Histopathological study of caseous necrosis in lungs of sheep in Diwaniya province

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Abstract

The specimens collect from Al Diwanya slaughter; we collect about 21 specimens (lungs of sheep), all these specimens contained lesions with cheesy like appearance. The specimens cut and prepared for histopathological sections from it, then stained with haematoxyline and eosin stain, we note granulomatous lesion characterized by caseous necrosis in centre (like cheese) also we note fibrosis and inflammatory process includes severe infiltration of macrophages and lymphocytes with presence of giant cells (which indicate the chronic diseases such as tuberculosis, John's disease or diseases which characterized by severe fibrosis such as fungal or parasitic diseases).

Introduction

The term of NECROSIS consists of two words: (Necro-death, osis - state). This is the term applied to the state of cell death. Essentially this means death of a tissue (cell death on a large scale) or part of a tissue with cellular reaction to the dead cells (1). Necrosis is the name given to premature death of cells and living tissue. It caused by external factors, such as infection, toxins, or trauma (2). Cellular necrosis can be induced by a number of external sources, including injury, infection, cancer, infarction, poisons, and inflammation. For example, an infarction (blockage of blood flow to muscular tissue) causes necrosis of muscle tissue due to lack of oxygen to the affected cell, such as occurs in a myocardial infarction -- a heart attack (3). There are some conditions that must be differentiated from necrosis, such as autolysis which means lyses of tissues by their own enzymes, following the death of the organism. Therefore, the key difference is that there is no vital reaction (i.e., no inflammation). Autolysis is essentially rotting of the tissue. Early autolysis is indistinguishable from early coagulative necrosis due to ischemia, unless the latter is focal (4). The second condition, apoptosis is a distinctive and important mode of cell death that should be differentiated from necrosis. Apoptosis (from root words meaning "a falling away from") is responsible for the programmed cell death in several important physiologic or pathologic processes (5). In our present study we performed with focused histopathological study for the fourth types of necrosis (caseous necrosis) because of it very important type and associated with many dangerous diseases such as tuberculosis, John's disease, fungal & parasitic infestations and other chronic diseases, so these reasons are the aim of study.

Materials and methods

After collection of specimens which taken from infected lungs, specimens were preserved in 10% buffered neutral formalin in a glass container, closed tightly and kept under room temperature until examination. After transportation of specimens to the laboratory of anatomy and histology in veterinary medicine college Al-Qadisiya University for preparation of microscopic slides, all formalin fixed specimens were dehydrated, embedded in paraffin wax and sectioned on microtome at a thickness 5 Mm. Histological samples were stained by haematoxin and eosin (HE) stain (6) and then all microscopic slides are examined under light microscope.

Results

The macroscopic lesion characterized by nodular pattern usually yellowish green
appearance, caseous or cheesy like appearance present in the center of lesion. Occasionally its appearance may be purulent. The caseous centre is usually dry, firm and covered with a fibrous connective capsule of varying thickness. Lesion size ranges from small enough to be missed by the unaided eye, to involvement of the greater part of the lung.

**Microscopic examination:**

From histopathologically examined lung tissues sections, granulomatous lesion with caseous necrosis in center of lesion were observed in the lungs (figure 1). The granulomatous lesion in the pulmonary tissue of infected sheep, consisted of a collection of inflammatory cells (lymphocytes and macrophages) within the infected tissue (figure 2). Also the microscopic slides demonstrated infiltration of third line of inflammatory process is multinucleated langhans giant cells (which have horse shoe nuclei) (figure 3) & (figure 4), these type of cells formed due to Many macrophages (2-12) cells may united together to formed it. The accumulation of living and dead macrophages, lymphocytes, multinucleated giant cells, bacteria and tissue cells around caseous necrosis in centre comprises a granuloma. A thick fibrous capsule may form around these granuloma (figure 5).

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**Fig.(1): Lung :** There is granulomatus lesion note the caseous necrosis in center of lesion and infiltration of inflammatory cells (Macrophages & Lymphocytes). 50X H&E.

**Fig.(2): Lung:** There is severing infiltration of inflammatory cells (Macrophages & Lymphocytes) in the pulmonary tissue with fibrosis. 100X H&E.
Fig. (3): Lung: There is multinucleated langhans giant cell (horse shoe like nucleus) in the pulmonary tissue. 50X H&E.

Fig. (4): Lung: There is multinucleated langhans giant cell (horse shoe like nucleus) in the pulmonary tissue. 100X H&E.

Fig. (5): Lung: There is granulomatous lesion (granuloma), note the caseous necrosis in center of lesion and infiltration of inflammatory cells (Macrophages & Lymphocytes) and fibrous capsule around this lesion. 50X H&E.
Discussion

From our results, we showed that caseous necrosis considered as lesion associated with many diseases such as chronic diseases (tuberculosis, John's disease, fungal and parasitic diseases). Grossly we note the granuloma (granulomatous lesion) in lungs tissue of infected sheep with chronic diseases which appears yellowish green in color with caseous necrosis in center of lesion this agreed with (7), they described the gross lesion of caseous necrosis in bovine tuberculosis and described the tubercles in infected cattle. Also we showed from our results that the fibrosis (fibrous tissue proliferation) around the granulomatous lesion which indicate the chronic reaction for causative agent (bacteria such as mycobacterium, fungi, parasite & other causative agent) (8), he show that Corynebacterium pseudotuberculosis infection in camels may cause granulomaous lesion surrounded by fibrous tissue. From our histological examination we note under microscope the chronic inflammatory response (Macrophage, Lymphocyte & plasma cells) which infiltrate into site of infection during few days until several months and cause line of demarcation around the caseous necrosis which present in the center of lesion. This agreed with (9), they described these inflammatory process in case of cutaneous leishmaniasis. This inflammatory response occur after infiltration of neutrophils which killed by causative agent. After neutrophils infiltration, lymphocytes and macrophages infiltrate into site of infection and these macrophages tend to kill causative agent but it can't to do this, So that Macrophages united together about (2-12 cells) to form multinucleated giant cell (which has horse shoe like nucleus) to kill the causative agent, this reported by (10), he described the granulomaous lesion in menigies of infected cattle, he reported the extensive necrotic areas (caseous necrosis) in menigies were surrounded by multinucleated giant cell, epitheloid macrophages, plasma cells, lymphocytes & fibrous proliferation.

Reference


دراسة مرضية نسجية للنخر ألمتجني في رئات الأغنام في محافظة الديوانية
خليل كرار جانب
كلية الطب البيطري/جامعة القادسية

الخلاصة

جمعت العينات من مجزرة الديوانية للحوم، حيث جمعت حوالي 21 عينة (رئات أغنام) كل هذه العينات احتوت أفة الورم الحبيبي ذات المظهر المتجني. قطعت العينات وحضرت مقاطع نسجية منها، بعد ذلك صبغت بصبغة الهيماتوكسيلين- أيوسين. حيث لاحظنا أفة الورم الحبيبي والتي تتميز بنخر تجني في مركز الأفة (الجمين) كذلك لاحظنا التليف والعملية الالتهابية والتي تضم أرتباط كثيف لخلايا البلازما والخلايا اللمفية مع وجود الخلايا العضوية (التي تدل على الأمراض المزمنة مثل السل ومرض جونز أو الأمراض التي تتميز باليئين شديد مثل الأمراض الفطرية والطفيلية.