# CANINE PANOSTITIS

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### SUMMARY

Camine 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 presure 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 esteoblastic 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

self-limiting disease of young large breed dogs involving the diaphyseal areas of the tubular long bones (Lenehan 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 commoly 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

Canine panostitis is a spontaneously occurring,

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; Lenehan 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 finidngs 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 (Lenehan et al., 1985; Newton 1989). The characteristic and Biery, histopathological findings are marked osteoblastic and fibroblastic activities which present throughout the periosteum, endosteum and marrow cavity (Bohning et al., 1970; Lenehan 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 euthanatized 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 cosin.

#### 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

on deep palpation of the long bones in all affected dogs. Muscular atrophy of the thigh and region were usually observed in chronic cases.

# Haematological picture:

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

Table 3: Hacmatology of dogs affected with panesis in 27 cases and 10 normal control dogs.

Para	neters		Affected dogs	Control gra
RBCs (Millions/Cu mm)		6.182±0.148***	4.085=0.44	
T. L.			10.237±0.5135	13.665=1.73
(Thou	usands/ Cu	mm)		
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
	В	%	0	0

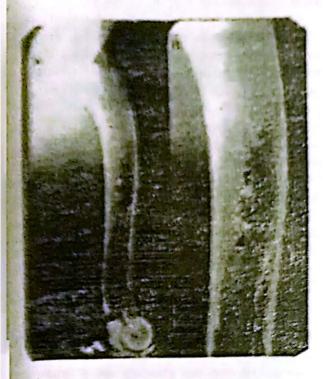
\*\* P= 0.01 \*\*\* P= 0.001 DLC: Differential leucocytic car

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 a diaphyses of long bones (Table 4). Humen comes first among the affected long bone, who femur was the least affected one. The earlier radiographic evidence of panostitis was mind radiodensities and accentuation of trabectal pattern within the medullary cavity (Fig. 1). For lesions usually observed in the shaft of long box



La She Showing increase in the medullary density arrow heads) with blurring of the normal trabecular mattern. Note the reduced contrast between the cortex and medulla (Phase I).

Fig.3a&b: 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. Laste: Sowing 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 occassionally 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

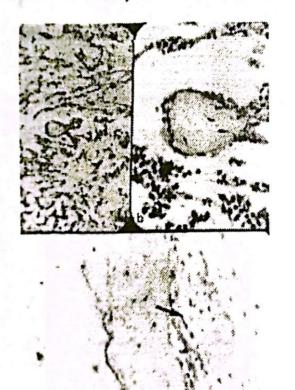


Fig. 5a: Bony spicules in the medullary bone marrow (arrow head). (H &E x 100).
b: Higher magnification of bone spicule demonstrating osteocytic formation. (II & E x 400).

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 afecting the load tubular bones, usually of large breed dogs. Name 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 breed have also been affected (Barrett et al., 1968 Bohning et al., 1970). In the present study panostitis involved primarily large breed of don 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 complain of suddeonset lameness, with severity increasing over several days and affecting one or more leg simultaneously. Some dogs appeared listless, and others were reluctant to move. Body temperature were within normal range. Haematological value revealed significant increase in total red blow cells and segmented neutrophils, and significan decrease in immature neutrophils (Band cells) Other values were within the normal ranges Eosinophils in affected dogs did not show an significant changes. This contradicted with Cone et al., (1968). The disease has been mos commonly involved the bones of the forelimb 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 the radiographic changes (Cotter et al., 1968).1 the current study pain was exhibited in some cast but radiographic changes were not marked.

Radiographic examination has been considered be the most reliable mean of differentiating panostitis from other lameness of growing dog Radiographically the disease assumes 3 phase. The first phase, begins, with an increase endosteal and medullary density. The second phase, the densities tend to coalesce and fill is medullary canal. The last phase, the medullar 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 we

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histopathological findings revealed and fibroblastic activities, but there a alterations in the osteoclasts. No matory reactions could be detected. The showed fibrous thickening while bony while bony that this disease is not a primary disease but it affects first the bone marrow, while material reaction is secondary. This agreed because et al., (1985) and Newton and Biery

considerable research, the cause of remains unknown. There was no suggest that the changes were of recoplastic origin.

parostitis must be considered in the paring list of bone diseases, which can affect man does of the large breeds.

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