J Vet Clin 22(2) : 94-99(2005)

Antiemetic Effect of Dexamethasone in Dogs Sedated with Xylazine

Jung-hoon Yang, Han-sem Kang, Jae-sung Bae, Chang-hyun Song, Jung-eun Kim, Hee-kyung Jin and Kwang-ho Jang[1]

College of Veterinary Medicine, Kyungpook National University, Daegu, 702-701, Korea

Abstract: This prospective study aimed to assess the efficacy of dexamethasone to prevent xylazine induced emesis in dogs. The antiemetic effect of graded, single high-dose intravenous dexamethasone against xylazine hydrochloride was studied. Clinically healthy mixed breed dogs that weighed 4.64± 1.25 kg were used in this study. Food and water were given 3 hours before the experiment. Venous blood specimens were collected from all experimental animals for hema-tological and blood chemical test pre- and post-experiment. Twenty-eight experimental animals were randomly divided into 4 groups; the group treated with 0.2 ml/kg of normal saline (Control group), the groups treated with 1 mg/kg (D1 group), 2 mg/kg (D2 group) and 4 mg/kg of dexamethasone (D4 group). Three doses of the dexamethasone or normal saline was administered intravenously to each group and after 5 minutes, xylazine (2.2 mg/kg) was administered intramuscularly. The time until onset of the first emetic episode and rate of emesis were investigated. At the same time, the extent of sedation was scored subjectively 5, 15, 30 and 60 minutes after injection of xylazine hydrochloride using Visual Sedation Score. The time until onset of the first emetic episode was 203.25± 11.35 sec in Control group, 187.33± 48.01 sec in D1 group and 218.33± 13.58 sec in D2 group. The rate of xylazine induced emesis were 57% in Control group and 43% in D1 and D2 group respectively. On the other hand, any emetic episodes were not observed in D4 group. At extent of sedation score, all experimental animals especially including the animals in D1 group were highly sedated at 15 minutes after administration of xylazine hydrochloride. Hematological and blood chemical values showed normal ranges pre- and post-experiment. We concluded that prior treatment with 4 mg/kg of dexamethasone hardly caused xylazine-induced emesis without disturbing the sedative effect of xylazine in dogs.

Key words : dog, emesis, xylazine hydrochloride, dexamethasone.

Introduction

Frequently a dog or cat resists restraint, due to either its nature or the procedure to be performed, and thus requires sedation and/or analgesia. Xylazine hydrochloride is a sedative available for use in small animals in the circumstances such as radiography, ultrasonography, catheterization, and skin biopsy[6]. This drug also can be used for oral examination, minor laceration repair, wound debridement, bandage placement, ear canal examination and cleaning, either[14,15]. From clinical experience, the maximum dose of xylazine recommended for sedation of dogs and cats is 1-2.2 mg/kg of intramuscular (IM) injection[6,16].

While xylazine produces sedation, it has undesirable actions that may be of little consequence if the animal is healthy. These actions include muscle relaxation, anxiolysis, cardiovascular effects, respiratory effects, gastrointestinal effects, renal effects, and hormonal effects[23]. Emesis frequently is reported after administration of xylazine hydrochloride in cats and dogs, which may distress an animal and also increase the risk of aspiration pneumonia[7,12]. Most clinicians would not routinely use prophylactic agents for patients undergoing sedation and would reserve these antiemetics for rescue. Although numerous antiemetics have been studied to prevent or reduce emesis, they have some side effects[5,9,17].

Among the antiemetics, serotonin subtype-3 ($5\text{-}HT_3$) antagonists such as tropisetron, ondansetron, granisetron and droperidol are very effective on vomiting, but they are very expensive[8,19]. Other currently used, lower-cost antiemetics include anticholinergics, antihistamines and dopamine receptor antagonists. These drugs have side effects, such as sedation, dry mouth, restlessness, changes in blood pressure, and extrapyramidal symptoms[27,28]. In clinical trials, dexamethasone was shown to be an effective antiemetic drug on Patient Controlled Analgesia (PCA)[5,29], Postoperative Nausea and Vomitiong (PONV)[8,11,21,22,30-33] and cancer chemotherapy[16,20] in humans.

Dexamethasone, a corticosteroid, is a low cost and effective antiemetic drug[16] with minimal side effects after a single-dose administration[16,29]. It was first reported as an effective antiemetic in patients receiving cancer chemotherapy in 1981[12]. Since then, dexamethasone has been widely used to prevent nausea and vomiting. The effective dose of dexamethasone in humans is 8-10 mg in adults[22] and 1-1.5 mg/kg in children[8,16]. Recently, dexamethasone has also been reported to be effective in the prevention of PCA, PONV and chemotherapy in animals[10,18,24,25]. We are not aware of any previous reports about the effect of dexamethasone on nausea and vomiting during sedation with xyalzine in dogs. We therefore evaluated the effect of a single dose of dexamethasone on the incidence of vomiting during sedation with xyalzine in dogs.

Materials and Methods

Experimental Animals

Twenty-eight adult mixed dogs of either sex that weighed

[1]Corresponding author.
E-mail : khojang@mail.knu.ac.kr

4.64±1.25 kg were used in this study. All of them were clinically healthy. They were housed separately in stainless steel cages with room temperature. They were vaccinated with DHPPL (Vanguard Plus 5CV®, Pfizer Animal Health Korea Ltd., Korea) and dewormed with febantel (Rintal Tablet®, Bayer Health Care Ltd., Korea) 1 month before the experiment. They were fed a commercial dry food (Biomill®, Woosung Feed Co Ltd., Korea) and water was always available ad libitium. Twenty-eight experimental animals were randomly divided into 4 groups; the group treated with normal saline and xylazine (Control group), the group treated with 1 mg/kg of dexamethasone and xylazine (D1 group), the group treated with 2 mg/kg of dexamethasone and xylazine (D2 group) and the group treated with 4 mg/kg of dexamethasone and xylazine (D4 group). Seven dogs were allocated to each group. This study was approved by the Kyungpook National University Animal Ethics Committee

Procedures

All dogs were subjected to the same procedures. Venous blood specimens were collected from all experimental animals for hematology and blood chemistry test pre- and post-experiment: WBC, RBC, PCV, Platelet (PLT), Serum alanine amino-transferase (SALT), Serum aspartate amino-transferase (SAST), Blood urea nitrogen (BUN), creatinine, and Total protein (T-Protein). Food and water were given 3 hours before the experiment.

Before 5 minutes of the induction of sedation, dogs received intraveneous (IV) administration of dexamethasone (Dexamethasone disodium phosphate sinil inj®, Sinil Pharm Ltd., Korea) at doses of 1, 2 and 4 mg/kg, or 0.2 ml/kg of normal saline. The sedation was induced with xylazine hydrochloride (Rompun®, Bayer Health Care Ltd., Korea). The dosage was selected on the basis of effective sedation dose (2.2 mg/kg) and muscles of the caudal thigh group were used as the site for injection. Then dogs were observed for 1 hour to confirm the time until onset of the first emetic episode and frequency of emesis. At the same time, the extent of sedation was scored subjectively 5, 15, 30 and 60 minutes after injection of xylazine hydrochloride. Scoring was done by three observers who were accustomed to assessing sedation score and blinded to the treatments used.

Assessments

1) Emetic response

Emesis was scored as an all-or-none response as to latency of the first expulsive vomiting. If emesis is occured, 1 point was added to the group and if emesis is not occured, no points were added to the group.

Animal behavior was observed for 60 minutes after injection of xylazine and analyzed at the end of the experiment. Emesis was characterized by rhythmic abdominal contractions that were either associated with the oral expulsion of solid or liquid material from the gastrointestinal tract or not associated with the passage of material.

In each animal, the latency to retch or vomit following the administration of the respective emotogen and the number of episodes of retching and/or vomiting were calculated for the duration of the experiment.

2) Total sedation index

Quantification of the extent of sedation was performed using a Visual Sedation Score(VSS). The VSS was modified from the sedation index established by Ansah *et al*[1,2] (Table 1). The category was divided into posture and gait of experimental animals and degree of resistance to manipulations.

The extent of sedation was scored subjectively 5, 15, 30, and 60 minutes after administration of xylazine. Scores from the above mentioned parameters were summed for each observation time to give total sedation score[3,4]. The maximum possible score at any observation time points was 9. A score of 0 corresponded to a response at the lowest intensity while 9 corresponed to no response even at the highest pinching intensity.

3) Hematology and Blood chemistry test

Blood samples (1.5 ml) were collected from the jugular vein pre- and post-experiment. WBC, RBC, PCV and PLT were evaluated with an auto blood cell analyzer (HEMA VET 850®, CDC Technologies Inc., USA) and SALT, SAST, BUN, creatinine and total-protein were measured with an auto dry chemistry analyzer (SPOT CHEM ™ SP-4410®,

Table 1. Scoring method for sedation in dogs after administration of xylaxine hydrochloride

Category	Score
Posture and gait	
Laterally or sternally recumbent, seems asleep, and is not easily wakened by light manipulations.	6
Laterally or sternally recumbent, seems asleep but can be wakened easily by light manipulations.	5
Laterally or sternally recumbent, seems awake but unable to rise or dose not make attempt to rise.	4
Laterally or sternally recumbent, can lift head up and hold for a while, occasionally makes weak attempts to rise but unable to rise fully.	3
Sternally recumbent or able to take sternal or sitting position with slight or no difficulty.	2
Stands and walks wobbling.	1
Walks normally.	0
Degree of resistance to manipulations.	
No resistance to manipulations and no reaction.	3
Moderate resistance to manipulations.	2
Delayed reaction but strong resistance to manipulations.	1
Strong/fairly strong resistance to manipulations.	0
Total sedation index	0-9

Kyoto DAIICHI KANAGU Co. Ltd. Japan).

Statistical Analysis

All experimental data were expressed as mean±standard deviation. Statistical analysis was performed by DUNCAN test of the one-way ANOVA, with tests for multiple compari-sons in SAS program (version 8.1, SAS Institute Inc., Cary, NC). Differences at $p<0.05$ were considered statistically significant.

Results

Emetic response

1) Latency of xylazine-induced emesis

Most of the emetic episodes occured during the initial phases of treatment. The time until onset of the first emetic episode in Control group was 203.25±11.35 sec. The time until first emetic episode in D1 and D2 group were 187.33±48.01 and 218.33 ±13.58 sec respectively. The data had no significant differences among groups (Fig 1).

2) Numbers of episodes of emesis

Numbers of episodes of emesis was 4 heads (57%) in Control group and 3 heads (43%) in D1 and D2 group respectively. No vomiting episodes were observed in D4 group. Converting from these values to percentages, 57% of the dogs developed vomiting in Control group (Fig 2).

Total sedation index

Total sedation scores were showed in Fig 3. The values of Control group were 4.10±2.17, 4.29±1.80, 2.71±1.70 and 0.76±0.63 respectively at 5, 15, 30 and 60 minutes after the sedation. The values of D1 group were 4.29±2.21, 5.76±1.56, 3.38±1.74 and 1.38±1.08 respectively at 5, 15, 30 and 60 minutes after the sedation. The values of D2 group were 3.81±0.47, 3.38±1.33, 2.29±0.72 and 1.05±0.42 respectively above mentioned times. The values of D4 group were 4.28± 0.80, 4.33±2.06, 3.43±2.00 and 1.33±0.92 respectively above mentioned times. The experimental animals in all groups were sedated highly at 15 minutes after administration of xylazine hydrochloride. Among them, the animals in D1 group obtained the highest sedation score which was significant at 15 min. There were no significant differences for total sedation scores at any dose level except D1 group. These results suggested that any doses of dexamethasone adopted in our study did not affect the degree of sedation.

Hematology and Blood chemistry test

1) Hematology

The values of WBC was slightly increased after the experiment, but there were no significant statistical differences among the groups (Table 2).

2) Blood chemistry test

SALT, SAST, BUN, Creatinine and Total-protein values had no sig-nificant statistical differences among the groups. The values were remained normally during experiment period

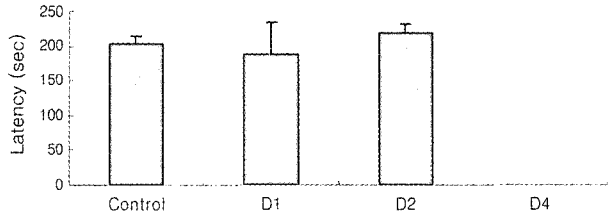

Fig 1. The time until onset of first emetic episode in each group.
Control: saline solution (2 ml/kg, IV) and xylazine (2.2 mg/kg, IM)
D1: dexamethasone (1 mg/kg, IV) and xylazine (2.2 mg/kg, IM)
D2: dexamethasone (2 mg/kg, IV) and xylazine (2.2 mg/kg, IM)
D4: dexamethasone (4 mg/kg, IV) and xylazine (2.2 mg/kg, IM)

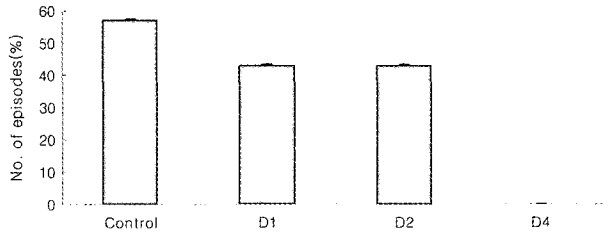

Fig 2. Numbers of episodes of emesis in each groups.

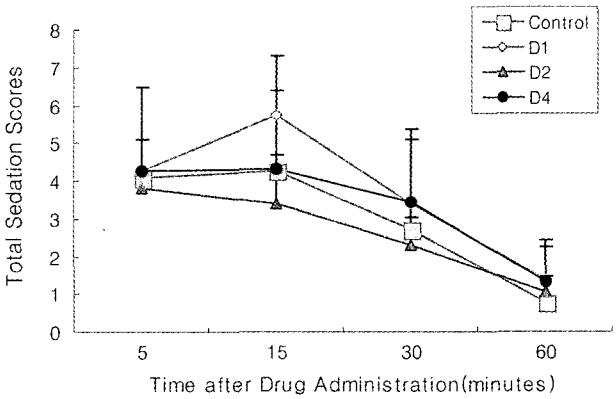

Fig 3. Total sedation score of 4 groups vs time after xylazine administration.

(Table 3).

Discussion

Xylazine hydrochloride and medetomidine are two a_2-agonists approved for use in small animals in the United States[12]. The a_2-agonists produce good-to-excellent analgesia and moderate-to-profound sedation, and their receptors are located throughout the CNS and are found in great numbers in the superficial laminae of the dorsal horn sensory fibers of the spinal cord and brainstem nuclei[7].

During the sedation with xylazine hydrochloride, there are several side effects such as bradycardia, decreased myocardial contractility, perfusion and gastrointestinal motility, and depressed thermoregulation[7]. Most of the emetic episodes

Table 2. Changes in complete blood count pre- and post-sedation in dogs

		Control	D1	D2	D4
WBC	Pre	9.86±1.17	11.32±0.48	10.74±0.54	20.13±11.50*
WBC	Post	10.3±1.80	20.96±3.20*	17.27±1.51*	23.25±3.78*
RBC	Pre	6.19±0.29	6.10±0.71	6.37±0.35	5.83±0.17
RBC	Post	6.30±0.44	6.25±0.81	6.32±0.09	5.46±0.17
PLT	Pre	407.5±111.90	491.5±92.67	313±87.12	342.5±66.24
PLT	Post	403.5±94.22	513.75±101.2	304.5±116.39	343.5±63.96
PCV	Pre	37.25±2.04	37.85±1.70	36.25±3.04	37.65±0.49
PCV	Post	39.53±1.87	39.90±3.11	37.60±0.71	33.65±2.48

WBC. white blood cell (K/μl)
RBC. red blood cell (M/μl),
PLT. platelet (K/μl)
PCV. packed cell volume (%)
*P<0.05

Table 3. Changes in serum chemistry values pre- and post-sedation in dogs

		Control	D1	D2	D4
SALT	Pre	61.5±15.39	25.5±16.29*	28±2.82*	38±19.59*
SALT	Post	49.75±13.12	36.5±9.81	34±2.82	51.5±20.50
SAST	Pre	14.5±9	11±1.41	14.5±6.36	10±5.06
SAST	Post	14±8	13.5±4.05	17±5.66	18.5±15.06
BUN	Pre	20.75±10.14	18.75±2.62	13±5.65	27.5±2.12
BUN	Post	15.15±10.01	14.25±4.85	14±2.82	23±2.82
Cre	Pre	0.85±0.31	0.8±0.12	0.85±0.07	0.9±0.56
Cre	Post	0.75±0.24	0.73±0.15	0.8±0.14	0.8±0.28
T-Pro	Pre	7.3±1.17	6.93±0.33	6.85±0.77	6.9±1.06
T-Pro	Post	6.5±0.18	7.55±0.3	7.55±0.07	7.4±1.27

SALT. serum alanine aminotransferase (IU/L)
SAST. serum aspartate aminotransferase (IU/L)
BUN. blood urea nitrogen (mg/dl)
Cre. creatinine (mg/dl)
T-Pro. total protein (g/dl)
* P<0.05

occured during the initial phase of treatment[8,13]. Emesis is generally seen within 3-5 minutes after xylazine hydrochloride administration in cats and occasionally in dogs[26]. In considering this point, the latency of emesis was observed for 60 minutes. Xylazine hydrochloride decreases esophageal sphincter pressure in dogs and may increase the likelihood of gastric reflux. In addition, acute abdominal distension has been reported in large-breed dogs after xylazine hydrochloride administration, which may be a result of drug- induced parasympatholytic activity promoting gastrointestinal atony and gas accumulation[23]. Upto 30% of dogs and upto 90% of cats will vomit after xylazine hydrochloride administration, apparently as a result of central stimulation of a_2-adrenoceptors[6]. In this study, 57% of dogs in the Control group and 43% of dogs in the D1 and D2 group vomited respectively. Any dogs did not vomit in D4 group. From the results, it is suggested that the antiemetic effect of dexamethasone does not act until the dose reaches the optimal limit.

Most clinicians would not routinely use prophylactic agents for patients undergoing sedation and would reserve these antiemetics for rescue. Even if antiemetics are being used to prevent nausea and vomiting, the data are insufficient on which are the most appropriate agents. The controversy about an ideal antiemetic is still existed.

The cost-effectiveness of the various antiemetics is a determination in their use[11]. Recently, dexamethasone has been found to have a prophylactic antiemetic effect on postoperative vomiting in adults and children[8,16]. In addition, in animal studies dexamethasone reduced chemotherapy-induced emesis[9,24,25]. One research reported the combined administration of granisetron and corticosteroids is useful in the inhibition of delayed emesis in ferrets[10].

The precise mechanism by which dexamethasone, a corticosteroid, exerts an antiemetic action is not fully understood. However, dexamethasone is a potent antiemetic drug that exerts its antiemetic action though the blockage of the corticoreceptors in the nucleus tractus solitarius of the central nervous system[15,16]. That is to say, dexamethasone exerts antiemetic action via prostaglandin antagonism, release of endorphins and tryptophan depletion. And it is known to have an action that reduces the permeability of the blood brain barrier[9]. Dexamethasone may also exert its antiemetic action through some peripheral mechanism[16].

It was considered dose-response studies were necessary to determine the optimal dose of dexamethasone for the prevention of emesis. In addition, one research suggested that the prophylactic IV administration of dexamethasone immediately before the induction, rather than at the end of anesthesia, was more effective in preventing PONV[32]. Therefore we decided dexamethasone administered 5 minutes before sedation with graded-dose.

Long-term corticosteroid therapy may have significant morbidity such as an increased risk of infection, glucose intolerance, delayed wound healing, superficial ulceration of gastric mucosa, and adrenal suppression[23]. However, side-effects from brief(24-48 h), even high-dose, corticosteroid treatment have been rare[30].

Larger doses of dexamethasone may have more antiemetic efficacy but are likely to be unacceptably sedating. To confirm the existence of this action, VSS was performed. The experimental animals in all groups were sedated effectively at 15 minutes after administration of xylazine hydrochloride. Except that D1 group at 15 minutes, there were no significances for total sedation scores at any dose level groups. These results suggested that any doses of dexamethasone adopted in our study did not affect the degree of sedation. In our studies, prophylactic treatment in D4 group significantly decreased xylazine-induced emesis without disturbing the sedative effects of xylazine in dogs. These results match those of studies with cats sedated with xylazine[18]. One different thing is dexamethasone is not related to the time until onset of the first emetic episode after xylazine injection. And there are few reasons to pay attention to the adverse effcts about the usage of dexamethasone. There is little doubt that dexamethasone is an effective intravenous antiemetic for use in the pre-sedative period in a single intravenous bolus. Considering high dose usage of dexamethasone or high cost of 5-HT_3 receptor antagonists, the use of proper antiemetic drugs is required. Therefore, it is imperative that more studies are required to be carried out in this area, particularly in evaluating the efficacy of corticosteroids, 5-HT_3 receptor antagonists, or a combination of both. The 5-HT_3 antagonists also were used effectively combined with dexamethasone in humans[16]. When prophylaxis with dexamethasone fails to prevent PONV, the combination with a small-dose 5-HT_3 receptor antagonist has been recommended[11]. Double and triple antiemetic combinations are recommended for patients at high risk for PONV[11].

In our study, it was not considered any risk factors such as age, sex and breed that could modify the incidence of vomiting as background among the groups. In spite of the acknowledged limitations of this study, our study provided valuable information concerning the high prevalence of vomiting, especially that associated with xylazine, that is important to today's practitioners.

As showen in this study, dexamethasone is more useful as antiemetics in terms of efficacy compared with placebo. Further studies are required about the precise mechanisms and more effective methods of dexamethasone.

References

1. Ansah OB, Raekallio M, Vainio O. Correlation between serum concentrations following continuous intravenous infusion of dexme-deto-midine or medetomidine in cats and their sedative and analgesic effects. J Vet Pharmacol Thera 2000; 23: 1-8.
2. Ansah OB, Vainio O, Hellsten C, Raekallio M. Postoperative pain control in cats: Clinical trials with medetomidine and butorphanol. Vet Surg 2002; 31: 99-103.
3. Apfel CC, Rower N, Korttila K. How to study postoperative nausea and vomiting. Acta Anaesthesiol Scand 2002; 46: 921-928.
4. Borgeat A, Ekatodramis G, Schenker CA, Warltier DC. Postoperative nausea and vomiting in regional anesthesia. Anesthesiology 2003; 98: 530-457.
5. Culebras X, Corpataux JB, Gaggero G, Tramer MR. The antiemetic efficacy of droperidol added to morphine patient-controlled analgesia: a randomized, controlled, multicenter dose-finding study. Anesth Analg 2003; 97: 816-821.
6. Cullen LK. Xylazine and medetomidine in small animals: these drugs should be used carefully. Aust Vet J 1999; 77: 722-723.
7. Dart CM. Advantages and disadvantages of using alpha-2 agonists in veterinary practice. Aust Vet J 1999;77:720-721.
8. Fujii Y, Uemura A. Dexamethasone for the prevention of nausea and vomiting after dilatation and curettage: a randomized controlled trial. Obstet Gynecol 2002; 99: 58-62.
9. Fukui H, Yamamoto M. Methotrexate produces delayed emesis in dogs: a potential model of delayed emesis induced by chemotherapy. Eur J Pharmacol 1999; 372: 261-267.
10. Fukunaka N, Sagae S, Kudo R, Endo T, Hirafuji M, Minami M. Effects of granisetron and its combination with dexamethasone on cisplatin-induced delayed emesis in the ferret. Gen Pharmac 1998; 31: 775-781.
11. Gan TJ, Meyer T, Apfel CC, Chung F, Davis PJ, Eubanks S, Kovac A, Philip BK, Sessler DI, Temo J, Tramer MR, Watcha M. Consensus guidelines for managing postoperative nausea and vomiting. Anesth Analg 2003; 97: 62-71.
12. Gaynor JS, Muir WW. a_2-Agonists. In: Handbook of veterinary pain management. Missouri: Mosby. 2002: 199-219.
13. Golembiewski JA, O' Brien D. A systemic approach to the manage-ment of postoperative nausea and vomiting. J PeriAnesthesia Nursing 2002; 17: 364-376.
14. Hall LW, Clarke KW, Trim CM. Sedation, analgesia & premedication. In: Veterinary Anaesthesia, 10th ed. London: WB Saunders. 2001: 83-87.
15. Hatch RC. Booth NH. Clark JD. Crawford LM Jr. Kitzman

JV, Wallner B. Antagonism of xylazine sedation in dogs by 4-aminopyridine and yohimbine. Am J Vet Res 1982; 43: 1009-1014.
16. Henzi I, Walder B, Tramer MR. Dexamethasone for the prevention of postoperative nausea and vomiting: a quantitative systematic review. Anesth Analg 2000; 90: 186-194.
17. Hickok JT, Roscoe JA, Morrow GR, King DK, Atkins JN, Fitch TR. Nausea and emesis remain significant problems of chemotherapy despite prophylaxis with 5-hydroxytryptamine-3 antiemetics. Cancer 2003; 97: 2880-2886.
18. Ho CM, Ho ST, Wang JJ, Lee TY, Chai CY. Effects of dexa-methasone on emesis in cats sedated with xylazine hydrochloride. Am J Vet Res 2001; 62: 1218-1221.
19. Ho SH, Wang JJ, Tzeng JI. Dexamethasone for preventing nausea and vomiting associated with epidural morphine: A dose-ranging study. Anesth Anal 2001; 92: 745-748.
20. Kirkbride P, Bezjak A, Pater J, Zee B, Palmer MJ, Wong R, Cross P, Gulavita S, Blood P, Sun A, Dundas G, Ganguly PK, Lim J, Chowdhury AD, Kumar SE, Dar AR. Dexamethasone for the prophylaxis of radiation-induced emesis: a National Cancer Institute of Canada Clinical Trials Group phase III study. J Clin Oncol 2000; 18: 1960-1966.
21. Liu K, Hsu CC, Chia YY. The effect of dose of dexamethasone for antiemesis after major gynecological surgery. Anesth Analg 1999; 89: 1316-1318.
22. Liu YH, Li MJ, Wang PC, Wang JJ. Use of dexamethasone on the prophylaxis of nausea and vomiting after tympanomastoid surgery. Laryngoscope 2001; 111: 1271-1274.
23. Plumb DC, Glucocorticoid agent. In: Veterinary drug handbook, 3rd ed Iowa: Iowa State university Press. 1999: 306-308.
24. Rudd JA, Tse JY, Wai MK. Cisplatin-induced emesis in the cat: effect of granisetron and dexamethasone. Eur J Pharmacol 2000; 391: 145-150.
25. Sam TS, Chan SW, Rudd JA, Yeung JH. Action of glucocorticoids to antagonise cisplatin-induced acute and delayed emesis in the ferret. Eur J Pharmacol 2001; 417: 231-237.
26. Thurmon JC, Tranquilli WJ, Bensen GJ. Preanesthetics and anesthetic adjuncts. In: Veterinary anesthesia, 3rd ed. Baltimore: Williams & Wilkins. 1996: 183-209.
27. Tramer MR. A rational approach to the control of postoperative nausea and vomiting: evidence from systematic reviews. Part I. Efficacy and harm of antiemetic interventions, and methodological issues. Acta Anaesthesiol Scand 2001; 45: 4-13.
28. Tramer MR. A rational approach to the control of postoperative nausea and vomiting: evidence from systematic reviews. Part II. Recommendations for prevention and treatment, and research agenda. Acta Anaesthesiol Scand 2001; 45: 14-19.
29. Tuncer S, Bariskaner H, Yosunkaya A, Tavlan A. Influnece of dexamethasone of nausea and vomiting during patient-controlled analgesia with tramadol. Clin Drug Invest 2002; 22: 547-552.
30. Wang JJ, Ho ST, Liu HS, Ho CM. Prophylactic antiemetic effect of dexamethasone in women undergoing ambulatory laparoscopic surgery. Br J Anaesth 2000; 84: 459-462.
31. Wang JJ, Ho ST, Liu YH, Ho CM, Liu K, Chia YY. Dexamethasone decreases epidural morphine-related nausea and vomiting. Anesth Analg 1999; 89: 117-120.
32. Wang JJ, Ho ST, Tzeng JI, Tang CS. The effect of timing of dexamethasone administration on its efficacy as a prophylactic antiemetic for postoperative nausea and vomiting. Anesth Analg 2000; 91: 136-139.
33. Wang JJ, Wang PC, Liu YH, Chien CC. Low-dose dexamethasone reduces nausea and vomiting after tympanomastoid surgery: a comparison of tropisetron with saline. Am J Otolaryngol 2002; 23: 267-271.

Xylazine hydrochloride로 진정시킨 개에 대한 Dexamethasone의 항구토 효과

양정훈 · 강한샘 · 배재성 · 송창현 · 김정은 · 진희경 · 장광호
경북대학교 수의과대학

요 약 : Xylazine hydrochloride로 진정한 개에서 발생하는 구토에 대한 dexamethasone의 항구토 효과를 평가하고자 본 실험을 수행하였다. 4.64±1.25 kg의 임상적으로 건강한 28마리 잡종견을 사용하였으며, 사료공급과 음수급여는 실험 3시간 전 실시하였다. 실험 전과 후 정맥에서 채혈하여 혈액검사와 혈청화학검사를 실시하였다. Dexamethasone 1 mg/kg (D1군), 2 mg/kg (D2군), 4 mg/kg (D4군) 또는 생리 식염수 0.2 ml/kg (Control군)를 정맥내 주사하고 5분 후에 xylazine hydrochloride를 근육내 주사하여 진정시켰다. 각각 구토 발생시간과 구토 유무를 측정하였고, xylazine hydrochloride 진정 후 5, 15, 30, 60분에 Visual Sedation Score를 사용하여 진정정도를 평가하였다. 구토 발생시간은 대조군에서 203.25±11.35초였고, D1군과 D2군에서 각각 187.33±48.01초와 218.33±13.58초로 차이가 없었다. 구토율은 D4군 전체 실험견이 구토를 보이지 않는 반면, Control군 실험견 중 57%가 구토를 하였고, D1군과 D2군 실험견들은 각각 43% 구토율을 나타냈다. 진정 정도는 실험군에 관계없이 dexamethasone을 투여한지 15분 후에 높은 수치를 나타냈다. 혈액검사, 혈청화학검사결과는 정상수치를 보였다. 이상 결과로, 개에서 전처치로 사용한 4 mg/kg 용량 dexamethasone은 진정작용에 관계없이 xylazine hydrochloride가 유발시키는 구토를 예방한다는 것을 알 수 있다.

주요어 : xylazine, 구토, 개, dexamethasone.