

Procedure Decisions in Bovine Dystocia

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Introduction

About 17 years ago, as a veterinary student, I recall a classmate asking our obstetrics professor, "How do you make the decision to do vaginal delivery or caesarean section?" "Experience, young man," was the reply, a vague answer indeed.

After eight years of large animal practice and eight years as a teaching clinician at WCVM, the same question is asked by students today. Here is an outline on how we try to answer some of these questions.

The mechanics of relieving dystocia are well described in the veterinary texts (1,2,3,4). In our opinion, the procedure decisions are not clearly presented. I hope to stimulate some response from you experienced practitioners to give your guidelines for decisions in bovine dystocia. I would like to stress I do not believe our way is the only way to make these decisions. I would like to emphasize if a practitioner is not capable in the management of dystocia, he is not likely to be a successful bovine practitioner because dystocia is about 20-25% of the caseload of bovine practice.

I. When to Interfere

Roberts (3) defines dystocia as the condition when the first or especially the second stage of parturition is markedly prolonged, and it becomes difficult or impossible for the dam to deliver the fetus without artificial aid. To be successful, one has not only to use the proper procedures but to use them at the appropriate time.

The cow should be in a small area of good environment where she can be observed daily for indications of approaching parturition. Mammary development, edema of the vulva and udder, mucous discharge from the vulva, and softening of the pelvic ligaments should all be noted. The softening of the sacro-sciatic ligament is the most reliable sign of imminent parturition. From this time forward, she should be observed every 3 to 4 hours for indications of the first stage of labor.

The first stage of labor is characterized by the dilatation of the cervix. At this time the herdsman will observe some or all of these signs: increased restlessness, reduced appetite, lying down and getting up, kicking at the abdomen, standing with an arched back and raised tail, and occasionally straining. There are marked differences in the intensity of the signs of this stage; usually heifers are much more

obvious than mature cows which may show little or no signs. The chorio-allantois usually ruptures as it is forced through the cervix. The amnion passes through the cervix into the vagina and the fetus enters the birth canal causing reflex stimulation of straining or active labor.

Second-stage labor is characterized by the expulsion of the fetus. In practice, the line between first- and second-stage labor is not as clear as in theory. The calf in the birth canal stimulates reflex and voluntary contractions of the abdominal and diaphragmatic muscles, producing heavy abdominal pressure. Intermittent heavy labor continues until the fetus is born or the cow becomes exhausted. Usually the amnion containing the front feet becomes visible first. Once the sac starts to hang below the vulva, it generally breaks. Then there is marked stretching of the vulva and the fetal head positioned on top of the legs passes through, followed by the rest of the calf. The cow may be standing initially in stage II, but she most often goes down and remains recumbent until the calf is born.

Stage III is characterized by the expulsion of the fetal membranes.

First-stage labor averages about 6 hours in length, but in heifers it can last up to 24 hours; second-stage lasts an average of 69 minutes, but varies from 30 minutes to 3 hours; and third-stage lasts from 2 to 12 hours according to Arthur (5). He also states a calf may survive eight hours in second-stage labor.

The time to interfere is based on the early recognition of dystocia. The objective is to diagnose and treat the dystocia early enough to conserve the lives of both cow and calf. In practical terms, it would be best if dystocia could be recognized in early second-stage labor and corrective measures taken immediately (Fig. 1). The thumb rule we use to base our decision on when to interfere uses the appearance of the amnion, like 0 hour on a stop watch. We recommend interference in a mature dystocia 1 hour after the appearance of the amnion, in the heifer 3 hours after. If a mature cow appears to be in first-stage labor for 6-8 hours and a heifer 10-12 hours with no obvious signs of progress, we recommend a vaginal examination to determine if dystocia is present.

II. Clinical Examination and Diagnosis of Dystocia

A. *History.* The case history is frequently underemphasized by the inexperienced clinician, yet is

very important. It may be taken as you are getting yourself and your equipment ready and also while you do a quick preliminary general examination. Questions that should be asked are: 1. What is the breeding history? Is the cow due to calve, and if not, when? What breed is the sire and, if possible, the size of his calves at birth? 2. Has the cow had dystocia before? 3. Has the cow been normal until the last few hours? 4. How long has the cow been restless, off feed, straining, etc.? 5. If she is straining, how frequently and how strong are the contractions? 6. Has anything been showing from the vulva? 7. Has any assistance been given?

The cow should be confined and restrained in a clean, dry environment with good working conditions if possible.

B. Quick Preliminary Examination. A quick preliminary examination is also often overlooked but is very important in the management of dystocia. This examination should ascertain: 1. The general condition of the cow, is she too fat or emaciated, etc.? 2. Is the cow standing or able to stand? 3. Is the cow bright and alert or depressed and exhausted? 4. Are any obvious signs of a concomitant disease like hypocalcemia or peracute mastitis present? 5. Check the color of her mucous membranes, her temperature and pulse.

C. Vaginal Examination. It is preferable to do this with the cow standing if at all possible. The cow should be properly washed about the vulva with soap and disinfectant and the tail should be tied or held by an assistant. The operator should thoroughly wash and lubricate his arms. Two pails of warm water in which one is the "clean water" and one is the "dirty water" are recommended. The good clinician practices a high standard of hygiene while performing on obstetrical cases.

The character of membranes and fluids passing out of the vulva should be noted, and also check the vulva for any signs of trauma. With your hand in the vagina, you will quickly be able to determine if the vagina is completely or partially occupied. At this time, the vaginal wall should be examined for evidence of tears, swellings, bands, folds, and the degree of lubrication. Then, the cervix should be examined for the degree of dilatation and also for any evidence of tears. A partially dilated cervix is easily missed by the inexperienced operator. If the calf is not too far advanced, those areas of the uterus that one can palpate should be checked next. One should inform the owner of any tears or other complications immediately so that you are not blamed later.

The fetus may have been examined to some degree initially, but now a detailed examination for presentation, position, and posture is done. Is it alive or dead, and if dead, is emphysema present and to what degree? Is the fetus normal anatomically and is there more than one fetus present? Are the uterine fluids gone, and is there a fetid odor? Is the uterus contracted down on the fetus, yielding very little or no room for mutation which may be necessary for

delivery? Is the fetus in distress? Signs of swelling in the legs, tongue, or muzzle, and reflex responses should be noted. If the animal is straining severely, an epidural will greatly aid the examination process.

A complete vaginal examination is often not performed and yet is one of the most important steps in the handling of dystocia. When one is deciding what procedure to use to relieve the dystocia, the information gathered by a good history and a complete examination is essential for an intelligent decision. The inexperienced clinician who gets quickly carried away by an abnormal posture of the calf may find after an hour or more of hard work that he or she has made the wrong procedural decision. This is the time to inform the client of the severity of the dystocia.

III. Procedure Decisions Involving the Live, Oversize Fetus

A. Anterior Presentation. The fetus may be in a normal presentation but have abnormal postures such as retained head or limb which could be due to not enough room in the birth canal. Mutation of the fetus can usually be accomplished and the objective is to deliver the fetus doing as little damage as possible to the cow and calf. The decision facing a clinician is shall I try forced extraction with vaginal delivery or perform a caesarean section. This very important decision requires one to review the information acquired from the history, preliminary examination, and to re-examine: 1) the size of the cow's birth canal relative to the size of the calf; 2) are the calf's feet large and are they crossed, indicating pressure on the shoulder; 3) palpate the calf's head for size and then palpate again between the calf's shoulder and the cow's ilium (Fig. 2). Remember, it is the size of the calf in relation to the size of the birth canal through which it must pass that is important. The oversize may be relative or absolute.

Some cows seem to have pelvic ligaments that stretch better than others. A large calf may be delivered from a Jersey cow much easier than a moderate-sized cow from a large Charolais. The work of O'Brien and Scott (6) revealed the concentrations of estradiol-17 beta were lower and progesterone higher in the blood of dystocia heifers compared to non-dystocia heifers during the parturition period. This might explain a relative lack of relaxation at parturition contributing to dystocia. The timing of these hormone changes is also important.

The following thumb rule is applied. Put chains on the front feet with double loops and put a snare on the calf's head (Fig. 3). The feet are then pulled well out of the vulva in an offset fashion and held there. When the calf is large, the head usually remains back. Then one man must be able to pull the calf's head from the abdominal cavity into the pelvic cavity (Fig. 4). If he can, vaginal delivery can usually be accomplished. If he can't, then caesarean section is usually indicated. If he is successful but only after much effort, we recommend a fetal extractor be set up to aid delivery

if necessary, or if the calf is of significant value, then caesarean section should be considered. If the head of the fetus is rostral to its feet in the pelvis, then push the head back into the abdominal cavity, pull out the feet, and use the same procedure.

If forced extraction is selected, remember alternate traction on the feet, pull in the direction of the birth "arch," and use an abundance of lubrication. The birth process may be quite traumatic to the calf and often the calf is injured more than realized during forced extraction. Haughey's (7) work would substantiate this, where he found a much higher incidence of vascular lesions in cranial and spinal meninges in assisted compared to unassisted calvings. Additional birth injuries found included separation of the costochondral junctions, fractured ribs, hemorrhage into hip joints, intervertebral fibrocartilages, and axillae. Also, rupture of the liver was found.

B. Posterior Presentation. With posterior presentation of the fetus, the thumb rule is similar but with some variation. The calf's hind limbs are pulled out, with one limb being pulled by two men. Hopefully, the hip of this leg will be pulled into the pelvis of the cow (Fig. 5). This leg is retained in position by one man. Then the other man must be able to pull the other leg equal to or further out than the first leg. If he can, our decision would be to go ahead with vaginal delivery. If he cannot, then caesarean section should be considered.

Hindson (8) has developed the interesting following formula to aid in making this decision:

$$\text{Traction Ratio: } \Pi/\text{DD} \times \text{P1}/\text{P2} \times 1/\text{E}$$

where Π = inter-ischial distance (mm) of the cow, DD = digital diameter (mm) of the fetus, P1 = parity factor of 0.95 for heifers, P2 = factor for posterior presentation of 1.05, E = an "exotic" factor of 1.05 for exotic animals. Ratio >2.5 - oversize not present; 2.3-2.5 - oversize may be present; 2.1-2.3 - traction likely difficult; <2.1 - surgery (caesarean) 1st line of treatment.

IV. Procedure Decisions Involving the Dead Fetus

The objective is to remove the fetus, causing as little damage as possible to the cow.

A. Anatomically Normal Fetus. If the fetus is in a normal presentation or if the mal-presentation can be corrected by mutation, then the same thumb rule is used as in the preceding section. If we cannot deliver the calf by vaginal delivery, our decision is between fetotomy or caesarean section. The capable clinician will be able to perform either operation well and the one he chooses is based on the case at hand. We often perform a partial fetotomy with vaginal delivery of a fetus in a mal-presentation which cannot be easily corrected or without obvious danger to the cow. We will use the following procedure for an oversize fetus in normal presentation. One complete forelimb is removed by percutaneous amputation and then forced extraction is attempted. If good progress is made, carry on until the thorax is out. If no progress, remove the other forelimb in the same manner and try again.

In this way we often get the thorax out. Then transect the fetal trunk at L-4 to L-5, followed by longitudinal division of the fetal pelvis (Fig. 6). If the fetus is grossly oversize, then complete fetotomy is required.

The decision to perform a fetotomy is based on: 1. There must be enough room to work. 2. The ability of the operator to do a fetotomy properly.

B. Emphysematous Fetus. These advanced cases are usually very difficult to correct regardless of the procedure chosen; the clinician's first decision may be to proceed, or to recommend euthanasia. This decision will be based on the total situation; the factors being, the condition of the cow, the severity of the dystocia, the value of the cow and the willingness of the owner to pay you for two to three hours of hard, unpleasant work. In our opinion, the prognosis in these cases really depends on the condition of the uterine wall, which is very hard or impossible to assess until you have done the laparotomy prior to caesarean or torn it during a fetotomy. The cow may look quite bright and alert initially, only to deteriorate rapidly as you proceed. When a severely emphysematous fetus is encountered, often it is impossible to pass a wire around and remove a substantial portion of it (Fig. 7). If this is the case, we recommend a caesarean section using a midline approach and packing the area off well with towels. This is a very difficult piece of surgery and often it is desirable to seek the assistance of a colleague. If you elect fetotomy, you require good equipment and an abundance of lubrication. The importance of lubrication cannot be overstressed. If you have had limited experience at fetotomy, this is definitely not the case to further your education.

Summary

In summary, the factors involved in the decision of caesarean section or vaginal delivery may be compared to a balance scale (Fig. 8). Those factors weighing in favour of caesarean are: the live oversize calf; an alert, strong cow; a highly valuable stressed calf; partial dilation of a non-responsive cervix. A tear in the uterine wall unless it is small in the dorsal aspect indicates caesarean. If a formidable fetotomy is required, very little room to work, thus very difficult to remove a substantial portion of the fetus with the first cut, caesarean is the procedure of choice. Caesarean is elected quicker in a posterior presentation than anterior for those borderline oversize cases, realizing that this surgery is also more difficult on the fetus in posterior presentation.

Those factors weighing in favour of vaginal delivery are: the live, normal-size calf; a dead calf; weak, disabled cow; a non-valuable calf; feasible fetotomy; and an anterior presentation.

The experienced clinician, after making his tentative decision, should then discuss the case with the client, giving him the best advice he can. Then with the client's input, a final procedure decision is made.

Terminal Stage of Pregnancy	1st Stage Labour	2nd Stage Labour	3rd Stage Labour
	1-24 hrs. Avg. 6 hrs.	1/2-4 hrs. Avg. 1-1/4 hrs.	1/2-8 hrs.

Figure 1. Stages of labor.

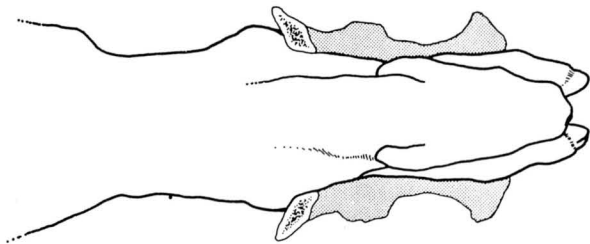


Figure 2. Judging fetal shoulder size.

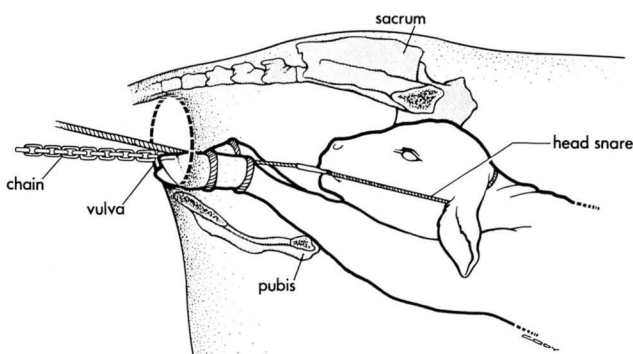


Figure 3. Judging fetal oversize-anterior presentation.

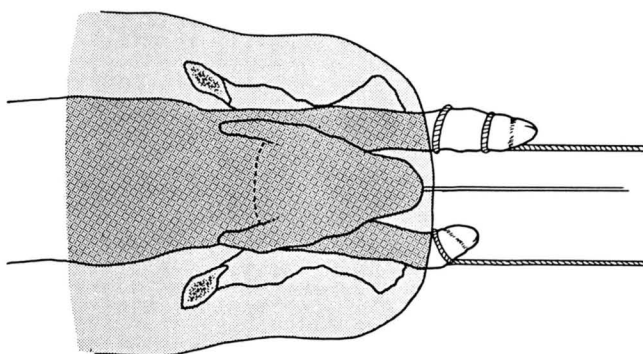


Figure 4. Judging fetal oversize-anterior presentation.

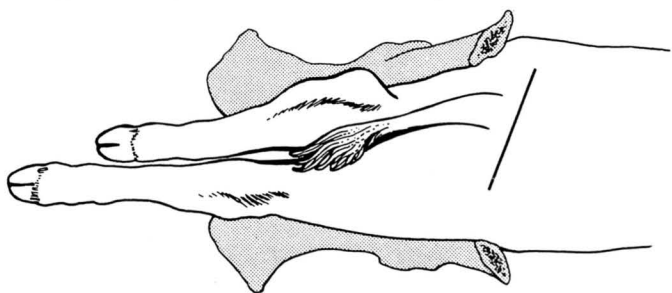


Figure 5. Judging fetal oversize-posterior presentation.

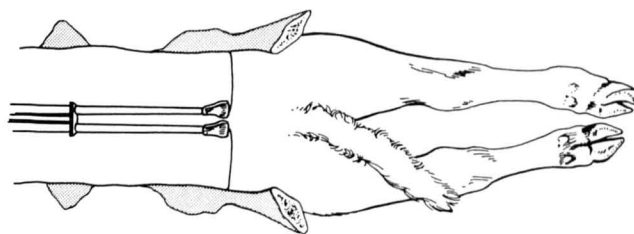


Figure 6. Transecting fetal trunk at L5.

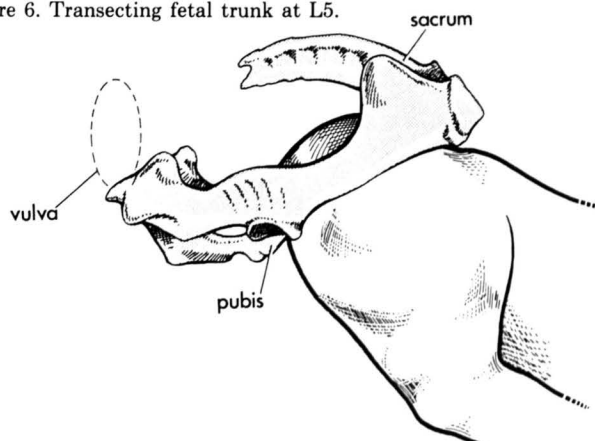


Figure 7. Emphysematous fetus-breech presentation.

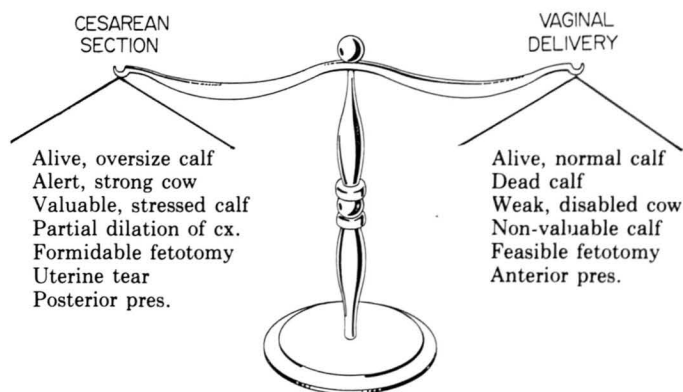


Figure 8. Factors involved in the decision of caesarean section or vaginal delivery.

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