ESVOT CONGRESS 2006

PROCEEDINGS

MUNICH, Germany
7th-10th September

“The Cutting Edge in Veterinary Orthopaedics”

European Society of Veterinary Orthopaedics and Traumatology
The reliability of early screening for canine hip dysplasia using the passive hip laxity score


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INTRODUCTION

Canine hip dysplasia (CHD) is commonly diagnosed on the basis of a standard ventrodorsal hip radiographic view (SVDV) in dogs older than 12 or 24 months.1,2 For obvious reasons, early prediction of CHD is clinically useful and of great interest for breeders. Alternative diagnosis methods, such as the PennHIP, were investigated for predicting CHD after 16 weeks of age. PennHIP method incorporates a stress radiographic view, and the passive hip joint laxity (PHL) is estimated measuring the distraction index (DI).3 The Estrela Mountain Dog (EMD) is a Portuguese breed with a high prevalence of CHD (67%), and in breeding terms is recommended to use animals with no or mild CHD.4 This strategy allows to use in breeding 60% of the adult population, which have better hips.4 The purpose of this study was to evaluate the DI for the early screening of animals for CHD control, using the same selection pressure at young age, the DI percentile 60 (DI60). In EMD DI60 is 0.55.5

MATERIAL AND METHODS

96 privately-owned EMD, 59 females and 37 males, whose owners were willing to participate in a prospective hip evaluation program to examine the reliability of early DI screening for CHD. These dogs were first evaluated under deep sedation before 1 year of age (mean ± standard deviation [SD], 5.3±1.8 months) of age using the PennHIP method, and then after the one-year mark (17.4±4.3 months) of age, using the SVDV. In deep sedation medetomidine (Domitor) 0.02 mg/kg intravenously (IV), butorphanol (Torbugesic) 0.1 mg/kg IV, and atropine sulfate (Atropina Injectável) 0.02 mg/kg IV were used. After the procedure the sedation was reversed by using atipamezole hydrochloride (Antisedan) 0.2 mg/kg, intramuscularly. In PennHIP method distraction view, the DI was calculated by dividing the distance between femoral head and acetabular centers, by the radius of femoral head.6 In older dogs the SVDV was used to classify CHD using the Fédération Cynologique International (FCI) grading system (5 grades A, B, C, D and E). All radiographic measurements were made using specific computer software (OSIRIS® Imaging Software), and the radiographs were previously digitalized using a computer scanner provided with a transparency adapter (ScanMaker 9800XL, Microtek). The data of early DI hip score and later FCI hip score were recorded at individual dog level, using the most severely affected hip joint as reference. Dogs with DI less or equal at DI60 (<0.55) were recommended for reproduction (RR DI) and the other dogs were not recommended for reproduction (NRR DI).

RESULTS

The DI ranged from 0.26 to 1.12 (mean ± SD, 0.58±0.22), 56 (58%) animals were in RR DI and 40 (42%) in NRR DI. The FCI score was 9 (9%) animals A, 17 (18%) B, 26 (27%) C, 17 (18%) D and 27 (28%) E. 52 (54%) animals were in RR FCI group and 44 (46%) in NRR FCI.

In early selection the true negative (TN) group included 48 selected animals, whereas the true positive (TP) group included 36 non-selected animals, the false negative (FN) group included 8 selected animals and the false positive (FP) group 4 non-selected animals. In early prediction of moderate and severe CHD (non-selected FCI animals) the sensitivity was (36/44) 82%, specificity (48/52) 92%, PPV (36/40) 90%, NPV (48/56) 86%, and accuracy (84/96) 88%.

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CONCLUSIONS

The results suggest that in EMD the PennHIP method can be used to complement FCI screening as a preliminary screening method for young animals, using the DI60 as reference. The accuracy of 88% can be considered acceptable and the risk of FP diagnosis, retiring animals from reproduction early, is very low: 8%. The study does not agree with others in some respects, because in the PennHIP method the sensitivity is normally higher than the specificity and the NPV higher than the PPV. We think that these facts could be related to the high prevalence of CHD in the breed and with the low mean age of animals in the PennHIP examination. The accuracy of the PennHIP method improves with the age of the dog, and hip joint laxity increases in some animals after 4 months of age.

REFERENCES