Case Report

Case Report of Bovine Ephemeral Fever in Babylon Governorate, Iraq: Clinical Presentation and Treatment

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Abstract | This report describes a clinical case of bovine ephemeral fever (BEF) in an adult cow. BEF is an acute, self-limiting viral disease of cattle characterized by sudden fever, muscle stiffness, lameness, and general lethargy. Symptoms appeared acutely, centered on the right hind limb, with the cow raising its leg off the ground and experiencing difficulty moving and standing. After clinical examination and excluding mechanical and neurological causes, the initial clinical diagnosis was made as BEF. Based on this, treatment was initiated with: Long-acting oxytetracycline (LAO) at a typical dose of 20 mg/kg intramuscularly (IM), repeated after 3 days. Diclofenac sodium (Voltaren) at a dose of 2.5 mg/kg intramuscularly once daily for 3 days as an anti-inflammatory and analgesic. Dexamethasone, a single dose of 0.04–0.1 mg/kg IM, was used as a steroid anti-inflammatory. The cow responded gradually to treatment and began showing signs of improvement within 48 hours, regaining the ability to bear weight on the affected limb and improving her appetite and general activity. Clinical recovery was completed in less than five days without complications. This case highlights the importance of early therapeutic intervention in BEF to alleviate symptoms and reduce downtime and productivity, despite the self-limiting nature of the disease. It also confirms the effectiveness of the treatment protocol used in promoting recovery.

Received | June 22, 2025; **Accepted** | July 08, 2025; **Published** | July 28, 2025
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Citation | Mosa, A.H., 2025. Case report of bovine ephemeral fever in Babylon Governorate, Iraq: Clinical presentation and treatment. *Hosts and Viruses*, 12: 129-134.
DOI | https://dx.doi.org/10.17582/journal.hv/2025/12.129.134
Keywords: Bovine, Virus, Fever, Iraq, Ephemeral

Introduction

Bovine ephemeral fever (BEF) is an acute viral disease of cattle, causing direct and indirect economic losses in the livestock sector, particularly in areas with high insect density and hot climates. Also known as "three-day fever" due to its short duration, the disease is generally not fatal, but it leads to a decline in cow production, including milk production, increased abortion rates, and decreased fertility rates. It also affects animal movement due to muscle stiffness and temporary lameness (Zhang *et al*., 2021; Tazawa *et al*., 2020). The virus causing the disease is Bovine Ephemeral Fever Virus (BEFV), a member of the Rhabdoviridae family. It is transmitted by blood-sucking insects such as mosquitoes and biting flies, making it a seasonal disease, with outbreaks occurring mainly during spring and summer in the Middle East, the Indian subcontinent, and North Africa (Walker *et al*., 2023). The disease is often diagnosed clinically by characteristic signs, such as sudden fever, joint stiffness, muscle weakness, and lameness, and some cases may progress to death if respiratory or neurological complications occur, especially in weak cows or those that do not receive appropriate supportive treatment (Liu *et al*., 2022). The development of clinical symptoms in BEF depends on the complex interaction between the virus and the host. The virus induces acute inflammation in the muscles and joints, resulting in the release of inflammatory mediators such as prostaglandins and cytokines, which cause fever, pain, and motor rigidity (Bai *et al*., 2023). Symptoms typically begin with a rapid rise in temperature, which may exceed 41°C, accompanied by severe lethargy, cessation of eating, and stiffness of the neck and back. The condition may progress to lameness in the hind limbs due to involvement of the axial muscles and pelvic girdle. Infection may be unilateral or bilateral, and transient joint swelling or muscle tremors are sometimes observed. The incubation period is short, ranging from two to four days, while symptoms typically last between 3–6 days unless complications occur (Kumagai *et al*., 2021). Another important characteristic of the disease is its rapid response to supportive treatment, with cows gradually returning to normal production within a short period. This is clearly observed in cases that receive anti-inflammatory and antipyretic medications early (Abdullah *et al*., 2024). There are no specific antivirals for the virus, so treatment relies on alleviating symptoms and preventing secondary infection, which increases the importance of early diagnosis and rapid response to the clinical condition. The diagnosis of BEF in field settings relies primarily on the animal's medical history and characteristic clinical manifestations such as acute fever, muscle stiffness, lameness, and sudden weakness, particularly in the absence of obvious localized signs of infection or skin or neurological lesions. While clinical examination is often sufficient to establish a preliminary diagnosis, confirmation requires laboratory techniques such as polymerase chain reaction (PCR) testing to detect viral nucleic acid, or the use of ELISA to detect antibodies in advanced cases (Bai *et al*., 2023; Al-Salihi *et al*., 2022). A blood test can also sometimes reveal an elevated white blood cell count or changes in acute protein levels, but these changes remain nonspecific. Given the unavailability of diagnostic tests in some rural areas, clinical diagnosis, supported by response to treatment, remains an effective tool in the field. Treatment relies on the use of nonsteroidal anti-inflammatory drugs (NSAIDs) (such as Voltaren and diclofenac sodium) to reduce pain and inflammation, in addition to steroidal anti-inflammatory drugs (SAIDs) such as dexamethasone in moderate to severe cases. A broad-spectrum antibiotic such as oxytetracycline is also recommended to prevent secondary bacterial infections, especially given the potential for temporary immune suppression caused by the disease (OIE, 2021). Typical doses are as follows: Oxytetracycline 20 mg/kg intramuscularly, Voltaren 2.5 mg/kg daily for 3 days, and dexamethasone at a dose of 0.04–0.1 mg/kg once, along with improved ventilation and provision of clean water and feed during the recovery period (Walker *et al*., 2023). Although BEF is considered a self-limiting viral disease in most cases, its economic impact on the livestock sector is significant, especially in developing countries where farmers rely on milk and meat production as their primary source of income. Direct economic losses include a decrease in milk production of up to 50% during the disease period, delayed calf fattening, decreased fertility, and increased abortions in pregnant cows with fever and general weakness (Mahmoud *et al*., 2022). Indirect losses include treatment costs, reduced market value of affected animals, additional labor burden for caring for infected cases, and disruption to animal use in agricultural activities (Liu *et al*., 2022). Epidemiologically, the disease is characterized by a seasonal onset that coincides with the seasons of vector activity, particularly in areas with warm climates and high humidity, making cattle in these environments susceptible to recurrent infection (Walker *et al*., 2023). Reports from the Middle East and North Africa indicate that the disease has recurred as an epidemic in some years, particularly in unvaccinated or high-density herds (Al-Salihi *et al*., 2022). Controlling vector insects and implementing preventive vaccination strategies are essential factors in reducing the spread of the disease, especially in endemic areas or areas adjacent to infection hotspots. Field veterinarians play a pivotal role in monitoring and diagnosing BEF cases through careful clinical examination and differentiating between this condition and other clinically similar diseases, such as mycobacterial sepsis, bacterial arthritis, or hemorrhagic fever. Early observation and response skills are among the most important tools in a veterinarian's hands, as early diagnosis contributes to improving treatment effectiveness, reducing production disruptions, and preventing the spread of the disease within the herd (Zhang *et al*., 2021). It is important to train veterinary personnel to quickly recognize signs of the disease and implement supportive treatment protocols using anti-inflammatories and antibiotics, especially in areas lacking advanced laboratory diagnostic methods (Mahmoud *et al*., 2022). In addition, reporting suspected or confirmed cases is the responsibility of veterinarians to activate epidemiological surveillance systems and assess the extent of the disease, especially in countries that are livestock transit areas or have high levels of transmission.

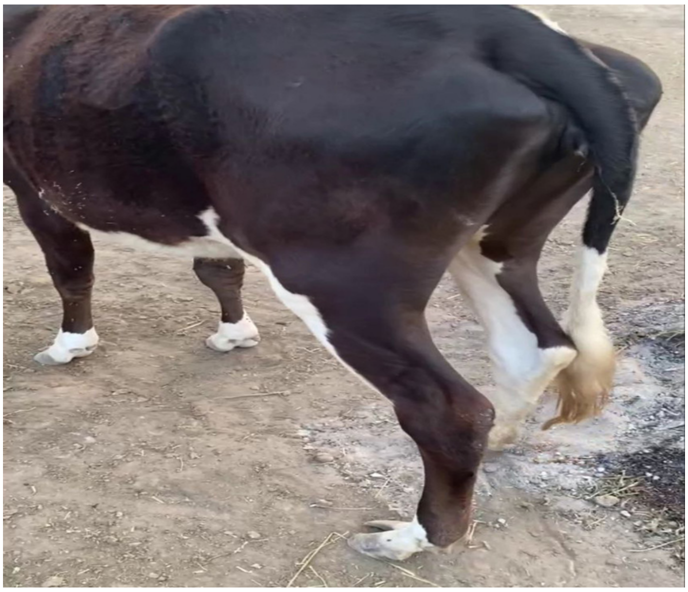

Figure 1: *A cow showing clinical signs of Bovine Ephemeral Fever, including stiffness, reluctance to move, and apparent discomfort.*

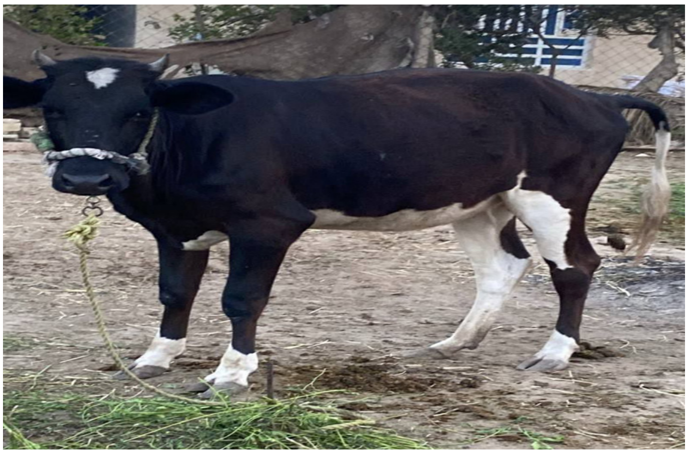

Figure 2: *Post-recovery from Bovine Ephemeral Fever: the cow is back to normal activity and in good health following successful treatment.*

Case presentation

In April 2025, a clinical case was reported at a dairy farm in Babylon Governorate, Iraq. The four-year-old Holstein cow was used for dairy production. Prior to the incident, the cow was in good health and was fed a balanced diet including concentrate, green fodder, and clean water. She was also regularly vaccinated against common diseases. On the day of the report, the farmer noticed that the cow was exhibiting unusual symptoms, including a sudden increase in temperature, lethargy, loss of appetite, and pronounced lameness in the forelimbs, in addition to profuse salivation. The symptoms began suddenly and without warning, with fever being the first noticeable sign, with a body temperature of 40.8 °C. This fever was attributed to a possible viral or acute inflammatory infection. Other signs included an arched back, pronounced stiffness in the limbs, and the animal's reluctance to move or eat. There were no external signs of injury or visible wounds, and the cow showed no signs of mastitis or digestive problems. On clinical examination, mild edema of the forelimb joints, decreased joint mobility, and tenderness were observed. The animal was immediately isolated in a pen separate from the rest of the herd to prevent the possibility of infection. According to the medical history, there had been no similar cases in the herd during the previous two weeks, but an increase in flying insects, particularly biting flies and mosquitoes, was observed, raising the suspicion of an insect-borne viral disease such as bovine ephemeral fever (BEF). A veterinarian was called, and a thorough clinical examination was performed. PCR testing or laboratory diagnosis was not available on site, but based on the clinical signs, geographical distribution, and environmental conditions (particularly high temperatures and increased humidity), a tentative diagnosis of BEF was made. Foot-and-mouth disease was ruled out due to the absence of oral blisters or hoof infections, and bacterial arthritis was ruled out due to the acute and sudden onset of the disease. An immediate treatment protocol was initiated on the same day. A broad-spectrum antibiotic (oxytetracycline) was administered intramuscularly at a dose of 20 ml, repeated after 72 hours, to control secondary bacterial infections that may be exacerbated by immunosuppression. A nonsteroidal anti-inflammatory drug (diclofenac sodium - Voltaren) was also administered daily for three days to reduce fever and alleviate muscle pain. Additionally, a single 10 ml dose of dexamethasone was used intramuscularly as an anti-inflammatory agent and inhibitor of the overactive immune response. After the first dose, the cow showed a slight improvement in appetite and a gradual decrease in temperature. By the second day, she began to move with limited movement. By the end of the third day of treatment, her temperature had returned to normal (38.5 °C), and the cow gradually regained activity and began eating acceptable amounts of food. Salivation stopped, and the lameness gradually improved until it disappeared by the end of the week. After the apparent improvement in the condition during the first three days of treatment, the animal was closely monitored, with twice-daily temperature checks, appetite, movement patterns, and milk production. It was noted that the temperature remained stable within the normal range of 38.3–38.7 °C, with no new elevations recorded. The cow also began to show greater interest in food and resumed consuming concentrate and green fodder normally, indicating a recovery of the digestive system. In terms of movement, the lameness gradually improved until it completely disappeared on the sixth day from the onset of symptoms. The lameness in this case was associated with myositis and temporary arthritis resulting from the virus's effect on muscle tissue and small joints. No physical support or surgical intervention was used, as the cow responded well to supportive treatment based on anti-inflammatory and antibiotics. Milk production was also monitored, which had decreased by 70% during the first two days of illness. As the condition improved, production gradually increased until it reached 90% of normal levels by the second week. This is common in cases of BEF, as the virus does not directly infect the udder, but rather indirectly through fever and lethargy. During the convalescence phase, the cow was supported with high-quality nutrition rich in vitamins and minerals, especially vitamins C and E, and selenium, to stimulate the immune system and help the body rebuild affected cells. Probiotics were also added to the feed to improve digestion and restore the microbial balance in the gut, especially after antibiotic use. Behaviorally, the cow was observed to be more responsive to the farmer and interacting normally with the herd. She showed no signs of aggression or isolation, indicating a return to her psychological and physical health. The veterinary care program was complemented by a follow-up visit 10 days after the onset of symptoms, during which clinical examinations confirmed the disappearance of all signs of illness. To determine the extent of the disease or the possibility of additional cases, a clinical survey was conducted on several cows in the same pen. No new infections were recorded, supporting the fact that early isolation and rapid therapeutic intervention helped prevent the spread of the virus to the rest of the herd. Environmental control measures have also been intensified by spraying barns with insecticides to eliminate potential vectors, especially mosquitoes and biting flies. Despite the lack of a laboratory diagnosis, the clinical accuracy of the assessment and the correlation of the signs with environmental factors and insect vectors helped establish the correct preliminary diagnosis. The positive response to treatment confirmed this diagnosis. It is worth noting that laboratory diagnosis is important for documenting epidemic cases, but in field veterinary settings, the clinician often relies on clinical and sensory evidence to make treatment decisions. This case serves as a model for dealing with emergency cases of BEF in rural areas, where resources are limited, but clinical knowledge and appropriate therapeutic intervention are the cornerstone of effective disease management.

Discussion

Bovine effluent (BEF) is an acute viral disease of cattle. It has a significant economic impact, especially in areas characterized by warm and humid climatic conditions that encourage the spread of vector insects such as mosquitoes and biting flies (Walker *et al*., 2023). The clinical case presented illustrates a typical disease pattern, with acute symptoms including muscle stiffness, lameness, and sudden fever, typically appearing over a short incubation period of two to four days (Kumagai *et al*., 2021). These symptoms highlight the acute immune response of the virus to muscle and joint tissue, causing inflammation and the release of prostaglandins and cytokines that lead to fever and muscle pain (Bai *et al*., 2023). Rapid response and early treatment are critical factors in improving clinical outcomes and reducing convalescence. The use of antibiotics such as oxytetracycline in this case, despite the fact that the disease is viral, is justified to prevent secondary bacterial infections that could exploit the animal's temporarily weakened immune system, a point agreed upon in recent literature (OIE, 2021). Nonsteroidal anti-inflammatory drugs (NSAIDs) such as diclofenac play an important role in relieving pain and reducing the inflammatory response, which improves the animal's mobility and reduces its suffering (Abdullah *et al*., 2024). Corticosteroids such as dexamethasone are used as adjunctive therapy in moderate to severe cases to reduce acute inflammation and control the immune response. This has proven effective in reducing the duration of the disease and improving recovery (Mahmoud *et al*., 2022). From a diagnostic perspective, relying on a careful clinical examination and distinguishing between similar diseases such as bacterial arthritis or neurological diseases is essential in the field, especially in areas lacking advanced laboratories (Al-Salihi *et al.*, 2022). This is due to the importance of rapid therapeutic intervention, as delayed diagnosis can lead to the development of serious complications, including pneumonia or neurological complications, which may increase mortality rates (Liu *et al.*, 2022). Therefore, training veterinarians and agricultural workers on early recognition of disease symptoms, such as acute muscle stiffness, sudden lameness, and high fever, increases the chances of successful treatment and reduces the spread of the disease (Zhang *et al.*, 2021). The economic impact of BEF is not limited to direct losses resulting from decreased milk production and delayed calf growth, but also includes treatment and care costs, in addition to indirect losses such as decreased fertility and increased abortion rates (Mahmoud *et al.*, 2022). Studies indicate that the decline in milk production can reach 50% during the disease period, significantly impacting the income of farmers, especially in developing countries that rely on livestock as a primary source of livelihood (Liu *et al.*, 2022). Furthermore, lameness and muscle stiffness reduce cattle's mobility, hindering their participation in agricultural and pastoral work, thus adding an additional burden to their owners (Zhang *et al.*, 2021). From a disease control perspective, the greatest challenge remains reducing exposure to the virus by controlling vector insects, especially during the spring and summer seasons when these insects are at their peak (Walker *et al.*, 2023). Measures such as the use of insecticides, improved ventilation, and maintaining farm hygiene can play an important role in reducing infection rates (Al-Salihi *et al.*, 2022). In addition, vaccination programs are an effective preventive strategy in endemic areas, as modern vaccines have shown good protection rates and reduced the severity of epidemics (Tazawa *et al.*, 2020). However, vaccination programs face logistical and technical challenges in some remote or high-density areas, calling for further efforts to expand vaccination coverage and educate farmers (Mahmoud *et al.*, 2022). The clinical situation also highlights the importance of epidemiological surveillance and prompt case reporting, as this can help reduce disease outbreaks and improve control, especially in areas considered animal corridors or virus transmission centers (Al-Salihi *et al.*, 2022). Collaboration between veterinary authorities and government agencies is vital to activate early warning systems and provide the necessary support to farmers, in addition to promoting scientific research to understand disease spread dynamics and methods of resistance (Zhang *et al.*, 2021). Overall, this discussion emphasizes that although BEF is a self-limiting disease in most cases, its impact on animal health and production cannot be ignored. Early diagnosis and integrated treatment with anti-infectives and prophylactic antibiotics are essential factors in improving disease outcomes and reducing economic losses (Abdullah *et al.*, 2024). There is also a pressing need to develop and strengthen prevention programs, including vector control and expanded vaccinations, along with continuous training for veterinary personnel (Walker *et al.*, 2023). Finally, achieving effective control of BEF requires a comprehensive approach that combines early diagnosis, effective treatment, prevention, and ongoing awareness-raising. Integrating these factors will contribute to reducing the economic and social burdens on rural communities that rely heavily on livestock and enhance the sustainability of milk and meat production, which will positively impact food security and agricultural development (Mahmoud *et al.*, 2022).

Conclusion

Bovine ephemeral fever (BEF) represents a significant health and economic challenge to the livestock sector, especially in tropical regions with high insect densities. Early diagnosis and prompt treatment with anti-inflammatories and prophylactic antibiotics improve the chances of recovery and reduce production downtime. Although the disease is self-limiting in most cases, its impact on milk production, fertility, and the agricultural economy is significant. Insect control and vaccination are key strategies to limit the spread of the disease. Supporting veterinary training and epidemiological surveillance are essential to improve control and reduce losses associated with this disease.

Acknowledgement

The author gratefully acknowledges the support of the Veterinary Teaching Hospital staff at Al-Qasim Green University for their assistance during the clinical examination and treatment. Appreciation is also extended to colleagues in the Department of Internal and Preventive Medicine for their valuable input.

Novelty Statement

This is the first reported case of bovine ephemeral fever in Babylon, Iraq, successfully treated with a combined protocol of oxytetracycline, diclofenac, and dexamethasone, highlighting the value of early interventi

Conflict of interest

The author has declare that there are no conflicts of interest that might influence the results or interpretation of this research work or clinical report.

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