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Ultrasonographic Features of Prostate Gland in the Cat

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Twelve sexually mature, clinically healthy male European shorthair cats at the age of 1-2 years were studied. Following anaesthesia, the urinary bladders of 10 cats were catheterized and filled with physiological saline. A transabdominal prepubic sonographic approach was used. The study was performed with Aloka SSD 500 Micrus equipment and a 5 MHz linear transducer. The prostate gland was observed in three views. The prepubic ultrasonography with a distended urinary bladder was found to be a good method for visualization of feline prostate in transverse and longitudinal sections up to the transverse plane through the caudal border of the gland. The glandular stroma was visualized as a hyperechoic structure compared to parenchyma and was equally well seen on transverse and longitudinal sonograms. The dorsal median sulcus between both glandular lobes was seen only on transverse sections. The lumen of prostatic urethra was observed as a hypoechoic ventromedial finding on transverse sections whereas the hyperechoic urethral wall was better visualized on longitudinal sections. The considerable difference between the transverse and the craniocaudal sizes (1 cm) evidenced the ovoid shape of the gland.

Key words: prostate, ultrasonography, anatomy, cat.

Introduction

In male cats, the urinary bladder neck passes caudally into a relatively long preprostatic urethra located under the rectum, craniocaudally to the pelvic brim. The prostate is a bilobed symmetrical organ located dorsolaterally to the prostatic urethra, behind the cranial border of the pelvic symphisis. Caudally, the pelvic (membranous) urethra goes up to the bulbourethral glands [7].

According to Barsanti [3], feline prostate is less developed compared to that in dogs and the prostatic urethra is respectively shorter. The gland do not encircle ventrally the urethra in cats as it is observed in dogs.

Souza et al. [9], having done a rectal examination of 32 clinically healthy dogs, reported that there was not a significant correlation between age, prostate location, shape, length and height.

Atalan et al. [1] reported a correlation between the weight and volume of the gland with both body weight and age.

It is well known that ultrasonography is a popular safe, non-invasive method for evaluation and investigation of the prostate gland [2]. In humans, the transrectal ultrasonography permits an excellent visualization of the gland whereas in small animals it is used only for experimental purposes [10].

Ultrasonographically, three views are recommended for estimation of human prostate: sagittal, transverse and dorsal, its position being dependent on urinary bladder distention.

In animals, the gland is examined for dimensions, shape and symmetry, echogenicity and cystic formations. The caudal border could be hidden by ossa pubis [2]. In the dog prior to puberty the prostate encircles the urethra, it is small with scarcely visible lobes and is uniformly hypoechoic [4, 8]. The adult prostate is symmetrically homogenous and echoic. After castration, the gland involutes and its lobes are hardly distinguishable [2].

The data about the ultrasonographic particularities of the prostate gland in cats motivated the present study of its sonographic morphological features, compared to both dogs and humans.

Material and Methods

Twelve sexually mature, clinically healthy male European shorthair cats at the age of 1-2 years were ultrasonographically studied. The animals were anaesthetized with 0.03 mg/kg atropine sulfate s.c.(Atropinum sulfuricum, 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 [6]. The urinary bladder of 10 cats was catheterized and physiological saline (Natrii chloridum 0.9%, Balkanpharma) was applied. The manipulation was not performed in the other 2 animals. The distended urinary bladder, going along the ventral abdominal wall up to the umbilicus (frequently with a right flexion) was used as acoustic window. The study was performed with Aloka SSD 500 Micrus ultrasonic equipment, a 5 MHz linear transducer and front length of 56 mm. The findings were documented on a Mitsubishi P91E printing device. Prior to the examination, the hair of the observation field was clipped from the transverse umbilical line to the transverse line through pecten ossi pubis and laterally, to plicae lateralis.The gland was visualized by means of a contact gel (Eko-gel, Lessa, Spain). For the transverse visualization of the prostate, the transducer was directed obliquely caudally, having been placed transversely on the ventral abdominal wall paralelly to the pelvic brim. Afterwards, the transducer was moved sagittally and the prostate was longitudinally viewed. Thus, the three prostatic dimensions were determined: width (transverse size), thickness (dorsoventral size) and height (craniocaudal size). The gland was observed in 3 views: transverse, longitudinal and oblique (45° vs the median plane). The sonographic approach was transabdominal, prepubic.

Results and Discussion

Ultrasonographically, the prostate is visualized as a solid homogenous structure with a relatively high echogenecity. The capsula and the stroma were more echoic than the parenchyma. The gland was ovoid and well defined. In its middle part, lin-

ear hyperechoic findings could be seen, differing from the weaker ultrasonic intensity of parenchyma (Fig. 1 and 2). The echographic intensity of the parenchyma in the dog was lower.

The caudal border of the gland was hardly visible because of the adjacent pelvic bones and its position deeply behind the pelvic brim. The normal prostate surrounded the urethra dorsoventrally whereas ventrally, the hypo- or anechoic urethra was seen. The dorsoventral diameter of the gland in the cat was smaller than canine one [3]. It wall also shown that the wall of the urethra was also with higher echogenicity than the urethral lumen, i.e. the periurethral area was hyperechoic and uniform (Fig. 3). This feature is similar to those observed in dogs and humans [2, 5].

On the transverse general view, a hyperechoic gland located dorsolaterally to a hypoechoic ventromedial centre (the prostatic urethra) was visualized (Fig. 1).

Ultrasonographically, a transverse ovoid shape of feline prostate was found out because of he average values of the craniocaudal and the transverse sizes of the gland (1.2 and 2.2 cm respectively). The average prostatic circumference was 5.5 cm and the average area — 2.2 cm^2 (Fig. 1).

On the sagittal view (Fig. 2), the echostructure of the glandular lobe was visible through indication of the urethra with a catheter. The echoic features of the parenchyma were not species-specific.

The dorsal median sulcus between both glandular lobes was observed only on the transverse view (Fig. 3), similarly to that in dogs [2] although in cats the sulcus was less deep.

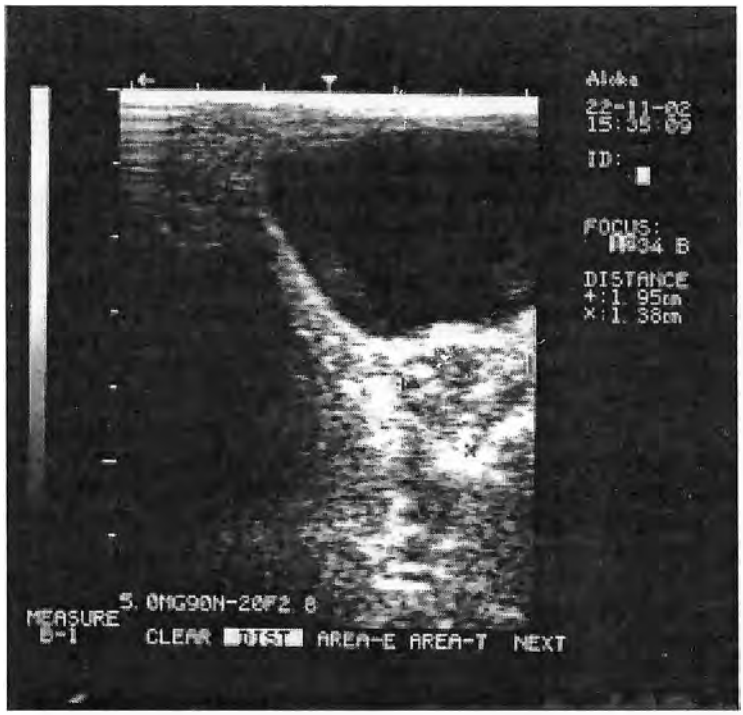

Fig. 1. Ultrasonographic photo of cat prostate — general view

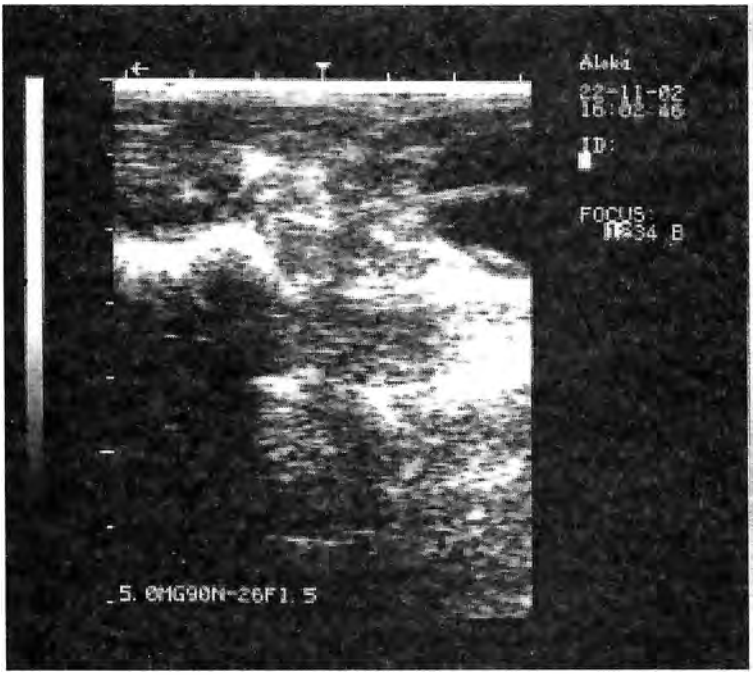

Fig. 2. Ultrasonographic photo of cat prostate — sagittal view

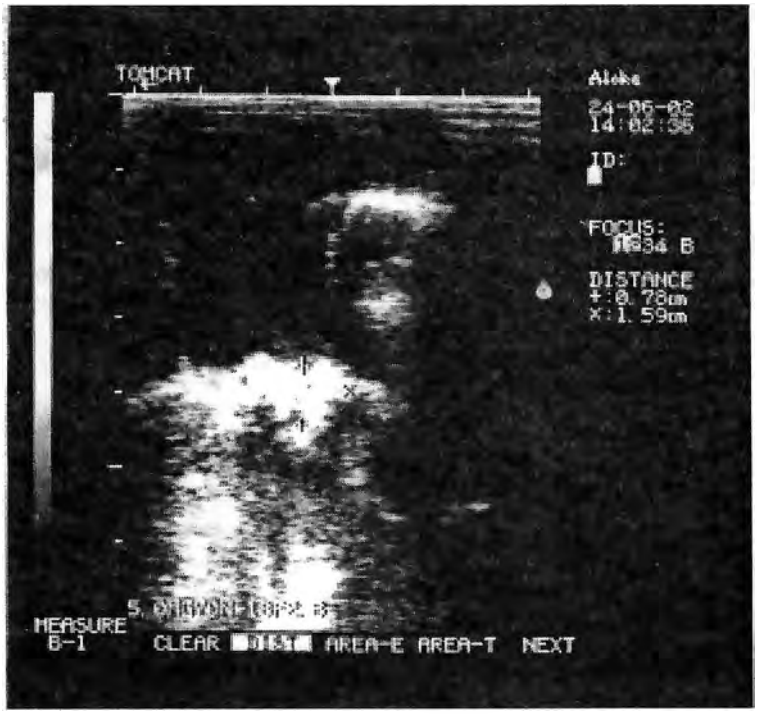

Fig. 3. Ultrasonographic photo of cat prostate — transversal view

Our results allowed to recommend the application of the prepubic ultrasonography over a distended urinary bladder as a good means for visualization of feline prostate in both transverse and longitudinal sections up to the level of the transition between gland and membranous urethra. The caudal border of the gland is distinctly observed via transrectal ultrasonograph, generally in men and dogs [10]. In male cats however, it is hardly applicable. For this approach, the urinary bladder should be empty and it is applied for evaluation of small intraglandular structures. Because of the small rectal lumen in male cats, the cranioventral abdominal position of the distended urinary bladder and the well developed pars externa prostate, we, similarly to Selcer [8] and Basinger [4], assumed that the prepubic transabdominal sonographic approach was sufficient for evaluation of the shape and size of the normal feline prostate.

In the course of our studies we confirmed that the distended urinary bladder was the only acoustic window for observation of the gland [2] and that its stroma is well visualized as a hyperechoic structure vs the parenchyma, uniformly in transverse and longitudinal views.

The lumen of the prostatic urethra was seen as a hypoechoic ventromedian finding on a transverse sonogram whereas the hyperechoic urethral wall was better visualized on longitudinal sonograms in catetherized urinary bladders.

In our opinion, the transversely ovoid shape of the gland could be evidenced via ultrasonography. The significant difference (1 cm) between the transverse and the craniocaudal dimensions is a reliable proof in this connection.

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