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## THE SIMULTANEOUS INOCULATION OF CATTLE WITH RINDERPEST AND HAEMORRHAGIC SEPTICAEMIA VACCINES (With 2 Tables)

By

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الحقن المتزامن بلقاحي الطاعون البقري والتسم الدموي في الأبقار

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أجرى هذا البحث باستخدام 15 عجلاً بقرياً قابلة للعدوى بالطاعون البقري وبالتسم الدموي - قسمت إلى أربعة مجموعات - حقنت المجموعة الأولى منها بلقاح الطاعون البقري فقط وحقنت المجموعة الثانية تزامنياً بلقاحي الطاعون البقري والتسم الدموي كل على حده في موضعين مختلفين من جسم الحيوان - وحقنت المجموعة الثالثة لقاح التسم الدموي فقط ، وذلك بالجرعة الحقلية لكل لقاح وهي (من ١ مل من لقاح الطاعون البقري النسيجي الحي المحتوي على عترة كابيتي ( 0 ) لفيروس الطاعون البقري عند مستوى التمرير ١٠٢ على خلايا كلى الأبقار - حقنت تحت الجلد في منطقة الرقبة ، ٢ مل من لقاح التسم الدموي الزيتي الميت عتسرة كارتر نوع ( B ) - حقنت في عضلة الفخذ - واحتفظ بالمجموعة الرابعة كضوابط غير محصنة وتحت نفس ظروف الإيواء . وقد إستدل من نتائج الفحوص الإكلينيكية المتتابعة على عدم حدوث أية أعراض جانبية أو علامات مرضية في أي من المجموعة المحصنة مقارنة بمجموعة الضوابط وذلك خلال فترة التجربة ولمدة ستة أشهر بعدها - وبإستقرار نتائج الفحوص السيرولوجية بعد تحليلها إحصائياً وجد أن الإستجابة السيرولوجية النوعية للحقن المتزامن باللقاح في الأبقار (المجموعة الثانية) لا تختلف معنوياً في مستواها عنها في الأبقار المحصنة إفرادياً بكل من اللقاحين (المجموعتان الأولى والثالثة) ، ويستخلص من ذلك أن تزامن التحصين بلقاحي الطاعون البقري النسيجي الحي المستضعف والتسم الدموي الزيتي الميت في الأبقار حقناً في موضعين مختلفين من جسم الحيوان لا يؤثر سلباً في مستوى الإستجابة السيرولوجية لكل من اللقاحين وعلى ذلك يوصى بتنفيذ أعمال التحصين المتزامن باستخدام اللقاحين المذكورين من خلال حملات التحصين الجارية في مصر وذلك لإيجابية هذا الإسلوب إقتصادياً وتطبيقياً .

### SUMMARY

A total of 15 calves, susceptible to rinderpest and haemorrhagic septicaemia were divided into 4 groups. One, which received rinder-

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O.A. OSMAN, et al.

pest vaccine alone, another which received simultaneously both rinderpest and haemorrhagic septicaemia vaccines at separate sites, a third which received haemorrhagic septicaemia vaccine alone and a fourth which was held as a non vaccinated control group.

The simultaneous vaccination of cattle with both vaccines produced no adverse effects and the animals remained clinically normal during a trial period of 42 days and for a further observation period of six months.

The serological response to vaccination as mentioned at day 0, 21 and 42 in virus neutralization and indirect haemagglutination tests was essentially the same in animals receiving simultaneous vaccination with both vaccines and in those receiving either vaccine alone.

For logistic and economic reasons, and in view of such positivity of results, the simultaneous vaccination of cattle with both vaccines is recommended to be followed through vaccination campaigns in Egypt.

### INTRODUCTION

In countries where livestock populations are frequently at risk to several infectious diseases for which adequate vaccines are available, questions are posed whether simultaneous vaccination can be used without impairing the protective response to each vaccine. The last outbreak of rinderpest in Egypt (1982-85) could be put under prompt control through an adequate vaccination campaign with the use of the locally produced tissue culture rinderpest vaccine (TcRRV). Since haemorrhagic septicaemia vaccine (HS) is routinely used in vaccination of cattle through vaccination campaigns, an assessment of the efficacy of the simultaneous inoculation of both vaccines was undertaken.

Successful trials were previously reported by several authors regarding simultaneous vaccination of cattle (MACADAM, 1964) for rinderpest and black quarter or anthrax spore vaccine; (BROWN and TAYLOR, 1966) for rinderpest and contagious bovine pleuropneumonia; (ZYKOV and PAPHAELSKAYA, 1981) for influenza and BCG; (JOSEPH and HEDGER, 1984) for foot and mouth disease and haemorrhagic septicaemia; (CHENEAU, 1985) for rinderpest and contagious bovine pleuropneumonia; (HEDGER, et al. 1986) for foot and mouth disease and rinderpest as well as (OSMAN, et al. 1987) for rinderpest and BCG. Therefore study concerns the simultaneous vaccination of cattle with rinderpest and haemorrhagic septicaemia vaccines.

## RINDERPEST, HAEMORRHAGIC SEPTICAEMIA VACCINES

**MATERIAL and METHODS****Animals:**

A total of 15 calves were used in the trial. They were rinderpest and haemorrhagic septicaemia-susceptible as proved by serological tests carried out on serum samples collected just prior to vaccination. Tested calves were divided into 4 groups, the first group received rinderpest vaccine, the second group inoculated simultaneously with both rinderpest and haemorrhagic septicaemia vaccines, the third vaccinated group with haemorrhagic septicaemia vaccine and the fourth group was held as a non vaccinated control. The groups were distinguished by tagging. The animals were all kept under the same management system. The serological response to vaccination was monitored at day 0, 21 and 42 in virus neutralization and indirect haemagglutination tests. All animals were clinically examined daily until the end of the experiment.

**Vaccines and Vaccination:****Rinderpest:**

The rinderpest vaccine was the locally produced TcRPV incorporating the live attenuated Kabete "0" strain of rinderpest virus at its 103<sup>rd</sup> passage on bovine kidney cells (BK) as described by ABDEL GHAFAR, *et al.* (1977). The dose was 1 ml containing at least 200 TCID<sub>50</sub> of attenuated rinderpest virus, given subcutaneously on the left side of the neck (OSMAN, *et al.* 1987).

**Haemorrhagic septicaemia:**

The haemorrhagic septicaemia vaccine was the locally produced formaline-inactivated oil-adjuvant vaccine incorporating the Carter's type "B" strain of *P. multocida* (GENEIDY, *et al.* 1967). It was administered in a 2 ml dose intramuscularly in the rump.

**Serological tests:****Neutralization test:**

Sera were assayed in virus neutralization tests on monolayers of BK cells as described by SINGH, *et al.* (1967). Rinderpest virus-neutralization titres were expressed as the Log<sub>10</sub> reciprocal of the final dilution of serum in the serum/virus mixture which neutralized 100-200 TCID<sub>50</sub> of rinderpest virus (OSMAN, *et al.* 1985).

**Indirect haemagglutination test:**

It was carried out as described by CARTER and RAPPY (1962). The titre of the serum was expressed as the Log<sub>10</sub> reciprocal of the highest dilution of serum giving 50% or more haemagglutination.

The results of the neutralization and indirect haemagglutination tests were statistically analysed using Student's "t" test.

## RESULTS

The simultaneous vaccination of cattle with both vaccines at separate sites produced no adverse effects and the animals remained clinically normal during the trial period and for a further observation period of six months.

### Response to rinderpest vaccination:

Table (1) summarizes the results of rinderpest virus neutralization test on sera from the four groups of animals taken before vaccination (day 0) and at days 21 and 42 after vaccination. There was no significant difference ( $P > 0.01$ ) between the geometric mean virus neutralization titres of the animals receiving simultaneous vaccination against rinderpest and haemorrhagic septicaemia (group 2) and those receiving rinderpest vaccination alone (group 1).

### Response to haemorrhagic septicaemia vaccination:

Table (2) shows the results of the indirect haemagglutination test for haemorrhagic septicaemia antibodies. There was no significant difference ( $P > 0.01$ ) between the geometric mean haemagglutination titres of the animals receiving simultaneous vaccination with both vaccines (group 2) and those receiving haemorrhagic septicaemia vaccine alone (group 3).

Controls were absolutely negative for both rinderpest and haemorrhagic septicaemia antibodies.

## DISCUSSION

One of the biggest constraints in obtaining adequate vaccination coverage is the poor response on the part of animal owners to vaccination campaigns. Most livestock owners are reluctant to bring their cattle for a number of reasons. Hence and for logistic and economic reasons, there has been a demand for simultaneous vaccination against rinderpest and haemorrhagic septicaemia. This demand has necessitated a closer look at the effects, as measured by serological responses, of simultaneous vaccination against these two diseases. In this trial, very satisfactory serological responses were obtained both to rinderpest and haemorrhagic septicaemia vaccines. The results obtained in this trial indicate that cattle given simultaneously both rinderpest and haemorrhagic septicaemia vaccines developed virus neutralization titres not different from those in cattle given only rinderpest vaccine. The results obtained evidenced also that the serological response to haemorrhagic septicaemia vaccination

## RINDERPEST, HAEMORRHAGIC SEPTICAEMIA VACCINES

was comparatively the same in either groups of animals, those simultaneously vaccinated with both vaccines and those vaccinated with haemorrhagic septicaemia vaccine alone.

Our results clearly indicate that the simultaneous vaccination of cattle with attenuated tissue culture rinderpest vaccine and inactivated oil-adjuvant haemorrhagic septicaemia vaccine at separate sites is safe to be used without impairing the response to individual vaccines. Such an application reduces the cost and the number of times a farmer need to muster the animals.

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### REFERENCES

- Abdel Ghaffar, S.; Osman, O.A.; Ata, F.A.; Mouaz, M.; Athanasious, S. and Mohsen, A.Y.A. (1977): The value of rinderpest tissue culture vaccine in cell culture and in calves. *Agric. Res. Rev.*, 55: 49.
- Brown, R.D. and Taylor, W.P. (1966): Simultaneous vaccination of cattle against rinderpest and contagious bovine pleuropneumonia. *Bull. Epizoot. Dis. Afr.*, 14: 141.
- Carter, G.R. and Rapay, D.E. (1962): *British Vet. J.*, 118: 289.
- Cheneau, Y. (1985): Prevalence of rinderpest and strategy of the Pan African Campaign. *Rev. Sci. Tech., Off. Des. Epiz.*, 4: 403.
- Geneidy, A.A.; Lotfy, O. and El-Affandy, A.M. (1967): Control of haemorrhagic septicaemia with special reference to the new oil adjuvant vaccine. *J. Egy. Vet. Med. Ass.*, 27: 121.
- Hedger, R.S.; Taylor, W.P.; Barnett, I.R.R.; Rier, R. and Harpham, D. (1986): Simultaneous vaccination of cattle against foot and mouth disease and rinderpest. *Trop. Anim. Hlth. and Prod.*, 18: 21.
- Joseph, P.G. and Hedger, R.S. (1984): Serological response of cattle to simultaneous vaccination against foot and mouth disease and haemorrhagic septicaemia. *Vet. Rec.*, 114: 494.
- Macadam, I. (1964): The response of Zebu cattle to tissue culture rinderpest vaccine mixed in (1) black quarter vaccine and (2) anthrax spore vaccine. *Bull. Epiz. Dis. Afr.*, 12: 401.
- Osman, O.A.; Mouaz, M.A.; Athanasious, S. and Abdel Ghaffar, S. (1985): Comparative study of in-vitro and in-vivo titration of pooled batches of tissue culture rinderpest vaccine. *Al-Azhar J. Pharm. Sci.*, 4: 117.

- Osman, O.A.; Mahmoud, A.A.; Mouaz, M.A. and Athanasious, S. (1987): A preliminary study on vaccination of calves with rinderpest and BCG vaccines. *Assiut Vet. Med. J.*, Vol. 19, No. 37.
- Singh, K.V.; Osman, O.A.; Baz, T.I. and El-Cicy, I.F. (1967): The use of tissue culture rinderpest vaccine for Egyptian cattle and water buffaloes. *Cornell. Vet.*, 57: 465.
- Zykov, M.P. and Paphaelskaya, T.I. (1981): Influenza vaccine response following its simultaneous application with BCG. *Z. Erkrank. Atm. Org.*, 156: 203.

Table (1)  
Results of rinderpest virus neutralization test

Groups	No. of animals	Vaccines received	Neutralization titres *					
			day 0	G	day 21	G	day 42	G
1	4	rinder- pest only	0		1.90		2.00	
			0		1.20		1.50	
			0	0		1.55		1.75
			0		1.30		1.60	
2	4	rinder- pest and H S	0		1.95		2.15	
			0		1.80		1.95	
			0	0		1.80		2.05
			0		1.90		2.10	
3	4	H S  only	0		0		0	
			0		0		0	
			0	0		0		0
			0		0		0	
4	3	non vaccinated controls	0		0		0	
			0		0		0	
			0	0		0		0
			0		0		0	

\* =  $\text{Log}_{10}$  reciprocal serum titres.

G =  $\text{Log}_{10}$  geometric mean titres.

HS = Haemorrhagic septicaemia.

## RINDERPEST, HAEMORRHAGIC SEPTICAEMIA VACCINES

Table (2)  
Results of indirect haemagglutination test

Groups	No. of animals	Vaccines received	heamagglutination titres *					
			day 0	G	day 21	G	day 42	G
1	4	rinder- pest only	0		0		0	
			0		0		0	
				0		0		0
			0		0		0	
2	4	rinder- pest and H S	0		3.40		3.40	
			0		3.10		3.10	
				0		3.10		3.25
			0		2.80		3.10	
3	4	H S only	0		3.10		3.10	
			0		3.10		3.10	
				0		3.10		3.10
			0		3.40		3.10	
4	3	non vaccinated controls	0		0		0	
			0		0		0	
				0		0		0
			0		0		0	

\* =  $\text{Log}_{10}$  reciprocal serum titres.

G =  $\text{Log}_{10}$  geometric mean titres.

HS = Haemorrhagic septicaemia.