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## Sedative Effects of Acepromazine and Xylazine in Horses: A Comparative Study

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**Abstract:** Twenty two trials were conducted on 5 horses to compare the sedative effects of acepromazine and xylazine under same experimental conditions. Acepromazine was administered in the doses of  $0.05 \text{ mg kg}^{-1}$  I.V., where as xylazine was used in the doses of  $0.5 \text{ mg kg}^{-1}$  I.V. Acepromazine produced light to moderate sedation with an average sedation score of 1.55. Xylazine, on the other hand, produced moderate to deep sedation with an average sedation score of 2.45. Acepromazine produced less but longer-lasting sedation than xylazine. Acepromazine was also slower than xylazine to produce an effect. The sedation after acepromazine injection started on average at 19.55 min and maximum sedation was achieved at 33.64 min. The recovery from sedation started on average at 61.82 min but most animals still showed light sedation at the time of the last recording at 90 min after acepromazine administration. Xylazine produced immediate sedation (within 2 to 3 min of the start of injection). Recovery from sedation started on average at 27.73 min and full recovery was noted in 69.54 min. No sedation was noted 24 h after injection of both drugs. There was more individual variation in response to the onset of sedative effect of acepromazine than xylazine. It was concluded that the quality of sedation produced by xylazine was better than acepromazine and animals under the effect of xylazine responded less to visual stimuli/noise than after acepromazine.

**Key words:** Acepromazine, xylazine, sedation, horses

### INTRODUCTION

Acepromazine maleate, a phenothiazine derivative, is one of the most common drugs used for tranquilization and preanaesthetic medication in horses<sup>[1]</sup>. Its primary use as a tranquilizer is to relieve anxiety and to quite the patient during transport or physical examination. When acepromazine is given as pre-anaesthetic, induction of anaesthesia is easier, the required dose of anaesthetic is reduced and recovery from anaesthesia is usually smooth<sup>[1,2]</sup>. Xylazine, a comparatively new drug, is an  $\alpha$ -2 agonist. It is generally reliable and rapid acting sedative compound. It also has analgesic and muscle relaxation properties<sup>[3-5]</sup>. Xylazine is reported to be a good analgesic for horses with severe colic pain<sup>[6]</sup> as in acute enteritis, strangulating small bowel obstruction and chronic simple obstruction. Studies suggest that xylazine is superior to other narcotic and narcotic-like analgesics in relieving superficial and deep visceral pain in ponies and horses<sup>[7-10]</sup>. Xylazine efficiently sedates and calms the painful horses. These actions of xylazine have proven extremely valuable to veterinarians wanting to restrain and control an equine patient. Thus xylazine has become the most commonly administered sedative-analgesic in horses<sup>[2]</sup>. Xylazine is also becoming popular as a pre-anaesthetic agent for short duration anaesthesia with ketamine in horses<sup>[2,11-15]</sup>. Some workers have even recommended infusion of

xylazine and ketamine for total intravenous anaesthesia of 60 min duration in horses<sup>[16]</sup>. When used as pre-anaesthetic, xylazine reduces the required dose of general anaesthetics<sup>[1,2,17]</sup>. In spite of the popularity and usefulness of acepromazine and xylazine for horses<sup>[1,22]</sup> very limited research has been done to compare their effects. This study was therefore undertaken to compare the sedative effects of acepromazine and xylazine in same horses under the same experimental conditions.

### MATERIALS AND METHODS

Experiments were carried out on 5 male horses of different ages and body weights (Table 1) over a period of three months. Acepromazine (Promex 10<sup>R</sup>, Apex Laboratories Pty Ltd., New South Wales, Australia) and xylazine (Rompun<sup>R</sup>, Bayer Australia Ltd, New South Wales, Australia) were used in doses of  $0.05 \text{ mg kg}^{-1}$  I.V. and  $0.5 \text{ mg kg}^{-1}$  I.V, respectively. Each horse received two drugs on separate occasions with an interval of at least 7 days. The experiments were repeated at least once on the same horse. The experimental design is given in Table 1.

**Experimental procedure:** Experiments were conducted in quiet surroundings. After preparations, one of two drugs was administered intravenously through a catheter placed in the jugular vein. Xylazine was injected slowly taking

one minute to complete the injection. Subjective observations on the behaviour of the animal and the degree and nature of sedation were recorded up to 90 min after the administration of each drug.

The values for start of sedation, maximum sedation and recovery were noted in each animal for each drug. Degree of sedation was qualified as 0 for no sedation, 1 for light sedation (slight effect with animal becoming quieter and easier to handle), 2 for moderate sedation (animal becoming less alert, partly closing the eyelids, some relaxation of the lower lip, prolapse of the penis, less responsive to external noise or stimuli) and 3 for deep sedation (animals becoming ataxic, leaning for support, eyes closed, lowering of the head, relaxation of penis and lower lip).

Table 1: Particulars of horses and experimental design

Horse No.	Breed	Age (Years)	Body weight (kg)	Experimental design
1	S/B	5.0	350-355	AxBxAxB
2	S/B	5.0	460-465	BxAxBxA
3	S/B	4.5	468-470	AxBxAxBxA
4	S/B	2.5	345-350	BxAxBxAxB
5	S/B	5.5	55-360	AxBxAxB

S/B = Standard bred, A= Acepromazine (0.05 mg kg<sup>-1</sup> I.V.), B = Xylazine (0.5 mg kg<sup>-1</sup> I.V.)

## RESULTS

All animals adjusted very well during the conditioning period. They gained some weight (2-5 kg) and remained healthy. No reactions or complications due to canulation or catheterization of vessels (such as phlebitis, thrombosis) were recorded.

Acepromazine produced light to moderate sedation with an average sedation score of 1.55. The sedation after acepromazine injection started on average at 19.55 min and maximum sedation was achieved at 33.64 min. The recovery from maximum sedation started on average at 61.82 min. Most animals (four animals in 7 trials) showed light sedation at the time of the last recording at 90 min (Table 2). Xylazine, on the other hand produced moderate to deep sedation with an average sedation score of 2.45. Xylazine also produced immediate sedation (within 2 to 3 min of the start of injection). Recovery from sedation started on average at 27.73 min and full recovery was noted in 69.54 min. Two horses (No. D and E) were still lightly sedated at the last recording at 90 min post-injection (Table 3). No sedation was noted 24 h after injection of both drugs.

Table 2: Degree and duration of sedation after administration of acepromazine in horses

Horse No.	Repeat	Start of sedation (min)	Start of maximum sedation (min)	Start of recovery (min)	Full recovery (min)	Duration of maximum sedation (min)	Degree of sedation	Sedation score
A	1	20	30	55	85	25	L	1
	2	25	35	65	80	30	M	2
B	1	20	60	85	+90	25	L	1
	2	30	60	85	+90	25	L	1
C	1	5	15	40	+90	25	M	2
	2	15	30	65	+90	35	M	2
	3	15	25	50	+90	25	M	2
D	1	35	35	70	+90	35	L	1
	2	25	30	50	80	20	M	2
E	1	15	15	35	80	20	L	1
	2	10	35	80	+90	45	M	2
Mean		19.55	33.64	61.82	86.81	28.18	-	1.55
SE		2.65	4.48	5.23	1.39	2.26		

M = Moderate sedation, L = Light sedation, Maximum sedation = Optimum sedation produced by the drug

Table 3: Degree and duration of sedation after administration of xylazine in horses

Horse No.	Repeat	Start of sedation (min)	Start of maximum sedation (min)	Start of recovery (min)	Full recovery (min)	Duration of maximum sedation (min)	Degree of sedation	Sedation score
A	1	2	5	25	70	20	M	2
	2	2.5	5	25	55	20	D	3
B	1	3	10	35	85	25	M	2
	2	2	5	20	60	15	M	2
C	1	2	5	30	65	25	M	2
	2	3	10	20	65	10	D	3
D	1	2.5	10	25	+90	15	D	3
	2	2	5	30	60	25	D	3
	3	3	10	30	50	20	M	2
E	1	2	10	30	+90	20	D	3
	2	2	5	35	75	30	M	2
Mean		2.36	7.27	27.73	69.54	20.45	-	2.45
SE		0.14	0.79	1.56	4.18	1.71		

D = Deep sedation, M = Moderate sedation, Maximum sedation = Optimum sedation produced by the drug

## DISCUSSION

Acepromazine produced less but longer-lasting sedation than xylazine. Acepromazine was also slower than xylazine to produce an effect. There was more individual variation in response to onset of sedative effect of acepromazine than xylazine. The quality of sedation produced by xylazine was better than acepromazine and animals under the effect of xylazine responded less to visual stimuli/noise than after acepromazine. These findings are in agreement with those reported by other researchers<sup>[5,18-20]</sup>. When xylazine was used in doses of 1.1 mg kg<sup>-1</sup> in horses, the onset of action was reported within 1.9 min, the optimum effect at 7.6 min<sup>[18]</sup>. In the present study when xylazine was used in the doses of 0.5 mg kg<sup>-1</sup> similar observations regarding the onset of sedation and time of optimum sedation were recorded. The hyper excitability reaction after acepromazine reported by others<sup>[21]</sup> was not observed in the present study. Most animals urinated after xylazine injection during 90 min of observations. Increases in the urine out put after xylazine has also been reported by other workers<sup>[22]</sup>. A comparative study between xylazine and a new drug medetomidine in equipotent doses concluded that both drugs induced comparable levels of ataxia and sedation in horses<sup>[23]</sup>. However ataxia persisted longer among horses given medetomidine. Presently xylazine is becoming more popular than acepromazine for use as preanaesthetic for ketamine anaesthesia in horses<sup>[24]</sup>. In the present comparative study it was concluded that the quality of sedation produced by xylazine was better than acepromazine and animals under the effect of xylazine responded less to visual stimuli/noise than after acepromazine.

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## REFERENCES

- Hall, L.W., K.W. Clarke and C.M. Trim, 2003. *Veterinary Anaesthesia*, 10th Edn., W.B. Saunders, Edinburgh, pp: 76-87, 247-249.
- Thurmon, J.C., W.J. Tranquilli and G.J. Benson, 1996. Lumb and Jones's *Veterinary Anesthesia*, 3rd Edn., Williams and Wilkins, Baltimore, USA, pp: 185-197.
- Kerr, D.D., E.W. Jones, D. Holbert and K. Huggins, 1972. Comparison of the effects of xylazine and acepromazine in the horse. *Am. J. Vet. Res.*, 33: 777-784.
- Burns, S.J. and W.C. McMullen, 1971. Clinical application of bay Va 1470 in the horse. *Vet. Med.*, 67: 77-79.
- Clarke, K.W. and L.W. Hall, 1969. Xylazine-A new sedative for horses and cattle. *Vet. Rec.*, 85: 512-517.
- Ruckebusch, R.T., 1987. Colonic  $\alpha$  2 Adrenoreceptor-mediated Responses in the pony. *J. Vet. Pharmac. Ther.*, 10: 310-318.
- Lowe, J.E., 1978. Xylazine, pentazocine, meperidine and dipyrone for relief of balloon induced equine colic: A double blind comparative evaluation. *J. Eq. Med. Surg.*, 2: 286-291.
- Pippi, N.L. and W.V. Lumb, 1978. Objective tests for analgesic drugs in ponies. *Am. J. Vet. Res.*, 40: 1082-1086.
- Kalpravidh, M., W.V. Lumb, M. Wright and R.B. Heath, 1984. Effects of butorphanol, flunixin, levorphanol, morphine and xylazine in ponies. *Am. J. Vet. Res.*, 45: 217.
- Muir, W.W. and J.T. Robertson, 1985. Visceral analgesia: Effect of xylazine, butorphanol, meperidine and pentazocine in horses. *Am. J. Vet. Res.*, 46: 2081-2084.
- Brouwer, G.J., L.W. Hall and T.R. Kuchel, 1980. Intravenous anaesthesia in horses after xylazine premeditation. *Vet. Rec.*, 107: 241-245.
- Hall, L.W. and P.M. Taylor, 1981. Clinical trial of xylazine with ketamine in equine anaesthesia. *Vet. Rec.*, 108: 489-493.
- Yamashita, K., W.W. Muir, S.T. Subakishita, E. Abrahamsen, P. Lerch, J.A. Hubbell, R.M. Bednarski, R.T. Skarda, Y. Izumisawa and T. Kotani, 2002. Clinical comparison of xylazine and medetomidine for premedication of horses. *J. Am. Vet. Med. Assoc.*, 221: 1144-1149.
- Ellis, R.G., J.E. Lowes, W.S. Schwark and J.I. Taylor, 1977. Intravenously administered xylazine and ketamine HCL for anaesthesia in horses. *J. Eq. Med. Surg.*, 7: 259-265.
- Taylor, P.M. and L.W. Hall, 1981. Xylazine and ketamine in the horse. *Proc. Ass. Vet. Anaesth. Gr. Bri. I.*, 9: 160-169.
- Mama, K.R., A.E. Wagner, F.P. Steffey, C. Kollias-Baker, P.W. Hellver, A.E. Golden and L.F. Brevard, 2005. Evaluation of xylazine and ketamine for total intravenous anesthesia in horses. *Am. J. Vet. Res.*, 66: 1002-1007.

17. Tranquilli, W.J., J.D. Thurmon, G.J. Benson, J.E. Corbin and L.E. Davis, 1984. Halothane sparing effect of xylazine in dogs and subsequent reversal with tolazine. *J. Vet. Pharmacol. Ther.*, 7: 23.
18. McCashin, F.B. and A.A. Gabel, 1971. Evaluation of Xylazine as a sedative and preanesthetic agent in horses. *Am. J. Vet. Res.*, 36: 1421-1429.
19. Aitkin, M.M. and J. Sanford, 1972. Comparative assessment of tranquilizers in the horse. *Proc. Ass. Vet. Anaesth. Gr. Br. Ir.*, 3: 20-28.
20. Kerr, D.D., E.W. Jones, K. Huggins and W.C. Edwards, 1972. Sedative and other effects of xylazine given intravenously to horses. *Am. J. Vet. Res.*, 33: 525-532.
21. Mackenzie, G. and D.W. Snow, 1977. An evaluation of chemical restraining agents in the horse. *Vet. Rec.*, 101: 30-33.
22. Thurmon, J.C., E.P. Steffey, J.G. Zinke., M. Woliner and D. Howland, 1984. Xylazine causes transient dose-related hyperglycemia and increased urine volumes in mares. *Am. J. Vet. Res.*, 45: 224-227.
23. Bueno, A.C., J. Cornick-Seahorn, G. Hosgood and R.M. Moore, 1999. Cardiopulmonary and sedative effects of intravenous administration of low doses of medetomidine and xylazine to adult horses. *Am. J. Vet. Res.*, 60: 1371-1376.
24. Mama, K.R., 2000. Anesthetic management of the horse: Intravenous Anesthesia. In: *Recent Advances in Anesthetic Management of Large Animals* (Ed. E.P. Steffey). Intl. Vet. Inform. Service, Ithaca, NY, USA.