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Presumptive Anthrax Outbreak in an Organized Dairy Farm with Successful Survival Following Early Antimicrobial Intervention: A Field Case Report from Nepal

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***Abstract*-- Anthrax is a highly fatal zoonotic disease of livestock caused by *Bacillus anthracis*, frequently resulting in sudden death with limited opportunity for treatment. A presumptive outbreak of anthrax occurred in an organized dairy farm comprising 23 animals (Holstein Friesian cross and Jersey cross cows, heifers, and calves) at Gaidakot-8, Nawalparasi, Nepal, in 2017. The outbreak was characterized by sudden death of three animals, unclotted dark blood oozing from natural orifices, severe post-mortem bloat, incomplete rigor mortis, and smoky discoloration of vulvar mucosa and udder skin. One cow exhibiting acute illness was immediately treated with high-dose streptopenicillin, non-steroidal anti-inflammatory drugs, and fluid therapy, resulting in complete recovery. Hematological examination revealed leukocytosis with neutrophilia. Giemsa-stained peripheral blood smear demonstrated large rod-shaped bacteria morphologically consistent with *Bacillus anthracis*. An incidental finding of microfilaria was also observed. Post-mortem examination was avoided due to suspected zoonotic risk. This report emphasizes the importance of early clinical recognition and prompt antimicrobial intervention in presumptive anthrax cases under field conditions.**

***Keywords*-- Anthrax, *Bacillus anthracis*, dairy cattle, field case report, penicillin, Nepal**

I. Introduction

Anthrax is an acute to peracute infectious disease of domestic and wild animals caused by the spore-forming bacterium *Bacillus anthracis*.

The disease is of major veterinary and public health concern due to its high fatality rate and zoonotic potential. In cattle, anthrax commonly presents as sudden death accompanied by unclotted dark blood from natural orifices, severe bloating, and absence of rigor mortis. Because of its rapid course, successful treatment is rarely documented. The present report describes a presumptive anthrax outbreak in an organized dairy farm in Nepal, highlighting clinical features, laboratory findings, and successful therapeutic management of one affected cow.

II. Case History And Epidemiology

In 2017, an organized dairy farm (Samrat Agriculture & Livestock Farm) located at Gaidakot-8, Nawalparasi, Nepal, housing 23 animals (Holstein Friesian cross and Jersey cross cows, heifers, and calves), experienced sudden deaths of three animals within a short period. No history of trauma, poisoning, or recent vaccination was reported. One adult cow showed acute illness and was presented for clinical examination.

III. Clinical Findings

The affected cow exhibited dullness, anorexia, elevated rectal temperature (103.7°F), tachycardia, and increased respiratory rate. Dark, tarry, unclotted blood was observed oozing from the rectum and vulva. The vaginal mucous membrane and udder skin appeared smoky to dark in colour. Abdominal distension was evident. Similar gross features, including marked bloating and incomplete rigor mortis, were observed in animals that died suddenly.

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Figure 1. Unclotted dark blood oozing from the natural orifices (vulva/rectum) of a cow suspected of anthrax, a classical clinical sign of *Bacillus anthracis* infection.

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Figure 2. Marked abdominal distension and bloating observed shortly after death, with absence/incomplete rigor mortis in suspected anthrax cases.

IV. Laboratory Investigations

Blood samples collected from the affected cow were dark and failed to clot readily. Complete blood count revealed leukocytosis with neutrophilia, suggestive of acute bacterial infection. Total serum protein levels were within normal limits.

Microscopic examination of Giemsa-stained peripheral blood smear revealed large rod-shaped bacteria arranged singly and in short chains, morphologically consistent with *Bacillus anthracis*. An incidental finding of microfilaria was also detected.

Due to strong clinical suspicion of anthrax and associated zoonotic risk, necropsy was avoided and strict biosecurity precautions were followed.

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Table 1.
Hematological findings of the affected cow with presumptive anthrax

Parameter	Observed Value	Normal Reference Range (Cattle)	Interpretation
Hemoglobin (Hb)	↓ Mildly reduced	8–15 g/dL	Suggestive of acute systemic infection
Total Erythrocyte Count (TEC)	Slightly ↓	5–10 ×10⁶/µL	Possible hemolysis/toxemia
Packed Cell Volume (PCV)	Mildly ↓	24–46 %	Consistent with acute disease
Total Leukocyte Count (TLC)	↑ Elevated	4–12 ×10³/µL	Leukocytosis
Neutrophils (%)	↑ Increased	15–45 %	Neutrophilia – acute bacterial infection
Lymphocytes (%)	↓ Reduced	45–75 %	Stress leukogram
Monocytes (%)	Slight ↑	2–7 %	Inflammatory response
Eosinophils (%)	Normal	2–20 %	Within normal limits
MCHC	↓ Reduced	30–36 g/dL	Hypochromia, inflammatory condition
Total Serum Protein	Normal	6.7–7.5 g/dL	No severe dehydration

"The hematological profile revealed leukocytosis with marked neutrophilia, indicating an acute bacterial infection. Reduced MCHC suggested hypochromic changes associated with systemic inflammatory response."

Table 2.
Peripheral blood smear observations (Giemsa stain)

Finding	Observation
Red blood cells	Mild anisocytosis
White blood cells	Predominantly neutrophils
Bacterial morphology	Large rod-shaped bacilli, singly and in short chains
Bacterial consistency	Morphologically consistent with *Bacillus anthracis*
Blood clotting	Absent / delayed
Additional finding	Microfilaria present (incidental)

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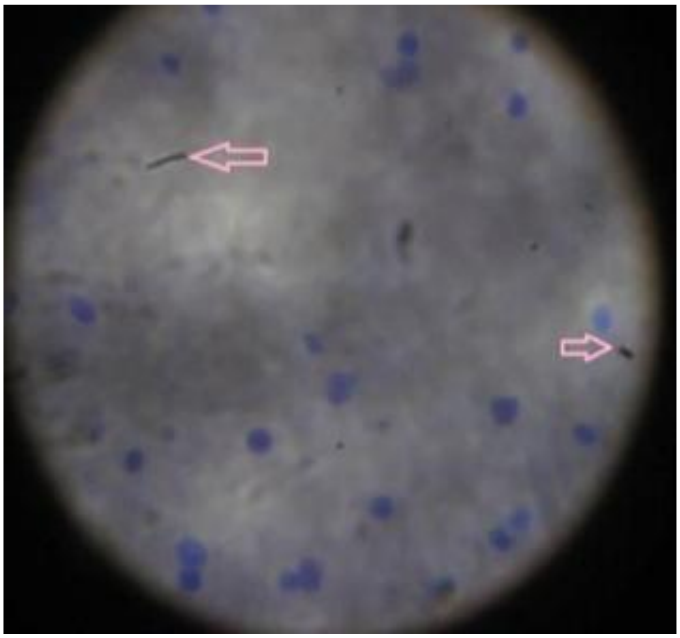

Figure 3. Giemsa-stained peripheral blood smear showing large rod-shaped bacteria arranged singly and in short chains, morphologically consistent with *Bacillus anthracis* (oil immersion, 100×).

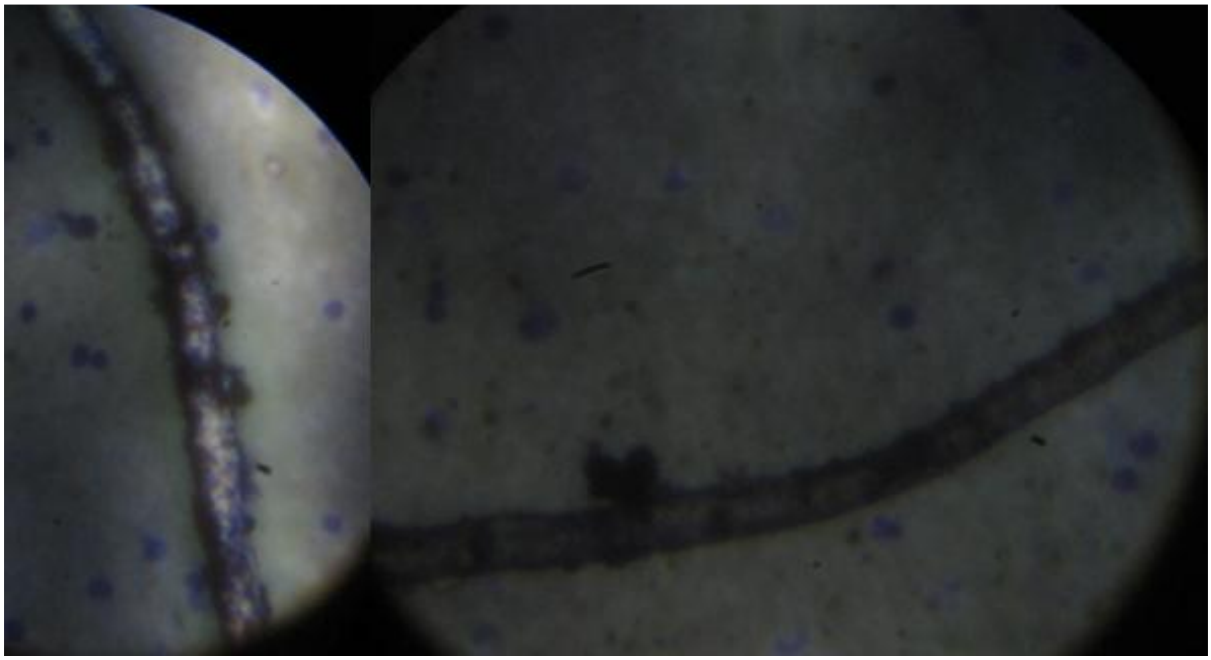

Figure 4. Incidental finding of microfilaria observed in the peripheral blood smear of the affected cow (Giemsa stain, 40×).

"Post-mortem examination was not performed due to strong suspicion of anthrax and associated zoonotic risk, and strict biosafety precautions were followed.

V. Therapeutic Management And Outcome

The affected cow was immediately treated with high-dose Streptopenicillin (5 g intramuscularly), non-steroidal anti-inflammatory drugs, and intravenous fluid therapy.

Treatment was continued for three consecutive days. Marked clinical improvement was observed from the following day, with restoration of appetite and normal posture. The animal made a complete recovery.

VI. Discussion

The clinical presentation and epidemiological pattern in the present outbreak were highly suggestive of anthrax. Sudden death, unclotted dark blood oozing from natural orifices, severe bloat, and absence of rigor mortis are classical features of anthrax in cattle. Microscopic observation of large rod-shaped bacteria consistent with *Bacillus anthracis* provided supportive evidence, although definitive confirmation requires specialized diagnostic tests. The incidental presence of microfilaria was considered unrelated to the acute disease process.

Penicillin is known to be effective against *B. anthracis* when administered early, before overwhelming toxemia develops. The successful recovery of the affected cow in this case underscores the importance of early clinical recognition and prompt antimicrobial therapy in suspected anthrax cases under field conditions.

VII. Conclusion

This report documents a presumptive anthrax outbreak in an organized dairy farm in Nepal, with successful survival of one affected cow following early antimicrobial intervention.

The case highlights the need for rapid clinical diagnosis, immediate treatment, and strict biosafety measures while handling suspected anthrax cases, particularly in resource-limited settings.

Acknowledgement

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Conflict of Interest

The author declares no conflict of interest.

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