

STUDY THE PERFORMANCE EFFICACY OF ANTIEMETIC AGENTS ON CLINICAL SIGNS ASSOCIATED WITH ANESTHESIA IN EMERGENCIES SURGICAL CASES

Muntadher Mohsin Habeeb, Luay A Naeem* and Haider Rasheed Alrafas¹

Department of Surgery and Obstetrics, College of Veterinary Medicine, University of Basrah, Basrah-Iraq

ABSTRACT

Received on: 21.04.2021

Accepted on: 05.07.2021

The purposes of the current study were the selection of antiemetic during anesthesia for the purpose to avoid the nausea, retching and vomiting that occur as a result of adverse effect of anesthetic agents through the injection of ondansetron and hyoscine and then the injection of the mixture of xylazine and ketamine. Fifteen healthy adult male German shepherd dogs in the current study were divided randomly into three groups (five dogs/group). Antiemetic drugs ondansetron 0.1 mg/kg body weight and hyoscine 0.03 mg/kg b.wt were injected intravenously followed with xylazine 1.1 mg/kg b.w. and ketamine at 2.2 mg/kg b.w. after 10 min, all drugs were injected intravenously. The effects of the drug were studied on the clinical parameters (nausea, retching and vomiting) at period zero (base line), 10 minutes after injection of antiemetic and injection of anesthesia agent in the recovery period by using clinical observation. The results showed that there were statistically significant differences on the incidence of occurrence of nausea, retching with vomiting for control group as compared with the other groups (O+ZK) and (H+ZK) during peri-anesthesia and post anesthesia time. As a result we can conclude that use of ondansetron and hyoscine in the dogs is a safe and reliable protocol for the elimination of nausea, retching and vomiting during emergency surgeries.

Key words: Ondansetron, hyoscine, ketamine hydrochloride, xylazine, German shepherd dogs, emergency surgery.

Introduction

General anesthesia, local anesthesia and regional anesthesia can be achieved by using the anesthetic agents regionally (including spinal and epidural anesthesia, as well as peripheral nerve blocks), locally and generally applied (Tonner, 2005).

The anesthetization of patient with general anesthesia causes loss of sensation and unawareness to the atmosphere (Hughes, 2008). Today general anesthesia can be produced by multiple medicine i.e. anesthetic agents, the anesthetists can mix more than one anesthetic agents to produce balanced anesthesia, some of these are volatile inhalation agents, intravenous or intramuscular agents and muscle relaxant with opiate agents to achieve the goals of minimum adverse effects (Tonner, 2005).

The most common side effects that are associated with anesthesia include alteration in the heart rhythms, respiratory manner, swelling with pain in the injection site, muscle rigidity, nausea, post-operative nausea and vomiting. In the per-operative and postoperative periods the nausea and vomiting are the most common problems (Bednarski *et al.*, 2011).

The risk of vomiting during the per-operative procedure can cause aspiration pneumonia, esophageal stricture and oesophagitis, rupture or tension on sutures of incisional tissues with increases in intraocular pressures. Profuse and prolonged vomiting symptom can lead to dehydration with prolonged hospitalization of patients (Kraus, 2013). Prevention and avoidance of nausea, retching and vomiting in the per-operative and postoperative period are very important mission that threat the patient's life (Myklejord *et al.*, 2012).

In dogs, nausea, retching and vomiting and development of aspiration pneumonia associated with administration of anesthesia are risk factors (Alwood *et al.*, 2006). Upper gastrointestinal tract dysfunction and surgical intervention of upper respiratory airway put the brachycephalic dogs at high risk of vomiting with increase risk of aspiration pneumonia and death during the per-anesthetic

period as compare to other dogs (Trappler and Moore, 2011).

Materials and Methods

This study was carried out on fifteen adult clinically healthy German shepherd dogs of different ages (7-9 years) weighing from (29–33 kg). The animals were housed in the caged of the animal house of the College of the Veterinary Medicine in the University of Basrah, maintained in individual cages under normal environment including climate, management and feeding. They were divided randomly and equally into three groups of 5 dogs each, drug combinations were set as group A (N+XK) received normal saline with xylazine and ketamine intravenously (1.1 mg/kg b. wt. and 2.2 mg/kg b.w. respectively), group B (O+XK) ondansetron (0.1mg /kg B.W) intravenously followed by mixture of xylazine and ketamine intravenously after 10 min, and group C (H+XK) with Hyoscine (0.03 mg /kg B.W) intravenously followed with a mixture of xylazine and ketamine intravenously after 10 min. The animals were allowed to take food and water.

Evaluation of clinical parameters

Nausea, retching and vomiting were evaluated by direct observation.

Results and Discussion

Evaluation of nausea, retching and vomiting

The clinical signs of nausea, retching and vomiting were appeared in the per-anesthetic and during recovery period and showed significance changes ($P < 0.05$) in control group as compare to other two treatment groups (H+XK and O+XK) (Figure 1, and Table 1). The clinical sign of nausea like increase salivation, shivering and yawning was visible clearly in dogs of control group as compare to other two groups (Figure 2). The retching sign in the German shepherd breed dogs are found more common as it is large deep chested breed, although all dogs are affected by non-productive vomiting (retching). Study of the retching signs revealed

¹Department of Microbiology and Parasitology, College of Veterinary Medicine, University of Basrah, Basrah-Iraq, *Corresponding author Email: luay.naeem@uobasrah.edu.iq

that dogs in control group attempt to vomit by extending the head forward as compared with other two treated group (Figure 3). Fig. 4 shows clearly the sign of vomiting in dog of control group.

Vomiting is the ejection of contents of the stomach and upper intestine; is a very common problem in dogs associated with many causes, anesthesia is one of the common causes of vomiting during peri and postoperative procedure.

The most common perioperative and post-operative adverse effects of the anesthetic agents are nausea and vomiting. This results in complications during surgery and occurred mostly in patients with multiple risk factors such as diabetics and

cardiovascular diseases. The pathophysiology of nausea and vomiting are multifactorial these includes patient, anesthetic agents and plan with surgical procedures. To consider these complications our study aims to evaluate some premedications (antiemetics) for prevention of nausea and vomiting in the German shepherd dogs. Present study shows that control group revealed high incidence (60%) of nausea, retching and vomiting 50 second after injection of anesthetic agents in dogs having experimental emergency surgeries. Similar signs were also observed during the recovery phase of the dogs in the our study due to anesthetic agents side effects (Tranquilli *et al.*, 2013).

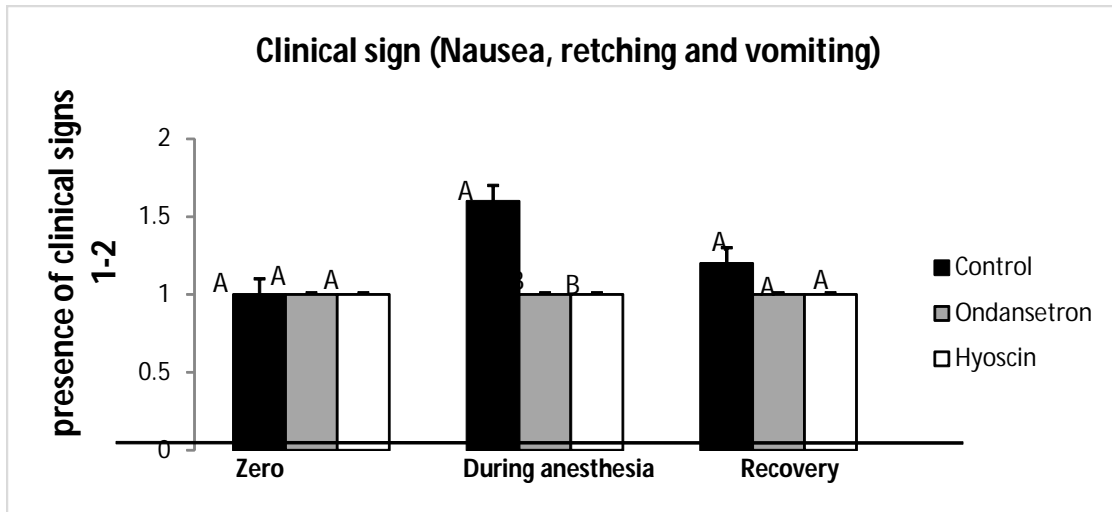


Fig. 1: Evaluation of Nausea, retching and vomiting changes associated with anesthesia: clinical study showed the appearance of clinical signs for control to compare with ondansetron and hyoscine groups before (zero) and during anesthesia and during recovery. AB different letters among groups indicates significant difference in the level (P< 0.05).

Table 1: Clinical study showed the appearance of clinical signs (nausea) for control, ondansetron and hyoscine groups before and during anesthesia and during recovery (means and standard errors).

Types of group Periods according to anesthesia time	Control group	Ondansetron group	Hyoscine group
Before anesthesia (zero)	01±0.00 ^A	01±0.00 ^A	01±0.00 ^A
During anesthesia	1.6±0.24 ^A	01±0.00 ^B	01±0.00 ^B
Recovery	1.2±0.20 ^A	01±0.00 ^A	01±0.00 ^A

AB different letters within each row indicated significant difference in (P<0.05).

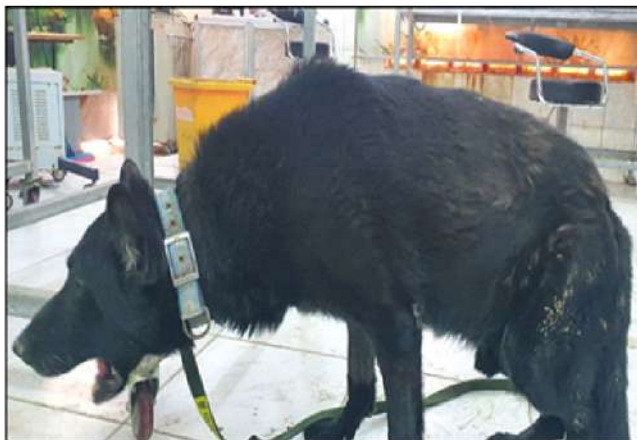


Fig. 2: Nausea in dog of control group



Fig. 3: Retching signs in control group



Fig. 4: The vomiting signs appear in the dog of control group

On the other hand in experimental group (O+XK) in which ondansetron injection was administered 10 min before anesthetic agent, does not show any clinical signs of nausea and vomiting peri and post surgery. Ondansetron is a antiemetic 5-HT₃ receptor antagonist, the 5-HT₃ receptors peripherally found on the vagal cranial nerve terminals and centrally effect on the chemoreceptor trigger zone (CTZ), that results in its effect as anti-emetic and anti-nausea agent and inhibit emesis in dogs. Ondansetron completely inhibit the signs of emesis and all behavioral signs of nausea (Kenward *et al.*, 2017; Plumb, 2018).

Experimental group (H+XK) that was exposed to the same conditions as the previous two groups revealed absence of nausea, retching and vomiting during the study time from zero to injection of anesthetic agents and during the recovery period from anesthesia. This finding is in aggrement with Gallii *et al.* (2019) that hyoscine prevents nausea and vomiting that occurs peri and post anesthetics period. The hyoscine doesn't have effect on a nerve of autonomic ganglia. The pharmacologic effect of this antiemetic agent is decrease in secretions, decrease in the motility of the gastrointestinal tract and urinary tract, mydriasis, and elevation of heart rate (Plumb, 2018). Its anticholinergic action exerts a smooth-muscle relaxing/spasmolytic effect and is capable of targeting the chemoreceptor trigger zone due to the lack of a well-developed blood-brain-barrier in the medulla oblongata, which potentiates the antiemetic effects that it produces through local action on the smooth muscle of the gastrointestinal tract (Renner *et al.*, 2005).

References

- Alwood AJ, Brainard BM, LaFond E, Drobotz KJ and King LG (2006) Postoperative pulmonary complications in dogs undergoing laparotomy: frequency, characterization and disease?related risk factors. *J. Vet. Emerg. Crit. Care.* **16**(3): 176-183.
- Bednarski R, Grimm K, Harvey R, Lukasik VM, Penn WS, Sargent B and Spelts K (2011) AAHA anesthesia guidelines for dogs and cats. *J. Am. Anim. Hosp. Assoc.* **47**(6): 377-385.

- Dilfy SH, Hanawi MJ, Al-bideri AW and Jalil AT (2020) Determination of Chemical Composition of Cultivated Mushrooms in Iraq with Spectrophotometrically and High Performance Liquid Chromatographic. *J. Green Eng.* **10**: 6200-6216.
- Gallii E, Zehavi EA, Zadik Y, Caspi T, Meltzer L, Merdler I, Kuten J and Tal D (2019) Long-term scopolamine treatment and dental caries. *Clin. Oral Investig.* **23**(5): 2339-2344.
- Hughes JML (2008) Anaesthesia for the geriatric dog and cat. *Ir. Vet. J.* **61**(6): 1-8.
- Jalil AT, Al-Khafaji AHD, Karevskiy A, Dilfy SH and Hanan ZK (2021) Polymerase chain reaction technique for molecular detection of HPV16 infections among women with cervical cancer in Dhi-Qar Province. *Materials Today: Proceedings.*
- Jalil AT, Dilfy SH, Karevskiy A and Najah N (2020) Viral Hepatitis in Dhi-Qar Province: Demographics and Hematological Characteristics of Patients. *Int. J. Pharm. Res.* **12**(1).
- Jalil AT, Kadhum WR, Faryad Khan *et al.* (2021) Cancer stages and demographical study of HPV16 in gene L2 isolated from cervical cancer in Dhi-Qar province, Iraq. *Appl Nanosci.* <https://doi.org/10.1007/s13204-021-01947-9>
- Kenward H, Elliott J, Lee T and Pelligand L (2017) Anti-nausea effects and pharmacokinetics of ondansetron, maropitant and metoclopramide in a low-dose cisplatin model of nausea and vomiting in the dog: a blinded crossover study. *BMC Vet. Res.* **13**(1): 1-12.
- Kraus BLH (2013) Efficacy of maropitant in preventing vomiting in dogs premedicated with hydromorphone. *VAA* **40**(1): 28-34.
- Marofi F, F Abdul Rasheed, O Sulaiman Rahman, H Setia Budi, H Jalil, AT Valerievich Yumashev A and Jarahian M (2021) CAR?NK cell in cancer immunotherapy; A promising frontier. *Cancer Sci.*
- Moghadas S, Elveny M, Rahman HS *et al.* (2021) A paradigm shift in cell-free approach: the emerging role of MSCs-derived exosomes in regenerative medicine. *J. Transl. Med.* **19**: 302. <https://doi.org/10.1186/s12967-021-02980-6>
- Myklejord DJ, Yao L, Liang H and Glurich I (2012) Consensus guideline adoption for managing postoperative nausea and vomiting. *WJWJ*, **111**(5): 207-213.

- Plumb DC (2018) Plumb's Veterinary Drug Handbook: Desk. John Wiley & Sons.
- Renner UD, Oertel R and Kirch W (2005) Pharmacokinetics and pharmacodynamics in clinical use of scopolamine. *TDM* **27**(5): 655-665.
- Saleh MM, Jalil AT, Abdulkereem RA and Suleiman AA () Evaluation of Immunoglobulins, CD4/CD8 T Lymphocyte Ratio and Interleukin-6 in COVID-19 Patients. *Turkish J. Immunol.* **8**(3): 129-134.
- Tonner PH, Bangert K and Scholz J (2005) Bailliere's Best Pract. Res. Clin. Anaesthesiol. **19**: 475-484
- Tranquilli WJ, Thurmon JC and Grimm KA (2013) Lumb and Jones' veterinary anesthesia and analgesia. John Wiley & Sons.
- Trappler M and Moore K (2011) Canine brachycephalic airway syndrome: surgical management. *Compend. Contin. Educ. Vet.* **33**(5): E1-8.
- Turki Jalil A, Emad Al Qurabiy H, Hussain Dilly S, Oudah Meza S, Aravindhan S, M Kadhim, M, M Aljeboree A (2021) CuO/ZrO2 Nanocomposites: Facile Synthesis, Characterization and Photocatalytic Degradation of Tetracycline Antibiotic. *J. Nanostruct.*
- Widjaja G, Jalil AT, Rahman HS, Abdelbasset WK, Bokov DO, Suksatan W and Ahmadi M (2021) Humoral Immune mechanisms involved in protective and pathological immunity during COVID-19. *Human Immunol.*