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**RESPONSE OF CATTLE TO SYNCHRONOUS VACCINATION
WITH RINDERPEST AND FOOT
AND MOUTH DISEASE VACCINES**
(With 2 Tables)

By

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إستجابة الأبقار للتحصين المتزامن بلقاحى الطاعون البقرى
والحمى القلاعية

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أجرى هذا البحث بإستخدام 15 عجلًا بقريةً قابلةً للمعدى بالطاعون البقرى وبالحمى القلاعية قست عشوائياً إلى أربعة مجموعات - حقنت المجموعة الأولى منها بلقاح الطاعون البقرى فقط وحقنت المجموعة الثانية تزامنياً بلقاحى الطاعون البقرى والحمى القلاعية كل على حده في موضعين مختلفين من جسم الحيوان - وحقنت المجموعة الثالثة بلقاح الحمى القلاعية فقط وذلك بالجرعة العقلية لكل لقاح وهى 1 مل من لقاح الطاعون البقرى النسبى الحى المحتوى على عترة كابتى (0) لفيروس الطاعون البقرى عند مستوى التسمير 10³ على خلايا كل الأبقار حقنت تحت الجلد في الجهة اليسرى من الرقبة ، 0.5 مل من لقاح الحمى القلاعية الفورمالينى المبت عترة (0₁/2/72, Egypt) وكلا اللقاحان بنتجان محلياً - واحتفظ بالمجموعة الرابعة كضوابط غير محقنة وتحت نفس ظروف الإبراء - وقد دلت نتائج الفحوص الإكلينيكية على عدم حدوث أية أعراض جانبية أو علامات مرضية أو ظواهر إكلينيكية مميّزة من المجموعات المحقنة مقارنة بمجموعة الضوابط وذلك خلال خمسة أسابيع من تاريخ التحصين - كما إستدل من نتائج الفحوص السيرولوجية الأسبوعية خلال نفس المدة على أن الإستجابة السيرولوجية النوعية للمقن المتزامن باللقاحين في الأبقار (المجموعة الثانية) لا تختلف معنوياً في محتواها عنها في الأبقار المحقنة أفرادياً بكل من اللقاحين (المجموعتين الأولى والثالثة) ، وذلك بعد تحليل النتائج إحصائياً . وخلاصة هذا البحث أن التحصين المتزامن بلقاحى الطاعون البقرى والحمى القلاعية يمكن أن يستخدم تطبيقياً توفيراً للوقت والجهد والمال اللازم لإجراء التحصين بكل لقاح على فترات متفاوتة .

SUMMARY

A total of 15 calves, susceptible to Rinderpest and Foot and Mouth disease, were randomly divided into 4 groups. One group received tissue culture

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Rinderpest Vaccine (TcRPV) alone, another simultaneously received TcRPV and Foot and Mouth Disease Vaccine (FMDV), a third group received FMDV alone and a fourth group which served as a non vaccinated control. No side effects or clinical reaction or disease syndrome could be detected in any of the vaccinated groups. All test animals remained clinically normal throughout an observation period of five weeks post inoculation. Very satisfactory serological responses were detected in animals simultaneously inoculated with both vaccines as well as in animals solely vaccinated with either vaccine.

Results clearly indicated that the simultaneous inoculation of cattle with TcRPV and FMDV on opposite sides of the neck can be safely used without impairing the response to individual components.

INTRODUCTION

Direct and indirect economic losses inflicted by Rinderpest on the livestock industry in Egypt clearly illustrate the importance of inhibiting the spread of infection and its eventual eradication from the country followed by the implementation of measures to prevent its reintroduction. The vaccine responsible for the spectacular decline in the incidence of Rinderpest in Egypt, was the TcRPV. The synchronous vaccination of livestock with both TcRPV and FMDV would save efforts, funds and time. Hence, the given study was undertaken to find out the clinical as well as the serological response of cattle to such synchronization of vaccination.

MATERIAL and METHODS

Animals :

A total of 15 calves were used in the study. They were Rinderpest and Foot and Mouth disease-susceptible as proved by serum neutralization and passive haemagglutination tests carried out on serum samples collected just prior to vaccination. Test calves were randomly divided into four groups. One group received TcRPV alone, another received both TcRPV and FMDV simultaneously, a third group received FMDV alone and a fourth group which was held as a non vaccinated control. Animals were kept under same management conditions and were subjected to daily clinical examination. They were weekly monitored serologically for five weeks post inoculation.

Vaccines :

Rinderpest vaccine :

The locally produced TcRPV incorporating the live tissue culture-attenuated Kabet "O" strain of rinderpest virus at its 103rd passage on bovine kidney (BK) cell monolayers, was used in the present study. The dose was 1 ml containing at least 100 TCID₅₀ of TC-attenuated rinderpest virus, injected subcutaneously on the left side of the neck (OSMAN *et al.*, 1987).

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Foot and Mouth Disease Vaccine :

The locally produced FMDV was used in the present work. It incorporated the formal-inactivated (0₁/2/72, Egypt) strain adsorbed onto aluminium hydroxide gel supplemented with saponin (MOUSSA *et al.*, 1974). The dose was 5 ml inoculated subcutaneously on the right side of the neck.

Serology :

Neutralization test :

Sera collected at specified intervals were assayed in rinderpest virus neutralization tests on BK cell monolayers. Rinderpest virus neutralization serum titres were expressed as the Log_{10} reciprocal of the final serum dilution in the serum/virus mixture which neutralized 100-200 TCID₅₀ of rinderpest virus (OSMAN *et al.*, 1985). Results of neutralization test were statistically analysed using the (t) test.

Passive Haemagglutination Test :

Sera collected at predetermined intervals were assayed for the detection of FMD antibodies. The test was used according to the method described by TOKUDA and WARRINGTON (1970), but slightly modified in the use of 1 in 20,000 dilution of formalin to treat sheep erythrocytes. Titres were expressed as the reciprocal of serum dilutions giving 50% or more haemagglutination. Serum titres of 4 and above were considered positives for FMD antibodies.

RESULTS

No side effects or clinical reactions could be detected in any of the vaccinated groups. Test animals remained clinically normal throughout an observation period of five weeks post inoculation.

Response to TcRPV :

Data shown in table (1) indicated that there was no significant difference (P 0.05) in rinderpest neutralizing antibody titres between group (1) receiving TcRPV alone and group (2) simultaneously vaccinated with TcRPV and FMDV.

Response to FMDV :

Results given in table (2) showed that the response was the same in animals of group (3) vaccinated with FMDV alone and in those of group (2) simultaneously vaccinated with FMDV and TcRPV. Control non vaccinated group of animals remained susceptible to both diseases.

Table (1): Results of Rinderpest Virus Neutralization Test.

G	N	Vaccines received	RVSNT										
			*0	1	M	2	M	3	M	4	M	5	M
1	4	TcRPV	0	0		1.6		1.6		2.0		2.0	
			0	0	0	1.6	1.6	2.0	1.8	2.0	2.0	2.0	2.0
			0	0		1.8		1.9		2.1		2.1	
			0	0		1.4		1.7		1.9		1.9	
2	4	TcRPV and FMDV	0	0		1.6		2.0		2.1		2.1	
			0	0	0	1.0	1.3	1.3	1.6	1.3	1.7	1.3	1.7
			0	0		1.4		1.6		1.6		1.6	
			0	0		1.2		1.6		1.8		1.8	
3	4	FMDV	0	0		0		0		0		0	
			0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0
			0	0		0		0		0		0	
4	3	non vaccinated control	0	0		0		0		0		0	
			0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0
			0	0		0		0		0		0	

G : groups of cattle .

N : number of animals.

TcRPV : tissue culture rinderpest vaccine.

FMDV : foot and mouth disease vaccine.

* : weeks post vaccination.

M : geometric mean serum neutralizing titres (Log_{10}).RVSNT : rinderpest virus - serum neutralizing titres (Log_{10}).

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Table (2): Results of passive haemagglutination test for FMD antibody.

Groups	No. of animals	Vaccines received	Serum titres					
			* 0	1	2	3	4	5
1	4	TcRPV	0	0	0	0	0	0
			0	0	0	0	0	0
			0	0	0	0	0	0
			0	0	0	0	0	0
2	4	TcRPV and FMDV	0	0	+	+	+	+
			0	0	+	+	+	+
			0	0	+	+	+	+
			0	0	+	+	+	+
3	4	FMDV	0	0	+	+	+	+
			0	0	+	+	+	+
			0	0	+	+	+	+
			0	0	+	+	+	+
4	3	non vaccinated control	0	0	0	0	0	0
			0	0	0	0	0	0
			0	0	0	0	0	0
			0	0	0	0	0	0

TcRPV : tissue culture rinderpest vaccine.

FMDV : foot and mouth disease vaccine.

* : weeks post vaccination.

† : Serum titres of 4 and above were considered positive.

DISCUSSION

Reports in the literature on the effect of simultaneous vaccination of animals with more than one vaccine, are varied. KATHURIA *et al.* (1976) reported that the response to FMDV of cattle simultaneously vaccinated with FMDV and TcRPV at separate sites was lower than that of animals vaccinated with FMDV alone. GARCIA - CARILLO (1978) concluded that the simultaneous application of FMDV and Brucella abortus strain 19 vaccine in guinea pigs interfered with the immunity to the latter. On the other hand, DARIE *et al.* (1979) found that simultaneous administration of a vaccine containing various combinations of Clostridia, Anthrax and FMD virus did not affect the magnitude or duration of the immune response in fattening lambs compared with that given by

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each vaccine when inoculated solely. POLYDOROU et al. (1980) reported that in sheep in Cyprus, FMDV could be given at the same time as enterotoxaemia, anthrax and enzootic abortion antigens. In France, a combined FMDV/rabies virus vaccine has been used for many years and it is reported that the evolution of antibodies to FMDV following the use of mixed vaccine does not differ from that observed following vaccination with the trivalent FMDV alone (FAURE et al., 1980 and COUDERT et al., 1981). In Malaysia, JOSEPH and HEDGER (1984) showed that cattle could be safely vaccinated with inactivated FMDV and haemorrhagic septicaemia vaccine without affecting the response to either component.

In this trial, very satisfactory serological response was obtained both to TcRPV and FMDV (Tables 1 and 2). It was of interest to find out that there was no significant difference ($P > 0.05$) in rinderpest neutralizing antibody response between group (1) which received TcRPV alone and group (2) simultaneously inoculated with TcRPV and FMDV. However, the rinderpest antibody titres of group (1) were slightly higher than those of group (2). Such increase was shown to be statistically insignificant and can probably be ignored (Table 1).

Our results clearly indicate that the simultaneous vaccination of cattle with TcRPV and FMDV at separate sites on the neck of the animal can be safely used without impairing the response to the individual components.

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