Evaluation of compression for analgesia for velvet antler removal: Canadian experience, preliminary observations

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Abstract

The objective of the present study was to examine the stress and pain response of elk to two analgesic methods used in conjunction with velvet antler removal. The two methods were the pharmacological use of lidocane (lido) and compression (comp) applied for four (4) minutes pre antler removal. Sixty-one mature (2-4 yr old) elk stags were used in the study with 51 animals allocated compression and 10 to the lidocane treatment. Measurements were taken on the animals during the antler removal process for behavioural response (nick test), orbital infrared measurements and beta endorphin. Data collected during the study indicated that a pre antler removal nick test with a saw showed lido animals to register a 69.6% non aversion response and a 30.4% aversion to the procedure vs values of 94.6% non aversion and 5.4 % aversion for the comp animals. The nick tests were scored between 0 (no response) to 4 (struggle) with scores of 0-1 considered non aversive and scores of 2-4 as aversive. By comparison, during the antler cutting the lido animals displayed an 83.3% non aversion (16.6% aversion) and the comp animals 82.0% non aversion (18.0% aversion). Orbital infrared temperatures showed a change of +0.32^{o} C between pre and post cut measurements for the lido group and a –0.08^{o} C change for the comp group. However, there were no significant differences in orbital temperature between lido and comp animals. In terms of serum beta endorphin, the lido animals showed an increase of 22.9 pg/mL from a baseline of 233 while the comp animals showed a change of only 2.2. Furthermore, the standard deviation was approximately double for the lido animals suggesting greater variation in the response to the lido treatment. These preliminary data suggest that within the limitations of the stress and pain measurements taken that the compression technique compared at least as well as the lidocane ring block for analgesia. Further measurements of stress and pain parameters are being completed in this study.

Introduction

Velvet antler is a unique food product of animal origin and has been demonstrated to possess a number of beneficial biological properties regarding human health (Sunwoo et al. 1997). The use of humane methods when removing the product from deer is considered mandatory by most countries and is in fact often legislated into codes of practice. However, debates exist regarding the most humane analgesic methods for this purpose. The pharmacological use of 2% Lidocane hydrochloride in a ring block procedure is generally considered and demonstrated as good practice (Wilson et al. 1999). However, use of lidocane has also been questioned from the standpoint of chemical residue in the antler product and from the standpoint of time of application to properly administer the ring block. As a non-chemical alternative to lidocane, researchers in New Zealand have suggested the use of a compression technique and have demonstrated its efficacy in red deer (Matthews et al. 2002). The purpose of the present study was to investigate the use of compression (comp) in north American elk (*Cervus elaphus canadensis*) and to compare the compression procedure to a conventional lidocane ring block in terms of measures of stress and pain in the animals.

Methods

A total of 61 mature, 2-4 yr old elk stags were used in this trial. The animals were represented by 51 animals in the compression group (comp) and 10 in the lidocane ring block group (lido). Antler from lidocane treated animals is often discounted in the north American market. All animals were raised on pasture and were brought into a proper handling facility for the velvet removal process. The animals were caught in an appropriate cradle, blind folded and then had either a lidocane ring block applied at 1.25 mL per cm pedicle circumference or the compression device applied. The ring block was allowed four minutes time post application before antler removal. For the compression technique, a latex band was mechanically fastened around the base of the pedicle (AgResearch, New Zealand) and left in place for four minutes before antler removal.

For behavioural measures, a nick test and a cut test were performed whereby a saw nick on the antler was made prior to cutting at dorsal, ventral and lateral surfaces of the antler just above the pedicle. The animal's reaction to these procedures was ranked as 0 (no response), 1 (slight), 2 (flinch), 3 (jump) or 4 (struggle). Non-aversive responses were considered as those scoring 0 or 1 and aversive responses as 2-4. The same scores were rated at the time of antler cutting. With respect to infrared orbital images a non-invasive orbital (eye plus the surrounding 1 cm) image was captured on the animals both before and after the antler removal using techniques described previously (Cook et al., 2002a,b). The time difference between measurements amounted to several minutes between the time of analgesia application and antler removal. Infrared measurements have been used successfully to monitor stress responses in animals such as under conditions of transport and handling (Schaefer et al., 1988, 1989), during a viral infection (Schaefer et al., 2001) and during an ACTH challenge model (Cook et al., 2001). Beta endorphin in serum was assessed by radio immuno assay (Peninsula Lab Inc. San Carlos, Ca, USA). Although not verified in elk, the antibody crossreaction with bovine, ovine and camel beta endorphin was reported at 39%. Therefore, it was felt that relative responses between treatments could provide some insight with respect to pain. Measurements on animal hematology, differential white blood cell counts and salivary cortisol were also performed but results are not available at this time.

Results

Animal behaviour responses to the process of antler removal are shown in Table 1 for nick tests both prior to antler cutting and also during the process of antler cutting. Percent values or the proportion of animals displaying both aversive and non-aversive responses are given. Data for orbital infrared measurements are shown in Table 2 for both treatment groups before and following antler removal. The beta endorphin data (Table 3) illustrates both the baseline values and proportional changes in beta endorphin measured before and after antler cutting.

Table 1. Animal behaviour responses to a saw nick test and to antler cutting in adult elk given compression or lidocane. Data represents the percentage of animals responding.

	Lidocane (=10)	Compression (n=51)
Nick Test		
Non-aversive (scores of 0-1)	69.6%	94.6%
Aversive (scores of 2-4)	30.4%	5.4%
Cut Test		
Non Aversive	83.3%	82.0%
Aversive	16.7%	18.0%

0=no response, 1=slight, 2=flinch, 3=jump, 4=struggle

Table 2: Orbital infrared temperature in elk before (pre) and following (post) antler removal. Data is in degrees centigrade.

	Lidocane (n=10)	Compression (n=51)
Pre removal	39.94	39.81 NSD
Post removal	40.26	39.73 NSD
Delta Temperature	+0.32	-0.08

NSD = Not statistically significantly different (p>0.05)

Table 3: Serum beta endorphin levels in elk taken before (pre) and following (post) antler removal. Data is in pg/mL.

	Lidocane (n=10)	Compression
Pre removal	233.0 ±185.6	194.5 ±77.8 NSD
Post removal	256.0 ±191.7	196.7 ±65.4 NSD
Delta value	22.9	2.2

NSD = Not statistically significantly different (p>0.05)

Discussion

Data from the current study suggests that compression appeared to be at least as effective as lidocane in attenuating stress and pain during the process of velvet antler removal. It is noteworthy that with respect to the beta endorphin values, the comp animals showed a lower standard deviation or more consistent response. However, the authors would caution that this data is based on fairly small numbers, and greatly different group sizes. Furthermore, additional tests of animal stress and pain response under the different analgesia methods is warranted. Nonetheless, the current study does suggest that compression may be a viable and humane alternative to pharmacological treatments such as lidocane.

In addition to the above, the authors would wish to advance the following position. Namely, even with effective analgesic methods, the attenuation of stress and pain during velvet antler removal is likely to be suboptimal unless the overall experience by the animal is considered (Cook and Schaefer 2002). As described by Hubbard and Wurtman (1997) stress *per se* affects every organ system and the attenuation of pain will in turn be influenced by the successful attenuation of stress. Hence, consideration of stressors during the pre velveting capture and handling as well as the utilization of post removal analgesics may be a humane undertaking. In recent Canadian studies, the authors are currently investigating the use of pre capture amino acid therapies (seritonergic precursors) to attenuate capture stress and also the use of post antler removal analgesics such as banamine and ketoprophine.

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