

CARRIAGE OF CAMPYLOBACTER JEJUNI AND CAMPYLOBACTER COLI IN HEALTHY AND DIARRHEIC CALVES

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I N T R O D U C T I O N

In recent years, reports from around the world have demonstrated beyond doubt the importance of *Campylobacter jejuni* and *C.soli* in enteric infections. These organisms are widely distributed in poultry, experimental and domestic animals and in humans (6, 8, 10, 13, 15, 20). Mammalian campylobacteriosis is characterized by an enterocolitis of variable severity (2, 6, 20). The prevalence of condition is relatively high in young individuals, in developing countries and in subjects with diarrhea (13, 20). *C.jejuni* and to a lesser extent *C.coli* are associated with natural and experimental infections in calves. The prevalence of these organisms in diarrheic calves varies from 1.5% to 46% in several reports (1, 2, 7, 12, 14, 17). Recent studies suggest that *C.jejuni* is indeed capable of initiating fever and diarrhea in calves (3, 9, 21, 23, 24). A number of studies have also shown that *C.jejuni* and *C.coli* are commonly found in healthy as well as diarrheic cattle (15, 17, 22). The prevalence of *C.jejuni* and *C.coli* in healthy cattle is variable; organisms have been isolated from as few as 2.5% of cattle and as many as 70% of cattle in several studies (16, 17, 19).

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The aim of the present study was to compare isolation rates of *C.jejuni/coli* in normal and diarrheic calves to determine whether these organisms could be implicated as a cause of diarrhea in calves.

MATERIALS AND METHODS

Sample collection: Rectal swabs from 100 diarrheic calves of known record that were admitted to the Ankara Veterinary Faculty clinics with diarrhea, and from 100 apparently healthy calves without signs of diarrhea were collected. Healthy calves were selected from herds free of clinically apparent diarrheal disease. Diarrheic calves were divided into two age groups: young, milk-fed calves less than 3 weeks of age and older, ruminating calves (4 weeks or more). Healthy calves were age-matched as far as possible with diarrheic calves. The history of animal and clinical condition were recorded in each case.

Bacteriological examination: Rectal swabs were inoculated onto 10% sheep blood agar containing polymyxin B (5 IU/ml), rifampicin (10 mcg/ml) and trimethoprim (10 mcg/ml). The plates were incubated at 42°C for 48 h in a jar containing Gas-pak H₂ + CO₂ generator envelope (Oxoid) without a catalyst. The methods of identification of *Campylobacter* spp we use were described by Lander and Gill (11). Briefly, cultures used in the various tests were grown on Mueller-Hinton blood agar at 42°C for 24 h in the microaerophilic gas mixture. The following tests were employed: Gram stain, motility, incubation at 25°C, catalase, oxidase, nitrat reduction, hippurate hydrolysis, tolerance to 1% glycin, H₂S production in TSI agar and FBP broth, and susceptibility to nalidixic acid and cephalothin. Hippurate positive strains were identified as *C.jejuni*, negative strains as *C.coli*.

Statistical analysis: Chi-square (χ^2) analysis was used to compare the prevalence of campylobacters in diarrheic and healthy calves, and in ruminating milk-fed calves (18).

RESULTS

Campylobacter spp were isolated from 31 of 100 diarrheic calves and from 16 of 100 healthy calves (Table 1). The difference between diarrheic and healthy calves in the prevalence of campylobacters was significant ($p < 0.05$). Of 47 strains isolated from healthy and diarrheic calves, 34 (72%) were identified as *C.jejuni* and 13 (28%) as *C.coli*. In diarrheic group, 23 (55%) of 42 ruminating calves were Campylobacter positive; whereas 8 (14%) of 58 milk-fed calves were Campylobacter positive. In diarrheic calves, the difference between ruminating and milk-fed groups in the prevalence of campylobacters was significant ($p < 0.001$). In healthy group, there was no significant difference between milk-fed and ruminating calves (12% vs 21%) in the prevalence of campylobacters. In ruminating calves, the isolation rate of campylobacters from diarrheic calves (55%) was significantly higher ($p < 0.001$) than those of healthy ones (21%).

The clinical features of Campylobacter positive cases are outlined in Table 2. Common findings in diseased calves infected with *C.jejuni/coli* were mild to moderate diarrhea, and blood and mucus in feces. The feces were generally soft to semi-fluid in the cases of ruminating calves, whereas watery in milk-fed calves.

TABLE 1. Prevalence of Campylobacter spp in healthy and diarrheic calves(*)

Species	Diarrheic calves		Healthy calves	
	Young (n:58)	Older (n:42)	Young (n:58)	Older (n:42)
<i>C.jejuni</i>	6	16	4	8
<i>C.coli</i>	2	7	3	1
Total	8(14%)	23(55%)	7(12%)	9(21%)

(*) Young = milk-fed calves (3 weeks or less); Older = ruminating calves (4 weeks or more).

TABLE 2. Fecal monitoring of milk-fed and ruminating calves infected with campylobacters

Feces	Milk-fed calves (n:8)	Ruminating calves (n:23)
Watery	6	5
Soft-semifluid	2	18
Blood	2	17
Mucus	4	11

DISCUSSION

In this study, we found *C.jejuni/coli* to be prevalent in diarrheic calves. A significant difference ($p < 0.05$) was determined when intestinal carriage rates of *C.jejuni/coli* by healthy and by diarrheic calves were compared. Such a difference has been found by a few researchers (1, 7). Several workers have failed to demonstrate any link between diarrhea and fecal isolation rate either of all campylobacters or of one particular species, and suggested that *Campylobacter* spp are common in both healthy and diarrheic cattle (12, 14, 15, 17, 22). In the most of these studies, healthy calves were examined during the time when diarrheal calves were also in the herd. It might be expected that a greater percentage of infected nondiarrheal calves would be present in herds in which some calves had diarrheal disease than in herds free of the condition. This may explain why campylobacters have been found to be common in healthy calves in most studies. In the present study, we collected samples from healthy calves in herds free of clinically apparent diarrheal disease. In experimental studies, colonization of intestinal tracts and the production of enteric disease symptoms in calves have also showed that *C.jejuni/coli* are able to produce enteric disease in calves (3, 9, 21, 23, 24).

In our study, the difference was clearly observed when isolation rates from milk-fed and ruminating diarrheic calves were compared. The prevalence of campylobacters in ruminating diarrheic calves was significantly higher ($p < 0.001$) than those of milk-fed diarrheic calves. If infection with *C.jejuni* and *C.coli* is relatively widespread

in certain populations of cattle, it is likely that colostral antibody against them is commonly to some degree. The protection of calves by colostral antibody may be the cause of low prevalence of campylobacters in milk-fed calves. It is also likely that *C. jejuni* and *C. coli* would be more pathogenic in colostrum deprived calves. It was interesting to observe the high prevalence of *C. jejuni/coli* in diarrheal cases of older, ruminating calves. The gradual loss of colostral antibody by age may be the cause of high *Campylobacter* infection rate in older calves as a result of increased susceptibility to colonization by this organism. Several experimental studies have also documented that campylobacters may be of more significance in enteritis of older, ruminating calves (3, 4, 5).

It is difficult to attribute epizootics of diarrheal disease to specific agents on the basis of clinical signs. In our study, however, *Campylobacter* associated disease in older calves was generally characterized by mild to moderate diarrhea as comparing with severe infections caused by other enteric pathogens. In most of the cases, feces were soft to semifluid but not watery and mostly contained flecks of blood. Similar fecal appearance was observed in most of the experimental studies (3, 9, 23, 24).

The results of this study provide some evidence for the association of *C. jejuni* and *C. coli* with enteric diseases of older-ruminating calves. It must be also remembered that there may be more than one cause for an enteric disease of calves.

S U M M A R Y

Campylobacter jejuni and *C. coli* were isolated from the rectal swabs of 31/100 diarrheic and 16/100 healthy calves. Of the 47 isolates, 34 were identified as *C. jejuni* and 13 as *C. coli*. In diarrheic calves, campylobacters were isolated from 23/42 (55%) older ruminant calves and 8/54 (14%) young milk-fed calves. *Campylobacter* spp were isolated from 9 (21%) of 42 ruminating healthy calves. The high frequency of isolation from diarrheic ruminating calves indicates that *C. jejuni* and *C. coli* may cause enteric infections in this group of calves.

Ö Z E T

İSHALLİ VE SAĞLIKLI BUZAĞILARDA CAMPYLOBACTER JEJUNİ / COLİ TAŞIYICILIĞI

İshalli buzağuların ve sağlıklı buzağuların rektal örneklerinden sırasıyla % 31 ve % 16 oranında Campylobacter türleri izole edildi. İzole edilen 47 suşun 34'ü C.jejuni, 13'ü C.coli olarak tanımlandı. Ruminasyona başlamış ve nisbeten yaşlı 42 ishalli buzağının 23'de, halen sütle beslenen genç 58 ishalli buzağının 8'de Campylobacter türleri saptandı. Ruminasyon dönemindeki 42 sağlıklı buzağının 9'dan Campylobacter izole edildi. Ruminasyona başlamış dönemdeki ishalli buzağulardan yüksek oranda C.jejuni ve C.coli izolasyonu, bu organizmaların 3 haftalıktan büyük buzağularda enterik infeksiyonlara neden olabileceğini gösterdi.

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