J. Hyg., Camb. (1986), **97**, 479–482
Printed in Great Britain

Low incidence of campylobacter enteritis in Northern Ireland

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(*Received 26 February 1986; accepted 8 May 1986*)

SUMMARY

In a prospective survey carried out over 9 months in 1984 in the Department of Bacteriology, Belfast City Hospital, *Campylobacter jejuni** was isolated from 24 out of 1200 faecal specimens (2%) from patients with acute diarrhoea. This isolation rate is much lower than that from other parts of mainland Britain which report an isolation rate of between 8 and 15%. It is difficult to explain this large discrepancy but the limited availability of unpasteurized milk and the generally worse summer here (fewer barbecues, picnics) may be some reasons to explain this low incidence in N. Ireland.

INTRODUCTION

Since 1977, *Campylobacter jejuni* has been increasingly recognized as a cause of sporadic and epidemic diarrhoea. Reports to the Public Health Laboratory Service Communicable Disease Surveillance Centre (CDSC) at Colindale show that since 1981, campylobacters have become the most common bacterial cause of diarrhoea in England and Wales, surpassing both salmonellae and shigellae. Reports also show that campylobacter isolations continue to increase at a rate of about 15% per annum. In 1984, nearly 21000 campylobacter isolations were reported in England and Wales (CDSC, 1984, unpublished) giving an approximate annual isolation rate of 40 per 100000 population.

For the same period in Northern Ireland, 58 human isolates of campylobacter were reported giving an annual isolation rate of only 4 per 100000 population. Salmonella and shigella isolates (nearly all *Shigella sonnei*) were more common than campylobacter in that year – 147 (10 per 100000) and 445 (30 per 100000) respectively (Communicable Disease – N. Ireland, 1984, unpublished). Compared with mainland Britain, the salmonella/shigella ratio is strongly reversed and the campylobacter figures are low. The reverse ratio is due to different incidences for both organisms, i.e. less salmonellae and more shigellae, not just a large excess of shigellae. The lower incidence of salmonellae ties in with that of campylobacter in that both infections are food-borne zoonotic infections.

In the Belfast City Hospital, a retrospective survey of the faecal specimens examined in the Department of Bacteriology indicate that over the past 2 years, out of 3405 specimens examined, 51 campylobacters were isolated, giving an isolation rate of only 1·5%. The corresponding isolation rates for salmonella and

* The term *Campylobacter jejuni* is used in the broad sense to include both *C. jejuni* and *C. coli*.

shigella were 2·8 and 6·3% respectively. Studies from various parts of mainland Britain and other European countries show that in recent years, campylobacters were responsible for between 8 to 15% of cases of acute diarrhoea (Bruce, Zochowski & Ferguson, 1977; Brunton & Heggie, 1977; Delorme *et al.* 1979; Kendall & Tanner, 1982).

In order to determine whether this low isolation rate was real or due to under-diagnosis and/or under-reporting, a prospective survey was carried out from March to November 1984 involving 1200 specimens. This was done in conjunction with routine processing of the faecal specimens in our laboratory.

MATERIALS AND METHODS

Source of samples

The Belfast City Hospital receives specimens from general practitioners, out-patient clinics and various peripheral hospitals, representing a good cross-section of the population in N. Ireland.

Twelve hundred faecal specimens were cultured on the same day as they arrived in the laboratory. Approximately half of the specimens were from general practice and half from hospital patients. Only faeces that were watery or semi-formed, from patients with a history of diarrhoea, were included in the survey.

Laboratory investigations

Each specimen was sampled with a cotton-tipped swab and inoculated onto a Preston medium agar plate (Bolton & Robertson, 1982) and the inoculum spread out to produce discrete colonies. The plates were then incubated at 43 °C in a microaerophilic atmosphere (Campylobacter Gas Generating Kit, 'Oxoid' used with a catalyst as instructed) for 48 h.

Preston enrichment broth (5 mls) (Bolton & Robertson, 1982) in screw-capped bijou containers was also inoculated with the faecal specimens using a swab. After overnight incubation at 43 °C aerobically with caps tightly closed, they were subcultured onto Preston agar plates which were then incubated as above.

After incubation, the Preston agar plates were examined and suspect colonies were gram-stained, tested for catalase and oxidase production and subcultured on to blood agar plates incubated at 37 °C aerobically. Organisms that were gram-negative rods with the characteristic curved or 's' shaped appearance, catalase and oxidase-positive and did not grow on blood agar plates aerobically were identified as *C. jejuni*.

The method used for isolation of campylobacters from faecal specimens in our routine service laboratory was by direct plating of the faeces on Skirrow's medium incubated at 43 °C microaerophilically for 48 h and identification of the organisms by gram-stain and oxidase test.

RESULTS

Out of the 1200 specimens examined, 24 campylobacters were isolated, giving an isolation rate of 2%. There was 100% concordance between the results obtained from the primary Preston solid agar media and those obtained from the Preston selective enrichment broth.

Routine processing of the faecal specimens in our laboratory resulted in isolation of campylobacters from the same 24 specimens. Most of the 24 campylobacter positive samples were from general practice.

DISCUSSION

The isolation rate of *C. jejuni* from diarrhoeal specimens in our study was 2%. This figure is much lower than that of between 8 and 15% reported from other parts of the UK.

To ensure that this was not due to faulty isolation techniques, our laboratory methods were reviewed and an additional enrichment technique as well as a different solid agar medium were used in conjunction with our usual method.

It has been reported that Preston enrichment broth and selective agar medium give better results than other enrichment techniques and media (Bolton *et al.* 1983). We compared direct plating on Preston agar medium, Preston enrichment broth followed by subculture on to solid media, and direct plating on Skirrow's agar medium which is our usual routine laboratory method. We found no difference in the isolation rate between these three methods.

Our findings confirm the low incidence of campylobacter infections in N. Ireland as judged by reports from both our own and various other laboratories in the province.

In recent years, there has been a more complete understanding of the way campylobacter infection is transmitted. The consumption of under-cooked meat, particularly poultry, is being increasingly implicated as a cause of sporadic infection (Norkrans & Svedhem, 1982; Severin, 1982) and eating outdoors (barbecues, picnics, etc.) has been found to be a risk factor (Oosterom *et al.* 1984). Unpasteurized milk and other dairy products have also been implicated in many outbreaks and sporadic cases of campylobacter infection (Robinson & Jones, 1981; Jones *et al.* 1981). In the last 5 years in England and Wales, 24 incidents involving nearly 1200 people, of infection associated with milk and fresh cream were reported. Many cases have also been traced to the keeping of pets, particularly the acquisition of a new kitten or puppy (Skirrow, 1981).

In N. Ireland, there are local regulations controlling the import and export of livestock and poultry. These regulations were originally introduced to control tuberculosis, brucellosis and other infectious diseases, e.g. foot-and-mouth disease among farm animals. It is doubtful whether these have much influence on campylobacter infections. Poultry and dairy products for consumption here are mostly locally produced and controlled by similar legislation to the rest of the UK. However, figures for poultry contamination for N. Ireland are as high as elsewhere (Neill, Campbell & Greene, 1984). The amount of farm bottling here is quite low, only 0·5% of the 200 million pints of milk per year sold for liquid consumption is not heat-treated in some way. This is in contrast with mainland Britain where unpasteurized milk is readily available in some rural areas. The recent introduction of a ban on the sale of unpasteurized milk in Scotland has already led to a reduction in the incidence of milk-associated campylobacter infection there.

The weather in summer in N. Ireland is generally less suitable for outdoor eating such as barbecues and picnics, which may contribute to a lessening of this risk

factor. There is also a local preference for food to be 'well done' and for people to eat more red meat than chicken – factors which would reduce the risk of acquiring campylobacter infection from meat and poultry. Red meats are in general much less frequently contaminated with campylobacter than poultry (Hudson & Roberts, 1982; Turnbull & Rose, 1982). There are no official figures available on consumption of poultry in N. Ireland but figures from mainland Britain show some variation among different regions, e.g. the poultry consumption in Scotland is 60% less than in Greater London.

It would be interesting and desirable to institute an epidemiological study of campylobacter infection in the province to compare risk factors here with those of the rest of the UK. At present, discussion of possible reasons for the large difference in infection rate between N. Ireland and the rest of the UK is largely speculation.

We wish to thank Dr T. S. Wilson and Dr N. McCracken for helpful comments.

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