Campylobacter spp.

Prevalence and risk factors in a cross-sectional study of vet visiting dogs in the UK

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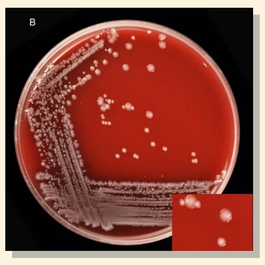
Campylobacteriosis

Human campylobacteriosis is a major cause of gastroenteritis (1) and a wide variety of animals have been implicated as reservoir hosts for *Campylobacter* spp. *C. jejuni* is most frequently associated with chickens, but asymptomatic infections by this and other *Campylobacter* spp., have also been encountered in livestock, companion animals and wildlife. Ownership of a dog is a risk factor for human campylobacteriosis (2, 3), although previous work has suggested that dogs principally serve as reservoir hosts for *C. upsaliensis*, a species that is far less frequently associated with human infections than *C. jejuni*.

The aim of this investigation was to determine the prevalence and species distribution of *Campylobacter* spp. infection in vet visiting dogs. Close contact with pets may pose a risk of transmission and thus infection to humans from zoonotic pathogens, such as *Campylobacter* spp.

Methods



Faecal samples were collected in a cross-sectional study from asymptomatic and symptomatic (those with diarrhoea) dogs attending veterinary practices selected randomly from 20 regions of the UK (August-December 2006). Each sample was returned in the post with a completed questionnaire, which recorded details such as age, breed, sex and health status, including any recent diarrhoea. Faecal samples were cultured on mCCDA using three methods; by direct inoculation with CA supplement; with prior filtration and CAT supplement; or with prior enrichment. Identification of isolates was accomplished using specific PCRs and, where appropriate, comparative sequence analysis of *groEL*, *gly A*, *hipO* and 16S rRNA-encoding gene fragments. In addition DNA extracted directly from the faecal samples was amplified by PCR to detect *C. upsaliensis* and *C. jejuni*. Statistics (Logistic regression) and graphs were generated using SPSS and excel.

Results

In total 249 faecal samples were received. All (apart from one) practice had at least one *Campylobacter* spp. positive sample. *Campylobacter* spp., were detected in 96 samples, giving a prevalence of 38.5% (95% CI 32, 44). Culture detected 61.4% of the 96, and DNA extract detected 91.6%.

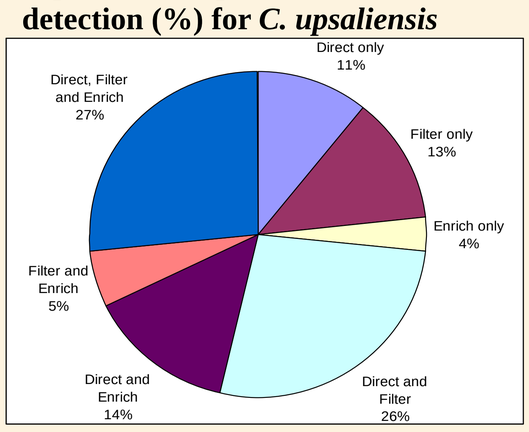
Culture

C. upsaliensis accounted for 94 (97.9%) of the positives whilst three were identified as *C. jejuni*.

Culture detection: Direct inoculation (78.5%), and prior filtration (71.4) detected more of the positives than the enrichment method (50%) (Fig 1). Direct inoculation detected significantly more than enrichment P<0.01.

Culture detected seven *C. upsaliensis*, and two *C. jejuni* that DNA extract did not.

Figure 1: Comparison of culture detection (%) for *C. upsaliensis*



Direct PCR from DNA Extracts 'DNA extract'

Thirty eight dogs (15.2%) were positive for *C. upsaliensis* by DNA extract, but negative in culture.

Table 1. Univariable analysis (Mann-Whitney U) of days in the post and *C. upsaliensis* status for DNA extract positive only, versus culture positive.

Variable	N	Mean rank	P-value
Days in the post			
Culture +Ve	53	39.7	0.01
DNA extract +Ve	36	52.8	

Analysis of days in the post suggested that DNA extract positives only had been in the post longer than culture positives (Table 1).

Positive by any method

Table 2. Univariable analysis of dog characteristics and *C. upsaliensis* status- positive by any method (P<0.1).

Variable	+	-	OR	95% CI	P-value
Age	94	152	0.9	0.9-0.9	<0.01
Antibiotics					
Recent	16	40	1		
None	76	109	1.7	0.9-3.3	0.09
Lives with another dog					
No	47	53	1		
Yes	41	52	1.5	0.9-2.7	0.09

Age appeared to have a significant effect on the *C. upsaliensis* status of dogs (Table 2), with younger dogs more likely to be positive.

Multivariable analysis using logistic regression is currently underway. Preliminary results suggest similar findings to those of the univariable.

Conclusions

•Over one-third of vet visiting dogs in the UK carry a *Campylobacter* spp. almost all isolates were *C. upsaliensis* supporting the hypothesis that dogs may be an important reservoir of *C. upsaliensis* infection for other species including man.

•Apart from age, no specific risk factors were associated with *C. upsaliensis* carriage in dogs.

•Detection methods appear to vary in their sensitivity, and this study suggests direct PCR from DNA extracts straight from faeces is the most sensitive technique.

•This study suggests that days in the post could be influential in terms of DNA extract positive only, versus culture positives.

•Whether or not *C. upsaliensis* is a significant risk factor for gastroenteritis in dogs, or indeed humans, is not yet clear, although some cases of *C. upsaliensis* associated gastroenteritis in humans have been reported (4, 5).

•The prevalence of *C. jejuni* in this study is low, suggesting that this population of dogs is unlikely to be a common source of *C. jejuni* infection for humans.

References

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