

PREVALENCE OF CAMPYLOBACTER AND SALMONELLA IN CATS AND DOGS (With One Table)

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إنتشار الكامبيلوباكتري والسالمونيلا في
القطط والكلاب

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لدراسة مدى إنتشار ميكروب الكامبيلوباكتري ، السالمونيلا وكذا بعض الميكروبات المرضية في القطط والكلاب تم جمع عينات براز من هذه الحيوانات من أماكن مختلفة بمدينة أسيوط والتي شملت عدد ٤٠ قطة ، ٩٠ كلباً منها السليم إكلينيكيًا والمصابة بالإسهال (قطة ١٥ كلباً) . بالفحص الميكروبيولوجي لعينات براز القطط تم عزل الكامبيلوباكتري جيوجيناي بنسبة ٥% كما وجدت ميكروبات البروتيس بنسبة ١٠% والتي شملت عتقاته المصنفة البروتيس ريتجيري والبروتيس ميرابيليس . دلت نتائج الفحص الميكروبيولوجي لبراز الكلاب على وجود ميكروبات الكامبيلوباكتري جيوجيناي بنسبة ٨.٩% ولقد كان توزيع هذا الميكروب في عينات براز الكلاب السليمة إكلينيكيًا والمصابة بالإسهال بنسبة ٦.٧% ، ٢٠% على التوالي . كما تم عزل الشيغيللا سوناي ، السيدوموناس ايرجينوزا والبروتيس بنسب ١% ، ١% ، ٩% بالترتيب . وقد تم تصنيف عتقات البروتيس المعزولة من براز الكلاب إلى برويتس ريتجيري برويتس فالجاريس والبروتيس ميرابيليس بواقع ٦ ، ٢ ، ١ ، عترة من كل نوع . ولم يستدل على وجود السالمونيلا في براز القطط والكلاب التي تم فحصها . وقد تم مناقشة دور القطط والكلاب في نقل بعض الأمراض المشتركة للإنسان .

SUMMARY

Faeces were collected from normal and diarrhetic 130 pet animals (40 housed cats and 90 unknown dogs) for bacteriological studies on *Campylobacter jejuni*, *Salmonella* organisms and other enteric pathogens. Out of those pet animals one cat and 15 dogs showed signs of enteritis. *Campylobacter jejuni* and *Proteus* organisms were recovered from 5% and 10% of faeces of cats. The 4 *Proteus* strains were identified as *Proteus rettgeri* 2 and *Protus mirabilis* 2 while *Campylobacter jejuni* were isolated from 8.9% of the dogs used in this investigation. The organism was detected in 6.67% and 20% out of 75 clinically healthy and 15 diarrhetic dogs respectively. The recovery rates of *Shigella sonnei*, *Pseudomonas aeruginosa* and *Proteus* spp. were 1.1%, 1.1% and 9% respectively. The identified *Proteus* spp. were *Proteus rettgeri* 6, *Proteus vulgaris* 2 and *Proteus mirabilis* one. *Salmonellae* failed to be isolated from faeces of cats and dogs. The role of cats and dogs in transmission of some zoonotic agents was discussed.

SABAH MOUSTAFA

INTRODUCTION

Some bacterial infections have been recognized as a zoonosis. Dogs and cats are considered the largest sources or focus of infection to man. It seems that *Campylobacter* like salmonellosis is an alimentary infectious disease (MORSE and DUNCAN, 1975; SVEDHEM and KAIJSER, 1981).

Campylobacter jejuni and *Campylobacter coli* have been encountered in the intestinal contents of a wide variety of warm blooded animals, including domestic species and free-living and captive wild animals (PRESCOTT and BRUIN-MOSCH, 1981). Dogs showed enteritis or apparently normal may harbour thermotolerant *Campylobacter*. The frequency of *Campylobacter* carriers among diarrhetic dogs has variably been reported to be between 1 and 75% (HASTINGS, 1978; FERREIRA, et al. 1979; HOSIE, et al. 1979; BRUCE, et al. 1980; PRESCOTT and BRUIN-MOSCH, 1981). The rate of isolate *C. jejuni* in dogs less than 3 months of age has been reported as 35% and in older dogs as 8.9% (BLASER, et al. 1980).

Descriptions of *C. jejuni* induced enteritis in dogs have not been adequate to rule out other known causes of diarrhea. HOSIE, et al. (1979) proved that 11.1% of healthy dogs and 10.4% of diarrhetic dogs act as carriers of *C.jejuni*. BRUCE, et al. (1980) found that 15 of 38 (39%) of clinically normal animals yielded *Campylobacter*, while 16 of 42 (38%) diarrhetic puppies were positive. PRESCOTT and BRUIN-MOSCH (1981) revealed the presence of *C.jejuni* in 0.5% of healthy dogs whereas the organism failed to be recovered from faeces of diarrhetic dogs.

Feline *Campylobacter* strains are mostly be identified as *C.jejuni* which ranging from few to 45% as described by BLASER, et al. (1980), BRUCE, et al. (1980), FLEMING (1983) and FOX, et al. (1983). However, KANEUCHI, et al. (1978) mentioned that 51 (6.6%) of 593 cats had *Campylobacter*. BRUCE, et al. isolated the *Campylobacter* from 45% of 56 clinically normal cats. This higher condition may be due to some cats which were caught near poultry processing plant were scavenged contaminated food as processed poultry carcasses are known to harbour *Campylobacter*.

Further studies on the prevalence of *C.jejuni* in pets demonstrated that the isolation rates of 13 to 75% for puppies, 5 to 50% for dogs and 4 to 10% for cats have been reported by HASTINGS (1978), BLASER, et al. (1979), FERREIRA, et al. (1979) and HOSIE, et al. (1979). Moreover, the incidence of *Campylobacter* isolation from dogs and cats recorded by SVEDHEM and KAIJSER (1981) was about 5%.

Many investigators studied the transmission of canine *Campylobacter* from dogs and puppies to man (SKIRROW, 1979 and BLASER, et al. 1978) as well as the transmission from pets cats to man (SKIRROW, et al. 1980; SVEDHEM and NORKANS, 1980 and BLASER, et al. 1982).

Salmonella is considered as pathogenic bacteria of considerable medical and economic interest. ADLER, et al. (1951), GORHAM and GARNER (1951), VARLEA, et al. (1951), SHOUMAN, et al. (1979), LOTFI and NASHED (1980) which were isolated *Salmonella*

ZOONOTIC PATHOGENS IN CATS AND DOGS

spp. from diseased and healthy dogs. However, MURDOCH (1986) stated that *Salmonella* spp. are frequently isolated from the faeces of normal cats and dogs and rarely cause clinical disease in adults while in young cats and dogs salmonellosis can be fatal. *Salmonella* was harboured in dogs and cats and transmission of *Salmonella* to human from pet animals has been demonstrated by MORSE and DUNCAN (1975), KOTANI, et al. (1977), FKUSHIMA, et al. (1985) and KANEUCHI, et al. (1987).

Dogs and cats are also a possible source of enteropathogenic organisms. *Pseudomonas aeruginosa* was isolated from two fatal cases of haemorrhagic enteritis in dogs while *Proteus* spp. appeared to be members of the normal intestinal flora of dogs (GORHAM and GARNER, 1951). However, CRAIGE (1948) and (1950) pointed out that *Proteus* organisms are an aetiological agent of acute and chronic dysentery in dogs. Furthermore, VARELA, et al. (1951) reported the presence of shigella in dogs.

Since dogs and cats live in close contact with man, the elimination of pathogenic microorganisms from its intestines is an important consideration in the epidemiology of human enteric infections. Therefore, this study was undertaken to clarify the significance of dogs and cats in Upper Egypt as reservoirs of *C.jejuni*, *Salmonella* and some enteric pathogens.

MATERIAL and METHODS

Rectal swabs and faecal specimens were collected from a total of 130 dogs and cats (40 housed cats from various sources and 90 stray dogs brought to Faculty of Vet. Med. Hospital, Assiut University). All animals were apparently healthy except one cat and 15 dogs showed signs of enteritis. Microbial analysis of faecal samples for the presence of *Campylobacter*, *Salmonella* and other enteric pathogens was carried out.

Isolations of *Campylobacter* were made by direct and enrichment culture methods. Each sample was plated onto blood agar base supplemented with 5% human defibrinated blood, vancomycin 5 mg/liter, trimethoprium 2.5 mg/liter and polymyxin B 1.250 IU/liter (ROGOL, et al. 1985). These samples were also inoculated into ROSEF (1981) liquid enrichment medium supplemented with vancomycin 10 mg/liter, trimethoprium 5 mg/liter and polymyxin B 2500 IU/liter. Both media were incubated at 42°C for 48 h under microaerophilic condition in anaerobic jar without catalyst using *Campylobacter* generation gas kits (Oxoid). All the seeded plates were examined after 48h of incubation for small, flat, grey or mucoid colonies which when examined by Gram stain showed characteristic Gram-negative spiral or S-shaped organisms. All enrichment media were subcultured on solid selective plates as described before. Biochemical characteristics of *Campylobacter* isolates were tested according to the recommended methods described by PARK, et al. (1984).

Isolation of *Salmonella* spp. and other enteric pathogens was done by direct plating of faecal samples on *Salmonella*-shigella (SS) agar plates. Also, samples were secondarily plated onto SS agar plates after incubation in selenite cystine broth at 37°C for 24

SABAH MOUSTAFA

h. The agar plates were incubated at 37°C for 24 h. Typical colonies were checked for biochemical characteristics by using the API 20 E (Analytab Products, Plainview New York, USA) and serological characteristics by standard procedures outlined by BAILEY and SCHOTT (1974) and CRUICKSHANK, et al. (1975) was followed for identification of *Salmonella* organisms.

Furthermore, *Pseudomonas* agar base supplemented with SR 103 (Oxoid) was used for isolation of *Pseudomonas aeruginosa*.

RESULTS

Results presented in Table (1) demonstrated the isolation rates of *C.jejuni* and some enteric pathogens from the faeces of cats and dogs.

DISCUSSION

The prevalence of *Campylobacter* and *Salmonella* in cats have rarely been conducted in comparison with those in other animals. All the cats used in this study were household and seemed to be healthy pet cats. The carrier rate of the zoonotic agent of *Campylobacter* in cats is relatively low.

Campylobacter jejuni ranging from 2 to 45% have been reported in cats of various sources by BLASER, et al. (1980), BRUCE, et al. (1980); FLEMING' (1983); FOX, et al. (1983 a) and KANEUCHI, et al. (1987). In this study the occurrence of *Campylobacter* in 5% of the examined cats is among the intermediate reported. The same recovery rate of *C.jejuni* from cats was recorded by SVEDHEM and KAIJSER (1981). On the other hand FOX, et al. (1983 b) could not able to isolate the organism from cats, while a 2% incidence ever reported for the apparently healthy pet cats was demonstrated by GRUFFYDD-JONES, et al. (1980). Moreover, MURDOCH (1986) stated that *Campylobacter* is frequently isolated from the faeces of normal cats.

Salmonella failed to be detected in faeces of cats. In this respect, isolations of *Salmonella* from the cat are uncommon where GORHAM, et al. (1951) could not able to isolate the organism from the faeces of 91 cats. On the contrary, *Salmonella* organisms were present in 8 of 593 (1.3%) of the examined cats. However, some investigators reported the isolation of *Salmonella* organisms from cats and the recovery rate varied from 1 to 10.8% (BALL, 1954; SHIMI and BARIN, 1977, FOX and BEAUCAGE, 1979).

Cats have close relations to humans as one of the most popular pet animals and be regarded as a significant reservoir of some zoonotic agents.

The incidence of *Campylobacter* in dogs ranged from 0.5 to 50% as reported by BLASER, et al. (1979); FERREIRA, et al. (1979); HOSIE, et al. (1979) and PRESCOTT, et al. (1981). The result showed that faeces from 90 dogs examined yielded 8.89% *campylobacters*. However, of a total of 90 dogs examined for the presence of *Campylobacter*, 75 clinically normal animals yielded 5 positive (6.67%) and 3 of 15 (20%) diarrhetic dogs were positive for *C.jejuni*.

ZOO NOTIC PATHOGENS IN CATS AND DOGS

FUKUSHIMA, et al. (1985) reported an incidence of 4% in dogs, while SVEDHEM and KAIJSER (1981) revealed that the carrier rate of *C.jejuni* in dogs was 5%. These results seemed to be lower than the obtained results.

An association between infected dogs and human campylobacteriosis has been recently noted by SKIRROW (1977); BLASER, et al. (1978) and BRUCE, et al. (1980). BLASER, et al. (1982) reported that healthy puppies excrete *C.jejuni* more frequently than adult dogs and that the puppies with diarrhea appear to be especially important in the transmission of the disease to humans. BRUCE, et al. (1980) revealed that a diarrhetic puppy in association with two children was excreting the organism for 40 days after the onset of the boy's illness.

Many investigators reported the isolation of salmonellae from faeces of dogs and the failure of recovery of such organisms may be due to the competitive effect of other intestinal flora. However, *Proteus* organisms were detected in 9% of dogs whereas the isolation rates of *Shigella sonnei* and *Pseudomonas aeruginosa* were the same (1.1%).

GORHAM, et al. (1951) observed that *Proteus* does appear in a high percentage of normal and sick dogs and they believe that *Proteus* spp are part of the normal intestinal flora of dogs. On the other hand, *Pseudomonas aeruginosa* was recovered from two cases of haemorrhagic gastroenteritis. Furthermore, *Shigella sonnei* was detected in 2% of the dogs studied by VARLEA, et al. (1951).

Our results indicated that cats and dogs may act as a reservoir of some zoonotic pathogens and the public should therefore be made aware of the potential hazards associated with infections transmitted by pet animals.

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SABAH MOUSTAFA

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ZOO NOTIC PATHOGENS IN CATS AND DOGS

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Table (1)
MPN count of *C.perfringens* in Fish and Mollusks

Organism	Cats		Dogs	
	No. examined	No. positive (%)	No. examined	No. positive (%)
<i>C. jejuni</i>	40	2(5%)	90	8(8.89%)
<i>Shigella sonnei</i>	40	0	90	1(1.1 %)
<i>Pseud. Aeruginosa</i>	40	0	90	1(1.1 %)
<i>Proteus spp.</i>	40	4(10%)*	90	9(10%)**