

**Diagnostic Confirmation and Treatment of *Hadjelia truncata*-  
Induced Parasitic Ventriculitis in Pigeons at Hathazari Livestock  
and Veterinary Hospital.**



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**Khulshi, Chattogram-4225, Bangladesh.**

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**A Clinical report submitted as per approved styles and contents**

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## Abstract

*Hadjelia truncata*, a nematode parasite, is a primary causative agent of parasitic ventriculitis in pigeons. This parasitic infection primarily targets the digestive tract, inducing significant damage to the gizzard. Two adult pigeons, exhibiting symptoms such as weight loss, diarrhea, and emaciation, were submitted for post-mortem examination at Hathazari Livestock Office and Veterinary Hospital, Chattogram, Bangladesh. Necropsy revealed an enlarged and distorted gizzard with undigested feed particles, minor hemorrhages indicative of parasitic ventriculitis. Microscopic examination of fecal samples identified embryonated eggs of *Hadjelia truncata*, confirming the parasitic infection as the cause of death. The parasitic ventriculitis were treated with ivermectin administered at a dose of 0.25 mg/kg for 3 consecutive days leading to a reduction in mortality and resolution of clinical signs. The farmer was also advised to ensure clean drinking water and fresh feed for the pigeons. This study underscores the importance of early diagnosis and targeted treatment for *Hadjelia truncata* infections in pigeons and highlights the need for ongoing research and management strategies to prevent the spread of parasitic diseases in commercial pigeon farming.

**Keywords:** *Hadjelia truncata*, Ventriculitis, Ivermectin, embryonated.

## Chapter-I: Introduction

The poultry industry is the most efficient and cost-effective source of animal protein in the shortest time, but it still struggles to close the gap between supply and demand due to the growing future need for protein. While commercial chicken farms satisfy present protein needs, consumer preferences for variety are driving a search for alternative, safe protein sources. As a result, pigeon farming is gaining traction as a method to fulfill this demand and promote economic development (Paul et al., 2016). In Bangladesh, 11% of the total pigeon population of 10.8 million birds were housed in commercial farms (Gupta et al., 2023). Bangladesh is a region with a tradition of raising domestic pigeons for meat (Paul et al., 2016). Pigeons can be infected with various diseases (viral, bacterial, fungal, and parasitic) that can be transmitted to humans and other birds (Albeshr et al., 2023). Parasitic diseases exhibited the highest prevalence (36%) among all infectious diseases investigated in Chattogram district (Akter et al., 2020). Parasitic disease includes ectoparasite and endoparasite. Investigations in the Chittagong district of Bangladesh revealed a high prevalence of ectoparasitosis (67%) and endoparasitosis (72%) among pigeons (Ghosh et al., 2014). A diverse range of helminths, such as cestodes, nematodes, and trematodes, are found to inhabit hosts internally as endoparasites. Nematodes, a group of helminth parasites, exhibit either direct or indirect life cycles.

*Hadjelia truncata*, a nematode belonging to the Habronematidae family, is a prevalent parasite found within the gizzards of pigeons (Alhadi & Awady, 2020). The nematode *Hadjelia truncata* has an indirect life cycle. The adult lesser mealworm beetle (*Alphitobius diaperinus*) serves as a natural intermediate host, facilitating the parasite's transmission. The larval stages of the nematode develop within the beetle's hemocoel (Alborzi & Rahbar, 2012). Definitive diagnosis of *Hadjelia truncata* infection can be achieved through gross examination of the gizzard after necropsy, where adult parasites reside beneath the koilin layer (Senties-Cué et al., 2011). Adult male parasites are typically 6 to 7 millimeters (mm) long, while females are much larger, ranging from 17 to 19 mm in length. Microscopic examination revealed distinct morphological features characteristic of the nematode. Two prominent trilobed lateral lips encircled the mouth at the anterior extremity. A relatively elongated, cylindrical pharynx was observed posterior to the mouth in both sexes. Females possessed a vulva located anteriorly on the body. The caudal

morphology exhibited characteristics typical of spirurid nematodes (Farah, 1988). Direct fecal smears revealed the presence of embryonated ova (Kelly et al., 2013). These parasitic infection in pigeon's manifests in various pathological effects, including stunted growth, reduced feed intake, diminished production, and overall performance decline. These consequences can translate into significant economic losses (Kelly et al., 2013). Clinical signs in pigeons infected with *Hadjelia truncata* often include anorexia, emaciation, and minimal to absent diarrhea. These may progress to terminal collapse and death. Gross examination reveals a prominent enlargement of the ventriculus (gizzard) (Oryan et al., 2016). Ivermectin and levamisole are commonly used medications for this condition (Jameel et al., 2016).

This study aimed to diagnose and treat *Hadjelia truncata* infection (infection with ventriculus worms) in pigeons which is commonly known as Parasitic Ventriculitis. While research on parasitic ventriculitis in Bangladeshi pigeons is limited, this case report may be the first to document it in Chittagong.

## **Chapter-II: Methods and Materials**

### **Study area**

The study was carried out at Hathazari Livestock Office and Veterinary Hospital, Chattogram, Bangladesh.

### **Study Period**

The study was conducted during the month of June, 2024.

### **Case Definition**

Two adult pigeons were submitted to the Hathazari Livestock Office and Veterinary Hospital for post-mortem examination by an owner. The owner had 12 pairs of adult pigeons and a number of them suffered a chronic disease exhibiting weight loss, diarrhea, general weakness etc.

### **Clinical Signs**

Weight loss, drooping of wings, Lethargy, Swollen crop, Emaciation, foul odor from droppings, diarrhea.

### **Post-Mortem examination**

The post-mortem of the pigeons were successfully done following the standard procedure starting with the visual inspection of external features or appearance such as skin color, plumage, feather condition for sign of disease. Then a V shaped incision was made along the ventral midline of the abdomen to open the body cavity and remove internal organs. Afterwards internal organs such as liver, lungs, heart, kidneys, gizzard, spleen etc. were examined for any sign of disease or abnormalities such as inflammation, hemorrhage or impaction.

### **Sample Collection**

Feces samples were taken from the affected pigeons and sent for microscopic examination at Hathazari Livestock Office and Veterinary Hospital.

### **Microscopic Examination**

Direct microscopic examination of the feces sample was conducted using a light microscope at the Hathazari Livestock Office and Veterinary Hospital. To identify the presence of any parasites or their developmental stages (eggs, larva) or any other organism within the feces samples, fresh feces were placed on microscope slide and mixed with a drop of water. Then the slide was subsequently examined under a light microscope at a magnification of 40x. This magnification allowed for detailed observation of the sample's microscopic composition, enabling the detection of any parasitic organisms or their associated reproductive structures.

### **Data Collection**

Clinical data, necropsy findings, and microscopic test results were obtained from the Hathazari Livestock Office and Veterinary Hospital for the study.



**Figure 1: Post-mortem of the affected pigeons**



**Figure 2: Microscopic observation of fecal sample direct smear**

## **Chapter-III: Results and Discussion**

The confirmatory diagnosis was established through the findings from the post-mortem and microscopic examination.

### **Post-mortem Findings**

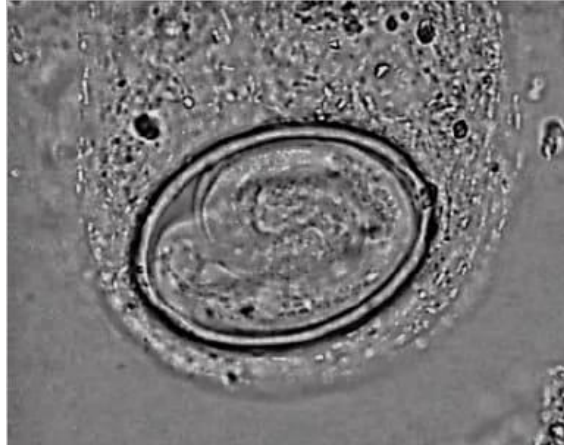
The post-mortem examination revealed notable alterations consistent with a diagnosis of parasitic ventriculitis as the cause of death in the affected pigeons. The most significant finding is the enlargement of the gizzard (ventriculus) walls, accompanied by structural distortion. Additional lesions consist of remnants of undigested substances within the gizzard. Furthermore, minor hemorrhages are observed at the periphery of the ventriculitis surface, while the inner lining of the gizzard exhibits erosion. This degradation appears to result from mechanical trauma potentially inflicted by the presence of parasite eggs or larvae within the gizzard contents. All other organs appeared to be normal. This study exhibits parallels with the findings of Razmi et al. (2007), as both the studies observed enlargement of the gizzard walls accompanied by distortion during necropsy. However, a key distinction between the two studies lies in the presence of nematodes; Razmi et al. (2007) reported a significant number of nematodes within the affected gizzards, whereas our necropsy findings revealed no live nematodes present in the gizzard. This study also aligns with the findings of Farah (1988), as both studies documented the presence of undigested feed particles and erosion of the inner layers within the gizzard. Nonetheless, there are notable differences between the two studies. A primary distinction is that our study identified small patches of hemorrhage at the margins of the ventriculus surface, a finding not reported by Farah (1988). Furthermore, while our necropsy results indicated that all other organs appeared normal, Farah's study noted that the livers exhibited variability, with some appearing normal or slightly enlarged, while others were fatty or displayed scattered dark focal lesions.



**Figure 3: Enlarged gizzard with undigested materials; minor hemorrhages at the periphery**

### **Microscopic findings**

Microscopic analysis of fecal samples from the affected pigeons revealed the presence of characteristic oval-shaped, embryonated eggs of *Hadjelia truncata*. This parasite is identified as the primary causative agent of parasitic ventriculitis in pigeons. The detection of these eggs is critical for understanding the pathology and implications of the infection in pigeon populations. This study parallels the findings of Albeshr et al. (2023), as both investigations identified embryonated eggs in the microscopic examination of direct fecal smears from pigeons. This observation corroborates the conclusion that *Hadjelia truncata* infection is the primary cause of death in those affected pigeons. While there are notable differences between the studies, the most significant contrast lies in the findings of Albeshr et al. (2023), who reported the presence of live nematodes in the affected gizzards. In their investigation, the parasites were cleared in lactophenol, allowing for detailed examination of various body parts under a light microscope. In contrast, our post-mortem examination revealed no live nematodes in the gizzards of the affected pigeons. They also employed more advanced diagnostic techniques, including molecular analysis through PCR, to diagnose *Hadjelia truncata* infection. An approach that was not utilized in our study.



**Figure 4: Characteristic embryonated egg of *H. truncata* in fecal sample**

## Chapter-IV: Treatment

All remaining pigeons belonging to the owner were treated with ivermectin at a dosage of 0.25 mg/kg body weight (Once daily) as a targeted therapeutic intervention for consecutive 3 days. Furthermore, the owner received comprehensive guidance on ensuring that the pigeons have access to clean drinking water and fresh feed. This advice is crucial, as these elements serve as primary sources of exposure to the infective larvae or eggs of *Hadjelia truncata*, thereby playing a significant role in the transmission of this parasitic infection. The owner implemented the prescribed treatment and recommendations, leading to a significant decrease in mortality among the pigeons. Furthermore, all other pigeons exhibiting similar symptoms were successfully cured within three days of treatment. This study parallels the work of Kelly et al. (2013), as both investigations employed ivermectin as a therapeutic intervention for *Hadjelia truncata* infections in pigeons. This study is also consistent with the findings of Jameel et al. (2016) regarding the use of ivermectin to treat *Hadjelia truncata* infections. However, a notable difference exists between the two studies: Jameel et al. (2016) additionally utilized an ethanolic suspension of *Calvatia craniiformis* alongside ivermectin to evaluate its efficacy against *Hadjelia truncata* and to compare it with ivermectin, which was the primary objective of their research.

## **Chapter-V: Conclusion**

This case report details the identification and treatment of *Hadjelia truncata* infection (parasitic ventriculitis) in pigeons. It outlines the clinical presentation, diagnostic procedures, and the therapeutic interventions used to manage this uncommon parasitic condition in avian species. The diagnosis was principally established through the postmortem examination findings, complemented by the identification of embryonated egg during the microscopic observation of a direct fecal smear. The infected pigeons were administered Ivermectin over a three-day period, with ongoing supportive care. In addition, recommendations were provided to ensure the availability of clean drinking water and fresh, uncontaminated feed to promote the birds' recovery.

## **Chapter-VI: Limitation**

Although the diagnosis was successfully established, the histopathological examination of the gizzard samples could have potentially provided more comprehensive and precise results, as the primary necropsy findings were localized in the gizzard. Unfortunately, we were unable to perform this analysis due to the limited resources at the Hathazari Livestock Office and Veterinary Hospital, which lacked the necessary facilities to properly preserve the samples. Furthermore, the absence of essential equipment, chemicals, and other requisite amenities hindered our ability to conduct the histopathological tests. However, there are significant opportunities for future research on parasitic ventriculitis, particularly with the availability of improved laboratory facilities and the advanced diagnostic tools and resources.

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## **Biography**

I am Sahriar Islam son of Mohammed Islam and Rina Akter born and raised in Hathazari, Chattogram. In pursuit of becoming a veterinarian, I began my studies at Chattogram Veterinary and Animal Sciences University in the Doctor of Veterinary Medicine program for the 2018-2019 academic year. Now, I'm gaining valuable hands-on experience as an intern student at the Faculty of Veterinary Medicine. In 2016, I graduated from Hathazari Parbati Model Government High School with my Secondary School Certificate. Two years later, in 2018, I earned my Higher Secondary Certificate from Hathazari Government College. The future of veterinary medicine holds immense significance for me. I envision myself working as a veterinary practitioner, ensuring the well-being of animals in diverse settings. Veterinary skills are crucial for not only treating sick animals but also preventing future health problems and promoting their overall well-being. Through my expertise, I hope to make a positive impact on the lives of animals and the human-animal bond.