Healthy Puppies and Kittens as Carriers of Campylobacter spp., with Special Reference to Campylobacter upsaliensis

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Living in a household with a dog or cat has previously been identified as a significant risk factor for acquiring campylobacteriosis, in particular, with reference to Campylobacter upsaliensis infection. In a cross-sectional study carried out in Denmark between August and December 1996, 72 healthy puppies and 42 healthy kittens, aged between 11 and 17 weeks, were sampled for fecal campylobacter shedding by culture of rectal swab specimens on blood-free agar base with cefoperazone at 32 mg/liter and amphotericin at 10 mg/liter and on blood-free agar base with cefoperazone at 8 mg/liter, teicoplanin at 4 mg/liter, and amphotericin at 10 mg/liter. Additionally, with respect to the C. upsaliensis transmission potential of poultry, a chicken cloacal swab sample from each of 100 different broiler flocks was included in the study for comparison. We found 21 (29%) of the puppies positive for Campylobacter spp., with a species distribution of 76% C. jejuni, 5% C. coli, and 19% C. upsaliensis. Of the kittens examined, two (5%) excreted campylobacters; both strains were C. upsaliensis. None of the chicken samples examined were found to be positive for C. upsaliensis. We concluded that young puppies and kittens are potential transmitters of human-pathogenic Campylobacter spp., including C. upsaliensis, while poultry seems negligible in C. upsaliensis epidemiology.

The isolation frequency ratios (IFR), i.e., the number of positive isolations on the mCCDA plate series at 42°C versus 37°C. Of 72 puppies, 21 (29%) were found positive for Campylobacter spp., including C. jejuni (19 isolates), C. coli (2 isolates), and no C. lari. Of 42 kittens, 5 (12%) were positive for Campylobacter spp.; both isolates were C. upsaliensis. Of 100 poultry samples, 64 (64%) were positive for Campylobacter spp., including C. jejuni (56 isolates) C. jejuni (5 cells) and C. coli (8 isolates). The isolation frequency ratios (IFR), i.e., the number of positive isolations on the mCCDA plate series at 42°C versus 37°C.
that of the CAT plate series at 37°C, were as follows: IFR$_{C. jejuni}$ 1.4 (62/45); IFR$_{C. coli}$ 3.0 (9/3); IFR$_{C. upsaliensis}$ 1.7 (5/3). We are not aware of any published studies on campylobacter carriage in randomly selected healthy young puppies, but a few studies of pet dogs below 1 year of age have been carried out, reporting 20 to 23.8% carriage rates (9, 13), slightly lower than but comparable to our present result of 29%. Most risk analyses have dealt with pets of mixed ages, but Salfield and Pugh found a significant risk for children aged 0 to 5 years of acquiring campylobacteriosis by living with a puppy in the family (22). Even though cats have been identified as a risk factor too, we found that the healthy kittens examined in this study were rather low-prevalence campylobacter carriers (5%). This finding is in accordance with that of Gondrosen et al., who found 0 of 12 healthy kittens examined infected (9).

Chicken differed from dogs and cats in species distribution. They had, as expected, a high prevalence of C. jejuni and were negative for C. upsaliensis. Although poultry probably is responsible for a considerable number of human cases of campylobacteriosis, the present results demonstrate that poultry is not likely to contribute to C. upsaliensis epidemiology at all. The present low prevalence rate in healthy kittens (5%) makes the conclusion about strain distribution impossible, but the fact that only C. upsaliensis was isolated may inspire further studies of cats as a source of C. upsaliensis.

We recovered five C. upsaliensis isolates on mCCDA, while only three isolates were recovered on the CAT medium, although this medium is claimed to be virtually equivalent to filter methods that previously have been the methods of choice for isolation of C. upsaliensis (2, 3). However, in our study, it proved inferior to even mCCDA for C. upsaliensis isolation, but also for isolation of both C. jejuni and C. coli. Thus, the true rates of C. upsaliensis carriage by puppies and kittens might have been higher than our actual findings, because most authors consider media like mCCDA, with 32 mg of cefoperazone per liter, inferior to filter methods with respect to recovery of C. upsaliensis (2–4). In accordance with our results, however, a screening of human diarrheal cases for Campylobacter spp. by the Statens Serum Institut has revealed a low rate of C. upsaliensis isolation as well, even though a filter method was included (6), indicating that C. upsaliensis might be of minor significance in campylobacter epidemiology in Denmark.

Complete understanding of the epidemiology of campylobacteriosis remains a challenge to researchers, although a considerable amount of knowledge has been acquired during the last 2 decades. In particular, the specific pet-to-human link requires further studies on the virulence of campylobacters isolated from nonclinical carriers and on the duration of the excretion period. From the results of this study, we conclude, however, that Danish puppies may be a considerable reservoir of the human pathogens C. jejuni and C. upsaliensis, while healthy kittens seem to be of limited significance. Further, we consider poultry without any significance in C. upsaliensis epidemiology.

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REFERENCES