PREVALENCE OF DEVELOPMENTAL SKELETAL ABNORMALITIES IN THE DOG IN BULGARIA: A 6-YEAR SURVEY

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Summary

A 6-year survey (1 October 2006 – 1 October 2012) on the prevalence of developmental skeletal abnormalities in dogs was performed based on patients’ records of the Small Animal Clinic to the Faculty of Veterinary Medicine – Stara Zagora, Bulgaria. From the total number of 6,097 dogs with surgical disorders, developmental skeletal disorders were diagnosed in 230 dogs (3.78%). The incidence of diagnoses was as followed: hip dysplasia (64.35%), panosteitis (16.96%), elbow dysplasia (12.61%), hypertrophic osteodystrophy (3.48%), osteochondrosis (2.62%). The most commonly affected breeds were German shepherd (33.4%), Central Asian Shepherd (7.83%), Golden Retriever and Rottweiler (6.52%), Labrador Retriever (4.78%), and the least frequently – small canine breeds and hunting dogs. Male dogs were more frequently affected. Most of the patients were under 3-years old (91.30%) and all recorded panosteitis cases were in dogs younger than 3 years of age.

Key words: bones, developmental disorders, dog, joints

INTRODUCTION

The group of canine growth-related developmental disorders includes: hip dysplasia, elbow dysplasia, osteochondrosis, osteochondritis dissecans, hypertrophic osteodystrophy and panostitis. In this group some authors add more diseases like Wobbler, premature closure of the antebrachial growth plates and dislocation of the patella and the shoulder joint in young animals (Fau et al., 2007).

Diseases of the joints and bones relevant to growth are of particular clinical interest because of the frequency with which they are diagnosed.

Most often medium, large and giant breeds are affected (Sturion & Pereira, 1995; Fau et al., 2007; Kirberger & Stander, 2007), because they are usually subjected to rapid growth periods within their first year of development (Janutta & Distl, 2008; Stecyk et al., 2010). Symptoms of pain and lameness can be the result of any trauma to bones, joints or the support-
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Some authors draw attention to the hereditary factor as the main cause of these diseases (Durmus & Han, 2010) and also to the rapid growth (Janutta & Distl, 2008; Stecyk et al., 2010), nutrition (Sturion & Pereira, 1995; Janutta & Distl, 2008; Krontveit et al., 2010; Corbee et al., 2012), weight (Krontveit et al., 2010; Nap, 2010; Stecyk et al., 2010), hormonal disorders (Simeonova, 2007) and other environmental factors.

The main task of this paper is to investigate the distribution of the above diseases associated with growth, as part of a more comprehensive analysis of the problem.

MATERIALS AND METHODS

A retrospective analysis was performed covering a six-year period, from 1 October, 2006 to 1 October, 2012. The analysis is based on the patient records at the Small Animal Clinic in the Faculty of Veterinary Medicine of Trakia University in Stara Zagora.

The focus of the aggregation of information was given to the clinical diagnosis, breed predisposition, gender and age. The analysis of data was done with the z-test for comparison of proportions.

RESULTS

The results of this statistical survey indicate that from the 6087 surgical cases the number of the dogs with developmental skeletal diseases was 230 (3.78%), out of which 145 male (63.04%) and 85 female (36.96%) (Fig. 1). This group of animals consisted of 38 breeds.

In terms of specific diseases (Fig. 2), they are distributed as followed: hip dysplasia (148/230), panosteitis (39/230), elbow dysplasia (29/230), hypertrophic osteodystrophy (8/230) and osteochondrosis (6/230). The prevalence of hip dysplasia was statistically significantly higher than that of the other growth disorders (P<0.001).

Fig. 1. Prevalence of developmental skeletal abnormalities (black) among all surgical patients referred to the Small Animal Clinic of the FVM in 2006–2013.

Fig. 2. Prevalence of different developmental skeletal abnormalities in dogs (n=230) referred to the Small Animal Clinic of the FVM in 2006–2013.
**Table 1.** Breed-specific prevalence of developmental skeletal abnormalities in dogs (n=230) referred to the Small Animal Clinic of the FVM in 2006–2013

<table>
<thead>
<tr>
<th>Breed</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>German Shepherd</td>
<td>76 (33.04%) A</td>
</tr>
<tr>
<td>Central Asian Shepherd</td>
<td>18 (7.83%) B</td>
</tr>
<tr>
<td>Golden Retriever</td>
<td>15 (6.52%) B</td>
</tr>
<tr>
<td>Rottweiler</td>
<td>15 (6.52%) B</td>
</tr>
<tr>
<td>Labrador</td>
<td>11 (4.78%) B</td>
</tr>
<tr>
<td>Chow-Chow</td>
<td>10 (4.35%) B</td>
</tr>
<tr>
<td>Other breeds</td>
<td>85 (36.95%) A</td>
</tr>
<tr>
<td>Total</td>
<td>230 (100.00%)</td>
</tr>
</tbody>
</table>

Different superscripts within a column denote statistically significant differences (P<0.001).

Regarding the breed factor (Table 1), it is found that this group of diseases is more common in German Shepherd (33.04%), Central Asian Shepherd (7.83%), Golden Retriever (6.52%), Rottweiler (6.52%), Labrador (4.78%), Chow-Chow (4.35%) etc, while rarely it is observed in some hunting breeds as well as in small-sized breeds (0.43%).

The category of the growth diseases is occupied mostly by animals at the age of 1–3 years (210 dogs against 20 that are over this age, which is the 91.30%). All the recorded cases of panosteitis were animals under 3 years old (Table 2).

As for the gender, male dogs prevail in each disease, bringing the total percentage of male and female dogs to 63.04 and 36.96 respectively (Table 3).

**DISCUSSION**

The problem of the skeletal growth disorders seems to interest several authors. Studies regarding the prevalence of these disorders have been performed also in Belgium (Coopman et al., 2008), Turkey (Durmus & Han, 2010), South Africa (Kirberger & Standler, 2007), India (Simon et al., 2010), Croatia (Stanin et al., 2011), Romania (Stecyk et al., 2010) and New Zealand (Worth et al., 2010), the results of which are mentioned below. Some of them, like New Zealand (Worth et al., 2010) and Croatia (Stanin et al., 2011), came up with a strategy for a solution, notably for hip and elbow dysplasia. Therefore it is considered necessary for Bulgaria too.

**Table 2.** Age-specific prevalence of developmental skeletal abnormalities in dogs (n=230) referred to the Small Animal Clinic of the FVM in 2006–2013

<table>
<thead>
<tr>
<th>Disease</th>
<th>≤ 3 years of age</th>
<th>&gt; 3 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number (%)</td>
<td>number (%)</td>
</tr>
<tr>
<td>Hip dysplasia</td>
<td>131/148 (88.51%) A</td>
<td>17/148 (11.49%) A</td>
</tr>
<tr>
<td>Elbow dysplasia</td>
<td>28/29 (96.55%) B</td>
<td>1/29 (3.45%) B</td>
</tr>
<tr>
<td>Osteochondrosis</td>
<td>6/6 (100.00%) C</td>
<td>–</td>
</tr>
<tr>
<td>Hypertrophic osteodystrophy</td>
<td>6/8 (75.00%) C</td>
<td>2/8 (25.00%) B</td>
</tr>
<tr>
<td>Panosteitis</td>
<td>39 (100.00%) B</td>
<td>–</td>
</tr>
<tr>
<td>All diagnoses</td>
<td>210/230 (91.30%)</td>
<td>20/230 (8.70%)</td>
</tr>
</tbody>
</table>

*Percentage for each diagnosis. Different superscripts within a column denote statistically significant differences (P<0.001).
In this study, hip dysplasia appears by far the commonest skeletal growth disorder in the relevant breeds, as it was already known, while panosteitis and elbow dysplasia follow. Several authors have reported the high frequency with which these diseases are diagnosed in large breed dogs (Coopman et al., 2008; Fau et al., 2007; Souza et al., 2011).

In terms of species distribution, the differences found are dictated by the geographical location of the country and the breeds of dogs that prevail in them. The first position of this indicator in this study belongs to the German Shepherd, while Central Asian Shepherds, Golden Retrievers, Rottweilers and Labrador Retrievers follow. Furthermore, these breeds appear as some of the most affected ones in Brazil (Souza et al., 2011), Poland (Narojek et al., 2008) and India (Simon et al., 2010) plus Bernese Mountain Dog in France (Fau et al., 2007) and Bullmastiff, Chow-Chows and Boerboels in South Africa (Kirberger & Stander, 2007), probably due to their popularity in each country on one hand and the insufficient breeding control on the other.

Most of the affected dogs were under 3-years old, which was expected as this study refers to growth disorders. It is known that the age of onset of each disease is as follows: hypertrophic osteodystrophy: 2–8 months, elbow dysplasia: 5–8 months, osteochondrosis: 4–8 months, panosteitis: 5-12 months and hip dysplasia: 2–12 months (Kowaleski, 2006; Olmstead, 2006; Roush, 2006). However there are patients over these ages, the majority of which is probably due to their late presentation for examination or certification for dysplasia. It is very interesting to mention that there is a close relation between disease and age. In all 16 cases of panosteitis (100%) young animals (under 3 years old) were affected.

Gender is also a subject of attention in many publications. Many authors support that males are more vulnerable to these diseases than females (Beuing et al., 2000; Kirberger & Stander, 2007; Kowaleski, 2006; Janutta & Distl, 2008; Simon et al., 2010; Souza et al., 2011). There are other researches though, in which the sick female dogs are more than the male ones (Fau et al., 2007).

Table 3. Gender-specific prevalence of developmental skeletal abnormalities in dogs (n=230) referred to the Small Animal Clinic of the FVM in 2006–2013

<table>
<thead>
<tr>
<th>Disease</th>
<th>male number (%)</th>
<th>female number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip dysplasia</td>
<td>84 (56.76%)^A</td>
<td>64 (43.24%)^A</td>
</tr>
<tr>
<td>Elbow dysplasia</td>
<td>21 (72.41%)^B</td>
<td>8 (27.59%)^B</td>
</tr>
<tr>
<td>Osteochondrosis</td>
<td>5 (83.33%)^C</td>
<td>1 (16.67%)^B</td>
</tr>
<tr>
<td>Hypertrophic osteodystrophy</td>
<td>4 (50.00%)^C</td>
<td>4 (50.00%)^B</td>
</tr>
<tr>
<td>Panosteitis</td>
<td>31 (79.49%)^B</td>
<td>8 (20.51%)^B</td>
</tr>
<tr>
<td>All diagnoses</td>
<td>145 (63.04%)</td>
<td>85 (36.96%)</td>
</tr>
</tbody>
</table>

*Percentage for each diagnosis. Different superscripts within a column denote statistically significant differences (P<0.001).
CONCLUSIONS

For a period of 6 years (01 October 2006 to 01 October 2012) from the total number of 6087 surgical cases presented in the Small Animal Clinic, 230 dogs (3.78%) were registered with disorders of the locomotor system related to growth (hip dysplasia, elbow dysplasia, osteochondrosis, hypertrophic osteodystrophy and panosteitis).

The frequency of these diseases is distributed as follows: hip dysplasia (64.35%), panosteitis (16.96%), elbow dysplasia (12.61%), hypertrophic osteodystrophy (3.48%) and osteochondrosis (2.62%).

The diseases of this group are more commonly found in German Shepherds (33.4%), Central Asian Shepherd (7.83%), Golden Retrievers and Rottweilers (6.52%), Labradors (4.78%) and rarely in other breeds, such as hunting or small breeds (0.43%).

It is reaffirmed that this type of disorders occurs more frequently in male and in very young dogs.

REFERENCES


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Paper received 01.10.2013; accepted for publication 09.12.2013

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