

Sero Conversion Studies of *Brucella abortus* SRB51 Vaccine in Cattle

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Abstract

The sero conversion of two doses of *Brucella abortus* strain RB51 vaccine was assessed in cattle. Vaccinations were done in two groups of sero negative calves of four months and above age with 1.8×10^{10} CFU and 1×10^{10} CFU of *B. abortus* strain RB51 vaccine respectively by subcutaneous route. Immune response were assessed on days 0, 7, 14, 21, 28, 60, 90, 120, 150 and 180 employing indirect ELISA. Cattle vaccinated with higher dose of *B. abortus* SRB51 produced significant antibody level earlier (seventh day) than those with lower dose (21st day) and persisted longer (upto 150 days), when compared to the group II (only upto 120 days). But both groups showed maximum immune response on the same observation period i.e. on 60th day of vaccination. The proportion of animals with significant immune responses was also higher in animals vaccinated with higher dose.

Keywords: *Brucella abortus* Strain RB51; *Brucella abortus* Strain 19; Sero Conversion; Immune Response

Introduction

Brucellosis is an economically important abortifacient disease of livestock that can be transmitted to humans. Calf-attenuated vaccine is still the best and most economical option for prevention of brucellosis as the other measures are not practicable in India owing to diverse socio-economic, religious and cultural factors. Attenuated *Brucella abortus* strain 19 was proven to be an effective vaccine against *B. abortus* in cattle. However, this vaccine has the disadvantage of inducing O-polysaccharide specific antibodies that interfere with serologic diagnosis of disease, of causing abortion in vaccinated animals under some circumstances and of being pathogenic for human being. But *B. abortus* mutant RB51 has now emerged as an alternative vaccine to strain 19 because it provides a degree of protection in cattle comparable to that induced by strain 19. Hence this study was undertaken to assess the sero conversion to two doses of SRB51 vaccine in cattle.

Materials and Methods

A total of 40 animals which aged four months and above and sero negative for brucellosis were included and grouped into two in this study. Twenty one animals of group I were subcutaneously vaccinated with 1.8×10^{10} CFU of *B. abortus* strain RB51 vaccine, whereas group II animals (19 number) were vaccinated with 1×10^{10} CFU of the vaccine subcutaneously.

Blood samples were collected from all these animals on days 0, 7, 14, 21, 28, 60, 90, 120, 150 and 180 and immune responses were assessed by indirect ELISA as per the method of Colby, *et al* [1].

Results and Discussion

On day 7, 19.04 per cent animals of group I showed sero conversion. Adone and Ciuchini [2] found that anti-RB51 antibodies were produced in cattle seven days post vaccination. Maximum (100 per cent) sero conversion was obtained at day 60. Earlier workers [3] observed peak titre at fourth week of vaccination. A fall in immune response was noticed on 90th day of vaccination (33.33 per cent) and vanished completely by day 180. This correlates with the observations of Olsen, *et al*. [4], who noticed a decrease in immune response at 12th week of vaccination, following inoculation of cattle with $0.85 - 1.6 \times 10^{10}$ CFU of SRB51.

All the animals of group II produced significant antibody response only on the 21st day of vaccination. Similar observations were made by Cook, *et al*. [5] where male calves inoculated with 1×10^{10} CFU SRB51 intramuscularly showed positive immune response only from the fourth week onwards in an indirect ELISA. In the present group also, 100 per cent sero conversion was achieved on day 60. But this is not in agreement with Adone, *et al*. [6] who reported that there was 50 per cent sero conversion at eighth post inoculation week, following vaccination of cattle with 10^9 CFU SRB51. Immune response was reduced to 63.15 per cent by 90th day and it became 21.05 percent on day 120. By day 150, animals became sero negative (See figure 1). Similar observations were recorded by Cook, *et al*. [5] who found that 80 per cent of calves inoculated with 10^9 CFU of SRB51 were still present at 18 post inoculation week. Elzer, *et al*. [7] opined that typically SRB51 is only present in sexually mature cattle for 6 to 8 weeks after vaccination. The lack of persistence of SRB51 in blood is possibly due to increased phagocytosis and killing of rough strains as compared to smooth strains [8].

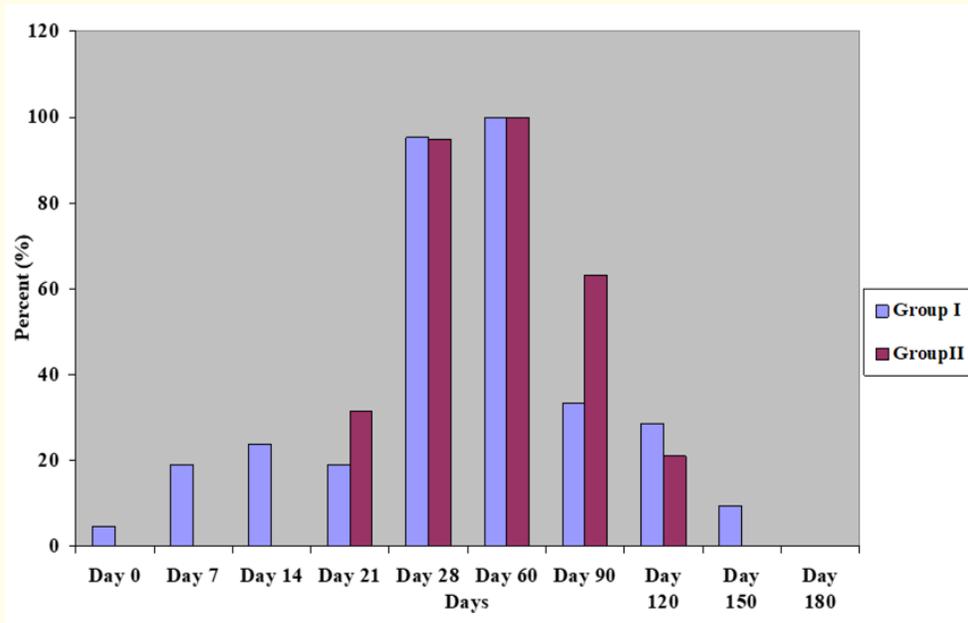


Figure 1: Comparison of percent of sero conversion to *Brucella abortus* SRB51 between group I and II animals.

Conclusion

Cattle vaccinated with higher dose of *B. abortus* SRB51 produced significant antibody level earlier than those with lower dose and persisted longer, when compared to the second group. But both groups showed maximum immune response on the same observation period i.e. on 60th day of vaccination. The proportion of animals with significant immune response was also higher in animals vaccinated with higher dose than those with lower dose except on day 21 and day 90. From the serologic point of view, it is concluded that *Brucella abortus* strain RB51 is an ideal vaccine candidate than *Brucella abortus* strain 19 and animals vaccinated with higher dose produced better immune response to *Brucella abortus* SRB51, when compared to those vaccinated with lower dose.

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