Pakistan Veterinary Journal

ISSN: 0253-8318 (PRINT), 2074-7764 (ONLINE)
Accessible at: www.pvj.com.pk

SHORT COMMUNICATION

Potential of Oral Vaccination against Classical Swine Fever in Backyard Pigs in Thailand and Laos PDR

Sarthorn Porntrakulpipat[1,*], Sunsanee Supunkong[1], Vannaphone Putthana[2], Sisavath Phommasichan[2], Sithong Phiphakhavong[3], Saksit Tipayatorn[4], Komvut Thammasar[4], Klaas Dietze[5] and Klaus Depner[5]

[1]Research Group for Preventive Technology in Livestock and Department of Veterinary Medicine, Faculty of Veterinary Medicine, Khon Kaen University, Thailand, 40002; [2]Division of Veterinary Medicine, Department of Livestock and Fishery, Faculty of Agriculture, Nabong Campus, National University of Laos (NUOL), Vientiane, Lao PDR, [3]Department of Livestock and Fisheries, Ministry of Agriculture and Forestry, Lao PDR; [4]Nong Khai Province Livestock Office, Department of Livestock Development, Thailand; [5]Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Suedufer 10, 17493 Greifswald-Insel Riems, Germany
*Corresponding author: sarthorn@kku.ac.th

ARTICLE HISTORY (14-630)

Received: December 18, 2014
Revised: April 02, 2015
Accepted: June 28, 2015
Online available: August 26, 2015

Key words:
Backyard pigs
Classical swine fever
Oral vaccination

ABSTRACT

Advances in classical swine fever (CSF) control are often hindered by low vaccination coverage, in particular in small scale backyard production systems. Alternative vaccination schemes such as oral vaccination have been tested recently and could complement parenteral vaccination. In this study, oral vaccination was conducted in backyard pigs in Thailand and Lao PDR, to test the feasibility of an approach where the provision of vaccine baits is performed by the farmers. Presence of antibodies against the CSF virus was analyzed before and 31 days after vaccination. In Thailand, where all animals were claimed to have already received a parenteral vaccination, the seroconversion rate was 59% before and 84.6% after the intervention. In Lao PDR no CSF vaccination has been applied before begin of the study, 31 days after the intervention 55.9% of the animals seroconverted. The seroconversion rate was 80% for the age group of animals ≤3 months. The result indicate that oral vaccination could be an appropriate additional tool for an improved CSF control in backyard production systems in endemic area. Adaption of the approach to local circumstances and an appropriate monitoring remain essential for the overall success.

To Cite This Article: Porntrakulpipat S, Supunkong S, Putthana V, Phommasichan S, Phiphakhavong S, Tipayatorn S, Thammasar K, Dietze K and Depner K, 2016. Potential of oral vaccination against classical swine fever in backyard pigs in Thailand and Laos PDR. Pak Vet J, 36(1): 103-105.

INTRODUCTION

Within the context of South East Asia Classical Swine Fever (CSF) remains a key burden on pig sector development (Edwards *et al*., 2000). Vaccination coverage in Thailand has reached almost 100 percent in larger commercial farms. Difficulties remain with pigs kept in small scale backyard production, a source of clinical CSF cases in the recent past. In Lao PDR, the vaccination difficulties arising directly from the pig sectors structure, lack of field veterinarians, transport infrastructure and functioning cold chains have been hindering success of current approaches.

Recently, the studies of Milicevic *et al*. (2013) and Monger *et al*. (2015) concluded that oral vaccination is an additional tool for an improved CSF control in backyard production systems in an endemic setting. It could substitute the conventional attenuated CSF vaccines in areas logistically challenging to reach. However, these studies were done in climatic conditions and infrastructure settings not necessarily comparable to South East Asia. Overall prospects of improved CSF control in backyard pigs using alternative vaccination modalities have been discussed by Dietze *et al*. (2013) encouraging further field testing adapting to local needs and circumstances.

In the presented study, oral vaccination against CSF using bait vaccine was implemented in two provinces of the neighboring countries Thailand and Lao PDR targeting small scale backyard pig production systems. The aim was to assess the immune response to the oral vaccine used under field conditions in South East Asia,

within an approach where the farmers themselves are in charge of the bait distribution.

MATERIALS AND METHODS

Field trial setup: The study was conducted in Sri Chiang Mai District, Nong Khai Province, Thailand and in Huay Chiam area, Saythany District, Vientiane capital, Lao PDR between September and October 2013. The two study areas are 35 kilometer apart with comparable environmental conditions.

All pigs included had to be healthy and come from backyard farms which were defined as small scale-holdings that keep a limited number of pigs (≤10 and ≤20 pigs per farm in Lao PDR and Thailand respectively), mainly for self-consumption or local trade, operating within a circuit that is different from the pig industry (Alexandrov *et al*., 2011). Final selection of farms fulfilling these requirements was done randomly. Data on age and vaccination status of pigs was recorded.

Vaccination scheme, sampling scheme and laboratory investigations: The vaccine used in the study was attenuated C-strain vaccine, produced in form of oral bait (RIEMSER® Schweinepestoralvakzine, Riemser Arzneimittel AG, Greifswald-Insel Riems, Germany). Two baits per pig were provided to the animal owner with instructions to feed them before the routine morning or evening feeding on day 0. From day 0 to day 31 the farmers were asked to record any abnormality of their pigs if observed.

For the serological examination, blood samples of all pigs from the involved holdings were taken on day 0 as well as on day 31 post-vaccination (dpv) for analysis. All serum samples were kept at -20°C until further analysis.

Antibody detection was performed using a commercially available blocking ELISA (IDEXX CSFV Ab Test) as per manufacturer's instruction. The samples that gave a blocking percentage ≥40 were assigned as positive.

Statistical analyses: Differences in the CSFV antibody presence between pre- and post-intervention was analyzed using Chi-Square test. Fisher's Exact Test was used when number of samples less than 5.

RESULTS AND DISCUSSION

All animals had been vaccinated against CSF except the one piglet age 1 month in Sri Chiang Mai District whereas no CSF vaccines were applied in Huay Chiam area before. Pigs were kept in separate pens according to their age; however, direct contact between animals in neighboring stalls could occur.

Around 60 and 50 percent of pigs in Sri Chiang Mai and in Huay Chiam area respectively showed immediate interest in the baits when those were placed on the floor of pen. For pigs not interested in the vaccine baits, farmers used different strategies to ensure the uptake such as additional provision of banana or rice bran or it was administered directly, hand-to-mouth. All pigs included in this study received two vaccine baits. No adverse health effects have been observed.

An overview of the CSFV antibody detection is given in Table 1. In the study area in Thailand, only 59 percent of the animals seroconverted with the conventional approach. In Lao PDR, the selected animals have not been vaccinated at all. These results from both settings confirm the need to look for additional methods to achieve better protection as it has recently been discussed (Dietze *et al*., 2013).

The effects of the intervention as conducted in this study have to be judged according the vaccination history of the animals. In Thailand, the percentage of pigs tested positive for CSFV antibodies significantly increased from 59 to 84.6%. In Lao PDR, the same parameter significantly increased from 0 to 55.9%. In Thailand, baseline seroconversion was found to be below 60 percent, a value considered too low to sustainably push back endemicity. In how far the approach of using oral vaccine baits as compared to the commonly used parenteral vaccination is superior in this setting cannot be answered, but the owner-driven use of oral vaccination did prove to lift overall seropositive rate above 80 percent. Comparing the overall results from Thailand before the intervention (with ongoing parenteral vaccination) with the post intervention results from Laos PDR (no previous parenteral vaccination) the oral vaccine use achieves comparable results.

Results of von Ruden *et al*. (2008) indicating that in a population of wild boar with more than 70 percent of seroconverted animals over 2 years control of CSF is possible give a rough indication for backyard pigs. In Thailand, before oral vaccination, this vaccination coverage was barely reached in the age group >3 months, suggesting a certain effectiveness of the vaccination program by Thai Veterinary authorities. However, vaccination coverage of pigs with the age ≤3 months was not sufficient, an age group often identified as problematic due to incomplete uptake of baits or the interference of maternal antibodies (Kaden and Lange, 2004; Suradhat *et al*., 2007; von Rueden *et al*., 2008; Milicevic *et al*., 2013). Even though animal numbers are too low for stronger conclusion, here the group of younger animals has, in both settings, shown higher increase of seroconversion levels as the older age group. Young piglets will more likely have received individual attention assuring bait uptake. The achieved increase of seroconverted animals from previously not protected of 71.4% in Thailand and 80% in Lao PDR are promising levels for sustainable CSF vaccination campaigns.

Levels of seroconversion in older pigs seen in Lao PDR are comparable to the levels achieved in Thailand through the regular parenteral vaccination scheme (older pigs, day 0). With adaptive changes in the delivery higher levels should be achievable.

Present study confirms the possibility of oral vaccination performed by the farmers themself, beneficial to CSF control under limited veterinary authority outreach. The need of a functioning cold chain is reduced when working with oral vaccine baits that remain effective three to four days at room temperature as needed for outdoor baiting (Brauer *et al*., 2006), but tropical climatic conditions might further reduce this time span. In the setting studied with animal owner conducting the bait distribution, further delay cannot be excluded.

Table 1: Positive classical swine fever virus antibody detection

	Sri Chiang Mai, Thailand			Huay Chiam, Lao PDR		
Animal group	Pre intervention	Post intervention	Seroconversion rate out of pre-intervention negative	Pre intervention	Post intervention	Seroconversion rate out of pre-intervention negative
Age ≤ 3 months	2/9(22.2)	7/9(77.8)*	5/7(71.4)	0/5(0)	4/5(80)*	4/5(80)
Age > 3 months	21/30(70)	26/30(86.7)	5/9(55.5)	0/29(0)	15/29(51.7)*	15/29(51.7)
Total number	23/39(59)	33/39 (84.6)*	10/16(62.5)	0/34(0)	19/34(55.9)*	19/34(55.9)

*Significant different between pre and post intervention. In parenthesis values are in percentage.

Conclusions: This study supports the conclusions of Monger *et al*. (2015) that the use of oral vaccine baits to immunize backyard pigs against CSF can be performed under field conditions, where the vaccination is performed by the farmer. The results should encourage to further explore this alternative vaccination strategy where backyard pig production systems are a bottleneck for CSF control.

Acknowledgements: The authors wish to thank Oudom Phonekhampheng and Fongsamouth Southammavong, Faculty of Agriculture, National University of Laos (NUOL), Vientiane, Lao PDR for their support.

REFERENCES

Alexandrov T, Kamenov P and Depner K, 2011. Surveillance and control of classical swine fever in Bulgaria, a country with a high proportion of non-professional pig holdings. Epidemiol Sante Anim, 59-60: 140-142.

Brauer A, Lange E and Kaden V, 2006. Oral immunisation of wild boar against classical swine fever: uptake studies of new baits and investigations on the stability of lyophilised C-strain vaccine. Eur J Wildlife Res, 52: 271-276.

Dietze K, Milicevic V and Depner K, 2013. Prospects of improved classical swine fever control in backyard pigs through oral vaccination. Berl Munch Tierarztl, 126: 476-480.

Edwards S, Fukusho A, Lefevre PC, Lipowski A, Pejsak Z *et al*., 2000. Classical swine fever: the global situation. Vet Microbiol, 73: 103-119.

Kaden V and Lange E, 2004. Development of maternal antibodies after oral vaccination of young female wild boar against classical swine fever. Vet Microbiol, 103: 115-119.

Milicevic V, Dietze K, Plavsic B, Tikvicki M, Pinto J *et al*., 2013. Oral vaccination of backyard pigs against classical swine fever. Vet Microbiol, 163: 167-171.

Monger VR, Stegeman JA, Dukpa K, Gurung RB and Loeffen WL, 2015. Evaluation of Oral Bait Vaccine Efficacy Against Classical Swine Fever in Village Backyard Pig Farms in Bhutan. Transbound Emerg Dis, doi:10.111/tbed.12333

Suradhat S, Damrongwatanapokin S and Thanawongnuwech R, 2007. Factors critical for successful vaccination against classical swine fever in endemic areas. Vet Microbiol, 119: 1-9.

von Ruden S, Staubach C, Kaden V, Hess RG, Blicke J *et al*., 2008. Retrospective analysis of the oral immunisation of wild boar populations against classical swine fever virus (CSFV) in region Eifel of Rhineland-Palatinate. Vet Microbiol, 132: 29-38.