Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Reproduction Section 447

Handling Calving Difficulties

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Reproductive problems cost the beef industry up to $500 million annually. Approximately half of this financial loss can be attributed to calf deaths during difficult calving (dystocia), which can also lead to many negative outcomes in the cow such as retained placenta, uterine infection, and subsequent cow infertility. Calves that experience dystocia at birth are 13 times more likely to be born dead or die within the first 12 hours of life. If calves survive a difficult birth, they are 2.5 times more likely to become ill, and 5 times more likely to die during the first 45 days of life compared to calves with normal births. Therefore, cattle producers should always pursue management strategies that minimize the incidence of dystocia in the cowherd.

The Calving Process

Understanding the anatomy of the cow's reproductive tract is the first step for good calving management. The major structures of the cow reproductive tract associated with calving are the vulva, vagina, cervix, and uterus. Specific information about the anatomy of the female reproductive tract is presented in fact sheet 440.

The fetus triggers the calving process by initiating a cascade of hormones that result in several biologic events. Briefly, when the fetus grows to a stage when uterine space becomes limited, the fetus becomes stressed and produces cortisol ("stress hormone") that leads to several hormonal changes in the cow's placenta. Other events that occur are stimulating stretching of pelvic ligaments, uterine contraction, cervix dilatation, and consequent delivery. Therefore, the fetus actually determines when it will be born.

During the last few weeks of pregnancy (up to 6 weeks), the cow's udder starts to develop and fill with colostrum, and the vulva swells. These are the first signs that calving is near. During the last 4 to 6 days of pregnancy, the vulva swells even more and the pelvic ligaments relax causing the area between the tailhead and pin bones to become loose and sunken.

The actual calving process can be divided into three stages that last up to 20 hours:

Stage 1—Preparatory Stage
(2 to 6 hours of duration)

Fetal cortisol stimulates synthesis of maternal estradiol and, consequently, uterine contractions. As pressure inside the uterus increases, the fetus rotates so the front feet and head are positioned to the posterior of the cow (Fig. 1A). If the fetus is positioned incorrectly, dystocia (difficult birth) may occur. Uterine contractions become more frequent and begin to push the fetus toward the cervix, which starts to dilate and allows the fetus to enter the birth canal (Fig. 1B).

During Stage 1, cows typically show signs of discomfort due to the contractions. Producers may notice restlessness, arching of the back, straining slightly, and kicking at the belly. Cows may separate themselves from the rest of the herd and also urinate frequently. However, cows are still alert, fully aware of their surroundings, and may eat, drink, and behave normally. The end of Stage 1 is typically marked by expulsion of the water bag (Fig. 1C), which is the most external of the fetal membranes.

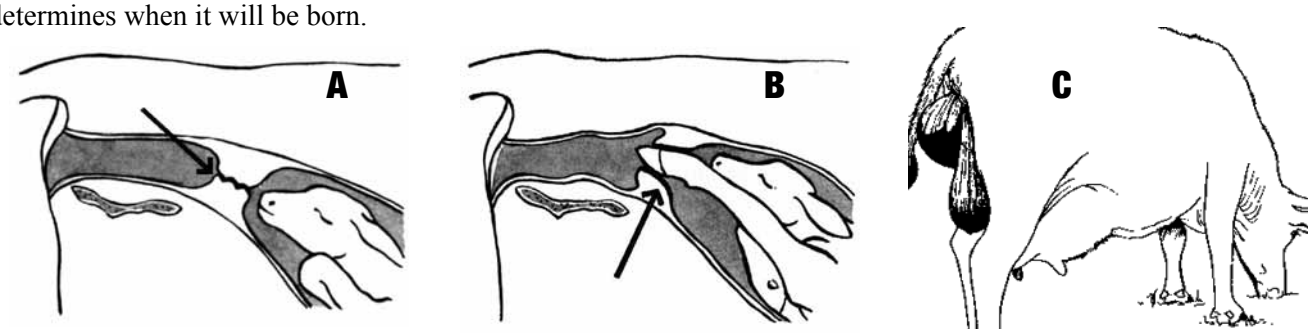

Fig. 1. The cervix is closed at the beginning of Stage 1 (A), but begins to dilate throughout this stage, allowing the fetus to enter the birth canal (B). Water bag expelled indicates the end of Stage 1 (C).

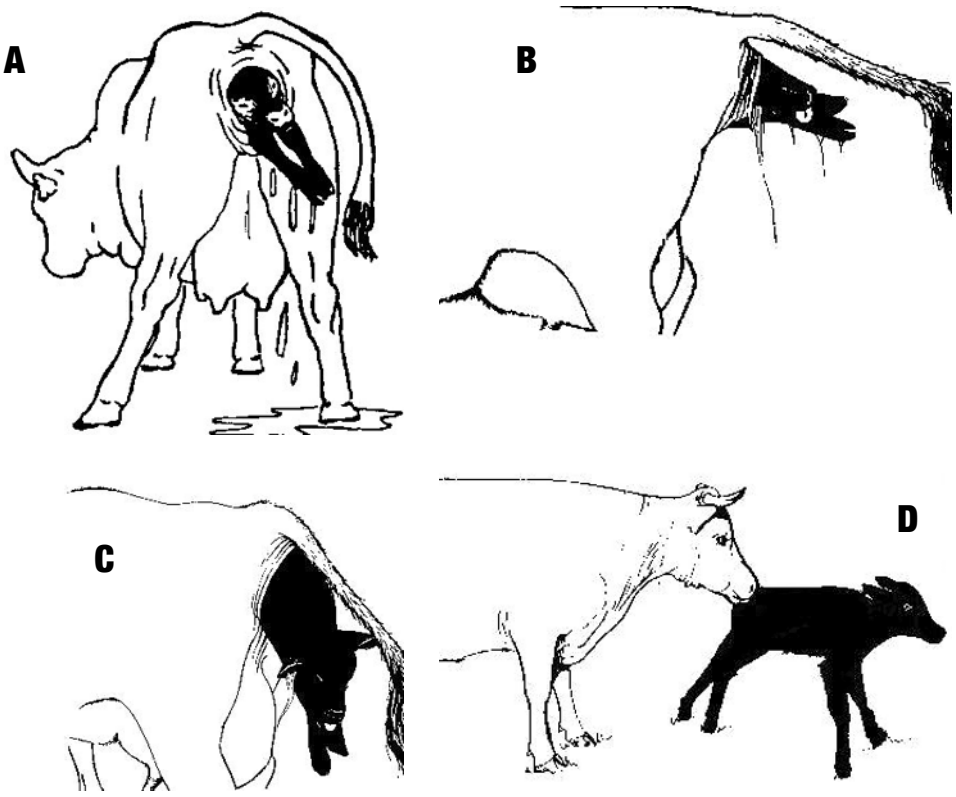

Fig. 2. Normal delivery (in sequence; illustrations 1 to 4), leading to the end of Stage 2.

Stage 2—Fetal Expulsion
(60 to 120 minutes of duration)

Maternal estradiol stimulates mucus production by the cervix and vagina, which, together with placental fluids, thoroughly lubricates the birth canal to facilitate the delivery process. As the fetus comes into the birth canal, it puts pressure on the cervix and induces a natural reflex in the cow to push, resulting in visible abdominal contractions that further aid in fetus expulsion. The combined contractions of the uterus and the abdomen stimulate the feet and head of the fetus to progress through the birth canal and put pressure on the placenta, reaching a certain level where it ruptures. Placental fluids are then released and further help in lubricating the birth canal.

Contractions continue to strengthen, and cows may lie down to cope with the pain. Cow behavior may also change during this stage, as she may become oblivious of her surroundings, and focused on her contractions. After rupture of the placenta the birth is imminent, with the cow continuing to push and, hopefully, progressing normally through delivery (Fig. 2).

The first part of the calf (it is not a fetus anymore!) that appears should be the front feet. After that, the abdominal contractions become even more frequent and intense. Sometimes the calving progress may slow down for a minute or two to allow the vulva to stretch. The next visible part of the calf is the nose, followed by the rest of the head, the shoulders, the chest, and the rest of the calf. The order in which parts appear is important because it will indicate if there could be a mal-positioned calf.

When the calf's chest is coming out, mucus may drain from the calf's mouth and nostrils because of labor contractions. This is an important process because it clears the respiratory passages for normal breathing. Within 10 minutes after the calf is born, the cow usually stands up and starts licking the calf. The calf usually staggers onto its legs within 20 to 30 minutes and should start nursing within 60 minutes after birth.

Stage 3—Placenta Expulsion
(6 to 12 hours of duration)

The placenta should detach from the uterus almost immediately after the calf is delivered. More specifically, the cotyledons on the placenta separate from the caruncles on the uterus and contractions expel the placenta from the cow. Sometimes the placenta expulsion is delayed because the cow is fatigued. However, if the placenta is retained for more than 12 hours, special precautions may have to be taken.

Calving Assistance

The first step to a successful calving assistance is recognizing a normal calving. As long as the calf is normally presented (Fig. 3), the vast majority of ani-

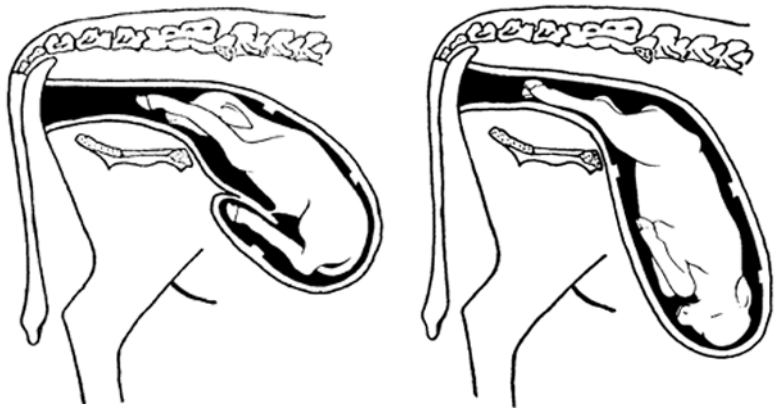

Fig. 3. Normal anterior or "head" presentation (left) and posterior or "butt" presentation (right).

mals will give birth without assistance. Most calves lost at birth are anatomically normal but die because of injuries or suffocation resulting from difficult or delayed calving. Therefore, knowing when and how to provide assistance highly determines the number of viable calves produced within cattle operations. Special attention should be provided to first-calf heifers, given that less than 2 percent of calving difficulties occur in mature cows.

Preparation for Calving

Having the correct facilities and equipment available at calving can mean the difference between a dead or a live calf. If the dam is likely to experience dystocia, she should be placed in a clean, well-lighted pen. Make sure all the equipment is clean and sanitized between cows. Remember, everything past the cervix is sterile, and you don't want to contaminate it. The following equipment should always be available at calving:

- OB chains and OB handles.
- OB sleeves.
- OB lubricant.
- Common disinfectant: chlorhexidine (Novalsan®) or povidone (Betadine®).

When and How to Examine a Cow

Regular observations are required to determine the progress of labor, and when and how to provide assistance or to seek help from a veterinarian. Normal delivery should be completed within 2 hours after the water bag appears. If not, the calf may be stillborn or delivered in a weakened condition.

Observing cows in labor at 30-minute intervals will provide information about whether the calving is progressing normally. Cows should be provided assistance if they have not delivered the calf within 2 hours from the time the water bag appears, or if more than 30 minutes time has elapsed without progress. First-calf heifers can be allowed an extra hour for a normal delivery but examination should still be provided if there is no progress within 30 minutes. If no progress is observed within a 30-minute interval, the dam should be examined to determine if calf presentation is normal and if it will fit through the birth canal. All interventions should be performed in a clean environment:

- Tie the tail to the cow, or have someone hold it away from the vulva.
- Wash the vulva and anus area of the dam using soap and warm water.
- After washing your hands and arms, put on a new disposable plastic OB sleeve and apply copious commercial obstetric lubricant (soap will irritate the vaginal walls and potentially cause temporary infertility).
- Insert your hand slowly into the vagina cupping your fingers.

To determine if the presentation is anterior or posterior, find out whether the limbs near the birth canal are forelimbs or hindlimbs. This can be done by feeling the fetlock and moving the hand up the limb. All four legs have two joints that bend. In the front legs both joints will bend in the same direction (i.e., fetlock joint bends downward and knee joint bends downward). In the hind limbs, leg joints/fetlock and hock bend in opposite directions. If only the toes can be reached, it is likely that the front legs are presenting if the soles point down (Fig. 3). If the soles point up, it is likely that the calf is presenting backwards.

For an anterior presentation to show with the toes pointing up, the calf would have to be on its back, and this occurs rarely. To determine if there is enough space in the birth canal for the calf, check if you can put your hand flat against the calf and go all around it. *If the calf's presentation is abnormal, or if the calf is too large to pass through the birth canal, a veterinarian should be contacted.*

Assisting the Calving Process

Deliveries should be assisted with proper preparation of facilities and equipment. Five rules apply:

1. **Be Patient**—The reproductive tract of the cow needs to dilate, and this requires time for the hormones to work. The normal position of the calf acts like a funnel to dilate the cervix and the vulva, inch by inch.
2. **Use as much lube as necessary—**Trying to deliver a dry calf makes things much more difficult and can harm the reproductive tract of the cow.
3. **Pull when the cow is pushing**—Pulling "against" the cow can damage the reproductive tract, which gets swollen and makes delivery more difficult.
4. **Steady Traction**—This is easier on the cow and the calf. Avoid jerky and irregular pulls.
5. **Do not use excessive force**—Avoid the use of a calf-jack unless you are by yourself. Use of a calf-jack can put too much force on the cow, and you will not notice it. The cow may be damaged in the process.

Most of the time, movement can be detected in a live calf by placing the fingers in the mouth, seizing the tongue, pinching the toes, or touching the eyelids. However, some calves may not show any signs of movement and still be alive. Cows that are in labor too long give up pushing, and then it will be more difficult to assist the delivery. In addition, delayed assistance has detrimental effects on the subsequent calf performance and fertility of the dam (Table 1).

Correct Chain Placement

To reduce the chance of a broken leg or injured foot, loop the OB chain above the fetlock and with a half

Table 1. Timing of calving assistance and performance of heifers and calves.

Item	Time of assistance	
	Early	Late
Postpartum interval (days)	49	51
In heat at beginning of breeding season (%)	91	82
Services/conception	1.15	1.24
Fall pregnancy (%)	92	78
Calf average daily gain (lb)	1.74	1.63
Calf weaning weight (lb)	422	387

Fig. 4. Proper placement of obstetrical chains on the calf's foreleg.

hitch on the pastern (Fig. 4). *Try, when possible, to place the chains on legs that are already outside of the cow to avoid contamination of the vagina and uterus.*

Assisting Calves with a Normal Anterior Presentation

The normal anterior presentation position is forefeet first, head resting on the forelegs, and the eyes level with the knees. The most common problem with normal anterior presentations is the delivery of large calves. If the space is tight, alternate by pulling one limb at a time to decrease the diameter of the shoulders. One elbow and shoulder of that limb will enter the pelvis first (Fig. 5). Now apply traction on both limbs and guide the head until it protrudes from the vulva.

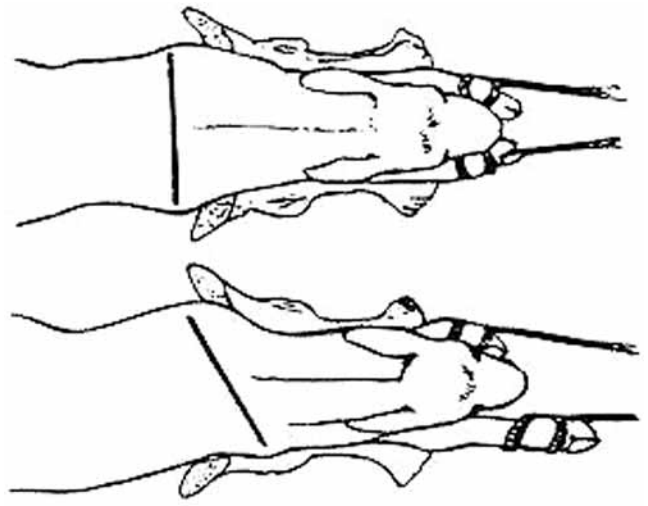

Fig. 5. Pulling a calf "one limb at a time."

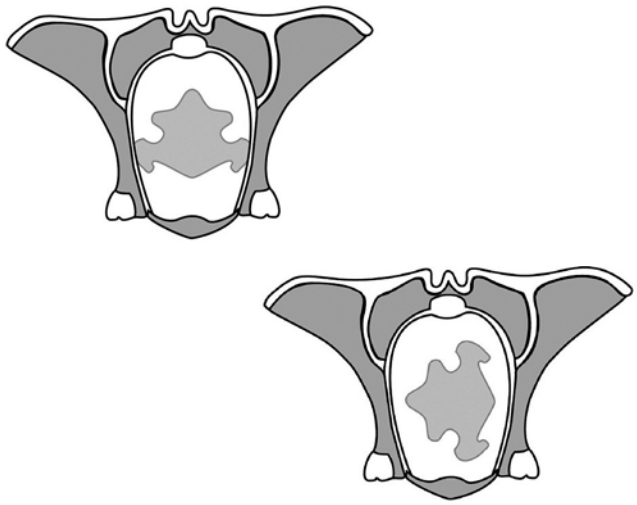

Fig. 6. Rotating the calf on its side allows matching the widest opening of the pelvis.

Traction should be straight backward until the chest clears the vulva and then traction should be directed downward toward the cow's hocks. The calf, thus, passes through the birth canal in the form of an arc. If the passage of the hind end of the calf presents any difficulty (hip lock), the body of the calf can be twisted to an angle of about 45-90 degrees to decrease the diameter across the pelvis of the cow (Fig. 6). Delivery is then made with the calf half-turned on its side.

Assisting Calves with a Normal Posterior Presentation (Backwards)

In a normal posterior or backwards presentation, both hindfeet are presented with the hooves facing upwards. Do not attempt to turn the calf around to get the front feet first; you can damage the uterus of the cow. In a posterior presentation, the head is the last part to be expelled, and there is a risk of drowning the calf in the fluids contained in the uterus. Therefore, proceed with delivery as quickly as possible, especially once the hindquarters of the calf are outside of the cow but still allowing time for good dilation of the cow's reproductive tract while the calf's hindquarters are inside of the cow.

As with the anterior presentation, if the space is tight, traction should be exerted on one limb at a time to decrease the diameter of the calf's pelvis. It may be necessary to push the other limb partly back into the uterus to accomplish this.

Once the legs are offset, traction should be applied to both limbs simultaneously. If this does not succeed, cross one limb over the other and pull on the lower limb. This will make the calf rotate slightly to one side and delivery may proceed more smoothly. The calf's tail may have a tendency to protrude upward and damage the top of the vagina. Ensure that the tail is down between the legs by placing your hand on the tail until it is out of the vulva.

Assisting Calves with an Abnormal Presentation

It is generally easier to correct any abnormal presentation if the dam is standing rather than laying down. If a cow or heifer won't get up, she should not lay directly on the part of the calf that has to be adjusted. Thus, if the calf's head is turned back toward the cow's right flank, the cow should lay on her left flank. Once the calf is in a normal position, delivery will be easier if the cow is laying down since she would lay down anyway once traction is applied to the calf.

If you don't have immediate access to a veterinarian, you can try to reposition a calf in an abnormal presentation. However, take into account that some of these abnormal positions may in fact be due to malformed calves and may require a C-section or a fetotomy. A C-section can save the life of the calf and the cow. Although some cows may have reproductive issues after a C-section, most beef cows recover without problems. *Remember, attempts to reposition the calf should be made between contractions!*

One of the most common calving problems occurs when one or both of the forefeet are back and the head is presented in a normal position (Fig. 7A). To correct this problem, push the calf back into the cow a little and carefully reach for the foreleg(s) guarding the hooves into your hand to avoid perforating the uterus. Another option is to rotate the calf's foot toward its chest while applying gentle traction. You will probably need both arms and/or additional help for this maneuver—one to keep pushing the calf back and the other one to pull the foreleg up.

A calf that has its nose down underneath the brim of the cow's pelvis (Fig. 7B) can be repositioned by grasping the calf's mouth or nostrils and pulling the head up into the normal position in the pelvis. If the calf's head is positioned to the side of its body, the same procedure can be used to correct it. If excessive force is used to pull the head into the canal, there is a good chance of breaking the jaw of the calf.

The breech presentation is a backwards presentation where the hind legs are extended forward into the uterus (Fig. 7C). Therefore, the only body part palpable during examination is the tail or the pelvis of the calf. This type of presentation is difficult to correct. An attempt can be made to push the calf deep into the cow with one arm, while reaching for one of the hindlegs with the other arm.

Extreme care is needed to prevent damaging the uterus with the calf's hooves. The calf's best chance with this type of presentation may be a C-section. Therefore, a veterinarian should be called promptly.

Sometimes, the calf can be presented upside-down, both forward and backward presentations (Fig. 7D). In this situation, the best option may be a C-section. An attempt can be made to rotate the calf to an upright position. This usually means rolling the cow over while keeping the calf in position.

Calves can be presented in many abnormal positions. The goal is to attempt to reposition them to a normal position without damaging the reproductive tract of the cow, and, if possible, delivering a live calf. If a sudden obstruction occurs, stop and examine the birth canal and calf to find out what is wrong before proceeding.

Twins can cause calving difficulties if they try to enter the birth canal at the same time or by trying to adapt to the limited space available in the uterus by adopting abnormal positions. Make sure both limbs you are working with belong to the same calf. To do this, feel along each limb to where it joins the body and feel along the body to the opposite limb.

Post-Natal and Post-Partum Care

Helping the calf after it is on the ground is important, especially if the cow does not get up to clean the calf. The three major things to take care of in the calf are:

Make Sure the Calf Can Breathe

Clear the nostrils of mucus and stimulate breathing by tickling the inside of a nostril with a piece of straw: the calf will sneeze, which helps to clear out the mucus.

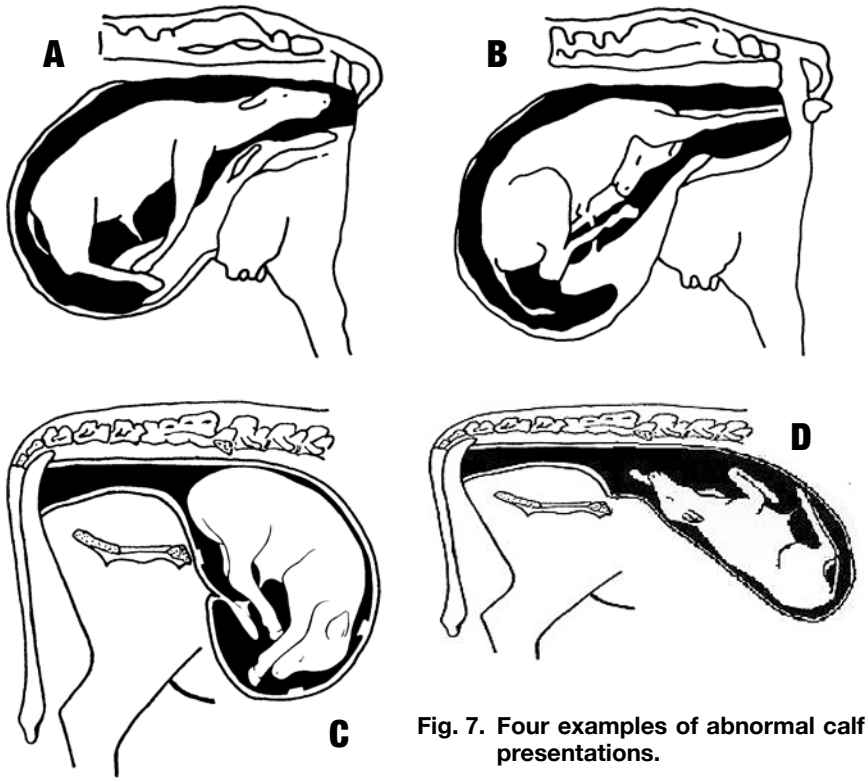

Fig. 7. Four examples of abnormal calf presentations.

It is not recommended to hang the calf upside-down to drain fluids from the lungs, as most of the fluids are in fact from the stomach and the position puts too much pressure on the diaphragm and makes breathing difficult.

If the calf does not breathe on its own, it may be necessary to use a respirator. Several types of respirators are available commercially. An inexpensive option is to place a hand around the mouth and nose clamping it together, closing off one nostril, and blowing into the other nostril at about 6- or 7-second intervals. Rubbing the calf's body rhythmically can also help to stimulate circulation.

Navel Treatment

The navel needs to be treated to prevent infection ("navel ill"). The best option is a strong iodine solution, especially in calves born in a muddy or wet environment, because it will desiccate the navel. This product is only available by veterinary prescription. Another option is using chlorhexidine solution.

Colostrum Ingestion

Make sure the calf gets colostrum within the first 3 hours after birth. Colostrum is the calf's only source of protection from many infectious agents. Because newborn calves are only able to absorb the immunoglobulin in colostrum within the first 24 hours of life, it is recommended that a calf should receive 10 percent of its body weight in colostrum within that period. This is about a gallon of colostrum for an 85-pound calf.

Colostrum may be frozen and stored when excess is available so it can be thawed and used when none is available for another calf. Consider using a colostrometer to test the quality of colostrum obtained from dairy farms, but always ensuring that the source is free of major diseases such as Johne's. For more information on how to determine colostrum quality, see 644 (Feeding Colostrum to a Calf).

As a precaution against infections, any cow that needs assistance should be given antibiotics, especially when the calving was difficult and hands had to reach inside the uterus. Uterine boluses and lavages are not indicated, unless recommended by a veterinarian. Leave the cow with the calf in a clean, small pen to bond.

References

Bellows, D. S., S. L. Ott, and R. A. Bellows. 2002. Review: Cost of Reproductive Disease, and Conditions in Cattle. Prof. Anim. Sci. 18:26.

Bellows, R. A. 1984. Calving Management. Proc. Annual Mtg. Soc. for Theriogenology. Denver, CO, pp. 145.

Bellows, R. A., R. E. Short, R. B. Staigmiller, and W. L. Milmine. 1988. Effects of Induced Parturition, and Early Obstetrical Assistance in Beef Cattle. J. Anim. Sci. 66:1073.

Dzuik, P. J., and R. A. Bellows. 1983. Management of Reproduction of Beef Cattle, Sheep, and Pigs. J. Anim. Sci. 57(Suppl. 2):355.

Gosey, J. 1987. Breeding Specification Cattle for the Future. Proceed. Range Beef Cow Symposium X, pp 218.

Mathis, C. P., and R. Parker. 2010. Reproductive Tract Anatomy, and Physiology of the Cow. In: Cow-Calf Management Guide & Cattle Producer's Library, CL440.

Meijering, A. 1984. Dystocia, and Stillbirth in Cattle: A Review of Causes, Relations, and Implications. Livestock Prod. Sci. 11:143.

Odde, K. G. 1988. Survival of the Neonatal Calf. Vet. Clinics of N. America: Food Animal Practice 4:501.

Price, T. D., and J. N. Wiltbank. 1978a. Dystocia in Cattle. A Review and Implications. Theriogenology 9:195.

Randall, R. 2009. Cowboy Obstetrics: Assisting with Calving. Available at: http://animalrangeextension.montana.edu/articles/beef/reproduction/cowboy_ob.htm.

Roberts, S. J. 1986. Veterinarian Obstetrics and Genital Diseases. Ithaca, NY. Distributed by Edwards Brothers, Inc., Ann Arbor, MI.

Selk, G., and D. Sparks. 2008. Calving Time Management for Beef Cows and Heifers. Oklahoma Coop. Ext. Ser., E-1006.

Senger, P. L. 2003. Pathways to Pregnancy and Parturition. 2nd edition. Current Conceptions, Inc., Pullman, WA.

Severidt, J., H. Hirst, D. VanMetre, and F. Garry. 2009. Calving and Calf Care on Dairy Farms. Available at: http://www.cvmbs.colostate.edu/ilm/proinfo/calving/notes/home.htm.

Whittier, J. C., and J. G. Thorne. 1995. Assisting the Beef Cow at Calving Time. Univ. Ext., Univ. of Missouri-Columbia, G-2007.

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