Euthanasia by intrathecal injection of lidocaine in calves: cadaveric and pilot studies

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Introduction

Injectable alternatives to pentobarbital overdose euthanasia of cattle are needed to improve the safety of carcass disposal. Intrathecal injection of lidocaine has been investigated as a method of euthanasia in anesthetized horses and results in low residues in the carcasses. Its efficacy has not been evaluated in cattle. The objectives were to describe the intrathecal distribution of a dye in cadavers and to investigate its efficacy as a method of euthanasia in calves.

Materials and Methods

Cerebrospinal fluid was aspirated after atlanto-occipital cistern centesis, then methyl blue (n=5 cadaveric calves) or lidocaine (n=4 anesthetized calves requiring euthanasia) was injected intrathecally. Dye distribution to central nervous system structures responsible for consciousness was assessed after sagittal section of the skull and cervical spine of cadaveric calves. Brainstem reflexes, heart rate and respiratory rate were monitored for 10 minutes in anesthetized calves. Any calf presenting a cardiac activity 10 minutes after lidocaine injection was administered an IV dose of pentobarbital. Descriptive statistics were generated.

Results

Intrathecal injection was successfully performed in all attempts. Most anatomical structures responsible for consciousness have been dyed. Brainstem reflexes and respiratory movements were lost within 30 seconds and remained so in all anesthetized calves. Heart rate initially decreased, then increased, and finally decreased until cardiac arrest. Two calves died within 10 minutes; two calves were administered pentobarbital at 10 minutes.

Significance

Intrathecal injection of lidocaine through the atlanto-occipital space can result in euthanasia of anesthetized calves. Further studies are needed to ensure that this innovative method of euthanasia is acceptable in calves.