Urethral Diverticulum Prevents Catheterization in Male White-tailed Deer (Odocoileus virginianus Zimmermann)

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Urine has recently been analyzed as an index of nutrition in white-tailed deer (Warren et al., 1981, op. cit.; Warren et al., 1982, J. Wildl. Manage. 46: 302-312; Del Giudice et al., unpubl. data). The three primary methods of urine collection are voiding, catheterization and cystocentesis. Catheterization is advantageous in that it is efficacious and relatively free of contamination (Duncan and Prasse, 1977, Veterinary Laboratory Medicine Clinical Pathology, Iowa St. Univ. Press, Ames, Iowa, pp. 99-113). While urethral catheterization is relatively easy in does, it is difficult, if not impossible, to perform on bucks due to an anatomic barrier.

We have attempted to collect urine in anesthetized male deer several times via catheterization using a size five French polypropylene urethral catheter (Sovereign®, Sherwood Medical Co., St. Louis, Missouri 63155, USA). After the catheter was advanced approximately 22 cm into the urethra, passage was blocked prior to reaching the urinary bladder. The blockage appeared to occur at the level of the ischiatic arch in all deer. To ascertain the exact location of this site, three road-killed deer were obtained from the Minnesota Department of Natural Resources. A catheter was inserted as previously described. When the obstruction was encountered, the catheter was clamped into place and the entire urinary tract removed. Careful dissection of the urethra beginning at the urethral orifice and progressing to the tip of the catheter revealed that the catheter had lodged in a urethral diverticulum. This was found in all three bucks examined. The diverticulum was located on the ventral aspect of the penile urethra just distal to the beginning of the pelvic urethra at the level of the bulbourethral glands. Its location and morphology appear to be identical to those of a male domestic goat (Capra hircus) (Hinkle et al., 1978, J. Am. Vet. Med. Assoc. 173: 1584-1586; Tayal et al., 1984, Vet. Radiol. 25: 260-264).

To further visualize the diverticulum, contrast radiographic studies were performed on dissected urinary tracts. Iothalamate meglumine contrast medium
Contrast radiograph of a dissected urinary tract of a male white-tailed deer showing urethral diverticulum (arrow) located between the expanded pelvic urethra and the penile urethra. (Conray®, Diagnostic Products Div., Mallinckrodt Inc., St. Louis, Missouri 63134, USA) was injected into the urethral orifice under moderate pressure to avoid distortion. The proximal portion of the urethra was clamped to prevent leakage and radiographs were taken. The diverticulum was revealed to be closely adherent to the urethra and measured approximately 1 cm long (Fig. 1).

Unable to discern the diverticulum’s exact anatomy, we prepared a latex cast of the urethra by injecting latex solution (Ward’s Natural Science Establishment Inc., Rochester, New York 14603, USA) into the urethral orifice, clamping the proximal portion, and allowing the latex to set for 48 hr. The preparation was then immersed in commercial hydrochloric acid for 7 days to dissolve the tissue from around the cast. The diverticulum arises from the lateral aspects of the urethra and terminates in a flattened lobe (Fig. 2). The urethra is considerably reduced in diameter at the point of insertion of the diverticulum.

The function of this diverticulum is unknown in white-tailed deer. Hinkle et al. (1978, op. cit.) stated that in the goat the diverticulum is adjacent to where the bulbourethral gland ducts open into the pelvic urethra, but this was not adequately documented. A urethral diverticulum may exist in the domestic bull (Bos taurus), but the anatomy is described poorly and no significance or function noted (Chauveau, 1910, The Comparative Anatomy of Domesticated Animals, D. Appleton and Co., New York, New York, 978 pp.).

This appears to be the first description of a urethral diverticulum in white-tailed deer and provides an explanation why
the male deer's urethra that prevented catheterization. The location of the diverticulum in relation to the urethra causes a catheter to be directed into the diverticulum as it passes proximally around the ischiatic arch. An attempt to force the catheter could result in trauma, scarring, and possible ablation of the urethral lumen. Alternate methods of urine collection have been described (Warren and Whelan, 1981, op. cit.).

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Morphologic Evaluation of a Male Pseudohermaphroditic White-tailed Deer

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This note describes the reproductive organs of a male pseudohermaphroditic white-tailed deer (Odocoileus virginianus) killed on 21 November 1981 near Togo, Minnesota. The deer, shot during the firearms deer season, had polished, symmetrical antlers (four points each; total main beam length = 45 cm) and was 7.5 yr old (Gilbert, 1966, J. Wildl. Manage. 30: 200–202). A vulva and clitoris of normal size for an adult female deer were present and there were no male external genitalia. The udder had four teats of normal size (6–7 mm) for a non-lactating deer.

Examination of the reproductive tract (Fig. 1) revealed rudimentary testicles 12 mm in diameter located intra-abdominally and enveloped in fat. Rudimentary in-