



Hydatidosis of Cattle with Secondary Bacterial Invaders

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Abstract:

Specimens of hydatid cysts were collected from infected liver and lung of cattle, multilocular cysts, different sizes, milky in color, some of them superficial while others embedded in the parenchyma of the organs.

Bacteria were isolated from liver and lung infected with hydatid cysts in cattle slaughtered in Diwania slaughter house. *S.aureus* and *C.Pyogenes* were isolated from the liver, while *Streptococcus spp* and *C. pyogenes* were isolated from lung hydatid cysts.

Bacterial colonies were identified by culturing on enriched and selective media with various biochemical tests. All bacterial species were sensitive to Ciprofloxacin and Gentamycin while it is resistant to Carbencillin and Ampicillin.

Histopathological study revealed the hydatid cysts in liver and the lung were surrounded by fibrous tissue. Coagulative necrosis were noticed in liver tissue while caseous necrosis was in lung tissue.

Key words: Hydatid cyst, *Corynebacteriu*, *St. aureus*, Liver abscess, Histopathology.

الاختراق الجرثومي الثانوي في الاكياس العدرية بالابقار

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الخلاصة:

نماذج من الأكياس العدرية (المانية) تم جمعها من كبد ورتة الأبقار. كانت الأكياس ذات لون أبيض حليبي وأحجام مختلفة متعددة الفجوات. بعضها مغمور في متن الكبد والبعض الآخر سطحي الموقع. عزلت البكتريا من كبد ورتة الأبقار المذبوحة في مجزرة الديوانية و المصابة بالأكياس العدرية و من هذه البكتريا كانت في الكبد *Corynebacterium pyogens* , *Staphylococcus aureus* و *Streptococci spp.* and *Streptococci spp.* لقد تمت تنمية مستعمرات البكتريا على وسط زرعى (selective enriched and media) فضلاً عن استعمال اختبارات كيميائية حيوية لتشخيص البكتريا. جميع هذه البكتريا كانت حساسة الى المضاديين الحيويين Ciprofloxacin , Gentamycin بينما كانت مقاومة للمضاديين الحيويين Ampicillin , Carbencillin.

الدراسة شملت التغيرات المرضية النسيجية الحاصلة في الكبد والرئة بسبب الإصابة المختلطة بين الأكياس العدرية والبكتريا ، وأثبت وجود رد فعل مرضي في الكبد والرئة منها تليف حول الأكياس وتنخر تجلطي في الكبد وتنخر تجبني في الرئة فضلاً عن ارتشاح خلايا التهابية حول الأكياس.

الكلمات المفتاحية: الكياس العدرية، خراج الكبد ، التغيرات المرضية النسيجية.

Introduction:

Hydatid cysts is a parasitic disease (Hydatidosis) Occur in an all mammals but mainly sheep and cattle , also occur in human (1) .

This disease is common and endemic health problem in human and animals . Infection happened due to ingestion of food or water contaminated with eggs of *Echinococcus Spp.* after excretion by canine (definitive host) , (2) .

(3) mentioned the spleen is the third organ beside liver and lung involved by hydatid cysts .

Hydatid cysts can localized in any organ of the body but the highest percent were recorded in liver and lung (4 and 5) . Beside hydatid cysts , sometimes liver and lung can be infected with bacteria . Liver abscesses are very common in dairy cattle , gram negative bacteria and a component of normal rumen microflora are the predisposing factors for bacterial infection (3and 6) . *Corynebacterium pyogenes* was the predominant facultative bacterium that isolated from liver abscesses (7) .

(8) indicated that wall of hydatid cyst microscopically include two layers (supporting laminated layer and germinal layer) , these two layers were developed during three - seven months after experimental infection in mice .

(9 and 10) were studied epidemiological distribution in Diwania and biochemical analysis of hydatid fluid and recorded the following results (29.9 gm/dl carbohydrate , 2.17 mg/dl protein , 7.14mg/dl calcium , 4.9 mg/dl phosphorus) , while (11 and 12) worked on biochemical analysis of hydatid fluid that isolated from the cysts of sheep , cattle , camels , goat and human.

Materials and methods:

The specimens of hydatid cysts (hundred / 62 liver and 38 lung) were collected from Diwanyia slaughter house and transported to the laboratory directly to identify the microorganisms .

Isolation of bacteria : The surface of the infected liver and lung were sterilized by hot spatula in a contact shape with surface , then incision was incised in liver and lung . Sterile Cotton swabs were used to take a sample from the organs incision , then cultured on blood agar and MacConkey agar , incubated for 24-48 hours . Isolated bacteria were recultured on selective and differentiated media with biochemical tests which include Catalase test , coagulative test , Gelatin liquefaction , Nitrate reduction and carbohydrates fermentation for identification of the isolates (13) . Sensitivity test were done by disc diffusion method, Carbencillin , Ampicillin, Ciprofloxacin and Gentamycin were used.

Histopathological study : one cupic cm of the infected liver and lung (part from the wall of hydatid cyst and part from the surrounded tissue) as specimens for sectioning. preparation of histopathological slides as follows :

- 1- Fixation : by using 10% formalin .
- 2- Dehydration by ascending series of Ethyl alcohol dilutions (50%, 70%, 80%, 90%,95%) time , two hours for each .
- 3- Embedding in wax .
- 4- Trimming and sectioning : by using rotaring microtome .
- 5- Clearing by putting the slides in incubator 40 c for one hour for solving wax and then washed by zylol .
- 6- Staining and mounting : Rehydration by using descending dilutions (95%, 90%, 80%, 70%, 50%) five minutes for each .

Staining with heamatoxyline for two minutes , washing with tap water then staining by eosin stain for two minutes(14)

Results:

Results of Bacteria (finding) : Hundred specimens of liver and lung were inpsected (62 liver and 38 lung) . The liver is particularly susceptible to bacterial infection because it receive blood from the hepatic artery and the portal system . Hepatic abscesses are most prevalent in ruminants which associated bacteria with parasite migration or hematogenic origin . lung receive blood from the pulmonary

artery but beside that it is exposed to external environment by respiration.

Corynebacterium Pyogenes and *Streptococcus* were isolated from the infected lung with hydatid cysts . These bacteria were gram positive bacteria and the percent of infection was (21%) .

Corynebactrium pyogenes and *Staphlococcus aureus* were isolated from the infected liver with hydatid cysts , these bacteria are gram positive cocci (Fig. 1) . Both bacterial infectios in lung and liver consider as secondary invaders as mixed infection (35%) .

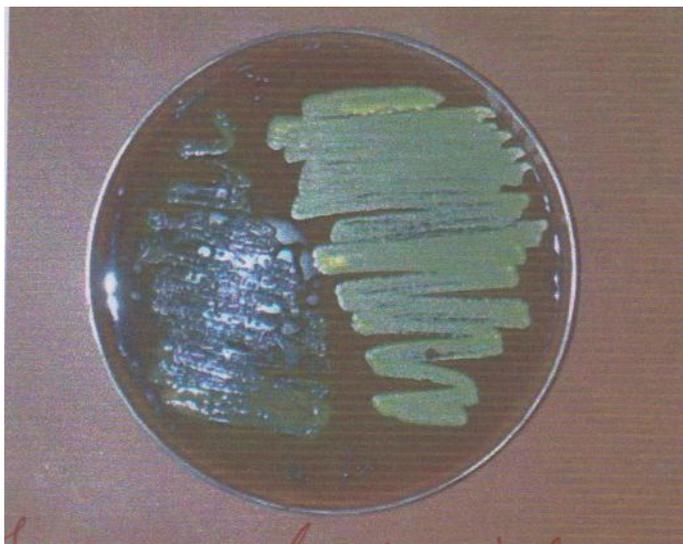


Fig. (1): Culture of *Corynebacterium pyogenes* (on the left) and *Staphylococcus aureus* (on the right) .

Sensitivity to antibiotic was done for isolated bacteria , *C. pyogenes* , *S. aureus* and *Streptococcus* were sensitive to Ciprofloxacin and Gentamycine while all these bacteria were resistant to Carbencillin and Ampicillin . Pathological Changes : Gross pathological changes in liver , hydatid cysts milky in

colour , different sizes , some of them superficial , project from the outer surface while others are embedded in the parenchyma , most of these cysts were unilocular cysts . Same general characterizations were present in hydatid cysts of the lung except the last are softer than those of liver Fig (2 and 3) .

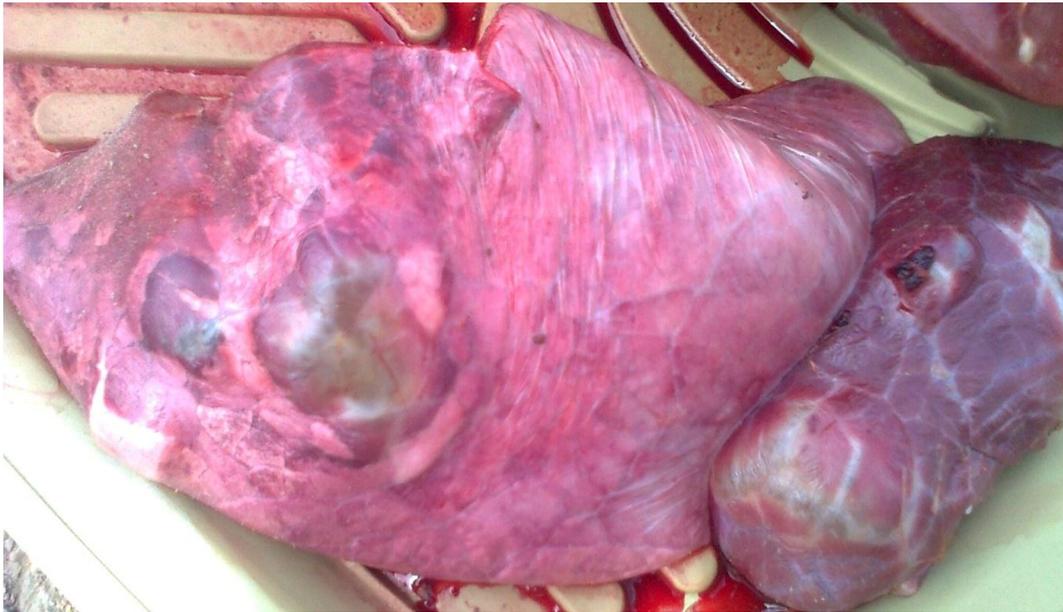


Fig. (2) : Upper / lung infected with hydatid cysts , milky coulor, cysts are mostly embedded in parenchyma and pressed lung tissue

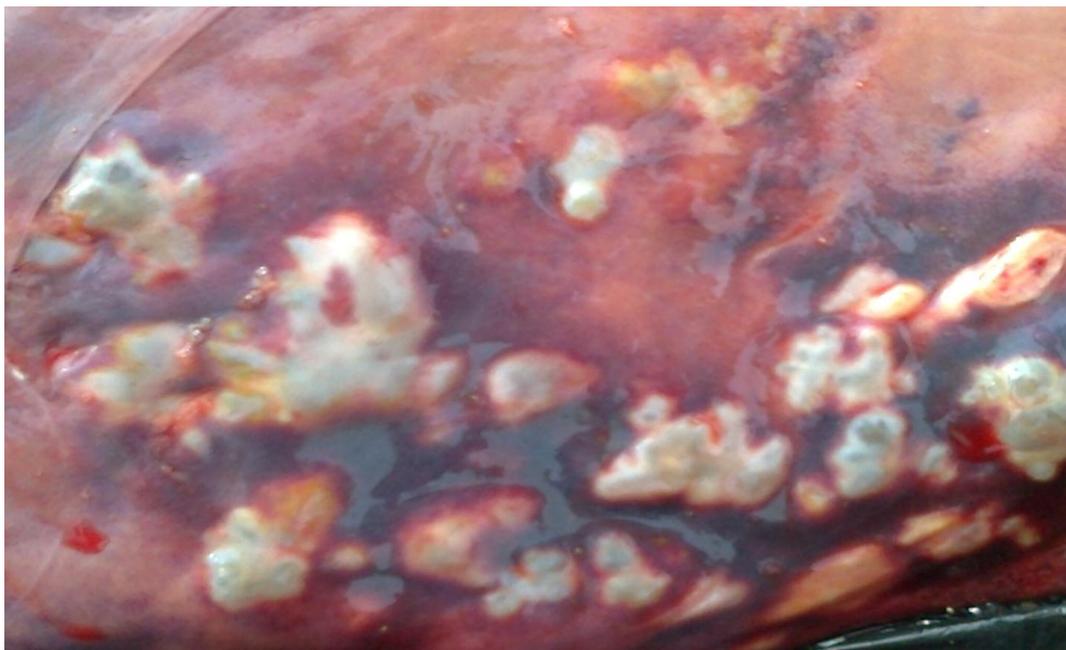


Fig.(3): lower / liver infected with hydatid cysts , Variable in sizes , multilocullor , milky in colour ,deep red liver tissue near the cysts due to hemorrhage and inflammation .

Microscopically , hydatid cysts cause pressure to the neighbouring alveoli of the lung therefor appeared compressed (slit like) , necrosis occur due to press on blood vessls , jaundice noticed due to obstruction of bile ducts and distribution of bilirubin between the hepatic cells .

Calci- fication was found in the necrosed area as deep violet granules with hematoxylin eosin stain .Infiltration of inflammatory cells (neutrophils , lymphocytes , eosinophils , monocytes and giant cells) (Fig. 4 and 5) .

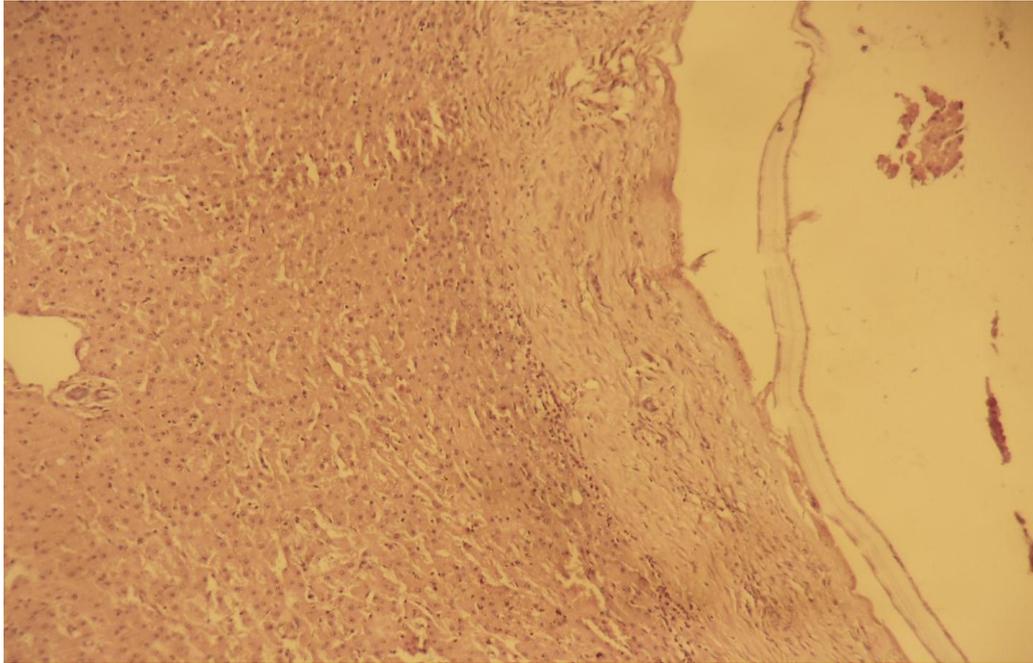


Fig. (4): Cross section of liver tissue with part of wall of the cyst , detachment of germinal and laminated layers , then fibrous tissue , infiltration of inflammatory cells ,as well as hepatic cells are compressed by the cyst .

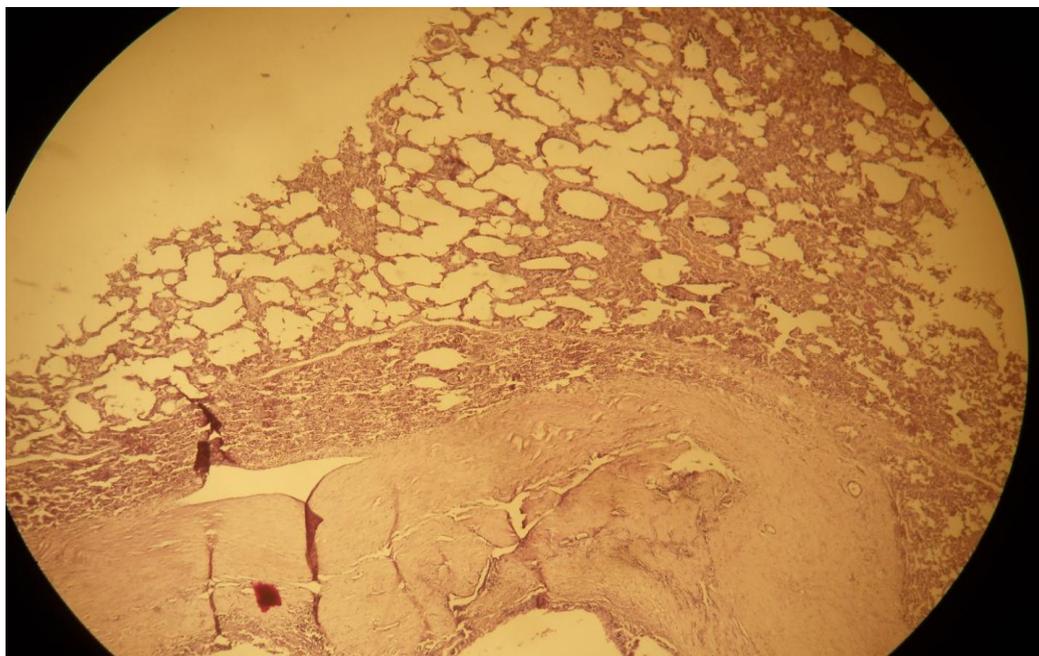


Fig.(5) : Upper / Cross section of lung infected with hydatid cyst , very thick wall especially fibrous layer , alveoli near by the cyst are compressed . H.&E. 10X.

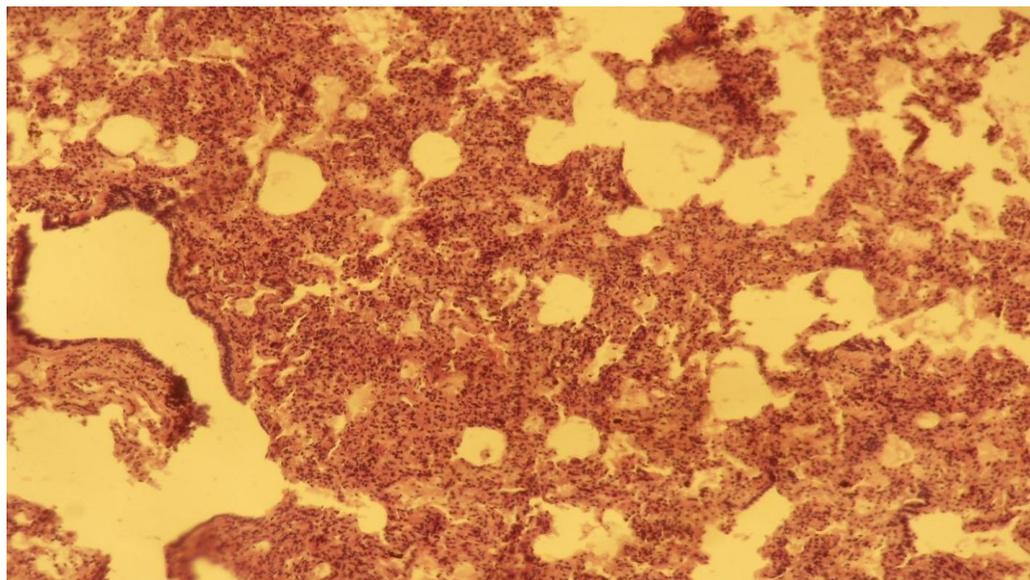


Fig.(6) : lower/ cross section of infected lung tissue , Spaces of alveoli are full with odema and inflammatory cells (Neutr- ophils, Lymphocytes , Monocytes , Eosinophils and macropha- ges . H.&E. 40X.

Discussion :

Many researchers worked on hydatid cysts . (15) indicated that oncospheres of *Echinococcus granulosa* trapped by the huge number of capillaries present in liver and lung . (2) reported the incidence of abscesses that caused by *C. pyogenes* in cattle (heavy eaters) high percent's (49.1%).(3) diagnosed *Fusobacterium necrophorum* and *Actinomyces pyogenes* in liver abscesses in all ages of beef cattle that feedlots , these abscesses are most common due to ruminitis caused by high quantity of ration (16 and 4) . The reason may be due to the origin of some bacterial infections were present in gastrointestinal tract of cattle as pathogenic bacteria transmitted by blood stream to the liver and lung (5).

C. pyogenes which isolated from both liver and lung of sheep and cattle , this infection due to stress and presence of flies transmitting this bacteria (18 and 19).

(11) isolated bacteria from the lung because the lung in contact with external environ- ment , while the *C. pyogenes* and *Staphylococcus aureus* were isolated

from the infected liver may be transmitted from intestine with oncosphere or extention from gastrointestinal inflammations . (20) induced bacterial infection in liver of BALB /C mice . These bacteria isolated from liver abscesses of cattle , therefor *C. pyogenes* and *S. aureus* were as secondary invaders.

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