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Attitudes of Swiss veterinarians towards pain and analgesia in dogs and cats

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Summary

A survey was performed to evaluate the use of perioperative analgesia in dogs and cats by veterinary practitioners. Questions were grouped in seven sections recording personal data, education in veterinary analgesia, general ideology regarding treatment of perioperative pain, personal experience, assessment, and use of main analgesics to treat perioperative pain. A total of 258 received forms were analyzed. Based on 5 questions, 88 % showed excellent motivation to use perioperative pain therapy. The main reason declared for the use of analgesics was to relieve the patient from pain (64.1 %). Most veterinarians reported to routinely administer analgesics before (71–96 %) or after (2–23 %) surgery. The most used analgesics were non-steroidal anti-inflammatory drugs (carprofen, meloxicam) and opioids (butorphanol, buprenorphine). Animals were routinely evaluated for pain after recovery. Only 43.8 % of veterinarians declared to use loco-regional anaesthesia. Swiss veterinarians appear to recognize well the need for perioperative pain treatment. However, weakness was shown in evaluating pain severity, distinguishing between opioid classes, and using loco-regional anaesthesia.

Keywords: analgesia, pain, dogs, cats, survey, Switzerland

Haltung der Schweizer Tierärzte gegenüber perioperativen Schmerzen und Möglichkeiten der Schmerztherapie bei Hunden und Katzen

Im Jahr 2010 wurde ein Fragebogen zum Thema «perioperative Analgesie bei Hund und Katze» an 1000 Schweizer Tierärzte versandt. Dieser war in sieben Abschnitte gegliedert. Neben persönlichen Daten und Angaben zu besuchter Weiterbildung in Schmerz-Therapie bei Tieren waren die generelle Ideologie in Bezug auf die Behandlung perioperativer Schmerzen, Erfahrung in Schmerztherapie wie auch die Bewertung und Verwendung der wichtigsten Analgetika zur perioperativen Behandlung von Schmerzen von Interesse. Insgesamt wurden 258 Fragebogen ausgewertet. Bei 88 % der antwortenden Personen war die Motivation, während Operationen Schmerzmittel einzusetzen, hoch. Der Hauptgrund für die Verwendung von Schmerzmitteln war eine Linderung der Schmerzen (64.1 %). Die meisten Tierärzte gaben an, Analgetika vor (71–96 %) oder nach (2–23 %) dem Eingriffe zu verabreichen. Dabei wurden vor allem nicht-steroidale Antiphlogistika (Carprofen, Meloxicam) und Opioide (Butorphanol, Buprenorphin) verwendet. Auch nach der Genesung wurden die Tiere bei 97 % der Tierärzte routinemäßig auf Schmerzen untersucht. Loco-regionale Anästhesie-Techniken wurden von 43.8 % der Tierärzte angewendet. In der Schweizer Tierärzteschaft wurde die Notwendigkeit einer perioperativen Schmerztherapie erkannt. Allerdings wurden die zu erwartende Schmerzintensität verschiedener Eingriffe wie auch die Unterschiede zwischen Opioid-Klassen anders beurteilt als erwartet. Loco-regionale Anästhesie-Techniken werden eher selten angewendet.

Schlüsselwörter: Analgesie, Schmerz, Hund, Katze, Umfrage, Schweiz

Introduction

Nowadays, the benefits of adequately balanced analgesia after a surgical event on a veterinary patient are widely accepted. Perioperative pain alleviation represents an important step for the success of the intervention and rapid rehabilitation. Systemic pharmacological treatments as well as loco-regional analgesic techniques have been described to reduce intra and postoperative pain in animals. In the last decade, several controlled clinical trials have evaluated their efficacy for different types of surgical interventions thus providing valuable information for a procedure-specific approach to pain treatment (Lamont, 2008).
Despite the increasing evidence, analgesia is not always properly applied in clinical practice. To understand the reasons and get a better picture of the reality, several surveys about the attitude toward pain treatment and its extent among small animal practitioners have been previously carried out in Canada (Dohoo and Dohoo, 1996), Great Britain (Capner et al., 1999), South Africa (Joubert, 2001) and France (Hugonnard et al., 2004) but no data are available for Switzerland. The purpose of this study was to determine to which extent Swiss veterinarians apply pain medication in their daily surgical practice. Switzerland being internationally recognized for its advanced concern about animal rights and welfare, and considering the efforts made over the last decade to communicate and teach on the use of analgesics in dogs and cats, it was hypothesized that Swiss small animal veterinarians would be aware of the importance of perioperative analgesia in their patients and knowledgeable about the techniques and drugs to be applied.

Material and Methods

A questionnaire[a] divided into 7 parts was developed. Part 1 collected personal data and information about the type of veterinary practice. Part 2 concerned satisfaction and wishes for education in treatment of pain and part 3 was intended to evaluate the general opinion of the participants on analgesia. Part 4 dealt more precisely with used postoperative analgesic protocols. The analgesics used routinely by veterinarians were requested considering seven typical surgical procedures (ovariectomy, ovariohysterectomy, castration, osteosynthesis, laparotomy, thoracotomy, and tooth extraction). Part 5 investigated the monitoring of the patient and the evaluation of pain during general anaesthesia and the early postoperative period. In part 6, the participants were asked specifically about their use of non-steroidal anti-inflammatory drugs, opioids and loco-regional anaesthesia. Part 7 collected information about the use of other drugs for postoperative analgesia.

[a] The questionnaire can be requested from the corresponding author (olivier.levionnois@vetsuisse.unibe.ch).

The questionnaire was made available in German and in French. The questionnaire was tested first within a small group of selected veterinarians working at the Small Animal Clinic, University of Bern to check the writing, the structure and the ease to understand and answer the questions.
A hard copy of the final questionnaire was sent by regular mail to approximately 1000 registered veterinarians. This form could be completed directly and sent back by regular mail, telefax or a as a scanned copy by electronic mail. On the form, a web address was also available where an electronic form of the questionnaire could be filled in on-line. On-line responses were directly recorded in the survey software (WWW.SURVEYMONKEY.COM) and downloaded as an electronic table (MS Excel for Windows). All forms that were not received on-line were typed in post-hoc using the online survey template. All versions were available in German and French with identical meaning and structure. The survey participants were asked to fill in only one form. All the questionnaires were sent out in November 2010 and data collection was closed in February 2011. After being entered into the database the responses were checked for major errors. Forms which were returned with more than 80 % of the questions unanswered as well as double (identical general and personal data and identical answers) were excluded from the study.

Results

From a total of 1000 forms sent, 270 (27 %) were returned, and 258 (26 %) were further scrutinized (185 in German, 73 in French). For each question, type and frequency of responses were analyzed.

Table 1: Age (mean and standard deviation) and graduation time of survey participants per gender.

Gender	number	%	Age (year)	Time since exam (year)
Female	125	48.4	44 ± 9.2	17.7 ± 9
Male	126	48.8	51 ± 9	24.7 ± 9.2
Not mentioned	7	2.7	60 ± 1.5	28.7 ± 6

Table 2: Percentage (%) of veterinary practices and median number of veterinarians and veterinary nurses working per clinic according to their number of surgical procedures performed per month.

Surgical activity (/month)	%	Veterinarian	Veterinary nurse
Low (< 10)	10.7	1	0
Moderate (10–40)	39.7	1.5	1.15
High (> 40)	44.8	1.8	2

Table 3: General opinion from 258 veterinarians on pain treatment in animals.

Statement	YES		NO	
	number	%	number	%
It is dangerous to treat pain as this is an important body protective mechanism	12	4.7	235	91.1
Good analgesia supports healing	255	98.8	2	0.8
Owners are willing to pay more for adequate analgesia	253	98.1	4	1.6
Side-effects of pain killers prevent their use	15	5.8	234	90.7
Pain therapy is part of a veterinarian's job	253	98.1	1	0.4

Part 1

Personal data on participants are presented in Table 1 and their type of practice in Table 2.

Part 2

In response to the question whether participants received sufficient education on pain and pain therapy during veterinary studies (247 responders), only 13 % (32) answered positively. The percentage of satisfied veterinarians was significantly higher in more recent graduates with 26.1 % (6) having completed their studies in the last 8 years, 22.9 % (11) 8 to 14 years ago, 8.1 % (6) 15 to 24 years ago and 7.8 % (8) more than 24 years ago. When asked in which form continuous education on pain and pain treatment could be performed, 58 % of participants reported to be interested in a scientific review, 45 % in a website dedicated to the subject, 33 % in a CD/DVD, and 17 % were interested in seminar or congress presentations. There was an equal proportion (20 %) of participants who reported to be interested in 1, 2 or 3 different media.

Part 3

When responders were asked to answer with yes or no to 5 questions in order to evaluate their opinion on treatment of pain in dogs and cats, 88 % (208 out of the 237 participants) answered yes to all and considered that 1) it is not dangerous to treat pain despite the fact that this could be an important body protective mechanism, 2) good analgesia supports healing, 3) owners are willing to pay more for adequate analgesia on their animals, 4) side-effects of pain killers do not prevent their use, and 5) pain therapy is part of a veterinarian's job. Detailed distribution is presented in Table 3 and Table 4.
For 64.1 % (164) of the participants, the main reason to administer analgesics was to relieve the animal from painful sensations. 34 % (86) mentioned an improved overall healing as their main motivation. Two veterinarians reported using analgesics mainly for the satisfaction of the owner, one to satisfy the local veterinary staff and one as part of a diagnostic procedure. Two individuals omitted to answer.

Part 4

Compared to other questions, a low mean response rate of 25 % (65 out of 258) was obtained when the intensity of pain had to be estimated between 1 and 10 (from very low to very intense pain) for 7 different surgical procedures. The majority of responders scored male castration (39) and feline ovariohysterectomy (35) as evoking moderate pain (score between 2 and 4), canine ovariohysterectomy (54), laparotomy (36) and tooth extraction (31) as evoking strong pain (score between 5 and 7), and osteosynthesis (41) and thoracotomy (68) as evoking very severe pain (score between 8 and 10). Very few veterinarians reported to never administer any analgesics when performing these interventions (Tab. 5). An overall mean of 40 % of veterinarians within those having answered the questions reported the regular use of both opioids and non-steroidal anti-inflammatory drugs together to alleviate pain after performing these surgical interventions (Tab. 6). Participants reporting not to routinely use analgesics (never or only if signs of pain are obvious) in cat ovariectomy and male castration were equally distributed within overall participant population for age and gender.

Part 5

Regarding patient observation during the recovery period, 3.2 % (8 out of 247) of the veterinarians reported not to perform it. If postoperative evaluation was provided, 21.2 % (51) were performed exclusively by the veterinarian, 9.5 % (23) by veterinary nurses, and the majority

Table 4: Number of participants having answered in favor of pain therapy out of 5 statements (Tab. 3).

Number of answers favorable to pain treatment	Number of statements let unanswered			
	0		1	2
	%	number	number	number
5	87.8	208	-	-
4	11.4	27	14	-
3	0.8	2	1	5

Table 5: Number (n) and percentage (%) of participants applying perioperative pain treatment in 7 different surgical procedures in dogs and cats 1) ovariectomy in dogs, 2) ovariohysterectomy in cats, 3) male castration, 4) osteosynthesis, 5) laparotomy, 6) Thoracotomy and 7) tooth extraction at different time points.

Time point	Surgical procedure													
	1		2		3		4		5		6		7	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Always after	26	10.7	31	12.8	32	13.2	3	2.5	24	1111.7	3	3.5	52	22.6
Always before	209	86.4	174	71.6	180	74.4	116	95.9	179	86.9	81	95.3	164	71.3
Never	4	1.7	19	7.8	20	8.3	1	0.8	2	1.0	0	0.0	5	2.2
Only if pain	3	1.2	19	7.8	10	4.1	1	0.8	1	0.5	1	1.2	9	3.9

Table 6: Number (n) and percentage (%) of participants using regularly NSAIDs or opioids for perioperative pain treatment in 7 different surgical procedures in dogs and cats 1) ovariectomy in dogs, 2) ovariohysterectomy in cats, 3) male castration, 4) osteosynthesis, 5) laparotomy, 6) Thoracotomy and 7) tooth extraction, with details for the 3 most mentioned drugs of each category.

Drug	Surgical procedure													
	1		2		3		4		5		6		7	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Use of NSAIDs	221	92.5	186	83.8	195	89.4	102	85.7	162	87.1	69	87.3	198	91.2
Carprofen	115	52.0	44	23.7	89	45.6	56	54.9	84	51.9	31	44.9	94	47.5
Meloxicam	100	45.2	91	48.9	92	47.2	52	51.0	78	48.1	33	47	108	54.5
Tolfedine	42	19.0	66	35.5	54	27.7	17	16.7	35	21.6	9	13	57	28.8
Use of opioids	149	62.3	96	43.2	96	44	74	62.3	96	51.6	51	64.6	91	41.9
Butorphanol	71	47.7	88	91.7	82	85.4	46	62.2	74	77.1	29	56.9	79	86.8
Buprenorphine	59	39.6	21	21.9	39	40.6	50	67.6	54	56.3	32	62.7	45	49.5
Methadone	30	20.1	5	5.2	13	13.5	14	18.9	19	19.8	14	27.5	11	12.1
Use of both	94	39.3	64	28.8	76	34.9	58	48.7	77	41.4	43	54.4	74	34.1
Use of none	3		4		3		1		5		2		2	

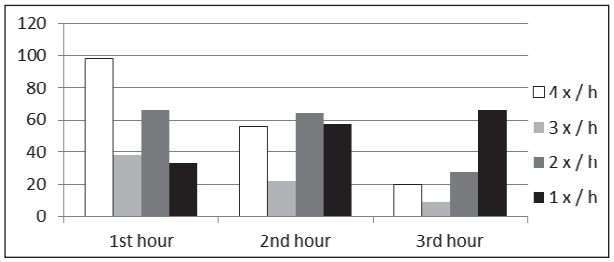

Figure 1: Number of participants reporting to observe the patient 1, 2, 3 or 4 times per hour at the 1st, 2nd and 3rd hour after termination of general anaesthesia.

(69.3 %, 167 out of 241) by both of them. Distribution of timing and frequency of postoperative evaluation is presented in Figure 1.

Part 6

When analyzing the general use of analgesics in veterinary practice, only 0.4 % (1) reported not to use non-steroidal anti-inflammatory drugs and 1.7 % (4) did not use any opioid drug. From all the participants reporting the frequent use of non-steroidal anti-inflammatory drugs (243), 79.1 % (193) mentioned the use of meloxicam, 75 % (183) of carprofen, 38.1 % (93) of tolfenamic acid and 37.7 % (92) of robenacoxib. Other drugs (firocoxib, metamizole, phenylbutazone) were mentioned by less than 10 % of the veterinarians. Opioid use was reported by 231 participants out of whom 94 % (221) used regularly butorphanol, 51.1 % (120) buprenorphine, 40.4 % (95) methadone, 21.7 % (51) fentanyl, 11.5 % (27) morphine, 7.8 % (20) dextromoramide and 2.3 % (6) meperidine. For both classes, the drug choice was mainly justified to be guided by the analgesic efficacy (46.5 % of participants for NSAIDs, 58.8 % for opioids) or by the personal experience with the drug (40.4 % of participants for NSAIDs, 33.6 % for opioids). Price, side-effects or other reasons affected the choice of drug class of only 10 % of the veterinarians. Fifty-one participants mentioned analgesia efficacy as main criteria for their choice of opioid drug but did not mention the use of a full-agonist (methadone, morphine or fentanyl) in their practice. Loco-regional anaesthesia techniques were performed only by 43.8 % (113) of veterinarians. The large majority (108 out of 113) reported the use of subcutaneous infiltration, while only 31.9 % (36 out of 113)

mentioned to perform nerve blocks and 13.3 % (15) epidural analgesia. Intra-testicular, intra-articular, intra-thoracic and peri-ocular infiltrations were reported by 4, 4, 3 and 1 veterinarian(s), respectively. Most of them (110 out of 113) used lidocaine. Only 20 participants reported the use of bupivacaine, 3 of morphine and 1 of ropivacaine.

Part 7

Regarding other drugs, the use of ketamine and medetomidine for postoperative systemic analgesia were the most reported (Tab. 7).

Discussion

The large majority of participants was favorable to the use of analgesics to treat pain in small animals, and was familiar with the administration of analgesics like non-steroidal anti-inflammatory drugs and opioids. The majority also routinely provided perioperative analgesia. Interestingly, the regular use of opioids seems to be higher in the present study than in former surveys (Dohoo and Dohoo, 1996; Hugonnard et al., 2004). This can be explained by the availability of opioid drugs for veterinary patients for many years in Switzerland. However, the concomitant use of both an opioid and a NSAID was less common. This association is a well-established and validated standard for the management of perioperative pain in dogs and cats (Taylor, 1999; Bednarski et al., 2011). A recent recommendation report on pre-medication and anaesthesia in dogs and cats (Vetoquinol Academia, 2009) validated by the Association of Veterinary Anaesthetists supported the combined use of NSAID and buprenorphine in all surgical patients (except where these drugs would be contra-indicated, particularly NSAIDs in dehydrated animals with organ insufficiency). The routine administration of both NSAID and opioid in anaesthetic premedication before therapeutic or diagnostic painful procedures is therefore recommended.

When participants were asked about the main criteria for the choice of an opioid drug, the majority (60 %) evoked the analgesic efficacy rather than their personal experience (34 %). Therefore, we expected to observe a more frequent use of opioid full agonists like methadone to treat severe postoperative pain with higher efficacy compared to partial agonists. However, buprenorphine and butorphanol resulted as the most frequently used opioids. This may point to weaknesses in opioid pharmacology. Methadone has a similar clinical profile to morphine. It can be routinely administered at the dose of 0.1–0.3 mg/kg IM or IV as premedication before induction of general anaesthesia or with sedation. Methadone has been proven to guarantee strong analgesia with minimal side effects (Tünsmeyer et al., 2012; Garofalo et al., 2012) and is indicated to treat early postoperative acute pain. In Switzerland a veterinary product is available in the form of levomethadone which should be administered at the dose of 0.05 to 0.2 mg/kg. The partial μ-agonist buprenorphine elicits a lower analgesic efficacy against strong to severe pain, but has the advantage of a longer duration of action (4 to 8 hours). This is often very useful in clinical practice to alleviate postoperative pain (20 μg/kg, 2 to 4 times per day). Butorphanol, useful otherwise to potentiate sedation, should be reserved to treat mild or non-surgical pain of visceral origin.

Other analgesic drugs were also mentioned. The use of ketamine as a systemic analgesic adjunct was reported by 45 veterinarians, while more than 100 mentioned to perform osteosynthesis, laparotomy, and thoracotomy or tooth extractions. Ketamine has been described to reduce anesthetic requirements, stabilize physiological parameters and promote perioperative and postoperative analgesia when administered as a continuous rate infusion (0.5–1.5 mg/kg/h) (Sarrau et al., 2007; Wilson et al., 2008). However, high dose and accumulation can lead to behavioral undesirable effects (excitation, hallucination, tremors). The use of intravenous lidocaine was seldom mentioned. Intravenous lidocaine infusions (1 mg/kg followed by 2 mg/kg/h) also provides additional analgesia and cardiovascular stability, with minimal risk for undesirable behavioral effects compared to ketamine (Wilson et al., 2008; Ortega et al., 2011). In conditions with intense pain, the association of a full agonist opioid (like methadone), lidocaine and ketamine as a balanced continuous infusion has been proven to have a higher efficacy than each drug alone at a higher dose (Aguado et al., 2011). Gabapentin and tramadol are administered off-label as oral analgesics to treat pain over long periods at home (chronic or recurrent painful conditions). These drugs are receiving interest for their clinical efficacy in association with NSAIDs when the latter are judged insufficient as sole agent therapy. However, further scientific evidence is required.

The use of loco-regional anaesthesia was clearly underreported. Less than 45 % of practitioners mentioned the use of subcutaneous infiltration with lidocaine, and only a minority of the participants appeared familiar with

Table 7: Number (n) and percentage (%) of participants using occasionally adjunctive systemic analgesics for treatment of pain in animals.

	Gabapentin		Ketamine		Lidocaine		Medetomidine		Tramadol	
	n	%	n	%	n	%	n	%	n	%
Yes	6	2.3	45	17.4	38	14.7	58	22.5	45	17.4
No	183	70.9	152	58.9	158	61.2	144	55.8	153	59.3

nerve blocks and epidural anaesthesia. Moreover, the use of bupivacaine, a local anaesthetic with longer duration of action than lidocaine, was seldom mentioned. The use of a mixture of lidocaine and bupivacaine (1:1) has been recommended to provide a fast onset of action (5–10 minutes) and a long duration (up to more than 6 hours). The administration of 0.1–0.2 mL/kg (eventually diluted to increase the total volume) can be performed subcutaneously, intratesticularly, intraovarian, in a wound, along surgical incision, close to a nerve (tooth, mandibular, infraorbital, digital, intercostal) or in the epidural space to decrease nociception, physiological reactions to pain, requirements for sedation or general anaesthesia, and postoperative pain. Loco-regional procedures are simple to perform, carry low risk and are not expensive. It provides an important skill to treat pain in animals.

One limitation of the present survey is the lack of differentiation between attitudes towards dogs and cats. Finally, the most disappointing result from the survey was the low response rate to score pain intensity and its high variability. In some previous reports, veterinarians attempted to rank pain intensity levels for different surgical procedures. However, pain evaluation is an individual process and should be performed in every animal in order to adapt the treatment to the patient's need. In this respect, several evaluation tools have been developed (Holton et al., 2001; Brondani et al., 2011; Guillot et al., 2011). Multi-parameter pain scales are available to practitioners to facilitate and repeat postoperative pain evaluation in dogs and cats. These tools help veterinarians not only to recognize and treat pain appropriately, but also to promote their skills to the owners and justify costs for analgesic treatments and hospital care. However, postoperative pain evaluation also requires regular observations and contact with the animals within the few hours after completion of surgery. It would be desirable to have one person dedicated to regular monitoring of the postoperative patient during recovery, especially the first three hours.

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Position des vétérinaires suisses vis-à-vis des douleurs péri-opératoires et des possibilités d'antalgie chez les chiens et les chats

En 2010 un questionnaire sur le thème de l'analgésie péri-opératoire chez le chien et le chat, divisé en sept chapitres, a été envoyé à 1000 vétérinaires suisses. Outre les données personnelles et les informations relatives aux formations suivies en matière de traitement de la douleur, on s'est intéressé aux conceptions personnelles quant à la lutte contre la douleur, aux expériences faites dans cette lutte ainsi qu'à l'utilisation des principaux analgésiques. Au total, ce sont 258 questionnaires qui ont été analysés. Chez 88 % des personnes, la motivation à utiliser des analgésiques lors d'opérations était élevée. La raison principale de cette utilisation était la réduction des douleurs (64.1 %). La plupart des vétérinaires déclaraient administrer des antalgiques avant (71–96 %) ou après (2–23 %) l'intervention. Il s'agissait principalement d'anti-inflammatoires non stéroïdiens (Carprofène, Meloxicam) et d'opioïdes (Butorphanol, Buprénorphine). Après guérison, 97 % des animaux étaient contrôlés de façon routinière par les vétérinaires quant aux douleurs. 43.8 % des vétérinaires utilisaient des techniques d'anesthésie locorégionales. En Suisse, la profession vétérinaire a reconnu la nécessité d'une antalgie péri-opératoire. Toutefois les différences d'intensité douloureuse prévisibles selon les opérations de même que les différences entre les diverses classes d'opioïdes sont estimées différemment de ce qu'on prévoyait. Les techniques d'anesthésie locorégionales sont relativement peu utilisées.

Posizione dei veterinari svizzeri nei confronti dei dolori perioperatori e fattibilità della gestione del dolore nei cani e gatti

Nel 2010 è stato inviato a 1000 veterinari svizzeri un questionario sul tema «analgesia perioperatoria nel cane e nel gatto» suddiviso in sette parti. Oltre ai dati personali e ai dati sui corsi frequentati per la terapia del dolore negli animali, di interesse erano le risposte sull'idea generale in merito al trattamento dei dolori perioperativi, l'esperienza nella gestione del dolore e la valutazione e l'uso degli analgesici più importanti per la terapia perioperativa del dolore. In totale sono stati analizzati 258 questionari. L'88 % delle persone che avevano risposto aveva una forte motivazione per l'uso di antidolorifici durante le operazioni. Il motivo principale per la somministrazione di antidolorifici era il sollievo dal dolore (64.1 %) La maggior parte dei veterinari avevano somministrato gli analgesici prima (71–96 %) o dopo (2–23 %) l'intervento. Sono stati utilizzati principalmente antinfiammatori non stereoidi (carprofene, meloxicam) e oppiacei (butorfanolo, buprenorfina). Anche dopo la convalescenza, il 97 % dei veterinari ha tenuto sotto controllo il dolore tramite esami sistematici. Tecniche di anestesia loco-regionale sono state utilizzate dal 43.8 % dei veterinari. La società dei veterinari svizzeri riconosce la necessità di una terapia del dolore perioperatoria. Tuttavia l'intensità del dolore che ci si può aspettare nei differenti interventi così come le differenze tra classi di oppiacei sono state valutate differentemente dalle aspettative. Le tecniche di anestesia loco-regionale vengono impiegate raramente.

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