COMPARISON OF SEROLOGICAL INTERFERENCE FOLLOWING VACCINATION WITH *BRUCELLA ABORTUS* STRAINS IN ROUTINE DIAGNOSTIC TESTS*

K. N. Nimisha[1], M. R. Saseendranath[2], V. Prasad[3], G. Krishnan Nair[4] and P. V. Tresamol[5]

Department of Veterinary Epidemiology and Preventive Medicine
College of Veterinary and Animal Sciences
Mannuthy - 680 651, Thrissur, Kerala

Abstract

The serological interference following Brucella abortus SRB51 and S19 vaccination, in routine diagnostic tests was evaluated in cattle of four months and above. Sero negative animals were grouped into three. All the six animals of group I and II were subcutaneously vaccinated with 1.8×10^{10} CFU and 1×10^{10} CFU of Brucella abortus SRB51 respectively, whereas all the group III animals (6 numbers) were vaccinated with 4×10^{10} CFU of Brucella abortus S19 subcutaneously. Blood samples were collected from all animals on days 0, 7, 14, 21, 28, 60, 90, 120, 150 and 180 following vaccination. Antibodies to S-LPS were measured in all three groups of animals by RBPT and STAT. None of the Brucella abortus SRB51 vaccinated animals, both with higher or lower dose, produced detectable antibody response in the conventional serological tests viz., RBPT and STAT throughout the study period, whereas animals vaccinated with Brucella abortus S19 produced detectable antibody responses in RBPT and STAT.

Key words : *Brucella abortus SRB51, Brucella abortus strain 19, serological tests, interference*

Though *Brucella abortus* strain 19 vaccine has the limitation of interfering with routine diagnostic test, it was being used against brucellosis since long. In recent years, a new type of vaccine, consisting of a rough *Brucella abortus* mutant (SRB51) has been developed for vaccination in cattle. The study was undertaken to compare the interference of *Brucella abortus* SRB51 and S19 with routine diagnostic tests.

Materials and Methods

Eighteen animals of four months and above and sero negative for brucellosis were grouped into three. All the six animals of group I and II were subcutaneously vaccinated with 1.8×10^{10} CFU and 1×10^{10} CFU of *Brucella abortus* SRB51 respectively, whereas all the group III animals (6 numbers) were vaccinated with 4×10^{10} CFU *of Brucella abortus* S19 subcutaneously.

Blood samples were collected from all animals on days 0, 7, 14, 21, 28, 60, 90, 120, 150 and 180 following vaccination. Antibodies to S-LPS were measured in all three groups of animals by RBPT and STAT.

* *Part of M.V.Sc. thesis submitted by the first author to the Kerala Agricultural University, Thrissur*

1. *Veterinary Surgeon, AHD , Kerala*
2. *Professor & Head (on leave)*
3. *Professor & Head, Dept. of Dairy Science*
4. *Professor & Head, Dept. of Veterinary Microbiology*
5. *Associate Professor*

Results and Discussion

Animals belonging to group I and II, which were vaccinated with *Brucella abortus* strain RB51, gave negative results in the RBPT throughout the study period. This conforms to the findings of previous workers (Schurig *et al.*, 1991), who also observed negative results for RBPT. As *Brucella abortus* strain RB51 is lacking the lipopolysaccharide O-side chain, the lack of specific antibody is responsible for this. Group III animals, which were vaccinated with *Brucella abortus* strain 19 showed positive response in RBPT up to 60 days. Similar observation was recorded by Venkatesha and Upadhye (1987) in which sera from calves after primary vaccination with S19 showed positive response in RBPT up to two months. Persistence of post vaccinal serologic titres that interfere with serological test interpretation is one of the most important disadvantages of the vaccinal strain 19 of *Brucella abortus* (Stevens *et al.*, 1994). Though the group I and group II differs in the dosage of SRB51, both groups did not give any reaction with RBPT.

Brucella abortus SRB51 vaccinates (group I and II) did not develop serum antibody titre which could be detected by STAT throughout the study period. Several workers (Schurig *et al.*, 1991; Cheville *et al.*, 1992) had observed the same finding. *Brucella abortus* strain RB51 lacks O-side chain found in strain 19 and virulent strains; it is this side chain which causes serologic reactions on the standard tests (Schurig *et al.*, 1991). In group III animals, out of six, five exhibited highest serum antibody titres (440 IU) at 14th day of vaccination in STAT , which correlated with the findings of Stevens *et al.*(1995) who got maximum titre (850 IU) in the STAT at two weeks after vaccination. Misra *et al.* (1982) reported that the peak titre was obtained on 15th day following S19 vaccination in cross bred calves. A similar finding was also observed by Das and Mulbagal (1983) in which cross bred calves attained maximum titre (416.66 IU) on 15th day of vaccination. In the present study, agglutinating antibody titres were detected up to 120th day of vaccination except in case of two animals, which showed antibody response till 180th day. Venkatesha and Upadhye (1987) observed that agglutinating antibodies became negative by third month itself, when calves of three to five week old were vaccinated with S19 vaccine. Alton (1978) reported that calves vaccinated at six months of age will often remain positive for agglutination test upto 18 months. This agrees with the finding of Uzal *et al.* (2000) that vaccination with one, two or three of the recommended adult doses of SRB51 did not interfere with the conventional serological techniques. The present study confirmed the advantages of non interference of SRB51 antibody in the conventional test results, comparing S19 where false positive reactions were obtained. Hence, SRB51 vaccine can be used as a *Brucella* vaccine strain in areas where *Brucella* control is done by both vaccination and test and slaughter policy.

References

Alton, G. 1978. Recent developments in vaccination against bovine brucellosis. *Aust. Vet. J.*, **54**: 551-557

Cheville, N.F., Jensen, S.M., Halling, F.M., Tatum, D.C., Morfitt, S.G., Hennager, W.M., and Schurig, G.G. 1992. Bacterial survival, lymph node changes and immunologic responses of cattle vaccinated with standard mutant strains of *Brucella abortus*. *Am. J. Vet. Res.*, **53**: 1881-1888

Das, A.M. and Mulbagal, A.N. 1982. The quantification of *Brucella* specific IgG_1, IgG_2 and IgM antibodies in vaccinated calves. *Indian J. Comp. Microbiol. Immunol. Infect. Dis.*, **3**: 144-146

Misra, D.S., Thapliyal, D.C., Kumar, A. and Saxena, O.P. 1982. Post vaccinal *Brucella* agglutinins in Red Dane cows, calves and cross-bred animals. *Indian J. Comp. Microbiol. Immunol. Infect. Dis.*, **3**: 153-157

Schurig, G.G., Roop, M.M., Baghi, T., Boyle, D., Buhrman, D. and Sriranganathan, N. 1991. Biological properties of RB51, a stable rough strain of *Brucella abortus*. *Vet. Microbiol.*, **28**: 171-188

Stevens, M.G., Hennager, S.G., Olsen, S.C. and Cheville, N.F. 1994. Serologic responses in diagnostic tests for brucellosis in cattle vaccinated with *Brucella abortus* strain 19 or RB51. *J. Clin. Microbiol.*, **32**: 1065-1066

Uzal, F.A., Samartino, L.E., Schurig, G., Nielsen, K., Cabrera, R.F. and Addeo,H.R. 2000. Effect of vaccination with *Brucella abortus* strain RB51 on heifers and pregnant cattle. *Vet. Res. Commun.*, **24**: 143-151

Venkatesha, M.D. and Upadhye, A.S. 1987. Immune response of young calves to *Brucella abortus* strain 19 vaccine with modified method. *Indian J.Comp. Microbiol. Immunol. Infect. Dis.*, **8**: 125-129