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Manuscripts

1 Owners' perception of their dogs' quality of life during and after radiotherapy for cancer

2
3 Abstract

4
5 Introduction:

6 Owners are the decision makers about cancer treatment in dogs. There is lack of data regarding
7 owners' perception of their dogs' quality of life (QoL) during or after radiotherapy.

8 Objectives:

9 The aim of this study was to determine owners' perception of dogs' QoL before, immediately
10 after and 6-weeks after radiotherapy treatments for a variety of neoplasms and assess satisfaction
11 over their decision to treat.

12 Methods:

13 Questionnaires were given to owners whose dogs completed a radiotherapy treatment at a
14 Referral Radiation Oncology Centre. Questionnaires were given in three time points: before
15 treatment, on the last day of treatment and more than 6 weeks after the treatment was finished.

16 Owners were asked questions regarding their perception of radiotherapy and the QoL of their
17 pets before, during and after treatment with radiation therapy. QoL was scored from 1 (could not
18 be worse) to 10 (could not be better).

19 Results:

20 Seventy-one owners met the inclusion and exclusion criteria. Results showed that 6 weeks **or**
21 **more after** treatment, most owners were happy they had chosen to treat their dog (92%) and
22 would treat another pet again, if indicated (88%). Across the 3-time-points (pre-treatment, end-
23 of-treatment and 6-weeks after the last treatment), median QoL perception score was 9 (1 "could
24 not be worse" to 10 "could not be better").

25 Clinical significance:

26 Radiotherapy was well tolerated by owners and dogs. The great majority of clients were happy to
27 have pursued radiotherapy, would choose to do it again (if indicated), and would recommend it
28 to a friend.

Words: quality of life, radiotherapy, questionnaire, cancer, radiation therapy, dog

Introduction

Cancer is an important cause of death in pets, representing 25% of dogs over 2 years old, and 45% over 10 years old (Villalobos 2011 a). Being a common disease in humans, most owners would have had personal experience of either a family member or friend that has been affected by cancer. It has been described as one of the main concerns in owner's minds in respect of quality of life (QoL) and health of their pets (Withrow et al 2013).

In veterinary oncology, treatments have evolved in parallel with human oncology. The goal of treatment in veterinary medicine tends to be QoL as well as tumour control or remission. QoL seems an important consideration in decision-making for owners with pets diagnosed with cancer (Moore 2011).

Radiation therapy has been used since the beginning of 20th century in veterinary medicine (Whiteley and Kestenman 1991). It is an effective treatment option for many solid tumours in dogs. The last two decades has seen it become more available in the United Kingdom and several centres are offering it. It can be used for curative intent or palliatively (LaRue and Gordon 2013). External beam radiotherapy is used to treat types of tumours such as nasal carcinomas, sarcomas, brain tumours, oral tumours, thyroid and mediastinal neoplasia, spinal cord and many others (LaRue and Gordon 2013). Side effects of radiation therapy can be divided into acute (or early) and late side effects. Acute effects occur soon during or after radiation therapy. They involve rapidly dividing tissues as skin, mucosa, epithelial structures of the eye and intestine. Acute side effects can be unpleasant and distressing for some owners but usually resolve quickly and are self-limiting (LaRue and Gordon 2013).

QoL in veterinary medicine has no worldwide accepted definition, however it has been considered synonymous with welfare. (Wojciechowska et al 2005 c). Attempts to assess QoL have been made in numerous studies in dogs and cats for various diseases including cancer (Boland et al 2014; Giuffrida et al 2014; Hamilton et al 2012; Reynolds et al 2010; Mellanby et al 2003). A scale for health-related quality of life was proposed for dogs with signs of pain secondary to cancer. In this study, dogs with cancer had lower scores compared with healthy dogs or dogs with dermatological disease (Yazbeck et Fantoni 2005). In 2011, Lynch *et al* developed a questionnaire assessing health-related QoL in dogs and cats with cancer. It included pets treated with chemotherapy, surgery, radiation therapy and no treatment. However, to the authors' knowledge, there is no "gold standard" method to assess QoL in dogs (Belshaw 2015). Owner perception of treatments and their pet's quality of life are equally important, but these parameters are poorly described. QoL has been reported as an important factor in decision making for non-cancer diseases in pets (Reynolds et al 2010). The influence of side effects seems to be important on the owners' perception of quality of life (Slater et al 1996, Bowles et al 2010). Owners are the principal decision makers about treatment options available to their dogs with cancer. Given the lack of data regarding owners perception of their dogs' quality of life during or after radiotherapy, the aim of this study was to determine owners' perception of quality of life of dogs before, immediately after and 6 weeks after radiation therapy treatment for a variety of neoplasms and assess their satisfaction with their decision to treat.

Materials and Methods

Questionnaires were given to all dog owners of patients that were starting radiotherapy (either a palliative or a definitive course) for cancer at the Linear accelerator radiation facilities of the xxxx between March 2014 and September 2015. 'Palliative' courses were defined as protocols

involving few large fractions, whereas 'definitive' were defined as those involving more fractions of a smaller dose per fraction (Nolan and Dobson, 2018). It should be noted that palliative radiation is usually given to prolong life by improving tumour control as well as improve perceived deficits in quality of life. Dogs undergoing protocols for bone cancer did not receive questionnaires because the fractions given were given at irregular intervals, for analgesia only with no expectation to have any impact on tumour control.

Questionnaires consisted of 3 parts: 1) before treatment has started, given out by hand at reception desk; 2) at the end of treatment, given out by hand at reception desk; 3) at least 6 weeks after the end of treatment, by hand or posted. Cases starting radiotherapy were identified as they started treatment.

Dogs that did not complete the course of treatment, were dead less than 6 weeks after treatment or received chemotherapy drugs simultaneously to radiotherapy were excluded from the study.

Owners that only answered the first part of the questionnaire and not the second or third were also excluded.

Owners that missed the first questionnaire but answered the second and or third were included in the study.

Data regarding patient (age, breed), body weight, disease, presence of metastatic disease, previous treatments, area treated with radiation therapy, number of fractions and total dose received, radiotherapy protocol type, presence of acute side effects were collected retrospectively from files.

Grading of acute side effects was classified by the first author retrospectively, based on the description of the side effects, using the VRTOG scale (La Due and Klein 2001).

Palliative protocols included following protocols: 4 weekly fractions (8 Gy each to a total of 32 Gy), 6 weekly fractions (6 Gy each to a total of 36 Gy) and “Quad shot” protocols (4 x 4 Gy fractions given over 2 days repeated once a month for a maximum of 3 months). Definitive protocols were protocols of daily fractions (15 to 20 daily 2.5-3.2 Gy fractions up to 50 Gy total dose).

The decision to treat and protocol chosen (palliative or definitive) was decided in the radiotherapy referral consultation between the radiotherapy clinician and the owner considering the type of tumour, stage of the disease and intent of treatment.

Patients receiving palliative treatments went home between treatments, except dogs undergoing a “quad shot” palliative protocol stayed overnight between treatments. Patients undergoing definitive protocols were hospitalized, either for the full treatment or during week-days, going home for weekends.

Irradiated sites were grouped in the following categories: “brain”, “nasal”, “oral and neck”, “perineal” and “skin/subcutis/intramuscular (skin/sc/im)”.

Questionnaires included questions regarding: Previous experiences with RT, previous feelings about RT, Quality of life perception before, during and 6 weeks after RT (using a Likert scale 1-10; 1- could not be worse and 10- could not be better), proportion of good days and bad days before, during and after RT, type of hospitalization, feelings about having treated pet with RT, if they would ever treat a pet again or if they would recommend it to a friend if indicated for their pet.

The questionnaire was developed based on a similar questionnaire performed for cats receiving chemotherapy (Tzannes et al 2008).

The project was approved by the Ethical Committee of the Institution.

Statistics used were mainly descriptive given the mostly subjective nature of the questionnaires. Software used include Microsoft Excel and Statistical Package for Social Sciences (SPSS) v.23 for Windows.

Results

Eighty owners met the inclusion criteria for the questionnaires.

Nine dogs were excluded from the study: five owners only answered the first part of the questionnaire and no further, three dogs did not complete treatment or died less than 6 weeks after treatment and one dog received concurrent chemotherapy.

Dogs that did not complete the full radiation treatment (1 dog) or were not alive by 6 weeks post treatment (2 dogs) were excluded. The dog that did not complete treatment died during treatment with worsening of neurological signs. This dog was having RT for a brainstem tumour and it was impossible to determine if death was due to treatment or progressive disease. Two dogs that were not alive at 6 weeks after treatment due to suspected progressive disease (one nasal tumour and one brain tumour) . No post-mortem was performed for any of the dogs. The authors excluded these cases as they could not be assessed on the second and/or third timepoint and from an ethical point of view.

Seventy one owners met the inclusion criteria and were included in the study. From those, sixty-five owners answered the first part (before treatment), 54 owners answered the second part (at the end of treatment) and 50 owners answered the third questionnaire (at least 6 weeks after treatment). Twenty nine owners answered all three questionnaires. The third part of the questionnaire was answered a median of 22 weeks after the end of treatment (range 5-65 weeks).

146

147 *Characterization of population*

148 Breed, age, gender and body weight of dogs included in the study are described in Table 1.

149 Seventy-two tumours were present in 71 dogs. One dog was treated simultaneously for two

150 cancers in two different locations (a cutaneous mast cell tumour and a subcutaneous soft tissue

151 sarcoma). The most common diagnoses were mast cell tumours (22.2%), soft tissue sarcomas

152 (20.8%) and oral melanomas (13.9%) (Supplementary information – Table A). The most

153 commonly treated area was the group: “skin, subcutaneous and intramuscular” (skin/sc/im) (

154 45.8%). Definitive protocol treatments were more common (58.3%) than palliative.

155 (Supplementary Information – Table A).

156 Protocols delivered are described in Table 2. For the definitive protocols the median dose per

157 fraction delivered was 3 Gy (range 2.5-3.2) for a median number of fractions of 16 (range 15-20)

158 and a median total dose delivered of 48 Gy (range 48-51).

159 For the palliative protocols the median dose per fraction delivered was 8 Gy (range 4-8), for a

160 median number of fractions of 4 (range 4-12) and a median total dose delivered of 32 Gy (range

161 32-48).

162 Most dogs had previous surgery (67.6%) and no previous chemotherapy (93%) before the

163 radiation treatment. Only 11.3% of dogs had recognized regional lymph node metastasis at the

164 time of treatment. No dogs had recognized distant metastasis.

165

166 *Characterization of acute side effects*

167 It was found that 59 dogs had acute side effects reported (Table 3), representing 83.1% of dogs.

168 Seventy-four events were reported in the 59 dogs. The most common side effect reported were

related to the skin, representing 63.5% of the events . Of the skin side effects 25.7% were grade 1 on the VRTOG scale (LaDue et al 2001), whilst 39.2% and 28.4% were grade 2 and 3 events respectively. Two thirds of the adverse events were related with definitive protocols (64.9%), and one third with palliative protocols (35.1%).

Questions related to “Previous experiences and owners’ feelings prior to radiation therapy treatment”

Only 21.5% of the owners that answered the first part of the prospective questionnaires had previous experience with radiotherapy. Most owners heard about radiotherapy in pets from the general practitioner veterinary surgeon (42.3%), whilst 28.2% heard at referral consultation. When asked regarding their feelings, most clients that answered the questionnaire had not previously thought about use of RT in pets (55.4%). Eighty-three percent of owners decided to treat with RT because they felt it was the best therapy for their pet. The remaining either were not sure, or another family member thought it was the best option or did not specify the reason.

Questions related to Treatment

From the data retrieved regarding the type of hospitalization (part-2 of the questionnaire), most dogs (53.7%) were hospitalized during the week but went home for weekends, 9.3 % were hospitalized for the full course and 37% were treated as outpatients, going home every day. Seventeen part-2 questionnaires (24%) were unanswered.

Questions related to “Perception of quality of life before, during and after treatment”

191 Owners were asked on a Likert 10-value scale (1- could not be worse and 10-could not be better)
192 regarding their perception of their dogs' QoL (Table 4).

193 The median QoL score before cancer was diagnosed was 10 (range 7-10) and before RT
194 treatment was 9 (range 4-10), based on a total of 65 owners' responses(questionnaire one).
195 During treatment, the median QoL reported remained 9 but the range was 2-10 based on a total
196 of 49 owners as 5 owners of animals that were hospitalized for the full length of treatment did
197 not answer this question as they were not with their pets during the hospitalization period. More
198 than 6 weeks after treatment, the median QoL was also 9 with a range of 4-10 (from a total of 50
199 questionnaires). Figure 1 shows the QoL scores of palliative and definitive protocol groups,
200 separately.

201 Looking at a qualitative perception of good and bad days, before radiotherapy treatment 63.1%
202 of owners thought their dogs had good days all the time (with no bad days), and 24.6% thought
203 their dogs had more good than bad days (table 4).

204 During treatment, 44.9% thought their dogs had good days all the time and many owners
205 (40.8%) still considered that their dog was having more good than bad days. Only one owner
206 thought that their dog was having bad days all the time and one said that it was having more bad
207 days than good days.

208 *Questions related to "owners feelings post-radiation therapy treatments"*

209 From part 3 of the questionnaire, when asked regarding their feelings after radiotherapy
210 treatment (table 5), most dog owners (92%) were happy that they chose radiotherapy. Four
211 owners (8%) were not sure about their feelings.

Most owners said that they would choose radiotherapy again if they had another pet with cancer, and it was indicated (88%). However, 6 owners (12%) did not answer this question on the third questionnaire.

Six weeks after treatment, most owners (96%) supported the use of RT in pets and if a friend's pet needed RT they would recommend it (92%).

Discussion

To the author's knowledge, there are no validated questionnaires for evaluation directly or indirectly (proxy-related) QoL of dogs with cancer undergoing RT. The individual characteristics of this type of treatment with frequent hospitalization and frequent general anesthetics for each fraction makes it different from most treatment modalities.

A previous study tried to address owners' perceptions of veterinary radiotherapy treatments in a new radiotherapy centre in Sweden (Denneberg and Egenvall 2009). It was a single retrospective questionnaire obtaining information on owners' perceptions and experiences, when choosing to have radiotherapy (RT) for their dogs. All owners thought it worth the effort and all but one would have done it again if needed. (Denneberg and Egenvall 2009)

There are no published studies regarding owners' perception of quality of life for dogs undergoing radiotherapy treatments in United Kingdom. The aim of our study was to clarify this as well as prospectively assess their satisfaction to treat.

Our results show that, most owners were happy that they had chosen to treat their dog with radiotherapy (85.2%) and would treat another pet again, if indicated (88.9%).

When RT treatments were considered all together, the median QoL scores were similar across the 3-time-points studied (pre-treatment, during treatment and more than 6-weeks after the last treatment), with a median QoL of 9.

As expected, both the median and first quartile of QoL perception score more than 6 weeks after RT was lower in palliative than in definitive treatments. It also seems that there may be a trend towards improvement of QoL perception with definitive treatments but the numbers are too small for accurate conclusions.

Considering QoL scores of palliative intent and definitive intent protocol groups, separately, QoL scores six weeks after palliative treatments were lower than before treatment, showing a possible negative impact from treatment. However, this may be explained by the fact that dogs chosen to have a palliative treatment may have earlier disease progression than the definitive group. However, this may also represent side effects considered unacceptable by some owners, considering the palliative nature of treatment.

The present study has showed a high QoL perception score from the beginning to the end of the study, independent of the type of protocol. This may represent a selection bias, since owners that choose RT for their pets may be more motivated and have more expectations and could be subject to a proxy placebo effect. Owners of dogs with poor baseline QoL scores may not be so keen to undertake such a treatment due to its costs and time implications.

Additionally, a selection bias may be present as that most dogs treated had skin/subcutaneous/intramuscular neoplasia and it may be postulated that the related RT acute side effects may be different in other locations.

A recent oral presentation presented at the annual congress of British Small Animal Veterinary Association congress in 2015 (Serras et al 2015) presented some preliminary data retrieved from retrospective questionnaires given to owners of dogs that underwent radiation therapy in UK. Results about quality of life perception and satisfaction to treat were similar to the ones in this

study and supported this study's findings that most owners were happy with decision to treat and would do it again if needed.

In the present study, there was a wide variation on tumour types and areas treated and this makes it difficult to see if there was any correlation between type of disease, area treated, type of treatment, type of side effects and QoL score perception. One particular point of interest would be to evaluate the effect of acute adverse effects on QoL scores for each type of tumour or for each area treated individually. A further multi-institutional study would be useful to assess this.

Dogs with bone neoplasia were excuded from this study because when the study was started, these cases were receiving a variable number of fractions for pain relief only and not as a defined protocol, making it difficult to decide when questionnaire 2 and 3 were due. It would be interesting to perform a QoL assessment for this specific group in order to define whether there is a QoL benefit.

Eighty percent of cases of this study had acute side effects reported. It would have been interesting to collect adverse event data concurrently as well as standardize recording, as recommended previously, to avoid underestimation or suboptimal collection (Giuffrida et al 2016). Another future recommendation would be to include a questionnaire with more objective measures of quality of life, to be assessed by the radiation oncologists and/or nurses alongside the owners' perception and compare them. This information may also detect more subtle changes during hospitalization and treatment.

It would have been interesting to try to understand whether the hospitalization type affected the QoL score perception. One can postulate that longer hospitalization can lead to institutionalisation of the animal due to kennelling and thus a decreased quality of life, as has been reported in previous studies (Boland et al 2014). On the other hand, it is likely that when

280 the dog is at home the owners may be more aware of possible side effects secondary to treatment
281 and/or general anesthesia.

282 We excluded one dog that received cytotoxic drugs during radiotherapy since this could interfere
283 with the side effects of radiotherapy. It would be interesting to know whether treating
284 simultaneously with chemotherapy and radiotherapy affects the severity of side effects
285 experienced by the dogs and the QoL perception by owners.

286 Unfortunately, only 29 owners answered to the 3 time-point questionnaires. First and second part
287 questionnaires were answered mainly while owners were waiting in reception. Some first and
288 second part questionnaires may have been missed due to unplanned admissions and discharges or
289 other uncontrolled variables. The third questionnaire was given at the review consultation or by
290 post and therefore, it was more dependent on the cooperation of the owners. Other studies have
291 similarly found difficulties in retrieving some questionnaires from owners (Tzannes et al 2008,
292 Bowles et al 2010). The time length between the end of treatment and the answer of the 3rd part
293 of the prospective questionnaire might have affected the QoL perception scores. Owners may
294 forget the more negative experiences (Tzannes et al 2008).

295 To the authors knowledge, there were no owners that were unwilling to answer the
296 questionnaires, but the lack of response on the third questionnaire (21 owners in 71) could
297 represent some owners that were not willing to answer. This can correspond to some non-
298 respondent bias. Five owners only answered the first part of the prospective questionnaire and
299 we are not aware why they did not answer second and third part. This can again represent bias. It
300 has been suggested that the non-responders may represent the ones that had a worse experience
301 (Bowles et al 2010; Edwards et al 2002). In our study the questionnaire was not anonymous as
302 we needed to link the grade of adverse event with the owners' answers. An anonymous

questionnaire may increase the chance of negative answers. Exclusion criteria included dogs that did not complete the course of treatment or died less than 6 weeks after treatment. This may represent bias since these owners may be upset and more likely to give negative answers. It would be interesting to know how these owners would have responded but ethically it was not considered correct to contact them further.

This study only includes a referral population, which will involve selection bias regarding the type of owners, type of cases and the individual cases that the referring general practitioner believes are suitable for referral. These owners tend to be more motivated and committed and usually want to proceed with more advanced treatment techniques and/or may have more resources. This was suggested in another similar study (Tzannes et al 2008). An interesting study would be to assess the reasons behind why some owners decline referral oncology consultation and radiotherapy.

Retrospective studies may have recall bias, since owners would have to recall the information.

This study was planned to minimize recall bias through a real-time questionnaire. However, the third part of the questionnaire may be subject to recall bias. Previous studies had shown that recall bias may reduce the negative answers and have an optimistic effect (Edwards et al 2002).

In conclusion, this study concludes although half of the owners had not previously thought about the use of radiotherapy, 6 weeks or more after treatment more than two thirds of owners who elected to pursue this treatment were happy with the decision to treat and would treat another pet with RT, if indicated. After their experience, over 90% of owners supported the use of RT in pets and would recommend it for a friend's pet if indicated.

Further studies are needed to assess the impact of individual type of tumour and individual areas treated on QoL and would allow better correlation with side effects and, in turn, allow

assessment of their influence on QoL scores. This study was an important preliminary study to help future owners with their decision whether to treat or not with radiotherapy. QoL assessment tools should also be included in future radiotherapy studies as primary end-points.

Conflict of interest: No conflict of interest have been declared.

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Figure 1 – Box and whisker plot on Quality of life perception scores prior to cancer diagnosis, pre-RT treatment, during RT treatment and over six weeks post treatment in palliative intent and definitive intent protocols.

103x130mm (72 x 72 DPI)

Table 1 – Summary of breed, age, gender and body weight of 71 dogs included in this study

Breed (Frequency (%))	
Labrador Retriever	19 (26.7)
Crossbreed	9 (12.7)
Various other breeds (less than 4 dogs per breed)	43 (60.6)
Age (years)	
Median	8.4
Range	1.8-12.4
Gender (n(%))	
Male neutered	36 (50.7)
Male entire	3 (4.2)
Female neutered	26 (36.6)
Female entire	6 (8.5)
Body Weight (kg)	
Median	26.3
Range	4.2-44

Table 2 - Description of the 72 radiotherapy protocols delivered in the 71 dogs included in the study

Protocols included in the study	Nº fractions	Dose per fraction	Total dose	Time period of delivery	Nº cases included
Definitive intent protocols	20	2.5 Gy	50 Gy	daily	14
	16	3 Gy	48 Gy	daily	26
	17	3 Gy	51 Gy	daily	1
	15	3.2 Gy	48 Gy	daily	1
Palliative intent protocols	4	8 Gy	32 Gy	weekly	24 ¹
	6	6 Gy	38 Gy	weekly	4
	8	4 Gy	32 Gy	4 fractions in 2 days repeated one month after ("quad shot")	1
	12	4 Gy	48 Gy	4 fractions delivered in 2 days; repeated one and two months after ("quad shot")	1

¹ one dog was treated simultaneously for 2 neoplasias in two different locations, both with a palliative intent protocol

Table 3 – Summary of acute side effects that occurred in 71 dogs included in the study; classified using VRTOG guidelines (LaDue et al 2001), from dogs clinical files.

Type of Adverse Event	Grade 1 n (%)	Grade 2 n (%)	Grade 3 n(%)	No grade	Total n(%)	Total of events (Definitive intent protocols)	Total of events (Palliative intent protocols)
Skin/hair	16 (34)	23 (49)	8 (17)	-	47 (63.5)	32	15
Mucous membranes/oral cavity	2 (11.1)	4 (22.2)	12 (66.7)	-	18 (24.3)	10	8
Eye	1 (33.3)	1 (33.3)	1 (33.3)	-	3 (4)	2	1
CNS	0	1 (100)	0	-	1 (13.5)	1	0
Others	-	-	-	5	5 (6.8)	3	2
Total events Each grade	19 (25.7)	29 (39.2)	21 (28.4)	5 (6.8)	74 events	48 events	26 events

CNS: Central nervous system; n: frequency of events

Table 4 – Summary of answers on qualitative Quality of Life perception prior, during and post radiotherapy treatment based on first, second and third part of questionnaire;

	Before RT treatment	During RT treatment	More than 6 weeks after treatment
Qualitative perception n (%)			
Good days all the time	41 (63.1)	22 (44.9)	n/a
More good than bad days	16 (24.6)	20 (40.8)	n/a
Equally good and bad days	2 (3.1)	4 (8.2)	n/a
More bad than good days	0	1 (2.0)	n/a
Bad days all the time	0	1 (2.0)	n/a
Other	1 (1.5)	0	n/a
Unanswered	5 (7.7)	1 (2.0)	n/a
Number questionnaires retrieved	65	54	50
Number questionnaires considered	65	49 ¹	50

¹ 5 dogs hospitalized for full time, so owners were not asked to assess QoL perception during hospitalization; n frequency of answers; n/a non applicable; RT - radiotherapy

Table 5 – Summary of answers on owners feelings post radiotherapy (RT) treatments

	Immediately after treatment	> 6 weeks after treatment
	Frequency (%)	Frequency (%)
Feelings about having treated pet with RT		
Happy that chose it	46 (85.2)	46 (92)
Not sure about feeling	4 (7.4)	4 (8)
Regret choosing RT	0	0
No answer	4 (7.4)	0
If had other pet with cancer, would choose RT, if indicated		
Yes	48 (88.9)	44 (88)
No	0	0
No answer to this question	6 (11.1)	6 (12)
Feelings about RT in pets		
Support the use	47 (87)	48 (96)
Don't have strong feelings either way	3 (5.6)	1 (2)
Object the use	0	0
Unanswered	4 (7.4)	1 (2)
Recommendation of RT to a pet's friend, if indicated		
Yes	-	46 (92)
No	-	0
Unanswered	-	4 (8)
Total of questionnaires	54	50

Table 1 – Summary of diagnosis, area treated and type of treatment for 71 dogs included in the study.

Diagnosis	Site group	Total of cases (n (%))	Palliative intent protocol (n (%))	Definitive intent protocol (n (%))
Acanthomatous ameloblastoma	Oral/neck	3 (4.2)	0	3
Anal Sac adenocarcinoma	Perineal	3 (4.2)	0	3
Carcinoma	Nasal	4(5.6)	1	3
Extra-axial brain mass¹	Brain	6 (8.3)	0	6
Frontal sinus tumour¹	Nasal	1 (1.4)	1	0
Haemangiosarcoma	Skin/sc/im	1 (1.4)	1	0
Histiocytic sarcoma	Skin/sc/im	-	-	-
Infiltrative lipoma	Skin/sc/im	2 (2.8)	0	2
Intra axial brain mass¹	Brain	2 (2.8)	1	1
Lymphoma (epitheliotropic)	Oral/neck	3 (4.2)	3	0
Macroadenoma	Brain	-	-	-
Mast cell tumour	Skin/sc/im	16 (22.2)	9 ²	7
Melanoma	Oral/neck	10 (13.9)	10	0
	Perineal	-	-	-
Meningioma	Brain	3 (4.2)	0	3
Pilomatrixoma	Skin/sc/im	-	-	-
Plasmacytoma	Oral/neck	1 (1.4)	1	0
Soft tissue sarcoma	Nasal	15	-	-
	Oral/neck	(20.8)	0	1
	Skin/sc/im		2 ²	12
Squamous cell carcinoma	Oral/neck	1 (1.4)	1	0
Synovial cell sarcoma	Skin/sc/im	-	-	-
Thyroid carcinoma	Oral/neck	1 (1.4)	0	1
Total		72 ²	30 (41.7%)	42 (58.3%)

¹ No histopathological diagnosis; ² one dog was treated simultaneously for 2 neoplasias in two locations; n frequency; sc subcutaneous; im intramuscular.