



## Case Report

# Clinical and Histopathological Investigations on Inclusion Body Hepatitis in Chickens in the Ain Touta Area (Algeria)

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### ABSTRACT

This study describes peculiar cases of inclusion body hepatitis (IBH) and the results of histopathological approaches aimed at better detailing this condition. IBH is an acute disease of young chickens caused by fowl adenoviruses (FAdVs). An outbreak of acute mortality affected a flock of 12000 animals. Affected chickens showed ruffled feathers, depression, watery droppings and some of them limping. The most common pathological lesions seen on necropsy were pale, swollen and friable livers with sub capsular hemorrhages. On histopathological examinations, acute hepatitis is characterized by hepatic necrosis, with large basophilic intranuclear inclusion bodies. The histopathological results were characteristic for IBH caused by adenovirus infection.

**Keywords:** chicken, clinic, histopathology, inclusion body hepatitis.

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## INTRODUCTION

Inclusion body hepatitis (IBH) was first described in 1963 in the USA (Helmboldt and Frazier, 1963). Then after, the disease has been reported in many countries worldwide. It is a sporadic disease condition caused by several serotypes of fowl adenoviruses (Franco *et al.*, 1974; Ferran, 2000; Fitzgerald, 2008; Gomis *et al.*, 2006; Choi *et al.*, 2012; Dar *et al.*, 2012). The syndrome characterized by sudden death which may reach 10% in 3-4 days and usually returns to normal after 5 days from the onset of clinical signs. All ages of chickens were found to be susceptible even in immunological intact chicks during the first 2-3 weeks of life. Broiler chickens as young as 5 days of age developed IBH. Affected birds showed depression, watery droppings and some of them limping. Also they were weak on their legs and some had ruffled feathers (Grimes, 1978; Hess *et al.*, 2000; Villate, 2001; Zadavec *et al.*, 2011).

The present paper describes the disease outbreaks of IBH in the district of Ain Touta (East of Algeria) through investigations based on clinical, *post mortem* and liver histopathological examinations of affected broiler chickens.

## MATERIAL AND METHODS

### Area of Study

The following study was carried out in Ain Touta (Batna) in the East of Algeria. This region is known by its high density of poultry houses and produce about 30% of the national egg production. An acute mortality was observed in a chicken flock of 12000 animals in poultry house of Ain Touta (East of Algeria).

### Clinical Findings and Post Mortem Examinations

A high morbidity and mortality rate was observed. The broiler chickens were usually found dead but were occasionally seen in an extremely depressed condition shortly before death. Death occurred within few hours following initial observation of symptoms. Careful clinical examination revealed that water and food intakes were simultaneously reduced. Clinical examination was extended to the necropsy examination of death and some of euthanized broilers.

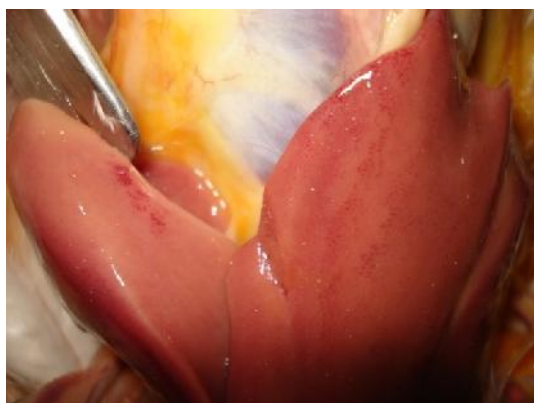
### Gross and Histopathological Examinations

Dead birds which had been brought for diagnosis were given detailed *post mortem* examinations. Liver fragments were collected and immediately in 10 % buffered formalin and to prevent autolysis and subsequent morphological changes. Tissues were washed to remove the formalin and dehydrated in increasing concentrations of ethanol followed by clearing and embedding using the xylene and paraffin respectively. Thin sections (6  $\mu\text{m}$ ) were made and stained with hematoxylin and eosin; according to the method described by Luna (1968) and Campbell (1995). All slides were carefully observed using the optic microscope (Axioskop 20; Carl zeiss). Histopathological observations were performed at the laboratory of histology in the Department of Veterinary Medicine (University of Batna), Algeria.

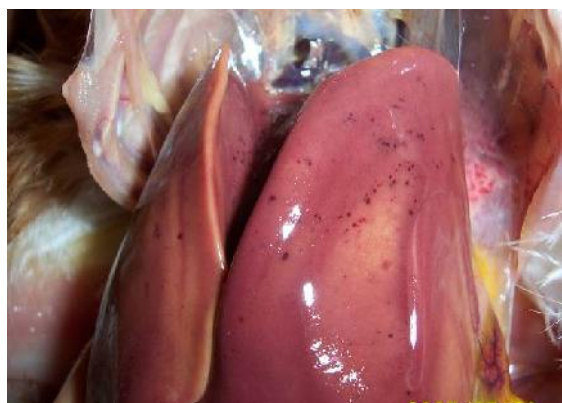
## RESULTS AND DISCUSSION

### Gross pathology

The most consistent findings in this condition were encountered in the liver. On gross examination, the appearance of the livers was very similar in all outbreaks. The liver is the primary organ affected in these birds which is enlarged, pale yellow with multiple petechial haemorrhages (Fig1a and 1b). The parenchyma of the liver was soft in consistency.



**Fig 1a: liver from infected chicken (hypertrophy and discoloration)**



**Fig 1b: petechial hemorrhages in liver**

In some cases, kidneys appeared swollen, small and pale due to deposition of urates. Skin and body fat were yellow in color. The bursa, spleen and thymus were considerably smaller than those in non affected chickens. Petechias were observed also in the abdominal fat and on members (Fig 2, 3).

The post mortem lesions observed during the present investigation were similar to those reported by (Howell *et al.*,1970; Grimes *et al.*,1978; Fitzgerald, 2000; Hess, 2011).



Fig 2: Petechiae on the abdominal grease

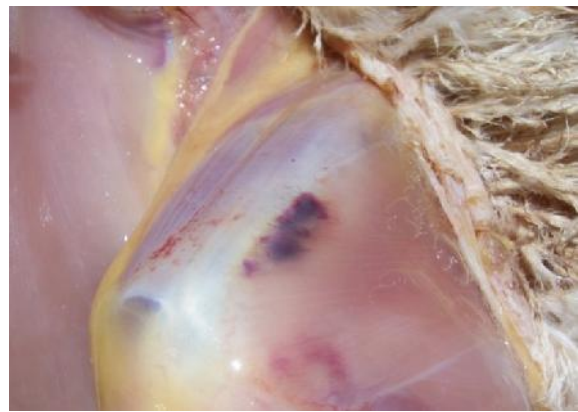


Fig 3: Petechiae on the members

### Liver histopathology

Hehmboldt and Frazier's term "hepatic catastrophe" to describe the severity of the changes observed in the liver. In the majority of cases, liver destruction was almost complete (Helmboldt and Frazier, 1963). Schonewille *et al.*, 2008; found that fowl adenovirus (FAdV) can also cause depletion of B and T cells in lymphoid organs.

Varying degrees of pyknosis, karyorrhexis and karyolysis were observed in the majority of the hepatic cells (Fig 4). Multiple subcapsular hemorrhages, multifocal groups of hepatocytes and lipid degeneration were also present.

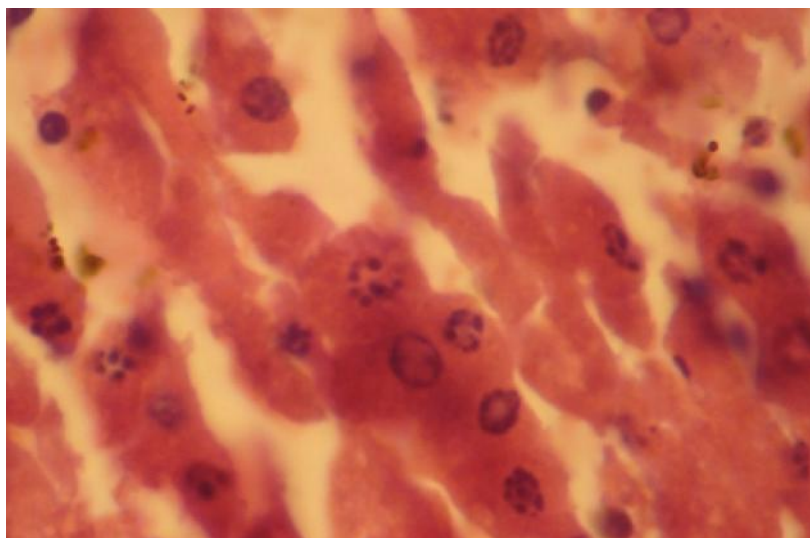
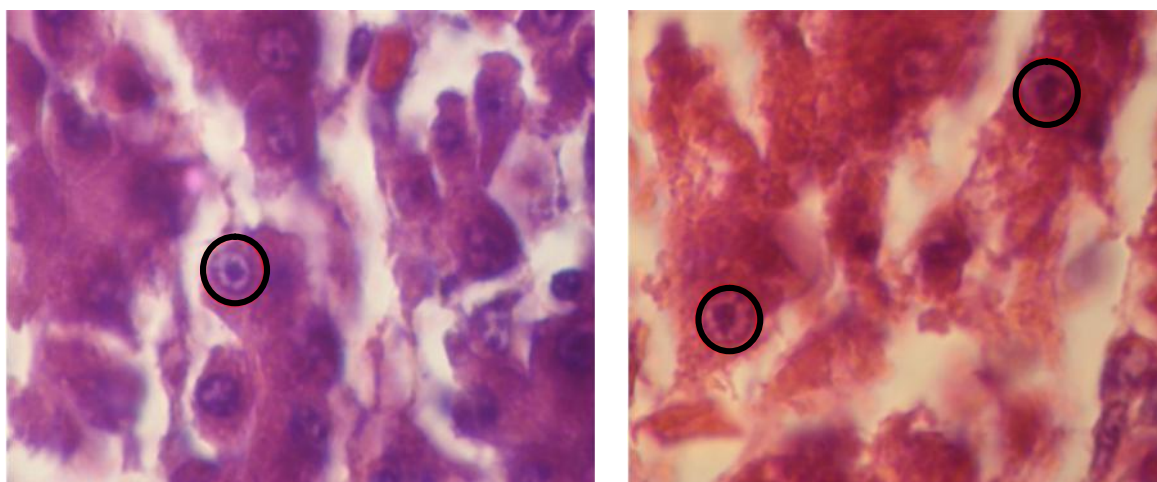


Fig 4: Hepatic cells with karyorrhexis and karyolysis (H&E X1000)

In some hepatic cells, swelling of the nuclei and margination of the chromatin were apparent. Large Cowdry Type A intranuclear inclusion bodies were noticed in many hepatocytes. They were surrounded by a clear halo and were irregular in outline. In some areas of the liver, inclusion bodies were very numerous (Fig 5).



**Fig 5: Hepatocytes with large basophilic intranuclear inclusion bodies (H&E X1000).**

## CONCLUSIONS

The use of histopathological technique is an easy way to confirm the diagnosis of IBH. In spite of the limited diffusion of the IBH in comparison with other avian pathologies (Gumboro Disease, Marek Disease and Newcastle Disease) but this disease has a high economic importance because the high mortality rate, contagiousness, the least use of the vaccines and the absence of an effective treatment against this disease. The only way to control this disease remains the prophylactic vaccination of broiler-breeder flocks and implementation of a strong biosecurity program on farms to prevent contamination of the broiler farms environment and poultries.

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