

ISOLATION OF SALMONELLA SPP. FROM DOG URINE

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Summary

The study was conducted on 55 dog urine samples of both sexes, with ages between one year and seven years they have vomiting, diarrhea, fever, and loss of activity with prolonged antibiotic therapy, having urinary tract infections in different places from Baghdad privet clinics. Results recorded the percentage of Salmonella was 32.7%. The positive isolation was 18 out of 55 samples. From the 18 positive animals, 5 recovered from diarrhea after a long period of antibiotic treatment.

Introduction

Salmonella spp. considered to be the major cause pathogen in Iraq .Their is about million cases recorded every year (1). It causes an infection in dogs leads to many disorders, summarized in gastro-enteritis, spontaneous abortions, and septicemic infections. Salmonella is zoonotic bacteria that have a high risk of transmittion to humans (2,3)

Generally, the majority of cases are infected by ingestion of contaminated food or water. The most frequent clinical manifestations are gastroenteritis. Some of *Salmonella* spp. may shed more in the urine of diseased human and animals than those shedding in the faces. Diagnosis of *Salmonella* infection in the urine, the indicate mostly *Salmonella*-associated urinary tract infection or may exist as a result of bacteremia or septicemia (3,4).

The organisms rarely caused urinary tract infections (5). Most cases of *Salmonellosis* cause mild-to-moderate gastro-enteritis that disappears simply with treatment and some cases fever disappears without treatment, but other cases develop invasion and then invasive infections like generalized bacteremia and sever meningitis and these cases of salmonella infection can be life-threatening so require a special medical care and parenteral antibiotics (2,5,6). Deaths due to invasion of *Salmonella* bacteria are common (3); death particularly among elderly people. Infants at < 1 year i.e., infants under 6 months and aged people above 60 years have the highest incidence of Salmonellosis (4) Of note, the incidence is higher among men than among women (5), these previous humans studies' facts may be linked to their infected pet dogs, However, this study will be focused on isolating and detection of *Salmonella* spp from dogs suffering from urinary tract infection (UTI), and chronic gastro-interitis may explain the big role of *Salmonella* in UT infections and seems warranted in Iraq.

Material and methods

1. Sample collection: During about one year of work, urine specimens were taken from 55 dogs directly from the urinary bladder as shown in figure (1). The animals have urinary tract infections or long periods of gastrointestinal infection with long antibiotic treatment

these dogs attended private veterinary clinics and antibiotic therapy was stopped for 48 hours before sample taking.

2. Specimen processing. Urine centrifuged by 3,000 xg, then all the supernatant was discarded carefully. The sediment sent to culturing on selenite broth medium and after incubation for 24 hrs at 37°C, recultured on salmonella-shigella agar and XLD agar both incubated at 37°C for 24 hrs, then confirmed biochemical test done to diagnosis such as triple-sugar iron, Simmon citrate, urease, phenylalanine(10).



Figure 1. Urine collection

Results

Cultural characteristics

Bacterial colonies grew on nutrient agar and appeared as small, rounded, smooth, and pale, while on SS-agar the colonies were pale with black centers. On microscopic examination, the bacteria appeared as Gram-negative bacilli. While the biochemical identification showed results illustrated in Table 1. The confirmatory diagnosis was done using the VITEK technique.

Test	Result
Gas	-
Indole	-
Motility	-
Urease	-
Oxidase	-
H ₂ S	+
Simmon Citrate	+
Catalase	+

The total 18 positive cases out of 55 samples taken have different levels of opacity as in Table 2 which shows the main information of all cases examined.

Table 2. Age, sex, and degree of turbidity in dogs suffering from UTI infection with salmonella isolate.

Case number	Dog age/sex	Degree of turbidity	Salmonella spp. isolated
1	4/F	+	+ve
2	7/F	+	+ve
3	4/F	+	+ve
4	3/M	+++	+ve
5	6/F	++	+ve
6	3/M	++	+ve
7	2/F	+++	+ve
8	7/M	+++	+ve
9	4/M	+++	+ve
10	3/F	++	+ve
11	7/M	+++	+ve
12	2/M	++	+ve
13	1/M	++	+ve
14	1/M	+	+ve
15	2/F	++	+ve
16	6/F	++	+ve
17	4/F	+	+ve
18	2/M	++	+ve

DISCUSSION

This study is the first one to investigate and isolate *Salmonella spp.* in dog urine in Iraq due to the absence of such a study to be conducted. The diagnosis of *Salmonella spp.* in urine of dogs is not usual, but in our study, we isolate this bacterium in 18 out of 55 dogs, and this finding is agreed with numerous studies in many countries, and we also agree with their explanation with regard to the reasons for *Salmonella* unusual existence in the urinary system. *Salmonella* infection

may be related to bacteremia or ascending infection due to fecal bacteria that contaminate the distal urethra (8,9,10). While a group of researchers considered the presence of salmonella in urine as an opportunistic infection (10), who also identified *Salmonella* bacteriuria in dogs with UTI and meningoencephalomyelitis. The result showed 32.7% *Salmonella* spp. Isolated from dogs' urine infected with UTI. *Salmonella* appeared to be opportunistic in the UT of dogs (11,12). *Salmonella enterica* (subspecies *enterica* serovar Indiana) was isolated from dogs suffering from severe vomiting, and a decrease of appetite with progressive lethargy (8). Shedding of *Salmonella* may indicate prostatic infection (9,10,11,12). All above results indicate the high need for investigation for salmonellae to protect human health (13,14,15).

References:

1. CDC, Center for Disease Control and Prevention. (2010). Foodborne disease outbreaks annual summary. CDC, Atlanta, G A. pp:1.
2. Hamzah, A., Khalaf, M. J., and Alzubaidy, I. (2012). Isolation of *Salmonella* spp. from human urine in Iraqi patients. 7(4):71-76.
3. Dos Reis, R. O., Cecconi, M. C., Timm, L., Souza, M. N., Ikuta, N., Wolf, J. M., & Lunge, V. R. (2019). *Salmonella* isolates from urine cultures: serotypes and antimicrobial resistance in hospital settings. *Brazilian journal of microbiology: [publication of the Brazilian Society for Microbiology]*, 50(2), 445–448. <https://doi.org/10.1007/s42770-019-00052-y>
4. Aljindan, R. Y., & Alkharsah, K. R. (2020). Pattern of increased antimicrobial resistance of *Salmonella* isolates in the Eastern Province of KSA. *Journal of Taibah University Medical Sciences*, 15(1), 48–53. <https://doi.org/10.1016/j.jtumed.2019.12.004>.
5. Manuel, L., Guerrero, F., Ramos, J.M., Nuñez, A., Cuenca, M., and de Goñgolas, M. (1997). Focal Infections Due to Non-typhi *Salmonella* in Patients with AIDS: Report of 10 Cases and Review. *Clin. Infect. Dis.* 25:690–697.
6. Arjunan M.; Al-Salamah AA; and Amuthan M. (2010). Prevalence and Antibiotics Susceptibility of Uropathogens in Patients from a Rural Environment, Tamilnadu. *Am.J. Infect. Dis.* 6 (2): 29-33.
7. Cohen, J.I, Bartlett, J.A., and Corey, G.R. (1987). Extra-intestinal manifestations of salmonella infections. *Medicine (Baltimore)*. 66(5):349- 388.
8. Shobha, K., Dsouza, A., Mridula, M., and Gowrish, S.R. (2012). Urinary Tract Infection Due to *Salmonella Typhimurium* in a HIV Seropositive Adult Male: A Case Report. *J. Admin. Int. Med. Molec. Med.* URL:http://www.webmedcentral.com/article_view/2930; 3(1):WMC002930.
9. Allerberger, F.J., Dierich, M.P, Ebner, M.R., Keating, J.M., Steckelberg, PK. and Anhalt JP. (1992). Urinary tract infection caused by nontyphoidal *Salmonella*: report of 30 cases. *Urol. Int.* 48:395–400.
10. Andruzzi, M.N., Krath, M.L., Lawhon, S.D. et al. (2020). *Salmonella enterica* subspecies *houtenae* as an opportunistic pathogen in a case of meningoencephalomyelitis and bacteriuria in a dog. *BMC Vet Res*, 16, 437 (2020). <https://doi.org/10.1186/s12917-020-02652-5>
11. Meidinger, K., Schellenberg, S., and Brawand, S. G. (2017). Persistent bacteriuria in a dog caused by *Salmonella enterica* subspecies *enterica* serovar Indiana. *Vet. Rec. Case Rep.* 5: 1-3. Doi. [10.1136/vetreccr-2017-000470](https://doi.org/10.1136/vetreccr-2017-000470). vetrecordcasereports.bmj.com
12. Mahon, B.E., Ponka, A., Hall, W.N., Komatsu, K., Dietrich, S.E, Siitonen, A., Cage, G., Hayes, P.S., Lambert-Fair, M.A., Bean N.H., Griffin, P.M., and Slutsker, L. (1997). An international outbreak of *Salmonella* infections caused by alfalfa sprouts grown from contaminated seeds. *J Infect Dis.*, 17.
13. Maitham S. Sadiq; Rasha M. Othman (2022). Phylogenetic tree constructed of *Salmonella enterica* subspecies *enterica* isolated from animals and humans in Basrah and Baghdad governorates, Iraq *Iraqi Journal of Veterinary Sciences*, 2022, Volume 36, Issue 4, Pages 895-903.
14. Zeena Saleh; B.M. Al-Muhana; Kh. Hamdan; M.S. Jawad; S.F. Klaif Isolation and identification of *Salmonella typhimurium* bacteria with detection of type-1 fimbriae coding gene by polymerase chain reaction (PCR) technique *Iraqi Journal of Veterinary Sciences*, 2019, Volume 33, Issue 2, Pages 195-199.
15. Roaa A.Hussein and Ibrahim Abdul-H. Al-Zubaidy Clinical and Hematological study of Experimental Salmonellosis in Awassi lambs (OVISARIES) *International Journal of Advanced Research (IJAR)* 4 (9), 2254-2257