



Theriogenology Question of the Month

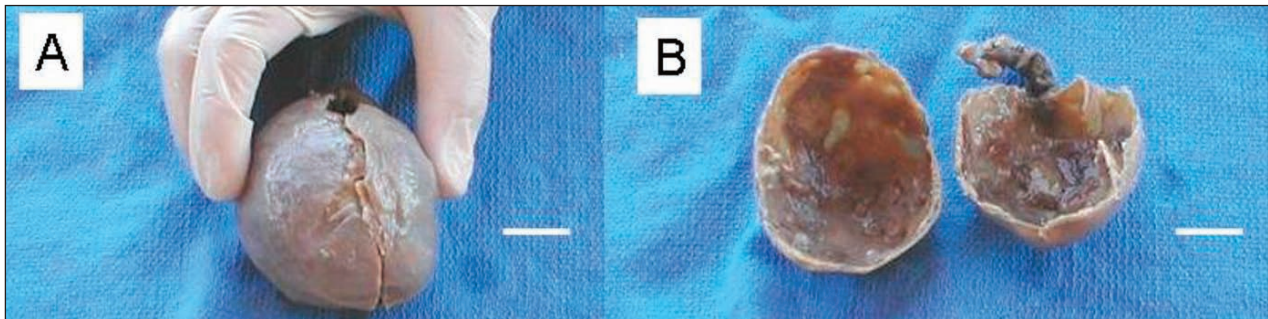


Figure 1—Photographs of a bony mass removed from a pedunculated stalk of tissue attached to the umbilical cord of the fetal membranes of a 6-year-old Arabian mare that gave birth to a healthy male foal on day 351 of gestation. The mass was removed from the umbilical cord. After it was fixed in neutral-buffered 10% formalin solution, the intact mass (A) was then bisected (B). Bar = 2 cm.

History

A 6-year-old Arabian mare was bred by a stallion 2 times with an interval of 2 days between breedings. Transrectal ultrasonography performed 21 days after the second breeding revealed a single embryonic vesicle

This report was submitted by Julie M. Harbo, DVM; Roy D. Mausling, DVM; Donald H. Schlafer, DVM, PhD, DACT, DACVM, DACVP; and Dirk K. Vanderwall, DVM, PhD, DACT; from the River Ridge Veterinary Hospital, 10300 S Miller Rd, Litchfield Park, AZ 85340 (Harbo, Mausling); the Department of Biomedical Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853 (Schlafer); and Northwest Equine Reproduction Laboratory, Department of Animal and Veterinary Science and Center for Reproductive Biology, College of Agricultural and Life Sciences, University of Idaho, Moscow, ID 83844 (Vanderwall). Address correspondence to Dr. Vanderwall.

(30 mm in diameter) at the base of the left uterine horn. The mare subsequently gave birth to a healthy male foal 351 days after the second breeding.

Fetal membranes were expelled approximately 1 hour after parturition. The fetal membranes were examined the following day to ensure they were complete (ie, all membranes had been expelled) and for evidence of abnormalities. During evaluation of the fetal membranes, a round (6-cm diameter) bony mass was identified attached to the umbilical cord by a pedunculated stalk. The mass was removed from the fetal membranes. It was opened, which revealed a hollow interior that contained reddish-brown serous fluid (Figure 1).

Question

What is this mass? *Please turn the page.*

Answer

A large ossified remnant of the yolk sac.

Results

The gross appearance, physical characteristics, and site of attachment of this umbilical cord mass are consistent with those of an ossified remnant of the yolk sac.



Figure 2—Same photograph as panel B of Figure 1. The mass was attached to the umbilical cord by a pedunculated stalk of tissue, a portion of which is evident (arrow). Bar = 2 cm.

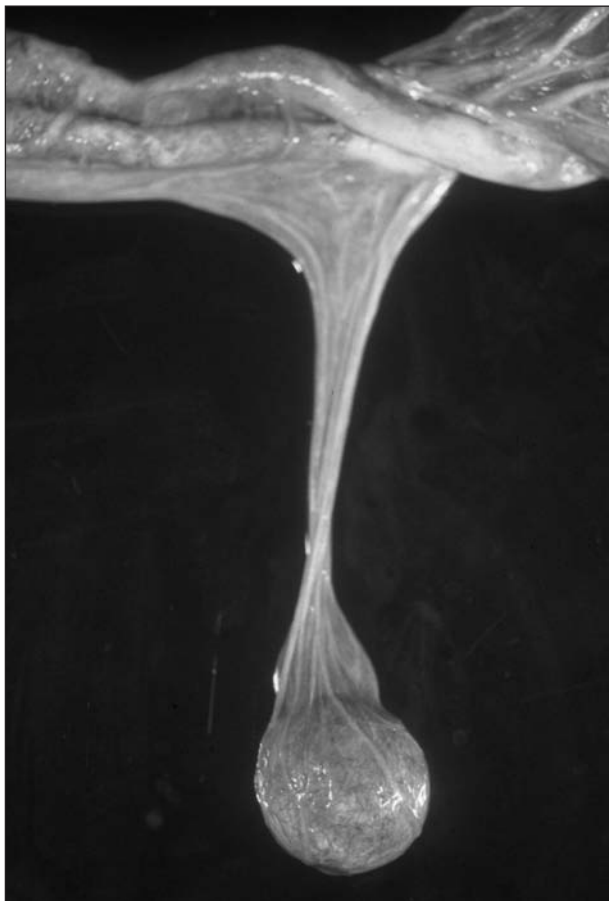


Figure 3—Photograph of a large ossified remnant of the yolk sac with a pedunculated attachment to the allantoic segment of the umbilical cord from a mare with a full-term foal. Notice the bands of tissue extending from the mass proximal and distal along the umbilical cord.

Discussion

It has been known for several years that ossified remnants of the yolk sac (evident as round bony masses) can be found attached to the umbilical cord of horses.¹ These masses arise from remnants of the yolk sac but are commonly misdiagnosed as being the result of a twin fetus that failed to develop successfully. These masses have also been incorrectly described in the veterinary literature as being the equivalent in horses to the amorphus globosus condition in cattle.²

The embryonic yolk sac in horses typically undergoes complete regression or involution between days 20 and 40 of gestation concurrent with development of the allantoic sac.³ Idiopathic failure of complete regression of the yolk sac results in persistence of a yolk sac remnant that usually becomes ossified. Ossified remnants of the yolk sac typically have a thin outer wall of bone covered by nondescript vascularized connective tissue. They often have a large fluid-filled central cavity that usually contains tan-colored fluid. The ossified remnant of the yolk sac reported here was attached to the umbilical cord by a pedunculated stalk (Figure 2). This is typical of large ossified remnants of the yolk sac, which often extend from a pedunculated stalk attached near the middle of the allantoic segment of the umbilical cord.

In a retrospective study⁴ of fetal membranes of mares, characteristics of 21 fetal membranes that contained umbilical cord masses were compared with characteristics of 15 fetal membranes that did not contain masses in the umbilical cord. In that study, masses were found in fetal membranes or umbilical cords of mares that ranged from 5 months of gestation to term. All masses were detected within or attached to the allantoic segment of the umbilical cord. Median diameter of 19 of those ossified yolk sac remnants was 5 cm (mean \pm SD, 5.4 \pm 2.8 cm).

In that retrospective study,⁴ the largest ossified remnant of the yolk sac was 13 cm in diameter; it was found in the umbilical cord of a mare that had a normal term fetus. Two of the smaller masses did not have a typical spherical shape, nor did they have partial ossification of the outer wall. Those 2 remnants were more solid masses with an interwoven trabecular arrangement of bone with irregular internal cavities.

Also, in that study,⁴ smaller masses were found within the core of the umbilical cord and had thin bands of yolk sac tissue that extended proximal and distal along the cord. When pedunculated, the stalk of larger ossified yolk sac remnants contained 2 bands of proximal and distal segments of nonossified segments of the yolk sac (Figure 3). Once they entered the core of the umbilical cord, these segments continued and extended proximally and distally inside the cord. Ossified tissues of the outer wall were commonly found to be plaques or plates of bone, which frequently fused to form a nearly continuous outer shell of lamellar bone.

Although most of the masses identified in that study⁴ were incidental findings that did not appear to have clinical importance, 2 masses were associated with fetuses that had been aborted and subsequently submitted for routine diagnostic evaluation. The history that accompanied submission of one of the fetuses

included the clinician's diagnosis of umbilical cord compression attributable to the mass as the probable cause of abortion. No infectious agents were cultured from either fetus, and there were no histologic lesions indicative of an infectious cause of abortion for either fetus. Therefore, the presumptive diagnosis for both fetuses was physical compression of the umbilical cord resulting from the mass, with subsequent placental compromise resulting in abortion.

Outcome

The foal reported here was healthy and vigorous at birth. The mare also appeared to be healthy after parturition. Therefore, detection of the ossified remnant of the yolk sac in the fetal membranes was determined to be an incidental finding. No treatments were deemed necessary for the mare or foal. The mare was insemi-

nated with fresh, extended semen during the foal heat and conceived to that breeding. Presently, the pregnancy is progressing normally.

References

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