Comparision of Prestokon® and Furazine - II® in the treatment of Microbial diarrhoea in neonatal lambs

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Abstract

A comparative efficacy of Prestokon® and Furazine-II® in the treatment of microbial diarrhea in neonatal lambs over a 24 hour period was evaluated. Microbial Colony Forming Units (CFU) per gram of each faecal sample was determined before treatment and 24 hours after treatment, specific causative microorganisms were not isolated. The average total CFU / g of faeces killed within 24 hours by Prestokon® was 63.31± 6.22 % and 32.47±14.75 % for Furazine-II®. The clinical response to treatment was also significantly ($P < 0.01$) better in lambs treated with Prestokon®. Although the result of this study suggest that Prestokon® might be more effective in the treatment of microbial diarrhea in lambs, it must be pointed out that clinically both drugs can be given repeatedly over a period of several days until clinical cure or improvement was observed.

Key words: Microbial diarrhea, neonatal lambs, treatment.

Introduction

New or improved methods of preventing or treating diseases are being tested continually in an effort to improve the health and productivity of animal populations (Williamson, 2002; Constable, 2004; Schoenian, 2009). Disease problems such as microbial infection and endo-parasitism often result in diarrhea, which has a devastating effect on production and productivity (Radostitis *et al*., 2007). Neonatal diarrhea is a major cause of losses in all species of farm animals, and caused principally by *Escherichia coli*, *Salmonella* species, rotavirus, and *Cryptosporidium* sp. *E. coli* scours are most common (Schoenian, 2009). In most farm animals the disease is most common in young animals 2 - 10 days of age, although it may occur in older animals (Nóbrega Júnior *et al*., 2005). *Clostridium perfringens* also produces enteric diseases, generically called enterotoxaemia, in sheep, goats, and other animals (Francisco and Songer, 2008). Diarrheal disease in lambs has received relatively little attention compared to calves and piglets where extensive investigation has been done (Radostitis *et al.*, 2007). The purpose of this study was to compare the efficacy of Prestokon® and Furazine-II® in the treatment of microbial diarrhea in neonatal lambs.

Materials and Methods

Fourteen *Yankasa* lambs (8 females and 6 males) aged 7 – 21 days presented to the Animal Health Unit of the Institute showing clinical signs of diarrheal disease were randomly assigned to two treatment groups of seven each. Lambs in-group A were treated with Prestokon® suspension and those in group B with Furazine-II® water suspension.

Selection of cases: The criterion for clinical diagnosis of diarrheal disease was semi fluid-to-watery faeces and having a rectal temperature above the normal range (102-103°F). Faecal samples were collected from each lamb per rectum in sterile polythene bags before treatment and 24 hours after treatment. The faecal samples were then plated on Nutrient Agar, a non-selective medium for total aerobic plate counts.

Treatment regimen: Diarrheic lambs were treated immediately after rectal temperatures and faecal samples were taken. Lambs in Group A were treated *per os* with Prestokon® suspension at the rate of 1ml/kg of body weight. Furazine-II® at the rate of 1ml/kg of body weight was given orally to lambs in Group B. All lambs that were still diarrheic 24 hours after the first treatment were treated again. Response to treatment was considered good if diarrhea had ceased 24 hours after the first treatment and there was significant decrease in the total bacterial count per gram of faeces.

Composition of the trial drugs:

Prestokon® (BYK Guiden Konstanz, West Germany).

Table-1. Response of Diarrhoeic lambs to Prestokon® Treatment (P = Prestokon)

Lamb No	CFU Before treatment (x109)	CFU After treatment (x109)	Difference (x109)	Percent killed	Clinical response
P1	1.85	0.68	1.17	63.24	Stopped
P2	2.05	0.92	1.13	55.12	Improved
P3	1.68	0.64	1.04	61.90	Stopped
P4	4.18	1.29	2.89	69.13	Stopped
P5	3.58	1.02	2.56	71.50	Stopped
P6	4.34	1.98	2.36	54.37	Improved
P7	2.12	0.68	1.44	67.92	Stopped
Mean	2.82±1.07	1.03±0.44	1.79±0.72	63.31±6.22	Significant (P<0.01)

60mg suspension containing: Neomycin sulphate 1g, thalysulphathiazole 6g, Spolamine Hcl 0.005 g, Vitamin A palmite 50000 iu, Vitamin E 0.4g.

Furazine-II® (Asefac Veterinary drugs, Nigeria). Hydrodispensable bactericide powder containing: Furazolidone 11%.

Bacteriology: 1gm was aseptically weighed from each faecal sample and dissolved in 9ml Physiological Saline Solution (PSS) to give a dilution of 10^{-1}. This was serially diluted to 10^{-6}, and using sterile pipettes 0.1ml of the 10^{-4} and 10^{-6} dilutions were surface plated on different plates of Nutrient Agar. They were incubated for 24 hours at 37°C and the colony forming units, CFU / g of each sample determined.

Statistical analysis: The means and standard deviations of each CFU / g of faeces before treatment and 24 hours after treatment were calculated. The paired t-test method was used to determine level of significance (Steel *et al.,* 1997).

Results

The results of this trial are presented in Tables 1 and 2. The average total CFU / g of faeces killed within 24 hours by Prestokon® was 63.31±6.22 % and 32.47± 14.75 % for Furazine-II®. Similarly, clinical response to treatment was significantly ($P < 0.01$) better in lambs treated with Prestokon® than those treated with Furazine-II®. However none of the lambs died during the experimental period and those with diarrhea at the end of 24 hours after the first period were treated again until clinical cure or improvement was observed.

Discussion

Attempts were not made to isolate the causative microorganisms but to determine the CFU / g of each faecal sample before treatment and 24 hours after treatment. There was an interval of 12- 48 hours between collection of the samples and culturing for microbial colony forming units. Culturing the faecal samples within 24 hours of collection probably would have resulted in a higher CFU /g before treatment, because the number of some microorganisms decreases rapidly as the sample ages (De, *et al*., 2002; Orden, *et al.,* 2007; Francisco and Songer, 2008).

Results of this study indicated a higher percentage of CFU / g of faeces killed by Pretokon® clinically after one treatment. This might be due to the composition and mechanism of action of the drug. Prestokon is made up of 5 active ingredients, prominent amongst which is Neomycin sulphate, a medium spectrum antibiotic used widely for coliform enteritis in all species of animals (Scheifele *et al.,* 1987). Also with Scopolamine Hcl, a parasympatholytic compound that abolishes tone and causes relaxation of the smooth musculature of the gastrointestinal tract thereby reducing the intensity and frequency or rate of progression of peristalsis that accelerate transit of ingesta and alimentary secretions

Table-2. Response of Diarrhoeic lambs to Furazine-II® Treatment (F = Furazine-II)

Lamb No	CFU Before treatment (x109)	CFU After treatment (x109)	Difference (x109)	Percent killed	Clinical response
F1	3.77	2.99	0.78	20.69	No effect
F2	4.81	3.90	0.91	18.91	No effect
F3	4.36	2.08	2.28	52.29	Improved
F4	2.44	1.64	0.80	32.78	No effect
F5	0.86	0.62	0.24	27.90	No effect
F6	2.37	1.94	0.43	18.14	No effect
F7	2.12	0.92	1.20	56.60	Improved
Mean	2.96±1.29	2.01±1.05	0.94±0.61	32.47±14.75	Insignificant (P>0.05)

through the intestines. The combined effects of these compounds appear to have a higher bactericidal effect especially that they are both gut active and not destroyed by milk. The relatively lower efficacy of Furazine-II in this trial may not be unexpected, since all the lambs treated were still suckling and milk is said to reduce the antimicrobial activity of nitrofurans (Constable, 2004; *Taylor et al., 2008)*. Although both Prestokon and Furazine-II may be effective antidiarrheic agents for the treatment of lamb microbial scours, but because rapid response to therapy is the goal, Prestokon appeared the drug of choice in this comparative trial.

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