

O20

An evaluation of the efficacy of cephalexin in the treatment of experimental canine cystitis

B. LEBREUX¹, L. MAYNARD¹, C. PÉCHEUR¹ & P. ARCHIMBAULT¹

¹VIRBAC SA, BP 27, 06511 Carros Cedex, ²PHARMAKON europe, BP 118, 69593 L'Arbresle Cedex, France

Introduction

Urinary tract infection in dogs and cats represents one of the most frequent motives of consultation in urology, and constitutes the second most common cause of infection after pyoderma. Enterobacteria represent 50–60% of the organisms involved in such infections with *Proteus mirabilis* and *Escherichia coli*. [1]. The aim of this experiment was to verify the therapeutic efficacy of cephalexin in the dog, following an experimentally induced infection of the bladder.

Materials and methods

Twelve Beagle dogs (six males and six females) were immunosuppressed by administration of 2 mg/kg/day of prednisolone given orally for 5 days. On the sixth day, the bladder was catheterized. A solution of sulfosalicylic acid was injected into the bladder where it remained for 10 min [2]. The bladder was then emptied and rinsed with sterile saline. Five mL of a saline solution containing 1.55×10^9 live *E. coli* isolated from a dog suffering from an acute spontaneous urinary infection were then injected into the bladder. Fifteen days later urine was collected by cystocentesis in order to verify and quantify the infection (Day 0). On the following day (Day 1) three groups of four subjects (two males and two females) were constituted. Group 1 was left untreated. Group 2 animals received 15 mg/kg/12 h of cephalexin (RILEXINE[®], VIRBAC S.A.) given orally (RILEXINE[®], VIRBAC SA). Group 3 animals received 12.5 mg (10 mg amoxicillin and 2.5 mg clavulanic acid)/kg/12 h. Groups 2 and 3 treatments were given for 14 days.

Animals were continuously observed for clinical signs three times daily from immunosuppression to the end of the study. Haematological and biochemical parameters were also monitored. Bacterial counts on urine collected by cystocentesis were performed 7 and 14 days after the start of treatment. Colony counts were performed after seeding of a trypticase soy agar dish with urine dilution ranging from 10^{-1} to 10^{-4} . The difference in bacterial counts between Day 0 and Day 8 or Day 15 was calculated and compared using a Kruskal–Wallis test with a threshold of 5%.

Results

There was no evidence of vesical pain in any animal. No pollakiuria was observed. Haematuria was present from 6 to at least 11 days after infection in all animals and thereafter inconsistently in some animals. The bacterial counts before treatment were positive in 11/12 dogs. Bacteriological counts at this time were on average 5.43 ± 0.95 log unit/mL, ranging from 4.0 to 7.1

Table 4.5. CfU count (log unit/mL) after treatment with 15 mg/kg/12h cephalexin or 10 mg amoxicillin and 2.5 mg clavulanic acid/kg/12 h (mean \pm SD)

Group	Product	D0	D8	D15
1 (n=3)	control	5.58 \pm 1.45a	4.55 \pm 2.11a	5.04 \pm 2.08a
2 (n=4)	cephalexin	5.22 \pm 1.19a	0.77 \pm 0.90b	0.40 \pm 0.81b
3 (n=4)	amox+clav	5.47 \pm 0.25a	0.53 \pm 1.05b	0.49 \pm 0.98b

Within the same column, values with differing letters are significantly different

log unit/mL. With a pathological level threshold of 100 cfu/mL urine, all control animals were far above this level on Day 8 and Day 15. All Group 2 animals and three of four animals in Group 3 were below this level on Day 8 and all treated subjects were below this level on Day 15 ($P < 0.05$). There was no significant difference between cephalexin and amoxicillin + clavulanic acid groups (Table 4.5).

Conclusion

This experiment revealed that this method of infection provided stable bacterial counts over time when 1.55×10^9 bacteria/mL were injected. However, even after immunosuppression and use of a high concentration inoculum, 1/12 dogs had sterile urine throughout the study duration. In such an infection, cephalexin and amoxicillin + clavulanic acid given b.i.d. at 15 or 12.5 mg/kg respectively, have good antibacterial activity. This is probably related to the urinary elimination of these active ingredients in their active form as parent compounds, to their high concentration in the bladder and to their activity at the pH of the urine encountered during cystitis.

References

- Cotard, J.P. (1993). Nephrologie et Urologie du chien et du chat. CNVSPA ed., France.
- Rogers, K.S., Rogers, G.E. & Simpson, R.B. (1988) *American Journal of Veterinary Research*, **49**, 345–349.