ATROPHIC RHINITIS AND ITS CONTROL WITH AN ADJUVANT VACCINE CONSISTING B. BRONCHISEPTICA AND P. MULTOCIDA STRAINS

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INTRODUCTION

In all countries with an intensive pig production atrophic rhinitis (A.R.) is becoming more and more important, because it causes high economical losses in fattening units. The disease has to be considered as a polyfactorial disease. This means there are infectious agents indispensable for the arise of the disease; the clinical picture, however, is highly influenced by secondary factors, which have nothing to do with the primary agent(s). As far as the infectious agents are considered Bordetella bronchiseptica (B.b.) plays a primary or initiating role in causing atrophic rhinitis. Further Pasteurella multocida (P.m.) is named as a causative agent of A.R. According to Harris c.s. (1971) infections of the nasal cavities by B.b. lead to colonizing of P.m. However, not all research workers were able to induce turbinate atrophy with porcine P.m. isolates. De Jong c.s. (1980) introduced a guinea pig skin test by which A.R. positive and negative strains can be distinguished. It appeared that most A.R. positive isolates of P.m. belong to type D. This finding is in agreement with those of others. For the control of A.R. the eradication resp. reduction of B.b. and P.m. flora in piglets and their environment is essential (De Jong c.s. 1977) With this in mind, challenge and field experiments with a bacterin of B.b. and P.m. were done.

METHODS AND MATERIALS

Isolation of B.b. and P.m. from nasal swabs was done according to the methods as described by Akkermans c.s. (1968). P.m. isolates were typed for their capsular antigen according to the method of Carter (1973, 1975) and occasionally for their somatic antigen according to the method of Heddlestone (1978). P.m. type D isolates were tested in the guinea pig skin test (De Jong, 1980). The vaccine was a w/o emulsion, containing 2 P.m. strains (type D, one A.R. pos., one A.R. neg.), covering the somatic antigens often found in A.R. pigs and a field strain of B.b. In the field experiment all reproductive stock received a basic vaccination of 2 ml with an interval of 6 weeks and a revaccination each 6 months. The sows in the challenge experiment received a vaccination of the same dosage at + 50 and 92 days of gestation. In the field experiment the effect of sow vaccination was scored by measuring the occurrence of B.b. and A.R. positive P.m. strains in piglets of 3-10 weeks, brachygnatio superior as described by Bercovich c.s. (1976) and clinical A.R. in weaners and fatteners. In the challenge experiment conchae atrophy (c.a.) in part of the piglets was judged too. The field experiment involved 5 commercial farms with all together about 800 sows, which were monitored for 7-22 months. All herds had an A.R. history.
The challenge experiment was done in 10 litters, 5 from vaccinated and 5 from control sows. The sows were bought as gilts from a commercial farm, clinically free of A.R. and without isolations for B.b. and P.m. in the weaners produced. Challenge experiment was done in an isolated unit, the feed was free of antibiotics. All litters were born within a period of 1 month, those of unvaccinated sows first and those of vaccinated lateron. There was an open air contact between the litters. Challenge of the piglets was done twice, at an age of 7 and 10 days. Of each litter 1/3 was challenged with a A.R. positive B.b. strain, 1/3 with a A.R. positive P.m. strain, the other 1/3 of the litter was contact challenged. Over-night broth cultures were used, 1 ml in each nostril.

RESULTS

In the challenge experiment we were able to provoke A.R. which became clinically evident in B.b. and P.m. as well as in contact challenged pigs. Both germs were isolated more frequently from all pigs as the experiment progressed. Piglets positive for B.b. were more frequently positive for P.m. than piglets whose nasal cavities were not colonised by B.b.
The incidence of positive B.b. isolations was lower in challenged pigs, - upto an age of 13 weeks -, born from vaccinated sows than in those born from the unvaccinated ones.
The same applied to P.m., but in that case only upto an age of 5 weeks. The degree of foreshortening of the upper jaw in piglets of vaccinated sows upto an age of 6 weeks was lower than that of unvaccinated ones. The incidence of c.a. at an age of 6 weeks was 69 % in piglets born from vaccinated sows and 100 % in those born from unvaccinated sows. Severity of c.a. in the vaccinated group was 2.5 on an average and in the unvaccinated group 3.3. Sneezing occurred much more frequently and severely in litters born from unvaccinated sows.
In the field experiments no more B.b. was isolated in those herds, which were positive for this germ before the basic vaccination. The incidence of P.m. isolations decreased, especially of those which had a positive guinea pig skin test. In some herds before the vaccination programme started systematical medication of weaners and fattening pigs was needed. Since only pigs were born from vaccinated sows there was no need for any treatment. The incidence of clinical A.R. became very rare (< 1%) as compared to ± 20 % before vaccination.
No side effects were observed in the sows, which were vaccinated irrespective of their pregnancy stage.

CONCLUSIONS

In a challenge experiment a bacterin consisting of B.b. and P.m. strains was able to prevent a heavy infection with both germs at an early age (< 6 weeks). Although vaccination of pregnant sows in the challenge incompletely prevented (sub) clinical A.R., the condition of litters of vaccinated sows upto an age of 6 weeks was much better. Probably the challenge dosage was too heavy and there was a permanent and increasing infection pressure from the environment. In the field experiment after vaccination only rare clinical A.R. was observed in weaners and lateron in the fattening units.
The farms were monitored for periods varying from 7-22 months after start of vaccination. B.b. was completely eradicated and the incidence of A.R. positive P.m. strains reduced sharply.
No side effects were observed in vaccinated sows.

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