Influence of treatment on the outcome of dogs with incompletely excised grade-2 mast cell tumors

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Summary

In this study we compared the outcomes of dogs with incompletely-excised grade-2 mast cell tumors (incompletely-excised grade-2 MCTs) either adjuvantly treated or not. Dogs with a grade-2 mast cell tumour (MCT) excised either incompletely or with narrow (<5mm) margins, without local recurrence or metastasis at the time of presentation and with a minimum follow-up of 10 months were included in the study. Dogs were separated in 2 groups: treatment (surgery, radiation therapy, chemotherapy or combination of those) and no-treatment. The original excision was incomplete in 90 dogs and narrow in 25 dogs. Ninety-two cases (80%) were treated and 23 (20%) were not treated, but only monitored. Pathology after revision excision found no signs of residual disease in 47/56 cases (84%). Local recurrence was confirmed in 7 dogs, suspected but not confirmed in 2 dogs. Metastatic disease was confirmed in 13 dogs and suspected but not confirmed in 11 dogs. Forty-six dogs died and 69 were still alive at the time of data collection. The 1-yr and 2-yr survival rates were 92% and 82%, respectively. No statistical differences were found regarding disease-free intervals, survival times, recurrence rates, metastatic rates, 1-year and 2-year survival rates between groups, or depending on treatment modality within the treatment group. Based on the finding that the outcome of incompletely-excised grade-2 MCTs was unaffected by adjuvant treatments, this study suggests that immediate systematic adjuvant treatment of incompletely-excised grade-2 MCTs may not be recommended over attentive monitoring and action upon uncommon recurrence.

Keywords: mast cell tumors, dogs, margins, recurrence, therapy

Einfluss der Behandlung auf das Ergebnis von Hunden mit unvollständing entfernten Grad-2 Mastzelltumoren

In dieser Studie wurden die Ergebnisse bei Hunden mit unvollständig exzidierten Grad 2 Mastzelltumoren (MCT), die entweder adjuvant behandelt oder lediglich überwacht wurden, miteinander verglichen. In der Untersuchung wurden Hunde berücksichtigt, wenn sie mit einem unvollständig oder mit schmalen (<5mm) Rändern exzidierten Grad-2 MCT diagnostiziert wurden, zum Zeitpunkt der Vorstellung ohne Hinweise auf lokales Rezidiv oder Metastasierung waren und ein minimales Follow-up von 10 Monaten aufwiesen. Die Hunde wurden in 2 Gruppen eingeteilt: eine Gruppe mit (Chemotherapie, Bestrahlung, chirurgische Behandlung oder eine Kombination davon) und die andere ohne weitere Therapie. Die ursprüngliche Exzision war unvollständig bei 90 Hunden und mit schmalen Rändern bei 25 Hunden. Zweiundneunzig Fälle (80%) wurden behandelt und 23 Fälle (20%) wurden ohne Therapie überwacht. Die histologischen Untersuchungen nach der Revisions-Exzision ergaben keine Anzeichen von zurückbleibender Tumorerkrankung in 47/56 Fällen (84%). Ein lokales Rezidiv wurde bei 7 Hunden bestätigt, bei 2 Hunden vermutet, aber nicht bestätigt. Metastasen waren bei 13 Hunden bestätigt, bei 11 Hunden vermutet, aber nicht bestätigt. Zum Zeitpunkt der Datenerhebung waren sechsundvierzig Hunde gestorben und 69 noch am Leben. Die 1-Jahres- und 2-Jahres-Überlebensraten waren 92% beziehungsweise 82%. Zwischen den Gruppen gab es keine statistisch gesicherten Unterschiede bezüglich des krankheitsfreien Intervalls, Überlebenszeiten, Rezidivraten, Metastasierungsraten, 1-Jahr- und 2-Jahres- Überlebensraten, oder bezüglich der Behandlung innerhalb der Behandlungsgruppe. Die Ergebnisse dieser Studie zeigen, dass begleitende Therapiemassnahmen das Ergebnis von unvollständig exzidierten Grad 2 MCTs nicht beeinflussen.

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Eine sofortige systematische begleitende Behandlung von unvollständig exzidierten Grad 2 MCTs kann gegenüber der aufmerksamen Überwachung und der Behandlung diagnostizierter Rezidive nicht empfohlen werden.

Schlüsselwörter: Mastzelltumoren, Hunden, Rändern, Rezidiv, Therapie

Introduction

Mast cell tumors (MCTs) are common in dogs, representing 16% to 21% of all cutaneous tumors in this species (Withrow and MacEven, 2013). Their biological behavior ranges from benign to highly malignant. In an effort to differentiate MCTs along this range, Patnaik et al., 1984 first classified them in three grades. More recently, a 2-tier grading system (Kiupel et al., 2011) has been proposed, separating MCTs in low- and high-grades, appearing highly correlated with biological behavior and survival, and of higher prognostic value (Sabbatini et al., 2015). In spite of its apparent greater clinical relevance, this more recent classification has not yet reached universal acceptance and Patnaik's classification remains the most commonly used.

Currently, in Patnaik's classification most canine MCTs result of grade 2 (Murphy et al., 2004; Kiupel et al., 2011; Sabbatini et al., 2015; Stefanello et al., 2015), which is the grade associated with the least predictable biological behavior (Matz et al., 2015). Most grade-2 MCTs will have low rates of local recurrence and distant metastasis, but some show higher aggressivity and poorer outcomes (Thamm et al., 2006; Withrow and MacEven, 2013). Surgical excision with 2-to-3-cm lateral margins and a deep fascial plane is currently the recommended treatment for grade-2 MCTs (Blackwood et al., 2012). When surgical excision is complete, the need for adjuvant treatment is at the discretion of the clinician and is most commonly based on the tumor stage, the size of achieved margins, as well as on a number of prognostic indicators, such as the tumor's mitotic index and specific markers (e.g. Ki67, AgNor) (Séguin et al., 2006; Scarpa et al., 2012; Withrow and MacEven, 2013). The most appropriate course of action in the face of incomplete resection of a grade-2 mast cell tumor remains unclear. A study recently found that treated incompletely-excised MCTs had a better prognosis than untreated ones (Kry and Boston, 2014). However, this study included MCTs of all grades and it is unknown whether its conclusions are applicable to grade-2 MCTs specifically. Other studies have reported recurrence rates of 23% and 33% for incompletely-excised MCTs (Séguin et al., 2001; Michels et al., 2002; Murphy et al., 2004), but these studies included low numbers of grade-2 tumors, ranging from 6 (Michels et al., 2002), of which 2 recurred, to 30 (Séguin et al., 2001), of which 7 recurred. Moreover, when revision surgery of an incompletely-excised MCT is performed, the presence of residual microscopic disease can often not be confirmed on the subsequent pathological examination of excised tissues (Murphy et al., 2004). Nonetheless, it is currently widely recommended to take action in the face of incompletely-excised grade-2 mast cell tumors (incompletely-excised grade-2 MCTs) (Blackwood et al., 2012), although this recommendation appears based on the intellectual grounds of general principles of oncologic surgery rather than on evidence.

The aim of our study was to report and compare the outcomes of incompletely-excised grade-2 MCTs being treated either with surgery, radiotherapy, chemotherapy or any combination of these, with those of incompletely-excised grade-2 MCTs without additional treatment. We hypothesized that the outcome (in terms of medial survival time, recurrence and metastatic rate) of incompletely-excised grade-2 MCTs would be significantly better for treated than for untreated dogs.

Animals, Material and Methods

Animals

The medical records of dogs referred to the VRCC (Veterinary Referral Essex, United Kingdom) after resection of a mast cell tumor between 2004 and 2011 were reviewed. Dogs were included in the study if the pathology report following the initial tumor excision ("first histology") was conclusive of a grade-2 tumor, either incompletely excised or excised with narrow margins, and if a minimum of 10- month follow-up after referral was available. Dogs which were found to have signs of local recurrence or metastatic disease at the time of presentation (WHO stage 1 or above [Withrow and MacEven, 2013]) were excluded.

Study design

Dogs were separated in 2 main groups, treatment and no-treatment, depending on the course of action chosen. The treatment group was subdivided into several treatment modalities: surgery only, surgery + radiotherapy, surgery + chemotherapy, radiotherapy only, radio-

therapy + chemotherapy and chemotherapy only. The type of adjuvant treatment administered, or lack thereof, was chosen by dog owners after they had been provided with extensive information regarding all options' expected benefits, known side-effects and potential complications.

Depending on the pathology report following the initial excision prior to referral, a distinction was made between incompletely-excised grade-2 MCTs with dirty margins (tumor cells extending to at least one of the surgical margins) and incompletely-excised grade-2 MCTs with narrow margins (tumor cells extending within 5 mm of any cut margins).

Patients treated with a second surgery aiming at removing the residual disease remaining after the first surgery underwent surgical removal of the scar with 2-cm lateral margins and one deep fascial place. The tissues excised were then submitted for pathology ("second histology") all to the same laboratory, to be examined for signs of residual disease.

Chemotherapy and radiation therapy

The most common chemotherapy protocol to treat the patients of this study used lomustine as single agent, in association with administration of oral prednisolone or not. Less frequent chemotherapy protocols included the single use of vinblastin, chlorambucile or prednisolone followed by masitinib. Two radiotherapy protocols were used: a hypofractionated protocol (4 fractions of 4 Gy, for a total dose of 16 Gy) or a definitive protocol (16 fractions of 3 Gy, for a total dose of 48 Gy).

Follow-up

Follow-up information was obtained from medical records and contacts with referring veterinarians and patient owners. Recorded information included histological status prior to referral (dirty or narrow margins), time from first surgery (prior to referral) to presentation, treatment modality, disease free interval (DFI), survival time (ST) and cause of death, if applicable. For cases which underwent revision excision, the information provided by the second pathology report was recorded. The appearance of a lesion in the region of the original surgical site was considered as local recurrence and the observation of distant lesions compatible with tumor spreading was accounted as metastasis. Both were classified as either confirmed or suspected, depending on whether a pathological diagnosis of MCT was made for these lesions or not.

Naturally deceased or euthanized animals were considered to have died from a cause related to their MCT if a definitive diagnosis of metastatic disease (given from FNAs or biopsies from lymph node, spleen, liver) was made either ante- or postmortem. Naturally deceased or euthanized animals were considered to have died from a cause possibly related to their MCT if they were showing clinical signs compatible with metastatic disease (e.g. fever, anorexia, weight loss, dyspnea, gastrointestinal signs not responsive to treatment), but metastatic disease was not confirmed cytologically or pathologically. Lastly, animals which naturally died or were euthanized for causes known not to be related to their MCT without evidence of metastatic disease were considered as dead from causes unrelated to the MCT.

Statistical analyses

Descriptive statistics were calculated for relevant data. Kolmogorov-Smironov tests were used to evaluate the normality of variable distributions. Parametric variables were reported with mean and standard deviation (SD) and non-parametric variables with median and range. Statistical comparison was performed using independent samples t-tests for parametric variables and Mann-Whitney U tests were used for statistical comparison between treatment groups and non–parametric variables. P-values <0.05 were considered significant.

Results (Table 1)

115 MCTs (95 dogs) met the inclusion criteria. Breeds represented by more than 1 individual were Labrador Retriever (n=37), Golden Retriever (n=20), American Staffordshire Terrier (n=12), Boxer (n=10), Jack Russell Terrier (n=4), Rhodesian Ridgeback (n=4), Weimaraner (n=3) and Miniature Poodle (n=2). The mean age and body weight of patients at first presentation were 84 months and 29.5kg, respectively.

Histologic findings

92 (78%) of the original MCTs were excised with dirty margins and 25 (22%) were excised with narrow margins. The proportion of cases with dirty or narrow margins versus clean margins was not significantly different between the treatment and the non-treatment groups. No signs of residual disease were found on pathological examination of the revision excision piece in 47 cases (84%), and residual tumor was found in 9 cases (16%). Re-excision led to complete excision in 55 cases (98%) and to another incomplete excision in 1 case (2%).

Treatment modalities

Ninety-two cases (80%) were treated and 23 (20%) did not receive any treatment. Of the 92 cases that received treatment, 44 (39%) underwent revision surgery only, 10 (9%) had revision surgery followed by chemotherapy (9 had lomustine, and 1 had lomustine and vinblastine), 2 (2%) had revision surgery and radiotherapy (total dose range, 16–48Gy), 5 (4%) had chemotherapy only (4 cas-

Table 1: Distribution of margin status, revision histology and outcomes among groups.

Treatment (n)	1st histology result		2nd histology result		Recurrence	Metastasis	Outcome		MST (days)	DFI (days)
	Dirty	Clean but close	Absence of RMD	Presence of RMD			alive	dead		
S (44)	35	9	38	6	2	6	27	17	1177 ± 589	1168 ± 574
R (26)	22	4	n/a	n/a	2	7	15	11	1085 ± 723	1036 ± 734
C (5)	2	3	n/a	n/a	1	2	2	3	1090 ± 586	964 ± 503
SR (2)	2	0	1	1	0	0	2	0	854 ± 650	854 ± 650
SC (10)	9	1	8	2	2	2	6	4	1115 ± 583	1028 ± 619
RC (5)	4	1	n/a	n/a	0	1	3	2	1224 ± 803	1214 ± 818
WS (23)	16	7	n/a	n/a	2	6	14	9	1101 ± 832	1061 ± 862

RMD = residual microscopic disease; S = surgery only; R = radiation therapy only; C = chemotherapy only; SR = surgery + radiation therapy; SC = surgery + chemotherapy; RC = radiation therapy + chemotherapy; WS = wait and see; MST = median survival time; DFI = disease free interval.

es received lomustine as mono-chemotherapy, one case received chlorambucile and prednisolone), 26 (23%) had radiotherapy only (total dose range, 16-48 Gy) and 5 (4%) had chemotherapy and radiotherapy (2 had lomustine, 2 lomustine and vinblastine, and 1 had masitinib).

Follow-up

The mean follow-up time was 1377 days (range 244-3062 days). Confirmed recurrence was observed in 7 dogs (6%) and suspected in 2 dogs (2%) with a global recurrence rate of 8%. Of those 9 cases, 7 had dirty margins on the first histology, while 2 had narrow margins. Of the 7 cases with dirty margins, 4 cases had a second surgery (2 only second surgery, 1 surgery and chemotherapy, 1 surgery and radiation therapy), one case received only radiation therapy, one case only chemotherapy and one case was just monitored. Of the 2 cases with narrow margins, 1 received surgery and chemotherapy, while the other one was just monitored. Confirmed metastatic disease was observed in 13 cases (11%) and suspected in 11 cases (10%). At the end of the study, 46 cases (39%) had died and 69 cases (61%) were still alive. Eleven dogs (10%) died from causes related to the MCTs (all of them were euthanized because of progressive disease), 15 (13%) deceased or were euthanized for causes possibly related to the MCT and 18 (16%) for causes unrelated to the MCT. The overall disease-free interval (DFI) was 1092±677 days and the overall survival time (ST) was 1128±669 days. The 1-year and 2-year survival rates were 92% (99/107 dogs) and 82% (77/94 dogs), respectively. At the end of the experiment no statistical differences were found in disease-free intervals, survival times, recurrence rates, metastatic rates, and 1- and 2-year survival rates between treated dogs and non- treated dogs, or between dogs treated with different modalities. No statistical differences were found either when surgically treated or radiotherapy treated dogs were separately compared to non treated dogs.

Discussion

We could not find any influence of the administration of an adjuvant treatment on the outcomes of dogs with an incompletely-excised grade-2 MCTs. Furthermore, no statistical differences were found between treatment modalities (second surgery, radiation therapy, chemotherapy and combinations of those). The overall recurrence rate was 8%, which is lower than previously reported (Séguin et al., 2001; Michels et al., 2002) (18%-23%). Furthermore, in the vast majority (84%) of cases that underwent revision surgery after incomplete resection, no evidence of residual tumoral disease was found on pathology.

The significance of pathologically incomplete margins after resection of grade-2 MCTs is uncertain, as incompletely-excised grade-2 MCTs are reported to only recur in 23% (7/30) to 33% (2/6) of cases (Michels et al., 2002; Murphy et al., 2004; Séguin et al., 2006). A recent study that evaluated the modified proportional margin technique for the excision of MTCs did not find any recurrence in the cases with incomplete surgical excision that did not receive any further treatment (Pratschke et al., 2013). In our study, we found an overall recurrence rate of 8% and a recurrence rate of 17% (2/23) for IEG-2MCTs that did not receive further treatments. Therefore, systematically revising surgery or administering any adjuvant treatments would have exposed 67% to 83% of dogs with incompletely-excised grade-2 MCTs to an unnecessary procedure or treatment. Although exact numbers regarding only incompletely-excised grade-2 MCTs are difficult to extrapolate from the current literature, the low recurrence rate we found in our study seems to be in accordance with several previous studies (Simpson et al., 2004; Fulcher et al., 2006; Pratschke et al., 2013). However, immediate adjuvant treatment, most often revision surgery, still is currently widely recommended in face of incompletely-excised

grade-2 MCTs (Séguin et al., 2006; Blackwood et al., 2012). In our study no statistical differences in outcome variables, including recurrence, metastatic and survival rates, were found between dogs with IEG2MCT receiving adjuvant treatment and those that did not receive any treatment. In addition, no differences were detected between the different treatment modalities, but considering that some treatment groups included small numbers of patients, the possibility of a type II error cannot be excluded.

Interestingly, we found that in the vast majority of cases (84%), no signs of residual MCT were found histologically after revision excision. Several speculations can be made to explain these findings. Firstly, there is no consensus in the literature regarding the definition of "incomplete" surgical margins for grade-2 mast cell tumors. In particular, the cut-off value of the distance between suspected tumor cells and cut margins to differentiate clean-but-close and dirty margins is variable. In an effort to standardize methods and make results comparable, we chose to adopt the definitions used by Murphy et al. (2004) in which margins approached by neoplastic cells within 5mm are referred to as "clean-but-close" and those being reached by neoplastic cells being referred to as "dirty". Secondly, in a number of cases, the mast cells observed at the surgical margins may be non-neoplastic, only reflecting local inflammation. Indeed, differentiating between neoplastic and non-neoplastic mast cells on histology can be difficult and the presence of such normal mast cells may result in the resection being falsely classified as incomplete (Michels et al., 2002; Séguin et al., 2006). Whenever margins are thus questionable, the use of staining pattern for receptor tyrosine kinase or proliferation markers, such as Ki-67 or argynophilic nucleolar, is recommended to increase the accuracy of the discrimination between neoplastic and non-neoplastic mast cells. Finally, it is possible that decreasing the tumor to microscopic disease changes the balance between neoplastic cells and the immune system, making host defenses able to kill remaining neoplastic cells (Séguin et al., 2006). Another source of possible deception is that dogs diagnosed with one or several MCTs are at increased risk of developing separated *de novo* MCTs. It is therefore possible that what is perceived and diagnosed as local recurrence it is actually a new occurrences of unrelated mast cell tumors. A recent retrospective study (Kry and Boston, 2014) found that revision surgery and radiotherapy as adjuvant treatments after incomplete mast cell tumor resection significantly improved survival and local disease control in dogs, which contrasts with our results. This conflict in results may result from differences in the design of the two studies. One difference is that Kry and Boston (2014) included patients receiving adjuvant chemotherapy in their "control" group and do not report whether the distribution of adjuvant chemotherapy among treatment groups was statistically homogenous or not. In fact, a higher proportion (54%) of patients of their "control" group received chemotherapy than in the treatment group (27%), and the administration of adjuvant chemotherapy may have been a confounding factor, as its influence on incompletely-excised MCTs is unclear. It has even been speculated that chemotherapy could have a negative impact on the outcome of incompletely-excised MCTs by depressing the host defense system and preventing it from eliminating remaining tumors cells (Séguin et al., 2001; Murphy et al., 2004; Séguin et al., 2006). No effect of adjuvant chemotherapy on the outcome of incompletely-excised grade-2 MCTs, either beneficial or detrimental, was found in our study, but a type II error cannot be excluded given the relatively low number of cases in certain treatment groups. Another major difference is that the present study investigated a more homogeneous population, as it focuses on grade-2, stage 0 mast cells tumors whereas Kry and Boston (2014) included MCTs of all grades and stages 0 and 1 (with macroscopic local recurrence). Given the great variability in local recurrence rates of mast cell tumors depending on their grade, it is possible that the inclusion of higher-grade tumors, for which adjuvant treatments are very likely beneficial, explains their findings. Furthermore, although Kry and Boston report the tumor grade distribution between treatment groups to be not significantly different, which could be a consequence of the relatively low-number of cases per group, more grade-3 tumors were present in the no-treatment group (4/26; 15%) than in the treatment groups (1/44; 2%). This difference may have worsened the outcome of the no-treatment group as a whole, as 3 of the 10 (30%) recurring tumors observed in the no-treatment group were grade 3.

Being retrospective in nature, our study has several limitations, as all follow-up information could not always be obtained. In particular, tumor grading according to Kiupel et al. (2012), and special stainings (e.g. Ki67, AgNOR) and the mitotic index were unavailable in most initial pathology results, and we were not able to collect enough slides from the original pathology laboratories to have them performed retrospectively from one single pathologist. Therefore, it was not possible to evaluate the influence of such prognostic factors on the outcomes of treated or non-treated dogs. Taking incompletely-excised grade-2 MCTs in dogs as a whole, we found that treatment did not improve outcome, but this may not remain true when specifically looking at the subset of incompletely-excised grade-2 MCTs which are most aggressive, showing negative prognostic factors on pathology. Further studies are necessary to evaluate this aspect.

Conclusion

Nonetheless, our study reports the greatest numbers of incompletely-excised grade-2 MCTs to date, and specifically focuses on grade-2 tumors, which show the greatest variation in biological behavior and have the greatest need for clarification as to management recommendations. Based on our findings, in the absence of metastatic disease (stage 0), it cannot be recommended to systematically and immediately administer adjuvant treatments, whether it be revision surgery, radiotherapy or chemotherapy. In the face of incompletely-excised grade-2 MCTs in dogs, such treatments would be superfluous in up to 90% of cases and incur unnecessary procedures and costs. Therefore, careful monitoring of the surgical site and prompt action upon any signs of local recurrence seems most appropriate. Further studies are needed to evaluate whether this approach needs to be adapted to subsets of incompletely-excised grade-2 MCTs differentiated according to available prognostic indicators.

Disclosure

The authors report no financial or other conflicts related to this study.

Effet du traitement sur le devenir de chiens présentant des mastocytomes de grade 2 incomplètement excisés

Dans la présente étude, on compare le devenir de chiens présentant des mastocytomes de grade 2 incomplètement excisés, selon qu'ils ont reçu un traitement adjuvant ou qu'ils aient simplement été sous surveillance. On a pris en compte des chiens chez lesquels des mastocytes de grade 2 ont été incomplètement excisés ou l'ont été avec une marge étroite (<5mm) et qui ne présentaient pas de signe de récidive locale ou de métastases au moment de l'examen avec un suivi de minimum 10 mois. Les chiens ont été classés en deux groupes, l'un avec des traitements (chimiothérapie, radiothérapie, chirurgie ou combinaison de ces traitements) et l'autre sans autre traitement. L'excision originelle était incomplète chez 90 chiens et présentait des marges étroites chez 25 chiens. 92 cas (80%) ont reçu un traitement et 23 (20%) ont été surveillés sans traitement. Les résultats de l'histologie après une excision de révision n'ont pas fait état de signes d'une affection tumorale restante dans 47/56 cas (84%). Une récidive locale a été confirmée chez 7 chiens et supposée mais pas confirmée chez 2 chiens. Des métastases ont été confirmées chez 13 chiens, supposées mais non confirmées chez 11. Au moment du relevé des données, 46 chiens étaient décédés et 69 encore en vie. Le taux de survie à 1 respectivement à 2 ans était de 92% respectivement 82%. Il n'y avait pas de différence statistiquement significative entre les deux groupes en ce qui concerne les intervalles entre les affections, la durée de la survie, le taux de récidive, le taux de métastases, le taux de survie à 1 et à 2 ans ou entre les divers traitements dans le groupe des animaux traités. Les résultats de cette étude montrent que des traitements adjuvants n'influencent pas le résultat en présence de mastocytes de degré 2 incomplètement excisés. Un traitement adjuvant systématique lors de mastocytes de degré 2 incom-

Influenza del trattamento sui risultati per i cani che hanno subito un'asportazione incompleta di mastocitomi di grado 2

In questo studio vengono comparati i risultati ottenuti nei cani che hanno subito un'escissione incompleta di mastocitomi di grado 2 (MCT), trattati con terapia adiuvante o solamente monitorati. Per lo studio, al momento della loro presentazione, i cani considerati non avevano evidenti segni di recidiva locale o di metastasi, avevano subito un follow-up minimo di 10 mesi ed erano stati diagnosticati con un'incompleta escissione o con margini ristretti (<5mm) di MCT di grado 2. I cani sono stati suddivisi in 2 gruppi: un gruppo con chemioterapia, radioterapia, chirurgia o una loro combinazione e l'altro senza ulteriore terapia. L'escissione originale era incompleta in 90 cani e con margini ristretti in 25 cani. Novantadue casi (80%) sono stati trattati mentre 23 casi (20%) sono stati monitorati senza terapia. Gli esami istologici dopo una nuova escissione non hanno rilevato segni di tumore residuo in 47/56 casi (84%). Una recidiva locale è stata confermata in 7 cani, sospettata in 2 cani, ma non confermata. Delle metastasi sono state confermate in 13 cani, sospettate in 11 cani, ma non confermate. Al momento della raccolta dei dati 46 cani erano deceduti e 69 ancora in vita. I tassi di sopravvivenza di 1 anno e 2 anni erano del 92% risp. dell'82%. Tra i gruppi non c'erano differenze statistiche affidabili riguardo l'intervallo libero da malattia, la sopravvivenza, il tasso di recidiva, il tasso di metastasi, i tassi di sopravvivenza di 1 anno e 2 anni o con riguardo del trattamento all'interno del gruppo trattato. I risultati di questo studio mostrano che le misure di accompagnamento non influenzano i risultati della MCT di grado 2 con escissione incompleta. Un immediato trattamento sistematico concomitante ad una escissione incompleta di mastocitomi di gra-

plètement excisés ne peut donc pas être recommandé par rapport à une surveillance attentive et un traitement lors de récidive diagnostiquée.

do 2 può non essere raccomandata a confronto di un attento monitoraggio e di un trattamento delle recidive diagnosticate.

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