

Epidemiological Study of Foot and Mouth Disease and Evaluation of Vaccination Method for Controlling Disease in Waset Province

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Abstract

Foot and mouth disease (FMD) distributed all over the world except of some sporadic countries. This study included epidemiology survey of disease in cattle and sheep in Waset province and evaluation of vaccination method for control of disease for years (2011, 2012, 2013) in 17 different cities. Diagnosis of virus depend on clinical signs and symptoms by veterinarians in hospitals. Results showed that highest morbidity occur in Alzybiayah city (142 case in cattle and 2860 case in sheep) in year 2011, while in 2012 number of infected animals were (35 in cattle in Alheay city and 60 sheep in Almowefqah city), in year 2013 values of morbidity were 30 head of cattle in Alheay city and 43 sheep in Sheikh Saeid area.

Vaccine types which used in immunization of animals were O1 Monisa, Asia1 shamir, these types used in Asia countries mainly because of serotypes of virus distribution. After statistical analysis of results we demonstrated that there were significance difference in the infected animals after vaccination between year 2011 and 2012, 2013 ($p < 0.05$). Percentages of mortalities for three years were 2011(0.6%, 1.6%), 2012 (0.07%, 0.02) and for 2013 (0.02%, 0.008%) for cattle and sheep respectively.

Key words: FMD, epidemiology, vaccine, Waset province

Introduction

The first written description of foot and mouth disease (FMD) probably occurred in 1514, when Fracastorius described a similar disease of cattle in Italy (1). Almost 400 years later, in 1897, Loeffler and Frosch (2) demonstrated that a filterable agent caused FMD. This was the first demonstration that a disease of animals was caused by a filterable agent and ushered in the era of virology. Subsequently it was shown that the agent, FMD virus (FMDV), consists of a single-stranded, plus-sense RNA genome of approximately 8,500 bases surrounded by four structural proteins to form an icosahedral capsid (3). FMDV is the type species of the *Aphthovirus* genus of the *Picornaviridae* family. The only other member of this genus is equine rhinitis A virus (4). Seven serotypes (A, O, C, Asia 1, and South African Territories 1, 2, and 3) have been identified serologically, and multiple subtypes occur within each serotype (2).

Outbreaks have occurred in every livestock-containing region of the world with the exception of New Zealand, and the disease is currently enzootic in all

continents except Australia and North America (1). The disease affects domestic cloven-hoofed animals, including cattle, swine, sheep, and goats, as well as more than 70 species of wild animals, including deer (5), and is characterized by fever, lameness, and vesicular lesions on the tongue, feet, snout, and teats (see "Pathogenesis" below). In sheep and goats the disease is generally mild and can be difficult to distinguish from other common conditions (6, 7). In addition, other vesicular diseases, such as swine vesicular disease (SVD), vesicular stomatitis, and vesicular exanthema of swine, cause signs so similar to those of FMD that differential clinical diagnosis alone can be difficult (8). Although FMD does not result in high mortality in adult animals, the disease has debilitating effects, including weight loss, decrease in milk production, and loss of draught power, resulting in a loss in productivity for a considerable time. Mortality, however, can be high in young animals, where the virus can affect the heart. In addition, cattle, sheep, and goats can become carriers, and cattle can harbor virus for up to 2 to 3 years (9).

Methods

We followed the infections of FMD in cattle and sheep in 17 different places in Waset city depend on sporadic cases and outbreaks. Diagnosis depend on clinical signs and symptoms of disease by veterinarian work in hospitals and veterinary centers which were (kut veterinary hospital, alazeziah, alswerah, aldiboni, alnyimaniah, alheay, alahrar, almowefqiyah, alzybedeah, albeshaeer, chessan, bedreh, shaykh saed, alfalaheah, alhefreiah, naheyat waste and alsheheymiyeh veterinary centers) for three years include 2011, 2012 and 2013. Second part of study determined numbers of vaccinated animals every year and type of vaccines used to determine if there is benefit from vaccination method to control of disease by statistical analysis of results in different cities.

Results

Results which obtained from collection data from 17 veterinary hospitals centers in Waset province were revealed that highest number of infected cattle in alzobeydeah city (142) followed by alnumaniyah(141) while number of infected sheep were (2860) in alzobeydeah city. In the other hand there were no infected cattle in aldiboni and chessan cities in the year 2011. In the second year (2012) highest morbidity number occurred in alheay city (35) cattle were infected while highest morbidity number of infected sheep in alnumaniyah city (60 head).

In the year 2012 the infected animals estimated in all cities were 46 and 67 head of cattle and sheep respectively as shown in table number (1). The total numbers of morbidity animals in province in three years represented in figure number (1). Results of vaccinated animals in three years 2011, 2012 and 2013and types of vaccines used to immunized cattle and sheep revealed in table number (2).

Percentage of morbidity were 0.6% cattle, 1.6% sheep in (2011). In the year 2012 Cattle morbidity was 0.07%, sheep 0.02% in year 2013 cattle infection was 0.02% and sheep 0.008%.

Statistical analysis of infected animals showed that there were significance differences between year 2011 and 2012, 2013 ($P < 0.05$). Results prove that vaccination method was a beneficial method to control of disease.

Table (1): number of infected cattle and sheep in 17 different veterinary hospital centers

	2011		2012		2013	
Region	cattle	sheep	cattle	Sheep	cattle	Sheep
Kut hospital	70	142	7	30	14	-
Alfalaheah	34	77	12	-	-	-
alswerah	40	61	3	7	1	-
Alaziziyah	16	14	-	-	-	-
Alheay	89	50	35	10	30	18
Alzobeydeah	142	2860	32	7	-	6
Alnumaniyah	141	409	27	60	-	-
Almofeqiyah	21	103	2	41	1	-
Alahrar	18	133	16	32	-	-
Bedreh	1	60	-	-	-	-
Sheakh saeid	45	211	-	-	-	43
Naheyat waste	24	257	11	11	-	-
Aldiboni	-	46	4	-	1	-
Chessan	-	45	-	-	-	-
Albeshaeer	79	53	30	-	-	-
Alhefreyah	11	880	-	-	-	-
Alshehmeyah	68	206	15	20	-	-
Total	799	5607	194	218	47	67

Table (2): Number of vaccinated cattle and sheep and types of vaccines

Year	Cattle	Sheep	Type of vaccine
2011	134825	350193	O1 Monisa, Asia1 shamir
2012	259267	915859	Type O1, A22, Asia1
2013	218532	851329	Type A, Asia1 shamir, O1 manisa

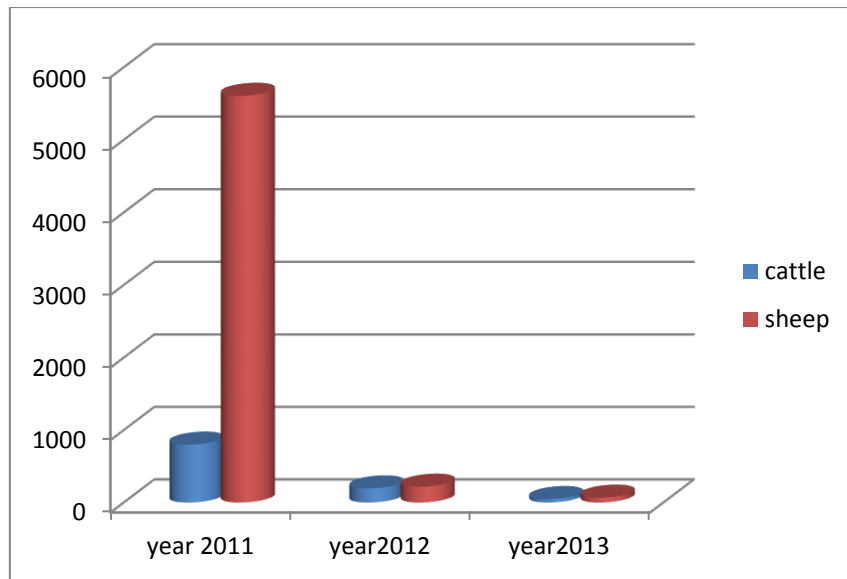


Figure (1): total numbers of morbidity of FMD virus in cattle and sheep herds in Waset province

Discussion

As a result of a successful vaccination program in Western Europe, which resulted in a cessation of disease outbreaks after 1989, the European Union adopted a no-vaccination policy in 1992 (10). From 1992 until 2001 there were only a few limited outbreaks in this region, including Bulgaria in 1991, 1993, and 1996; Italy in 1993; Russia in 1993 and 1995; Greece in 1994, 1996, and 2000; and Albania, Macedonia, and Yugoslavia in 1996 (11, 12). During the same period, remarkable strides in disease control were also made in South America, utilizing annual vaccination campaigns and animal culling. By the end of the 1990s, Argentina, Chile, Uruguay, the southern part of Brazil, and Guyana were recognized by the international community as being free of FMD without vaccination (13). Although FMD still occurred in the Middle East and many countries in Africa and Asia, near the end of the 20th century, it appeared that, in the developed countries and in countries that engaged in international trade of animals and animal products, FMD was under control. As a result, many of these countries discontinued vaccination entirely, and research efforts in many European and South American countries were significantly reduced.

Table number (1) and figure (1) revealed significance decline values of infected animals (cattle and sheep) for the three followed years the vaccination method is successful for elimination of disease, but to get definite results we need to control of entrance of import animals to country or cities. In Iraq and middle east area must be continuous tracking of virus serotype to estimate suitable vaccine and not depend on the past or famous serotypes of virus distributed in our area, in 2006 in Iran new serotype spread called (A-Iran-05) (14).

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دراسة وبائية مرض الحمى القلاعية في الابقار والاغنام في محافظة واسط وتقييم كفاءة اللقاحات المستخدمة للسيطرة على المرض

الخلاصة

يعتبر مرض الحمى القلاعية من الامراض الاوسع انتشاراً في كل انحاء العالم عدا بعض الدول. شملت الدراسة وبائية المرض في محافظة واسط وللسنوات 2011, 2012 و 2013 في الابقار والاغنام في 17

مستشفى ومستوصف بيطري في مختلف اقصية ونواحي المحافظة, تم تشخيص الاصابات اعتماداً على العلامات السريرية والاعراض الخاصة بالمرض. سجلت اعلى نسبة اصابة في قضاء الزبيدية حيث وصل عدد الابقار المصابة الى 142 والاغنام 2860 في العام 2011, بينما ظهرت اعلى الاصابات في قضاء الحي حيث كانت اصابات الابقار 35 وفي الاغنام كانت الاصابات 60 في ناحية الموقية. في العام 2013 سجل قضاء الحي اعلى اصابة بالابقار (30) وفي الاغنام سجلت ناحية شيخ سعد اعلى اصابات 43.

اللقاحات المستخدمة في السنوات الثلاثة هي O1 Monisa و Asia1 shamir حيث تستخدم بصورة اساسية في البلدان الاسيوية بسبب انتشار عترات الفايروس نفسها في تلك المناطق. بعد التحليل الاحصائي تبين وجود فروقات معنوية بين نسبة الاصابات بين العام 2011 والعامين 2012 و 2013 على مستوى احتمالية ($p < 0.05$). فقد بلغت نسبة الاصابات للابقار والاغنام للعام 2011 (0.6% و 1.6%) وللعام 2012 (0.07% و 0.02%) وللعام 2013 (0.02% و 0.008%).