

CANINE PANOSTITIS

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K. A. FARAG*; A. A. ABD EL-SAMEE**; A. A. SHALABY*** and M. A. HAMOUDA****

*Dept of Vet. Surgery Anaesthesiology and, Radiology Cairo University.

**Dept of Vet. Internal Medicine, Infectious diseases, Fish diseases and management .Cairo University.

***Dept. of Vet. Pathology. Cairo University Beni suif branch.

****Dept of Vet. Pathology Cairo University.

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SUMMARY

Canine panostitis was diagnosed in 27 male German shepherd and other large dogs at different ages. Clinical signs included shifting leg lameness and pain reaction when applying pressure on the affected long bones. Haematological findings showed no significant eosinophilia of the afflicted dogs. The salient radiographic features of the disease revealed minute or focal radiodensities in the medullary cavity of long bones, accompanied with thickening of endosteum and periosteum. Histopathologically, showed fibroblastic and osteoblastic activities and no evidence of inflammatory cell infiltration. Canine panostitis should be considered in the differential diagnosis of lameness in young large breed of dogs.

INTRODUCTION

Canine panostitis is a spontaneously occurring, self-limiting disease of young large breed dogs involving the diaphyseal areas of the tubular long bones (Lenahan et al., 1985; Newton and Biery, 1989). The disease was first described in the veterinary literature in 1951 by Bauman and Gratzl as chronic osteomyelitis or eosinophilic panostitis. In Egypt, the disease was first recorded by Farag (1991) in a German shepherd dog.

German shepherds have the highest breed incidence, and males are affected more commonly than females (Barrett et al., 1968; Hardy and Stockman, 1969; Bohning et al., 1970; Lacroix, 1970; Burt and Wilson, 1972; Tandy and Haywood, 1977). Dogs with panostitis were commonly presented clinically with history of acute onset of lameness unrelated to trauma. The age of patients was mostly between 5 and 12

months; however, dogs as young as 2 months and as old as 7 years may present with the disease (Cotter et al., 1968; Evers, 1969; Lenahan et al., 1985; Newton and Biery, 1989).

Clinical pathologic findings of dogs with Panostitis do not vary significantly from normal animals. although eosinophilia may be present (Cotter et al., 1968). The radiographic findings show increased intramedullary radioopacity that may or may not have well-defined margins. Additional radiographic findings include an endosteal bone thickening and periosteal reaction (Cotter et al., 1968; Hardy and Stockman, 1969; Turnier and Silverman, 1978; Burk and Ackerman, 1986; Metcalf, 1986; Morgan, 1988). Histopathologically, canine panostitis is not a primary bone disease but a disease of the adipose bone marrow in which the secondary effects are osseous in nature (Lenahan et al., 1985; Newton and Biery, 1989). The characteristic histopathological findings are marked osteoblastic and fibroblastic activities which present throughout the periosteum, endosteum and marrow cavity (Bohning et al., 1970; Lenahan et al., 1985). The present study deals with the clinical, radiographic and histopathological findings of canine panostitis.

MATERIALS AND METHODS

The present study was carried out on 27 male dogs (24 German shepherds, 2 Mixed breed and a Doberman pinscher) at different ages, suffering from musculoskeletal disorders and 10 apparently healthy German shepherd dogs at similar ages as a control group. The cases were referred to the Department of Surgery, Anaesthesiology and Radiology and Department of Medicine, Faculty of Veterinary Medicine, Cairo University, from

October 1991 to November 1993. The dogs were subjected to clinical examination. Blood samples were taken for routine haematological examinations. Radiographs of all long bones were carried out. Postmortem examination were conducted on 4 dogs which were euthanized after being abandoned by their owners. Specimens from mid-shaft of long bones were fixed in formaline 10%. The specimens were then decalcified, dehydrated, cleared and embedded in paraffin. Sections at 4-5 microns thick were prepared and stained with hematoxylin and eosin.

RESULTS

Incidence:

Large breeds of dogs, German shepherds were mostly affected (Table 1). Their ages at time of the onset of lameness ranged from 4 months to 4 years. More than 50% of patients were less than 1 year of age (Table 2). All affected dogs were males.

Table 1: Breed incidence of panostitis in 27 dogs.

Breed	No.	%
German shepherd	24	88.9
Mixed breed	2	7.4
Doberman pinscher	1	3.7

Table 2: Age at time of onset of lameness in 27 cases of panostitis.

Months	No. of dogs	Months	No. of dogs
4	1	5	2
7	6	8	7
12	4	15	2
18	1	24	1
30	1	48	2

Clinical signs:

The affected dogs had a history of lameness of variable duration ranged between 1 week and 4 months. The onset was sudden. The degree of lameness was increasing during the first few days and unaffected by rest or exercise. Body temperature was normal, and signs of systemic

illness were absent. A pain reaction was elicited on deep palpation of the long bones in all affected dogs. Muscular atrophy of the thigh and an region were usually observed in chronic cases.

Haematological picture:

Haematological examinations revealed significant increase in the total erythrocytic count and segmented neutrophil percentage, and significant decrease in immature neutrophil percentage (Band cells). Other haematological values were within normal limits in comparison with apparently healthy control group (Table 3).

Table 3: Haematology of dogs affected with panostitis in 27 cases and 10 normal control dogs.

Parameters	Affected dogs	Control group
RBCs (Millions/Cu mm)	6.182±0.148***	4.085±0.441
T. L. C. (Thousands/ Cu mm)	10.237±0.5135	13.665±1.721
DLC		
N	62.592±2.180**	47.1±4.416
Band cells	1.111±0.192***	13±1.587
L	26.888±2.177	31±4.168
M	3.296±0.479	4.4±1.343
E	5.074±1.143	5.1±1.014
B	0	0

** P= 0.01 *** P= 0.001 DLC: Differential leucocytic count

Table 4: Anatomical location and frequency of radiographic findings in 27 dogs with panostitis.

Bone	No.	%
Humerus	47	87
Ulna	39	72
Radius	35	64
Femur	8	14

Radiographic findings:

Radiographic changes involved only the diaphyses of long bones (Table 4). Humerus comes first among the affected long bone, while femur was the least affected one. The earliest radiographic evidence of panostitis was minimal radiodensities and accentuation of trabecular pattern within the medullary cavity (Fig. 1). Foot lesions usually observed in the shaft of long bones



Fig. 1a & 1b: Showing increase in the medullary density (arrow heads) with blurring of the normal trabecular pattern. Note the reduced contrast between the cortex and medulla (Phase 1).



Fig. 3a & 3b: Showing less well-defined area of increased medullary density involving the distal third of the right humeral diaphysis. Note the marked thickening of the cortex with irregular endosteal surface (Phase 2).



Fig. 2a & 2b: Showing large focal areas of increased radiodensity (arrows) in the shaft of the humerus (Phase 2).



Fig. 4: Displaying the bone densities fill the medullary cavity with smooth intact periosteal new bone (arrow) (Phase 2).

(Fig. 2). Bone cortices were occasionally thickened and there were concomitant elevation and thickening of endosteum and periosteum (Fig. 3 & 4).

Histopathological findings:

Histopathological examinations revealed that medullary bone marrow and periosteum were the most parts affected by this disease. There were osteoblastic and fibroblastic activities. Osteoblastic activity was observed in bony spicules in the form of osteocytes (Fig. 5a & b), while fibroblastic activity was responsible for periosteal thickening (Fig. 5c). There was no osteoclastic activity could be seen in the



Fig. 5a: Bony spicules in the medullary bone marrow (arrow head). (H & E x 100).

b: Higher magnification of bone spicule demonstrating osteocytic formation. (H & E x 400).

c: Periosteal thickening (arrow)(H & E x 400).

examined specimens as well as no evidence of inflammatory cell infiltration in the lesion.

DISCUSSION

Canine panostitis is a disease affecting the long tubular bones, usually of large breed dogs. Names ascribed to this disease in veterinary literature include juvenile osteomyelitis (Bauman and Pommer, 1951), enostosis (Cotter et al., 1968), eosinophilic panostitis (Riedesel, 1969), and canine panostitis (Bohning et al., 1970). The predominant incidence of the disease has been in the German shepherd breed, but other large breeds have also been affected (Barrett et al., 1968; Bohning et al., 1970). In the present study, panostitis involved primarily large breed of dogs that were between 4 and 18 months old, however some cases up to 3 years old have been reported. Similar findings were reported by (Bohning et al., 1970; Tandy and Haywood, 1977).

Affected dogs were presented with the complaint of sudden onset lameness, with severity increasing over several days and affecting one or more legs simultaneously. Some dogs appeared listless, and others were reluctant to move. Body temperatures were within normal range. Haematological values revealed significant increase in total red blood cells and segmented neutrophils, and significant decrease in immature neutrophils (Band cells). Other values were within the normal ranges. Eosinophils in affected dogs did not show any significant changes. This contradicted with Cotter et al., (1968). The disease has been most commonly involved the bones of the forelimbs particularly the humerus and ulna (Cotter et al., 1968; Bohning et al., 1970; Lenehan et al., 1985). The degree of pain is not always proportional to the radiographic changes (Cotter et al., 1968). In the current study pain was exhibited in some cases but radiographic changes were not marked.

Radiographic examination has been considered to be the most reliable mean of differentiating panostitis from other lameness of growing dog. Radiographically the disease assumes 3 phases. The first phase, begins, with an increase in endosteal and medullary density. The second phase, the densities tend to coalesce and fill the medullary canal. The last phase, the medullary canal regains a normal or decreased density (Bohning et al., 1970; Turnier and Silverman 1978; Burk and Ackerman 1986). In the present study the first and the second phases were

previously recognized.

The histopathological findings revealed osteoblastic and fibroblastic activities, but there were no alterations in the osteoclasts. No inflammatory reactions could be detected. The periosteum showed fibrous thickening while bony spicules could be seen in the bone marrow. This indicates that this disease is not a primary disease of bone, but it affects first the bone marrow, while the periosteal reaction is secondary. This agreed with Lenahan et al., (1985) and Newton and Biery (1989).

Despite considerable research, the cause of panostitis remains unknown. There was no evidence to suggest that the changes were of inflammatory or neoplastic origin.

Canine panostitis must be considered in the growing list of bone diseases, which can affect young dogs of the large breeds.

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