Spontaneous bleeding in a neonatal calf persistently infected with BVDV1b

A calf developed skin bleeding on the second day of its life. It was referred to the clinic on suspicion of bovine neonatal pancytopenia (BNP). Hematology showed extreme thrombocytopenia, moderate anemia, but no leukopenia. A PCR test on a heparinized blood sample was bovine viral diarrhea virus (BVDV) positive, as were the two BVDV antigen ELISAs performed three and ten weeks later. Non-cytopathic BVDV type 1b was isolated from the blood. Although the calf recovered from hemorrhagic disease, and continued to be healthy, it was euthanized at eleven weeks of age because of persistent BVDV infection. On the basis of the case history, BNP could be excluded from the differential diagnosis. This case illustrates that hemorrhagic disease is not exclusively associated with BVDV type 2 and that the clinical signs in neonatal calves infected with BVDV1b can be identical to the clinical presentation of BNP.
cytopathic BVDV type 1b and not suffering from MD is reported.

CASE REPORT

In June 2011, a two-day old Belgian blue calf developed spontaneous skin bleeding, and was transferred to the Faculty of Veterinary Medicine (UGhent – Merelbeke (Belgium)) on suspicion of bovine neonatal pancytopenia (BNP). The farmer mentioned an increased frequency of neonatal diarrhea and respiratory disease among the calves during the previous months, but no hemorrhages had been noticed among other cattle of the mixed beef and dairy herd. The calf was delivered by caesarian section, had received four liters of colostrum from its own dam, and appeared to be healthy in the first day of life. BVDV vaccination had never been performed in the herd, and the dam was homebred.

On arrival, the calf was depressed, and showed melena and skin bleeding, not only from both ears due to ear tagging, but also on the back and legs. The mucosae were pale and petechiae and submucosal bleeding were found under the tongue and elsewhere on the oral mucosa. The body temperature was 39°C, the pulse rate was 80 per minute, and the respiratory rate was 24 per minute.

Hematology showed extreme thrombocytopenia (0 platelets/L), a moderate anemia (PCV=0.23 L/L), but no leukopenia (9.5x10⁹/L). A PCR test performed on a heparinized blood sample taken on arrival was BVDV positive, as were two antigen ELISAs on whole blood taken three and ten weeks later (IDEXX BVDV Ag/ Serum Plus Test, IDEXX Europe, Hoofddorp, the Netherlands). Non-cytopathic BVDV was detected at virus isolation from a whole blood sample taken on day 52. The isolated strain was genotyped as BVDV type 1b and not suffering from MD (Letellier et al., 2006). Nevertheless, the case was exceptional in that the calf of the present case only received colostrum from its own dam. The cow was born and raised on the farm, and BVD vaccines had never been used in the herd. Moreover, colostrum from other herds had never been administered on this farm. For these reasons, BNP could be excluded, and persistent infection with BVDV type 1b was considered to be responsible for the thrombocytopenia in the newborn calf.

It has been suggested that some cattle may be viremic for a longer period than the generally accepted 14 to 21 days (Collins et al., 2009). Therefore, a second blood sampling for antigen-ELISA was carried out on the calf of the present case ten weeks after the first, to exclude the possibility of prolonged transient infection. Collins et al. found evidence of the presence of BVDV in blood of calves up to three months after infection, but these calves were antigen ELISA negative at that stage. The fact that the calf of the present case was antigen ELISA positive at the second sampling proved that it was PI.

Although persistently infected, the calf showed two of the three predominant symptoms of experimental acute severe BVDV-infection: fever, low white blood cell count and low platelet count (Walz, 1999; Ridpath et al., 2006). Nevertheless, the case was exceptional for several reasons. First of all, the bleeding disorder was associated with a BVDV type 1 strain. To the authors’ knowledge, this has only been reported by Dabak et al. (2007) in older PI calves suffering from MD. Secondly, the calf of the present case was much younger than previously reported for HD and the clinical presentation was indistinguishable from the clinical signs of BNP. Thirdly, the thrombocyte count returned to normal in spite of persistent viremia. Therefore, a direct effect of the virus on thrombocytes seemed unlikely. This finding is in line with the re-

DISCUSSION

As the calf had no initial fever, and as there were no other symptoms at the same time as the bleeding syndrome, hemorrhagic sepsisemia and endotoxemia could be excluded as potential causes of thrombo-
sults of a study by Walz et al. (2005), who detected no significant difference in platelet counts between cattle PI with BVDV and control cattle. A hypothesis for the thrombocytopenia might be the removal of virus containing thrombocytes or megakaryocytes after interaction with collostral antibodies comparable to BNP pathogenesis (Deutskens et al., 2011).

CONCLUSION

This case report illustrates that BVDV1b-associated hemorrhages can occur in PI calves younger than one month, not suffering from MD at that stage of infection. As the clinical presentation was the same as for BNP, it is advisable to rule out BVDV-infection in suspected cases of BNP.

REFERENCES


