Journal of Animal and Veterinary Advances 11 (16): 2930-2933, 2012
ISSN: 1680-5593

Retrospective Study on the Treatment of Aseptic Necrosis of the Femoral Head in Dogs

[1]Erinda Lika, [1]Paskal Gjino, [3]Majlinda Belegu, [2]Sokol Duro,
[1]Elenica Dimco, [2]Esmeralda Sherko and [1]Luigj Turmalaj
[1]Department of Clinical Subjects,
[2]Department of Morfofunctional Subjects, Faculty of Veterinary Medicine,
[3]Department of Math and Informatics, Faculty of Economics,
Agricultural University of Tirana, Tirana, Albania

Abstract: The necrosis of the femoral head consists of aseptic osteonecrosis of the femoral head widely known even in the field of human medicine as the Legg-Perthes disease. It is characterized by an ischemic necrosis more or less wide of the segment of the femoral head. This pathology mainly affects the small breeds (Pekingese, Terriers, Barboncinos), above all young ages of 4-11 months old. The aseptic necrosis of the femoral head might appear unilaterally but according to literature it might also occur bilaterally. During the biennial period of October 2009 to October 2011, researchers studied the cases presented at the Veterinary Clinic of the Faculty of Veterinary Medicine as well as some cases presented in different veterinary clinics in Tirana. Altogether, 14 dogs were treated and diagnosed (5 males and 9 females). Their age resulted from 2 months old up to 14 years old. Two medication methods were applied: conservative and surgical medication. Conservative medication was applied in those cases when surgical intervention was not considered necessary. It consisted in using some anti-inflammatory non-steroid substances such as brucsicam, pirocsicam, diclofenac, carprofen, ketodifen accompanied by regional immobilization and physiotherapy. Surgical medication consisted of intervention in the coxofemoral articulation and removal of the femoral head.

Key words: Necrosis, femur, dysplasia, dog, intervention, coxofemoral

INTRODUCTION

The aseptic necrosis of the femoral head is a painful disease and does not cause only physical pain for the animal. This pathology has its own importance, considering the fact that it affects dogs of pure breeds and at a very young age so it affects breeds and ages preferred by the owners.

This pathology requires for specialized surgical intervention in grave conditions, a technique that has been used successfully in veterinary medicine. The aseptic necrosis of the femoral head (widely known as the Legg-Calve-Perthes disease) in dogs of small breeds was firstly described in veterinary literature by Tutt in1935. Just like Waldenstrom who prescribed this disease in 1909, he described the disease in people.

The aseptic necrosis is a pathology that occurs when the process of blood supply to the femoral head is damaged. The causes are yet not clear but genetic causes are thought to be predominant. In most of the cases, clinical signs appear in dogs of 4-11 months old. Treatment in cases of grave pathology is only surgical. Now a days this pathology is considered as the most frequent and characteristic for the osseous and cartilaginous system and as a pathology of dogs mostly kept in housing conditions (Demko and McLaughlin, 2005; LaFond *et al*., 2002).

The necrosis of the femoral head consists of aseptic osteonecrosis of the femoral head, known in the field of human medicine as the Legg-Perthes disease. It is characterized by an ischemic necrosis more or less wide, of a segment of the femoral head (Baines, 2006). This pathology mainly affects the small breeds (Pekingese, Terriers and Barboncinos), above all the young ages of 4-11 months old. The aseptic necrosis of the femoral head might appear unilaterally but there is data in the literature that it might even occur bilaterally (Agabegi and Agabegi, 2008; Gibson *et al*., 2005; Sampson, 2006). This pathology is closely related to the etiopathogenetic mechanisms that are included since it arises.

MATERIALS AND METHODS

For the study of the aseptic necrosis of the femoral head researchers examined all the cases presented at the

Corresponding Author: Erinda Lika, Department of Clinical Subjects, Faculty of Veterinary Medicine, Agricultural University of Tirana, Tirana, Albania

Clinic of the Faculty of Veterinary Medicine in Tirana, Albania, during October 2009 to October 2011. There were 14 dogs altogether, of different breeds, weights and ages which manifested clinical framework at different stages.

This pathology was diagnosed based on the clinical data and in some cases it was confirmed through radiological control. The radiological control accurately defines the stages of development of this pathology.

Two medication methods were used simultaneously; conservative and surgical medication. Conservative medication was applied in those cases when surgical intervention was not considered necessary. It consists in using some non steroid anti-inflammatory substances such as: brucsicam, pirocsicam, diclofenac, carprofen, ketodifen accompanied by immobilization of the region and physiotherapy. Surgical medication consists in intervening in the coxofemoral articulation and removal of the femoral head.

Technique: The operation is performed with general anesthesia. It is performed through the use of Atropine and Xylasine as a pre-anesthetics followed by Ketamine as a dissociative anesthetics.

Among several techniques of intervening the coxofemoral articulation, the most successful one is the anterior one (Anterior Arthrotomy). After reaching the articulatory cavity the limb is rotated until stretching of the articulatory capsule is felt which is cut in its posterior part. After the femoral head is evidenced it is cut through a chisel, the surgical bone saw (oscillatory) or through the osseous forceps. The removal of the femoral head together with part of its neck will create a cavity in the interior part of the ace tabular cavity and for this reason the articulatory capsule is cut and removed partly whereas the rest is stretched and stitched with interrupted knots. A pseudo-articulation is created in the remaining part which keeps the remaining part of the femur immobile to the ace tabular cavity.

In the end, local chemotherapeutic treatment is done and the operatory wound is ligated. The limb is immobilized for a fortnight.

RESULTS AND DISCUSSION

During the period of October 2009 to October 2011, researchers examined 14 cases with aseptic necrosis of the femoral head. The results have been shown in the Table 1. Dogs manifest this pathology with pain where the first constant sign is grave lameness. It is interesting to pinpoint hat atrophy of the muscular structures is noticed in the limb where this pathology occurs. As a result of the pain, the animal does not like to move while severe pain accompanies the animal inobligatory movements sometimes even rattling noises can be heard. In the most serious forms, researchers have noticed that the dogs with this pathology keep their leg shrunken.

Table 1: The results of aseptic necrosis during the study

Breeds	Age (months)	Sex	Weight (kg)	Treatment	Remarks
Pekingese	9	F	4.0	Surgical	
Pekingese	11	F	4.5	Surgical	
Pekingese	15	M	3.5	Surgical	
Pekingese	10	F	4.0	Surgical	
Terrier White	12	F	5.0	Surgical	
Terrier	10	M	4.5	Surgical	
Metis	17	M	12.0	Surgical	Atrophy (Euthanasia)
Metis	9	F	8.0	Surgical	
Rottweiler	20	M	40.0	Surgical	Atrophy (Euthanasia)
German pastor	12	F	30.0	Surgical	
English setter	9	F	12.0	Surgical	
Dalmatian	7	F	8.0	Conservative	
Doberman	13	F	25.0	Surgical	
Doberman	15	M	30.0	Conservative	

Table 2: Frequency of the disease according to breeds

Breeds	No. of diseased head	Percentage of the number of head
Pekingese	4	28.57
Terrier	2	14.28
Metis	2	14.28
Doberman	2	14.28
Rottweiler	1	7.14
German Pastor	1	7.14
English Setter	1	7.14
Dalmatian	1	7.14

Table 3: Frequency of the disease according to weight

Total No. of head	Diseased dogs according to weight (kg)			
	3.5-12	Percentage of head	>12	Percentage of head
14	10	71.42	4	28.57

From the Table 2, it can be noticed that small breeds such as Pekingese and Terrier comprise the highest percentage which coincides to the data from the literature (LaFond *et al*., 2002; Sampson, 2006). This is thought to be related to micro traumas caused by micro fractures of the subchondral part of the femoral head. Being light and impulsive breeds, these are more probable to move and play. This is also confirmed by the fact that in this study dogs with light body weight are more affected (Table 3).

The factors that lead to these micro fractures according to the literature (Ettinger *et al*., 2000) are also related to the excessive use (without criteria) of the cortisones which affect metabolic disorders of Ca and P, absolutely indispensable in the consolidation of the osseous system at these ages. Cortisones or pathologies such as rachitis, osteoporosis, renal osteodistrophy are

characterized by the decrease of the activity of the osteoblasts or the increase of the activity of the osteoclasts.

Corticosteroids affect the bones causing osteoporosis by reducing the quantity of calcium absorption in the intestines, increase of the activity of the osteoclasts, reduction of the activity of the osteoblasts and increase of calcium elimination in urine.

Fattening accompanied with metabolic disorders of the lipids (hyperlipidemia) causes dual damage of the micro circulation of the blood through adipose embolia and the increase of the mechanic pressure on the articulation as a result of the overweight.

The mechanical traumas accompanied with a fracture of the femoral neck and the coxofemoral luxation must be taken into consideration as a factor arising this pathology. Sugar diabetes with a diabetic microangiopathy might be a predominant factor (Bell, 2010; Boss and Misselevich, 2003; McLaughlin, 2001).

The aseptic necrosis of the femoral head might be viewed even in the vascular alterations accompanied with changes in the blood vessels walls causing vasculitis or when there are disorders in coagulation because of thrombocyte alternations and functional anomaly in the factors of blood coagulation (Brenig *et al*., 1999; Ettinger *et al*., 2000).

Another factor which was taken into consideration in this study was the factor age. As it can be seen even from Table 4 the most frequently affected ages by this pathology are those from 7-12 months old in 64.28% of the head studied, compared to 35.71% of the age >12 months old. This data coincide to those of the literature where it says that this pathology is more frequent among younger ages from 4-11 months old (LaFond *et al*., 2002).

Table 4: Frequency of the disease according to age

	Diseased dogs according to age (months old)			
Total No. of head	7-12	Percentage of head	>12	Percentage of head
14	9	64.28	5	35.71

Being a pathology with a sub acute character in addition to the mentality of the owners not to seek rapid and specialized help, researchers think that the disease should have appeared long ago before the ages they were presented in our clinic.

In addition to age, sex might be another factor which arises clinical interest in the cases presented with this pathology. The data are shown in Table 5. According to the results of Table 5, it appears that females are more frequently affected by this pathology (64.28%), compared to males (35.71%). Researchers think that the highest frequency of this pathology in females should be firstly related to the more intensive metabolism and earlier sexual maturity where somatotropin, thyroxin, adrenal hormones play an important role which also make up the endocrinologic factors of growth, development and sexual maturity (Agabegi and Agabegi, 2008; Ettinger *et al*., 2000).

The dogs presented in the clinic have come with this pathology at different stages but we must emphasize that the majority of them displayed it at a really advanced stage of the aseptic necrosis of the femoral head. In the opinion this is the result of the continuous influence of those factors in the growing conditions and keeping them in housing conditions. Another factor which should not be excluded is overloaded and nutritious disorders on one hand and wrong medication on the other hand because of lack of diagnosis.

In the clinic, out of 14 head affected by the aseptic necrosis of the femoral head, only 2 cases were medicated in a conservative manner, the others because of grave conditions underwent surgical intervention. The results are shown in Table 6.

As it can be seen from the Table 6, surgical interventions were not only in higher percentage but also more successful. From all the operated head only 2 were eliminated because several weeks after the operation researchers examined muscular atrophy and inability to move.

Table 5: Frequency of the disease according to the sexes

	Diseased dogs according to sex					
Total No. of head	Females (head)	Percentage of head	Average age (months old)	Males (head)	Percentage of head	Average age (months old)
14	9	64.28	10.12	5	35.71	15.4

Table 6: Results of surgical treatment

	Applied medication							
Total No. of head	Conservative	Percentage of head	Healing (%)	Surgical intervention	Percentage of head	Healing (%)	Eliminated (muscular atrophy)	Percentage of head
14	2	14.28	100	12	85.71	71.42	2	14.28

CONCLUSION

The aseptic necrosis of the femoral head is a frequent pathology in dogs which should be estimated also the most affected breeds are Pekingese and Terrier. While the most affected ages from these pathologies are from 7-12 months old. About the most frequently affected sexes are the females.

RECOMMENDATIONS

The aseptic necrosis of the femoral head in dogs which are heavier and more advanced presents difficulties and the medication results are not really successful. Attention must be paid in the use of cortisones, especially in female dogs. Also must be paid attention to give a balanced nutrition to the dogs. They must be proteinic and the necessary quantity of Ca should be ensured by reducing foods with carbohydrates and fats. Female dogs should be sterilized before they reach their sexual maturity.

REFERENCES

Agabegi, S.S. and E.D. Agabegi, 2008. Step-Up to Medicine (Step-Up Series). 2nd Edn., Lippincott Williams and Wilkins, Hagerstwon, MD., ISBN: 978-0781771535, Pages: 560.

Baines, E., 2006. Clinically significant developmental radiological changes in the skeletally immature dog: 2. Joints. Practice, 28: 247-254.

Bell, J.S., 2010. Genetic testing and genetic counseling in pet and breeding dogs. Proceedings of the 35th World Small Animal Veterinary Association World Congress, June 2-5, 2010, Geneva, Switzerland.

Boss, J.H. and I. Misselevich, 2003. Osteonecrosis of the femoral head of laboratory animals: The lessons learned from a comparative study of osteonecrosis in man and experimental animals. Vet. Pathol., 40: 345-354.

Brenig, B., T. Leeb, S. Jansen and T. Kopp, 1999. Analysis of blood clotting factor activities in canine legg-calve-perthes disease. J. Vet. Int. Med., 13: 570-573.

Demko, J. and R. McLaughlin, 2005. Developmental orthopedic disease. Vet. Clin. North Am. Small Anim. Pract., 35: 1111-1135.

Ettinger, S., J. Feldman and C. Edward, 2000. Textbook of Veterinary Internal Medicine. 5th Edn., W.B. Saunders Co., USA., pages: 1873.

Gibson, K.L., D.D. Lewis and R.D. Pechman, 2005. Department of veterinary clinical sciences, school of veterinary medicine, louisiana state university, baton rouge 70803-8422. J. Bone Joint Surg. Am., 87: 550-557.

LaFond, E., G.J. Breur and C.C. Austin, 2002. Breed susceptibility for developmental orthopedic diseases in dogs. J. Am. Anim. Hospital Assoc., 38: 467-477.

McLaughlin, R.M., 2001. Kinetic and kinematic gait analysis in dogs. Vet. Clin. North Am. Small Anim. Pract., 31: 193-201.

Sampson, J., 2006. What is required for breeding programmes or molecular technologies to make impact on the prevalence and incidence of elbow dysplasia in dogs? Proceedings of the British Veterinary Orthopaedic Association Autumn Scientific Meeting, November 10-15, 2006, Chester, UK.