

ABSTRACT

Foot and mouth disease (FMD) has been one of the most important epizootic diseases in several cloven-hoofed animals including buffaloes, causing severe economic losses in Vietnam. This study aimed at observing clinical indicators, physiological parameters, haematological and blood chemistry values of 30 buffaloes naturally infected with FMD virus (FMDV). The study was undertaken from January 2015 to February 2016 in Hanoi, Vietnam. Results show that buffaloes infected with FMDV displayed significantly higher fever, increased respiratory rate and increased heart frequency compared to healthy animals. Moreover, FMDV-infected animals always showed high fever and vesicular stomatitis, often showed edging nail congestive inflammation and, sometimes only, blisters on the nipple. Haematological indicators showed that FMDV-infected buffaloes were dehydrated (increased total protein). Besides, infected animals also underwent anaemia as mean corpuscular haemoglobin and mean corpuscular haemoglobin concentrations were plummeted. Total white blood cell count plummeted too, especially the number and proportion of neutrophils. Meanwhile, the number and proportion of lymphocytes sharply increased compared to healthy animals. Infected buffaloes also displayed signs of liver and heart damages as judged by an increase in concentration of AST and ALT, while there was not renal damage since creatinine concentration remained stable.

BACKGROUND

Buffaloes- high value live stock animals but vulnerable to FMD



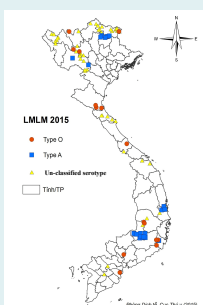
Buffaloes at Cho U (Do Luong, Nghe An) - the most dynamic buffalo market in southwest Asia



Free grazing buffaloes in Hanoi, Vietnam



Buffalo: an important means for agricultural production



FMD epidemiological map 2015 (source: Division of epidemiology, Department of animal health)

OBJECTIVE

- 1) To identify clinical symptoms in FMDV-infected buffaloes;
- 2) To identify alterations in hematology of FMDV-infected buffaloes;
- 3) To identify alterations in some blood chemical parameters of FMDV-infected buffaloes.

METHODS

- FMDV-infected buffaloes were confirmed by both clinical examination and RT-PCR using primers: FMDV-VP1R: CATGTCTCTGTCATCTGGTT and FMDV-AS1F: GCGSTHRYCACACAGGYCCGG to detect the virus in swab samples.
- Blood samples were collected from jugular veins from 30 infected animals (20 female and 10 male buffaloes) ranging from 2 to 5 years old during an acute onset of FMD.
- Hematology and blood chemistry were identified by using a 32-parameter hematology analyzer - Pentra DF Nexus and a DxCAU 700 automated chemistry analyzer.
- Statistical analysis was done using GraphPad Prism® version 5.0 software (California, USA). One-way analysis of variance (ANOVA) followed by Newman-Keuls posthoc test was used to compare data sets between healthy and infected buffaloes. Statistically significant at a value of $p < 0.05$.

RESULTS

CLINICAL ALTERATIONS IN FMDV-INFECTED BUFFALOES

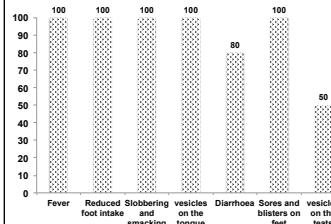


Figure 1: Common clinical symptoms of FMDV-infected buffaloes

Data was presented in percentage of FMDV-infected animals manifesting with the clinical symptoms (n = 30 FMDV-infected buffaloes).

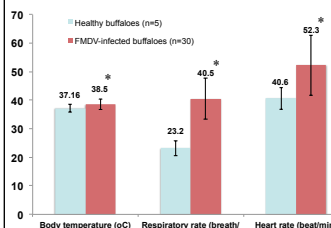


Figure 2: Body temperature, respiratory and heart rate of FMDV-infected buffaloes

Data was presented in mean \pm SD. Asterisks indicate the significant difference compared to healthy group ($p < 0.05$).

RESULTS (continued)

HAEMATOLOGICAL AND BLOOD CHEMISTRIAL ALTERATIONS IN FMDV-INFECTED BUFFALOES

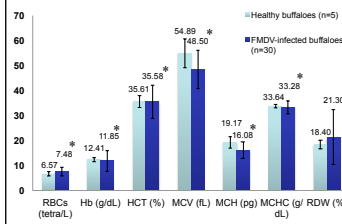


Figure 3: Alterations of red blood cells in FMDV-infected buffaloes

Data was presented in mean \pm SD. Asterisks indicate the significant difference compared to healthy group ($p < 0.05$).

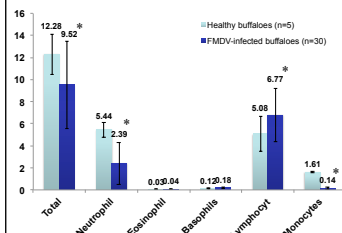


Figure 4: White blood cell counts in FMDV-infected buffaloes

Data was presented in mean \pm SD. Asterisks indicate the significant difference compared to healthy group ($p < 0.05$).

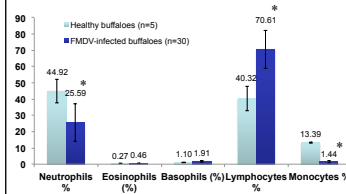


Figure 5: Proportional white blood cells of FMDV-infected buffaloes

Data was presented in mean \pm SD (%). Asterisks indicate the significant difference compared to healthy group ($p < 0.05$).

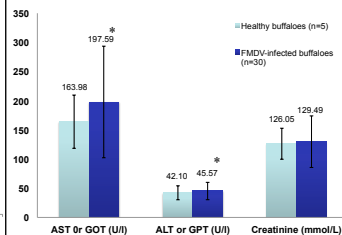
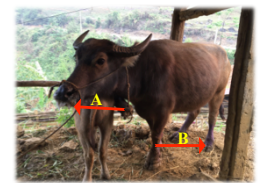


Figure 6: Blood Aspartate aminotransferase (AST), Alanine aminotransferase (ALT) and creatinine of FMDV-infected buffaloes

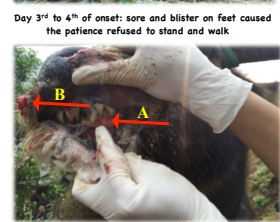
The concentrations were presented in mean \pm SD. Asterisks indicate the significant difference compared to healthy group ($p < 0.05$).

RESULTS (continued)

COMMON LESIONS IN FMDV-INFECTED BUFFALOES



Day 3rd to 4th of onset: slobbering and smacking lips (A), sore and blister on feet (B)



Day 5th to 6th of onset: vast detachment of gums (A) and tongue membranes causing bloody slobbering (B)



Day 15th of onset: lesions in mount cavity were healed, the animal were almost recovered.

CONCLUSIONS

- 1) 100% of FMDV-infected buffaloes manifested with typical symptoms including: high fever, slobbering and smacking lips, vesicles on the tongue and sores and blisters on feet. In addition, heart rate and respiratory rate also increased significantly compared to healthy animals.
- 2) Hematology of the infected buffaloes was altered obviously. Proportion of lymphocytes increased sharply while there were significant drop in all of other white blood cell counts. Red blood cells was also altered obviously in some parameters. Cell counts, hematocrit, mean corpuscular hemoglobin concentration (MCHC) and red cell distribution width (RCD) were increased significantly, meanwhile hemoglobin (Hb), mean corpuscular volume (MCV) and mean corpuscular Hemoglobin (MCH) decreased obviously.
- 3) AST and ALT of the infected buffaloes were also increased significantly, while blood creatinine remained stable.