

Ecotopic infection of cattle with Fasciola gigantica : parasitological and pathological studies

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Summary

Out of 1250 bovine fascioliasis , 10 cattle were found to have lung fascioliasis, one cow had abomasal fascioliasis and another one with renal fascioliasis.

The recovered flukes were identified as immature specimens of Fasciola gigantica .Gross and histopathology of the lesions were studied .The occurrence of Fasciola gigantica in kidney and abomasum was recorded for the first time .

Introduction

Infection with Fasciola gigantica is an important cause of disease and economic loss in domestic animals in many parts of the world . Among the effects attributed to fluke infection are loss of condition , reduced meat and milk production reduced fertility and rendering of livers unsuitable for human consumption . Severe infection may cause death either directly or indirectly by initiating or aggravating bacterial infection (1) . One of the reasons making F.gigantica more pathogenic than F.hepatica is frequent ecotopic occurrence of F.gigantica in most of the domestic animal species (1,2,3) .

Ectopic ovine F.gigantica infection was reported in spleen, lung, heart, diaphragm and portal vein, in addition the liver (4,5) . In cattle F.hepatica could only produce lesions in the liver but F.gigantica extended its pathogenic effects to the lung tissue (3,6) .

The aim of this study is to elucidate the occurrence of F.gigantica in organs other than the liver with parasitological and pathological investigation.

Materials and Methods

Organs of 1250 cattle infected with fascioliasis were examined for presence of Fasciola. These cattle were slaughtered in Shula and Doura abattoirs , Baghdad.

The technique used for recovery of flukes from the liver and other organs was as described by Boray (7). The differentiation between the species of Fasciola based on the criteria reported by (8). In addition portion of Infected liver lung and abomasum but not from kidney were sectioned and stained with H. and E. The recovered worms kept in physical saline then fixed in 10% formal saline and stained with acid carmine for identification .

Results

Parasitological Findings:

All worms isolated from infected organs ; liver , lungs, abomasum and kidney were identified morphologically and microscopically as immature forms of Fasciola.gigantica .

Pathological Findings:

Liver : grossly:-

Multiple dark tortuous tunnels 3 – 5 cm in length were seen on the surface of the liver , more over grossly examined liver also showed whitish firm branched cords. This cord is dilated and thickened bile ducts which contain large amount of mucoid yellowish green fluid , liver fluke and tissue debris.

Microscopically:-

Tissue section revealed necrotic tunnels in the liver parenchyma . These tunnels contain paired liver flukes , R B C , necrotic debris and P M Ns and granulation tissue which is rich by eosinophils that surround these tunnels . In other section , the glissons capsules was thickened by fibrous connective tissue with numerous small bile ducts embedded in fibrous tissue which extended through the liver parenchyma. Multiple area of vacuating degenerative and necrosis of liver cells were seen , together with multiple areas of so called nodular hyperplasia (regenerated hepatocytes) were also observed. Histological examination also showed cholangiohepatitis which was characterised by hyperplasia of epithelial lining of bile ducts with desquamation and ulcerative changes as well as diffuse fibrous connective tissue proliferation in the wall of bile ducts which lead to close their lumen . Calcification was also seen.

Lung :grossly :-

There were 1 – 3 firm of 1.5 – 2 cm dark red nodular lesion . It was present at the periphery of the right diaphragmatic lobe . The rest of the lung was congested.

Microscopic examination revealed necrotic tunnel in the pulmonary parenchyma adjacent to the bronchi . It contained free RBC, PMNs, necrotic debris and paired liver fluke (Fig:1)

The trunk was surrounded by macrophages , lymphocytes eosinophils and fibroblasts . Catarrhal bronchitis and bronchiolitis are also seen . The alveolar space and interlobular septa filled with free RBCs and proteinaceous fluid . In other section the alveolar space become crowded with alveolar macrophages with hemosidrin and PMNs together with hyperatrophy and hyperplasia of smooth muscle of blood vessels , bronchiole and alveolar ducts.

Abmasum: grossly :-

A swelling was found in the pyloric region of the abomasum 4.0 cm long and 1 cm wide which was open at one end with the posterior part of the fluke protruding outward (fig:2). The orifice of the swelling had been incised , a scanty blaskish – brown discharge exuded and sluggish motile fluke (3.5+0.5cm) emerged.

Histopathological examination of the abmasum section revealed that the normal cytoarchitecture of the abmasum Mucosa was altered by diffuse interstitial inflammatory cells Infiltration, plasma , cells and macrophages were the predominant cells together with eosinophils and lymphocyte (fig :3).

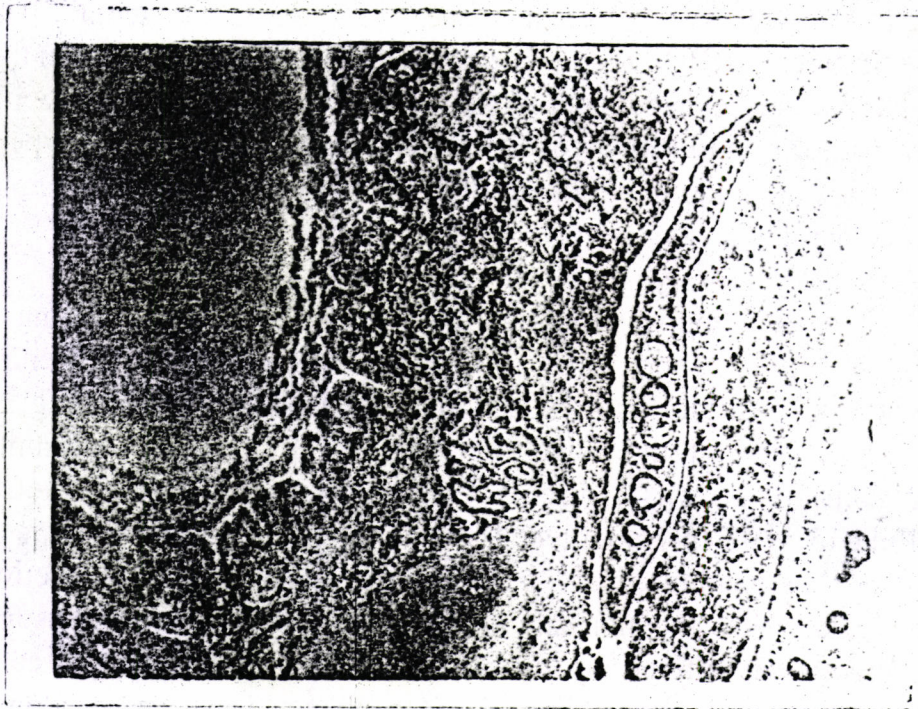


Fig. 1 : Lung of cattle showing necrotic tunnel adjacent to the bronchi containing RBC , PMNs , necrotic debris and a pair of liver fluke (H.E. 10X)

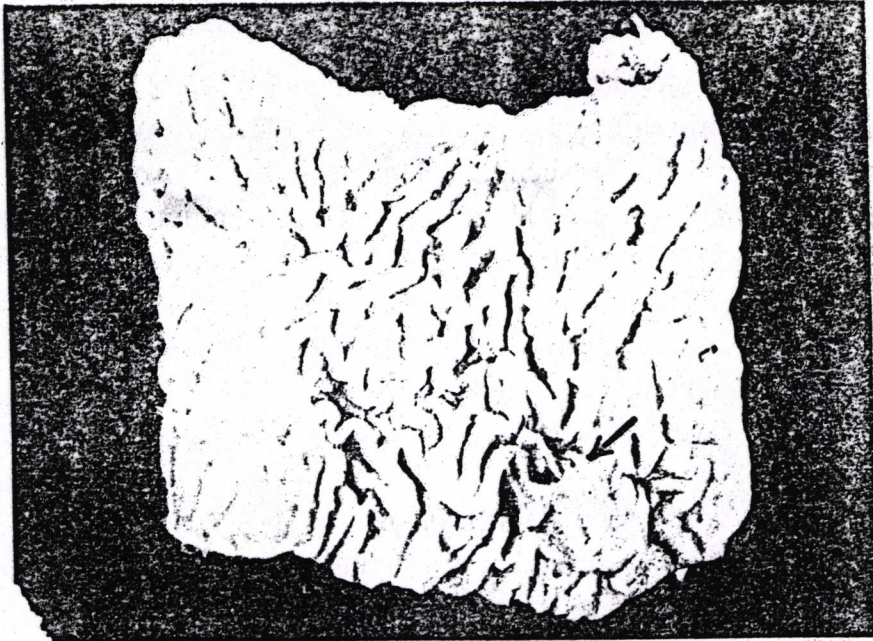


Fig.2. A swelling in the pyloric region of the abomasum , the posterior part of the fluke was protruded out ward.



Fig.3. Cross section of the abomasum showing diffuse interstitial cells

Congestion of blood with vessels and edema were observed in the lamina propria , hyperplasia of epithelial lining of the mucosal gland were seen . This lead to narrowing and occluding their lumen. However , affected mucosa showed comprised, elongate glands which lined by flat, columnar or cuboidal mucosal cells . Desquamation or erosion of the epithelial mucosa were also reported . In other section multiple aggregation of macrophage , histiocytic and lymphocyte were noticed as well as atrophy of some mucosal glands.

Discussion

Abberant migration of the flukes is more common in cattle and encapsulated parasite are often seen in the lung . The pathogenesis of liver fluke is similar to that in sheep but the added feature is calcification of the bile ducts and enlargement of the gall bladder (6).

The chronic form of the disease is the most important in cattle although acute and subacute diseases may occasionally occur under condition of heavy challenges especially in young calves (6). The lesions observed in the liver were agreed with that described in sheep and cattle (5,9,10).

The migratory pathway by which larval Fasciola reach their normal or ectopic sites mainly via the intestinal wall and peritoneal cavity .Very occasional migratory flukes find their way into central lobular vein and are carried by blood through the heart to the general circulatory system to reach different organs in the body .

Lesion induced by aberrant Fasciola are more common in bovine lung (6,11). It was most satisfactory that the fluke reached the abomasum from the liver via the bile duct to the small intestinal lumen returning forward till reach the pyloric region of the abomasum and penetrate the mucosa reaching the muscular layer and lodged their .

To lesser extent , this fluke reached the abomasum via the general circulation . This is more true for fluke infection to other organs .

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الإصابات الشاذة في الأبقار بطفيلي *Fasciola gigantica* دراسة طفيلية ومرضية

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الخلاصة

لقد تم تسجيل (10) حالات إصابة بطفيلي *Fasciola gigantica* في رنات الأبقار وواحدة في المعدة الرابعة والأخرى في الكلية من مجموع (1250) بقرة مصابة بهذا الطفيلي، لقد شخصت الديدان بعد عزلها بأنها من نوع *Fasciola gigantica* وتم دراسة الآفات المرضية في هذه الأعضاء عياناً ونسجياً وكانت الإصابة بهذا الطفيلي في الكلية والمعدة الرابعة لأول مرة .