



Federation
of Veterinarians
of Europe



FEEVA
Every horse matters

FVE/FEEVA Best Practice Protocol for Euthanasia of horses 2020

DRAFT FOR CONSULTATION
COMMENTS TO INFO@FVE.ORG BY 7 NOVEMBER 2020

Introduction

When horses need to be euthanised there are several matters to consider. Firstly, a method of euthanasia is only considered acceptable when **guaranteed loss of consciousness** occurs **before cardiac or respiratory arrest**. This can be achieved through chemical suppression of the brain or mechanical disruption (captive bolt, gunshot).

Secondly, **human safety** during euthanasia should be addressed because of the unpredictability of the procedure.

Finally, **proper disposal of the carcass** after euthanasia should be arranged and considered prior to selecting the method of euthanasia.

In general, veterinarians performing euthanasia must assess and attempt to minimise the potential for animal distress due to physical discomfort or surroundings.

Bystanders and handlers of the horse should always be instructed in the course of events and safety measures for each individual before the horse is euthanised.

Recommended steps for euthanasia of horses

1. Sedation with an alpha-2 agonist followed by induction of anaesthesia with ketamine and then another method of euthanasia
2. Sedation with alpha-2 agonist followed by euthanasia with barbiturate solutions (or combinations)

Recommended medications for medical euthanasia of horses

- Sedation (alpha -2 agonist is essential, acepromazine administered can be considered)
 - Detomidine 0.01-0.02 mg/kg
 - Romifidine 0.04 – 0.08 mg/kg IV
 - Xylazine 0.5-1.0 mg/kg IV
 - Acepromazine 0.05-0.1 mg/kg
- Induction of general anaesthesia



- 42 ○ Ketamine 2.0 – 2.2 mg/kg IV.
43 (Ketamine can be combined with benzodiazepines such as Midazolam or Diazepam 0.05-0.1 mg/kg IV)
44
45 ● Euthanasia solutions (overdose of barbiturates or authorised barbiturate combinations)
46 ○ Pentobarbital 44-140 mg/kg IV administered as a bolus (quickly)*
47 ○ Somulose: combination of barbiturate and cinchocaine hydrochloride administered
48 slowly over 15 seconds**

49
50 *Recommended dosage varies between national authorisations (SPC) across Europe. According to research 67mg/kg is an
51 adequate dose to obtain cardiac arrest.

52
53 **Recommended dosage according to the individual mixture

54
55

56 Use of barbiturates and barbiturate combinations

57

58 An intravenous overdose of barbiturates is a reliable method of choice causing a quick loss of
59 consciousness and death with a minimum of pain and distress for the animal.

60

61 Barbiturates depress the central nervous system (CNS) in descending order, beginning with the
62 cerebral cortex, inducing a loss of consciousness progressing to general anaesthesia. With an
63 overdose, this progresses to apnoea due to depression of the respiratory centre, followed by
64 cardiac arrest.

65

66 Considering the safety of people involved, sedation of the standing horse or induction of general
67 anaesthesia should be instituted before injection of barbiturates. Direct intravenous administration
68 without prior premedication or induction of general anaesthesia does lead to loss of consciousness
69 before induction of cardiopulmonary arrest, however it can cause induction of excitation and the
70 horse falling backwards abruptly.

71

72 Due to the injection volume of barbiturates and because it should be given strictly intravenously,
73 secure intravenous access should be obtained, for example using an intravenous catheter.

74

75 The commercial barbiturate combination products are usually interchangeable with
76 pure barbiturates.

77

78 However, the combination of *pentobarbital with a neuromuscular blocking agent (NMBA)* is **NOT**
79 **ACCEPTABLE** because of the potential for the NMBA to induce paralysis prior to the onset of
80 unconsciousness.

81 **Other welfare-acceptable methods for euthanasia of horses**

- 82 • Penetrating Captive Bolt followed by bleeding or pithing

83

84 The physical damage to the brain is followed by an instant
85 loss of consciousness, while bleeding or another method
86 will cause death.

87 Motor activity may continue and can be dangerous.

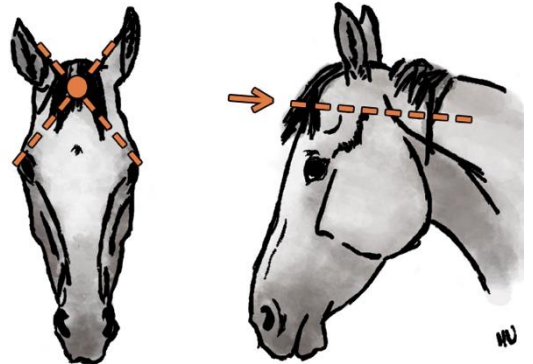
88

89 The technique requires skill, adequate restraint and proper
90 placement of the captive bolt, and should only be
91 performed by well-trained personnel.

92

93 Appropriate licences can be mandatory.

94



95 **Methods of euthanasia of horses that are considered conditionally acceptable**

- 96 • Potassium Chloride *ONLY in conjunction with general anaesthesia*

97

98 A saturated solution of potassium chloride in a dosage of 75-150 mg/kg intravenously will induce
99 cardiac arrest. A saturated solution can be made with 35.5 gr KCl in 100 ml of water. Clonic spasms
100 and muscle fasciculations may occur if given to conscious animals.

101

102 Potassium chloride is not a controlled substance and is easily acquired, stored, transported and
103 mixed in the field. However, it is not approved for euthanasia of animals.

104

- 105 • T61 *ONLY in conjunction with general anaesthesia*

106

107 T61 is a commercially available combination of embutramide, mebezoniumiodide,
108 tetracainehydrochloride. Embutramide causes unconsciousness and respiratory depression and
109 mebezoniumiodide causes muscular paralysis. Only to be used under general anaesthesia to avoid
110 the effects of mebezoniumiodide prior to loss of consciousness.

111 Excitation and vocalisation in distress is described when given to conscious animals because it is
112 painful while injected.

113

- 114 • Intrathecal lidocaine

115

116 Administration of 2% lidocaine hydrochloride at a dosage of 4mg/kg administered within 30
117 seconds. The method is only to be used by veterinarians experienced with intrathecal injections

118

- 119 • Gunshot to the head

120

121 If a horse is not approachable e.g. in the case of wild or feral horses, a gunshot to the head can be
122 considered acceptable if performed by a skilled and licensed person.



Federation
of Veterinarians
of Europe



FEEVA
Every horse matters

123 According to EU regulation 1099/2009 regarding methods of stunning for slaughter of animals it is
124 allowed to use a firearm with free projectile to severely and irreversible damage the brain in case
125 of slaughter.

126

127 **Disposal of the carcass**

128 After euthanasia, disposal of the carcass remains must be carried out through appropriate measures.
129 When carcasses are to be left in the field due to unavailability of appropriate disposal facilities, a
130 penetrating captive bolt, a gunshot to the head, avoiding lead bullets, or a nontoxic injectable agent
131 (potassium chloride after induction of anaesthesia with a non-toxic general anaesthetics) should be
132 used.

133

134 There are potential environmental hazards associated with carcasses left in the field
135 containing harmful residues of other chemical euthanasia methods (e.g. barbiturate
136 overdose) being consumed by scavengers or predators.

137

138

139 **References:**

140

- 141 • Aleman, M., Williams, D.C., Guedes, A, Madigan, J.E. Cerebral and brainstem
142 electrophysiologic activity during euthanasia with pentobarbital sodium in horses. JVIM
143 19 march 2015
- 144 • Aleman, M., Davis, E., Williams, D., Madigan, J., Smith, F. and Guedes, A. (2015),
145 Electrophysiologic Study of a Method of Euthanasia Using Intrathecal Lidocaine Hydrochloride
146 Administered during Intravenous Anesthesia in Horses. J Vet Intern Med, 29: 1676-1682.
147 doi:[10.1111/jvim.13607](https://doi.org/10.1111/jvim.13607)
- 148 • Buhl, R. *et al.* Evaluation of clinical and electrocardiographic changes during the euthanasia of
149 horses. The Veterinary Journal 196 (2013) 483-491.
- 150 • AVMA guidelines for the Euthanasia of Animals: 2020 edition
- 151 • EU Regulation 1099/2009 of 24 September 2009

152

153 Acknowledgements to Lieuwke Kranenburg DVM Dip ECEIM, Utrecht University, for drafting the FEEVA Best
154 Practice Euthanasia protocol for horses