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Johan Åkerstedt
Siv Klevar
Attila Tarpai
Tormod Mørk

Scientific editors Hege Hellberg and Ståle Sviland
Norwegian Veterinary Institute

Veterinærinstituttet
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Editors
Ståle Sviland and Hege Hellberg

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PO Box 750 Sentrum
N-0106 Oslo
Norway

Fax: + 47 23 21 60 01
Tel: + 47 23 21 60 00
E-mail: postmottak@vetinst.no
www.vetinst.no

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The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway

Johan Åkerstedt, Siv Klevar, Attila Tarpai, Tormod Mørk

Bovine virus diarrhoea virus was not detected in any of the herds sampled in 2010.

Introduction

Bovine virus diarrhoea (BVD) is caused by bovine virus diarrhoea virus (BVDV) in the genus pestivirus. The virus is the cause of mucosal disease and hemorrhagic syndrome, but the economically most important manifestations of disease are related to infection in pregnant animals, resulting in embryonic death, abortion and congenital defects. Persistently infected calves may be born and serve as the main reservoir of infection to other animals (1). Bovine virus diarrhoea is a notifiable disease in Norway.

An eradication programme, financed by the authorities and the industry, started December 1992 (2). During the programme period, the number of herds with restrictions decreased from 2,950 in 1994 to none at the end of 2006. Details of the programme and a discussion of factors important for its success are given in the annual report for 2006 (3). Since 2007, the aim of the programme has been surveillance and control (4).

The Norwegian Food Safety Authority was responsible for carrying out the surveillance and control programme for BVD. The Norwegian Veterinary Institute was in charge of planning the programme, collecting the bulk milk samples from the dairies and performing the tests. Blood samples from beef herds were collected by inspectors from the Norwegian Food Safety Authority.

Aim

The aim of the surveillance and control programme for BVD in 2010 was to document freedom from the infection in Norwegian livestock and to contribute to the maintenance of this favourable situation.

Material and methods

Twelve and a half per cent of all Norwegian dairy and beef cattle herds were selected for examination. The target dairy herd population consisted of all herds delivering milk to dairies during the sampling period. The group of beef herds to be sampled was based on a register of all beef herds receiving governmental support according to recordings of July 2010. Bulk milk samples from the dairy herds were provided by the dairies. In beef herds, individual blood samples were collected from cattle older than 24 months, with a maximum of ten animals per herd.

In 2010, bulk milk samples from 1,265 randomly sampled dairy herds were collected. In addition, most dairy farms in the municipalities of Selbu and Tydal in South Trøndelag county were sampled (n = 63), due to an increased rate of abortions in cattle in this geographical area. A total of 4,020 individual blood samples from 507 beef cattle herds were tested in herd pools. The sampled herds represented 12.0% of all Norwegian cattle herds (Table 1).

All samples were tested for antibodies against BVDV using a commercial indirect enzyme-linked immunosorbent assay (ELISA; Svanova Biotech AB, Uppsala, Sweden) at the Norwegian Veterinary Institute in Sandnes (5). In case of positive or inconclusive results in pooled blood samples, the individual samples were tested.

Depending on the level of antibodies in bulk milk, dairy herds were divided into four groups (3,6). In some herds with low to high levels of antibodies (classification 1 to 3), individual blood samples from young stock were collected, pooled, and tested as pooled samples. Seropositive or inconclusive results from beef cattle herds were also followed-up by testing blood samples from young stock. Table 2 shows numbers of tested herds and individual cattle during the years 1993 to 2010.

In case of seropositive young stock, identification of persistently infected animals would be done by testing blood samples for antibodies from every individual in the relevant herd. Animals with weak positive or negative serological results were tested for the presence of virus using an antigen-capture ELISA (IDEXX Laboratories, Inc., Westbrook, Maine, USA). Positive reactions in newly infected herds would be verified with the polymerase chain reaction (PCR) and sequence analysis.

Table 1. Numbers of dairy herds and beef herds tested within the frame of the Norwegian surveillance and control programme for BVD in 2010

Herd category	Total no. of cattle herds*	No. of herds tested	% tested of the total no. of herds
Dairy herds	11,150	1,328	11.9
Beef herds	4,200	507	12.1
Total	**15,350**	**1,835**	**12.0**

* Based on data from the Register of production subsidies as of 31 July 2010.

Results

From the 1,328 sampled dairy herds, bulk milk samples from 1,282 herds were negative for antibodies against BVDV in 2010. Five herds had moderate levels of antibodies and 41 herds had low levels of antibodies against BVDV in bulk milk (3.46%).

Of the 507 sampled beef herds, pooled blood samples from eight herds were seropositive for BVDV (1.58%). In addition, pooled blood from two beef herds gave inconclusive results. Individual samples representing the pooled samples from these ten herds were tested. In one herd, all four sampled cows gave inconclusive results whereas seropositive animals were found in the other nine herds. In six of these nine herds no seropositive animal was born after 2001. Younger cows in the same herds were seronegative, suggesting that positive reactions in these herds were results of earlier infections. From the remaining three herds with seropositive animals, young stock was sampled.

Pooled blood samples from young stock were tested from 47 herds; three beef cattle herds (see above), four dairy herds with moderate levels of antibodies in bulk milk, 19 dairy herds with low levels of antibodies in bulk milk, as well as 21 herds after assessment by the field veterinarian. No seropositive young stock was found.

Individual blood from sixty-three animals from 11 herds were additionally investigated for BVDV. Infected animals were not detected (Table 2).

Table 2. Numbers of Norwegian cattle herds and individual cattle tested for antibodies against BVDV, and numbers of herds and individual cattle positive for BVDV (antibody results not shown).

Year	Bulk milk samples	Pooled blood samples from beef cattle older than 24 months[1]	Pooled milk samples from primiparous cows	Pooled blood samples from young stock	Individual blood samples		No. of virus positive	
	No. of herds	No. of herds	No. of herds	No. of herds	No. of herds	Samples	Herds	Individual blood
1993	26,424		5,031	5,000	NA	46,000[2]	NA	1,300[3]
1994	26,148		3,228	4,107	NA		NA	
1995	25,577		3,191	5,347	NA	36,065	NA	1,180
1996	25,167		1,849	3,163	NA	21,437	NA	685
1997	24,862		1,297	3,292	1,515	16,023	265	525
1998	24,038		1,415	3,407	780	7,091	98	198
1999	23,584		924	3,060	648	7,619	92	224
2000	21,796		100	1,610	423	6,947	72	129
2001	19,910		53	4,198	386	6,287	56	174
2002	18,771		-	2,854	284	3,962	28	43
2003	17,549		-	2,100	149	1,135	9	22
2004	7,365		-	1,351	84	1,017	2	6
2005	7,481		-	1,230	48	356	1	4
2006	14,620		-	997	28	113	0	0
2007	1,575		-	387	8	20	0	0
2008	1,424		-	423	8	34	0	0
2009	1,315	435	-	10	7	31	0	0
2010	**1,328**	**507**		**47**	**11**	**63**	**0**	**0**

[1]Before 2009, pooled sample from young stock was examined.

Discussion

No herds had restrictions because of BVD at the beginning of 2007. Testing bulk milk from all dairy herds and a 20% representative sample of all beef cattle herds was performed in 2006 with no findings of new infected herds. This indicated that the goal of eradicating BVD in Norway was achieved. The results of the surveillance and control programme from 2007 to 2010 confirm this conclusion. No new infected farm has been found and no restrictions have been imposed on any farm due to BVD.

Although Norwegian livestock is currently free from the disease, import of infected animals and unknown wildlife reservoirs may pose a continuous threat to the present status. For the rapid detection of a potential reintroduction and consecutive control of spreading, a surveillance system has to make efficient use of the competence and awareness existing among farmers and local veterinarians.

References

1. Baker, JC. The clinical manifestations of bovine viral diarrhea infection. Veterinary Clinics of North America: Food Animal Practice 1995; 11: 425-45.

2. Nyberg O, Lindheim D, Gudmundsson S, Eikenæs O. The surveillance and control programme for bovine viral diarrhoea (BVD) in Norway. In: Fredriksen B, Mørk T. (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2001. Oslo: National Veterinary Institute; 2002. p. 93-101.

3. Kampen AH, Åkerstedt J, Gudmundsson S, Hopp P, Grøneng G, Nyberg O. The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway. In: Brun E, Jordsmyr HM, Hellberg H, Sviland S. (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2006. Oslo: National Veterinary Institute; 2007. p. 65-71.

4. Åkerstedt J, Klevar S, Tarpai A, Mørk T. The surveillance and control programme for bovine virus diarrhoea (BVD) in Norway. Annual report 2009. In: Karlsson AC, Jordsmyr HM, Hellberg H, Sviland S (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Oslo: National Veterinary Institute; 2010.

5. Juntti, N, Larsson, B, Fossum, C. The use of monoclonal antibodies in enzyme linked immunosorbent assays for detection of antibodies to bovine viral diarrhoea virus. J Vet Med B 1987; 34: 356-63.

6. Niskanen R. Relationship between the levels of antibodies to bovine virus diarrhoea virus in bulk tank milk and the prevalence of cows exposed to the virus. Vet Rec 1993; 133: 341-4.

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The Norwegian Veterinary Institute has its main laboratory in Oslo, with regional laboratories in Sandnes, Bergen, Trondheim, Harstad og Tromsø, with about 360 employees in total.

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The NFSA comprises three administrative levels, and has some 1300 employees.

The NFSA advises and reports to the Ministry of Agriculture and Food, the Ministry of Fisheries and Coastal Affaires and the Ministry of Health and Care Services.

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