

Fetal mummification of a 270 day fetus in a mare

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Summary

A 12 year old, Selle Francais mare was presented for pregnancy evaluation. A transabdominal ultrasound examination by the referring veterinarian had revealed a lack of fetal fluids and no visible fetal heartbeat. On presentation, the mare was bright and alert. Transabdominal and transrectal ultrasound examinations were performed; both confirmed the referring veterinarian's findings. On transrectal palpation, the cervix was tightly closed and the uterus was partially involuted. Bony protuberances of the fetus were palpable transrectally. A vaginal examination was performed. With manipulation, the cervix did not fully dilate; however, one hand could be passed into the uterus which was contracted around bony portions of a large fetus. The client elected a cesarean section to eliminate the risk of uterine or cervical trauma. A partially mummified 17 kg fetus, with a crown rump length of 86 cm was removed from the uterus. The mare recovered uneventfully after surgery.

Background

This case describes the second report in the literature of a fetus that developed past 200 d of gestation prior to mummification, without the mare displaying signs of systemic illness. It also describes successful removal of the large fetus via cesarean section.

Case presentation

A 12 year old, primiparous, Selle Francais mare was presented to the University of Pennsylvania New Bolton Center for pregnancy evaluation at approximately 350 d of gestation. The mare was initially examined 33 days prior to admission by the referring veterinarian at approximately 317 d gestation, when premature mammary gland development was noted by the owner. Palpation and ultrasonography per rectum at that time revealed a thickened combined thickness of the uterus and placenta, the viability of the fetus was not assessed transabdominally at this time. Trimethoprim sulfa and altrenogest administration for suspected placentitis were initiated. The mammary gland development regressed and no signs of premature labor were observed.

Eleven days after the mare's expected due date, at approximately 350 d gestation, the referring veterinarian performed a second transrectal and transabdominal ultrasound examination. At that time, no fetal fluids were visible, the fetus had no heartbeat and there was no fetal movement. The mare was referred to New Bolton Center that same day for further evaluation.

On presentation, the mare was bright and alert with all vital parameters within normal limits. The mare had no vaginal discharge, a slightly developed mammary gland and milk could be expressed from both teats. Bloodwork was unremarkable with a packed cell volume of 35%, total protein of 7.0 gm/dl, white blood cell count of $6.78 \times 10^3/\mu\text{L}$ and a creatinine of 1.2 mg/dL.

Transabdominal ultrasonography was performed and the uterus was seen to be partially involuted and no fetal fluids were visible. Hyperechoic structures consistent with fetal bones were visualized in the right caudo-dorsal inguinal area; no fetal heartbeat was present. Palpation and ultrasonography per rectum were performed. Bony protuberances of the fetus were easily palpable through the wall of the uterus, and were visible on ultrasound as hyperechoic structures in the uterine lumen.

Treatment

Transvaginal manual delivery of the fetus was attempted. The cervix was initially closed, but with gentle manipulation one hand was passed through the cervix to evaluate fetal size and position. The fetus was relatively large with leathery contracted tissue, making it difficult to assess. The suspected presentation, position and posture were anterior longitudinal, dorsoiliac with the head and neck flexed. A sterile nasogastric tube was passed through the cervix and a solution of methylcellulose lubricant and

water was pumped into the uterus around the fetus. The cervix failed to fully dilate, the uterus was inelastic and the fetus was rigid making manipulations to correct the position difficult. Since the owner's primary concern was preserving fertility of the mare, a cesarean section was recommended at this time to prevent uterine or cervical trauma.

The mare was pre-medicated with 0.5 mg/kg xylazine intravenously (IV) and induced with 2.2 mg/kg ketamine IV and 0.05 mg/kg midazolam IV. Anesthesia was maintained with isoflurane. The fetus was removed through a midline laparotomy incision. The fetus was female and weighed 17 kg with a crown rump length of 86 cm, suggesting that the fetus died around 270 days gestation. There was no malodorous exudate or fetal maceration suggestive of active infection. Both the limbs and nose of the fetus were contorted. The presentation position and posture was confirmed as per vaginal assessment. Additionally, the right front limb was flexed at the carpus and the left front limb was flexed at the elbow. The hind limbs were bilaterally flexed at the hock. The skin was diffusely brown black, leathery and easily sloughed. Viscera were in varying degrees of dehydration. The fetal membranes were friable brown and leathery, and were removed in entirety with the fetus. (see Figure)

The mare recovered from general anesthesia uneventfully. After surgery, the mare was administered 22,000 IU/kg of potassium penicillin IV QID, 6.6 mg/kg of gentamicin IV SID and 1.1 mg/kg of flunixin meglumine IV BID for 72 hours. The mare was administered maintenance, 60 ml/kg/day, IV fluids at 1-2 L lactated Ringer's solution/hour for the first 24 hours after surgery. The uterus was lavaged with 5 L sterile saline 24 hours following surgery. The effluent was slightly blood tinged with a few blood clots and all the fluid was recovered. Following the lavage, a single dose of 20 IU oxytocin was administered IV to evacuate the uterus.

Outcome

Palpation and ultrasonography per rectum 48 hours after surgery revealed that the left ovary contained a corpus luteum and multiple small follicles < 20 mm in diameter. The right ovary contained multiple small follicles < 15 mm in diameter. The uterus had excellent tone and no intraluminal fluid. The cervix was closed and no fluid was visualized in the vagina. The mare was discharged with instructions to continue oral administration of a 1.1 mg/kg dose of flunixin meglumine once daily for three days. It was recommended the mare be kept on stall rest for one month, then turned out in a small paddock for one month before being turned out with a group of brood mares.

Discussion

Fetal mummification of a singleton fetus and fetal maceration are rarely reported in the mare. The fetoplacental unit becomes the dominant source for progesterone once endometrial cups regress between 90-120 d of gestation.¹ Without a functioning fetoplacental unit a fetus is generally aborted shortly after death, before mummification occurs.¹

Fetal mummification was first reported in 1984 by Ginther and Pierson in describing the ultrasonographic anatomy and pathology of the equine uterus.² On transrectal ultrasound of 300 ponies and 110 horses several mummified fetuses were identified.² One mare reportedly had the mummy removed and became pregnant when bred that same season, no subsequent pregnancy data were given on the other cases.² There are limited other case reports available with several causes proposed for the mummification.

In mares carrying a singleton fetal mummy altrenogest administration is thought to cause retention of the dead fetus. There are several case reports in the literature that seem to support this hypothesis, however many pregnant mares administered altrenogest abort shortly after the fetus dies.^{3,4} In both reports mares were administered altrenogest through 150 d of pregnancy or later.^{3,4} Fetuses were between 140 and 200 d of gestation at death based on crown rump length or last recorded palpation with fetal movement.^{3,4} In one case the mare expelled the fetus without assistance,⁴ while the fetus was manually delivered transvaginally from the other mare.³ Both mares were discharged without any systemic complications.^{3,4} In one mare, histological evaluation of an endometrial biopsy sample the following year was classified as category III due to chronic inflammation and moderate fibrosis.³

A second group of case reports involve early fetal death. In these cases, the cause of fetal death was unknown, but authors hypothesized that retention of the fetus occurred because retained endometrial cups continued to produce equine chorionic gonadotropin and stimulate development of secondary corpora lutea.^{5,6} None of the mares were administered altrenogest.^{5,6} In one case the mare was evaluated by palpation and ultrasonography per rectum at nine months of gestation and found to have a retained fetal mummy.⁵ The fetal mummy was manually removed transvaginally and based on crown rump length the age at death was estimated at 50 d.⁵ This mare was rebred and produced a foal the following year.⁵ In a second case a fetal mummy was manually removed transvaginally from a mare evaluated at 10 months of gestation.⁶ The fetus had brachygnathia and gastroschisis.⁶ The crown rump length was 18 cm, suggesting fetal death occurred around 95 d.⁶ The mare was rebred and diagnosed pregnant at 14 d, but aborted several months later.⁶

There is one case report that attributes fetal mummification to a congenitally short uterine body in a mare administered altrenogest.⁷ The mare had a history of consecutive abortions.⁷ A mummified fetus that appeared to be 80-90 d of age based on crown rump length was aborted at 273 d gestation.⁷

Fetal mummification of a late gestation fetus has been previously described in a single case report. A 15 year old mare was evaluated at 375 days gestation for vaginal discharge and a history of abdominal discomfort 17 days prior to admission.⁸ The mare had retained a dead fetus that could not be removed transvaginally due to size of fetus and inelasticity of uterine wall.⁸ A term, partially mummified fetus was removed via cesarean section; the fetus was in transverse position and had never engaged in the cervix.⁸ The mare recovered uneventfully from surgery.⁸

This case describes a retained mummified fetus that had developed after 200 d of gestation with no systemic signs other than slight mammary gland development. Like the Gilbert report, the fetus was too large to deliver transvaginally through a partially closed cervix with a noncompliant uterus and therefore a cesarean section was performed.

Learning points

- Late term fetal death and mummification is possible in the mare without any systemic signs of illness.
- Cesarean section is a viable option to deliver a large mummified fetus when the cervix is not fully dilated and the uterus is noncompliant.

References

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Figure. Photograph of the mummified fetus showing the posture within the uterus.

(Editor's Note: The photograph in this manuscript is available in color in the online edition of Clinical Theriogenology.)