

# Botulism Outbreak In Asian Elephants: Histopathological Findings At Necropsy



Paloma Jimena de Andrés Gamazo (pjandres@ucm.es)<sup>1</sup>; Esther Pavón<sup>2</sup>, Job Stumpel<sup>3</sup>, Tim Bouts<sup>4</sup>, Willem Schaftenaar<sup>5</sup>, Marja Kik<sup>6</sup>, María de los Ángeles Jiménez Martínez<sup>1</sup>

<sup>1</sup>Dept. Animal Medicine and Surgery; Veterinary School, Complutense University of Madrid, Spain; <sup>2</sup>La Reserva del Castillo de las Guardas, Seville, Spain  
<sup>3</sup>Wildlands Adventure Zoo Emmen, Emmen, The Netherlands; <sup>4</sup>Pairi Daiza, Brugelette, Belgium; <sup>5</sup>Diergaarde Blijdorp, Rotterdam, The Netherlands  
<sup>6</sup>Division of Pathology, Department of Biomolecular Health Sciences, 90051 Faculty of Veterinary Medicine, Utrecht University, The Netherlands.



## Introduction

● Six Asian elephants with severe, progressive clinical signs of dysphagia, hyporexia, weakness and recumbency died at a zoological facility within a 12-day period.

● After ruling out many diseases, a postmortem diagnosis of botulism was done based on **clinical signs observed in mice after the intraperitoneally inoculation of digestive content of deceased elephants or silage used to feed the animals, and the isolation of *Clostridium botulinum* from these samples.**

This case report aims to investigate the **histopathological lesions** caused by **botulism** in the Asian elephant.

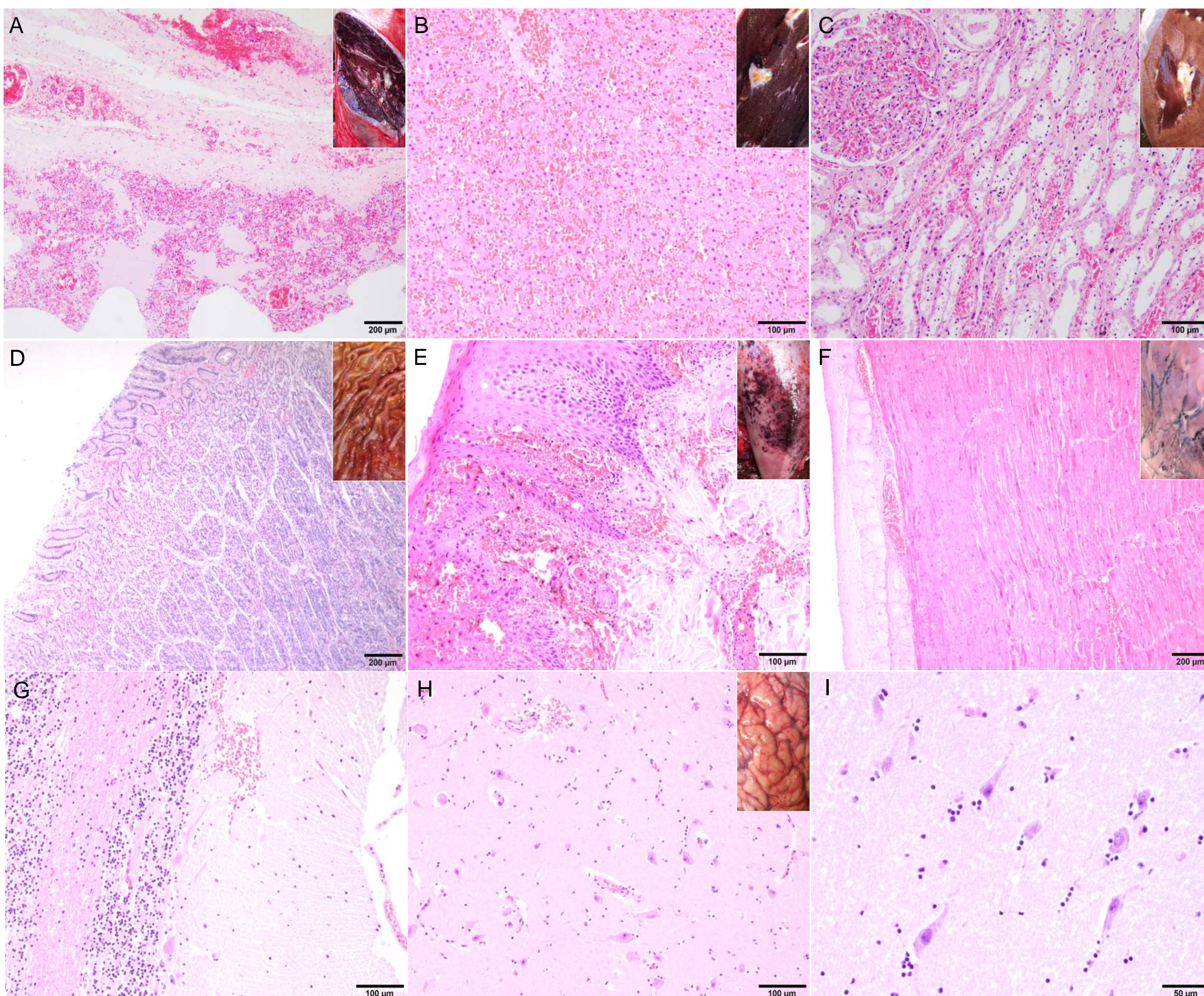
## Materials and Methods

Complete necropsies were performed and tissues from every organ system, including brain, were processed for histopathology at the:

- Pathology division, Department of Biomedical Health Sciences, Veterinary Medicine, Utrecht University, The Netherlands and the Zoo
- Wildlife Pathology Service of the Complutense Veterinary Teaching Hospital of Madrid, Spain.

Samples from the digestive system were processed for additional laboratory tests.

## Results and Discussion



A severe systemic **vascular disorder** with edema, congestion, hemorrhages, thrombi, and associated hypoxic degeneration and necrosis of affected tissues was observed.

The lung (A), liver (B), kidneys (C), gastrointestinal tract (D and E) and heart (F) were vastly affected.

Morphologic alterations of **nervous tissue** (G and H) were similar as described in the other organs and extremely unspecific. **Satellitosis** (I) was also observed in the cerebrum.

**No infectious agents** were noted within any of the examined tissues.

Figure 1. Histopathological lesions observed in the animals diagnosed with botulism. The main organs affected were lung (A), liver (B), kidney (C), stomach (D), oral mucosa (E), heart (F), cerebellum (G), and cerebrum (H and I). The corresponding macroscopic image has been added to the right upper corner of each histological image.

● It has already been described that toxins produced by *Clostridium botulinum* induce vascular alteration, congestion, vasogenic and interstitial edema in other species similar to what was observed here.

● Since the lesions observed were similar to those caused by Elephant Endotheliotropic Herpesvirus, it is important to rule out completely by molecular or other complementary assays this virus, given that intranuclear herpesviral inclusions are not always observed.

● Enterotoxemias caused by toxins from *Clostridium perfringens*, can produce similar vascular damage and neurological disorders. A definitive diagnosis can only be made by detection of botulinum toxin or any of the *C. perfringens* toxins in plasma, food, feces, etc.; as it was confirmed in this case.

## Acknowledgements:



> Asian Elephant EEP

> All the veterinarians and keepers who helped during the fateful episode.



Utrecht University