

EVALUATION OF ETOMIDATE AND ALFENTANYL IN DOG ANAESTHESIA

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ABSTRACT - *The use of etomidate for short periods of anaesthesia (e.g. biopsy, skin suture, radiography) was related both to its short duration of action and the absence of significant side-effects. It was rapidly metabolized by liver in inactive metabolites, and its pharmacokinetics characteristics recommended it for continuous perfusion or intravenously. In dog, alfentanil was used to diminish the induction dose of intravenous anaesthesia, although it may be the cause of a few minutes apnea. The aim of this study was to monitor the course of anaesthesia, using a combination of etomidate and alfentanil.*

Key words: anaesthesia, etomidate, alfentanil, dog

REZUMAT – *Evaluarea anesteziei cu etomidat și alfentanil la câine. Utilizarea etomidatului pentru perioade scurte de anestezie (de exemplu, biopsie, sutura pielii, radiografie) este descrisă ca având o durată scurtă de acțiune și absența efectelor adverse semnificative. El este metabolizat rapid în ficat în metaboliți inactivi, iar caracteristicile sale farmacocinetice ar trebui să-l recomande pentru administrare în perfuzie continuă sau bolus intravenos. La câine, alfentanilul poate fi utilizat pentru a reduce doza de inducție a anesteziilor intravenoase, deși acesta poate fi cauza producerii unei apneei de câteva minute. Scopul acestui studiu a fost de a monitoriza anestezia sub combinația etomidat – alfentanil.*

Cuvinte cheie: anestezie, etomidat, alfentanil, câine

INTRODUCTION

Injection – like anaesthesia offers many advantages to anaesthetists and surgeons veterinarians. It is easy to be administered and induces a rapid effect of anaesthesia; it does not require special equipment, does not irritate the respiratory

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tracts and is relatively agreeable for the dog. The imidasolic – etomidate derivative is recommended for inducing anaesthesia in Caesarian operations, for traumatized patients or for heart, liver disease or haemo-dynamically instable patients (Thurmon *et al.*, 1996; Seymour, Gleed, 1999). The fentanyl derivative-alfentanyl is by one and a quarter stronger as analgesic than fentanyl, but has the advantage of a rapid effect (1-2 minutes since the intravenous injection). It was described as having a shorter action than fentanyl, although the pharmacological studies on its pharmaco-kinetics in dog have demonstrated its higher cumulative effect, as a result of repeated doses (Benzécri, 1973; Janssen., 1975).

MATERIALS AND METHODS

We have studied 30 apparently healthy dogs. They were divided into three groups. The dosage regime for etomidate and alfentanyl was the following: group 1 (n = 12): 1 mg/kg etomidate and 4 µg/kg alfentanyl; group 2 (n = 10): 1 mg/kg etomidate and 8 µg/kg alfentanyl; group 3 (n = 8): 1.5 mg/kg etomidate and 4 µg/kg alfentanyl.

Doses were administered intravenously. For each group, the heart and respiratory frequency, the level and duration of muscle relaxation and analgesia were recorded. The muscle relaxation was assessed quantitatively. It was graded as deep, when the animal was immobile, and moderate when some spontaneous movements (tail, legs) were noticed.

Analgesia was considered to be marked when no response was registered by a painful stimulus (prick with a needle) and when the interdigital reflex was absent. Analgesia was considered to be moderate when the interdigital reflex was again recorded. In addition, rotation of the eyeball, the period between injection administration and the first attempt of dog to keep his head right and to walk were measured. The statistical analysis of results was carried out through the Software Programme for Statistical Analyses. Data obtained are presented as $M \pm SD$ (Central paradigm of statistics, especially of descriptive statistics: “giving up to some information to the advantage of relevance gain”).

RESULTS AND DISCUSSION

The results on relaxation, analgesia and recovery parameters are summarized in *Table 1*. From the 30 anaesthetized dogs, 4 cases of excitation were observed, which needed additional ketamine administration (3 mg/kg). Most of the excited dogs were very nervous prior to the induction of anaesthesia as a result of the prolonged travail. In all the three groups, bradycardia took place after the first minutes post injection: at the first group, the return to control values occurred before the end of anaesthesia (the 14th minute). When marked

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bradycardia occurred, several dogs displayed arrhythmias. Other side-effects were: vomiting (n = 1) and recovery accompanied by excitation (n = 3).

The study confirms the previously reported data from specialty literature. The normally recommended dosage regime (group 1) was, generally, sufficient for most of therapeutic purposes. In 9.5 % of the cases, the doses of etomidate increased by 50 %. This combination of drugs has produced only low cardiovascular effects and had the shortest duration of action. In contrast, when the dose of alfentanyl was doubled, analgesia was prolonged by 3 minutes, but the depressant effect on the cardiovascular system has become a limiting factor. The dosage level used at the third group has also resulted in undesirable side-effects (the depressant effect on the cardiovascular system was the most important one and, in addition, awakening was delayed).

Table 1

Dog response (duration in minutes) to the administration of a combination of etomidate and alfentanyl

Groups	1 (n = 12)	2 (n = 10)	3 (n = 8)
Etomidate (mg/kg)	1.0	1.0	1.5
Alfentanyl (µg/kg)	4.0	8.0	4.0
Muscle relaxation			
Deep	8 ± 5	7 ± 4	9 ± 1
Moderate	10 ± 5	11 ± 6	15 ± 9*
Analgesia			
Marked and moderate	9 ± 9	13 ± 2*	14 ± 2*
Eyeball rotation	5 ± 4	6 ± 5	7 ± 3*
Awakening from anaesthesia	10 ± 6	11 ± 4	
First attempt to keep the head right	13 ± 1	15 ± 1	19 ± 2*
First attempt to walk	17 ± 8	20 ± 3	25 ± 8*
Walk	22 ± 0	23 ± 1	31 ± 5*

Values are expressed as mean ± SD

* p < 0.05 = significant; group 1 = control group

CONCLUSIONS

The main advantages of etomidate – alfentanyl combination are short duration of action; sufficient analgesia for minor surgery; few side-effects on the cardiovascular system, which make this combination useful in case of shock.

The main disadvantages are excitation in about 10 % of dogs, which needed ketamine administration; occurrence of panting, which makes radiographic examination difficult, especially in high-size dogs; the combination is expensive.

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