History

Two Holstein bulls were examined at the University of Wisconsin Veterinary Medical Teaching Hospital because of failure to ejaculate. Both bulls had been housed at a commercial artificial insemination facility for several months prior to evaluation. The bulls were both 16 months old and weighed 452 kg (994 lb; bull 1) and 455 kg (1,001 lb; bull 2). The 2 bulls were three-quarters siblings (ie, they had the same sire and the same maternal grandsire [the sire and maternal grandsire were different bulls]). The bulls were born on separate farms in geographically disparate parts of North America, and both were acquired by the artificial insemination center approximately 4 months before referral to the veterinary teaching hospital. One of the bulls had an episode of severe bronchopneumonia when it was approximately 11 months old (5 months prior to examination at the veterinary medical teaching hospital), but it recovered completely with palliative treatment. No other health problems were recorded in the medical history of either bull.

Results of evaluations of the bulls at the artificial insemination facility had been unremarkable; the external genitalia and libido of both bulls were considered normal. Attempts to collect semen from each bull with a phantom or via electro ejaculation had not revealed abnormalities in sexual behavior or penile erection, but neither bull had ejaculated.

Results of physical examinations of both bulls at the veterinary medical teaching hospital were within anticipated limits. Both bulls had appropriate growth and were in good body condition. Results of routine hematologic analysis (a CBC and serum biochemical analysis) were unremarkable for both bulls. Urinalyses of midstream-catch samples obtained from each bull revealed no abnormalities, with no proteinuria, hematuria, or pyuria.

Results of per rectal examinations, including palpation of the internal urogenital tract, were also unremarkable. Scrotal circumference was 34.5 and 37.5 cm in bulls 1 and 2, respectively, and was considered within reference limits for Holstein bulls of this age. No abnormal findings were detected during palpation and ultrasonography of the testes and epididymides of both bulls.

Close observation of each bull during urination revealed a mild swelling in the midline perineal area, which was larger and more obvious in bull 1 (Figure 1). The swelling extended from the level of the ischial arch to just dorsal to the location of the sigmoid flexure.

Question

What are the most likely causes of the perineal swellings in these 2 sibling bulls? Please turn the page.
Localized perineal swellings in male cattle are most commonly associated with abnormalities of the lower portion of the urinary tract, such as obstructive urolithiasis (phosphate, silicate, or calcium salts) with or without secondary urethral rupture, or with congenital malformation of the penis or urethra.

Results
To further evaluate the condition, perineal ultrasonography was performed, which revealed that both bulls had a thin-walled sac containing anechoic fluid. The sac was narrow proximally in the pelvic portion of the urethra and distally in the penile portion of the urethra. Aseptic techniques were used to aspirate fluid from the perineal swelling of each bull. Aspirates from both bulls contained normal-appearing urine; spermatozoa were present in the asomite obtained from bull 2, but no spermatozoa were identified in the aspirate obtained from bull 1. During urination, there was a grossly visible and ultrasonographically detectable increase in size of the sac and the volume of contents. Ultrasonographically, this increase was evident as anechoic fluid.

Electroejaculation of each bull was attempted and resulted in a typical erection, but neither bull ejaculated. However, the swelling in the midline perineal area of each bull became more evident during attempted electroejaculation.

On the basis of these results, the bulls were given a poor prognosis for fertility. The manager of the artificial insemination facility was consulted, and the decision was made to euthanize both bulls. Gross visual and histologic examinations were performed.

Grossly, both bulls had similar pathological abnormalities of the urethra (Figure 2). In each bull, there was a local dilation of the proximal aspect of the penile portion of the urethra in the region of the ischiocavernous muscle. In bull 2, the focal dilation was 17 cm in length and 15 cm in diameter at its widest point, whereas in bull 1, the focal dilation was 20 cm in length and 12.5 cm in diameter at its widest point. In both bulls, the dilation began close to the origin of the ischiocavernous muscle at a point <5 cm ventral to the level of the ischial arch. No lesions suggestive of previous obstruction or urolithiasis were detected in the urinary tract of either bull.

Results of histologic examination of testicular and epididymal tissues were unremarkable, and normal spermatogenesis was evident. Bull 1 had anatomically normal accessory sex glands, but the bulbourethral glands could not be identified in bull 2. The pudendal nerves and lumbosacral spinal cord segments were grossly and histologically normal in both bulls.

Discussion
The anatomy of male cattle includes a suburethral recess arising from the junction of the pelvic urethra (pars pelvina) and the penile urethra (pars penina). At this level, the urethra is surrounded by the bulb of the penis (bulbus penis), which is a dorsal bilobed expansion of the corpus spongiosum. A similar structure is present in male sheep, goats, swine, and camelids. The bulbourethral glands empty into this recess, and there is a fold of mucosa at the proximal extent of the recess, which serves to prevent retrograde flow of spermatozoa and accessory sex gland secretions. Postmortem examination of the lower portion of the urinary tract in both bulls described here failed to reveal a distinct and separate suburethral recess, and it was considered likely that the dilation of the urethra in both bulls involved and obliterated the suburethral recess. In the literature, comparable congenital urethral anomalies in cattle have been classified as a megalourethra,1 suburethral diverticulum,2,3 or urethral recess dilation.4

Figure 2—Photographs of the dissected urethra from the same bull as in Figure 1 (A) and from another 16-month-old 455-kg (1,001-lb) bull with a history of failure to ejaculate (bull 2 [B]). The bulls were three-quarters siblings (ie, they had the same sire and the same maternal grandsire [the sire and maternal grandsire were different bulls]). Each bull had a large urethral recess dilation (white arrow). Notice that the urethral recess dilation is located ventral to the ischium (green arrow) and proximal to the normal-appearing penis (blue arrow). Bar = 3 cm.
We assumed that the abnormality in these 2 bulls was similarly a congenital enlargement of the urethra and was not acquired during the first months after birth, although we could not confirm this assumption. Results of our investigation did not raise suspicion of an acquired obstructive problem in either bull.

The fact these bulls were so closely related raised the possibility of a heritable component to the condition and contributed to the decision to euthanize them, rather than to continue with their intended use as breeding animals. There is a report in which 1 member of a pair of identical human twins had a similar megalourethral abnormality. This suggests that it is not a hereditary condition with simple Mendelian inheritance, at least in humans.

Regardless of heritability issues, it would have been highly unlikely that either bull would have been fertile, considering that the anatomic abnormality had already resulted in failure to ejaculate. Surgical correction via excision of a congenital enlargement of the suburethral diverticulum in a female calf as well as a congenital megalourethra in a bull calf has been reported. The 2 bulls of the present report were similar to a bull of a previous case report. In the bull of that report, exploratory surgery with resection was successfully performed, and that bull reportedly was alive with no complications at least 2 months after surgery. Because of the risks of a heritable component, surgery was not considered an option for the 2 bulls described here.

The inability of either bull to successfully ejaculate, despite normal libido and erection during arousal, along with the presence of spermatozoa within the saccular distention of the proximal aspect of the penile portion of the urethra in bull 2, suggested that ejaculatory fluids and accessory sex gland secretions accumulated within the structure. Similar congenital urethral abnormalities in humans lead to poor development of the corpus spongiosum and corpus cavernosum. Although the corpus spongiosum and corpus cavernosum were present and appeared anatomically normal in these 2 bulls, it is possible that the abnormally coordinated function of these structures may have contributed to the inability of both bulls to ejaculate.

It also was not possible to identify distinct bulbourethral glands in bull 2. Lack of bulbourethral glands may have further diminished ejaculatory volume in that bull.

In both bulls, the size of the perineal swelling was quite subtle, and it enlarged substantially only during urination and attempted electroejaculation. We suggest that similarly affected animals may be hard to identify during initial physical examination, but close observation during urination and electroejaculation, combined with ultrasonographic examination of the lower portion of the urinary tract, would be most likely to reveal the abnormality.

**Outcome**

The bulls were euthanized because of a poor prognosis for fertility and the possibility that there was a genetic component to the condition. Surgical correction may be a treatment option for a megalourethra or suburethral diverticulum.

**References**