

Foot and Mouth Disease vaccination stress on semen quality in Murrah bulls¹

K. MURUGAVEL², J. RAJASEKARAN and A. SUBRAMANIAN

Department of Obstetrics & Gynaecology,
Madras Veterinary College,
Madras - 7.

ABSTRACT

Foot and Mouth Disease vaccination stress on semen quality in Murrah buffalo bulls as investigated in this study. No significant change was recorded in the semen volume following FMD vaccination. However significant decrease in spermatozoal concentration, initial motility, live sperm percent and significant increase in the percentage of total spermatozoal abnormalities were noticed following FMD vaccination. Increased spermatozoal abnormalities returns to pre-vaccination level significantly on eighth week post-vaccination.

—x—x—x—

Several studies were made on the effect of various stress factors affecting the semen quality in bulls. Vaccination is one of the major stress factor which affects semen quality. Information regarding the effect of FMD vaccination on semen quality in white cattle are many. (Venkataswami *et al.*, 1972; Rao, 1974; Saxena *et al.*, 1976; Saxena and Tripathi, 1977 and Tripathi and Saxena, 1977). However in buffalo bulls the information is scanty (Tripathi and Saxena, 1976). Therefore, the present trial was conducted to study the effect of FMD vaccination on semen quality in Murrah bulls.

MATERIALS AND METHODS

Six Murrah bulls 5 to 8 years of age stationed at Buffalo Bull Station, Erode were utilized in this study. Semen was collected twice weekly with Artificial Vagina. Before

vaccination, the semen was collected and the mean pre-vaccination semen volume sperm concentration, initial motility, live sperm percentage and percentage of morphologically abnormal spermatozoa were recorded. Eosin-nigrosin stain was used to study the live sperm percent and morphological abnormalities of spermatozoa. Semen diluted with Tris egg yolk glycerol buffer was used to record the percentage of initial motility. All the six bulls were vaccinated with FMD vaccine ('Raksha' tissue culture inactivated vaccine). Semen was collected twice weekly for nine weeks following vaccination. The weekly mean seminogram parameters were recorded. Statistical analysis of the results was carried out as per Snedecor and Cochran (1967)..

RESULTS AND DISCUSSION

The mean values of semen volume, Sperm concentration, Initial motility, live sperm percent and total spermatozoal abnormalities are presented in Table 1. No significant change was recorded in the seminal volume following vaccination. Similar finding was recorded by Tripathi and Saxena (1976) in Murrah bulls. Major semen volume is contributed by accessory

1. Part of M.V.Sc. thesis of the first author submitted to Tamilnadu Veterinary and Animal Sciences University, Madras.
2. Assistant Professor, Rajiv Gandhi College of Veterinary and Animal Sciences, Pondicherry.

reproductive glands (Roberts 1986). Since Radhakrishnan *et al.*, (1975) reported that the activity of accessory reproductive glands remains unaffected following vaccination. The semen volume in this study was unaffected. A significant decrease in sperm concentration on the first week following vaccination was noted. Tripathi and Saxena (1976) reported no change in sperm concentration following FMD vaccination. The high incidence of sperm abnormalities observed following vaccination is probably due to an increase in resorption of spermatozoa in the epididymis (Rao, 1971).

Two weeks following vaccination, a decrease in initial motility was recorded in this study. Tripathi and Saxena (1976) also observed decrease in initial motility in Murrah bulls. Sperm cells develop the capacity for motility during their passage through the epididymis. (Krishna and Rao, 1986). Epididymal dysfunction following vaccination could be the cause for decline

in initial motility. Decline in live sperm count was seen first two weeks following vaccination. This agrees with the findings of Tripathi and Saxena (1976). The mean of total abnormal spermatozoa reached the maximum of 39.60 % during second week post-vaccination. Tripathi and Saxena (1976) also recorded increase in total abnormal spermatozoa in four Murrah bulls following FMD vaccination. Rao and Venkataswami (1971) reported testicular degeneration following FMD vaccination in crossbred bulls. Increase in total morphologically abnormal spermatozoa could be attributed to the disturbance in epididymal function and defective spermatogenesis by vaccination induced testicular degeneration.

Acknowledgements: We thank the Managing Director, TCMFP, for permitting us to carry out the research at Buffalo Frozen Semen Station, Erode.

Table 1. Pre and Post Vaccination values of seminal parameters. (Mean \pm SE).

Parameters	Pre-Vaccination	Post-Vaccination (Weeks)								
	(Control)	I	II	III	IV	V	VI	VII	VIII	IX
Volume (ml)	4.44 ^{NS} \pm 0.34	3.21 ^{NS} \pm 0.51	2.63 ^{NS} \pm 0.50	4.33 ^{NS} \pm 0.92	3.83 ^{NS} \pm 0.51	4.61 ^{NS} \pm 0.55	3.54 ^{NS} \pm 0.55	3.98 ^{NS} \pm 0.50	4.45 ^{NS} \pm 0.35	4.42 ^{NS} \pm 0.37
Sperm Concentration x 10 ⁹ /ml	1.02 ^a \pm 0.05	0.63 ^b \pm 0.07	0.81 ^{ab} \pm 0.08	0.89 ^a \pm 0.07	0.95 ^a \pm 0.09	1.05 ^a \pm 0.06	0.95 ^a \pm 0.07	1.05 ^a \pm 0.06	0.99 ^a \pm 0.08	1.06 ^a \pm 0.08
Initial Motility (per cent)	66.25 ^a \pm 1.41	35.00 ^{bc} \pm 3.87	31.67 ^b \pm 6.70	51.25 ^{bc} \pm 4.27	63.33 ^a \pm 2.11	59.58 ^a \pm 7.34	62.5 ^a \pm 3.10	64.17 ^a \pm 2.47	65.83 ^a \pm 1.05	66.67 ^a \pm 2.79
Live Sperm Count (per cent)	79.13 ^a \pm 0.85	67.54 ^c \pm 1.34	70.84 ^{bc} \pm 2.39	75.26 ^{ab} \pm 1.67	77.33 ^a \pm 1.07	76.61 ^a \pm 1.34	79.11 ^a \pm 0.71	79.62 ^a \pm 1.18	78.59 ^a \pm \pm 0.72	79.57 ^a \pm 0.95
Total Abnormalities (per cent)	17.48 ^a \pm 0.56	38.35 ^c \pm 1.29	39.60 ^b \pm 1.48	35.19 ^a \pm 2.14	34.93 ^a \pm 1.37	26.93 ^d \pm 1.86	29.92 ^{bcd} \pm 1.26	24.92 ^{ca} \pm 1.59	20.96 ^{abc} \pm 0.79	19.34 ^{ab} \pm 1.02

NS-Non-Significant

Mean bearing atleast one Common Superscript in each row do not differ significantly (P > 0.05).

REFERENCES

- Krishna, K.M. and Rao, A.R. (1986). Epididymal dysfunction in buffalo bulls. *Indian Vet. J.* 63: 1013-1016.
- Radhakrishnan, R., Venkataswamy, V. and Pattabiraman, S.R. (1975). Further report on the effect of protective vaccination on semen quality of breeding bulls. *Indian Vet. J.* 52: 620-625.
- Rao, A.R. (1971). Changes in the morphology of sperm during their passage through genital tract in bulls with normal and impaired spermatogenesis. Ph.D. Thesis. Dept. of Obste. and Gynae. Royal Vet. College. Stockholm. Sweden.
- Rao, A.V.N. (1974). Vaccination stress in a Cross-bred bulls. *Indian Vet.J.* 51: 74-75.
- Rao, V.J. and Venkataswami, V. (1971): Histopathology of testicular tissue of crossbred bulls in foot and mouth vaccination - II. *Indian Vet. J.* 48: 1101-1102.
- Roberts, S.J. (1986). *Veterinary Obstetrics and Genital Diseases (Theriogenology)* 3rd Edn. Published by the Author, Woodstock, Vermont. pp. 752-890.
- Saxena, V.B. and Tripathi, S.S. (1977). Effect of foot and mouth disease vaccination on semen quantity, quality and preservability in Jersey bulls. *Indian Vet. J.* 54 959-964.
- Saxena, V.B. and Tripathi, S.S., Verma, M.C. and Singh, R. (1976). Foot and mouth vaccination stress in Red Dane, Jersey and Murrah bulls. *Curr. sci.* 45: 154-155.
- Snedecor, G.W. and Cochran, W.G. (1967). *Statistical Methods*, 6th Edn. Iowa State University Press, Ames, Iowa, U.S.A.
- Tripathi, S.S. and Saxena, V.B. (1976). A note on foot and mouth vaccination stress on quantity, quality and preservability of semen in Murrah bulls. *Indian J. Anim. Sci.* 46(1): 44-47.
- Tripathi, S.S. and Saxena, V.B. (1977). Effect of foot and mouth vaccination on ultrastructure of heat of Red Dane bull spermatozoa. *Pantnagar J.Res.* 2(1): 67-78.
- Venkataswami, V., Pattabiraman, S.R., Daniel, J. and Sunderavadanam, V.R. (1972). Effect of vaccination on spermatozoa resistance and their metabolic activity. *Indian Vet. J.* 49: 1012-1016.