Isolation and Identification of Facultative Anaerobic Bacteria from Feces of Pet Dogs

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Abstract

A fifty fecal swabs (25 from Anbar province and 25 from Salahuddin province) were collected from both sexes dogs with different global breeds, different ages. These swabs were cultured onto blood, nutrient and MacConkey agars, then the colonies were purified on nutrient and MacConkey agars. A gram stain and biochemical tests were done including catalase, oxidase and TSI. The results of isolation and identification showed that Salmonella spp. were isolated from 5 out of 14 puppies (35.7%), while E. coli from 9 (64.3%) and Serratia spp. from 1(7.1%), whereas, from adults, salmonella spp. isolated from 9 (25%) dogs and E. coli from 24 (66.7%) out of 36 adult dogs.

It is concluded that Salmonella spp. and E. coli are the most prevalent in asymptomatic dogs and puppies in Anbar province and Salahuddin which means that the dogs are a reservoir for these bacteria and it is considered as a bad indication for transmission of this pathogen to human being and other animals.

Key words: Facultative anaerobic, dog, E. coli, Salmonella, puppies.

Introduction

Dogs are the pet animals that have been kept from 14 centuries, numerous studies have shown that pets play an important role in human life, and the infected pets threaten the lives of individuals, especially those immunocompromised, it has been found that pet dogs that live in contact with human have a significant role in transmitting diseases to their own (1 ; 2). Dogs transmit viral and bacterial diseases to humans being through saliva, contaminated feces and urine or via direct contact, and the most important bacteria that transmitted by dogs are Salmonella spp., Yersinia spp., Capnocytophaga spp., Coxiella burnetti, Staphylococcus intermedius and Leptospira spp., in addition to MRSA (3). It has been documented that dogs are potential reservoirs of pathogenic Salmonella spp. and E. coli (4). The most common sources of Salmonella spp. and E. coli in dogs are from chicken and meat that undercooked (5).

The subclinical carrier cases in dogs are regarded as the common form of salmonellosis seen in dogs which shed these organisms in feces without showing clinical signs and contaminate the surrounded environments (6).

It has been reported that the prevalence of dogs which carry E. coli is 26.9% (7), whereas (8) reported that the Salmonella prevalence in dogs varies greatly between 5% to 70%.

The most prevalent bacteria isolated from dogs were Salmonella (9; 10, 11, 12), E. coli (13, 14, 15; 16).

This study was aimed to isolate the facultative anaerobic bacteria from canine feces.

Materials and method

Animals

From March 2019 to the end of April 2019, A fifty dogs (25 dogs from Anbar province and 25 from Salahuddin province) from different global breed and both sexes at 2 months-6 years of age were used in this study.

Examination of animals

All animals were examined clinically for
temperature, pulse and respiratory rates and for presence of any abnormal clinical signs.

**Collection of the Samples:**

A fifty fecal swabs with transport media were collected and transported anaerobically by special containers to the college of veterinary medicine, universities of Fallujah and Tikrit lab’s for bacterial isolation and identification.

**Bacteriological examination:**

The isolation and identification of bacteria from samples were done according to (17), all swabs were cultured on nutrient, blood and MacConkey agars and incubated for 24-48 hours at 37°C. in anaerobic jar with 10% CO₂. The colonies were subjected to Gram stain, then suspected isolates subcultured on MacConkey, EMB and nutrient agars for purification and characterization of the colonies. Catalase, oxidase and other biochemical tests includes TSI, Indole and citrate were done for identification of the isolated bacteria.

**Results**

All animals that were clinically examined showed normal signs and parameters and appeared to be healthy.

1. **Bacteriological isolation:**

In the present study, culturing of faecal samples from 50 dogs and puppies revealed a presence of some gram negative bacteria including *E. coli*, *Salmonella* spp. and *Serratia* spp.

Cultural and biochemical characteristics of different species of bacteria isolated from faecal samples of affected dogs are depicted in figure 1.

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**Figure 1. Different cultural appearance and biochemical tests**
2. Rate of infection

Out of 14 puppies, only 5 (35.7%) had a subclinical infection with salmonella, 9 (64.3%) with E. coli and 1 (7.1%) with Serratia spp., while the adults revealed 9 (25%) dogs with salmonella spp. and 24 (66.7%) with E. coli, while there was not infection with Serratia spp. (Table 1).

Table (1) Rates of subclinical infection with Salmonella spp., E. coli and Serratia spp. of puppies and adults.

<table>
<thead>
<tr>
<th>Animals</th>
<th>No. of animals</th>
<th>Animals positive For Salmonella spp. %</th>
<th>Animals positive For E. coli %</th>
<th>Animals positive For Serratia spp. %</th>
<th>Animals negative for culturing %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puppies</td>
<td>14</td>
<td>5</td>
<td>35.7</td>
<td>9</td>
<td>64.3</td>
</tr>
<tr>
<td>Adults</td>
<td>36</td>
<td>9</td>
<td>25</td>
<td>24</td>
<td>66.7</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>14</td>
<td>28</td>
<td>33</td>
<td>66</td>
</tr>
</tbody>
</table>

Discussion

Many studies were done to estimate the incidence of Salmonella spp. in puppies and dogs. Carter and Quinn (18) and Sanchez et al. (6) found that the percentages of Salmonella in clinically appeared healthy dogs was ranged between 0-44%, this results were in agreement with our results.

At the opposite side, the current results were disagree with many researches, the study of Shimi et al. (19) in Iran was performed to detect Salmonella in feces of 181 dogs, they found that 28 (15.5%) were carry the Salmonella. Also, Kocabiyik et al. (20) found that dogs positive for Salmonella were 11% in Turkey, also, Fukushima et al. (21) examined stray dogs that appeared healthy and found that the percentages of carrying Salmonella was 5.9% in Japan. While the percentages of Salmonella in feces of stray dogs found in Taiwan were 6.3% (22).

The reason for presence a higher percentages of Salmonella as observed in our study may be due to the potentially higher exposure of dogs to this genus of bacteria.

The results of the current study are compatible with the results of Ojo et al. (7) who showed that the percentage of E. coli in apparently healthy dogs was 26.9%, while the presented results were disagree with Beutin (23) who examined the healthy dogs for presence of E. coli and they found that the percentages of this bacteria ranged from 3.2 to 12.3%. Also, it has been reported that the percentages of E. coli was 1.1% in healthy dogs (24), while in Japan was 0.16% (25).

Serratia spp. and Escherichia coli were also isolated from bacteriological culture of fecal swabs obtained from dogs (26,27).

Hancock et al. (28) reported that the higher percentages of E. coli and other bacteria is due to younger age susceptibility, transport, sudden alteration in feed and using of antimicrobial therapy which may lead to disorder in microflora of intestine.

Conclusion

These results refer to that large percent of dogs that appear clinically healthy may carry E. coli, Salmonella spp. or other bacteria and may be act as a source for infection to human being and other animals, and this is considered as a bad indication for transmission of these pathogens to human, and the dogs act as a good reservoir.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.
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