

LETTER TO THE EDITOR

Letter to editor from Dr. Foster regarding Investigation of the role of *Campylobacter* infection in suspected acute polyradiculoneuritis (APN) in dogs

I am an Australian veterinarian who works in a different geographical location to the authors of this paper. I live in Western Australia (WA). The authors of this paper are located in eastern Australia (New South Wales [NSW] and Victoria). I routinely diagnosed cases of suspected acute polyradiculoneuritis (APN) while I was in referral practice in NSW (1995–1999). On moving to WA, it appeared to me that APN was much less common, as between 2000 and 2003 at a referral institution in WA, I did not personally diagnose one case

I would agree with the authors that Australian dog owners commonly feed raw chicken bones and I would think that dog owners in WA are no different in that regard from those in NSW and Victoria. Australia's chicken meat industry is largely a duopoly and with 70% of Australian chicken being produced by two companies, it is likely that chicken sources for all states should be very similar. Thus, I have always been concerned about the hypothesized association between raw chicken and APN

Reading the paper, I was concerned about a number of issues, with the most important being that of the inclusion criteria. The inclusion criteria were relatively weak: namely dogs >1 year of age with acute onset of ascending paralysis within 3 weeks of presentation and no evidence for possible botulinum toxicity. The performance of a thorough tick search (while probably performed) was not defined as being necessary for inclusion in the study despite paralysis because of *Ixodes holocyclus* being very common in NSW. Electrolyte and creatine kinase measurements were not required (albeit some biochemistry was performed in 24 cases), nor were infectious disease serology, snake venom detection (snake envenomation is another common cause for lower motor neuron signs in Australian dogs), electrodiagnostics or CSF analysis. Given that the inclusion criteria were relatively weak, it was then concerning that only 19/27 (70%) cases actually met the inclusion criteria. Four cases had descending tetraparesis and four cases had all limbs affected. Thus, 30% of the APN cases in this study did not appear to meet the inclusion criteria of the study. In addition, with each case of APN enrolled, the study design was such that 2 case controls were to be recruited from staff and client dogs yet only 47 control dogs were included not 54 as there should have been for 27 APN cases; that is there were 13% fewer controls than

specified in the study design. There was no mention of why this deviation from the study design occurred.

I did have other concerns also:

1. There was no information on the clinics, number of clinicians involved or their levels of expertise (a relevant issue when the inclusion criteria is based on clinical assessment).
2. There was no information on how many cases were from NSW and how many from Victoria (potentially different incidence of tick paralysis and snake species).
3. Three dogs with APN (11%) did not have a questionnaire available for analysis.
4. There was no record of how many staff dogs were used as controls relative to client dogs and this could be a significant source of bias given that staff of veterinary clinics that have a strong belief that raw chicken causes APN could potentially be less likely to feed raw chicken.
5. Question 4 of the survey asked whether the dog was indoors, outdoors, or both with clarification of whether dogs were primarily outside, primarily inside, or a mixture. That information was not recorded in the results. Table 1, however, indicates that a high number of dogs in both groups had no outdoor access. It seems implausible that 16/24 APN dogs and 20/47 control dogs had no outdoor access. This would imply that the majority of dogs in this study were not taken outside to defaecate, urinate, or eat their raw bones.
6. Question 8 of the survey questionnaire requested details of raw meat but no details were provided in results (Table 1) as to the sources so it is not known whether raw chicken was the only source of raw meat?
7. It is not possible from the paper to assess how many of the control dogs positive for *Campylobacter* spp. received raw chicken and this is particularly relevant given the study aims.
8. Sequencing for species determination in this prospective study was performed in 77% (10/13) of *Campylobacter* positive APN samples but only 45% (5/11) of *Campylobacter* positive control samples.

[Correction added on 09 November 2018 after first online publication: Letter writer title corrected.]

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9. *Campylobacter upsaliensis* was predominantly identified in this study. The authors state that *C. upsaliensis* has only ever been reported in 3 cases of human Guillain Barré syndrome (GBS). Given that there was incomplete sequencing information and no difference in prevalence of *Campylobacter jejuni* (a known cause of human GBS, the model for this hypothesis) between the groups, any association between *Campylobacter* and APN in dogs seems tenuous.
10. There was an unsubstantiated comment that small breed dogs are more likely to eat raw chicken (necks and wings), thus the association between small breeds and APN. It is important to alert readers that it is also very common practice in Australia to feed whole raw chicken frames to large breed dogs with most supermarkets, in WA at least, selling chicken frames for this purpose in the chilled meat section.
11. Limitations of the study were not acknowledged and there were no alternative explanations proposed for any of the associations:
- For example, it may be that animals eating raw chicken were more likely to be fed other raw meat and that those other meats could be the cause of *Campylobacter* positivity or neurological signs.
 - For example, it may be that dogs (especially small breed dogs) eating raw chicken are eating outside and acquire a novel

mosquito-borne disease, experience snake or spider envenomation (flaccid paralysis in cats in Sydney, NSW has anecdotally been attributed to spider envenomation) or develop tick paralysis. The latter is particularly relevant given that *Ixodes holocyclus* could be a potential explanation for the increased incidence of APN in NSW and Vic compared to the rest of the world and other states in Australia, such as WA, where *I. holocyclus* is not found.

There may be an association between raw chicken consumption and *Campylobacter* positivity in dogs and there may be an association between raw chicken consumption and APN in NSW and Victoria. However, that does not translate to proof of *Campylobacter* (or raw chicken) causing APN. It is my view that one cannot reasonably suggest or imply from this study, with its very significant limitations, that raw chicken feeding is a likely cause of APN.

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