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Original Contribution

ULTRASONOGRAPHIC FEATURES OF FELINE BULBOURETHRAL GLANDS

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ABSTRACT

Ten sexually mature, clinically healthy male European shorthair cats aged 1–2 years were studied. The bulbourethral glands were examined after preliminary anaesthesia and catheterisation of the urethra. A perineal sonographic approach was used on a CHISON 600 VET equipment and multifrequency microconvex C20605 probe with a working frequency of 7 MHz. The musculoskeleal periphery of the gland was visualized as hyperechoic vs the parenchyma, uniform in both aspects (sagittal and transversal), and glands were depicted with an ovoid shape. In five studied animals, bulbourethral glands were surgically removed after euthanasia and were investigated in a liquid isotonic medium with regard to compare their sonographic features with the normal topography. The analogous results obtained via both methods allowed us to propose the use of perineal ultrasonography as a sufficiently definitive and less invasive method for visualization of feline bulbourethral glands in transversal and sagittal sections

Key words*:* glandula bulbourethralis, ultrasonography, cat.

INTRODUCTION

Ultrasonography is a non-invasive method for visualization of male genitalia in both animals and humans

The bulbourethral glands are examined for shape, symmetry, size, echogenicity and cavity - like findings (1, 2, 3, 4, 5, 6).

In the cat, the glands are located behind the prostate gland, over the pelvic arc, at the caudal part of pelvic urethra between the urethra and bulbospongiosus muscles, in front of penile root. They are a paired organ and are located dorsolaterally to the caudal part of the membranous urethra that continues into penile urethra in dorsal direction (7, 8). In men, the bulbourethral glands are two small oval yellowish pea-sized structures situated dorsolaterally at the end of membranous urethra between both fasciae of pelvic diaphragm.

Depending on their topography, the glands are classified as diaphragmal, diaphragm-bulbar and bulbar, releasing a mucinous secretion that drains in the beginning of spongious urethra prior to ejaculation (9, 10). Using transrectal ultrasonography, the bulbourethral glands have been studied in boars and are described as elongated oval echoic findings with large anechoic central zones (2). In the bull, the stallion and the elephant, the glands have been studied via transrectal ultrasonography whereas in the stallion, they were sonographically studied prior and after ejaculation and post mortem in a liquid medium (3, 4, 5, 11, 12). Using perineal echography, bulbourethral glands have been investigated in men on the occasion of their cystic degeneration (syringocele) and urethral bulbar narrowing – Cobb's collar (13). They were visualized as small tubular findings parallel to the urethra (14). Using the transrectal approach, these glands were studied in men with regard to haemospermia, neoplasms, inflammation or lytiasis (6, 15).

Bulbourethral cysts (syringocele) have been reported in mice and goats (16, 17).

The scarce literature data about the perineal ultrasonographic investigation of bulbourethral glands of domestic carnivores

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and cats in particular, in contrast to prevailing information about the transrectal approach, motivated our investigation of some ultrasonographic features of these glands in the cat.

The obtained data could serve as reference point for the echographic differentiation of normal and pathologically altered bulbourethral glands in this animal species.

MATERIAL AND METHODS

Ten sexually mature, clinically healthy male European shorthair cats aged 1–2 years and weighing 2.8–4.0 kg were studied. The animals were anaesthetised with 0.03 mg/kg atropine sulphate s.c. (*Sopharma*), followed by 2 mg/kg xylazine i.m. (*Alfazan*) after 15 min and 15 mg/kg ketamine (*Alfazan*) i.m. after another 15 min (18). The urethra was catheterised in order to mark its lumen. The study used an ultrasound equipment CHISON 600 VET and multifrequency microconvex C20605 probe with a working frequency of 7 MHz and radius of 20 mm. The findings were printed on a Mitsibishi P91E thermoprinting device. A perineal ultrasonographic approach was employed. A contact gel (*Eko-gel® Lessa, Espana*) was used. For the transversal visualization of the gland, the transducer was placed in the dorsal plane in cranial direction, transversely put on the perineum in a parallel position above the pelvic arc. Then, the transducer was shifted perpendicularly over the pelvic arc and the gland was pictured in a sagittal view. Two dimensions (mm) were obtained: width (transverse, lateral size) and height (dorsoventral size).

In five of all studied animals, the pelvic urethra with the penis and the bulbourethral glands were surgically removed after euthanasia, put into a liquid isotonic medium in order to compare the ultrasonographic features of the glands with their normal topography.

RESULTS AND DISCUSSION

Ultrasonographically, the bulbourethral glands in the cat are visualized as a solid heterogenous finding with a relatively high echogenicity. The peripheral glandular zone, that embedded parts of the urethral and bulbospongiosus muscles, was characterized by higher echogenicity than that of the central hypoechoic parenchymal zone. The glands were with an ovoid shape, well differentiated from the adjacent soft tissues in the perineum. They were observed dorsally to the pelvic arc and the penile root (**Figures 1 and 2**).

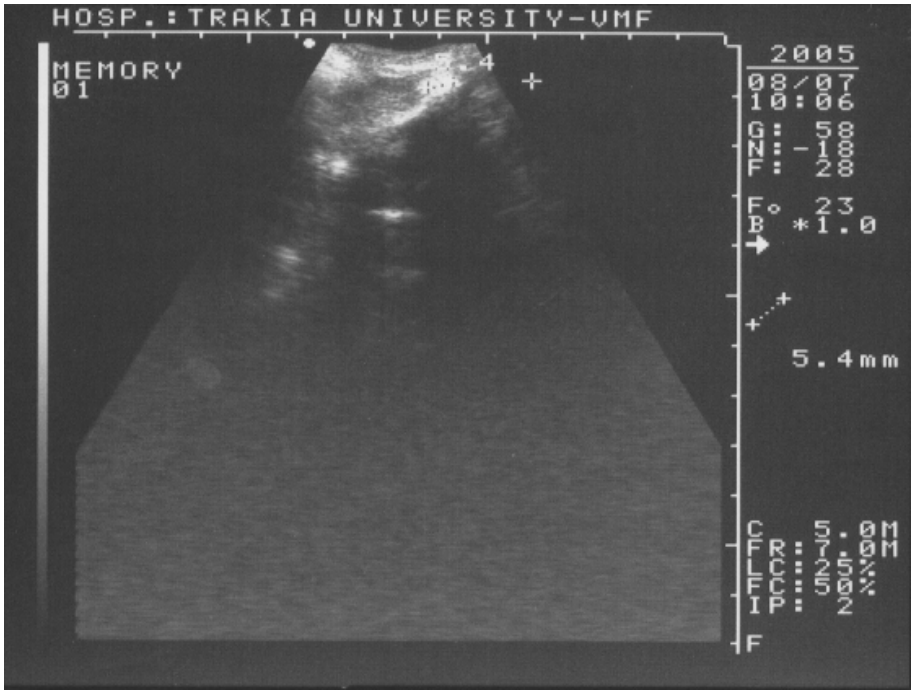

Figure 1. *Transversal sonographic section of bulbourethral glands in a cat (dorsoventral size)*

The cranial border of glands was not depicted because of the adjacency of pelvic bones and the potential of the perineal approach. Normal bulbourethral glands were visualized dorsolaterally to bulbar urethra and ventrally, the hyperechoic catheterised urethral lumen could be seen. The dorsoventral dimension of the gland (height) varied from 6.4 to 7.6 mm

whereas the lateral dimension (width) – from 5.4 to 6.5 mm (**Figures 1 and 2**).

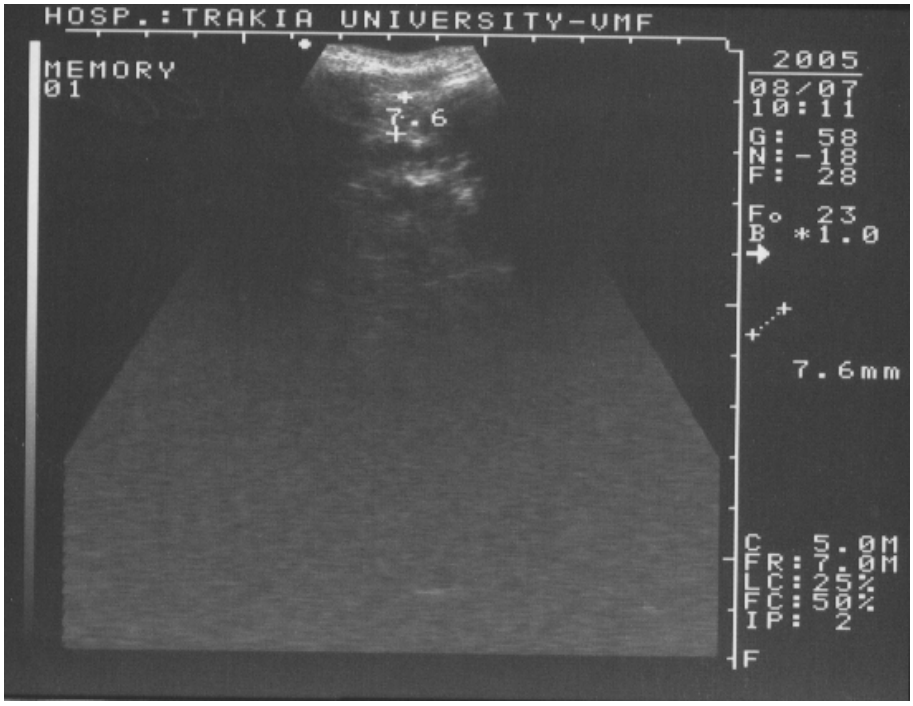

Figure 2. *Sagittal sonographic section of bulbourethral glands in a cat (lateral size)*

On the transversal cross-section, the gland appeared hyperechoic, but without a visible hypoechoic central part while the ventral urethral lumen was hyperechoic because it was marked (**Figure 1**).

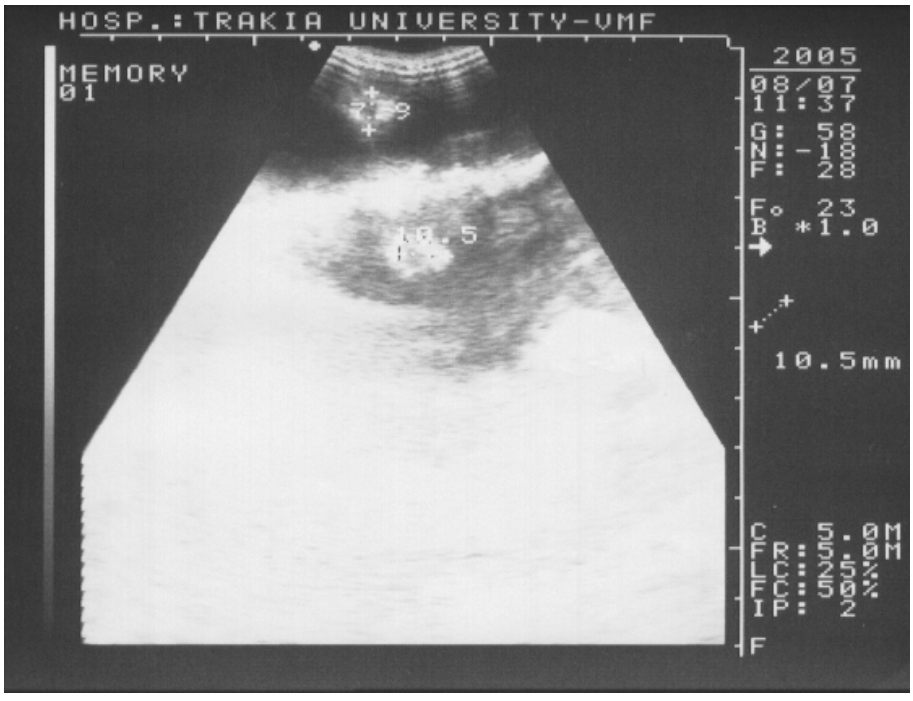

Figure 3. *Dorsal sonogram of bulbourethral glands in a cat, surgically removed with the urethra in an isotonic liquid medium*

On the sagittal cross-section, an echogenic gland with hyperechoic periphery and hypoechoic centre was visualized. It was observed dorsolaterally to a hyperechoic ventromedial centre, that gave a picture of catheter - marked urethral lumen (**Figure 2**).

The performed ultrasonographic studies revealed the ovoid shape of bulbourethral glands dorsoventrally, further evidenced by the difference between the dorsoventral and the lateral dimensions (10 –11 mm).

Using the applied perineal ultrasonographic approach, the caudal, dorsocaudal and ventrocaudal parts of the

cat's glands were investigated. The transrectal approach is used in men, boars, bulls, stallions and elephants mostly from a dorsal and cranial aspect (2, 3, 4, 5, 6, 11, 12, 15).

Feline bulbourethral glands were ovoid dorsoventrally unlike the boar, whose bulbourethral glands were ovoid craniocaudally (2).

The glands removed after necrospy, studied in an isotonic liquid medium, were observed from a dorsal aspect similarly to the stallion (11). In this way, the findings were also with a hyperechoic peripheral glandular zone formed by skeletomuscular lining and a hypoechoic centre, situated parallel to the hyperechoic bulbar urethra, as in men (13, 14) (**Figure 3**).

The analogous results obtained via both methods allowed us to propose the use of perineal ultrasonography as a sufficiently definitive and less invasive method for visualization of feline bulbourethral glands in transversal and sagittal sections compared to transrectal ultrasonography in large mammals and men.

The data of the present study allowed us to conclude that the ultrasonography of bulbourethral glands in cats could reveal important anatomical features of the glandular structure. They could be valuable not only for the image anatomy of the glands but also for their diagnostic imaging.

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