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BENIGN PROSTATIC HYPERPLASIA - PREVALENCE AND CLINICAL-SONOGRAPHIC FEATURES IN DOGS

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Abstract

Benign prostatic hyperplasia (BPH) is the most common canine prostatic disorder being diagnosed in almost 100 per cent of sexually intact male dogs over the age of seven years, as well as in animals treated with androgenic hormones. The present study reports the incidence of benign prostatic hyperplasia, regarding age and breed among dogs, commonly clinical signs, and incorporating in the clinical picture the paraclinical examinations especially ultrasonography in order to obtain an diagnosis. The research was made between 2018-2019, within the Clinic of the Faculty of Veterinary Medicine Bucharest and within private veterinary practices. Benign prostatic hyperplasia was diagnosed in 30 dogs with insidious and asymptomatic evolution recording frequently hematuria, polakisuria and prostatomegaly. The paraclinical investigation with ultrasonography aims to establish the definite diagnosis, detecting ultrasound changes suggestive -prostatomegaly with dimensions between 20-90 mm with regular homogeneous appearance or lacunar microcystic aspect. All the research that is included in the study, it is appreciated that it is of considerable importance in fundamental research on the incidence of primary factors, responsible for pathogenetic vulnerabilities useful in clinical activity in structured screening.

Key words*: benign prostatic hyperplasia, prevalence, ultrasonography, dogs.*

INTRODUCTION

Benign prostatic hyperplasia is an increase in the volume and number of non-inflammatory types of prostate epithelial cells, in simple or complex form (cystic hyperplasia) (Nizanski, 2014). It arises spontaneously in the gland as a consequence of ageing and endocrine influence and may begin as early as 2-3 years of age, becoming cystic over 4 yrs of age (Sun, 2017).
Benign prostatic hyperplasia mainly affects intact male dogs, almost 100%, as well as animals treated with androgen hormones, being rare in cats (Dhivya, 2012).
The age is recorded as a predisposing factor, and it is estimated that approximately 50% of intact male dogs will develop BPH by the age of 5, 60% by the age of 6 and 95% by the age of 9 (Juodziukyniene, 2016).
Estrogens act by increasing the number of prostate receptors for androgens, respectively by forming free-radical metabolites that affect the prostate by altering its response to the action of androgens (Golchin, 2019). Androgens act through dihydrotestosterone (resulting from the transformation of testosterone by the 5th reductase) and increase the number and size of epithelial cells and prostate stroma (Jubb, 2015).
Clinical signs associated with the condition are constipation, hemospermia, tenesmus and hematuric syndrome being triggered by dysuria and urethral stenosis due to enlargement of the prostate (Renggli, 2010; Pinheiro, 2017) or as a result of hyperplastic tissue with increased vascularity (Golchin, 2019).

MATERIALS AND METHODS

The research took place between 2018-2019, within the Clinic of the Faculty of Veterinary Medicine Bucharest and within the private veterinary practices.
The studies and investigations initiated and carried out started from the suspicion and confirmation of the diagnosis of benign prostatic hyperplasia which involved the development of clinical examination and paraclinical methods translated by performing

urine analysis, biochemical and hematological profile and imaging methods.
Preliminary urinary biochemical examination was performed using Urispec Plus urine strips or diagnostic strips or interpreted using a respective automated analyzer, IDEXX VetLab UA Analyzer, and urinary density was determined using a refractometer. REC-300ATC The assessment of the urinary sediment was performed with the Optika microscope.
Determination of hematological parameters was performed with IDEXX VetAutoread Hematology Analyzer and Scil Vet Abc Plus and Genrui - 5-Part Auto Hematology Analyzer KT-6610 and biochemical parameters with Spotchem EZ SP 4430 (Figure 6) and SkylaTM VB1 Veterinary Clinical Chemistry Analyzer.
Imaging was performed using the Esaote Veterinary MyLab 30 ultrasonography.

RESULTS AND DISCUSSIONS

Benign prostatic hyperplasia was diagnosed in 30 dogs between age 3 and 18 years, of different breeds (Figure 1).

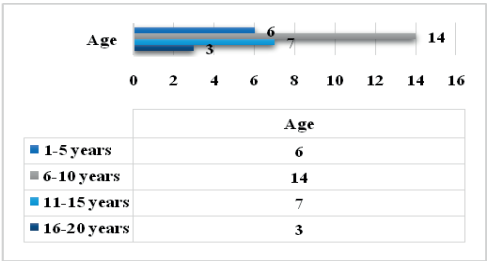

Figure 1. Distribution by age in dogs with benign prostatic hyperplasia

The medical history of the patiens was followed in order to identify possible pre-existing conditions and possible repetitive clinical signs relevant to a diagnosis, so the data collected consisted of the manifestation of blood urination in 8 individuals, urination with a high frequency (n = 7), urination in impermissible places (n = 1), pain on palpation in the pelvic area (n = 1), a urination with an increased amount (n = 1) or lack of urination (n = 1) and the presence of inhomogeneities at the testicular level (n = 1).
The evaluation of patients involved recorded body temperature (°C) with the following values 38.3 (n = 7), 39.2 (n = 2), 38.2 (n = 2), 38.1 (n = 3), 38.7 (n = 3).), 39.3 (n = 2), 38.4 (n = 2), 38.5 (n = 3), 38.9 (n = 3), 38.6 (n = 2) and 37.9 (n = 2), data on the general condition of the animal, assessed as good (n = 30), with absent uremia (n = 30) and clinical information on the frequency of urination being of a pollakisuric nature in 5 patients, normal in 24 individuals and with strangulation in one animal.
The urine was examined visually from a colorimetric point of view, being noticed by the owner a urine of red color (n = 7), yellow - orange (n = 5) and yellow in a percentage of 60.00% (n = 18).
Urethral discharges independent of the act of urination with initial/incipient hematuria suggest the existence of a prostate condition. The nature of the prostate condition was confirmed by subsequent evaluations.
The clinical evaluation was completed by the physical examination of the urinary and genital tract, the following aspects being reported:

- absence of physical changes detectable through inspection and palpation (n = 30);
- absence of renal pain sensitivity (n = 30);
- absence of pain sensitivity in the bladder (n = 30);
- by the method of clinical exploration with the help of the index called transrectal digital palpation, a prostatomegaly was found in a percentage of 100% (n = 30) with painful manifestation in 15 patients (30.00%) or without manifestation of painful sensitivity in 15 individuals.

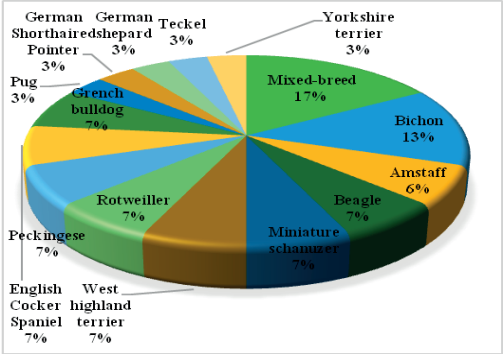

Figure 2. Distribution by breeds in dogs with benign prostatic hyperplasia

The correlative character of the registered clinical-anamnetic data indicates an insidious and asymptomatic or poorly expressed

evolution in benign prostatic hyperplasia, with reduced and uncharacteristic systemic changes, and as a dominant clinical for the algorithm od diagnosis were - hematuria (43.55%), polakisuria (19.35%) and prostatomegaly (100%).

Urinary parameters were evaluated by diagnostic strips or with the help of the automatic analyzer obtaining the following values - leukocyturia of different intensities, urobilinogen, a urine sample with positive nitrates, proteinuria, urinary pH with 6.5 in 10 patients, pH 7 in 7 individuals, pH 6 (n = 7), 9 (n = 2), 5, 5.5, 7.5 and 8, the presence of blood suspicion with + (n = 11), ++ (n = 5), +++ (n = 12), ++++ (n = 2) and urinary density was 1030 in 11 animals, 1020 in 7 individuals, 1025 (n = 2), 1035 (n = 2), 1045 (n = 2), 1040 (n = 2), 1050 (n = 2), 1000 and 1009.

Examination of the urine sediment by light microscopy confirmed the presence of red blood cells in the urine, the presence of leukocytes, epithelial cells, ammonia-magnesium phosphate crystals, reduced microbial flora and bilirubin crystals.

The paraclinical investigation through the ultrasound imaging method aims to establish the definite diagnosis, detecting ultrasound changes suggestive of benign prostatic hyperplasia:

- prostatomegaly correlated with age and species with dimensions between 20-30 mm at a percentage of 60.00% (n = 18), 30-40 mm (n = 4), 40-90 mm (n = 10) (Figures 3, 4, 5, 6, 7, 8);
- regular homogeneous appearance in 19 individuals in a percentage of 63.33%;
- lacunar microcystic appearance in 11 patients.

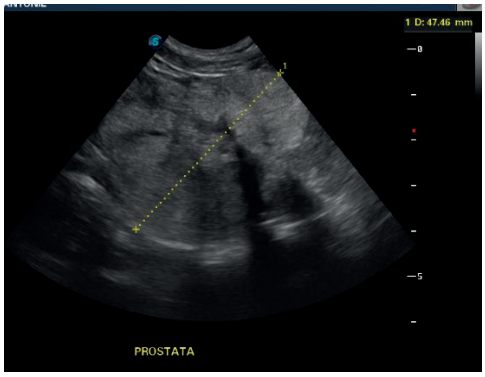

Figure 3. Benign prostatic hyperplasia - prostatomegaly (47.46 mm)

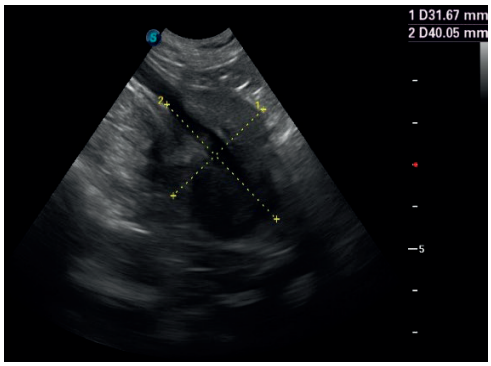

Figure 4. Benign prostatic hyperplasia - prostatomegaly (31.67 mm)

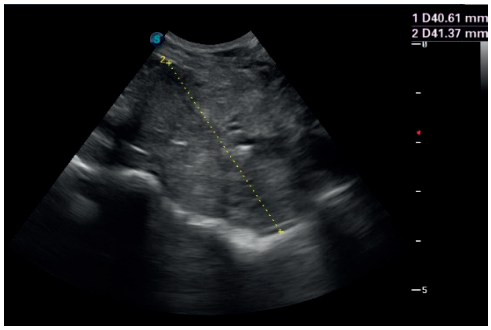

Figure 5. Benign prostatic hyperplasia - prostatomegaly (41.37 mm)

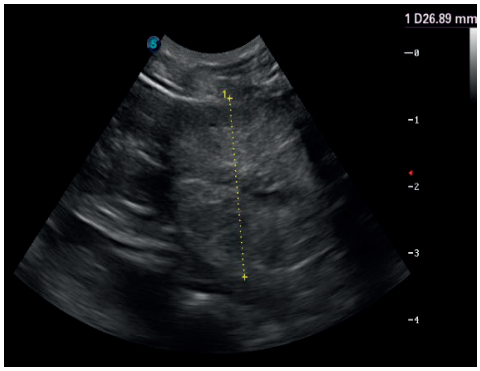

Figure 6. Benign prostatic hyperplasia - prostatomegaly (26.89 mm)

In addition to the initial hematuria, dysuria, and tendency to constipation, which suggests prostate damage, ultrasound examination allows the most accurate assessment of changes in volume, contour, echogenicity, and echostructure in benign prostatic hyperplasia, prostatitis, and intra / paraprostatic cysts.

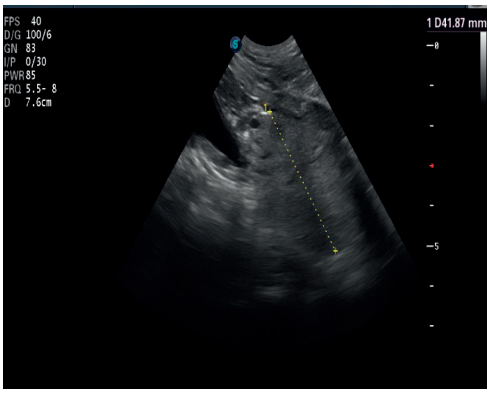

Figure 7. Benign prostatic hyperplasia - prostatomegaly (41.87mm)

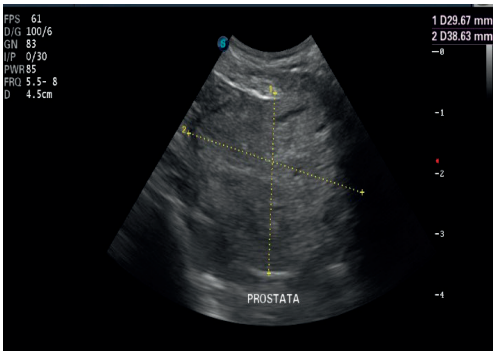

Figure 8. Benign prostatic hyperplasia - prostatomegaly (29.67 mm)

Investigations of the blood biochemical and hematological profile performed in 10 patients allowed to obtain the paraclinical picture of the animal presented in the clinic and to discover the existence of risk factors for the development of certain diseases, referring to the normal values of the device and the existing context (Tables 1 and 2).

Table 1. Results of analysis in patients with benign prostatic hyperplasia

Parameters	10 years	18 years	11 years	6 years	8 years	7 years
AST *(U/l)*	**18**	**48**	**18**	**20**	**24**	**-**
ALT *(U/l)*	**187**	**18**	**91**	**40**	**39**	**30**
GGT	**23**	**0**	**-**	**0**	**10**	**0**
Crea *(mg/dL)*	**1**	**1.4**	**1.3**	**1.7**	**0.9**	**0.8**
Uree *(mg/dL)*	**28**	**34**	**20**	**91**	**21**	**7**
TP *(g/dL)*	**6.9**	**6.1**	**5.7**	**-**	**6.2**	**6.2**
Glucosis *(mg/dL)*	**116**	**99**	**91**	**86**	**103**	**97**
ALKP *(U/l)*	**127**	**66**	**-**	**1004**	**114**	**99**

Table 2. Results of analysis in patients with benign prostatic hyperplasia

Parameters	10 years	13 years	18 years	10 years	8 years
AST *(U/l)*	**9**	**-**	**-**	**-**	**10**
ALT *(U/l)*	**63**	**54**	**43**	**-**	**134**
GGT	**20**	**3**	**1**	**-**	**-**
Crea *(mg/dL)*	**0.7**	**0.7**	**1.6**	**-**	**0.7**
Uree *(mg/dL)*	**30**	**16**	**32**	**-**	**20**
TP *(g/dL)*	**6.7**	**6**	**7.3**	**-**	**-**
Glucosis *(mg/dL*	**76**	**98**	**106**	**-**	**98**
ALKP *(U/l)*	**461**	**434**	**76**	**-**	**-**
HGB *(g/dL)*	**18**	**14.3**	**11**	**14.7**	**-**
HCT *(%)*	**51.9**	**42**	**6.7**	**44.3**	**-**
Grans *(%)*	**82**	**75.9**	**85**	**73**	**-**
Grans *(K/µL)*	**6.2**	**10.4**	**13.7**	**6.8**	**-**
WBC *(mii/mm³)*	**7.5**	**7.17**	**16.1**	**9.3**	**-**
PLT *(K/µL)*	**68**	**532**	**936**	**667**	**-**

CONCLUSIONS

Benign prostatic hyperplasia can vary in severity, with clinical signs that are often non-specific leading to common diagnoses of prostatic syndrome.

Our study indicates that a correct diagnosis will be obtain by peforming an complete physical examination including transrectal digital palpation of the prostate that should always be included in a male health check and by ultrasonography that has a great value for diagnosis.

Ultrasound imaging was the examination of choice by visualizing the prostatic gland, its urethra, the bladder and the locoregional lymph nodes.

All the research included in the study, it is appreciated that it is of considerable importance in fundamental research on the incidence of primary factors, responsible for pathogenetic vulnerabilities useful in clinical activity in structured clinical and paraclinical screening .

The complex form of prostatic hyperplasia, which usually occurs in geriatric dogs, is an ideal research model due to its unique pathological feature, including not only glandular hyperplasia, but also an increase in the stromal components of the prostate**.**

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