

Stomach hyperplasia in dog association with salmonellosis

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Abstract:

The inoculation of *Salmonella .typhimurium* for dogs to show its effect on their stomach , that all dogs became severely ill following inoculation, also all animals were die during one week.

The histopathological changes showed mucosal metaplasia which included ; sever vaculation of mucosa and increased mucous glands at the base of lamina propria due to site of entry of *Salmonella* , as well as the increased number of mucous gland which give the secretory area of stomach as finger like projection, also in other section showed as intestinlization . In other part of stomach mucosa showed atrophy, and appear cystic dilatated mucus glands.

Moreover, lesion included the thickened muscularis and pyloric region with edema in sub mucosa, also the mucosa of the fundus and pylorus showed inflammatory cell infiltration following salmonellosis.

تضخم مخاطية المعدة المرافق للإصابة بداء السالمونيلا في الكلاب

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الخلاصة:

حين تجريع الكلاب بجرثومة *Salmonella .typhimurium* وذلك لغرض معرفة تأثيرها على المعدة ، أظهرت الجراء توعك شديد وبعدها ماتت جميعها خلال أسبوع واحد بعد التجريع. وكانت نتائج التقطيع النسجي كما يلي:

حصول تضخم في مخاطية المعدة تمثل ب تفجي شديد في مخاطية المعدة وزيادة غددها المخاطية من عند الصفيحة الأساسية وذلك لموقع دخول الخمج بالسالمونيلا . وكذلك زيادة اعداد تلك الغدد مما يضيفي شكل نتؤات إصبعية على مخاطية المعدة الإفرازية ، و إن هذا النوع من التضخم الذي سببه الخمج قد رافقه ضمور في مشاهد أخرى للمخاطية بشكل توسع كيسلي لغدد المخاطية للمعدة. علاوة على ذلك حصول تنخن في الطبقة العضلية لبواب المعدة ويرافقه الوذمة لتحت المخاطية مع انه لوحظ انتشار الخلايا الالتهابية في كلا المنطقتين البوابية والقاعدية للمعدة بعد الخمج بداء السالمونيلا.

Introduction:

Salmonellosis: was an economically important disease of all animals. The infection occur worldwide by more than 2375 serotypes of *Salmonellae* (1).

Salmonella spp. may concluded in three main groups, first one was human specific as in *S. typhi* and *S. paratyphi*, second group consist of serotypes that adapted for specific animals host examples *S. duplin* in cattle, while the third group included the non host adapted serotypes; *S. typhimurium*, which occur most often and widely distributed than any other types as well as its most important zoonotic diseases in developing countries (2). Salmonellosis had an economically important in farm animals also in dog and cat (3,4, and 5).

The sub clinical *Salmonella* infection in dogs was recorded in ratio of 52% (6), whereas the hazards of carrier state was related to transmit the infection to man (7,8 and 9). Whatever many clinical illnesses characterized by septicemia and enteritis, which manifested by diarrhea usually with hemorrhage, as well as vomiting, fever, depression, abortion and the death as fate for young puppies (10,11 and 12).

The present study was aimed to exert the effect of salmonellosis on stomach of dogs.

Materials and methods:

The experiment was done by using ten puppies (local breed), they were aged between (2-4) months old

from birth, and weighed between (3-4.5) kg. The dogs adapted for experiment for two weeks, during that time had therapy as follow; Ciprofloxacin in dose of 20mg/kg B.W daily for six days, while given Ivermectin of 0.2 mg/kg B.W by S/C in one dose, and Niclosamid of 50 mg/kg B.W(13).

The experiment designated as following:

The dogs were divided into two equal groups which consist of five puppies for each.

First group as Control:

The animals of this group were inoculated orally with 10 ml of sterile trypticase soya broth.

Second group (Infected group):

The animals of this group were inoculated orally with 10 ml of trypticase soya broth which contain (1×10^9) CFU of *S.typhimurium* per ml as infected group (laboratory of clinical pathology–college of veterinary medicine- university of Basra). Postmortem examination was done after the death of the experimentally infected (second) group.

The specimens for histopathologic examination were collected from funds and pylorus stomach, preserved in 10% formalin for preparation and sectioning according to Luna (14).

Results and discussion:

The effect of *Salmonella typhimurium* on dog stomach was represented by second group of present experiment, which showed

clinical illness following inoculation, that lead to death for all of 5 dogs of the group during a period of week, the most morbid puppies following salmonellosis were related to septicaemia and septic shock (3). Then the post mortem resulted the followings:

The severely congested stomach showed histological findings such as sever vaculation of mucosa and increased mucous glands at base of lamina propria (figure-1). Such findings were associated with site of bacterial entry such as *Salmonella* (15 & 16). Other way the pathogen may pass through the pylorus to the small intestine then after rapidly penetrated the mucosal epithelium to reach lamina propria then subsequent infection by descending to stomach, that due to gram negative bacterial affinity against receptor mediated endotoxin (17).

The figures (1 & 2) appeared increased number of mucous gland which gave secretory area of stomach a finger like projection in relation to sever injury following bacterial multiplication at the lamina propria which also described by Schachter (18). The obvious hyperplasia of mucosa and vaculation may made stomach thicker mucosa than normal due to those projections, which gave signs of intestinalization upon stomach

mucosa, that mean hyperplasia was occur following infection (16&19).

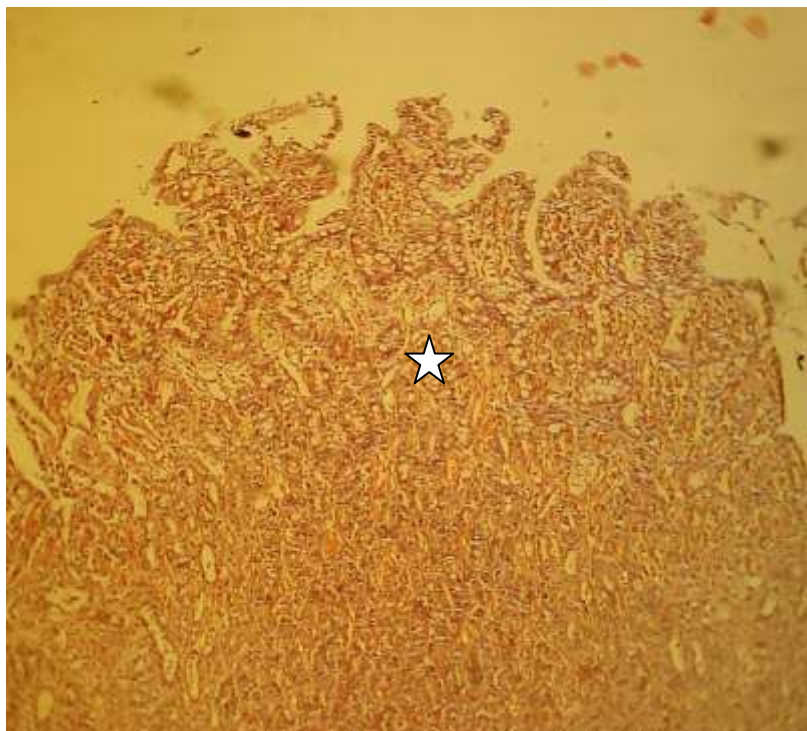
In some other section there were atrophic mucosa, cystic dilatation of mucus glands , with cellular debris and few inflammatory cells (figures 3, A & B), those histopathological changes may followed sever damage on stomach mucosa, which also recorded in relation to bacterial product such as toxins (18&20,).

Other lesion included the thickened muscularis externa (figure 4), also explained by previous authors in response to *Salmonella* spp infection and subsequent hypertrophy in chronically damaged muscle, then that change was replaced by masses of fibrous tissue, or may due to fascial thickening (21).

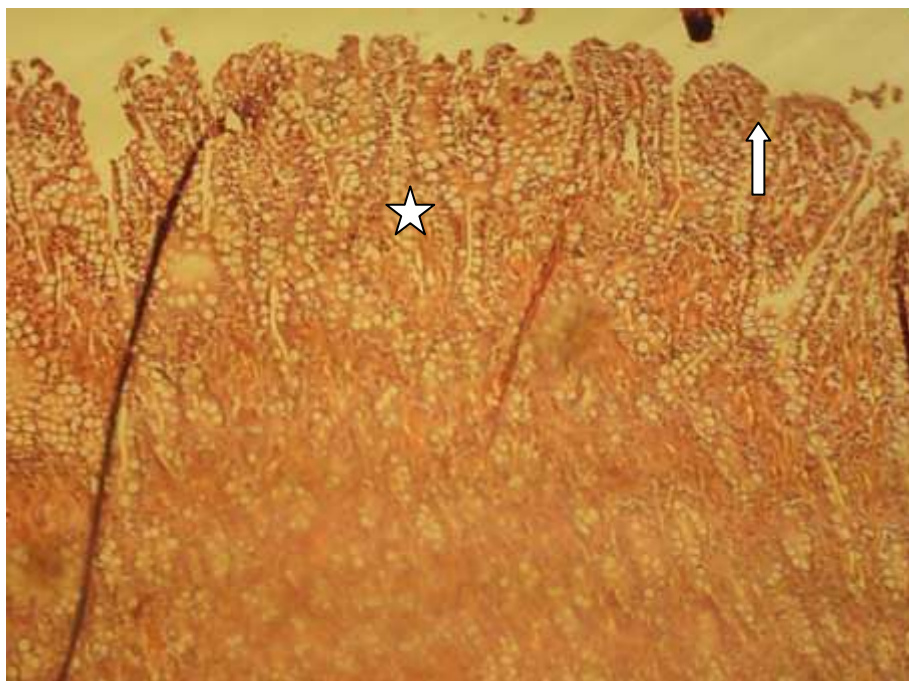
More over there were vaculation and prominent ganglia (figures 5) which explained by Jubb *et al*, (19) and Cunningham, (22) as response to sever microbial infection.

Pyloric region showed edema in sub mucosa and increase number of inflammatory cells (figure-6), that endotoxin of gram negative bacteria caused activation for permeability and inflammatory cells aggregation (17& 23).

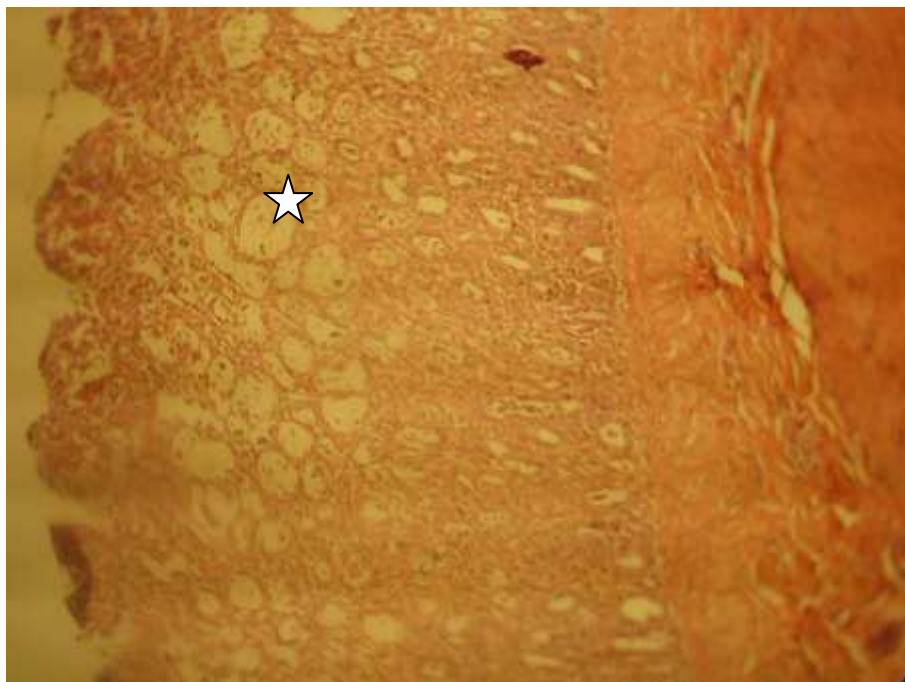
The control group showed at normal limit during clinical and pathological observation of the study.



Figures (1): stomach mucosa, fundus region, showed sever vacuolation and increased number mucous glandes(stare). (H&E) x100



Figures(2):stomach mucosa, fundus region, showed increased number mucous glandes(stare), and appearance of finger like projections(arrow)(H&E) x200

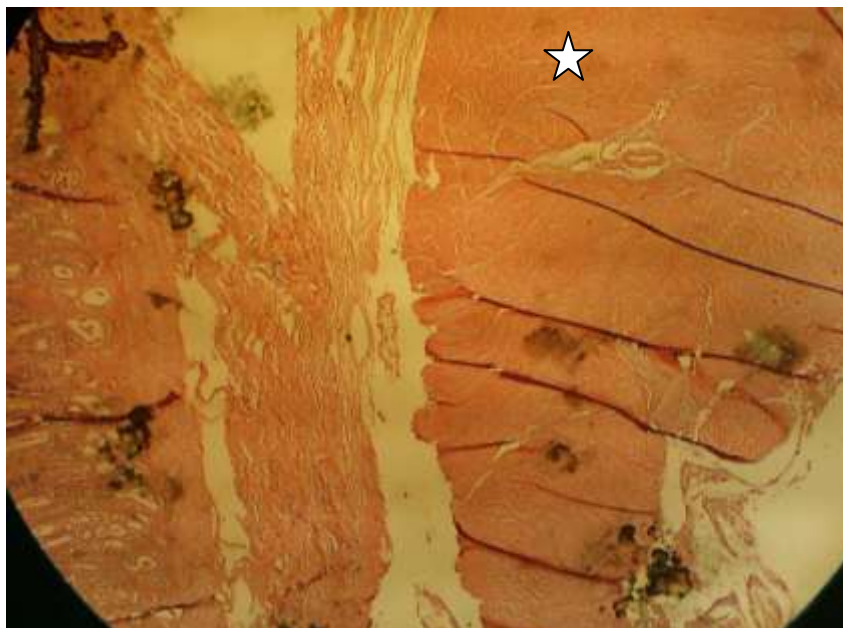


A x 200 (H&E)



B x 400 (H&E)

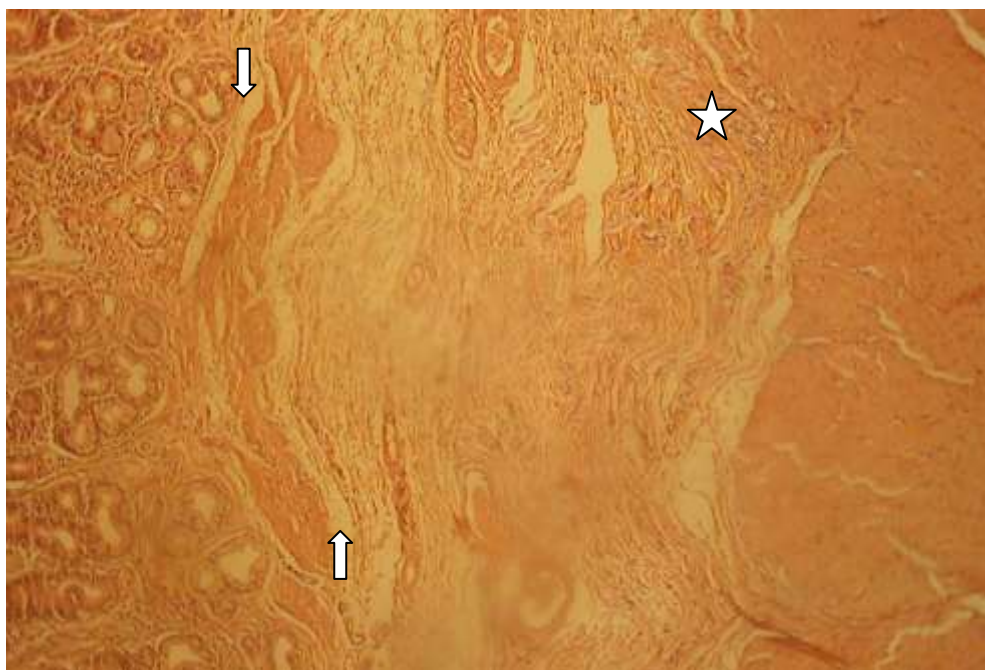
Figure(3): Stomach of dog, showed atrophic mucosa with cystic dilatation(star) and inflammatory cells infiltration(arrow). (H&E)



Figure(4);stomach of dog, their was thickening of muscularis(stare), (H&E) x50



Figure(5);stomach of dog, sever vacuolation of mucosa (arrow) and prominent ganglia (star). (H&E x400)



Figure(6);stomach of dog, Pyloric region shows edema in sub mucosa (arrows) and infiltration of inflammatory cells(star) . (H&E) x100

References:

- 1) O.I.E.(1996). Manual of standards for diagnostic test and vaccines. List A and B diseases of mammals , birds and bees. 3rd Ed. OIE. Paris France, ISBN, 92-9044-423-1,723.
- 2) Macgavin,M.D and Zachary,J.F. (2007). Pathologic bases of veterinary diseases. Mosby-Elsevier. pp 363-364.
- 3) Foley ,J.E; Orgad,U, Hirsh, C; Poland,A and Pedesen,N.C.(1999). Outbrack of fatal salmonellosis in cats following of high titer modified live panleukopenia virus vaccine. JAVMA,214(1):67-70.
- 4) Willis,C.(2001). Isolation of Salmonella species from imported dog chews. Vet.Rec.,6:426-427.
- 5) Lohmann, K.L. and Barton, M.H. (2004) Endotoxemia. Sec.13.7, In: Reed, S.M.; Bayly, W.M. and Sellon, C.D. Equine Internal Medicine .2nd Ed., Sanders, U.S.A. pp821-846.
- 6) Dahlinger,J; Marks,S.L and Hirsh,D.C. (1997). Prevalence and identity of traslocating bacteria in healthy dogs. J.Vet.Inter.Med.; 11(6):319-322.
- 7) Morgan,R.V (1997) Small animal practice,3rd Ed .WBSanders Co.pp;1148-1149.
- 8) Kozak,M; Horosova,K; Lasanda, V; Bilek,J and Kyselova,J. (2003). Do dogs and cats present at risk of transmission of salmonellosis to

human. Bratisl Lek Listy; 104 (10):323-328.

9) Ojo,OE. and Adetsoye,A.I. (2009). Salmonella typhimurium infection in diarrheic and non-diarrheic dogs in Ibadan, Nigeria. Vet. Arhiv. 79(4):371-377.

10) Kaufman,A.F(1966).Pets and salmonella infection J.A.V.M.A.149: 1655–1661.

11) Borland, E. (1975). Salmonella infection in dogs, Cats. Tortoises and therapies. Vet. Record; 96: 401 – 402.

12) Gillespie, J. I. I. and Timoney, J. F. (1981). Hagan and Bruner's infectious disease of domestic animals: 7thed. Ethic and London: Domestic Publishing Associates Division - Corneal University press.P758– 771.

13) Bill,RL (2006) clinical pharamacology and therapeutics for the veterinary technician ,3rd Ed. Elsever-USA.430p.

14) Luna,LG.(1968). Manual of histology staining methods. The armed forces institute of pathology, 3rd . McGraw- Hill book Co. New York.:12-31.

15) Tanaka, Y.; Yasuji., K. and Kiyoshi, I. (1976). Expermental carrier in dog produced by oral administration of *Salmonella*

typhimurium. Japan. J. vet, Sci.; 83: 569 – 578.

16) Plumlee, K. H. (2004) Clinical veterinary toxicology. Mosby, USA. 477p.

17) van Amersfoort, E. S. ; van Berkel, T. J. C. and Kuiper, J. (2003) Receptors, mediators, and mechanisms involved in bacterial sepsis and septic shock. Clin. Microbiol. Rev. 16 (3): 379–414.

18) Schachter, M. (1999) Damage by microbial agents. Ch.9, In: Schachter, M.; Engleberg, N. C.; Eisenstein, B. I. and Medoff, G., Mechanism of microbial disease. 3rd Ed. Lippincott Williams &Wilkins .London: 115-124.

19) Jubb, K.V.F.; Kennedy, P.C. and Palmer, N. (1985) Pathology of domestic animals. 3rd Ed. Vol. I. Academic press, U.K., 582p.

20) Apanavicius, C.J.; Powell; K.L.; Vester; B.M.; Karr-Lilienthal, L.K.; Pope, L.L.; Fastinger, N.D.; Wallig, M.A.; Tappenden, K.A. and Swanson, K.S. (2007) Fructan supplementation and infection affect food intake, fever, and epithelial sloughing from *Salmonella* challenge in weanling puppies. J Nutr.; 137(8):1923-30.

21) Rubin, R. and Weinstein, L. (1977). Salmonellosis in microbiologic, Pathogenic and clinical features.New York,

Intercontinental Medical Book Crop.
P.111-113.

22) Cunningham, J. G. (2002)
Textbook of veterinary physiology,
3rd Ed. Sanders, U.S.A. 575p.

23) Carrigan, S. D.; Scott, G. and
Tabrizan ,M.(2004).Toward resolv-
ing the chalanges of seosesis
diagnosis. Clinical chemistry,
50:1301-1314.