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Study the Efficacy of Antiemetic with Anesthesia on the Physiological Parameters Changes in German Shepherd Dogs

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ABSTRACT

Objectives: the purposes of the current study to evaluate the efficacy of antiemetic's associated with anesthesia on the physiological parameters (rectal body temperature and rate of respiratory, heart and oxygen level) that occur as a result of injection of anesthetic agents, use of ondansetron and hyoscine as antiemetic before surgery as a premedication's and then injection of the mixture of xylazine and ketamine intravenously to induce unconsciousness (general anesthesia).

Methods: Fifteen healthy adult males from German shepherd dogs used in the current study that divided randomly into three groups. Drugs dosed of ondansetron (0.1mg/kg. b.w) and hyoscine (0.03 mg/kg. b.w) with xylazine and ketamine (1.1mg/kg B.W, 2.2mg/kg B.W) respectively. All drugs were injected intravenously, the effects of the drug were studied on the physiological parameters at periods of zero time (base line) ,10 minutes after injection of antiemetic and 10 minutes after injection of anesthetic agents by using patient monitor for reading the physiological observation

Results:the results showed that there were statistically significant decrease in the incidence of body temperature and respiratory rate during the period of anesthesia followed the injection of antiemetic agents for all groups to compare with no significant between groups at the level of ($P< 0.05$). In the observation of heart on patient monitor reveal in all groups significant decrease of the heart rate during the period of observation followed the injection of these agents but the other group (ondansetron group) reveal at the level of ($P < 0.01$) significant decrease after the injection of anesthetic agents and hyoscine group on the level ($P < 0.05$) was a significant decreasing. There are non- significant different in all groups at the level of ($P< 0.05$). In control group when evaluate the oxygen level show significant decrease at the level ($P< 0.01$) after injection of anesthetic agents but in other group (ondansetron and hyoscine) non-significant decrease after injection of anesthetic agents. As a result of our study we concluded use of antiemetic agents (ondansetron and hyoscine) in the dog is a safe and reliable protocol for the surgeries associated with general anesthesia.

Conclusion: The results of this study showed significant decrease in body temperature and heart rate during the period of anesthesia followed by the injection of antiemetic agents for all groups. However, the ondansetron group revealed the level of ($P < 0.01$) significant decrease after the injection of anesthetic agents and hyoscine group on the level ($P < 0.05$) was a significant decreae.

Keywords: Ondansetron, Hyoscine, Ketamine Hydrochloride, Xylazine, Physiology, German shepherd dogs.

Abbreviations: Heart Rate (HR), Respiratory Rate (RR), Body Temperature (BT), Oxygen Saturation (Spo2), Ketamine (K).

INTRODUCTION

In general, anesthesia is intended to allow surgery to be performed in a safe manner, the patient under the most favorable operating conditions with experiencing a minor pain, and anxiety, or with other discomfort behavior. It is convenient, for all staff and patient for the effective use and other hospital resources, for the anesthetic to quickly induce suitable operating conditions, so permitting rapid recovery with few 2011).

The alpha 2-adrenergic receptor agonist of the non-opioid group agent is xylazine hydrochloride, which mostly used in clinical practice as the analgesic, sedative and muscle relaxant effects (Cole et al., 2000). This used to reduce or eliminate some of the unpleasant effects that associated with general anesthetic agents include:

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adverse effect events. Anesthesia can be performed using local anesthesia, regional anesthesia (including spinal and epidural anesthesia, as peripheral block of nerves) and general anesthesia (Toner, 2005).

Pre-anesthetic drug agents play an important role in the safety when administration of anesthesia, these drugs produces a calm desired state or sedated the animals (Vesal et al., 2011). Many drug combinations or single drug are used for these objectives, and some drug combinations using to lowering the doses of each drugs and well known to have more reliable effects of hypnosis or sedation from a high dose of each drug separately (Vettorato andBscco divided randomly and equally into three groups two, were set as Group A (Five dogs received normal slaine) with xylazine at dose (1.1 mg/kg B.W.) and Ketamine Hydrochloride at dose (2.2 mg/kg B.W) intravenously, Group B (Five dogs received with kg b.w of Ondansetron intravenously followed after 10 min. a mixture of xylazine (1.1 mg/kg b.w.) with ketamine (2.2 mg/kg b.w) intravenously while group C, five dogs received with 0.03 mg /kg b.w. from Hyoscine intravenously followed after 10 min. a mixture of xylazine (1.1 mg/kg.b.w) with ketamine (2.2 mg/kg.b.w) intravenously.

The animals continues to eat food and water, after that the amount of preparation will determined by dogs age, existing health concern and by the type of surgery planned in general , physiological parameters. Temperature, Respiratory rate, Heart rate, Oxygen level and then prepares the animal for monitoring by capnogram.

Evaluation of physiological parameters

The current study was performed in fifteen healthy dogs to assessment the physiological observations as the effects of antiemetic with anesthetic agents combination (Xylazine and Ketamine) as a new anesthetic protocol on heart and respiratory rate, with measure the changes in rectal body temperature and oxygen saturation. The data of physiological parameters were recorded before, during induction of anesthesia and in the recovery period. Results of the present study were collected according of the time interval and that subdivided into to three phases, phase 1 time interval from 0 to 10 minutes, phase 2 time interval from 10 minutes to 20 minutes and Phase 3 time interval from 20 minutes to recovery time. The results are given below under separate heading according the data recorded by patient monitor (capnography) (figure 1, 2).

tachycardia/arrhythmia, hyper/low blood pressure, pain with injection, laryngospasm, bronchospasm, nausea, post-nausea and vomiting during Operation (PONV) as a result of increased muscle tone, tremor, increased body temperature, respiratory rate, heart rate, and oxygen saturation (Weaver & R laptopoulos, 1990).

Materials and Methods

Our study was perform on fifteen experimental adult, healthy German shepherded dogs, that ages (7-9 old years) weighing from (29- 33 kg). The dogs housed in separated cages of the animal house in the Veterinary Medicine College, University of Basrah, maintained in 0.1 mg/

Results

1. Temperature

In group A, the body temperature revealed a significant decrease during the period of anesthesia after the injection of anesthetic agents and groups (O+ZK) and (H+ZK), also body temperature decreased significantly during the period of anesthesia after injection of anesthetic agent. Briefly, there was no significant between groups at the level of (P< 0.05) (Figure-3).

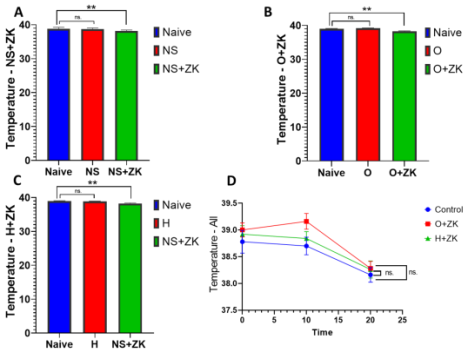

Figure 3: Body Temperature changes associated with anesthesia:A) Body temperature for control group. **B) Body temperature** for O+ZK group. **C) Body temperature** for H+ZK group. **D) Comparison Body temperature** for all experiments groups. **E)** Significance (*p <0.05,**p <0.01) was resolved by using one–way ANOVA and post - huc Turkeys test for bar graphs and Mann-whitney test for All groups data .Data are representative of at least three independent experiments.

2. Respiratory rate

In all groups, respiration rate significant decrease (P< 0.01) when injection of anesthetic agent and enter animal in deep anesthesia but respiration rate significant decrease (P< 0.05) when injection of Ns in

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Figure-1 Applied of Capnography

Figure-2 Anesthetic animal

3. Heart rate

The heart rate of all dogs of the group A showed a significant decrease during the period of observation after the injection of anesthetic agents while the other groups (B) revealed a significant decrease at the level of (P< 0.01) after the injection of anesthetic agents and (C) group showed Significant decreasing at the level (P< 0.05). Briefly, there are non-significant differentiations between groups in the level of (P < 0.05). (fig-5).

control group.

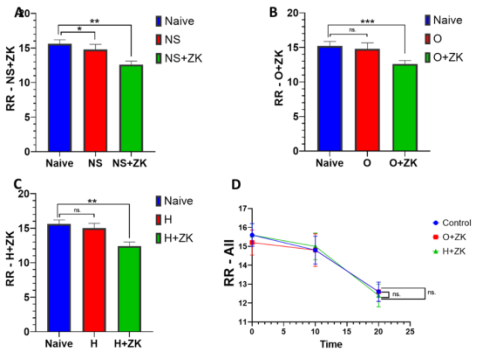

Figure 4: Respiratory rate changes associated with anesthesia: A) Respiratory rate for control group. B) Respiratory rate for O+ZK group. C) Respiratory rate for H+ZK group. D) Comparison Respiratory rate for all experiments groups. E) Significance (*p<0.05,**p<0.01)was determined by using one – way ANOVA and post-huc Turkeys test for bar graphs and Mann-whitney test for All groups data .Data are representative of at least three independent experiments.

changes in heart rate, respiratory rate, rectal body temperature with oxygen saturation and were recorded every 10 minutes before and after injection of the antiemetic with anesthetic mixture of xylazine and ketamine until recovery time, recorded heart rate, respiratory rate and body temperature continuum until 20 minutes from the start of our study was same for the recorded values.

In present study, the collected results appear that the mean heart rate was decreased significantly in the 10min after xylazine-ketamine administration in the control group as a results of the common adverse effects of α2- adrenoceptor agonists on the cardiovascular system may have manage to the decreased heart rate in this anesthetic regimen this advocate by (Hall et al., 2001), in the other groups (O+ZK) there are significant decreased in the level of (P < 0.01) after the injection of anesthetic agents and (H+ZK) group was reveal the significant decreased at the level (P < 0.05). No significant different between groups at the level of (P < 0.05), the results of (O+ZK) group showed generally as a result of it is effects, failure of potassium and/or sodium channel currents within the cardiomyocyte membrane reveal to be responsible for difference induced by 5-HT3 receptors or antagonists. QRS in both cases may result in

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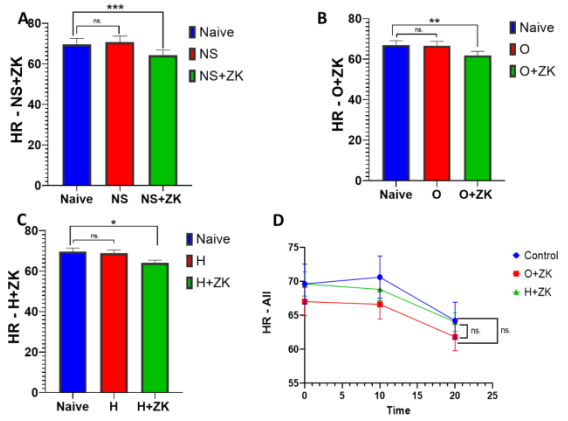

Figure 5: Heart rate changes associated with anesthesia: A) Heart rate changes for control group. B) Heart rate changes for O+ZK group. C) Heart rate changes for H+ZK group. D) Comparison Heart rate changes for all experiments groups. E) Significance (*p<0.05,**p<0.01) was determined by using one – way ANOVA and post-huc Turkeys test for bar graphs and Mann-whitney test for All groups data .Data are representative of at least three independent experiments.

3. Oxygen level

In group (A), oxygen level significant decrease at the level (P< 0.01) after injection of anesthetic agents but in other group (O+ZK) and (H+ZK) non-significant decrease after injection of anesthetic agents (fig-4)

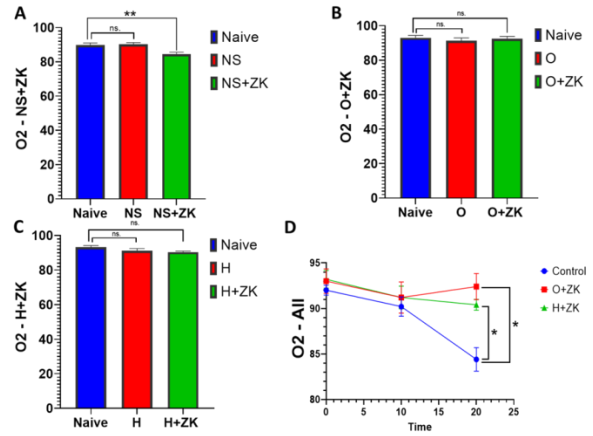

Figure 6: Oxygen saturation during anesthesia: A) Oxygen saturation for control group. B) Oxygen saturation for O+ZK group. C) Oxygen saturation for H+ZK group. D) Comparison Oxygen saturation for all experiments groups. E) Significance (*p < 0.05,**p < 0.01) was resolved by using one–way ANOVA and post - huc Turkeys test for bar graphs and Mann-whitney test for All groups data .Data are representative of at least three independent experiments.

Discussion

The Physiological parameters collections the data of ventricular arrhythmias (Navari and Koeller 2003). Ondansetron mostly blocks K channels, prolonging the effects on the QT and JT intervals (Benedict et al. 1996; Koryshev et al. 2000).

The collected respiratory rate data appear the insignificantly decreased (P = 0.065) at 10 minutes from beginning to a short recovery time after administration of the xylazine-ketamine combination, and respiratory rate decreased starting in the 10min after administration of the xylazine-ketamine combination in all groups. This agreement was reported with (Afshar et al. ., 2005), (DEMİRKAN et al., 2002) recorded that the respiratory rate significantly remained under than the baseline throughout xylazine-ketamine anesthesia, and the decrease in respiratory rate could be attributed to respiratory center depression by ketamine alone or by xylazine-ketamine combination.

The rectally body temperature recorded was appear decreased a non-significantly (P = 0.063) at 10 min up to the recovery time after applied of the xylazine – ketamine on all groups were observed that administration of analgesia and general anesthesia results in hypothermia responses showing a fall in body temperature that is agree with (Yohannes, 2018) Which show the decrease in rectal body temperature following xylazine - ketamine administration can be briefly explain the effect by blocking and

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the

rejection of the hypothalamic thermoregulatory center that disagreement with (Kul et al., 2000) and the failure to find significant changes in the rectal body temperature following ketamine with xylazine administration in the dog and rabbit. The decreased in body temperature may be as a result of inhibition action on the thermoregulation center (Buggy and Crossley, 2000; Fox et al., 2008) in the hypothalamus during anesthesia applied on dogs. The reduction in heart rate, respiratory rate and rectal temperature in this study was in agreement with studies by Sindak et al, 2010.

Evaluation of Oxygen saturation in the present study reveal the changes in all groups, the decreased SpO2 during the entire period of anesthesia showed agreement with similar results reported in different investigations by (Matthews et al., 2003; Dubois et al., 2004; Ward et al., 2006; Sankar et al., 2011; Nusory., 2011) that show the decrease in SpO2 may be due to the depression caused by the anesthetics agents in the ventilatory functions of the lungs, Low SpO2 indicates the decreased in the peripheral oxygenation and decreased tissue perfusion.

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