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Study of Some Anesthetic Protocols with Propofol in Dogs during Gastroendoscopy

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Abstract

This study was conducted during the period 2013-2018 at the Veterinary Medicine Faculty, in veterinary hospital Pet Life and in some of the veterinary clinics in the district of Tirana. For the realization of this study, several anesthetics were considered, which are currently present in the pharmaceutical market of Tirana. They were used in dogs of different ages, breeds and weights, for Gastroendoscopy in dogs that had gastric disorders such as constant vomiting, hemorrhage from the mouth, melena, and gastric dilatation. Selected dogs were divided into three large groups where each combination group of injected general anesthetic substances was applied according to the following protocols:

Protocol no. 1 Xylazine- Propofol I / V

Protocol no. 2 Acepromazine + Xylazine - Propofol I / V

Protocol no. 3 Atropine + Xylazine + Acepromazine - Propofol I / V

Propofol in gastrointestinal endoscopy has the advantage of its repeated intravenous use or infusion without causing accumulation; the reawakening is fast and in most cases the re-awakening time is foreseen. Slow intravenous application to gastrointestinal endoscopy reduces the onset of side effects such as hypotension and apnea often occurring in rapid injections of the preparation.

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INTRODUCTION

Propofol (2,6-diisopropylene phenol) is a versatile allergic anesthetic with short-term sedative-hypnotic action. This agent is applied intravenously and is widely used for sedation of patients in routine trials. Propofol is known for its safety, while its effects such as Hypnosis and Cardio-Respiratory Depression are related to the dosage.

Propofol is a global depressant of the central nervous system. It activates the amino-butyric acid γ receptors directly and inhibits N-methyl-D asparagus (NMDA) and modulates the flow of calcium. Furthermore, doses that do not include or exceed sedation have angiolytic effect. It also provides an immunomodulatory effect such as decreasing the inflammatory response thought to be responsible for organ dysfunction. It has been proven that propofol has neuroprotective effects, diminishes the circulation of cerebral blood and decreases intracranial pressure. Propofol is potent antioxidant and possesses inflammatory properties. Laboratory studies have found that propofol can protect the brain from ischemic lesions.

MATERIAL AND METHOD

This study was conducted during the period 2013-2018 at the Veterinary Medicine Faculty in Pets Life hospital and in some of the veterinary clinics in the district of Tirana. For the realization of this study, several anesthetics were considered, which are currently present in the pharmaceutical market of Tirana. They were used in dogs of different ages, breeds and weights, for gastric endosopy in dogs that had gastric disorders such as constant vomiting, hemorrhage from the mouth, melena, and gastric dilatation. These anesthetic include the use of some preanesthetic substances and some injecting general anesthetics in the form of various anesthetic protocols.

The compilation of these anesthetic protocols was made to evaluate the best anesthetic effect and the fewest side effects of each protocol to determine the most successful protocol for general

injectable anesthesia during dog gastric endoscopy in our country's conditions.

According to the anesthetic protocols determined depending on the patient's health condition and depending on their age, their pre-anesthesia was initially applied through the preanesthetic substances defined in the protocol and further continuation of anesthesia was accomplished through the use of Ketamine, Tiopental and Propofol.

The above anesthetic protocols were applied to 37 dogs, which were chosen depending on the gastrointestinal problems they showed. In this dog were defined race, age and weight. The dogs selected for the study were 1 to 10 years old. For study purposes, the selected dogs were divided according to the following age groups:

Group age, 0-5 years old
Group age 5-10 years
Group age over 10 years

The weight of dogs ranged from 5 kg. up to 30 kg.

Prior to the application of general injectable anesthesia, the classification of the dogs taken in the study was performed depending on their health status in the following classes:

*** Class I Patient Class with Normal Condition.**
*** Class II Patients with Systemic Light Diseases.**
*** Class III Patients with Various Systemic Diseases.**
*** Class IV Patients with Systemic Illness that threaten life.**
*** Class V Patients with Very Serious Condition.**

The study included only class I patients (23 dogs) and patients of grade II (14 dogs).

Plans for gastric endoscopy were left in a hunger diet 12 hours before surgery. The animals were initially subjected to clinical examination and through it were evaluated the following parameters: Nutrition Status, Behavior, Liposuction Color, Heart Rate, Respiratory Frequency, Body Temperature, Capillary Refill Time.

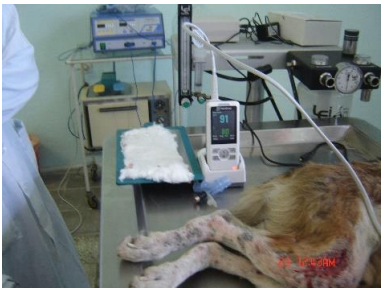
From clinical control before anesthesia resulted:

- The nutrition status was normal in 24 dogs, deficient in 6 dogs, and 7 dogs were overweight (obese).
- Behavior appeared normal in 16 dogs, apathetic in 6 dogs, calm in 10 dogs and excited in 5 dogs.

- Before anesthesia mucosa looked pink in 29 dogs, congested in 5 dogs and faint in 3 dogs.
- Selected dogs were divided into three large groups where each combination group of general injected anesthetic substances was applied according to protocols described in the methodology.

The frequency and pulse quality were evaluated simultaneously with the frequency and depth of ventilation. Heart and lung sounds were evaluated via the "Operator Manual" monitor The mucous membranes when are faint or gray are very good indicators of some disorders and can be used to warn about the condition of hypoxemia, shock, metabolic acidosis, poor tissue perfusion or cardiovascular depression. The reflex bite served to see if the patient was sufficiently anesthetized before cutting the skin.

Patient monitoring was based on the evaluation of quantitative and qualitative indicators of anesthesia. Monitoring of quantitative indicators was based on the evaluation of Cardiac frequency, Respiratory frequency, Body temperature



The monitoring of qualitative indicators was based on the evaluation of Capillary recharge time, the color of the mucous membranes, Muscular relaxation, Analgesia, Reflections of the corneal palpebral.

Patient monitoring was performed during the three phases of anesthesia; during the induction phase of anesthesia comprising the time from the injection time of the injectable anesthetic substance until the moment the effect of the injected anesthetic substance is present; during the anesthesia continuation phase, which includes the period during which the injected anesthetic acts in the organism;

during the resuscitation phase involving the elimination of the anesthetic substance from the organism.

RESULTS AND DISCUSSION

In Table No. 1 are given cardiac frequency monitoring data during propofol anesthesia

Table no. 1 Cardiac frequency monitoring during Propofol anesthesia

Scheme	**Cardiac frequency** (beat/min)		
Anesthesia with propofol	Induction	Continues	Rianimation
Protocol No. 1	74 ± 10	62 ± 13	59 ± 8
Protocol No. 2	77 ± 10	60 ± 9	60 ± 5
Protocol No. 3	80 ± 12	72 ± 7	66 ± 10

The most noticeable fluctuations in the bradycardia were found in the dog group where protocol No.2 (Acepromazine + Xylazine - Propofol) was applied. During the application of this protocol, bradycardia was more pronounced during the anesthesia continuation phase (60-90 beats per minute). This is related to the cardiovascular depressant effect that has propofol especially when combined with sedatives such as xylazin and acerpromazine, which also have side effects of bradycardia and hypotension. Referring to the data obtained during the cardiac frequency monitoring and the way of applying Propofol, it was practically estimated that the rate of propofol injection significantly influenced the reduction of cardiac frequency, hypotension deepening unapplied by cervical cardiac growth, due to myocardial shrinkage. While Atropina (Protocol No. 3) was added to the preanesthetics applied in Protocol No. 2, the data obtained during the monitoring as reflected in Table 3 clearly outlined the antivagal effect of Atroipina. Cardiac frequency during the resuscitation period during Propofol anesthesia was high in protocol no. 2.

Arterial pulse monitoring

Table no. 2 Monitoring of arterial pulse during Propofol anesthesia

Scheme	Arterial pressure (mm Hg)		
Anesthesia with propofol	Induction	Continues	Rianimation
Protocol No. 1	106.3±2.4	86.2±7.8	93.3±2.1
Protocol No. 2	104.3±3.5	90.5±6.7	107.2±3.2
Protocol No. 3	108.0±3.6	93.2±2.6	101.5±3.6

Respiratory system monitoring

For each group the relative respiratory data was recorded as, Respiratory frequency Apnea, dyspnea.

Table no. 3 Respiratory Frequency Monitoring During Propofol Anesthesia

Scheme	**Respiratory Frequency** (respiri/min)		
Anesthesia with propofol	Induction	Continues	Rianimation
Protocol No. 1	22 ± 7	20 ± 3	23 ± 5
Protocol No. 2	22 ± 9	21 ± 5	24 ± 4
Protocol No. 3	25 ± 4	23 ± 8	26 ± 7

Referring to the data obtained during the monitoring of respiratory parameters at various stages of anesthetic injection with injectable propofol, it results that Propofol exhibits respiratory depression in protocol No. 2 especially in the phase of comparing with its other combinations at this stage. The respiratory depressant effect and the appearance of apnea are directly related to the way Propofol is applied. In dogs in which intravenous application of Propofol was slow respiratory depression was less pronounced while apnea manifestation was almost absent. While in dogs in which Propofol's

application consisted in rapid intravenous injection, respiratory depression and apnea were frequently reported.

Body temperature monitoring

For each group, the relative body temperature data were recorded at the induction moment and every 10 minutes until awakening. The body temperature was determined by thermometry in the rectum and through the values indicated on the electronic monitors.

Table no. 4 Body temperature monitoring during anesthesia withPropofol

Scheme	**Body temperature**		
Anesthesia with propofol	Induction	Continues	Rianimation
Protocol No. 1	38,6 ± 1,3	37,5 ± 1,0	36,8 ± 0,4
Protocol No. 2	38,5 ± 1,0	37,8 ± 0,8	36,2 ± 0,2
Protocol No. 3	38,4 ± 1,2	37,6 ± 0,5	36,4 ± 0,7

The hypothermia condition found during anesthesia with Propofol is volatile depending on the propofol combinations with the respective preanestethics. As it appears in the table above, it is clear that hypothermia in the third protocol is more pronounced.

Monitoring of qualitative indicators

The monitoring of qualitative indicators was based on the evaluation of Capillary refill time, The color of the mucous membranes, Muscle relaxation, Analgesia, Reflex corneal palpebral

Capillary recharge time was determined by finger pressure in the gingiva mucus and was evaluated in three steps as follows:

Normal *

Weak **

Missing ***

Table no. 5 Capillary refill time monitoring during Propofol anesthesia

Scheme	Capillary refill time		
Anesthesia with propofol	Induction	Continue	Reanimation
Protocol No. 1	*	**	***
Protocol No. 2	**	***	**
Protocol No. 3	*	**	**

During Propofol's anesthesia capillary refill was deficient during the reanimation phase in the dog group where protocol no.1 (Xylazine - Propofol) was applied due to the hypotensive effects that possess the two constituent substances of this protocol. Capillary replenishment was also deficient in the phase of anesthesia in the dog group where protocol No.2 (Acerpromazine + Xylazine -Propofol) was applied. This is explained by the synergy of the hypotensive collateral effects that these three substances exhibit with each other.

The color of the mucous membranes

The color of the mucous membranes was classified in three steps as follows:

dim*

pink **

congested ***

Table no. 5 Monitoring the color of the mucous membranes during anesthesia with Propofol

Scheme	Mucous membranes		
Anesthesia with propofol	Induction	Continue	Reanimation
Protocol No. 1	**	*	*
Protocol No. 2	**	*	*
Protocol No. 3	**	*	**

During the monitoring of the color of the mucous membranes in the three anesthesia schemes, pale color was found mainly in the phase of anesthesia and in the resuscitation phase. The presence of painful color of the mucous membranes may be related to many factors such as the development of intraoperative hemorrhages associated with the decrease of blood pressure in the phase of anesthesia. While the observation of the pink lining of mucus in the induction phase of the three anesthesia schemes is related to the fact that depressive substances of the cardiovascular system such as xylazine, ACP, and injectable anesthetics such as Propofol have not yet started to exhibit their depressive cardiovascular effect, is also commented above with decreased cardiac frequency decrease, arterial blood pressure drop and peripheral vasodilatation.

Muscle relaxation

The degree of muscular relaxation was estimated based on the degree of relaxation of the lower jaw. This way the assessment of muscle relaxation constitutes one of the best indicators of anesthesia depth. However, even in deep anesthesia, muscle tone is present. There is a big difference between races due to the size and strength of muscle masseters. In cases where the animal attempted to close the mouth then anesthesia was further deepened.

Muscle relaxation was evaluated over the criteria:

Incomplete *

Normal (physiological reaction) **

Sufficient (Damaged Resistance) ***

Good (no resistance) ****

Table no. 6 Monitoring muscle relaxation during anesthesia with Propofol

Scheme	**Muscle relaxation**		
Anesthesia with propofol	Induction	Continue	Reanimation
Protocol No. 1	*	**	**
Protocol No. 2	**	***	****
Protocol No. 3	***	****	****

In all the anesthetic protocols applied under the three schemes outlined above, Xylazine has myorelaxant effect. The myorelaxant effect of Ksilazina is also evidenced by its interaction with Acerpromazine and Propofol in protocol 2.

analgesia

While analgesia was evaluated according to the criteria:

defective (hyperalgesia), *

normal (physiological reaction) **

enough (reduced sensitivity) ***

good (no response to stimuli) ****

Table no. 7 Monitoring of analgesia during anesthesia with Propofol

Scheme	**Analgesia**		
Anesthesia with propofol	Induction	Continue	Reanimation
Protocol No. 1	*	***	*
Protocol No. 2	*	**	*
Protocol No. 3	*	**	*

During the monitoring of analgesia in the three anesthesia schemes applied to dogs taken in the study, it was found that the best degree of somatic analgesia was achieved in protocol no.1. Both of these substances are present in all three protocols of the first scheme and therefore analgesia was considered sufficient (decreased sensitivity ***)

All other preanesthetic substances (Atropin, Acerpromazine) and Injectable Anesthetics (Propofol) do not possess analgesic effect. This explains the results obtained during the monitoring and evaluation of the analgesic scale, which results are reflected in the relevant Table.

Reflexes palpebral

The palpebral reflex was evaluated according to the following criteria:

Absent ***

Weak**

Normal *

Table no. 8 Monitoring of palpebral reflex during anesthesia with Propofol

Scheme	**Palpebral and corneal reflex**		
Anesthesia with propofol	Induction	Continue	Reanimation
Protocol No. 1	*	***	**
Protocol No. 2	*	***	***
Protocol No. 3	**	***	***

During the monitoring of the palpebral reflex in Propofol anesthesia, there was a lack of this reflex (***) during the anesthesia sequencing stage and during the resuscitation stage, respectively in the dog groups where Protocol No.2 and Protocol No. 3 were applied. Lack of reflexes is caused by Propofol's action.

Comparing the results obtained during the monitoring of the palpebral reflex during the anesthesia treads according to Protok I, II, III, it was found that palpebral reflexion during general injections with Propofol injected especially after 3-4 minutes after the injection of the propofol dose reflex is absent (***).

Monitoring of the duration of induction, sequencing and anesthesia reanimation according to different anesthetic protocols.

Table no. 9 Monitoring Prolonged Phase of Anesthetic Phase

Skema Koha (në min.)	**General anesthesia with Propofol**		
	Protocol No.1	Protocol No.2	Protocol No.3
Induction	3.2±1.2	3.8±1.6	5.3.3±3.7
Continue	24.1±7.6	46.2±5.3	57.9±19.6
Reanimation	17.4±3.2	27.6±2.3	42.8±14.6

Practical discussion of other effects of propofol

In some cases, the animals may exhibit muscular vibrations or fascifications which can not be painful but may be of concern, especially if they are located on the side of the surgical intervention.

Intravascular depression may be evident if administered intravenously. This situation is conducive to patients who are not

involved in cardiovascular pathology. Arterial hypertension is a common occurrence that is initially associated with a decrease in vascular resistance with inotropic effects. Slow propofol administration and prior administration to fluid therapy (5-10 ml / kg of electrolyte solution for 5-10 min.) Can help reduce cardiopathic effects but in mitral valve damage pacemens fluid therapy in these rate would have been countered and could aggravate the patient's condition.

Respiratory depression is an undesirable effect but is controlled by slow administration of propofol doses.

Anemia, diarrhea (in a cat that is administered continuously) is shown.

Recent reports suggest that magnitude of changes may be closely related to the dosage used.

There have been considerations that include the potential for worsening hyperlipidemia in patients treated with propofol where there is a rise in triglycerides in some cases of impairment

These conclusions can confine the methodology for administering, storing and storing lipid-free microorganisms.

Fast administration can result in accidental overdoses causing cardiopulmonary depression or arrest. The breathing arrest can be evident and require assisted breathing or regulating ventilation with pure oxygen. In the case of cardiopulmonary depression interfere with antiarrhythmic or other techniques according to the case presented

CONCLUSIONS

- Propofol in gastrointestinal endoscopy has the advantage of its repeated intravenous use or infusion without causing accumulation; the reawakening is fast and in most cases the re-awakening time is foreseen.
- Slow intravenous application to gastrointestinal endoscopy reduces the onset of side effects such as hypotension and apnea often occurring in rapid injections of the preparation.
- Use of propofol injections during the gastric endoscopy every 10-15 minutes and in the amount of ¾ of the induction dose it allows the continuation of anesthesia even without applying the infusion.

- Premedication and sedation reduce the induction dose of propofol, due to synergistic action at the level of the nervous system.
- The use of propofol in gastrointestinal examination may lead to the appearance of rare opistotonus vibrations, rigor and movement of the articulations.
- Palpebral Reflex during injectable anesthesia with Propofol is absent.

RECOMMENDATIONS

- The dosage should be individual based on the total body weight titrated with the desired clinical effects.
- You should wait at least 3-5 minutes between dosing administration to clinically evaluate anesthetic effects.
- Smaller dose doses are used when used with narcotics.
- In gastric patients or underweight patients, care should be taken in the use of propofol. Dosage at the same time with small doses and long dosage intervals.
- If overdose of propofol occurs during gastric endoscopy, propofol should be discontinued immediately.
- In endoscopic examination overdose is likely to cause cardiovascular depression. Respiratory depression should be treated with artificial ventilation with oxygen.
- Cardiovascular depression may require increased intravenous fluid infusion rates, and use of anticholinergic preparations.
- The use of propofol is associated with two life-threatening risks, anaphylactic reactions and anaphylactoid.
- For general anesthesia or sedation, propofol should be administered only by persons trained in general anesthesia without involving personnel for performing a surgical or diagnostic procedure.
- During gastric endoscopy, sedated animals should be continuously monitored and disposed of to provide artificial ventilation, oxygen delivery, and cardiovascular resuscitation.
- The animals should be continuously monitored in gastric endoscopy for early signs of hypotension, apnea, airway blockage, and / or oxygen dehydration. These cardiopulmonary

effects are more likely to occur after immediate intravenous administration of propofol, aged patients.

- Immediate discontinuation of prolonged propofol use may result in rapid awakening and this should be avoided. This may result in fast anxiety-related fasting, and the patient's resistance to mechanical ventilation. Intravenous propofol emulsion injection should be adjusted to maintain a moderate level of sedation through the transient process or assess the level of sedation.
- The use of propodol for sedation in the gastric endoscopic examinationof the long-term and high dose digesters causes propofol infusion syndrome, a syndrome characterized by heavy metabolic acidosis, hyperkalaemia, lipemia, hepatomegaly, kidney failure, changes ECG, and / or cardiac arrest.

REFERENCES

1. De Andres J, Sala-Branch X. **Peripheral nerve stimulation in the practice of brachial plexus anesthesia**: A review. Reg Anesth Pain Med. 2001; 26:478-483.
2. Fisher B. **Complications of regional anaesthesia**. Available at: www.frca.co.uk/documents/anes.5.4.125.pdf. Accessed February 2, 2006.
3. Franco CD, Salahuddin Z, Rafinad A. **Bilateral brachial plexus block**. Anesth Analg. 2004; 98:518-520.
4. Glosten B. **Anesthesia for obstetrics**. In: Anesthesia Ed 5 Miller RD, Churchill Livingstone, Philadelphia 2000:2024-2068.
5. Goff MJ, Arain SR, Ficke DJ, et al. **Absence of bronchodilation during desflurane anesthesia: a comparison to sevoflurane and thiopental**. Anesthesiology 2000;93:404–8.
6. Gries, Weis, Herr, et al. **Etomidate and thiopental inhibit platelet function in patients undergoing infrainguinal vascular surgery**. Acta Anaesthesiol Scand 2001;45:449-457.
7. Groeben H. **Strategies in the patient with compromised respiratory function**. Best Pract Res Clin Anaesthesiol 2004;18:579–94.
8. Gronert GA, Antognini JF, Pessah IN. **Malignant hyperthermia**. In: Anesthesia. Ed 5 Miller RD, Churchill Livingstone, Philadelphia 2000:1033-1052.

9. Hahnenkamp K, Honemann CW, Fischer LG, et al. **Effect of different anaesthetic regimes on the oculocardiac reflex during paediatric strabismus surgery**. Paediatr Anaesth 2000;10:601-608.
10. Ho AMH, Karmakar MK, Cheung M, Lam GCS. **Right thoracic paravertebral analgesia for hepatectomy**. Br J Anaesth. 2004; 93:458-461.
11. Karmakar MK, Gin T, Ho AMH. **Ipsilateral thoraco-lumbar anaesthesia and paravertebral spread after low thoracic paravertebral injection**. Br J Anaesth. 2001; 87:312-331.
12. Lika E, Gjino P; A**nestezia veterinare** Tekst Universitar, ISBN: 978-9928-04-01-7, Tiranë. 2012.
13. Moon PF, Erb HN, Ludders JW, et al. **Perioperative risk factors for puppies delivered by cesarean section in the United States and Canada**. J Am Anim Hosp Assoc 2000;36:359-368.
14. Reves JG, Glass PSA, Lubarsky DA. **Nonbarbiturate intravenous anesthetics**. In: Anesthesia. Ed Miller RD, Ed 5, Churchill Livingstone, Philadelphia 2000:228-272.
15. Shinagawa K, Kojima M. **Mouse model of airway remodeling: strain differences**. Am J Respir Crit Care Med 2003;168:959–67.
16. Sprung J, Oglestree-Hughes M, Moravec C. **The effects of etomidate on the contractility of failing and nonfailing heart muscle**. Anesth Analg 2000;91:68-75.
17. Wagner AE, Walton JA, Hellyer PW, et al. **Use of low doses of ketamine administered by constant rate infusion as an adjunct for postoperative analgesia in dogs**. J Am Vet Med Assoc 2002:221;72-75.
18. White KL, Shelton K, Taylor PM. **Comparison of diazepam-ketamine and thiopentone for induction of anaesthesia in healthy dogs**. Vet Anaesth Analg 2001;28:42-48.
19. Wiklund CU, Lindsten U, Lim S, Lindahl SG. **Interactions of volatile anesthetics with cholinergic, tachykinin, and leukotriene mechanisms in isolated Guinea pig bronchial smooth muscle**. Anesth Analg 2002;95:1650.