

Experimental infection of goats with *Mycoplasma capri* and « peste des petits ruminants » virus

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RÉSUMÉ

ONOVIRAN (O.), MAJIYAGBE (K. A.), MOLOKWU (J. U.), CHIMA (J. C.), ADEGBOYE (D. S.). — Infection expérimentale des chèvres avec *Mycoplasma capri* et le virus de la peste des petits ruminants. *Rev. Elev. Méd. vét. Pays trop.*, 1984, 37 (1) : 16-18.

Mycoplasma capri (souche de Smith) et le virus de la peste des petits ruminants (PPR) ont été inoculés séparément ou simultanément à des chèvres adultes. Deux des quatre chèvres infectées par *M. capri* sont mortes d'une pneumonie généralisée 10 à 12 jours après inoculation. L'une des quatre chèvres inoculées avec le virus PPR est morte d'une gastro-entérite grave 12 jours après inoculation de même que trois des quatre chèvres inoculées simultanément avec les deux germes sont mortes de pneumonie et de gastro-entérite.

Des symptômes de pneumonie et de diarrhée sont apparus à des niveaux divers dans le groupe de chèvres témoin.

Mots clés : Virus Peste des petits ruminants - *Mycoplasma capri* - Chèvre - Nigeria.

SUMMARY

ONOVIRAN (O.), MAJIYAGBE (K. A.), MOLOKWU (J. U.), CHIMA (J. C.), ADEGBOYE (D. S.). — Experimental infection of goats with *Mycoplasma capri* and « peste des petits ruminants » virus. *Rev. Elev. Méd. vét. Pays trop.*, 1984, 37 (1) : 16-18.

Adult goats were inoculated with *Mycoplasma capri* (Smith's strain) or peste des petits ruminants (PPR) virus or both organisms simultaneously. Two of four goats which had *M. capri* died 10 to 12 days post inoculation with extensive pneumonia. One of four goats inoculated with PPR virus died 12 days post inoculation with severe gastro-enteritis.

Three of four goats inoculated simultaneously with both organisms died with lesions of pneumonia and gastro-enteritis within 12 days post inoculation.

Symptoms of pneumonia and diarrhoea were exhibited in varying degrees in the latter group of goats.

Key words : Peste des petits ruminants Virus - *Mycoplasma capri* - Goats - Nigeria.

INTRODUCTION

The two major causes of mortality in the goat population of Nigeria are pneumonia and diarrhoea (7). Field investigations have shown that both symptoms are observed invariably in any group of sick goats and lesions found in many of the dead ones include pneumonia and/or

gastroenteritis. *M. capri* and PPR virus are two organisms which have been isolated previously from pneumonia and diarrhoea respectively in goats (5, 8, 9).

An experimental study on the interaction of *M. capri* and PPR virus in goats would reveal the clinical symptoms and pathology of such a mixed infection and provide information which may be of value in any similar field situation. This was the purpose of this study.

MATERIALS AND METHODS

Experimental animals

Fourteen healthy adult goats were purchased from a local market. Two weeks after purchase, they were examined three times serologically at weekly intervals and found to be free of antibodies to *M. capri* and PPR virus. They were divided randomly into four groups A to D. A to C contained four each while group D contained two animals used as controls. Each group was housed separately.

PPR virus

The spleen, small intestine, kidney and mesenteric lymph glands were removed from a goat experimentally infected with a local strain of PPR virus and showing diarrhoea. The tissues were macerated in a sterile tissue grinder containing phosphate buffered saline, centrifuged at 1,000 g for 20 min. and the resultant supernatant further centrifuged at 10 000 g for 20 min. The final supernatant containing 10^4 TCID₅₀/ml (Tissue culture infective dose) was stored at 4 °C and used within 72 hours or stored at - 70 °C before use. Goats in group A were inoculated orally with 20 ml of the suspension. Clinical examination was carried out daily. Gross pathological examination was carried out in any dead goat and the presence of virus antigen in lymph glands and spleen was detected by counter current immunoelectrophoresis (CCIE) (MAJIYAGBE *et al.*, 1980).

Mycoplasma capri

The Smith's strain of the organism was used. An ampoule of the culture was reconstituted with 2 ml of sterile distilled water. 1 ml of this was then inoculated into 9 ml of tryptose serum broth and 10-fold serial dilutions made down to 10^{-10} . From the last tube to show growth after 48 hours, 2 ml culture was added to 50 ml broth and incubated for 24 hours. Such 24 hour culture contained approximately 10^8 colony forming units/ml. Group B animals were inoculated intranasally with a total of 5 ml of the culture squirted into each nostril. A successful application was evidenced by a cough following the inoculation.

Combined infection

Group C animals were inoculated with the same quantity of both *M. capri* and PPR virus

simultaneously using the same routes as described above.

Control

Group D animals were given 5 ml sterile broth intranasally and 20 ml orally.

RESULTS

PPR virus infection

Two goats showed fever (40-40.8 °C) from 6 days after challenge. This was followed 4 days later by diarrhoea which was very severe in one goat but mild in two. Other symptoms observed were nasal discharge, anorexia and depression.

One goat died 12 days post inoculation while one was killed *in extremis* two days later.

Lesions observed at post mortem were gastroenteritis, enlargement of the mesenteric lymph gland and distension of the caecum and colon.

The other two goats showed no signs of infection and gross lesions when killed.

M. capri infection

There was a febrile response (41-42 °C) in three animals 72 hours after inoculation. Other symptoms observed were dullness, respiratory distress and anorexia. Two of the goats died 10 and 12 days after challenge.

Post mortem lesions observed included pleuritis, adhesions and massive consolidated areas affecting all lobes of the left lungs. No gross lesions were found in the abdominal organs.

The other two goats were killed 8 weeks after inoculation. Apart from encapsulation in the left apical lobes of one animal, no gross lesions were found.

Virus antigen was detected in all the abdominal tissues by CCIE.

Combined infection

All the four goats showed a febrile response (42-43 °C) 3-5 days after inoculation. This was followed 3 days later by grunting, depression and anorexia. Three goats had ocular and nasal discharges, two had distension of the abdomen while all goats had diarrhoea. 10-12 days after inoculation three goats died.

The other goat had erosion of the oral cavity and this persisted until it was killed 8 weeks after challenge.

Post mortem lesions observed included pleuritis, adhesion, pneumonia and consolidation of the lungs, enlargement of thoracic and mesenteric lymph glands, gastroenteritis, and necrosis of mucosae of colon and caecum.

Control

No symptoms or lesions of pneumonia and gastroenteritis were observed in the goats throughout the 8-week period of the experiment or when killed.

DISCUSSION

A combined infection of *M. capri* and PPR virus was found to be much more severe in goats than infection by a single agent. Although the pathogenesis of the infection was not clearly demonstrated in the present investigation, similar studies have shown that a more severe disease results from mixed infections

of bacteria and viruses than a single infection (3, 4).

Various reports have implicated PPR virus as the causative agent when deaths occur in goats in the field following symptoms of diarrhoea with or without respiratory malfunction (2). The results of the present investigation tend to suggest that more than one microbial agent are likely to be involved because it is known that secondary bacterial infections often complicate viral infections making accurate diagnosis difficult (1).

Further investigations would be carried out to determine if a control measure directed against either PPR virus or *M. capri* will minimise the incidence or severity of pneumonia and diarrhoea usually observed in the Nigerian goat population.

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RESUMEN

ONOVIRAN (O.), MAJIYAGBE (K. A.), MOLOKWU (J. U.), CHIMA (J. C.), ADEGBOYE (D. S.). — Infección experimental de las cabras con *Mycoplasma capri* y el virus de la peste de los pequeños rumiantes. *Rev. Elev. Méd. vét. Pays trop.*, 1984, 37 (1) : 16-18.

Se inocularon *Mycoplasma capri* (cepa de Smith) y el virus de la peste de los pequeños rumiantes (PPR) separadamente o simultáneamente en cabras adultas. Dos de las cuatro

cabras infectadas por *M. capri* murieron de una neumonía generalizada 10 a 12 días después de la inoculación. Una de las cuatro cabras inoculadas con el virus PPR murió de una gastroenteritis grave 12 días después de la inoculación.

Tres de las cuatro cabras inoculadas simultáneamente con los dos gérmenes murieron de neumonía y de gastroenteritis 12 días después de la inoculación.

Síntomas de neumonía y de diarrea ocurrieron a varios niveles en el grupo testigo de cabras.

REFERENCES

1. ABEGUNDE (A.), NAWATHE (D. R.), OKEKE (A. N. C.), OPASINA (D. B.). *Nig. vet. J.*, 1980, 9 (1) : 48-52.
2. HAMDY (F. M.), DARDIRI (A. H.), BRESSE Jr. (S. S.), NDUAKA (O.), IHMELANDU (E. C.). *Can. J. Comp. Med.*, 1976, 40 : 276-284.
3. KASZA (L.), HODGES (R. T.), BETTS (A. O.), TREXIER (P. C.). *Vet. Rec.*, 1969, 84 : 262.
4. LIU (C.), JAYANETRA (P.), VOTH (D. W.). *Ann. New York Acad. Sci.*, 1980, 174 : 823.
5. LONGLEY (E. P.). London, HM Stationary Office, 1951. (Colonial Res. Publ. n° 7).
6. MAJIYAGBE (K. A.), ABEGUNDE (A.), NAWATHE (D. R.). *Nig. vet. J.*, 1982, II (2).
7. OJO (M. O.). *Bull. epizoot. Dis. Afr.*, 1971, 19, 561-515.
8. OJO (M. O.). *Trop. anim. Hlth Prod.*, 1976, 8 : 85-89.
9. TAYLOR (W. P.), ABEGUNDE (A.). *Res. Vet. Sci.*, 1979, 26 : 94-96.