Yemeni Journal of Agriculture and Veterinary Sciences
ISSN Online: 2789-1593, Print: 2311-7788
YJAVS- 25–06-01-05
DOI: http://doi.10.70022/yjavs.v6i1.2599
Available on line at: http://journal.tu.edu.ye/index.php/yjavs/index

Case report

Concurrent foot & mouth disease and coccidiosis in a 4-year-old Friesian cow: Case report

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KEYWORDS
FMD,
Coccidiosis,
Friesian Cow

Article history
Received:
23 February, 2025
Accepted:
25th May, 2025
Published:1 June, 2025

ABSTRACT

This case report describes outbreak of foot and mouth disease (FMD) and coccidiosis in cow presented to KM Animal Clinic and Surgery Veterinary Pharm Sdn. Bhd. Taman Perindustrain Batu Caves, Selangor, Malaysia during the year of 2023. The cow was Friesian with four years old and showed clinical signs such as vesicles (blisters) chiefly in the mouth and on the feet, anorexia, fever, shivering, grinding of the teeth, salivating. Physical and laboratory examinations of the cow showed that existing of coccidia oocyst (750 OPG), anorexia, empty abdominal cavity, rumen stops moving, dehydration, white to the yellowish mucous membrane (anaemia), irregular heartbeat, weak body (lost the weight very fast). The cow was treated with antibiotics, vitamins along appetizer and good house management. But the cow was died. Necropsy of the cow revealed severe pulmonary congestion with engorged capillaries within the alveoli, and the heart coalescing basophilic bacterial colonies within the blood vessels, kidney degeneration, and necrosis of the renal tubular epithelium. In conclusion, based in clinical and laboratory findings, the suspected case was confirmed as FMD concurrent with coccidiosis, the findings of this report highlight the symptoms of FMD and coccidiosis in the cow. Vaccination of animal and good management could be effective control measures to prevent infections.

INTRODCTION

Livestock industries play a major role in economic development and in the life of the farmers. In Malaysian sector of economy, a livestock industry shows a vital role such increased demand of cattle, sheep and goats' meat. It also has importance in Malaysia as a source of cash income and food security (Jesse et al. 2022). This case report describes concurrent infections of foot and mouth disease (FMD) and coccidiosis in Friesian cow. foot and mouth diseases and coccidiosis significantly impact livestock health, productivity, and economic outcomes. Concurrent infections complicate diagnosis and treatment, potentially leading to severe clinical outcomes. Common diseases affecting ruminants in

Malaysia are mastitis, contagious ecthyma, helminthiasis, pneumonia, lymphadenitis papilloma-virus, and brucellosis (Jesse et al. 2020; Odhah et al. 2021; Jesse et al., 2022). Additionally, coccidiosis, mange, meliodosis, Caprine arthritis encephalitis, milk fever, coxaella burnetti, Johne's disease and tuberculosis, pasteurellosis, and blue tongue (Jesse et al. 2016; Faeza et al. 2019). FMD is a disease caused by Aphthovirus, a member of the family Picorna-viridae, it has 7 serotypes, namely, A, O, C, Asia 1, Southern African Territories SAT1, SAT2, and SAT3. The disease characterized by erosive or ulcerative lesions in the oral cavity and on the feet that may rupture and cause lameness (Abubakar et al. 2022).

Coccidiosis is a disease of the intestinal tract caused by single celled intracellular parasites of the genus *Eimeria* and characterized by jaundice, haemolytic anaemia and destruction of the intestinal mucosa (Waruiru et al. 2000; Hamid, Kristianingrum and Prastowo, 2019). This might be accompanied by haemorrhage into the lumen of the intestine, catarrhal inflammation, and diarrhoea (Yusof and Md Isa, 2016: Hastutiek et al. 2022).

Existing literature on concurrent foot and mouth diseases (FMD) and coccidiosis cases in Malaysia is limited. Most studies focus separately on these diseases, lacking comprehensive reports on their combined impact on cattle health and productivity. This case report addresses this gap, highlighting critical diagnostic and management insights (Khadijah et al., 2014). Nevertheless, a retrospective study of the outbreaks of FMD in Malaysia Peninsular between in 2001 and May 2007, of 270 cases revealed that serotype O virus represented 89.95 % and serotype A virus represented 7.7 % of the outbreaks. These findings confirmed that FMD is endemic in Peninsular Malaysia (Ramanoon et al. 2013). This case report aimed to document the clinical presentation, diagnosis challenges, and management outcomes of concurrent foot and mouth disease and coccidiosis in a four-year-old Friesian cow.

CASE PRESENTATION

During the year of 2023, A 4-year-old crossbred Friesen cow weighing 180 kg with a body condition score of 2/5(according BCS 5-scale) was referred to the Veterinary Clinic of KM Vet Pharm Sdn. Bhd. The owner complained that, the cow had progressively increased lameness for several weeks and the animal showed hoof problems and loss of appetite Fig (1). Finally, the cow stopped eating and goes into recumbency position and appeared non-responsive to any treatment Fig (2). Besides, the above clinical signs, there were diarrhea, poor body condition. Based on the history, physical examination, clinical findings and eruption of similar cases in other areas of the country, the tentative diagnosis was established as foot and mouth disease.

CLINICAL, PARASITOLOGICAL, HAEMATOLOGICAL EXAMINATIONS

On clinical examination, the cow appeared lethargic, mucous membrane was pale, irregular heartbeat with heart rate 88 bpm, temperature, and respiratory rate of 38.7 °C, and 24 bpm respectively. The tongue had blisters lesions, as well as the lips, and on the soft tissues of the feet and inter-digital clefts. Animal was dehydrated and recumbent. Based on the clinical finding's observations, it was confirmed that animal was suffering with FMD.

Faecal samples were collected to check the presence of parasites or their eggs and oocysts. Qualitative faecal examination was performed by direct and floatation techniques to detect the presence of parasitic ova or oocyst (Mundt et al, 2005); While, McMaster counting technique was used to quantify the oocysts per gram (OPG) of faeces. On faecal examination, typical oocysts of *Eimeria spp.* were found under microscope. The counts of oocysts per gram (OPG) of faeces was 750 OPG. Other parasites or their eggs/oocyst were not noticed in faecal sample examined. on the basis of clinical symptoms and results of faecal examination it was confirmed that animal was suffering with coccidiosis.

Blood samples were also collected aseptically from the jugular vein for hematological analysis. Blood samples were analyzed according to techniques described by Katsogiannou et al. (2018) and Kim et al. (2024). The results confirmed presence of chronic anaemia .

TREATMENT

In current case, the treatment plan was commenced with hoof trimming, cleaning and applying heal cream with bandages on affected areas. In addition, meboliv powder was given to improve appetite. Administration of flunivet injection for 5days (2ml/45kg), Penicillin Streptomycin mixture (1ml/25kg) and 500 ml of Aminoplex through an intravenous (IV) were given. The bed was prepared with hay, dung was removed to maintain the environment dry and clean. One week later, to assist the animal to recover fast, additional 500 ml of Aminoplex IV, 20 ml of Catosal injection and 10 g of Rumitone, 100 g Nutrisacc and 100 ml of Provical forte (vitamin) were given.

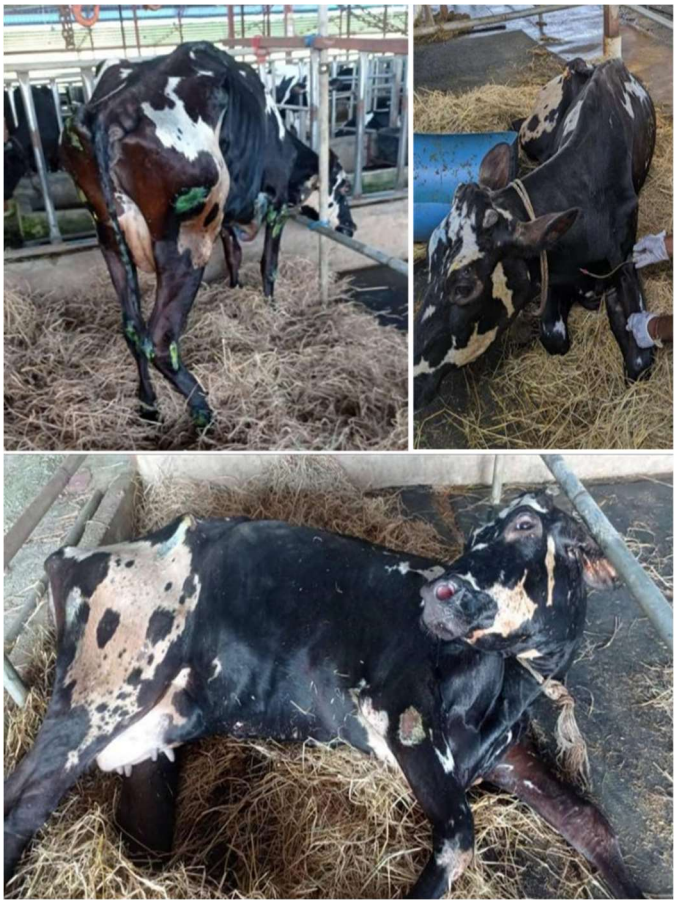

Figure 1. The cow on presentation with signs of non-weight bearing lameness, lethargy, and recumbency with neck bent towards the right flank.

Figure 2. A-lung shows severe pulmonary congestion with engorged capillaries within the alveoli. B- kidney photograph. C- the heart shows coalescing basophilic bacterial colonies within the blood vessels. D- The reticulum showed one metal screw, which created some ulcers.

POST-MORTEM EXAMINATION

Systematic post-mortem examination of the carcass was carried out to ascertain the actual cause of death using techniques described by McInnes, (2015) and Brooks (2016). The examination include: visual examination, palpation, and incision of vital visceral organs such as the lung, spleen, liver, kidneys, oesophagus, omasum, abomasum, spleen, and small intestine.

The post-mortem examination of the lung showed severe pulmonary congestion with engorged capillaries within the alveoli. There is diffuse thickening of the alveolar septa with infiltration by lymphocytes and plasma cells shown in (figure 2-A). Heart examination revealed that, coalescing basophilic bacterial colonies within the blood vessels as shown in (figure 2-B). In the kidney, degeneration and necrosis was observed diffusely throughout the renal parenchyma as well as in the renal tubular epithelium. In addition, there was multifocal, mild infiltration of lymphocytes and plasma cells in the interstitium of the renal cortex and focal lymphocytic infiltration in the renal pelvis as seen in (figure 2-C). Oesophagus showed mild inflammation of the submucosa layer. In reticulum, one metal screw was found, which created some ulcers as shown in figure 2-D.

DISCUSSION

Foot and mouth disease (FMD) is a highly contagious and transboundary viral disease of domesticated and wild cloven-hoofed animals. Outbreak of FMD is associated with huge economic loss to the global livestock industry (APHIS, 2007; Biswal et al., 2012). FMDV is a member of the genus Aphthovirus family Picornaviridae and is considered to be the most contagious agent infecting farm animals. In Malaysia, Previously Ramanoon et al (2013) reported that the FMD disease outbreak in cattle occurred with O and A serotypes of the virus. It can spread rapidly through livestock populations across continents. FMDV is often transmitted through air or direct contact (Gomes et al., 1997).

Diagnosis of FMD is commonly made by observing clinical signs but it is difficult to detect serotypes of virus involved. The diagnosis of viral serotypes is usually made by enzyme-linked immunosorbent assay (ELISA), complement fixation test (CFT), virus neutralization test and PCR (Knowles and Samuel, 2003).

Based on the clinical signs, history and laboratory examinations, the current case was confirmed as FMD. This result is in agreement with

previous studies (APHIS, 2007; Biswal et al., 2012; Ramanoon et al. 2013; Jesse et al. 2016; Nazneen et al .(2016; Elnekave et al. 2016) in Peninsular Malaysia and other countries of the world. In addition, these authors also reported that, an infected animals may show fever commonly rises to 40°C to 41.5°C, erosions and ulceration onto the hooves, lips, mouth, teats, snout and tongue. Outbreaks of FMD in cattle are common and may be exacerbated by use of ineffective FMD vaccines, lack of routine immunization, introduction of mutant viruses through cattle movement, use of vaccines of heterogeneous strains or diverse strains of FMD viruses even within same serotypes (Alexandersen et al., 2003).

Bovine coccidiosis caused by protozoan parasites. It's reported in animals less than one year age and occasionally occurs in adults because of lower immune competence in young animals (Soulsby, 1986; Maheshwari et al., 2024). The infection is transmitted through the ingestion of sporulated oocysts in contaminated feed, water and licking of contaminated surfaces. Coccidiosis in animals characterized by severe diarrhea, dysentery, dehydration, depression, anorexia, weakness and recumbency (Ahmed and Soad, 2007). In this case report, the parasitological examination was crucial to reach the diagnosis of coccidiosis. Qualitative faecal analysis revealed the existing the coccidiosis and quantative analysis revealed that the counts of oocysts per gram (OPG) of faeces was 750 OPG in investigated cow. These results are in contrast with findings of Avellaneda-Cáceres et al. (2022) who observed more clear clinical signs and higher counts of oocysts in faeces and; partially in agreement with findings of Yatoo et al. (2013). The contrary and accordance among the results of current report and findings of above workers may be due the age of animals and immunological factors.

In the present case report, treatment of animal(cow) was initiated with administration of antibiotics, Vitamin and supplements and good management. One week later, antibiotic, Vitamin and other medicine were given to help the animal to recover fast. Similarly in Iraq, a treatment trial conducted by Abd et al. (2024) with the aim of preventing FMD complications and saving the life of cow using a combination of antimicrobials, anti-inflammatory, supportive therapy and antiseptic solutions. However, in current report, the treatments do not save the life of animal and the cow was died. The reason behind death of animals could due to interaction among the medicine given to animal (Cow) or poisoning due to overdoses.

CONCLUSION

Based in clinical signs, laboratory analysis and postmortem examination findings, the suspected case is confirmed as FMD concurrent with coccidiosis. The findings of this report highlight the symptoms of FMD and coccidiosis in the cow. Vaccination of animal and good management could be effective control measures to prevent infections.

ACKNOWLEDGEMENT

The authors would like to thank the authorly and laboratory staff in university`s veterinary hospital, University Putra Malaysia (UPM) for help and assistance extended to us.

CONTRIBUTION OF AUTHORS

SHA, SKS, MCM, MNAO, ZKHM and GB performed the study, attended outbreak and collected samples, tested the samples and prepared initial and final draft. All authors checked and agreed with final manuscript.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

FUNDS

This case study was funded by KM Animal Clinic & Surgery Veterinary Pharm Sdn. Bhd Malaysia.

ETHICS STATEMENT

Ethical review and approval were not required for the animal study because the presented case was initially submitted for routine diagnostic purposes (for determination of the cause of disease and necropsy).

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تزامن الحمى القلاعية مع داء الكوكسيديا في بقرة الفريزيان بعمر 4 سنوات: تقرير حالة

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الملخص

يصف تقرير الحالة هذا تفشي مرض الحمى القلاعية (FMD) بالتزامن مع وداء الكوكسيديا في احدى ابقار الفريزيان التي تم احضرها إلى عيادة KM Animal Clinic and Surgery Veterinary Pharm Sdn. Bhd. Taman Perindustrain Batu Caves، Selangor، ماليزيا خلال سنة 2023. كان عمر البقرة أربع سنوات، وقد ظهرت عليها علامات سريرية مثل الحويصلات (البثور) بشكل رئيسي في الفم وعلى القدمين وفقدان الشهية والحمى والارتعاش وصرير الأسنان وسيلان اللعاب. وبعد الفحوصات السريرية والمخبرية للبقرة كشفت النتائج عن وجود متكيسات الكوكسيديا، وفقدان الشهية وتوقف حركة الكرش، وظهور أعراض الجفاف، وتغير لون الغشاء المخاطي من الأبيض إلى الاصفر (فقر الدم)، وعدم انتظام ضربات القلب، وضعف الجسم (فقدت الوزن بسرعة كبيرة). تم علاج البقرة بالمضادات الحيوية والفيتامينات بالإضافة إلى المقبلات والإدارة الجيدة. لكن البقرة توفيت. كشفت نتائج تشريح الجثة عن احتقان رئوي شديد مع احتقان الشعيرات الدموية داخل الحويصلات الهوائية، واندماج مستعمرات بكتيرية قاعدية في الأوعية الدموية، وتنكس كلوي، ونخر في ظهارة الأنبوب الكلوي. بناءً على النتائج السريرية والمخبرية، خلصت الدراسة الى ان الحالة المشتبه بها تم التأكد من انها كانت مصابة بمرض الحمى القلاعية بالتزامن مع داء الكوكسيديا. يُمكن الوقاية من العدوى والمرض بتطعيم الحيوانات وتوفر الإدارة الجيدة والفعالة.

الكلمات المفتاحية: مرض الحمى القلاعية، الكوكسيديا، بقرة الفريزيان

To cite this article: Saddam Hussein Al-Majhali[1], Sk Saravankumar[1], MC Manikam[1], Mohammed Naji Ahmed Odhah[2*], Zaid K. Mahmood[3] , Garba Bashiru[4]. 2025. Concurrent foot & mouth disease and coccidiosis in a 4-year-old Friesian cow: Case report.Yemeni Journal of Agriculture and Veterinary Sciences; 6(1): 33- 39.