

Theriogenology Question of the Month

This feature is sponsored by the American College of Theriogenologists. Readers of the *JAVMA* are invited to submit contributions. Contributions should provide a learning exercise about theriogenology. A specific question should be posed for the readers. The author's answer to the question and a brief discussion should be presented. Possible topics include commonly seen problems in domestic or exotic animals. Herd problems in dairy and beef cattle, sheep, goats, horses, and exotic hoofstock, problems in kennels or catteries, or flock problems in domestic and exotic fowl also are appropriate. Please contact Dr. Craig A. Smith, Associate Editor (800/248-2862, ext 259, or FAX 847/925-1329), for further details.

History

A 33-month-old 450-kg (990-lb) Paint stallion was examined because of failure to ejaculate spermatozoa. The stallion had bred 2 mares by natural mating the previous summer, but neither mare became detectably pregnant. Two weeks prior to admission to our clinic, semen had been collected and examined by a referring veterinarian. Spermatozoa were not detected in that ejaculate.

After arrival at our clinic, 2 ejaculates were collected from the stallion, using a Missouri-model artificial vagina and an ovariectomized mount mare. The stallion displayed normal libido and breeding behavior and appeared to ejaculate on both collections. Indirect evidence for ejaculation included engorgement of the glans penis, urethral pulsations (4 or 5 pronounced

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pulsations of the urethra palpable on the ventral aspect of the base of the penis), flagging of the tail, and gel (60 ml in the first ejaculate, 23 ml in the second ejaculate).¹ After removal of the gel portion of each ejaculate, < 10 ml of transparent liquid remained in the collection receptacle. Examination of the gel-free liquid, using a phase-contrast microscope at 200 \times magnification, did not reveal spermatozoa. Alkaline phosphatase activity of the gel-free liquid was 43 U/L, a value consistent with ejaculates that do not contain fluid from the testes and epididymides (6,913 to 22,180 U/L in ejaculates of clinically normal stallions).²

Palpation of the scrotum and its contents revealed small, slightly soft testes. Length, width, and height of each testis were measured; results were used to estimate testicular volume according to the formula of an ellipsoid. Volume of the left (103 ml) and right testis (107 ml) yielded an estimated combined testicular volume of 210 ml, which was similar to that reported³ for 2.5- to 3-year-old stallions (175 to 200 ml). The epididymides were quite small, particularly at the point where the body (corpus epididymidis) joins the tail (cauda epididymidis). Using ultrasonography, the corpus epididymides were estimated to be 0.3 cm in diameter, and the cauda epididymides were estimated to be only 1 cm in diameter. The epididymides were uniformly echogenic, without the Swiss-cheese appearance attributed to a convoluted epididymal duct containing fluid.⁴ Palpation per rectum revealed the vas deferens and ampullae, seminal vesicles, and lobes of the prostate were palpably normal.¹

Question

What is most likely diagnosis for this stallion?
Please turn the page.

Answer

Azoospermia attributable to bilateral epididymal hypoplasia.

Outcome and Discussion

Azoospermia also can result from failure of the testes to produce spermatozoa. Thus, examination of a testicular specimen obtained by biopsy or needle aspiration was needed to rule out azoospermia attributable to failure of testicular production of spermatozoa. The stallion was sedated with xylazine hydrochloride and butorphanol tartrate. After aseptic preparation of the scrotal skin, a spring-loaded biopsy specimen instrument^a was used to procure a specimen from the left testis. The biopsy specimen was fixed for 24 hours in Bouin's solution, embedded in paraffin, sectioned, and stained with periodic-acid-Schiff-hematoxylin. Light microscopic examination of the biopsy specimen revealed interstitial (Leydig's) cells in the interstitium and seminiferous tubules of normal appearance (basal lamina lined with sustentacular [Sertoli's] cells and spermatogonia, with typical early and late primary spermatocytes, round spermatids, and elongating spermatids evident as germ cells progressing toward the lumen of the tubule). Several stage-VIII seminiferous tubules (ie, lumen of tubules lined with elongated spermatids being released) were detected with elongated spermatids lining the lumen.⁵ The finding that spermatogenesis proceeded to completion, in conjunction with azoospermia and a low concentration of alkaline phosphatase in the gel-free semen, suggested obstruction of the excurrent ducts preventing spermatozoa from entering the ejaculate. The extremely small epididymides in a young stallion were suggestive of bilateral epididymal hypoplasia (failure of epididymides to develop to typical size).

Epididymal hypoplasia is a rare condition in horses, but it reportedly can develop concurrently with testicular hypoplasia.⁶ Testes with mild to moderate hypoplasia contain seminiferous tubules that usually are smaller in diameter, with spermatogenesis failing to proceed beyond the spermatocyte stage. In mild forms of testicular hypoplasia, hypoplastic seminiferous tubules are interspersed with histologically normal tubules.^{6,7} In severe forms, the seminiferous tubules are lined only by Sertoli's cells with rare spermatogonia

that do not have evidence of mitosis.⁷ Despite a normal histologic appearance of the testicular parenchyma during examination of a biopsy specimen, testicular hypoplasia cannot always be ruled out, because a biopsy specimen represents such a small portion of the testis. The lack of discrete areas of distension or firm lumps in the epididymides suggested sperm granulomas had not developed as a result of extravasation of spermatozoa into extraepididymal tissue.⁶

Chromosome abnormalities are among the causes of subfertility in stallions.⁸ Therefore, a blood sample was collected into a heparin-coated glass tube, and lymphocytes were cultured and karyotyped. Twenty chromosome spreads were photographed and analyzed. It was determined the stallion had a normal male karyotype (64, XY). Because of the expectation that epididymal hypoplasia is a congenital condition, and the fact that we detected azoospermia in a 33-month-old postpubertal stallion, castration was recommended.

^aBard Biopsy Biopsy Instrument, C. R. Bard Inc, Covington, Ga.

References

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