



Evaluation of the effect of using Citrus aurantium extract with Acepromazine and Ketamine during induction of anesthesia on the heart rate of male dogs during sterilization surgery and comparing it with the treatment used with acepromazine and ketamine and control treatment

Hamid Karimoddini^{a*}, Saemeh Rezaei Larijani^a

^a Doctor veterinary medicine, Islamic Azad University, Babol branch, Iran

Article	Abstract
<p>Article history: Received: 26th June 2021 Received in revised form: 07th July 2021 Accepted: 07th July 2021</p> <p>Keywords: Surgery, Anesthesia, Citrus aurantium extract, Ketamine</p>	<p>Evaluation of the effect of using Citrus aurantium extract with Acepromazine and Ketamine during induction of anesthesia on the heart rate of male dogs during sterilization surgery and comparing it with the treatment used with acepromazine and ketamine and control treatment. Because high anxiety is usually accompanied by physiological responses such as increased metabolism, decreased immunity, and grew work of the cardiovascular system. There is also a significant relationship between stress and subsequent mortality, which has led to the disorder being considered a public health issue, which is more evident during surgery. We used Ketamine, Acepromazine, and orange spring extract, which is the treatment tested in this study to relax and reduce heart rate during induction of anesthesia. The results showed that sedation and reduction of heart rate in the treatment using Citrus aurantium extract with Ketamine and Acepromazine were significantly different from other treatments. The highest reduction in heart rate was related to the treatment in which orange spring extract was used.</p>

Introduction

Herbal medicines have fewer side effects and better tolerated compared to chemical drugs (diazepam and xylazine). Today, in addition to the usual chemical drugs, some other herbal medicines are also used as a pre-anaesthetic and replacement drug along with Ketamine. Can be attributed to extracts or essential oils such as roses, Citrus aurantium, king seed, violet oil, lavender and hops [1]. Including these plants that are used as sedative, sleepy and as a pre-anaesthetic compound.

One of the critical concerns in general anesthesia is the patient's hemodynamic stability under optimal conditions based on the type and technique of surgery. However, acceptable drugs have a rapid onset of action and a short duration of action with minimal side effects. Ketamine is a class of phencyclidines from intravenous anaesthetics. The duration of action was 2 mg/kg

intravenously for 10-15 minutes .in addition, knowledge of the person, time and place is fully achieved after 15-30 minutes of drug discontinuation. In ketamine anesthesia , no memories of surgery and anesthesia remain for the patient. Cardiovascular effects of ketamine cause increased blood pressure, heart rate and cardiac output, leading to increased work and the need for myocardial oxygen [2].

Due to the contradictory results regarding the effect of HIIT, researchers believe that the use of natural antioxidants and medicinal plants can have beneficial effects on the health of the elderly. Among medicinal plants, Citrus aurantium has many biological effects and has long been used in traditional medicine. The antioxidant, anti-cancer, anti-allergic and anti-fat burning effects of Citrus aurantium have been shown in previous studies. Citrus aurantium contains a lot of synephrine and alkaloids [2]. In this regard, researchers have shown that consumption of Citrus aurantium with its antioxidant effects improved cognitive function in rats with Parkinson's [3].

Anxiety is a common phenomenon in our time and has always been the focus of human attention throughout history. Human beings have long been associated with the two phenomena of fear and anxiety. They have always sought ways to overcome these problems and alleviate them, and in this way have achieved remarkable results, but still achieved complete success Has not found [4]. Anxiety, a natural reaction to stress, has behavioural, physical, and mental components and is also a type of perception that does not exist externally and objectively but can help interpret observable phenomena [5, 6]. Although it is believed that low anxiety is necessary for daily life, high anxiety also causes severe damage to the body, mind, social relationships, profession and education. It deprives a person of having an acceptable quality of health in life [7]. Excessive and long-term anxiety is usually accompanied by physiological responses such as increased metabolism, decreased immunity and improved cardiovascular function. Also, there is an important relationship between anxiety and subsequent mortality that is important in public health. Secondary depression seems to be the most common and probably the most serious complication of anxiety. Depression causes the patient to seek treatment [4, 8].

Materials and methods

This study was performed on 40 male dogs for sterilization surgery in the age range of 3 to 5 years with a 30 to 35 kg weight range. Animals were selected from a shelter in the same conditions and were divided into two treatment groups according to ethical principles. In this surgery, before injection of Ketamine and Acepromazine to treatment, 20cc of spring orange extract was administered orally .We injected Ketamine intravenously in dosage 5 mg/kg and Acepromazine in dosage 0.03 mg/kg and applied anesthesia to perform surgery, which measured the heart rate during induction of anesthesia .

Result

The results show a significant difference in the sedative effect and reduction of heart rate of Citrus aurantium extract with Ketamine and Acepromazine compared to the control treatment. We used only Ketamine and Acepromazine. The highest decrease in heart rate was related to the treatment that used Citrus aurantium extract.

Table 1

Sample number	Pulse	Sample number	Pulse	Sample number	Pulse
29	99	30	105	31	103
32	98	33	107	34	112
35	108	36	97	37	104
38	101	39	116	40	109
41	94	42	111	43	107
44	95	45	103	46	109
47	96	48	100		

According to the results, it was shown that Citrus aurantium extract during induction of anesthesia could increase the sedative effect and reduce heart rate. In addition, the effects of this drug are herbal and can replace chemical anesthesia drugs in the future.

Table 2

Model Summary				
model	The correlation coefficient	The square of the correlation coefficient	The adjusted coefficient of determination	standard error
1	.902 ^a	.813	.812	.67847

Table 3

ANOVA ^a					
Model	The sum of the squares	Degree of regression freedom	Average squares	Freedom	meaningful
1 regression	456.195	1	456.195	991.036	.000 ^b
left over	104.953	228	.460		
Total	561.148	229			

Table 4

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	Not standardized impact coefficient B	standard error	Not standardized impact coefficientBeta		
1 Fixed	3.599	.133		27.073	.000
Citrus aurantium	.528	.017	.902	31.481	.000

Discussion

This study showed that HIIT and simultaneous consumption of Citrus aurantium extract increase GPX as well as decreased MDA and PC in male muscle tissue of older rats. According to

the study of recent research, researchers have expressed that in the conditions of disease and oxidative stress, the use of antioxidant-rich diet alongside physical activity is effective in improving the metabolism of substrates, resulting in the result of this study with our research result is On a path [9].

Compared to the effect of Citrus aurantium and diazepam in reducing preoperative anxiety on 60 patients, elective surgery candidates showed that Citrus aurantium could be used as an effective pre-medication to reduce the stress of patients before surgery. That the result of this research matches us [10].

According to other studies, it can be concluded that replacing herbal medicines as a pre-anaesthetist instead of chemical drugs, because chemical drugs are far more side effects than herbal medicines, are abundantly found by plant drugs. And achieving them faster and easier [8].

In this study, the antioxidant effect of Citrus aurantium extract was mentioned that reduces a significant percentage of underlying diseases during surgery, which in turn increases the positive impact of this drug [7].

Reference

1. Fatollahpoor, S., et al., *The comparison of anesthesia induced by a combination of ethanolic extract of Valeriana officinalis and Ketamine with diazepam and Ketamine in male Rats*. Pharm Nutr, 2015. **2**: p. 107.
2. Sonntag, H., et al., *Myocardial perfusion and myocardial oxygen consumption in patients during the induction of anesthesia using dehydrobenzperidol-fentanyl or Ketamine*. Zeitschrift fur Kreislaufforschung, 1972. **61**(12): p. 1092-1105.
3. Elyasi, L. and H. Ghazvini, *The Protective Effects of Citrus Aurantium Extract on a 6-Hydroxydopamine-Induced Model of Parkinson's Disease in Male Rats*. Anatomical Sciences Journal, 2020. **17**(1): p. 1-6.
4. ر.ط. رضا، بررسی شیوع اضطراب در معلمان مقطع دبیرستان شهر تهران، مرضیه، م.ن.، ص.ع. مرتضی
5. Rosenfeld, M., *Judicial balancing in times of stress: Comparing the American, British, and Israeli approaches to the war on terror*. Cardozo L. Rev., 2005. **27**: p. 2079.
6. تأثیر آموزش ایمن‌سازی در مقابل استرس بر اضطراب امتحان و عملکرد تحصیلی دانش‌آموزان دختر. نشریه علمی آموزش و ارزشیابی، et al.، اقدسی (فصلنامه)، 2013. **5**(20): p. 33-48.
7. Katzelnick, D.J., et al., *Impact of generalized social anxiety disorder in managed care*. American Journal of Psychiatry, 2001. **158**(12): p. 1999-2007.
8. ن. علی، بررسی شیوع اضطراب در کادر پرستاری شاغل در بیمارستانهای وابسته به دانشگاه علوم پزشکی کرمان، علیرضا، غ.ن.، پ. فاطمه
9. Shykhoslamy, Z., et al., *The effect of aerobic training with Citrus aurantium L. on SIRT1 and PGC-1 α gene expression levels in the liver tissue of elderly rats*. Jorjani Biomedicine Journal, 2019. **7**(4): p. 57-65.
10. و. دیازپام در کاهش اضطراب قبل از عمل جراحی (Citrus aurantium). ا. محمود، مقایسه اثر بهار نارنج، and غلامرضا، ش.، پ. ابراهیم