Chemical immobilisation of Letea feral horses (*Equus caballus*) using ketamine and medetomidine

ROSU O[1,2], UDRESCU LA[1], BIRTOIU D[3], MANU E[2]

[1] University of Agronomic Sciences and Veterinary Medicine Bucharest, Faculty of Veterinary Medicine, Splaiul Independentei 105, 050097 Bucharest, ROMANIA; rosu.ovidiu@gmail.com
[2] Vier Pfoten Romania, Maica Alexandra 24, 011243 Bucharest, ROMANIA
[3] University of Agronomic Sciences and Veterinary Medicine Cluj-Napoca, Faculty of Veterinary Medicine Cluj-Napoca, Calea Manastur 3-5, 400372 Cluj Napoca, ROMANIA

Introduction

The risks associated with round-ups were the reasons for the present study evaluating the feasibility of selective horse capture using on ground remote tranquilisation during an ongoing mare birth control program in Danube Delta. The purpose of the study was to find an appropriate ketamine/medetomidine combination, fitting into a single dart that would offer a suitable anaesthesia for free-ranging feral horses in the field.

Materials and Methods

Thirty-five free-range feral horses were remotely anaesthetised for immunocontraception using different combinations of ketamine/medetomidine with (Group 2, 7/35) or without hyaluronidase (Group 1, 28/35). The studies were conducted in Grindul Letea, Danube Delta, Romania. Drugs were delivered remotely using 5.0, 6.0 or 7.0 ml, Ø13 mm aluminium disposable darts, with either 3.81 cm or 5.08 cm barbed needles, delivered by Ø13 mm compressed air rifle. The mares were slowly approached and darted from 15 to 45 meters. Heart rate, respiratory rate, temperature and SpO2 were measured and recorded during recumbency. Induction time and total time of recumbency (duration of anaesthesia) were also recorded.

Tab. 1: Descriptive statistics (mean, SD, median, min, max and n) for feral horses under two different immobilisation protocols.

	ketamine (mg/kg)	medetomidine (mg/kg)	hyaluronidase (IU/kg)	Induction (min)	Time of recumbency (min)	Temperature (°C)	Respiratory rate (bpm)	Heart rate (bpm)
Group 1								
Mean	2.32	0.09	-	8.85	69.56	37.6	25.4	41.44
Standard deviation	0.56	0.02	-	4.76	12.87	1.34	9.29	8.84
Median	2.24	0.1	-	7.5	68	37.2	24	40
Minimum	1.42	0.05	-	4	60	34.1	14	26
Maximum	3.8	0.15	-	22	110	40.4	68	88
n	28	28	-	28	23	86	93	65
Group 2								
Mean	1.74	0.119	3.64	9	73.8	38.5	32.57	45.16
Standard Deviation	0.32	0.02	0.54	4.83	20.54	1.22	12.10	6.30
Median	1.85	0.11	3.57	8	65	38.2	31	44
Minimum	1.25	0.08	2.85	4	48	36.3	11	36
Maximum	2.2	0.17	4.4	17	92	40.8	56	65
n	7	7	7	7	5	44	40	36

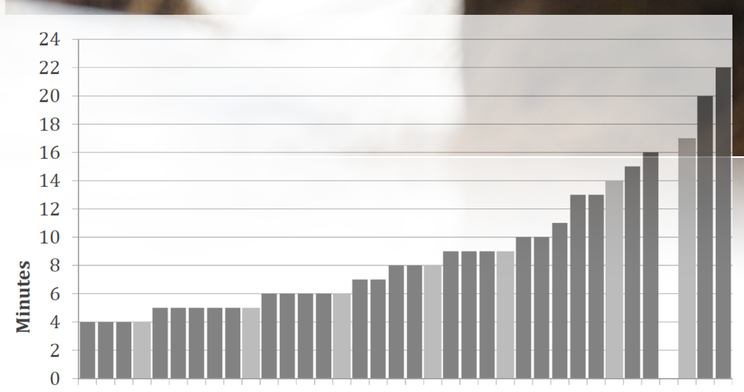
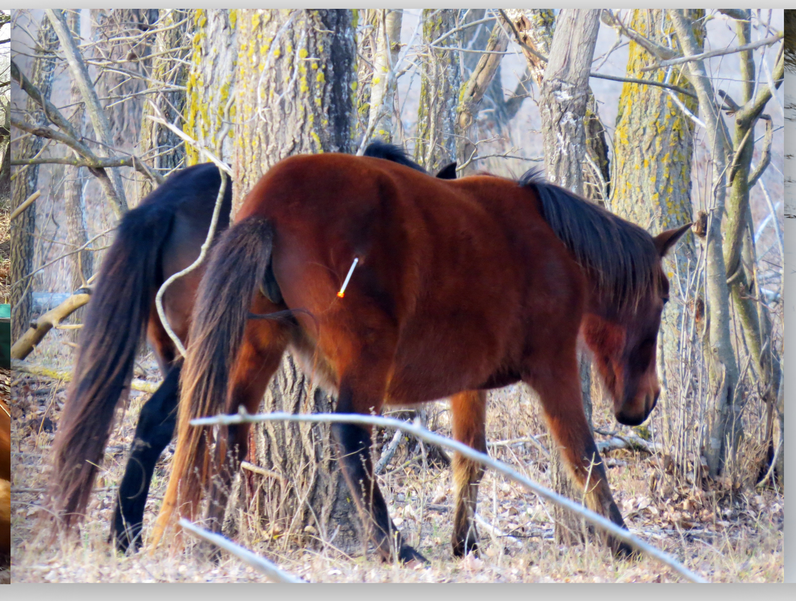


Fig 1: Distribution of induction times for 28 horses immobilised using ketamine and medetomidine (dark grey), seven horses immobilised using ketamine, medetomidine and hyaluronidase (light grey).



Results and Discussion

A mean ($\bar{x}$) induction time of 8.85 minutes was recorded for Group 1 that were immobilised with ketamine (1.45 - 3.8 mg/kg, $\bar{x}$ = 2.32 mg/kg) and medetomidine (0.05 - 0.15 mg/kg, $\bar{x}$ = 0.09 mg/kg) and a mean induction time of 9 minutes for Group 2 (7/35) that received ketamine (1.25 - 2.2 mg/kg, $\bar{x}$ = 1.74 mg/kg), medetomidine (0.08 - 0.17 mg/kg, $\bar{x}$ = 0.119) and hyaluronidase (2.85 - 4.4 IU/kg, $\bar{x}$ = 3.64 IU/kg) (see Tab.1, Fig.1).

Approx. 25 minutes after induction five horses in the first study group and two from the second required additional 1.4 mg/kg ketamine I.V. to achieve a deeper anaesthesia level. The mean duration of anaesthesia was 69.56 min for Group 1 and 73.8 min for Group 2. Despite several moments of transitory tachypnoea, all the vital parameters, except SpO2 were within the normal physiological range without any significant differences between the two groups. No specific antidote (atipamezole) was given, except for one individual due to critical clinical conditions.

During reversal the horses were manually assisted to sternal position with the front limbs extended, which facilitated their raising. All of the combinations offered good muscle relaxation and adequate anaesthetic depth. Once standing most of the horses preferred to remain stationary if not disturbed. Some tachypnoea and one case of a stormy awakening was reported, however, there were no post-anaesthestic complications or injuries. Most of the horses were able to stand up at first attempt and once standing they remained stationary.

Overall, a combination of approx. 2.32 mg/kg ketamine and 0.09 mg/kg medetomidine resulted in a satisfactory induction in 8.9 minutes and 69.5 minutes of anaesthesia.

The authors conclude that using ketamine/medetomidine combinations (with or without hyaluronidase) is a reliable alternative to ethorphine for field feral horse immobilisations, offering good muscle relaxation and adequate anaesthetic depth, with few complications and smooth reversals, even without antagonisation.

Acknowledgements

We would like to thank Kuki Barbuceanu and Robert Hengl from Four Paws animal welfare NGO for creating the opportunity and providing the founds to work on the Birth Control Project in Letea. We thank Prof. Dr. Alin Birtoiu from the Faculty of Veterinary Medicine Bucharest for his patience and giving his invaluable support in the process of starting the project. Also, Cristian Nistor for letting us use his amazing photos. Last but not least we want to thank all the volunteers without whom this project would not have been possible.

Full article here: