

Utilizing fetal ultrasound in beef herds

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Abstract

Fetal ultrasound in beef cows has many advantages over rectal palpation, but the extent of those advantages will depend on a correct analysis of what type of information can be collected and how the producer will utilize the information. Successfully obtaining images involves making a goal of having easily repeatable, easily obtainable images, and then addressing the livestock and ultrasound equipment factors that contribute to those images as well as the environmental and cow factors that contribute to those images. Optimizing these factors and spending time with the producer addressing how they will utilize the information will determine the type of information that is collected. After this is determined, a plan for collecting the data chute-side and identifying the different groups can be made. The ultimate goal should be to provide actionable data that is easily implemented within in the herd to provide an economic return.

Key words: cattle, breeding, reproduction, ultrasound

Résumé

L'échographie fœtale chez les vaches de boucherie offre plusieurs avantages par rapport à la palpation rectale. Néanmoins, l'ampleur de ces avantages dépend d'une analyse correcte du type d'information à recueillir et de son utilisation par le producteur. Le succès dans l'obtention d'images dépend de l'accès à des images faciles à reproduire et à obtenir. Il est aussi important d'aborder les multiples facteurs qui contribuent aux images incluant le bétail, l'équipement d'échographie, l'environnement ou la vache. Le type d'information qui sera recueillie dépendra de l'optimisation de ces facteurs de même que du temps passé avec les producteurs pour déterminer comment ils comptent utiliser cette information. Après cette étape, un plan de cueillette des données à proximité de la chute et l'identification des différents groupes peuvent être envisagés. Le but ultime est de donner accès à des données exploitables menant à des actions facilement applicables dans un troupeau pour en améliorer la rentabilité.

Introduction

Fetal ultrasound in beef herds has often been thought of as practice that only registered breeders or

high input producers should utilize. It is well known that fetal ultrasound can provide many details undetectable by rectal palpation, such as fetal sex, fetal viability, fetal anomalies, and the presence of twins. These details are unlikely to be needed by all beef producers, but nearly all producers can get an economic benefit from fetal ultrasound over what is attainable from rectal palpation alone. Using ultrasound to determine calving groups is fast, accurate, and economically viable for the producer and the veterinarian performing the service. The economic benefits to the producer can far outweigh the cost depending on the data collected and how that data is utilized.

Obtaining Images

Once the veterinarian can skillfully recognize a fetal image on ultrasound and manipulate the ultrasound probe and reproductive tract, a goal of getting easily repeatable and easily obtainable images should be made. Several factors contribute to getting easily repeatable and easily obtainable images, including the livestock and ultrasound equipment used, the environment, and individual cow factors. Meeting this goal leads to consistent results while obtaining the maximum amount of information available.

A good hydraulic chute is essential to meet the goal of easily obtainable and easily repeatable images. Having a cow fully restrained, as well as having the cow in the exact same position, reduces physical strain on the veterinarian and increases image consistency and speed. A good chute should provide easy access to the rear of the cow without excessive strain to the shoulder and rotator cuff. The chute should be quiet and easily operated by the person ultrasounding. The chute should also be convenient for transport.

A good ultrasound machine is necessary to obtain quality images. New ultrasound machines have digital images and are very portable. In addition, a good machine should be highly durable, have fetal aging software loaded on the machine, and adapt to several types of use depending on the veterinary practice using it. Preferably the machine should be battery operated, accept several types of probes, and have to ability to save images.

Environmental factors that can affect ease of obtaining images with repeatable results include extreme weather and sunlight. Looking at ultrasound images in direct sunlight is possible, but providing some level of protection from the sun allows more differentiation

in shades of gray, and allows better analysis of fetal viability and conformation.

The cow-to-cow variation can affect obtaining good images. Manure consistency can be a large obstacle if the cow has been held off of feed and water. Anything that decreases the level of contact between the probe face and the rectal wall and uterus will compromise the image. Having a large amount of fecal matter decreases image quality and repeatability, and drastically increases the amount of physical strain on the person ultrasounding.

One of the most important factors contributing to getting repeatable and easily obtainable images is the stage of gestation of the cow. Cows that are less than 30 days pregnant require more time to identify the fetus and its viability. The fetus in cows more than 100 days pregnant can be difficult to age and sex due to its size and position in the pelvis. Cows carrying a fetus greater than 120 days of gestation can be very difficult to reach and will have more natural variation in size by that time, ultimately decreasing the level of accuracy in fetal age and sex.

Ideally cows to be examined should be between 30 and 100 days of gestation to obtain the most information. However, knowing the fetal age range allows many groups of cows to be ultrasounded outside of this optimal window; it merely reduces the amount of information that can be provided.

Ultimately, if all the factors that contribute to image quality were optimized, fetal sex, fetal age, and fetal viability could all be provided to the client for every cow. However, all of these factors are rarely optimal in the real world, and the amount of information that can be provided to the client will have to be adjusted accordingly.

Image Classification

The most important part of image identification and evaluation is the ability to identify an open reproductive tract versus a pregnant reproductive tract. Being able to differentiate ovarian structures from cows in early pregnancy is also crucial. For practitioners first starting to ultrasound cows, becoming familiar with images of pregnant tracts, nonpregnant tracts, and ovarian structures before learning how to obtain images can be helpful.

There are several different methods available to determine fetal age using ultrasound. Biparietal diameter, crown rump length, and trunk diameter are common measurements that are included in many ultrasound machines. There are limitations to determining gestational age using these measurements that should be kept in mind when deciding the type of information collected and method used. Regardless of the type of measurement

used, a systematic approach when evaluating the image is helpful. Obtain a specific view of the fetus that can be obtained in the majority of cows within the group. Include an evaluation of the fetal structure, viability, and sex as a part of that fetal assessment.

It is important to be as consistent and repeatable in the data collected as you are with the images obtained. The data collection method does not need to be advanced, but it should preferably be collected by the same person, and the person recording the data should be able to clearly hear and see whoever is ultrasounding. Most errors made during ultrasound examination result from poor data collection. If paper records are used, it is preferable to have carbon copies. A summary of fetal-age group dates, the fetal-age range, the date, number of head, types of markings, and any vaccinations or treatments that were made should be recorded on the same sheet. Paper records should be lined, and lines should be numbered. Collecting data electronically is preferable only if there is a competent person available to collect it.

Utilizing the Data

Deciding the data will be utilized is the most important aspect of fetal ultrasound. A conversation with the producer prior to starting will help determine what type of information is available, what type of information is needed, and how that information will be collected and implemented. Identifying the producer's goals helps determine how the data should be organized, and how the cows should be identified within groups.

Regardless of the intensity of their management practices, nearly all producers find economic benefits from the information obtained by ultrasound compared to rectal palpation. Dividing cows into gestational groups is a common way for producers to capitalize on ultrasound data. Since the length of the breeding season is commonly 60 days, 2 30-day or 3 20-day groups is an easy way to divide a cow herd into calving groups. This is a manageable amount of groups to mark/identify during ultrasound examination. Dividing cows into calving groups obviously allows a producer to manage labor, feed, and disease problems, but it also allows flexibility in marketing. Drought management is a big issue for many producers, and determining when cows will calve can provide a great tool for managing feed resources during drought.

Many producers utilize ultrasound to create marketing groups of calves. Bred heifers are frequently ultrasounded due to the higher amount of labor involved with calving; more precise projected calving dates helps organized labor resources. Many bred heifers are artificially inseminated and ultrasound is frequently used to determine AI versus bull bred pregnancies. Fetal sexing

can be used as a marketing tool as well. Grouping cull cows by fetal age can also be a good marketing tool.

Knowing normal pregnancy distributions with naturally-bred and artificially-bred cattle, as well as normal variations in gestation length, is helpful in determining calving groups. In general, groups that will calve at the same location should not be too short because there will be a significant overlap in calving dates between the groups. Groups that have been AI'd should not be broken into groups that cutoff a return heat cycle. Unless there is a specific need for exact days of gestation for each cow or heifer, I discourage using that as the means of classifying fetal age. Most producers do not have the ability to utilize individual fetal age data, and it will result in overlapping calving dates due to variations in gestation length and aging accuracy.

Proper identification of calving groups is a very important part of the process. Information provided by fetal ultrasound must be easy to utilize to be of most value to the producer. For many producers, this means that the information provided needs to be translated into an actual identifying mark before the cow leaves the chute.

Without this step much of the information becomes merely notes on a page that never gets used. Using an inexpensive ear tag or bleach mark to identify various groups at the time of ultrasound allows the producer to easily use the information at any time.

Conclusion

Optimizing the livestock equipment, ultrasound equipment, environmental setting, and various cow factors involved with ultrasounding allows the practitioner to get images that are repeatable and consistent. In turn, getting repeatable and easily obtainable images leads to a fast, accurate, and profitable process.

Providing a producer the ability to manage calving groups, labor, feed resources, disease problems, or capitalize on better markets is the real value in fetal ultrasound. Combining this service with other veterinary resources provided to the producer strengthens the relationship with clients and gives the veterinarian an advantage over lay people that offer ultrasound services.