HYPERIMMUNE SERUM IN THE CONTROL OF PESTE DES PETITS RUMINANTS

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SUMMARY

The value of administration of hyperimmune serum in the control of peste des petits ruminants was investigated in goats at different stages of the disease. A group of the goats was given hyperimmune serum intravenously at the fever stage of temperature of 40.5°C or above; another group showing no elevation of temperature but with other clinical signs of the disease were also given hyperimmune serum. Results indicated that hyperimmune serum was very effective in reversing the process of the disease if administered at the fever stage but not in animals that had progressed past the fever stage. The goats given the hyperimmune serum survived for 10 days before showing evidence of reinfection.

INTRODUCTION

The potential of hyperimmune serum was investigated in an attempt to find a solution to a field problem where a large number of goats have been assembled by purchasing from the local markets and face the danger of the entire flock being wiped out as a result of infection with peste des petits ruminants (PPR) within the first 10 days.

MATERIALS AND METHODS

The PPR virus used for this study was obtained from the National Veterinary Research Institute, Vom (Batch Vom 435, K5, MFD, 1.6.76). The titre of the virus was 3.5/0.1ml. It had undergone four passages and had been found not to kill sheep which are less susceptible than goats. The hyperimmune serum was produced by injecting three adult West African Dwarf sheep three times at weekly intervals with 2ml of the reconstituted virus. Before injection the sheep which were purchased from the local market were quarantined for seven days and their temperatures were taken daily to ensure that they were not incubating the disease. The first injection of the virus was on the eighth day after purchase. Sixty-six days after the third injection of virus 100 ml of blood was collected from each sheep for preparation of the hyperimmune serum and the blood was left in the refrigerator at 4°C overnight. The serum was then decanted and stored in the refrigerator until required for use.

Twenty-five goats were purchased from the local market and quarantined for seven days before use. They were screened for gastro-intestinal and blood parasites during the quarantine period; those considered clinically healthy were then used. The disease was produced in the flock by deliberately introducing a goat that had been diagnosed to be suffering from PPR, a diagnosis that was confirmed at post-mortem.

Eleven goats were given 5ml of the hyperimmune serum intravenously on detection of an elevated temperature of 40.5°C or above with or without ocular, respiratory, or gastro-intestinal tract symptoms; each animal was also given 2ml

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of combiotic (Pfizer) intramuscularly. Another nine goats which showed ocular, oral, respiratory or gastro-intestinal tract clinical signs without abnormal temperature elevation was also injected with 5 ml of the hyperimmune serum intravenously on detection of any of the clinical signs. They were also each given 2 ml of combiotic intramuscularly. The remaining five goats which showed both elevated temperature and other clinical signs were left as controls. They were, however, given 2 ml of combiotic each at the start of the disease. The changes in temperature following administration of hyperimmune serum were statistically analysed. Each animal that died was subjected to post-mortem to determine whether PPR was responsible for the death.

RESULTS

Administration of hyperimmune serum to goats having an abnormally elevated temperature of 40.5°C or above resulted in very significant reduction (P<0.001) of temperature to normal values in all animals within 24 h (Table I). In all animals ocular and nasal discharges and cough where present cleared also within 24 h. In one animal (G.23) where diarrhoea was present it stopped within the same period. In another animal (G.7) which had extensive erosions of the hard palate and proliferative gingivitis the healing was complete within four days without administration of any other form of medication. All the 11 goats survived for up to 10 days before showing any signs of reinfection by PPR. Six of the goats showed the typical signs of PPR from the eleventh day after administration of hyperimmune serum and died within the next four to seven days (Table I). The other five goats which developed labial scabs at about the tenth day after hyperimmune serum administration did not show any other clinical signs. The labial scabs healed within the next 10 days. They all survived till they were challenged seven days after the labial scabs had cleared (or 27 to 30 days after hyperimmune serum administration) with virulent PPR virus (reconstituted Batch Vom 435, K5, MFD, 1.6.76). All the five goats died of PPR within eight to 10 days of challenge.

Administration of hyperimmune serum to nine goats which showed clinical signs but had temperatures within normal range also produced significant reduction (P<0.01) in temperature (Table II); the clinical signs such as ocular and nasal discharges cleared within 24 h. In two animals diarrhoea persisted till death. With exception of one animal that survived for 15 days the other eight goats died of PPR three to four days after administration of the hyperimmune serum. Post-mortem examination showed the presence of pneumonia in all the animals that died. All the five control goats had elevated temperatures of 40.6 to 40.9°C. They all showed ocular, respiratory and digestive system involvement and all died four to seven days after the fever stage. Post-mortem findings confirmed the diagnosis of PPR (Table III).

DISCUSSION

It was observed in this study that administration of hyperimmune serum at the fever stage (temperature elevation of 40.5°C or above) was very effective in reversing the process of the disease. Hamdy, Dardid, Nduaka, Breese and Ihemelandu (1976) reported that the fever stage in PPR was characterised by a temperature of more than 40°C which persisted for five to seven days and that the onset of the disease was manifested by the initial appearance of watery and ocular discharges followed by mucopurulent discharge as the disease progressed. They