Pain-Induced Distress and Its Alleviation Using Butorphanol After Ovariohysterectomy Of Bitches

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Volume I

Text

(Volume II contains the Tables, Figures and Appendices)

On the strength of one link in the cable,
Dependeth the might of the chain.
Who knows when thou may'st be tested?
So live that thou bearest the strain!

Reef Points, 1964-65
United States Naval Academy

Abstract

Ovariohysterectomy is the most frequently performed surgical procedure in companion animal veterinary practice. It is regarded by many as being quite benign; however, questioning of that premise prompted this investigation. There were no satisfactory data available to determine how benign or noxious this procedure might be, yet this query is of considerable clinical importance. There exists the further vagary of assessment for pain-relief measures, whether associated with surgery or injury. Great value would lie in establishing a routinely available criterion for pain assessment. The present work was therefore undertaken to examine this area of clinical relevance and to establish a model for further study of postsurgical pain-induced distress and its alleviation.

Most previous studies in this area had omitted satisfactory control or baseline animals in that the anaesthetic or analgesic treatments were rarely, if ever, applied to animals that were not also subjected to surgery. Accordingly, the following nine treatments were made: Control, Anaesthesia, Analgesia, Analgesia plus Anaesthesia, Anaesthesia plus Analgesia at intubation, Anaesthesia plus Analgesia at extubation, Anaesthesia plus Surgery, Analgesia plus Anaesthesia plus Surgery, and Anaesthesia plus Surgery plus Analgesia. These were designed so that, with the inclusion of surgery, all the major variations in treatment were independently examined.

The parameters used to evaluate the extent of pain-induced distress were changes in plasma cortisol concentration and behaviour. Cortisol is a well established physiological parameter of distress, and behaviour is a cue used by most clinicians. Butorphanol was selected as the analgesic of choice in this investigation based upon its wide use, margin of safety, across-species efficacy, versatility in route of administration, long shelf-life, competitive pricing, and freedom from the requirement for documented use by controlling authorities.

The following conclusions were drawn from the cortisol data. Psychogenic stimuli in conscious control bitches were responsible for a transient rise in cortisol concentrations not seen in anaesthetised dogs which were unconscious. Butorphanol elicited a large cortisol response,

attributable to dysphoria, which was again prevented by anaesthetic administration. As judged by cortisol response there was no apparent benefit of preoperative butorphanol administered intravenously 30 minutes prior to or at the time of anaesthetic induction. However, there was an earlier decline in cortisol concentration when butorphanol was given at extubation and this was interpreted to reflect an earlier decrease in postoperative pain-induced distress.

The study commenced with 166 behavioural parameters (interactive and noninteractive) from which it was found that 76 occurred at insufficient frequencies as to be valuable as indices of postoperative pain-induced distress. Among the discriminating behaviours, noninteractive parameters characteristic of the nonanalgesic surgery group were drawing the rear limbs up into a pike position, lip licking, cage circling, incision licking, vomition, and 'look back' (flank gazing), while the only characteristic interactive behaviour was an extended neck. Vocalisation was associated with the dysphoria of analgesia rather than pain-induced distress.

The major contributions of this research were: (1) establishing ovariohysterectomy as a model of pain-induced distress to examine the benefit of various pain-control strategies, (2) elimination of a number of commonly seen behaviours and identification of useful behaviours for identifying pain-induced distress, (3) clarification of the responses to control and 'base-comparison' treatments with regard to both cortisol and behavioural responses, (4) identification of specific pain-induced behaviours, (5) derivation of a mathematical function representing a numerical expression for the clinical intuition of the subjective impression of pain experience in dogs, and (6) identifying behaviours that can be used by the clinician to indicate the presence or absence of pain-induced distress following ovariohysterectomy. Results suggest that the ovariohysterectomy is associated with sufficient pain-induced distress to warrant the associated use of analgesia.

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