserted into the tub and 100-102°F water is run into the tub as fast as possible. Cows in lateral recumbency on the mat will roll sternal when 12 to 24 inches of water fills the tub, and will usually attempt to stand beginning when the tub is ½ to ⅔ full. If a cow is still not trying to stand when the tub is full, pushing her nose briefly under water will usually stimulate her to stand.

If there is no hot water near the cow or the tub is not next to dirt or grass suitable for the cow to exit upon, the wheels can be put back on and the cow easily trailered to a better location. We have even driven cows down the highway to the clinic in the tub!

Once standing in warm water, it is often obvious by observation which limb(s) are knuckling, paretic or painful. Most cows calm down and relax in a standing position within 5 minutes. Most will eat hay, and even first calf heifers which haven't been handled much seem to be remarkably calmed by the warm water. Unlike horses we've tried in the tub, cattle do not panic or attempt to jump out (only 1 out of 70 tried to jump out). It appears that the hot water may even have some beneficial therapeutic effects on improving peripheral circulation. We generally aim to leave the cow in the water for 6 to 8 hours, but we have left cows in it for over 24 hours if they were comfortable. If the water temperature drops below 95°F, we release some water from the discharge valve and replace it with hot water. This is especially important in cold weather. When the decision is made to remove the cow from the tub, the water is drained and the end of the tub facing the dirt, sand, or grass is opened. The cow is encouraged to slowly exit into a pen with good footing. **Cows must never exit onto a paved surface.** Some cows collapse as the water is let out and others as they try to walk. Careful observation as water is drained and the cow moves can be very helpful in trying to locate anatomic or functional problems. The animal which collapses can be pulled out on the mat and left on suitable bedding, dirt, sand, or grass until refloated the next day. Advance planning on location is vital to the success of using flotation. Cows which can walk out into a pen may or may not be able to stand by the next day. We have refloated cows for up to 10 days in a row before they could get up by themselves.

Preliminary data from our first 70 cases indicates that flotation is useful. We had a 46% (32/70) success rate in getting previously nonresponsive cattle to rise, stand, and walk unassisted. The majority of successful cases were diagnosed prior to flotation as calving paralysis due to dystocia (18 cases). Fourteen of these 18 (78%) had successful outcomes, while 4 were humanely euthanatized. The remainder of the successes were nonresponsive hypocalcemia, nutritional myodegeneration, and coliform mastitis with shock and DIC, cellulitis in 1 rear leg, torn muscles in 1 rear leg, painful lumbosacral instability, and one animal that fell and did the splits. For cows with calving paralysis that survived (survivors), the average time to stand either unassisted or with tail support (not flotation) was 4.25 days (range, 1 to 12 days; n=12). Days were not recorded for 6 cases. Within this survivor group, 67% stood in 3 or fewer days (n=8); 33% stood in 4 or more days (n=4). Survivor cows that were down for 1 day or less before being floated took an average of 2.8 days to stand (n=5); survivors that had been down for 2 or more days before being floated took an average of 5.3 days to stand (n=7). Complications associated with flotation therapy were one case each of fetlock subluxation, mastitis, coxo-femoral joint subluxation, and thrombophlebitis. Cows which are knuckling over in the fetlock should have a fiberglass splint (made from cast material) firmly taped to the lower limb to provide support and prevent pain and luxation. Cows previously unable or unwilling to stand due to knuckling will usually stand when properly splinted.

Diagnoses at the time of flotation for animals that were euthanatized because of a worsening prognosis and owner concern over costs included those with ruptured gastrocnemius tendon, coxofemoral luxations, severe coliform mastitis and shock, chronic anemia and weight loss due to parasitism, pregnancy toxemia, abortion and metritis, compression myopathy and neuropathy, and 1 with radial nerve paralysis. Also unsuccessful (but not correctly diagnosed before flotation) were 1 animal with septic polyarthritis, 1 with a vertebral body abscess and spinal cord compression, and 1 with a fractured femur.

Now that we have more experience with flotation,

we are more selective in choosing candidates for this treatment. A good physical examination prior to flotation is of paramount importance. If one eliminates many of the unsuccessful cases listed above, and selects only alert animals without ruptured tendons, fractures, luxated joints or septic polyarthritis, the success rate will improve even further (to 78% in our group). Compared to the expected[7] rate of recovery of 33%, this is a 136% improvement in outcome. We are very encouraged and continue to use flotation for downers in our clinic to stop further pressure myopathy/neuropathy, and reverse some of the effects of poor circulation and pressure neuropathy.

Flotation is most effective if applied early, before a downer cow develops serious myopathy/neuropathy. Our studies have shown that flotation using the Aqualift is practical and effective, even when cattle have been down for 24 hours or more and have a variety of serious problems. Two of our local dairies were so impressed with the Aqualift that they purchased one of their own (one of 50 sold by Kirby to date), convinced that prompt flotation of an injured cow or nonresponsive milk fever case before the onset of severe irreversible nerve damage was beneficial and cost effective. We strongly recommend that the veterinarian perform a physical examination prior to flotation when possible, and also act as the personnel trainer, and that farm workers/owners actually do the flotation. The veterinarian should be called to provide consultation/treatment for difficult cases, cows which are knuckling, and cows which are not responding as expected. We have successfully trained our barn crew to float cows. The economics seem good. At $10/hr., 2 people for 1 hr/day for an average of 4 days, the cost of labor is about $80. Factor in a 22% failure rate, and the cost per success is closer to $100. One hundred dollars for a fresh cow is a good cost benefit ratio.

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Abstract

Oesophageal injury associated with the administration of an anthelmintic bolus to calves

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Six of 18 calves from a suckler herd which were dosed with a sustained-release anthelmintic bolus, using appropriate equipment, developed clinical signs related to oesophageal perforation. Two died as a direct result of the injuries sustained, one required surgical removal of the paraoesophageal bolus and the remaining three were managed medically. The calves were in the approximate weight range advised by the manufacturers as suitable for dosing, but some were younger than the minimum recommended age. These animals were of a fractious nature having been relatively little handed.