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Ileocystoplasty in chinchilla rabbit bucks: A pilot study on Ketamine-Xylazine Anaesthesia

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Abstract

Objective: This pilot study evaluates the anesthetic effects of ketamine-xylazine combination for ileocystoplasty in rabbits.

Methods: Four chinchilla rabbits were divided into two groups. Group 1 underwent ileocystoplasty, while Group 2 served as controls. Anesthesia was induced with ketamine (45 mg/kg) and xylazine (5 mg/kg). Onset, duration, and recovery time were recorded, alongside physiological parameters (heart rate, respiratory rate, pulse, and temperature).

Results: Anesthesia onset was rapid (3.35 ± 0.1 min, 3.34 ± 0.6 min), with a smooth surgical duration (75.93 min) and full recovery (129.41 min). Vital parameters significantly decreased post-induction but normalized within 72 hours.

Conclusion: Ketamine-xylazine at tested doses provided stable anesthesia and smooth recovery for ileocystoplasty in rabbits. This protocol can guide future studies on optimizing anesthetic regimens.

Keywords: Ileocystoplasty, Ketamine, Xylazine, Rabbit, Anesthesia

1. Introduction

Ketamine hydrochlorine anaesthesia is dissociative general anaesthesia that is used in combination with a skeletal muscle relaxant like xylazine hydrochloride to enhance a balanced anaesthesia [1, 2]. It is a unique intravenous (IV) and intramuscular anaesthetic that is used to achieve a wide spectrum of pharmacological effects such as: somatic analgesia, sedation, catalepsy, sympathetic nervous system stimulation and bronchodilation. It has been in clinical use since 1970 [3, 4, 5]. It is often used with other drugs to achieve a smooth anaesthesia like Xylazine.

Xylazine hydrochloride is an alpha 2 adrenoceptor drug that has muscle relaxant, sedative and analgesic pharmacologic properties and commonly combined with Ketamine for routine procedures in Veterinary practice [1]. Xylazine is used as a premedication to avert impending danger of side effects such as; Respiratory depression associated with ketamine administration.

It is a pharmacological drug that is widely used in veterinary practice as a premedication in cattle, horses, dogs, cats and rabbits for minor and major surgical procedures like ovariohysterectomy, ileocystoplasty and other procedures [5-7].

Ketamine-Xylazine in rabbits provides adequate analgesia [1]. For short-term anaesthesia of rabbits, the dose most frequently used is 35 mg/kg body weight and 5 mg/kg body weight of Xylazine [2-3]. In the present study, the anaesthetic effects of Ketamine-Xylazine combination at the dose of 45 mg/kg weight and 5 mg/kg body weight respectively were evaluated for a pilot ileocystoplasty study in rabbits [8-12].

2. Materials and Methods

2.1 Annual Selection Housing, Actualization and feeding

The buck chinchilla rabbit weighed 1.88 ± 0.25 kg and aged 7.82 ± 0.5 was kept in an individual cage on an intensive management system in the animal housing facility of the college of Veterinary medicine, Joseph Sarwuan Tarka University Makurdi (JOSTUM). The rabbits were fed with commercial ruminant Pelletized Feed (made by Vital Feed Limited Kaduna, Nigeria) and forage feed.

The rabbits were acclimatized for the period of two (2) weeks before the experimental procedure. During the period of acclimatization, a routine prophylaxis was administered with antibiotic, Oxytetracycline at the dose 15mg/kg body weight and dewormer, Albendazole at the dose of 20mg/kg body weights. The Haematological, physiological and clinical parameters were evaluated and certified fit for all experimental animals before randomly picking one for commencement of the pilot study. For this study, a total of 4 rabbits were selected at random into two groups of 2 rabbits (Fig. 1,2,3).

2.2 Experimental Site

The research work was conducted at the Veterinary Teaching Hospital, small animal surgical theatre facility, South Core, Department of Veterinary Surgery and Diagnostic Imaging, Joseph Sarwua Tarka University Makurdi.

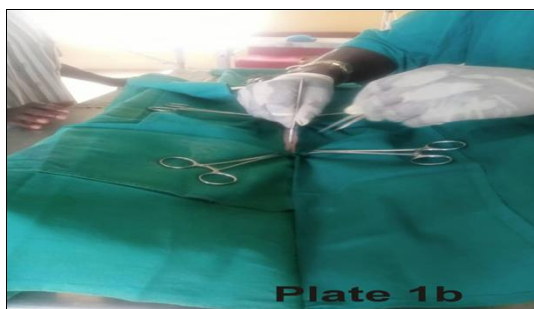


Fig 1: Caudal Midline Laparotomy Incision in chinchilla rabbit



Fig 2: Exteriorized Urinary bladder and intestine



Fig 3: Post surgical anaesthetic recovery monitoring

2.3 Anaesthetic Protocol

After injection of ketamine and xylazine were administered at the dose of 45mg/kg body weight and 5mg/kg body weight respectively. The depth was evaluated base on the negative pin pricked responses. The skin at the abdominal wall of the surgical landmark was pricked. The responses at these areas indicated the degree of anaesthesia, which is expressed as the number of negative responses, which is failure of twitch, 3/3 indicated maximum anaesthesia and 0/3 indicated no anaesthesia. The test was repeated at 10 minutes intervals for a period of 60 minutes. Prior to onset of the study the rabbit was fasted for six (6) hours before anaesthetic induction. A dose of 5mg/kg body weight of Xylazine was administered intramuscularly for ten (10) minutes then followed by a dose of 45mg/kg body weight Ketamine intramuscular induction in this study. While 1/3 maintenance doses of Ketamine were given in the situation of anaesthetic recovery before completion of the surgery (Fig. 1,2,3).

2.4 Surgical procedure

All rabbits in groups 1 were subjected to ileocystoplasty where a defect was created on the urinary bladder and closed with a 4 cm tissue graft that was harvested from the ileum using chromic cat gut size 4-0. The laparotomy closure was carried out with nylon size 3-0. Bucks rabbits in group 2 were not subjected to surgery.

2.5 Measured physiological parameters

Heart rate, respiratory rate, pulse rate and body temperature were observed prior to anaesthetic induction at 0 hour and during anaesthesia at 0, 2, 12, 24, 36 and 72 hours and recorded in table 2.

2.6 Statistical Analysis

dependent -sample test was used to compared parameters among different groups. Paired samples T-test was used to compare the changes in value of each parameter. Significant was determine when $P < 0.005$, and all statistical analysis were carried out using SPSS software. All results are presented as mean $\pm$ standard deviation (SD) and data obtained were tabulated.

2.7 Ethical Clearance

Ethical Clearance for this study was obtained from Ethical committee of Joseph Sarwuan Tarka University Makurdi.

3. Results

Table 1: Assessment of onset, Duration of anaesthesia, Recovery time of Ketamine

Groups	Anaesthesia onset (min)	Duration of Anaesthesia	Onset of sedation	Surgery recovery time
1	3.35 $\pm$ 0.1	82.14 $\pm$ 0.4	3.20 $\pm$ 0.2	75.93 $\pm$ 0.1 129.41 $\pm$ 2.0
2	3.34 $\pm$ 0.6	80.02 $\pm$ 0.3	3.10 $\pm$ 0.12	- 126.26 $\pm$ 3.8

Assessment of onset, Duration, sedation time, Recovery time of Ketamine-xylazine anaesthesia were evaluated and are recorded in Table The onset of anaesthesia representing the time from injection of the anaesthetics to the time the desired level of loss of pain or unconsciousness was observed to start, 3.35 $\pm$ 0.1minutes and 3.34 $\pm$ 0.6 minutes for group 1 and 2 respectively. Various methods were used to evaluate the anaesthesia viz; pin pricked, ear pinch, pedal pinch and righting reflexes were used. The outset of xylazine sedation

was achieved at a mean period of 3.35 ± 0.1 minutes and 3.34 ± 0.6 minutes for group 1 and 2 respectively, the duration of anaesthesia lasted for a period of 82.14 ± 0.4 minutes and

80.02 ± 0.3 minutes for group 1 and 2 respectively the duration of surgery was 75.93 minutes in group 1 (see table 1).

Table 2: vital parameters

Parameters	Group	0 HOUR	2 HOURS	12 HOURS	24 HOURS	36 HOURS	72 HOURS
Heart	1	125.20 $\pm$ 1.2	104.21 $\pm$ 2.0	111.14 $\pm$ 1.5	121.04 $\pm$ 2.0	122.05 $\pm$ 1.2	191.40 $\pm$ 2.4
	2	122.30 $\pm$ 0.4	101.0 $\pm$ 1.4	125.0 $\pm$ 1.8	124 $\pm$ 2.4	125.0 $\pm$ 2.1	125.0 $\pm$ 0.5
Temperature	1	39.61 $\pm$ 1.0	36.11 $\pm$ 1.4	39.42 $\pm$ 0.6	39.40 $\pm$ 0.5	39.81 $\pm$ 0.8	39.72 $\pm$ 1.4
	2	39.6 $\pm$ 0.2	36.9 $\pm$ 1.4	39.4 $\pm$ 1.0	39.5 $\pm$ 2.0	39.5 $\pm$ 1.2	29.6 $\pm$ 1.4
Pulse	1	125.12 $\pm$ 1.0	104.24 $\pm$ 1.4	111.04 $\pm$ 1.8	121.04 $\pm$ 0.8	122.05 $\pm$ 1.5	191.40 $\pm$ 1.6
	2	125.10 $\pm$ 1.0	106.6 $\pm$ 1.8	125.0 $\pm$ 1.6	126.0 $\pm$ 1.0	125.0 $\pm$ 1.2	124.0 $\pm$ 1.4
Respiratory	1	35.11 $\pm$ 0.2	29.10 $\pm$ 0.5	31.11 $\pm$ 1.0	33.12 $\pm$ 0.6	35.40 $\pm$ 0.1	33.05 $\pm$ 0.6
	2	35.1 $\pm$ 1.4	30.0 $\pm$ 2.0	35.4 $\pm$ 1.0	35.2 $\pm$ 1.2	35.6 $\pm$ 1.8	34.2 $\pm$ 0.3

The vital parameters were recorded in table 2. The values of all parameters at 2 hours for respiratory rate (29.10 ± 0.5 and 30.0 ± 2.0), temperature (36.11 ± 1.4 and 36.9 ± 1.4 minutes), heart rate (104.21 ± 2.0 and 101.0 ± 1.4 minutes) and pulse rates (104.24 ± 1.4 and 106.6 ± 1.8) were observed in Group 1 and 2 respectively. All the parameters were significantly decreased ($P \leq 0.005$) at 2 hours post induction.

4. Discussion

Rabbits are commonly used in veterinary procedures, including experimental surgery and biomedical research (Kihç, 2004). However, they pose a significant challenge in anesthesia due to the narrow margin between surgical anesthesia and respiratory arrest (Kamal *et al.*, 2019). The rabbit's respiratory center is particularly susceptible to the depressive effects of anesthesia, leading to a high mortality rate during anesthesia (Kaya *et al.*, 2002).

Anesthesia is essential for various surgical operations in rabbits, including sedation for blood collection, intravenous cannula installation, neutering, gastrotomy, cystotomy, and fracture fixation (Brodelt, 2009). When proper safety protocols are followed, such as using the correct anesthetics and adhering to specified dosing schedules, administering anesthetics to rabbits is considered safe.

Timeline (Table 1). In the table, onset of anaesthesia representing the time from injection of the anaesthetics to the time the desired level of loss of pain or unconsciousness was observed to start, 3.35 ± 0.1 minutes and 3.34 ± 0.6 minutes for group 1 and 2 respectively. Various methods were used to evaluate the anaesthesia *viz*: pin pricked, ear pinch, pedal pinch and righting reflexes were used.

Balance surgical anaesthesia evidenced by loss of pains, smooth muscular relaxation and smooth recovery was observed following xylazine predication and ketamine induction in the pilot ileocystoplasty [13, 14]. The surgery was successful in all rabbits used in this study. The onset of xylazine sedation was achieved at a mean period of 3.35 ± 0.1 minutes and 3.34 ± 0.6 minutes for group 1 and 2 respectively, the duration of anaesthesia lasted for a period of 82.14 ± 0.4 minutes and 80.02 ± 0.3 minutes for group 1 and 2 respectively the duration of surgery was 75.93 minutes in group 1 (see table 1) [15-17]. The onset of sedation was achieved in a period of 3.20 ± 0.2

and 3.10 ± 0.12 minutes for group 1 and 2 respectively, the onset was faster than 3.42 ± 1.3 minutes reported by Booth and McDonalds [4]; Satheskumar [1, 15]. The present onset of sedation was also shorter than 35.5 minutes reported by Booth and McDonald [4, 16] and 45.0 ± 6.1 minutes reported by Satheskumar [1, 17]. The period of complete recovery from surgical anesthesia was 129.41 minutes and

126.26 ± 3.8 minutes for group 1 and 2 respectively, against 160.0 minutes reported Satheskumar [1, 18] and 105 minutes reported by Booth and McDonald [4, 19].

The values of respiratory, temperature, pulse rate and heart rates are recorded in table 2. All the parameters were significantly decreased at 2 hours post induction in both groups. Physiological parameters can be affected by various factors, including surgical pain, anesthesia, and analgesia (21). This study's findings align with Karasu *et al.* (22), demonstrating that combining xylazine and ketamine anesthesia in rabbits' results in decreased vital parameters.

Specifically, pulse and respiratory rates measured at 2- and 12-hours post-surgery showed significant reductions. Notably, the lowest values were recorded 2 hours after surgery, indicating the most pronounced effect of anesthesia on vital parameters during this period. Additionally, the duration of anaesthesia represents the depth or duration of loss of consciousness or pain sensation on pain stimulus induced by pin pricked, ear pricket and pedal twitched.

5. Conclusion

The present dose of ketamine hydrochloride anesthesia of 45mg/kg body weight premedicated with xylazine hydrochloride at the dose of 5mg/kg body weight produced a rapid anesthesia and smooth muscle relaxation sufficient throughout invasive ileocystoplasty pilot case study. Smooth anaesthesia and recovery of rabbit that underwent ileocystoplasty was evidence in this study.

These findings can guide future researchers and clinicians to optimizing anaesthetics protocols for animals' safety,

6. Recommendation

Observation from the pilot study, it can be recommended that ketamine HCl, at the dose of 45 mg/kg body weight with Xylazine HCl, 5 mg/kg body weight produced sufficiently profuse smooth anesthesia and can be conveniently used for ileocystoplasty in rabbits.

Further investigation should be carried out to investigate the impact of ketamine -xylazine anaesthesia on haematological and biochemical parameters.

Conflict of Interest

No conflict of interest.

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7. References

1. Satheshkumar S. Ketamine-Xylazine in Rabbits. Indian Vet J. 2005;82:388-389.
2. Amed JF, Klavano P, Stones EC. Effect of xylazine ketamine. Vet Med Small Anim Clin. 1974;67:1305.
3. Lipman NS, Manni RP, Erdman SE. [Title not provided]. Lab Anim Sci J. 1990;40:395.
4. Booth NH, McDonald LE. Jones Veterinary Pharmacology and Therapeutics. 5th ed. Ludhiana (IN): Kalyani Publishers; 1982. p. 246.
5. Afshar FS, Baniadam A, Marashipour SP. Effect of xylazine ketamine on arterial blood pressure, arterial blood pH, blood gas, rectal temperature, heart and respiratory rates in goats. Bull Vet Inst Pulawy. 2005;49:481-4.
6. Akter MA, Orchy KAH, Khan MMR, Hasan M, Hasan M, Alam MM. Clinical evaluation of general anaesthesia using ketamine hydrochloride with and without diazepam in sheep. Arch Vet Sci Med. 2020;3:63-75. <https://doi.org/10.26502/avsm.016>
7. Bienert A, Plotek W, Wiczling P, Warzybok J, Borowska K. The influence of age and dosage on the pharmacodynamics of dexmedetomidine in rabbits. J Med Sci. 2014;83(2):108-15. <https://doi.org/10.20883/medical.e53>
8. Brodbelt D. Perioperative mortality in small animal anaesthesia. Vet J. 2009;182:152-61. <https://doi.org/10.1016/j.tvjl.2008.06.011>
9. Chen L, Yin YP, Wu CC, Jiang S, Fan HG, Lu DZ. Anaesthesia with intraperitoneal tiletamine/zolazepam, xylazine, and tramadol in mice. Med Weter. 2015;71:219-23.
10. Dupras J, Vachon P, Cuvelliez S. Anaesthesia of the New Zealand rabbit using the combination of tiletamine-zolazepam and ketamine-midazolam with and without xylazine. Can Vet J. 2001;42:455-60.
11. Gil AG, Silvan G, Illera M, Illera JC. The effects of anesthesia on the clinical chemistry of New Zealand white rabbits. Contemp Top Lab Anim Sci. 2004;43:25-9.
12. Kamal MM, Mishra P, Akter MA, Hasan M, Hashim MA, Alam MM. Effects of two anaesthetic combinations (xylazine-ketamine and xylazine-propofol) on clinical and hematobiochemical profile in dogs. Bangladesh Vet J. 2019;53(1-4):10-20. <https://doi.org/10.32856/BVJ-53-2019.02>
13. Karasu A, Altug N, Aslan L, Bakır B, Yuksek N. Evaluation of the anesthetic effects of xylazine-ketamine, xylazine-tiletamine-zolazepam and tiletamine-zolazepam using clinical and laboratory parameters in rabbits. Med Weter. 2018;74(10):646-52. <http://dx.doi.org/10.21521/mw.6119>
14. Kaya U, Apaydın N, Kaya A, Koc B. Comparison of cardiovascular and respiratory effects of xylazine-tiletamine-zolazepam and xylazine-ketamine anesthesia in rabbits. Vet Anaesthesiol. 2002;8:63-8.
15. Khalaf FH, Al-Zuhairi AH, Almutheffer EA. Clinical and hematological effect of acepromazine, midazolam, ketamine as general anesthetic protocol in rabbits. Int J Sci Nat. 2014;5:328-31.
16. Murrell J. Choice of premedicants in cats and dogs. In Pract. 2007;29:100-6. <https://doi.org/10.1136/inpract.29.2.100>
17. Oguntoye CO, Oke BO. A Comparison of xylazine/ketamine, diazepam/ketamine and acepromazine/ketamine anaesthesia in rabbits. Sokoto J Vet Sci. 2014;12:21-5. <http://dx.doi.org/10.4314/sokjvs.v12i3.4>
18. Perumal N, Ramasamy V, Kumar MM, Majumdar SS. Effects of ketamine and thiopentone anaesthesia on serum lipid parameters in adult bonnet monkeys (*Macaca radiata*). J Am Assoc Lab Anim Sci. 2007;46(3):21-3.
19. Rahman MS, Akter MA, Hasan M, Haque ME, Haque E, Alam MR, et al. Clinico-hemato-biochemical evaluation of general anesthesia with combination of xylazine and ketamine and ketamine alone in sheep (*Ovis aries*). Bangladesh Vet J. 2021;55(1-4):8-15. <https://doi.org/10.32856/BVJ-55-2021.02>
20. Larbode NP, Ascol RH, Paverstein CJ, Odell WD. Effect of xylazine ketamine. Fertil Steril. 1982;38:349.
21. Brondani JT, Luna SP, Padovani CR. Refinement and initial validation of a multidimensional composite scale for use in assessing acute postoperative pain in cats. Am J Vet Res. 2011;72:174-83.
22. Karasu A, Yılmaz O, Kalkan A. Effects of xylazine and ketamine combination on vital parameters in rabbits. J Vet Anaesth Analg. 2018;45(2):123-130.
23. Mohammad A H, Mohammad AA, Mohammad SS, Waheed SA, Mamoud N, Mohaed WE. Evaluation of anaesthesia with xylazine-ketamine, xylazine-fentanyl-ketamine in rabbits: A comparative study. J Adv Vet Sci Tech. 2023;8(1):38-44. <https://doi.org/10.31797/vetbio.1129402>

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