Histopathological study of the effect of Hydatid Cyst of *Echinococcus granulosus* on Lung Tissue of Intermediate Hosts

Hamad J. Jumaa & Fatima Qasim Al-Hayali
Biology Department, College of Science, Unversity of Mosul, Mosul, Iraq

Abstract
This study was conducted to investigate the histopathological changes caused by hydatid cysts of *Echinococcus granulosus* in bronchioles and bronchus of lung naturally infected . langs in humans, sheep and cattle. The injuries were diagnosed by histopathological study in infected humans, sheep and cattle. The results showed sever histopathological lesions in the lung cells, such as collapsed in pulmonary alveoli, fibrosis, bronchiolectasis, bronchiolitis obliterans. Hydatid cyst in lung cause oedema, changes in blood vessel walls and Hemorrhage.

Introduction
Hydatid disease is a chronic granulomatous disease result from the development of the intermediate larva stage of *Echinococcus granulosus* in various sites at the body cavity, principally the liver and lungs in man or other intermediate hosts. This disease causes widespread morbidity and mortality in many regions of the world (1,2). It is prominent in tribal and village communities of the Middle East.
The cyst may remain dormant for many years. However, it poses a hazard to the patient because it may rupture at any time, resulting either in the formation of daughter cysts or, uncommonly, in death due to asphyxiation or to a hypersensitivity reaction to the cyst contents (3).
The present work aimed to investigate the histopathological alterations response of lung during the period of infection in human, sheep and cattle.

Material and method
In human, the 28 individuals selected for this study were patients at the Al-Zahrawi hospital in Mosul City between January 2001 to June 2001. there were classified as ruptured or non-ruptured, size of cyst, thickness of the pericyst and operative complications.
In sheep and cattle, the 20 samples selected are tabulated in the same way as those of the human. All samples that were obtained from the lung of human, sheep and cattle were cut into about 1cm pieces, and fixed promptly in 10 buffered neutral formalin, embedded in paraffin and sectioned at 4-6 micrometers. Sections stained with haematoxyline-eosine stain for histopathological examination (10).

Results
In human, the conditions of the hydatid pericyst wall depends largely on the time rupture of the cyst and the circumstances of rupturing. Operative results depend on the condition of the cyst wall. So the results are represented with two sides, ruptured cysts and unruptured cysts.
In ruptured cysts, the clinical sumptoms are represented as chest pain radiating to the left shoulder, episode of fever, cough and slight hemoptysis . Histopathological examination showed extensive granulation of the tissue in the pericyst wall, giant cell granulomata had formed around positions of cyst wall and booklets.
Heavy diffuse eosinophils showed extensive granulation tissue. There was a complete fusion of the visceral and parietal pleura (Fig. 1). Buried within the fibrous adhesions were numerous small and larger hydatid daughter cysts measuring up to 2cm diameter. The cyst contained collapse hydatid membrane with pus. The dense packing of the membrane indicated shrinking after rupture into the pleura.
In unruptured cysts, the histological examination of the specimen showed a thick layer of granulated tissue and fibrous tissue was found in the cyst cavity with giant cells granulomata, around parasitic material. In the lung paranchymotous there were numerous alveolar macrophages, heavy interstitial lymphocytic infiltration and chronic bronchitis (Fig. 2) which lead to conventional bronchiolectasis (Fig. 3). Later then, the lesion causes constriction and oblitrans (Fig. 4).In sheep and cattle, the effect of hydatid cyst on bronchiole is the sam as human, it also causes chronic bronchiolitis, bronchiolectasis, and bronchiolitis obolitrans (Fig. 5).

Discussion
Hydatid cyst may arise any where in the lungs, but those growing near the centre of lungs is surrounded by large vessels and bronchi and tend to grow outwards owing to the lesser resistance. The majority of hydatid cysts in the lung is probably young cysts, and grows rapidly, because the pulmonary capillary network forms the second capillary filter for circulating hexacanth embryos after the liver capillary bed (9). Lung cysts are more spherical than those in the liver because of the spongy nature of the pulmonary tissue (7). These result suggestive a hepatic cyst which has ruptured through the diaphragm (5). The presence of blood in the sputum can result from rupture of the pulmonary capillaries. In unraptured cysts, bronchial compression with consequent completely with subsequent atelectasis and fluid stasis in pericysts alveoli, pressure changes develop in the alveolar epithelium and the air space fill with alveolar macrophages.
During cyst rupture,cyst fluid and scolices are deposited in the pericystic pulmonary parenchyma. The inflamatory response, occasionally anaphylactic shock (4). All these factors lead to fibrosis and the complications of fibrosis such as atelectasis and chronic bronchitis which are resulted from bronchial changes that are described as hypertrophic, mucosal thickening and excessive munopurulent secretion. These changes lead to the bronchiolectasis and bronchiolitis oblitrans (8,11).
The increase in the diameter of the cyst was correlated with higher lung tissue elasticity and the delay in diagnosis because of delayed symptoms in these patients (6).

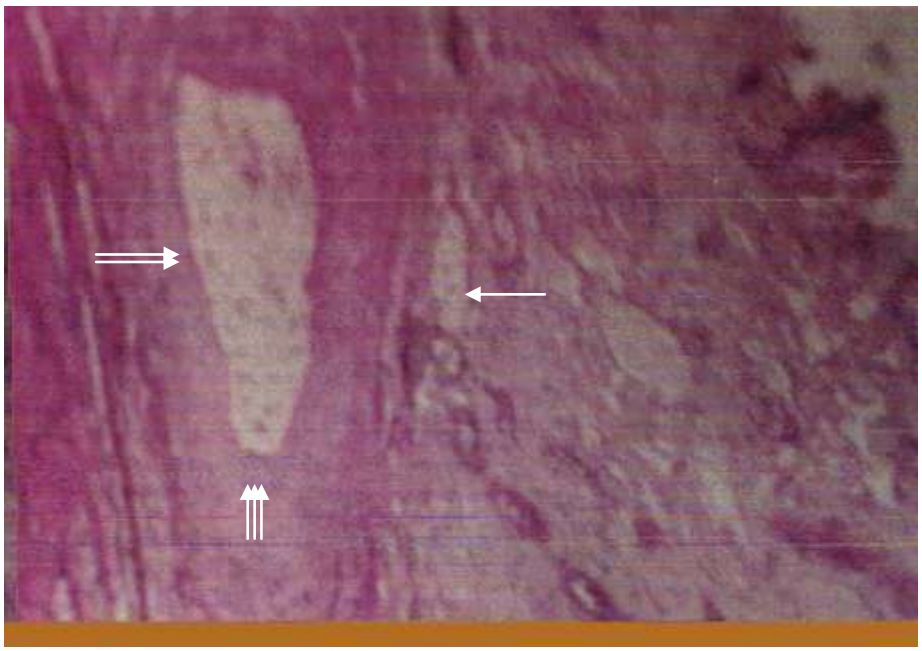

Fig. (1) Hydatid cyst ruptured in human lung showed protoscoleces → diffusion in lung tissue, fibrosis ⇒ , thick adventitial layer of blood vessele ⇶ Haematoxylin-esoin stain. (40X)

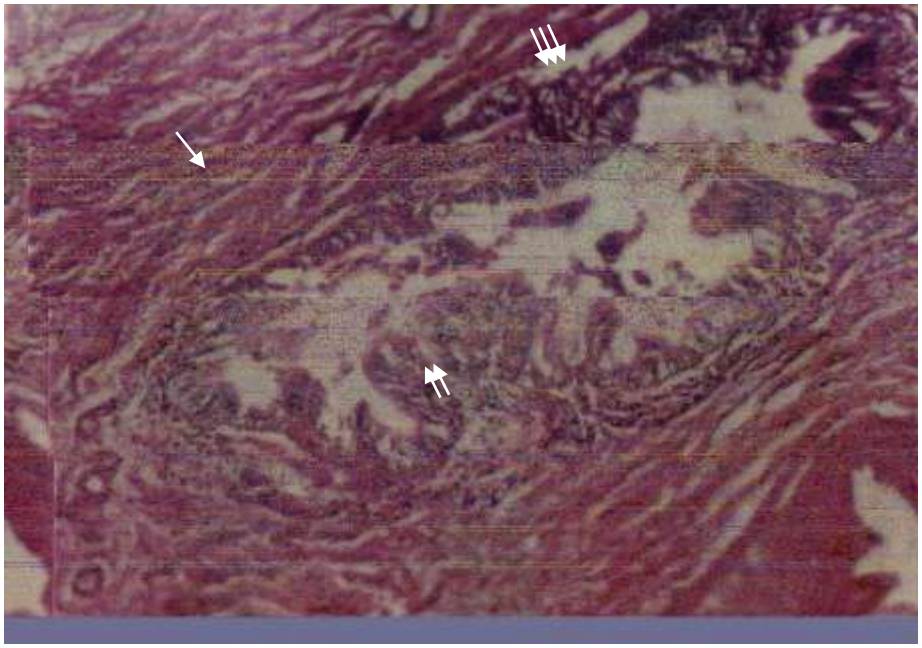

Fig. (2) Hydatid cyst ruptured in human lung showed fibrosis →, bronhiectasis ⇒ , peribronchial inflammation ⇶ Haematoxylin-eosin stain (40X)

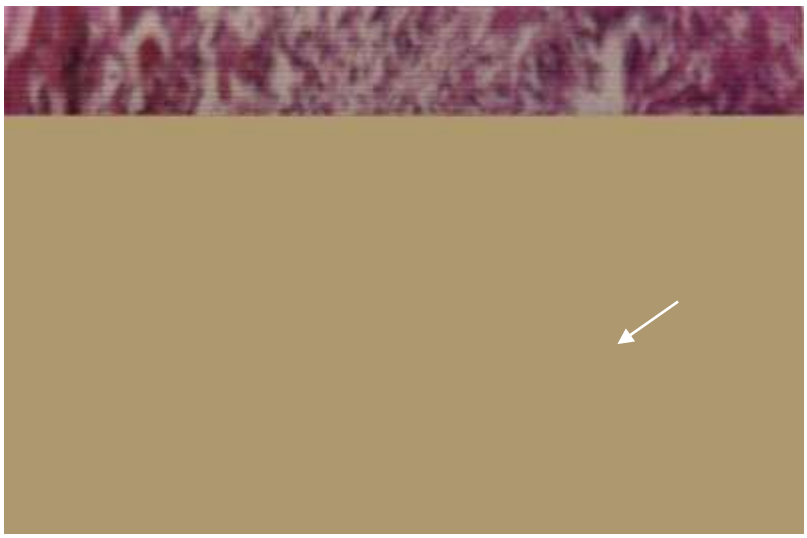

Fig (3) Hydatid cyst ruptured in human lung showed conventional bronchiolectasis → Haematoxylin-eosin stain (40X)

Fig (4) Hydatid cyst ruptured in human lung showed bronchiolitis obliterans → , hemoptysis in pulmonary alveoli ⇒ Haematoxylin-eosin stain (40X)

Fig. (5) Hydatid cyst in cattle lung showed chronic inflammation reaction periterminal bronchiole → and pulmonary alveoli ⇒ Haematoxylin-eosin stain (40X)

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دراسة نسجية مرضية لتأثير الكيس العدري لطفيلي المشوكة الحبيبية *Echinococcus granulosus* على انسجه الرئه في المضائف الوسطية

حمد جنداري جمعة و فاطمة قاسم الحيالي

قسم علوم الحياة ، كلية العلوم، جامعة الموصل، الموصل، العراق

الملخص

تناولت الدراسة الحالية معرفة التغيرات المرضية النسجية التي يسببها داء الأكياس العدرية للمشوكات الحبيبية *Echinococcus granulosus* في القصبات الهوائية لرئات الإنسان، الأغنام والأبقار المخمجة طبيعياً. شخصت التغيرات المرضية نسجياً بمقاطع شمعية متسلسلة، إذ ظهرت آفات مرضية شديدة في خلايا الرئة وسببت وهطاً في الأسناخ الرؤية، تليفاً في الرئة مع توسع القصيبات وحدوث التهاب القصبات المسد إذ أن وجود الأكياس في الرئة يسبب خزب الرئة وتغيرات في جدران الأوعية الدموية، والنزف الدموي الرئوي.