

Commentary

Is it time to retire the use of intrauterine glass balls for estrus suppression in mares?

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The ancient medical maxim *primum non nocere* (first, do no harm)¹ comes to mind when reflecting on the more than 10 years that veterinarians have been using intrauterine glass balls (ie, marbles) for estrus suppression in mares. Although these devices were initially thought to be innocuous, a spate of recent reports²⁻⁶ has documented the potential for deleterious reproductive consequences associated with their use. In light of these reports, rethinking the use of these devices seems prudent, particularly because they are intended to address a behavioral issue (ie, the real or perceived adverse effects of estrus on performance activities such as showing and racing) rather than a disease condition.

Glass balls are inserted into the uterine lumen in an effort to prolong functioning of the CL and allow for continued secretion of progesterone, which suppresses estrous behavior naturally. In nonpregnant mares, the CL secretes progesterone for approximately two weeks after ovulation (ie, the duration of diestrus) and then stops functioning when the endometrium secretes prostaglandin $F_{2\alpha}$, causing luteolysis. As a result, serum progesterone concentration falls, and the mare returns to estrus. In 2003, Nie et al⁷ reported that placement of a 25- or 35-mm-diameter sterile glass ball in the uterine lumen immediately following ovulation resulted in prolonged CL function in 39% of the mares that retained the glass ball after insertion (50% of the smaller glass balls were expelled soon after placement). In those mares that developed prolonged CL function following placement of the glass ball, CL function was maintained for approximately 90 days, during which time serum progesterone concentrations were > 1.0 ng/mL and estrous behavior was not observed.

Clinical interest in the intrauterine glass ball protocol was driven by the desire for nonpharmacological (ie, nonhormonal) methods of estrus suppression that could serve as an alternative to use of the synthetic progestin altrenogest,^{a,b} which is widely considered the gold standard for estrus suppression in mares. Although altrenogest reliably blocks estrous behavior, it is expensive, must be administered daily, and poses safety concerns for personnel who handle the drug.⁸ Because of these limitations as well as heightened concerns over the use of exogenous steroid hormones in performance horses, the intrauterine glass ball protocol provided an

ABBREVIATION

CL Corpus luteum

attractive alternative, leading to its widespread use for estrus suppression.

In their study, Nie et al⁷ investigated whether the presence of a glass ball in the uterus would induce pathological changes in the endometrium by comparing uterine biopsy specimens collected immediately before insertion of the glass ball with specimens obtained immediately after the ball's removal. Of the 18 mares that retained the glass ball, 1 had a mild increase in chronic inflammation of the endometrium, whereas the remaining 17 had no adverse changes in uterine biopsy score. In addition, the mares were bred the year following glass ball removal with a 74% pregnancy rate. Collectively, these results were taken as evidence of the innocuousness of the procedure. However, in 2011, there was a report⁹ of spontaneous fragmentation of a glass ball in the uterine lumen of a mare. Five additional case reports²⁻⁶ describe 9 mares with deleterious consequences associated with the presence of one or more intrauterine glass balls. Clinical signs, when present, included vulvar discharge, signs of urogenital discomfort, and chronic, intermittent colic. The most severe complications were pyometra and glass ball fragmentation. An apparent contributing factor in all of these mares was long-term (ie, years) retention of the glass ball or balls. Notably, 5 (56%) of the mares had 2 glass balls in the uterine lumen, presumably as a result of insertion of a second glass ball without knowledge of the first or on the basis of an assumption that the first had been spontaneously expelled. Findings for these 9 mares provide a compelling reason to discourage the use of intrauterine glass balls for estrus suppression in mares and, when they are used, to ensure that they are subsequently removed. In addition, clinicians would be advised to carefully check for intrauterine glass balls in mares that have been retired from performance activities so that any intrauterine glass balls can be removed.

Importantly, there are alternatives to the use of intrauterine glass balls for prolonging CL function, including oxytocin treatment, induction of late-diestrus ovulation, intrauterine infusion of plant oils, and pregnancy.³ Of these, oxytocin treatment seems to be the most practical and efficacious. Administration of 60 U of oxytocin IM on days 7 to 14 after ovulation induces prolonged CL function in 60% to 70% of treated mares, allowing suppression of estrous behavior for approximately 2 months.^{10,11}

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In conclusion, in keeping with the principle to do no harm, it seems prudent to forego using the intrauterine glass ball protocol for estrus suppression in mares and consider using one of the alternative methods of prolonging CL function instead.

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- a. ReguMate, Intervet, Millsboro, Del.
 - b. Altresyn, Ceva Animal Health, Lenexa, Kan.
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