Vet.Med.J.,Giza. Vol.42,No.1.(1994):155-158

LIVER AND KIDNEY FUNCTIONS IN CATTLE VACCINATED WITH TISSUE CULTURE RINDERPEST VACCINE

BY

HANAN S. A. AHMED* ; G. S. ESSAWY** AND A. A. FARAHAT**

*Rinderpest Vaccine Department. Serum and Vaccine Research Institute , Abbassia, Cairo.
**Department of Physiology. Fac. Vet. Med. Cairo University.

Received: 23 / 1 / 1994

SUMMARY

This study was conducted to determine the effect of rinderpest tissue culture vaccine on the hepato-renal functions of cross-breed Friesian calves. Eight claves 8-14 months of age and weighing 150-180 Kg were vaccinated with tissue culture rinderpest vaccine (10^{4-B} $TCID_{50}$ / ml / calf). and blood samples were collected before vaccination and at 3,7,14 ad 21 days post-vaccination. The results revealed that the calves became immunized against rinderpest disease where the neutralizing antibodies reach tis peak (2.52 ± 0.02 log10 / ml) by 21 days. The calves showed increase in total protein at 21 days and globulin at 14 and 21 days, while albumin was decreased at 14 and 21 days. SGOT, SGPT, bilirubin, creatinine and blood-urea-nitrogen did not change.

It is concluded that the tissue culture rinderpest vaccine has no effect on liver and kidney functions and produce a good level of immunity.

INTRODUCTION

Rinderpest has been known as the most important and devastating disease of cattle and buffaloes . It is still the cause of high mortality rate among the cattle and buffaloes (Scott, 1981).

Rinderpest is an acute febrile disease of ruminants produced by a virus related to the paramyxo virus family (Burner and Gillespie, 1965).

Efficient vaccination of cattlle and buffaloes against rinderpest has led to virtual eradiction of clinical disease in Egypt (Abo El-Hassan et al., 1987). Therefore, this work was planned to study the effect of tissue culture rinderpest vaccine on liver and kidney functions.

MATERIALS AND METHODS

Eight cross-breed Friesian calves 8-14 months of age and weighing 150-180 Kg were used . The animals were apparently healthy and free from both external and internal parasites. They were housed in isolated units and fed on concentrated ration (3kg/calf/day) and proved to be rinderpest susceptible just prior to vaccination by serum neutralization test (Reed and Muench, 1938). the rectal temperature was recorded before vaccination and up to 21 days.

the animals were vaccinated by tissue culture attenuated rinderpest vaccine (10^{4-B} $TCID_{50}$ / ml / calf). Blood sample was collected from each animal before vaccintion and at 3, 7, 14 and 21 days post-vaccination. The serum was separated and used to determine the antibody titre after vaccination by serum neutralization test (Reed and Muench, 1938).

Also, The serum was used to study the following hepato-renal parameters; serum glutamic oxalacetic transaminase (SGOT) and serum glutamic pyruvic transaminase (SGPT) according to Reitman and Frankel (1957), serum alkaline phosphatase (SALP) (Kind and King, 1954), serum total protein (Weichselbaum, 1946), serum albumin (Ness, 1965), serum direct and indirect bilirubin (Malloy and Evelyn, 1937), blood-urea-nitrogen (Coulombe and Favreau,

Table (I): Rectal temperature and rinderpest antibody titre in calves inoculated with tissue culture rinderpest vaccine.

Items	Time				
	Prevaccination day	Post-vaccination (days)			
		3	7	14	21
Rectal temperature	38.50 ± 0.04	38.86 ± 0.06	38.60 ± 0.05	38.62 ± 0.03	38.17 ± 0.06
Rinderpest antibody titre (Log 10)	0.00 ± 0.00	-- ± --	1.58 ± 0.5**	2.11 ± 0.01**	2.52 ± 0.02**

Values expressed as means ± SE.
** Means significantly differed from prevaccination at P ≤ .0.01.

Table (2): Results of liver and kidney function tests in calves vaccinated with rinderpest tissue culture vaccine (n=8).

Hepato-renal parameters	Sampling time				
	Prevaccination day	Post-vaccination period (days)			
		3	7	14	21
SGOT (IU %)	9.66 ± 0.24	9.10 ± 0.09	9.21 ± 0.25	9.37 ± 0.12	10.32 ± 0.16
SGPT (IU %)	6.06 ± 0.30	6.666 ± 0.38	5.38 ± 0.34	6.71 ± 0.34	5.82 ± 0.43
SALP (k.k.u/dl)	8.32 ± 0.44	9.46 ± 0.37	8.35 ± 0.62	9.79 ± 0.99	8.99 ± 0.45
Total protein (g/dl)	6.56 ± 0.20	6.22 ± 0.20	6.04 ± 0.16	7.42 ± 0.42	7.23 ± 0.24 *
Albumin (g/dl)	2.98 ± 0.12	2.93 ± 0.14	3.92 ± 0.09	2.61 ± 0.15*	2.52 ± 0.08**
Globulin (g/dl)	3.58 ± 0.25	3.29 ± 0.25	3.02 ± 0.17	4.81 ± 0.44*	4.51 ± 0.29*
Total bilirubin (mg/l)	5.00 ± 0.81	4.28 ± 0.42	5.05 ± 0.57	5.02 ± 0.30	4.65 ± 0.42
Direct bilirubin (mg/l)	0.92 ± 0.11	1.56 ± 0.32	1.15 ± 0.41	1.22 ± 0.21	1.35 ± 0.40
Free bilirubin (mg/l)	4.07 ± 0.80	2.70 ± 0.29	3.90 ± 0.56	3.80 ± 0.42	3.30 ± 0.42
Blood-urea-nitrogen (mg%)	17.95 ± 1.64	20.25 ± 1.62	14.89 ± 0.49	20.82 ± 0.58	19.40 ± 1.14
Serum creatinine (mg %)	1.42 ± 0.02	1.41 ± 0.02	1.41 ± 0.06	1.43 ± 0.02	1.39 ± 0.03

Values expressed as means ± Standard error.
** Means significantly differed from prevaccination at P ≤ .0.05.
** Means significantly differed from prevaccination at P ≤ .0.01.

1963) and serum creatinine (Husdan and Rapaport, 1968). The data were statistically analysed using student "t" test.

RESULTS

Quantitative serum neutralization test before vaccination revealed that the calves were clinically normal and seronegative to rinderpest neutralizing antibody then the titres of antibodies were significantly increased ($P < 0.01$) at the day 7, 14 and 21 post-vaccination (table 1).

The rectal temperature recorded before vacination and up to 21 days post-vaccination were within the normal limits (table 1). Liver and Kidney functions (Table 2) revealed that serum total protein was increased ($p < 0.05$) at 21 days post-vaccination, serum albumin was decreased at 14 and 21 days, and serum globulin increased at 14 and 21 days.

DISCUSSION

The rectal temperature of the calves were within the normal limits (38.17 ± 0.6 to 38.86 ± 0.05). This indicates that there is no post-vaccinal reactions. These results agree with that of Chawala (1969) and Murty et al. (1974).

The rinderpest neutralizing antibodies titre reached its peak (2.52 ± 0.02 log10 TCID50 / ml) by 21th day post-vaccination. These data are in a close agreement with that of Gurkipal (1983). So, the animals of the present study become immune against rinderpest disease.

SGOT and SGPT were within the normal limits. These results agree with that of El-Amrousi et al., (1975).

Serum alkaline phosphatase values showed insignificant changes. These data are within the normal limits reported by Goswami et al. (1971) for young and adult healthy cattle (7.37 ± 0.52 and 9.33 ± 0.47 K.K.U. %, respectivley).

Serum total proteins were increased at 21 days post-vaccination and serum globulin were increased at 14 and 21 days post-vaccination while the serum albumin were decreased at 14 and 21 days. These data are in agreement with that of Taha et al. (1984) in vaccinated buffaloes. The increase in the level of total protein and globulin could be attributed to the increased level of antibodies after vaccination .

Total, direct and free bilirubin showed insignificant changes before and after vaccination. These results coincide with that of Jamin (1978) in healthy cattle.

Blood-urea-nitrogen and serum creatinine are within the normal limits. The results of blood-urea-nitrogen agree with that recorded in healthy cattle by Blowey (1975) and Ekman (1976) . The serum creatinine are in accordance with that reported by Salah and Zein-El-Abdin (1976) and Muniandy et al., (1990).

Conclusively, the tissue culture rinderpest vaccine (TCRPV) has a non-significant effect on both liver and kidney functions. So, the vaccine could be used safely for vaccination of cattle where it produces a good level of immunity.

REFERENCES

Abo El-Hassan, D. G.; Ikram, A.; Karim, A.; Arab, R. M.; Saber, M. S.; Amin, M. M. Osman, O. A. and reda, I. M. (1987):Studies on rinderpest and disease like rinderpest in Egypt. J. Egypt. Vet. Med. Ass., 47; 274-284.

Blowey, R. W. (1975): Apractical application of metabolic profiles. Vet. Rec., 97: 324-327.

Burner, D. W., and Gillespie, J. H. (1965): Rinderpest disease in cattle and buffaloes. In Haggn's infectious disease of Domestic animals . 5th Ed., pp. 958-967.

Chawla, S. K. (1969): Immunological response to tissue culture rinderpest vaccine in exotic and crossbred animals. (Abstract) Vet. Bull. (1970): 4813.

Coulombe, T. L. and Favreau, L. (1963): Determination of urea-nitrogen in serum.Clin. Chem., (9): 102-108.

Ekman, L. (1976): Variation in some blood biochemical characteristics in cattle, horse and dogs and cause of such variations. Ann. Rec. Vet., 7 (2): 125-128.

Amrousi, S.; Mahmoud, M. S. and Nafie, E. K. (1975): Activity of some serum enzymes in normal, vaccinated and experimentally infected cattle with cattle plague virus. Assuit Vet. Med. J., 11 (3/4): 293-297.

Goswami, O. B.; Eapen, K. I. and Purohit, V. D. (1971): Differencies in serum alkaline phosphatase activity and serum cholesterol level in adult Hariana cattle.Am. Vet. J., 48 (3): 244-246.

Gurkipal, S. (1983): A note on the serological response to rinderpest tissue culture vaccine. Ind. J. Anim. Health. 22 (2): 147.

Husdan, H. and Rapaport, A. (1968): Estimation of creatinine by Jaffe reaction. A comparison methods. Clin. Chem., 14: 222-238.

Jamin, R. N. (1978): Recommendation on an uniform bilirubin and bilirubin standard. Clin. Chem., 8: 405.

Kind, P. R. N., and King, E. G. (1954): Calorimeteric method for phosphatase activity. J. Clin. Path., 7: 727.

Malloy, H. T. and Evelyn, K. A. (1937): Determination of serum bilirubin. J. Biol. Chem., 119: 481-489.

Muniandy, N.; Cheah, T. S.; Mahadi, Y. and Palanisamy, K. (1990): Reference values in blood chemistry and haematology for crossbred calves in peninsular Malaysia. J. Vet. Malaysia, 2 (2): 127-132.

Murty, D. K. and Sharma, S. K. (1974): Studies on reactogenicity and immunogenicity of cell culture rinderpest vaccine in different species of ruminants. Ind. J. Anim. Sci. 44 (6): 359.

Ness, A. J. (1965): The determination of human serum albumin by its specific binding of anionic dye. Clin, Chem Acta., 12: 532-540.

Reed, L. J., and Muench, H. (1983): A simple method for estimation of 50 percent end points. Am. J. Hyg., 27 493-497.

Reitman, S. and Frankel, S. (1957): A calorimeteric method for the determination of serum glutamic oxalacetic and serum glutamic pyruvic transaminases. Am. J. Clin Path., 28:56-60.

Salah, M. H. and Zein-El-Abdin, Y. (1976): Studies on some biochemical constituents and enzymes in the serum of normal non-pregnant dairy Egyptian buffaloes J. Egypt. Vet. Ass., 36 (1): 169-182.

Scott, G. R. (1981): Rinderpest and peste des petits ruminants. Virus disease of food animals, Vol. II 401-432.

Taha, S. M., El-Helo, I. A. and Osman, O. A. (1984) Studies on the effect of tissue culture rinderpest vaccine on the blood picture of buffaloes. Agri. Res. Rev., 62 (28): 198-208.

Weichselbaum, T. E. (1946): An accurate and rapid method for the determination of proteins in small amounts of blood serum and plasma. A. J. Clin. Path., 16: 40-49.