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TUBERCULIN RESPONSE RELATED TO THE ADMINISTRATION OF SOME VIRAL AND BACTERIAL VACCINES (With Two Tables)

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(Received at 31/5/1990)

استجابة اختبار التوبركولين منسوبا بإعطاء بعض التحصينات الفيروسية والبكتيرية

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السل من الأمراض التي لها أهمية صحية كما أنه يسبب خسائر اقتصادية هائلة، والحمى القلاعية والطاعون البقري والتسمم الدموي والتهاب الجلد العقدي. فكان من الضروري مقاومة هذه الأمراض. ولما كان هناك اقتراح من الباحثين وآخرين بإجراء اختبار التوبركولين والتحصينات ضد هذه الأمراض في آن واحد لتقليل الوقت والجهد في مقاومتها وأجريت التجارب في عجول من الجاموس والبقرة الفريزيان وهذه العجول قد حقنت بنوع واحد من التحصينات البكتيرية أو الفيروسية تحت الدراسة وقد أجرى اختبار التوبركولين في نفس وقت التحصين وكذلك بعد التحصين بشهرين وقد اتضح من الدراسة أن التحصين بملقاح الحمى القلاعية والطاعون البقري والتهاب الجلد العقدي والتسمم الدموي لا يتداخل مع اختبار التوبركولين. ويمكن إجراء هذا الاختبار أثناء عملية التحصين لتقليل الوقت والجهد.

SUMMARY

The public health importance of tuberculosis and the economic losses caused by the disease and the others named rinder pest, foot and mouth, lumpy skin disease and haemorrhagic septicaemia make eradication of these diseases are essential.

The suggestion made by the author and others that tuberculin, testing and vaccination programme measures should be carried out simultaneously to reduce the time and the cost of the campaign. The experiments were investigated in freizian and buffalo calves both sensitized with BCG vaccine and six weeks later, each group vaccinated with one viral or bacterial vaccines under the study. Tuberculin testing were carried out simultaneously and two months later of vaccinations.

In conclusion foot and mouth, rinder pest, lumpy skin and haemorrhagic septicaemia vaccination did not interfere with tuberculin reactions. A fact which may be of economic value during control campaign.

A.A. MAHMOUD

INTRODUCTION

Tuberculosis causes extensive waste and major concern to the cattle industry. The occurrence of the disease, in animals and man adds both economic and public health importance.

The methods used for eradication of tuberculosis depend on a number of factors but ultimately the tuberculin test and slaughter policy is the only one by which effective eradication has been achieved (BLOOD, *et al.* 1986).

A decrease in the levels of tuberculin response during viral infections and after the administration of viral vaccines has been observed in man (BENTZON, 1953). Variations of the tuberculin response have also been observed in certain bacterial infections, both in humans and guinea pigs (COLDING, *et al.* 1976).

In Egypt, tuberculosis control programme under way or about to be initiated in cattle and buffaloes vaccinated against foot and mouth, rinder pest, lumpy skin disease and haemorrhagic septicaemia. The administration of vaccines simultaneously with tuberculin testing would simplify and reduce the cost of the control programmes.

The experiments that follow were carried out to determine whether those vaccines have an influence on the levels of response to the tuberculin when conducted simultaneously or shortly before this test.

MATERIAL and METHODS

Experimental animals:

Hundred thirty freizian calves and ninty buffaloe calves, approximately 6-9 months old with no history of previous vaccination were used. They were clinically healthy and proved to be free from internal and blood parasite as revealed by examination of faecal samples and periferal blood samples stained with Giemsa stain (BODDIE, 1959).

Vaccines:

- a) Monovalent foot and mouth disease (FMD) vaccine type 0, with aluminum hydroxide and saponin.
- b) Attenuated tissue culture rinder pest (RP) vaccine.
- c) Attenuated sheep pox vaccine used in cattle to protect them against lumpy skin disease (CAPSTICK and COACKLEY, 1967).
- d) Oil adjuvent vaccine of haemorrhagic septicaemia (HS).

TUBERCULIN VIRAL & BACTERIAL VACCINES

The above mentioned vaccines were obtained from Serum and Vaccine Research Institute Abbasia Cairo.

e) BCG

The strain used for human vaccination and produced by Jap, BCG, Lab., Tokyo, Japan, was obtained through the Egyptian organization for Biological and Vaccine Production, Agouza, Cairo.

Tuberculin:

Mammalian tuberculin was obtained from Serum and Vaccine Research Institute, Abbasia, Cairo.

Experimental design:

Sensitization of calves: Calves were sensitized by intradermal inoculation of BCG in a dose of 10-20 million organisms.

A - Four experiments were carried out in freizian calves

Experiment No. (1):

Twenty sensitized calves vaccinated with FMD vaccine in a dose 5 ml subcutaneously.

Experiment No. (2):

Twenty two sensitized calves, vaccinated with tissue culture RP vaccine in dose of 10^2 ID₅₀ subcutaneously (the ampoule contain 200 dose dissolved in 200 ml normal saline, each calf received 1 ml).

Experiment No (3):

Twenty five sensitized calves, vaccinated with sheep pox vaccine (the content of ampoule contain 200 doses dissolved in 100 ml normal saline and each calf received 1/2 ml intradermally in a caudal fold.

Experiment No (4):

Twenty three sensitized calves, vaccinated with oil adjuvant vaccine of HS in a dose of 2 ml intramuscular.

Ten BCG sensitized and non vaccinated calves were used as control group in each experiment.

Single intradermal tuberculin test:

The method of HERBERT (1974) was applied in tuberculin testing of calves under experiments at time of vaccination and 2 months later. The test was performed in the neck with mammalian tuberculin and the readings of the reactions were made by measuring the differences in the skin fold thickness before inoculation and 72 hours after.

A.A. MAHMOUD**B - Buffalo calves:**

As in freizian calves similar procedure was carried out.

Experiment No. (1):

Foot and mouth disease vaccine inoculated in twenty five calves.

Experiment No. (2):

Tissue culture rinder pest vaccine inoculated in twenty two calves.

Experiment No. (3):

Oil adjuvent vaccine of haemorrhagic septicaemia inoculated into twenty two calves.

In each experiment a seven BCG sensitized calves and non-vaccinated served as control group.

RESULTS

The results obtained from freizian and buffalo calves are respectively presented in tables 1 and 2.

Tuberculin reaction showed insignificant increase when carried out simultaneously with FMD or sheep pox vaccinations. Also it did not interfere with the test when conducted two months apart.

There was no difference in the tuberculin response between tissue culture rinder pest (RP) vaccinated freizian and buffalo calves and the controls. At the same time vaccination with oil adjuvent vaccine of HS in freizian and buffalo calves did not interfere with tuberculin testing.

DISCUSSION

The basis of all tuberculosis eradication schemes in the tuberculin test depends on the policy of slaughtering all positive reactors whether they are open cases or not.

In the present study, it was found that insignificant increase in the reaction of tuberculin testing, were observed when FMD vaccination and the test carried out simultaneously. On the other hand, it seems that vaccination did not apparantly interfere with the test carried out two months apart (tables 1 & 2). The former result was previously supported by the explanation given by BLACK (1979) who reported that FMD vaccine causes hypersensitivity to the animals. The cause was attributed to the

TUBERCULIN VIRAL & BACTERIAL VACCINES

fact that the vaccine contains alluminum hydroxide and saponin which may irritate the skin. The later findings agree with these of DEKANTOR, et al. (1980).

The application of tissue culture RP vaccine in this study did not interfere with tuberculin test (tables 1 & 2). This might be attributed to the saftey and immunogenicity of the live attenuated tissue culture RP vaccine for cattle and buffaloes (SINGH, et al. 1967 and OSMAN, et al. 1985). Moreover, our results agree with that have been reported by OSMAN, et al. (1987) who concluded that RP vaccine did not affect on tuberculin test.

All over results of the present work carried out under our field environmental conditions showed that the simultaneous applications of tuberculin testing with vaccination of calves with sheep pox vaccine, induce insignificant increase in tuberculin reaction. Moreover, it did not interfere with test when conducted two months apart (table 1) these findings were not in agreement with those reported by BENTZON (1953) who observed a decreased reaction to tuberculin after vaccination with some viral vaccines. This controversy might be due to differences in viral vaccines.

Results obtained in tables (1 & 2) pointed out that no difference in tuberculin response between HS vaccinated calves and controls were noticed.

CONCLUSION

It may be concluded that foot and mouth disease, rinder pest pox and haemorrhagic septicaemia vaccinations in cattle and buffaloes did not significantly interfere with tuberculin test. A fact which may be of economic value during control campaign.

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A.A. MAHMOUD

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Table (1)
Tuberculin responses in Freizian calves sensitized with BCG
and inoculated with viral and bacterial vaccines

No. of Experiment	Inoculum	No. of animals	Mean tuberculin response in min.	
			at time of vaccination	two month later
1	Foot and mouth disease vaccine	20	14.8 \pm 0.23	12.3 \pm 0.22
	Control	10	11.6 \pm 0.26	10.1 \pm 0.11
2	Tissue culture rinder pest vaccine	22	11.6 \pm 0.52	13.2 \pm 0.17
	Control	10	10.9 \pm 0.43	13.1 \pm 0.15
3	Sheep pox vaccine	25	15.1 \pm 0.56	11.9 \pm 0.18
	Control	10	10.9 \pm 0.22	10.9 \pm 0.12
4	Oil adjuvant vaccine of haemorrhagic septicaemia	23	11.2 \pm 0.11	12.6 \pm 0.33
	Control	10	10.8 \pm 0.17	12.1 \pm 0.24

Mean tuberculin response = difference in skin thickness in m.m before and after treatment.

TUBERCULIN VIRAL & BACTERIAL VACCINES

Table (2)

Tuberculin responses in buffloe calves sensitized with BCG and inoculated with viral and bacterial vaccines

No. of Experiment	Inoculum	No. of animals	Mean tuberculin response in mm.	
			at time of vaccination	two month later
1	Foot and mouth disease vaccine Control	25 7	13.5 \pm 0.01 10.3 \pm 0.12	11.0 \pm 0.22 9.2 \pm 0.36
2	Tissue culture rinder pest vaccine Control	22 7	12.1 \pm 0.13 11.0 \pm 0.34	14.9 \pm 0.54 13.3 \pm 0.46
3	Oil adjuvant vaccine of haemorrhagic septicaemia	22 7	10.5 \pm 0.15 9.1 \pm 0.47	13.6 \pm 0.18 12.5 \pm 0.36

Mean tuberculin response = difference in skin thickness in mm before and treatment.