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THE PREVALENCE OF CLOSTRIDIA IN DOGS WITH SPECIAL REFERENCE TO ITS PUBLIC HEALTH IMPORTANCE

(With One Table)

By

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مدى انتشار ميكروبات الكلوستريديا في الكلاب واهميتها في الصحة العامة

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أوضحت نتائج الفحص اللاهوائي لعينات براز من الكلاب السليمة والمريضة بالاسهال عن وجود ميكروبات الكلوستريديا حيث تم عزل ميكروب الكلوستريديم برفرنجينز نوع أ(٨٠٪) ونوع ب(٥٠٪) والكلوستريديم ديفكل (٦٠٪) والكلوستريديم فلكس (٣٠٪) والكلوستريديم بروجنس (١٠٪) من الكلاب المريضة بالاسهال في حين تم عزل ميكروب الكلوستريديم برفرنجينز نوع أ (٤٠٪) والكلوستريديم بروجينس (٦٠٪) فقط من الكلاب السليمة. كما أن الفحص اللاهوائي لعينات براز الاطفال أثبتت وجود ميكروب الكلوستريديم برفرنجينز نوع أ(٦٠٪) و ب(٢٠٪) والكلوستريديم ديفكل (٤٠٪) والكلوستريديم فلكس(٤٠٪) في براز الأطفال المريضة بالاسهال بينما من براز الأطفال السليمة فقد تم عزل ميكروب الكلوستريديم برفجينز نوع أ والكلوستريديم بروجينس والكلوستريديم فلكس فقط بنسبة ٢٥٪. وأوضحت العدوى الصناعية بميكروب الكلوستريديم برفرنجينز نوع أ للكلاب صغيرة السن عن وجود اسهال نتيجة الحقن كما أوضح الفحص التشريحي عن وجود التهاب بالامعاء وتخلط بمحتويات الامعاء كما تم عزل الميكروب المحقون مرة أخرى واستبيان سم الميكروب ايضا بمحتويات الامعاء وتعتبر هذه الدراسة الأولى من نوعها في مصر سواء على الكلاب أو الاطفال كما أن عزل ميكروب الكلوستريديم ديفكل من الأطفال يعتبر الأول من نوعه على المستوى العالمي حيث أنه لم يتم عزل هذا الميكروب من قبل من الأطفال وهذا يوضح أهمية هذه الدراسة في مصر لتلافي اختلاط الأطفال بالكلاب وخاصة الكلاب المصابة بالاسهال حفاظا على سلامة الأطفال من مرض الاسهال المسبب بهذه الميكروبات

SUMMARY

Bacteriological examination was carried out on twenty faecal samples of dogs, 10 from apparently healthy dogs and 10 from dogs showing diarrhoea. The results of anaerobic culture examination of faecal samples of the dogs suffered from diarrhoea revealed the isolation of Cl.perfringens type A (80%), Cl.perfringens type B (50%), Cl.difficile (60%) as well as Cl.fallex and Cl.sporogens (30 and 10%, respectively). Cl.perfringens type A and Cl.sporogens were only isolated from the apparently healthy dogs in an incidence of 40 and 60%, respectively.

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Anaerobic culture examination of faecal samples of five children suffering from diarrhoea revealed the presence of Cl.perfringens type A and B and Cl.fallex (60, 20 and 40%, respectively). Cl.difficile was isolated from diseased children for the first time in Egypt in a percentage of 40%. Moreover, Cl.perfringens type A, Cl.fallex and Cl.sporogens were isolated from five apparently healthy children at the same percentage of 20%.

Experimental infection of puppies with Cl.perfringens type A per os showed several clinical symptoms and post mortem lesions characteristic to this type of infection. The inoculated strain was reisolated from the intestinal contents. The suggested role of dogs in transmitting infection to human beings was discussed.

INTRODUCTION

Clostridial organisms are widely distributed in nature where they are normally present in the soil, dust, air, water, sewage as well as in the intestinal tract of human beings and animals. The organisms specially Clostridium perfringens are implicated in cases of gas gangrene in man and animals as well as in food intoxication (BETTY and RICHARD, 1978). Infections of dogs with Clostridial organisms may occur by ingestion of contaminated food specially fish where EL-GED et al. (1985) found that Cl.perfringens are present in the intestinal tract of apparently healthy and diseased fish. PROSCOTT et al. (1978) isolated large numbers of Cl.perfringens from the intestine of dogs suffering from haemorrhagic entritis. WARRER and KRUININGER (1979) recorded that non-toxogenic Cl.perfringens was shown to be a normal gastric inhabitant in both healthy and dogs suffering from gastric dilatation and no other Clostridia could be isolated from the stomach content of normal dogs. BERG et al. (1979) isolated anaerobic bacteria specially Cl.perfringens in large numbers from dogs and cats with a haemorrhagic gastro-intestinal conditions. STEAD and LAWSON (1981) found that wound infection due to bone fractures was associated with Cl.welchii. TILTON et al. (1981) recovered Cl.perfringens type A from the intestine of dogs which died from parvovirus infection. CARMAN and LWIS (1983) recovered large numbers of Cl.perfringens type A from the faeces of dogs with chronic intermittent diarrhoea. BERRY and LEVOTT (1986) found that the faecal samples from 3 dogs with chronic diarrhoea were positive for Cl.difficile.

In Egypt studies on Clostridia in dogs are rather scarce, although stray dogs are widely distributed all over the country and in many houses, where dogs and children are in close contact. The present study has been carried out to investigate the prevalence of clostridial microorganisms in healthy and diseased dogs, as well as in contact children. Moreover, study of the pathogenicity of clostridial microorganisms in dogs was carried out.

MATERIAL and METHODS

Sampling :

Twenty faecal samples were obtained from 10 apparently healthy dogs and

10 dogs showing diarrhoea. Moreover, 10 faecal swabs were obtained from contact children (5 healthy and 5 showing diarrhoea).

Experimental animals :

Six apparently healthy puppies were used through out the experiment.

Culturing :

The collected samples were cultivated anaerobically in cooked meat media for isolation of clostridial members. The inoculated media were heated at 80°C for 10 minutes to kill the vegetative contaminants then incubated in gas pak anaerobic jar for 24-48 hours. Few drops from each culture were streaked on 100 ug/ml gentamycin sheep blood agar plates, for facilitating the isolation of different clostridia (EL-GED, 1979), and incubated anaerobically for 24-48 hours. The growing colonies were examined morphologically, microscopically and biochemically using catalase test (WILLIS, 1977). Pure cultures were identified biochemically according to SMITH and HOLDEMAN, 1968. Furthermore, the suspected colonies of Cl.perfringens were tested by the lecithinase test (OAKELY and WARRACK, 1953) and typed by dermatonecrotic test in guinea pigs (STERNE and BATTY, 1975) as well as by using the diagnostic antisera of Burroughs Wellcome (Anti- A, B, C, D and E). Other isolates were identified by the pathogenicity and protection test as well as the biochemical tests depending on fermentation of sugars (SMITH and HODEMAN, 1968).

Experimental infection of puppies :

Six puppies, proved to be free from clostridia by anaerobic examination, were divided into three groups (two puppies, each). Group 1 recieved 0.5 ml of the fresh pure culture of cl.perfringens type A per os using sterile rubber tube. Group 2 recieved 1 ml of the culture and group 3 was left as control. All dogs were kept under observation for 10 days. The clinical symptoms were recorded as well as their faecal samples were examined for Cl.perfringens type A. One dog showing diarrhoea was sacrified and the P.M. lesions were recorded.

RESULTS

I- Prevalence of Clostridial types in faecal samples of dogs and children:

The results of anaerobic examination revealed 41 isolates from the examined faecal samples of dogs and children as shown in Table (1). The table denotes that Cl.perfringens type A was predominant in either diseased dogs or children.

II- Clinical symptoms and P.M. lesions :

Experimentally infected dogs with Cl.perfringens type A, showed profuse diarrhoea after four days. On P.M. examination there was congestion and haemorrhages in the intestinal mucosa. The intestinal contents were mucoid. The inoculated organism was reisolated and its toxin was detected in the intestinal contents.

DISCUSSION

The results of this study proved the presence of different types of Clostridia in the intestine of either apparently healthy or diseased dogs and children, specially Cl.perfringens type A. Although the later constitutes a normal intestinal flora, yet their incidence is higher under disease or stress conditions. Our findings in this respect correspond with the results of PROSCOTT et al. (1978), WARRER and KRUININGER (1978), BERG et al. (1979), STEAD and LAWSON (1981), TILTON et al. (1981), CARMAN and LWIS (1983), who recorded the presence of Cl.perfringens specially type A in dogs showing diarrhoea. A substancial evidence for the incrimination of Cl.perfringens type A in gastrointestinal infection in dogs was confirmed by experimental infection in puppies, reproducing the disease and reisolation of the causative agent.

This study also proved the presence of Cl.difficile in dogs and children showing diarrhoea and this agreed with the results of BERRY and LEVOTT (1986), who could isolate Cl.difficile from dogs with chronic diarrhoea. Concerning the isolation of Cl. difficile from children showing diarrhoea it is considered to the best of our knowledge the first record in this aspect.

From the afore-mentioned study it could be concluded that dogs may play a role in transmission of clostridial organisms to contact human beings specially children with subsequent infection producing diarrhoea.

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Table (1): Isolated strains of Clostridia from apparently healthy and diseased dogs and children.

Isolated Clostridia	Dogs				Children			
	Apparently Healthy (10)		Diseased (10)		Apparently healthy (5)		Diseased (5)	
	No.	%	No.	%	No.	%	No.	%
Cl.perfringens type A	4	40	8	80	1	20	3	60
Cl.perfringens type B	-	-	5	50	-	-	1	20
Cl. difficile	-	-	6	60	-	-	2	40
Cl. fallex	-	-	3	30	1	20	2	40
Cl.sporogens	3	60	1	10	1	20	-	-

% percentage calculated according to the number of cases.