CAMPYLOBACTER FETUS SUBSP. JEUNI
IN INTACT SHEEP AND BUFFALO CARCASES
(With 2 Tables)

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(Received at 24/12/1988)

SUMMARY

60 freshly slaughtered sheep and buffalo carcases (30 of each) were examined for the presence of Campylobacter jejuni by enrichment and direct plating procedures. Intact gall bladder, liver, muscle (diaphragm) and mesenteric lymph nodes samples were obtained from each animal. The recovery rate of C. jejuni from sheep carcases (23.33%) was higher than that in buffalo carcases (10%). The incidence of the isolated organisms from gall bladder, liver and mesenteric lymph nodes samples of sheep were 16.67%, 10% and 6.67% while the corresponding values in buffalo were 6.67%, 3.33% and 3.33% respectively. C. jejuni failed to be recovered from the examined muscle samples of both animals. The 4 positive livers for Campylobacter were from animals with positive gall bladders. The significance of Campylobacter as a foodborne pathogen was discussed.

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INTRODUCTION

It is now well established that Campylobacter fetus subsp. Jejuni is a common cause of human enteric disease. Red meats are recognized as a vehicle of salmonellosis but to date, there is little evidence to implicate a widespread association between red meats and Campylobacter infection (BUTZLER and SKIRROW, 1979; SKIRROW, 1982).

In recent years, reports from around the world have demonstrated beyond doubt the importance of C.jejuni and C.coli in human enteritis. There has also been an increasing concern over the role of food animals as reservoirs of these organisms with the implication that Campylobacter diarrhea is a zoonotic infection. However, the organism has been isolated from most common domestic animal species, so it has been inferred that direct transmission of the disease to human might occur via consumption of animal products (BUTZLER and SKIRROW, 1979; GARCIA, et al. 1985). Furthermore, a number of studies have shown that C.jejuni and C.coli are commonly found in healthy as well as diarrheic animals and that the organisms can be isolated from gall bladders and intestinal contents of pigs, sheep and cattle (SIMBERT, 1965; BRYNER, et al. 1972; BLASER, et al. 1980; PRESCOTT and BRUIN-MOSCH, 1981; ROSEF, 1981; MUNORSE, et al. 1983 and GARCIA, et al. 1985).

However, carcasses of most other animal providing meat can be contaminated by C.fetus subsp. jejuni. The incidence varies with animal species, but generally, the degree of contamination of carcasses seems to be low (STERN, 1981; SVEDHEM and KALISER, 1981; GILL and HARRIS, 1982b). In this respect, the recovery rate of Campylobacter fetus subsp. jejuni on unwashed 58 pork, 59 lamb and 58 beef carcasses was studied by STERN (1981) who recorded that the potential pathogen was present on 38%, 24% and 2% of the examined swine, sheep and beef carcasses.

BOLTON, et al. (1982) examined carcasses in abattoirs and in butcher's shops. Campylobacters were isolated from 32% of beef, 70% of sheep and 56% of pig carcasses when sampled at abattoirs but not from any carcasses examined in butcher's shops. On the other hand, the level of contamination with C.jejuni described by GILL and HARRIS (1982 a) was about one to 10/cm² where the organism was recovered from the flank but not the rump areas. Chilled carcasses and deboned veal appeared to be less frequently contaminated with C.jejuni. Besides, small numbers of C.jejuni could be recovered from equipment during the processing of unweaned calves but not after routine cleaning.

TURNBULL and ROSE (1982) revealed the presence of C.jejuni in 1% of 6000 red meat samples examined at retail distribution thus the contamination rate of raw red meat by the organism is in general very low. On the other hand, BRACEWELL, et al. (1985) found that 12.5% of 112 freshly slaughtered pork carcasses obtained from three packing plants contained Campylobacter coli while no isolates were obtained from chilled carcasses.

In a survey conducted by STERN, et al. (1985) for the presence of C.jejuni and C.coli in 1800 red meat products, the recovery rate was about 5.1% Pork samples yielded

C. coli and other meats yielded C. jejuni. These results provide a baseline for the prevalence of Campylobacter in the selected foods and also support epidemiological data associating mishandled foods of animal origin as a potential vehicle in human gastroenteritis.

GARCIA, et al. (1985) reported the isolation of C. jejuni and C. coli from a total of 525 specimens from 100 slaughtered beef cattle where the organisms were isolated from steers, bulls, heifers and cows. Significantly higher isolation rates were obtained from the gall bladders, large intestines and small intestines than from the livers or lymph nodes.

In Egypt, one article by KHALAF ALLA (1985) revealed the recovery rate of C. jejuni and C. intestinalis from cattle, buffalo, sheep and camel carcasses. The incidence of C. jejuni in cattle and sheep was the same (12%), while in buffalo and camel it was 8% and 4% respectively. Furthermore, C. fetus subsp. intestinalis was isolated from buffalo and sheep carcasses only.

As C. jejuni is a commensal in the intestines of domestic animals such as cows, swine, sheep and poultry the meat of these animals may become contaminated with the organisms during slaughtering (GRANT, et al. 1980; STERN, 1981 and BLASER, 1982).

This investigation was carried out to study the distribution of C. jejuni among various sites of the digestive tract of sheep and buffalo and to estimate the recovery rate of the potential pathogen on meats.

MATERIAL and METHODS

60 sheep and buffalo carcasses (30 carcasses of each) were selected at random from Assiut slaughter house and sampled for isolation of C. jejuni. A total of 240 specimens were collected under sterile conditions in sterile separate plastic bags and transferred directly to the laboratory for processing. The specimens obtained from each animal included intact gall bladder, muscle sample (diaphragm), liver and mesenteric lymph nodes.

By means of hot spatula the surfaces of muscles, livers and deflated lymph nodes were sterilized, then by the aid of forceps and scalpel pieces from deep tissues were taken under sterile conditions and streaked onto Muller-Hinton agar supplemented with 10% sheep blood, trimethoprim 5 mg/liter, vancomycin 10 mg/liter, polymyxin B 2500 IU/liter and 0.05 sodium pyruvate (GARCIA, et al. 1985).

Isolation of Campylobacter from the gall bladder was done by inserting sterile pipette through an incision into the gall-bladder after sterilization of its surface, then few milliliters were drawn from the bile and spread over the surface of Muller-Hinton blood agar using surface plating technique.

All inoculated plates were incubated at 43°C for 48 h in microaerobic gas mixture of 10% CO₂, 5% O₂ and 85% N₂ using Campylobacter gas generating kits (Oxoid).

For the enrichment technique, the prepared organs and bile samples were inoculated into flasks containing the enrichment broth described by ROSEF (1981) which incubated at 43°C in the microaerobic gas mixture. After 24 and 48 h, each inoculated enrichment broth was streaked onto plates of Muller–Hinton blood agar with supplements which incubated at 43°C for 48 h under the same microaerophilic condition. Non swarming suspect colonies resembling those of Campylobacter were subjected to biochemical characteristics according to the procedures described by PARK, et al. (1984).

RESULTS

Results indicating that the recovery of C. jejuni from slaughtered sheep and buffalo carcases are given in Tables 1 & 2. Of the carcases sampled immediately after slaughter 10 (16.67%) were found to contain C. jejuni. Sheep was found to harbour C. jejuni (23.33%) more than buffalo (10%). The recovery rate of the organism from gall bladder, liver and mesenteric lymph node samples of sheep was 16.67%, 10% and 6.67%, while that of buffalo was 6.67%, 3.33% and 3.33% respectively as presented in Table (1).

C. jejuni failed to be detected in the examined muscle samples of both sheep and buffalo as recorded in Table (1). On the other hand Table (2) revealed that the organism was recovered from both gall bladder and liver samples of 3 sheep and one buffalo.

DISCUSSION

Campylobacter jejuni is now established enteropathogen that has been responsible for several food associated disease outbreaks. The organism is frequently present in the intestinal tract of domestic animals and has been isolated from carcases of slaughtered beef, sheep and swine (ROSEF, 1981; STERN, 1981; HUDSON and ROBERTS, 1982).

The present study demonstrates that 10 out of 60 slaughtered sheep and buffalo (16.67%) are reservoirs of C. jejuni and constitute potential sources of enteric infection. The incidence of C. jejuni in buffalo is 10% and this figure is much lower than in previous reports on C. jejuni isolation rates of 32% and 50% from beef carcases as reported by BOLTON, et al. (1982) and GARCIA, et al. (1985).

Furthermore the 23.33% incidence in sheep is also lower than that demonstrated by BOLTON, et al. (1982) who recorded an incidence of 56% and the achieved results run parallel with that of STERN (1981) who reported an incidence of 24%. On the other hand, KALAF ALLA (1985) revealed that the recovery rate of C. jejuni from buffalo and sheep was 8% and 12% which appeared to be lower than the reported results.

The isolation of C. jejuni from 6.67% of the examined livers is significant considering the increasing emphasis on beef and sheep livers consumption in human nutrition. However, experimental evidence conducted by SOONATTAKUL, et al. (1971) has demonstrated that beef and lamb livers are a principal site of Campylobacter infection, and the organism was isolated from the blood of an individual who had eaten such a product.
COMPYLOBACTER IN SLAUGHTERED ANIMALS

The recovery rate of C. jejuni from the gall bladders of 11.67% of the examined animals indicating that the organism is a potential inhabitant of the gall bladders as observed by BRYNER, et al. (1972) and GARCIA, et al. (1985). The high rate of Campylobacter isolation from the gall bladders and liver may partly attributed to the presence of bile which improves the growth of C. jejuni (OSTEROM, et al. 1981). However, it is likely that there was internal migration of C. jejuni between the gall bladder, the bile duct and the liver either in vivo or soon after slaughter (GARCIA, et al. 1985). In this respect, it is of interest to note that all the 4 positive livers for C. jejuni were from animals with positive gall bladders.

Campylobacter jejuni failed to be detected in the examined muscle samples. Some studies have shown that the incidence of C. jejuni in raw red meat is very low (SEVEDHEM and KAISER, 1981; STERN, 1981; TURNBULL and ROSE, 1982).

The results of this study indicate that the contamination level of buffalo and lamb carcases in Upper Egypt were much lower than those reported by researchers in other locations.

Due to the relatively hot weather in Upper Egypt which favour the growth of Campylobacter as reported by SMIBERT (1974) who pointed out that C. jejuni is a micro-aerophilic and requires a minimum temperature of about 30°C thus the presence of the organism in the examined carcases constitutes a public health hazard.

Since Campylobacter fetus subsp. jejuni has been implicated as an agent of foodborne disease, it is important that individuals involved with production, processing or preparation of food be aware of foodborne disease potential of this organism (DOYLE, 1981).

REFERENCES


COMPYLOBACTER IN SLAUGHTERED ANIMALS


Table 1

<table>
<thead>
<tr>
<th>Animal species</th>
<th>No. of positive animals or specimens</th>
<th>No. tested (%)</th>
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<tbody>
<tr>
<td></td>
<td>Animals</td>
<td>Gall bladder</td>
</tr>
<tr>
<td>Sheep</td>
<td>7/30(23.33)</td>
<td>5/30(16.67)</td>
</tr>
<tr>
<td>Buffalo</td>
<td>3/30(10)</td>
<td>2/30(6.67)</td>
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<tr>
<td>Total</td>
<td>10/60(16.67)</td>
<td>7/60(11.67)</td>
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Table 2

<table>
<thead>
<tr>
<th>Isolation from single or multiple specimens per animal</th>
<th>No. and % of positive animals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sheep</td>
</tr>
<tr>
<td>One specimens</td>
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</tr>
<tr>
<td>Gall bladder</td>
<td>2</td>
</tr>
<tr>
<td>Mesentieric L. node</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>4 (57.14)</td>
</tr>
<tr>
<td>Two specimens</td>
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</tr>
<tr>
<td>Gall bladder + liver</td>
<td>3 (42.85)</td>
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