



In Adult Dogs, Does Feeding a Raw Food Diet Increase the Risk of Urinary Calculi Formation Compared to Feeding a Complete Dry Kibble Diet?

A Knowledge Summary by

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KNOWLEDGE SUMMARY

PICO

In adult dogs, does feeding a raw food diet alter urine composition compared to a kibble diet?

Clinical bottom line

The evidence provided by the single study identified is weak and the outcomes can neither support nor challenge the hypothesis that a raw food diet increases the risk of urinary calculi compared to a kibble diet. Therefore, professionals working within the veterinary science or nutrition field should proceed with caution when advising clients and rely on their professional experience until more evidence is generated.

Clinical Scenario

During consultation you are asked by a client if a raw food diet supports the prevention of kidney stone formation in dogs because they have read on an internet forum that a raw food diet is a healthy and natural alternative to kibble that alleviates a number of health issues. The client is now seeking additional advice from you. You decide to explore the available literature that investigates the effect of raw feeding is on urine composition in dogs.

The Evidence

There is currently very little published evidence which studies the effect of raw feeding on urine composition. The literature search returned 129 records of which 120 records were excluded because they were not related to the PICO. A further 5 records were excluded because they investigated the use of meat-meal with carbohydrate biscuit rather than raw meat, 1 record was excluded as it was non-primary research and 1 record excluded for investigating non-urinary parameters. The study by Dijcker *et al.*, (2012) identified that currently, evidence is undetermined on whether a raw food diet maintains healthy urinary composition parameters or increases the risk or urolithiasis in adult canine dogs. The findings from this paper found that feeding a commercially available dry kibble diet was associated with a high urine calcium to creatinine (Ca/Cr) ratio compared to the raw diet which was associated with a lower Ca/Cr ratio.

Summary of the evidence

Dijcker (2012)	
Population:	Dogs aged between 1.3 to 16.1 years of age, 13 female (of which 4 entire), 10 male (of which 4 entire), bodyweight range 12-35 kg.
Sample size:	23
Intervention details:	Treatment group 1 (n = 23): Fed raw food over a 4-week period Treatment group 2 (n = 23): complete and balanced dry extruded feed over a 4-week period. Each diet started with a 3-day gradual diet change, and diets were provided by owners.

Study design:	Cohort (study 1) and RCT (study 2) in crossover design Questionnaire from private owners
Outcome studied:	Uox and Uca excretion rates and the dietary and animal related factors which are associated with these parameters. A single urine sample was collected in week 4 of the diet by the owner through natural voiding. Urine sample was divided immediately between a non-acidified vial and an acidified vial containing 2N HCl. Samples were stored at -20 °C until analysis. Uox was measuring using isotope dilution mass spectrometry, whereas Uca was measured atomic absorption spectroscopy.
Main findings: (relevant to PICO question):	Uox concentration was not affected by either diet Uca concentration was higher in dogs fed dry diet (TG2) Urinary creatinine concentration high in dogs fed raw meat diet (TG1)
Limitations:	<ul style="list-style-type: none"> • High degree of non-completers (38/64) with another 3 dogs excluded as outliers. • Small sample size (n = 23) • Questionnaire with high risk of bias. Inconsistencies with urine sampling by owners • Inconsistencies in urine storage by owners • Reliance on owners providing research diets

Appraisal, application and reflection

The option to feed a raw diet to dogs has grown in popularity and is now readily available commercially. Historically, there has been concern regarding excessive protein intake and the potential increase of calculi promoting substances such as calcium and uric acid (Robertson *et al.*, 1979). This concern has been steadily increasing (Lulich *et al.*, 1999) which has led to the association of a high protein diet with the increased risk of renal damage (Singer, 2003). Interest in the health benefits of a protein fed diet is increasing, however studies measure the relationship between protein and growth rather than welfare and health. Studies are also based on results from comparatively brief studies of less than 6 months. Furthermore, the majority of research conducted focusing on raw feeding, assesses the transmission rate of zoonotic disease and the risk this poses to human health (Joffe and Schlesinger, 2002; Strohmeyer *et al.*, 2006; Finley, *et al.*, 2006; Lefebvre *et al.*, 2008).

It was noted at the British Small Animal Veterinary Association (BSAVA) 2016 Congress, that standardised information and advice is limited and not easily available to veterinarians, which reduces their ability to advise clients correctly. This lack of evidence-based peer reviewed research was addressed by Goh (2016), who found that advice concerning a raw feed diet often stems from anecdotal evidence only.

There is currently very little published evidence which studies the effects of raw feeding on urine composition and therefore on urinary calculus formation or urinary tract health. Additionally, there is still little evidence-based scientific research and a lack of feeding trials which supports the hypothesis that raw diets are a healthier or more nutritionally balanced than other diets (Michel, 2006; van Veggel & Armstrong, 2017).

Methodology Section

Search Strategy	
Databases searched and dates covered:	CAB Abstracts (1973-2017), PubMed (1950-2017)
Search terms:	(dog OR dogs OR canine OR canines OR bitch OR bitches) AND (raw OR BARF OR 'biologically appropriate raw feed' OR natural OR meat OR 'raw food*' OR 'raw diet*') AND (urine and (composition or analysis or constituent))
Dates searches performed:	1 st June 2017

Exclusion / Inclusion Criteria	
Exclusion:	<ul style="list-style-type: none"> • Review Papers • Dogs under 1 year of age • Mixed diet • Non-urinary parameters • Non-peer reviewed publications
Inclusion:	<ul style="list-style-type: none"> • Primary research papers • Dogs over 1 year of age • Urinary composition • Complete raw feed

Search Outcome							
Database	Number of results	Excluded – not related to PICO	Excluded – non-primary research	Excluded – under 1 year of age	Excluded – not complete raw food	Excluded – non-urinary composition	Total relevant papers
Cab Abstracts	32	29	1	0	1	0	1
NCBI PubMed	97	91	0	0	4	1	1
Total relevant papers when duplicates removed							1

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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