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Short Communication

THE ONDERSTEPOORT *CANINE DISTEMPER* VIRUS STRAIN AND MEASLES VACCINE PROTECT NIGERIAN LOCAL DOGS AGAINST LOCAL ISOLATES OF *CANINE DISTEMPER* VIRUS

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SUMMARY

Three groups of dogs aged three months each were used in an experiment to assess efficacy of imported *Canine distemper* vaccine (Ondersteport strain) and measles vaccine in protecting Nigerian dogs against local isolates of *Canine distemper* virus. Each group consisted of four randomly selected puppies. One group was vaccinated with triple vaccine (which contain the Ondersteport live *Canine distemper* vaccine). The second group was vaccinated with measles vaccine while the third group served as unvaccinated controls. Four weeks post vaccination all the three groups were infected with 0.1 ml of brain extract of a dog earlier infected with local *Canine distemper* virus isolated in chorio-allantoic membrane of chicken embryo. Morbidity and mortality was 100% in the control group. The measles vaccinates showed mild rashes on the lower abdomen and recovered spontaneously. There was no morbidity in the group vaccinated with triple vaccine up to 60 days post infection (PI). The two vaccination methods protected the Nigerian dogs ($P < 0.01$).

KEY WORDS: Onderstepoort strain, measles vaccine, protection, Nigerian local dogs

INTRODUCTION

The most effective method of controlling *Canine distemper* is mass vaccination of dogs and other carnivores (Horst 1975). Adelus *et al.* (1991) reported that low number of vaccinated dogs rather than insufficient efficacy of vaccines, or reversion to virulence by the vaccines, was responsible for outbreaks of the disease in France.

Most commercial canine distemper vaccines are made of the Onderstepoort virus strain isolated from South Africa (Yoshida *et al.*, 1999). However, strains of *Canine distemper* virus different from the Ondersteport strain have been isolated (Iwatsuki *et al.*, 1999; Wakasa *et al.*, 2000). In our experience, after serum from a dog vaccinated with the Ondersteport vaccine was incubated with equal volume of a local of canine distemper virus (titre = 1:64), the antihaemagglutination antibodies were still detectable. On the other hand, incubating equal volume of the same serum with equal volume of the Ondersteport virus vaccine completely adsorbed out the haemagglutinating

antibodies. This suggests that variation may exist between the Nigerian local isolates and the Onderstepoort strain used in making commercial vaccines.

Also, Jones *et al.,* (1997) had reported that cross protection exists between the morbilliviruses. Measles vaccine has often been recommended for protecting dogs against *Canine distemper* (Horst, 1975).

The triple vaccine which is a combination of canine distemper vaccine and other vaccines has been found to be safe (Kock *et al.,* 1985), and as effective as when given singly (Chalmers and Baxendale, 1994). The combined vaccine should be given intramuscularly (Cooper *et al.,* '1991). In vaccinated dogs, antibodies start developing 14 days post vaccination and gets to the peak about 28 days post vaccination (Pare *et al.,* 1999).

So this experiment was mounted to assess the efficacy of the commercially available triple vaccine and the recommended measles vaccine in protecting Nigerian dogs (Mongrels) against the local isolates of the *Canine distemper* virus by adopting the recommended vaccination procedures.

MATERIALS AND METHODS

Virus Isolation

Cerebrospinal fluid (CSF) of a dog which was confirmed to have *Canine distemper* by serum neutralization test and haemagglutination inhibition test, was inoculated into chorio-allantoic membrane of 12 day old chick embryo. Following embryonic death, haemorrhagaes and pocks lesions on the CAM, the CAM was harvested, and macerated.

Then 0.1 ml of the macerated infected CAM was inoculated intranasally into a 3 month old puppy to reproduce the characteristic *Canine distemper* clinical signs seen in the natural case. At post mortem the infected dog brain was macerated in phosphate buffered saline (pH 6.8) and centrifuged. The supernatant was used as a source of virus for the experiment.

Animals used

Twelve, 12 weeks old of Nigerian local dogs (puppies) were purchased. They were kept for one week to acclimatize. During this period, they were dewormed and treated with antibiotics to eliminate or reduce helminthes and bacterial infections. Their sera were also tested for *Canine distemper* antibodies to ensure they were free of the infection. They were then divided into three groups of 4 dogs each.

Vaccination

One group of 4 dogs was vaccinated with Triple Vaccine (combination of Canine distemper, Infectious hepatitis, and Parvovirus vaccines) by intramuscular injection.

A second group was vaccinated with one human dose each of measles vaccine, also by intramuscular route. The third group was not vaccinated and served as control.

Infection

Four weeks post vaccination each of the 12 puppies was inoculated with 0.1 ml of the infected brain extract intranasally. They were subsequently observed daily

for 60 days for clinical signs. Morbidity rates of the vaccinated unvaccinated groups were compared using Chi-square test. A vaccine was judged to be effective if the morbidity rate of the vaccinated group was significant lower than that of the control group.

RESULTS

Clinical signs such as fever, anorexia, ocular discharges and pustules on the lower abdomen appeared in all the four dogs in the unvaccinated group 7 days PI. They died 18 – 20 days PI. The group vaccinated with measles vaccine showed rashes on the belly, which healed spontaneously.

There was no clinical sign in the group vaccinated with Triple Vaccine up to day 60 PI. The morbidity rates in the three groups are as shown on Table I.

Table I: Effect of vaccination on morbidity of dogs experimentally infected with Nigerian isolate of *Canine distemper* virus

Groups	Number of dogs	Morbidity rate (%)
Triple Vaccine	4	0
Measles vaccine	4	0
Unvaccinated	4	100%

The two vaccines were significantly effective ($P < 0.01$).

DISCUSSION

The zero morbidity recorded in the group vaccinated with triple vaccine showed that the triple vaccine made from the Ondersteport virus strain can protect dogs against the Nigerian strain of the *Canine distemper* virus. This result is in agreement with the report of Iwatsuki *et al.* (1999) and Wakasa *et al.* (2000). Immunity by the vaccines is said to depend on production of antibodies against the nucleoprotein, fusion protein and/or the haemagglutinin protein (Sutherland *et al.*, 2000) and Sixt *et al.* (1998). Therefore protection of dogs by the triple vaccine and measles vaccine showed that the morbilliviruses share any or all the three antigens. Of all the antibodies, the antibody against the haemagglutinin antigen appears to be the most important (Pares *et al.*, 1999; Iwatsuki *et al.*, 1999). So immune status of our local dogs could be assessed by determination of levels of anti – H antibody by haemagglutination–inhibition test.

Mass vaccination with the Onderstepoort vaccine has been adopted by many countries (Horst 1975). The vaccine is safe to both dogs and zoo carnivores (Kock *et al.*, 1985). However outbreak in three week old puppies has been traced to live vaccine given to the bitch when the puppies were three days old (Mccandlish *et al.*, 1992). So it is recommended that bitches be vaccinated before matting them.

Another draw back to use of vaccine in controlling *Canine distemper* is presence of maternal antibodies in the puppies. The maternal antibodies destroy vaccines and lead to vaccination failures (Horst, 1975).

However, Horst (1975) reported that *Canine distemper* maternal antibodies do not have significant effect on measles vaccine. So young puppies less than 11 weeks of age could be vaccinated with

measles vaccine and revaccinated when they are up to 11 weeks old. Thereafter dogs should be revaccinated annually (Horst, 1975).

It is suggested that mass vaccination, hygienic practices such as proper disinfection of boarding and clinic facilities before re-use be adopted to reduce prevalence of *Canine distemper* in Nigerian dogs.

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