Ultrasonographic Examination of the Equine Neonate: Thorax and Abdomen

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KEYWORDS

• Neonatal diagnostic imaging • Thoracic ultrasound • Abdominal ultrasound

KEY POINTS

- Diagnostic imaging can substantially augment physical examination findings in neonatal foals.
- Used either in combination with radiography or as a stand-alone imaging modality, ultrasound evaluation of the thoracic and abdominal body cavities is often a high-yield diagnostic undertaking.
- Many of the conditions that afflict neonatal foals are highly amenable to sonographic interrogation, including pneumonia and other changes in the lungs associated with sepsis, systemic inflammatory response syndrome , multiple organ dysfunction, and prematurity; colic arising from both medical and surgical causes; and urinary tract disorders.
- Sonographic imaging is not impaired by intracavitary fluid accumulation, and it reveals abnormalities of both soft tissue and bony origin.
- Adding imaging findings to physical examination and laboratory results aids the veterinarian in detection of intracavitary disease early in evaluation, and this translates into an improved level of both patient care and client care.

IMAGING IS AN IMPORTANT COMPONENT OF A COMPREHENSIVE EXAMINATION

Among the most common owner complaints that prompt presentation of neonatal foals to a veterinarian for evaluation and care are lethargy, failure to nurse, colic, respiratory signs, urinary tract abnormalities, and various manifestations of sepsis and the systemic inflammatory response syndrome. Because foals lack the tolerance for pain or the physiologic compensatory reserves that adult horses can draw on, adopting a passive, wait-and-see approach with a compromised neonate is often

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an unrewarding strategy and is considered by some to fall below the present standard of care. The practitioner should conduct a comprehensive examination to return the highest yield possible of relevant information. Combining the visual input of diagnostic imaging with physical examination findings and laboratory results adds thoroughness to the evaluation, not only at the time of initial presentation but also during serial monitoring in follow-up examinations.

Of the diagnostic imaging modalities available for use, ultrasonography, radiography, and, increasingly, computed tomography (CT), can provide important and specific input into medical problems of the neonate. Although the preponderance of cases in which CT was used in equine practice has involved orthopedic or intracranial applications,[1] tomography has recently been used to evaluate the lungs in foals[2–5] and holds promise for investigation of intracavitary diseases in this subset of equine patients in the future. At present, though, its availability is limited; it necessitates use of trained personnel and is generally unavailable after hours, and it requires a foal to be heavily sedated or anesthetized. Radiography and ultrasonography yield complementary information and have specific strengths and weak points in their capabilities, but both types of equipment are portable and can be used as point-of-care testing in the stall.

Diagnostic ultrasound equipment is light and easy to set up; the imaging involves no exposure to ionizing radiation, and owners or other stakeholders present find the real-time images of ultrasound especially compelling and illustrative of explanatory points being made by the veterinarian. From a purely imaging standpoint, ultrasound confers certain advantages that are useful in emergent scenarios: it is not necessary to take multiple views to determine the laterality of a lesion; there are no issues with magnification and loss of resolution with varying film-focal point distance; it is not necessary to obtain the images at peak inspiration; some points inaccessible to radiography (eg, the cranial mediastinum, pleural space, and lung fields lying ventral to the diaphragmatic crura) are easily and sensitively examined with ultrasound; and accumulation of fluid in body cavities or in the lung does not add a general opacity or loss of detail to the images but rather increases the acuity of the imaging. Accumulation of fluid in the pleural or peritoneal cavity, for instance, does not necessitate draining of the fluid and then reimaging so that the lung or visceral organs can be better evaluated, but reveals details of tissue form and function through the fluid—whether lung is atelectic or consolidated, or whether a given segment of intestine surrounded by peritoneal fluid is distended but contractile or distended and adynamic, for example—and also reveals clinically relevant characteristics of the fluid itself—whether it occupies one or both hemothoraces, or whether it is acellular and consistent with a transudate or cell-dense and likely to be hemothorax or exudate, to site 2 examples. In short, gaining skill with sonographic imaging can yield an impressive body of information to what which is obtained through physical examination and laboratory testing.

Sonographic imaging does have some shortcomings, and these will be discussed at relevant points in the following sections detailing specific pathologic conditions. Nevertheless, keeping an ultrasound machine in the practice vehicle or plugged in near the examination room is a convenient, safe, and rapid way to add significantly to the body of information derived from the physical examination. At initial evaluation, and later, during serial monitoring as the foal responds to treatment or morbidity progresses, the value of sonographic imaging to the examining veterinarian is hard to overstate and is the focus of this article. The reader is directed to other sources for details of treatment.