

Carbon Accumulation in Mesenteric Membranes of Domestic Ducks

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الخلاصة :

ان الهدف من هذه الدراسة هو للكشف عن تراكم جزيئات الكربون (السخام) في اغلب الأغشية المساريقية للتجويف البريتوني في طيور البط المحلي والتي تربي في المناطق الملوثة ومقارنتها مع غيرها من طيور البط في المناطق الصحية. أظهر الفحص العياني لتجويف البريتون للطيور التي تأثرت بالتلوث هنالك تجمعات لجزيئات الكربون في الغشاء المساريقي خلف الكبدى الايسر المحيط بالقانصة والغشاء المساريقي فوق الكبدى الايسر. ان بقع الكربون متناثرة بكثرة خلال الأغشية المساريقية ما بين أجزاء من الأمعاء الدقيقة والغليضة وكذلك تكون منتشرة ضمن الأغشية المساريقية المحيطة بالأجهزة التناسلية. على العكس من ذلك ، لا توجد اي آفة عيانية في أي من الأنسجة المساريقية للطيور التي تم جمعها من الحقول السليمة

Abstract

The aim of this work is to detect accumulation of carbon particles (soot) in the most mesenteric membranes of peritoneal cavity in domestic ducks which raised in polluted area and compared with other birds in healthy area. The grossly examination of the peritoneal cavity for birds which affected by pollution are showing the pools of carbon particles in the left retrohepatic mesenteric membrane around the gizzard and the left superior hepatic mesenteric membrane. The abundantly scattered of carbon blots through the mesenteric membranes between parts of small and large intestine and diffused throughout of the mesenteric membranes which surrounded the urogenital organs. Contrariwise, there are no gross lesion present in any mesenteric tissues of birds which gathered from healthy fields.

Keywords: Carbon, Mesenteric Membranes, Duck

Introduction

In mature birds, as in mammals, the coelom is separated into three elementary compartments, pericardial, pleural and peritoneal, but there are main differences between the two modules of vertebrates (1). The main peritoneal hollow of birds is divide up into five compartments by five peritoneal dual- layered sheets of peritoneum (2). On the other hand, (3,4) recognized eight coelomic cavities in mature birds. They are including one pericardial cavity, two pleural cavities (left and right), and five peritoneal cavities. The last are universals the intestinal cavity, the right and left dorsal hepatic cavities, the left and right ventral hepatic cavities. Embryologically, all this coelom arises to develop such as the lateral plate mesoderm forms by 5 days of incubation, in addition, no true diaphragm is present in birds compare to mammals (1). The main mesenteric membranes of the birds are (a) the ventral mesentery is pane which stretches the liver and gizzard to floor of peritoneal cavity, (b) the right and left sheets of retrohepatic septum which stretches the ventral mesentery to the roof of the peritoneal cavity. These two sheets are fused and separates the liver from other visceral organs, while the only left retrohepatic sheet enclose the gizzard, and have connection with mesoduodenum. (c) The thin left and right hepatic ligaments, which arise obliquely and extend through parietal peritoneum to covering the liver.

Histologically, (5) mentioned that the peritoneal membrane consist from layer of squamous epithelium, under this membrane the mesenteries which is a thin sheet of loose connective tissue have little elastic fibers.

Some authors were mentioned of deposition of carbon components in the soft tissue of respiratory system or scattered as black foci of lymph nodes (6), while the others described the accumulation of monosodium urate crystals (MSU) in mesenteric tissues of reptiles (7). Carbon is very broadly diffused in the environment, and its elementals played chief role in human life. Carbon has 7 isotopes, with nitrogen, hydrogen and oxygen forms large numbers of it combinations. (8). Air pollution can be reflects a serious reason of different healthiness conditions including lung cancer and respiratory infection (9). Most of the brick makings use lignite coal or Assam coal which have much amount of ash and sulphur contents (10). The toxic materials that emitted from these brick have unfavorable which affecter on plants, animals, soil and people which present in their surrounding area (11).

The purpose of this paper was to use macroscopic study phenotype of the black carbon aggregation through the mesenteric layers in ducks which living in soot polluted area, and to provide basis formations for effect of bricks manufactories on poultry farming comparing with the healthy birds (ducks).

Materials and Methods

Twelve adult birds of domestic duck (without depending on sexual category) were collected, from two fields of Wasit province, the (6) birds, with average of body weight ($1586 \text{ g} \pm 61.29$), were collected from polluted area assimilate the bricks manufactories, and other (6) birds of duck collected from agricultural fields which featuring with healthy environment, the average of its body weight ($1510 \text{ g} \pm 27.26$). All ducks were anesthetized with chloroform dropped in cotton pad kept about the face, after that the abdominal cavity was opened and uploaded the organs which fills the peritoneal cavities. The results were captured by using digital camera with (10.1 mega pixel).

Results and discussion

The macroscopic findings of the present study is showing that no real diaphragm is present in duck as described in chick (1). On the other hand, the peritoneal cavities of ducks including dual dorsal hepatic cavities (right and left), dual ventral hepatic cavities (left and right) and singular intestinal cavity. All these anatomical results similar to the findings of some authors in birds (1,12)

Gross post-mortem examination of all ducks with healthy environment was revealed to normal mesenteric membranes of peritoneum cavities. These membranes characterized with smooth, shiny appearance with just enough fluid to save it wet, as sheets of intestinal peritoneal cavity which comprising intestines and urogenital organs (fig. 1) and sheet of hepatic peritoneal cavity witch containing liver (fig. 2), in addition, all these visceral mesenteric membrane full with lymphatic vessels. This result was similar to the findings of (2) who described the peritoneum and peritoneal cavity of chicken. However, the macroscopical investigation of the abdominal cavity for ducks which exposure to bricks manufactories fume was revealed to numerous black blots of carbon which clearly spread through in visceral mesenteries. These blots appear as pools in the left retrohepatic sheet which surround the gizzard (fig. 3), and the left dorsal hepatic

sheet which extend caudally from liver to the body wall (fig. 4). Whilst the black blots are profusely scattered through intestinal peritoneal cavity, which including the mesenteric membranes between parts of small and large intestine (fig. 5, 6), and also diffused throughout of the membranes surrounded the testes or ovaries of the duck (fig. 7,8). Several authors were mentioned that deposition of the carbon and silica particles (anthracosis) in the lung, liver, intestinal tract, spleen and definite groups of lymph nodes with existence more or less fibrosis in affected tissues (13). So, (14) was revealed that Carbone particles deposit in mucosa, submucosa and macrophages of influenced tissue. However, the (anthracosis) has been reported commonly in cattle, doge, birds, and reptiles (6,15,16). In the present work, the Carbone particles were deposit in the different parts of mesenteric membranes which contain plexuses of blood and lymphatic vessels and diffuse foci of lymph tissue. These lymphoid tissues which appear as black color. This result is similar to the (5) who was mentioned that simpler lymphoid nodules associated with lymphatic vessels of duck, fowl and other species of birds. On other hand, he was mentioned these foci of lymphoid tissue as mural lymphoid nodules, and it was considered pathological in nature. In lymph node, the scattered foci of black blots classified as simple anthracosis (17), and the carbon particles are detected essentially in the cytoplasm of macrophage of this lymphatic tissue (18).

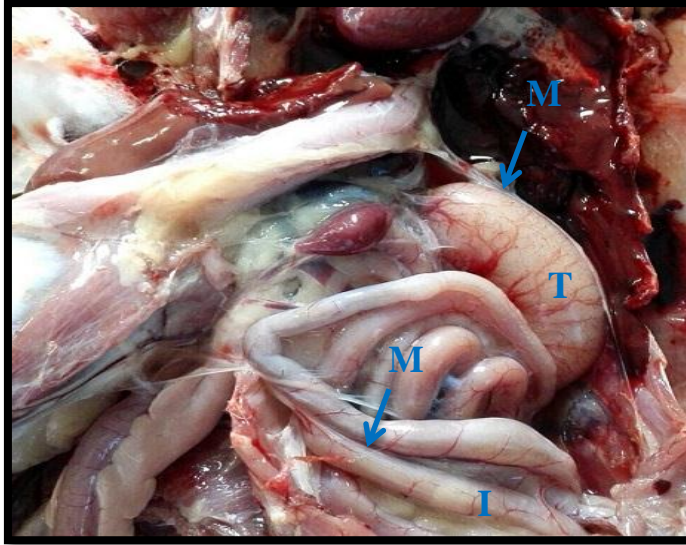


Figure (1): photograph of peritoneal cavity of duck illustrated normal mesenteric membrane (M) which surrounded the intestine (I) and testis (T).



Figure (2): photograph of peritoneal cavity of duck illustrated normal mesenteric membrane which surrounded the gizzard (G) and liver (L).

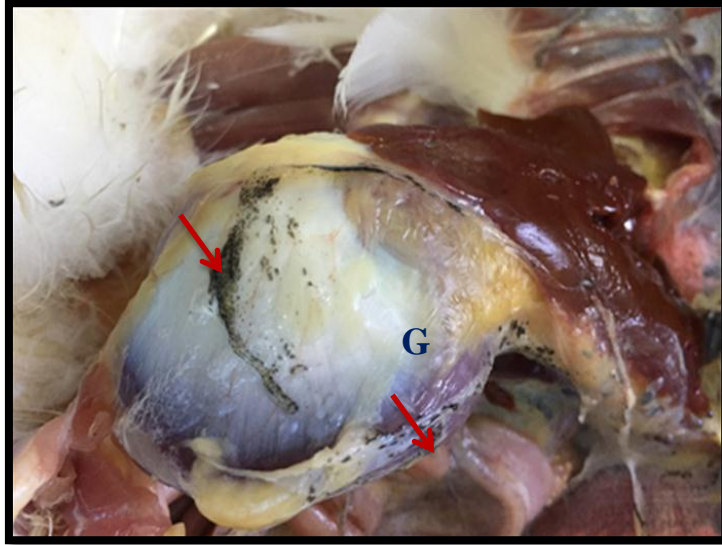


Figure (3): photograph illustrated the black blots (red arrow) of carbon in left posthepatic mesenteric membrane which surround the gizzard (G).



Figure (4): photograph illustrated the black blots (red arrow) of carbon in the dorsal hepatic mesenteric membrane in the caudal part of abdominal cavity.

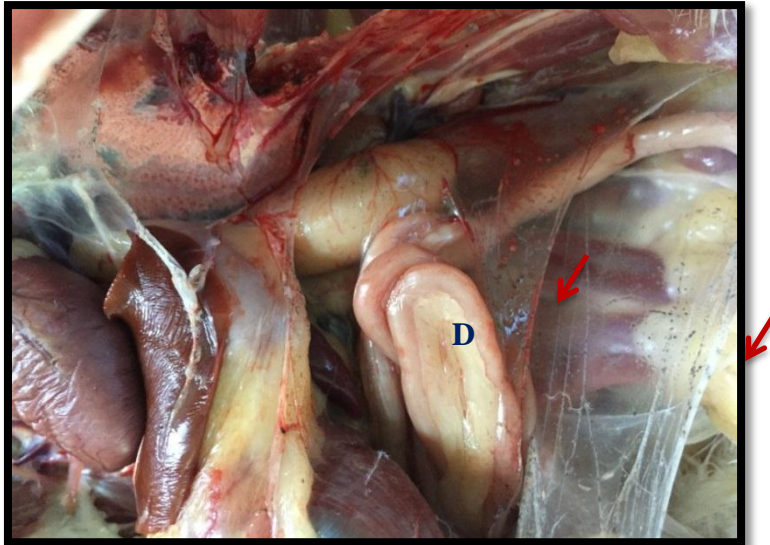


Figure (5): photograph illustrated the carbon particles (red arrow) are profusely scattered through the mesenteric which surrounded the duodenum (D).

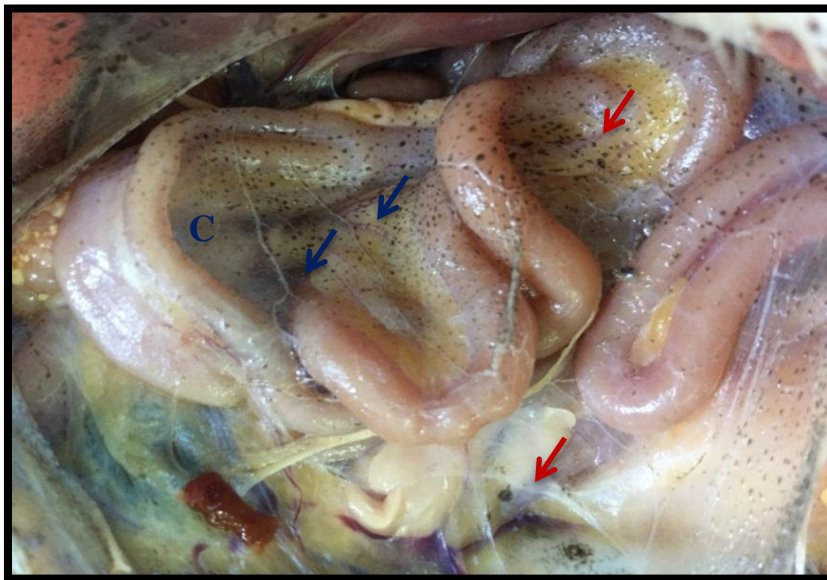


Figure (6): photograph illustrated the carbon particles (red arrow) are scattered through the mesenteric membrane which surrounded the large intestine, cecum (C), with high lymphatic vessels (blue arrow).

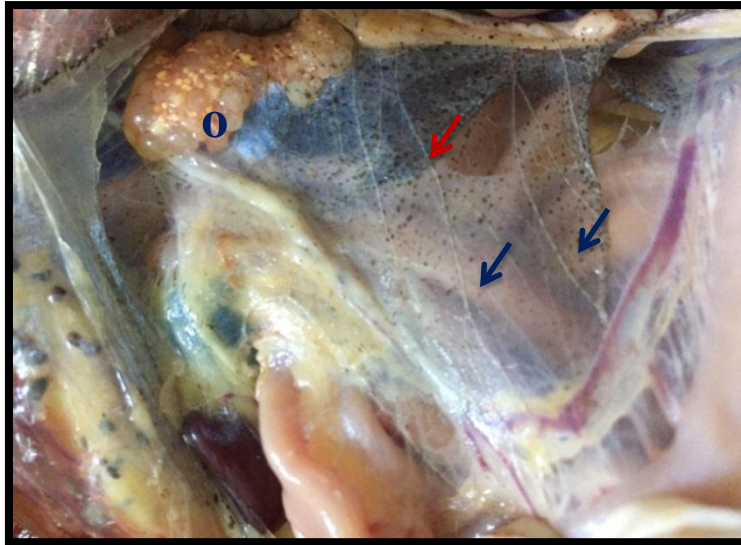


Figure (7): photograph illustrated the carbon particles (red arrow) are diffused throughout of the mesenteric membranes with high lymphatic vessels (blue arrow) surrounded the ovary (O) of the female duck.

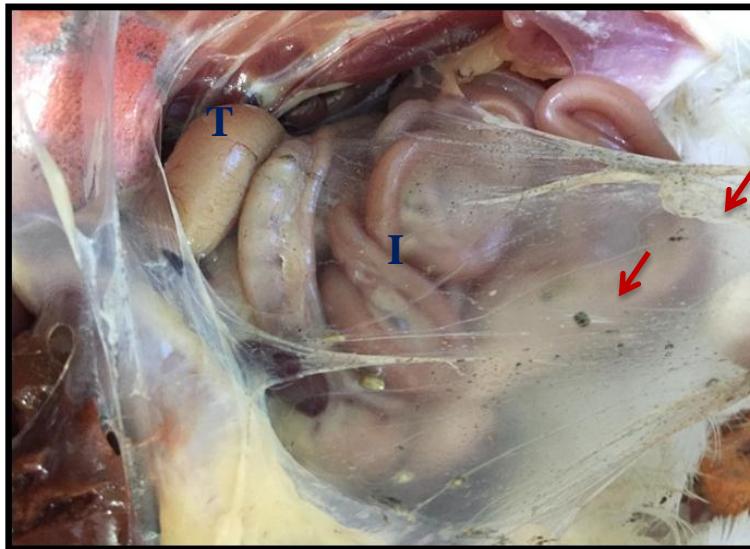


Figure (8): photograph illustrated the carbon particles (red arrow) scattered as big spots through the mesenteric membrane which surrounded the intestine (I) and testis (T) of male duck.

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