# Prognostic Indicators for Survival and Athletic Outcome in Critically Ill Neonatal Foals

Pamela A. Wilkins, BS, DVM, MS, PhD

**KEYWORDS**

• L-Lactate • Sepsis • Prematurity • Neonatal encephalopathy • Critical care
• Intensive care

**KEY POINTS**

- Providing a prognosis for survival is generally more accurate than providing a prognosis for nonsurvival.
- Prognoses can be made for survival to hospital discharge, survival to a certain age, reaching certain sales expectations, or for performing as intended at a certain age among others.
- Many early studies were retrospective and focused on general populations of sick foals. More current prospective and retrospective studies are identifying differences in various prognostic indicators based on primary diagnostic categories, differences in management techniques, and changes in various indicators with time.
- No prognostic indicator will perform perfectly, particularly when dealing with a species where euthanasia decisions are commonly made for reasons other than impending death.

The management of critically ill foals is labor intensive, relatively expensive, and often stressful for the owner. Providing owners a well-informed prognosis for both survival and future usefulness of the foal early in the course of treatment is highly desirable. Today, there are many completed and ongoing projects aimed at improving the ability of equine practitioners to provide this information, but much work remains to be done. This article touches the surface of some of the indicators of outcomes that have been identified in order to provide the practitioner a sense of the utility of these indicators, particularly as they may relate to specific disease processes.

## MATERNAL BODY WALL TEARS (PREPUBIC TENDON RUPTURES)

Early peer-reviewed reports of prepubic tendon and ventral body wall tears occurring in prepartum mares appeared in 1982 and 1986, respectively, although the conditions

The author has nothing to disclose.
Department of Veterinary Clinical Medicine, University of Illinois College of Veterinary Medicine, Urbana-Champaign, 1008 West Hazelwood Drive, IL 61801, USA
*E-mail address:* pawilkin@illinois.edu

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were anecdotally known to veterinarians before that time.[1,2] The largest early reported case series described 4 mares with abdominal wall herniation and was published 30 years ago.[1] Three of the 4 cases in that case series were euthanized with no attempt to save the foal. The fourth case had parturition induced with delivery of a dead foal. The recommended treatment of abdominal wall herniation/prepubic tendon rupture was induction of parturition with attempts to save the foal depending on the owner's wishes and the supposed fetal readiness for birth.

Potential predisposing factors to body wall defects cited in the literature include hydrops allantois, hydrops amnion, trauma, twins, and fetal giants.[1,2] The earliest references suggested that mares be restricted to stall rest after induction, with abdominal support provided.[1] Repeat breeding was discouraged. Reported complications included laminitis, retained placenta, septic metritis, and shock.[2,3] Other primary literature pertaining to body wall defects focused on isolated cases.[4,5] Early reports suggested that mares be managed with supportive care, analgesia, restricted exercise, and abdominal support until they become suitable candidates for induction of parturition or elective cesarean section, carried out to prevent further abdominal wall trauma associated with abdominal muscle contraction during parturition yet allowing for potential delivery of a viable fetus.[1–4]

Treatment of mares with body wall defects has evolved over recent years at some facilities, and induction of parturition or elective cesarean section are generally avoided in these practices, when possible, because of potential risks to the fetus associated with inappropriate timing of induction of mares.[5,6] Conservative case management consists of stall rest/confinement, abdominal support, continuous monitoring of mare and fetus, and pain management, in addition to repeated ultrasonography and treatment of placentitis if indicated. All parturitions should be attended, and assistance rendered if necessary. Outcome for foals is improved with this conservative approach to management of body wall defects in pregnant mares compared with more interventional management approaches based on one recent study.[6] The study was a small, retrospective case series and, as such, has many limitations; however, it does serve to describe the conservative approach and allow reporting of outcomes using this approach.

Most importantly, the study showed that mares with body wall tear/prepubic tendon rupture could be successfully conservatively managed with a good prognosis for survival for the foal, making conservative management of mares with body wall defects the optimal therapeutic option, if possible, based on the condition of the dam. The outcome for mares did not seem to be significantly affected by type of management. Because few mares presented with hydrops allantois/amnion in the study, the investigators could not draw significant conclusions about the effects of hydrops allantois/amnion on mare survival, and although foal survival from mares with hydrops conditions has been reported, it is less in mares with hydrops conditions.[7] It is important to recognize that in some hydrops conditions, mares were euthanized shortly after presentation, or induced early in gestation, without attempt to save the fetus, introducing a bias based in clinician and owner perception of likelihood for survival that was not investigated. Despite the small number of cases reviewed, a clear improvement in outcome for foals was seen with conservative management of mares with body wall tear/prepubic tendon rupture, likely related to more appropriate readiness for birth. Not all cases are amenable to conservative management (ie, mares in extreme discomfort, or mares with rapidly enlarging body wall defects), and humane issues should always be of the primary concern for the attending clinician. However, mares with abdominal wall tear/prepubic tendon rupture can be successfully managed to term, and live, healthy foals can result from such pregnancies.