Routine thoracic ultrasound: Your gateway to calf consults and practice profits

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Abstract

Routine thoracic ultrasonography is a developing service offered by veterinary practitioners that acts as an accurate, rapid, calf-side diagnostic tool to aid in calf health management. Bovine practitioners competent in the technique can provide this service to progressive producers by way of client education, demonstration and evidence of impact on bovine respiratory disease (BRD) in pre-weaned dairy calves. Routine, strategic scanning demonstrates trends in new infection rate, cure rates and severity of lesions in those affected. Utilizing the data to establish benchmarks for individual calf programs allows practitioners and producers to make prudent, evidence-based decisions on treatment and management changes to aid in prevention. Routine thoracic ultrasound is a tremendous opportunity for new and recent veterinary graduates who are looking to expand clinic services, and can be offered with little additional overhead. Consistent veterinary involvement brings the practitioner to the forefront in calf management and consultation.

Key words: practice management, ultrasound, calves

Thoracic ultrasound technique

Utilization of ultrasonography for examination of the thorax of the pre-weaned calf is a rapid, minimally invasive, calf-side diagnostic that allows the practitioner to gain insight on the respiratory disease status of calves with no outward clinical signs. With a reported sensitivity of 79-94% and specificity of 94-100%,[1,2,4] this diagnostic technique offers an untapped potential to both the veterinary practitioner and producer to maximize detection of BRD in pre-weaned calves, reducing the negative-associated effects of BRD on replacement heifers during rearing and their productive lifetimes.

Familiarity with the technique of thoracic ultrasound (TUS) by bovine practitioners is an obvious essential step in offering this service to progressive dairy clients. Numerous opportunities have been available for practitioners to learn this technique at AABP (American Association of Bovine Practitioners) preconference seminars and other university outreach meetings, and a growing number of new or recent veterinary graduates have good familiarity with the technique upon graduation. Utilization of a 0 to 5 scoring technique described by Dr. Terri Ollivett simplifies the description of severity of lung consolidation on a numerical scale that is relatively easy to convey to producers: [3]

Calves are ultrasound-scored using a 0 to 5-point scale:

    0 and 1 = normal
    2 = lesions > 1 cm, but < 1 lobe
    3 = at least one lung lobe consolidated
    4 = at least two lung lobes consolidated
    5 = three or more lung lobes consolidated

Seventy percent isopropyl alcohol is applied to each side of the calf thorax as a contact medium, allowing the ultrasound to generate an image of the lung field as the probe is placed between each of the intercostal spaces 10th to 1st. Practitioners who develop competency and confidence in scanning calves should be able to perform this technique in under 30 seconds per calf.

Client education and marketing

Implementation of routine TUS on farms is primarily fueled by demonstration and/or word-of-mouth referral from producer to producer. That aside, educating producers on the long-term effects of BRD in pre-weaned calves and possible unknown prevalence is imperative to successful application of this service on-farm. Producer outreach and education meetings allow for dissemination of information to producers in a low-risk environment to market this service. Additionally, offering a trial of the service as a "loss leader" can show the producer the impact that ultrasonography has on detecting subclinical calves that would otherwise go undetected by the nature of the definition.

Strategic scanning

Practitioners who have demonstrated the importance and impact of subclinical BRD to producers are faced with the challenge of how to implement this diagnostic on farm as a cost-effective and impactful tool to use in a calf-rearing program. Initial cursory scans should be done to determine the age of onset in each individual herd to customize a scanning plan to maximize detection on that specific farm. Scanning at approximately 3 weeks of age is a good starting point since maternal antibody is waning at the same time active immunity is being developed by the calf. Additionally, a scan at 5 weeks of age will straddle this timeframe in which the calf is most susceptible to respiratory disease, called the window of susceptibility. Calves can additionally be evaluated at 7 weeks if they exhibited lesions at 5 weeks to monitor treatment success. A two or three-scan system allows the producer and practitioner to monitor disease incidence and treatment success. Alternatively, practitioners may choose to scan to monitor post-treatment success (improvement or resolution of lesions within 7 to 10 days), or monitor prevalence of lesions at weaning or pre-grouping ("exit scanning"). Regardless of the approach, practitioners should be cognizant of how the data is going to be utilized.

Anecdotally, calves typically do not exhibit lung lesions under 2 weeks of age unless processing of the newborn calf is performed incorrectly or the possibility of disease pressure is high, such as instances of consistent failure of passive transfer, high prevalence of concurrent disease, ventilation inadequacies in barn-housed calves, subpar nutrition, etc. In these instances, treatment rates of clinical calves may be at an acceptable rate. Working with producers to identify and correct these problems can shift consultation toward the veterinarian, providing additional opportunities of business.

Pairing TUS results with additional diagnostics such as deep nasopharyngeal swabs for viral PCR (polymerase chain reaction) and bacterial culture can direct treatment efforts or practical

vaccination needs and schedules. Knowing and understanding the current vaccination protocol can help direct scanning efforts toward logical timeframes to examine calves. It becomes obvious that detection is not prevention. That being stated, detecting calves with subclinical BRD can aid in correct treatment at the earliest onset of disease, allowing for better treatment success which subsequently follows with better post-transition performance until replacements enter the milking string.

Data analysis and utilization

On a basic level, detection and treatment of subclinical BRD in calves is fairly straightforward – "this calf has subclinical BRD, so let's treat her." Opportunities for practitioners with familiarity in on-farm records software or Microsoft Excel to analyze data are abundant, although reporting basic disease incidence and cure rate data may be all that is needed. For simplicity's sake, assigning calves as either positive (score ≥ 2) or negative (score < 2) aids in generating new infection rate and cure rate data. Not only providing producers with a list of subclinical calves to treat, but also visit-to-visit key performance indicators provides producers with a value-added service to track performance over time. The three most crucial indices to monitor are:

1. New infection rate (goal < 25%)
2. New infection cure rate (i.e. excludes chronic calves (goal > 80%)
3. Proportion of new infections with score ≥ 3 (goal < 30%)

Monitoring these indices over time helps evaluate trends in calf respiratory health, treatment success, and severity of lesions at first evaluation. For example, a recent decline in treatment success may lead to the discovery of under-dosing antibiotic, inappropriate antibiotic choice, or other factors that attribute to high disease pressure that may decrease treatment cure rate, elevate new infection rate, and the severity of those lesions. The overarching goal is to generate an idea of pre-weaned respiratory health of each calf going into weaning/grouping. Identification and treatment in the pre-weaned period prevent relapses during the most stressful time in the calf's life.

Thoracic ultrasound as a practice builder

New and recent graduate practitioners generally strive to create a niche or aspect of veterinary medicine in which they thrive. Practice owners should be cognizant of this, and allow flexibility of their associates to develop new skills and services for their clientele. TUS is a developing and emerging skill that producers unknowingly crave and seek out. New hires generally are either 1) replacing an existing position within a practice, or 2) carving out a new position for themselves within the practice, attempting to accumulate clientele that they consider their own.

Regardless of either of these common scenarios, exploring new services to offer to producers falls, by nature, onto the younger generation of veterinarians. Since rectal ultrasonography for pregnancy diagnosis is commonly offered by many veterinary practices, there is little overhead in offering TUS other than isopropyl alcohol and time. Additionally, developing this service will naturally generate questions and concerns by producers that will be funneled to the practitioner.

Historically, youngstock rearing on dairies functions commonly in lieu of veterinary involvement other than maintaining a valid veterinary client-patient relationship and when occasional calf health issues arise. Producers, with increasing frequency, are looking to feed mill or pharmaceutical company representatives due to their availability and perceived free-of-charge consultation. Shifting the focus to the veterinarian as the forefront authority on calf health is imperative to not only the success of the calf program, but also for the industry to garner consumer trust. Routine TUS assists in more concrete veterinary involvement in a calf program, using advanced diagnostic capabilities to ensure calves are attaining their potential.

Conclusions

Routine TUS is an emerging service that can be offered by bovine veterinarians to aid in calf health management. Competency in the technique allows for rapid detection and diagnosis of subclinical BRD in pre-weaned calves. Scheduled herd visits with an intent to utilize data collected, allow for monitoring management changes and gain insight to each individual calf's respiratory health prior to transition to a dry ration. Providing the producer with key performance indicators after each visit strengthens the value of this service, in which focus of implementation should be toward progressive producers. TUS allows for expansion of practice services, shifting the focus of calf consultation toward the veterinarian.

References

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