Queen Mother Hospital for Animals
Royal Veterinary College

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Dear colleague,

Re: Radioactive Iodine Treatment for Hyperthyroidism

Thank you for calling us to refer a cat to the Queen Mother Hospital for Animals (QMHA) for radioactive iodine treatment.

We enclose:

- A brief overview of what the treatment entails.
- A check-list of requirements that need to be met before cats can be seen for treatment.

Please read this carefully to make sure that your patient is a suitable candidate for radioactive iodine treatment. It is really important that a clinical history and relevant blood work are available to us at the time of the appointment. Please ensure that this is either sent ahead of time, or sent with the clients on the day.

The demand for treatment with radioactive iodine is high and unfortunately we often have a long waiting list. Please let one of our Receptionists know as soon as possible if an appointment needs to be cancelled, or postponed, for any reason, so another cat can be treated instead. If your client is undecided about whether to pursue radioactive iodine treatment and would like to discuss the options with us, please ask for a routine medicine appointment first - treatment can then be arranged for a later date if the owners wish to proceed.

We hope that the enclosed information sheet answers any questions regarding radioactive iodine treatment. If not, or if you are concerned that your patient may not be an ideal candidate for radioactive iodine treatment, please telephone Reception 01707 666399 or email QMHreception@rvc.ac.uk and ask if one of our Internal Medicine team can contact you.

Alternatively, we have set up a FAQ site where we hope you will be able to find the answers to most of your questions https://rvc.padlet.org/hsyme1/iodineFAQvets or scan the QR code, there is also a parallel site to direct owners to https://rvc.padlet.org/hsyme1/iodineFAQowners.

We hope that the enclosed information sheet answers any questions regarding radioactive iodine treatment. If not, or if you are concerned that your patient may not be an ideal candidate for radioactive iodine treatment, please telephone QMHA Reception on 01707 666399, email QMHreception@rvc.ac.uk, or chat to us at https://rvc.uk.com/qmha/webchat and ask if one of our Internal Medicine team can contact you.

Yours sincerely,

Harriet Syme BSc BVetMed PhD DACVIM DECVIM-CA FHEA MRCVS

RCVS, European and American Specialist in Small Animal Internal Medicine

Radioactive Iodine Treatment

What's involved?

A single dose of radioactive iodine (I^{131}) is given by subcutaneous injection. The iodine is concentrated in the thyroid gland where it emits beta-radiation, killing the surrounding hyper-functioning cells. Parathyroid gland function is unaffected. The iodine that is not concentrated in the thyroid gland is very rapidly eliminated in the urine, saliva and sweat in the first couple of days following the injection. The remainder is slowly eliminated due to thyroid hormone turnover (with the I^{131} incorporated into the hormone and then excreted in the urine) and due to decay of the isotope (the physical half-life of I^{131} is eight days). Cats must stay with us in an isolation facility for several days after the injection until most of the radioactivity has been eliminated. Following a review of the cats' measured radiation activity and the doses received by the vets and nurses caring for them (which are very low), and in consultation with our RPA, **we have reduced the length of time that cats need to be hospitalized.** We now admit cats on a Monday, inject them with I^{131} on the Wednesday, and they return home the following Friday.

What does it cost?

The current cost of treatment is £3160.00 inc. VAT. This cost is essentially a 'package deal' covering pre-treatment and post-treatment blood tests, the treatment itself and hospitalisation for two weeks. The cost is higher (£3959.00 inc. VAT) for cats treated for thyroid carcinoma because they receive a higher dose and stay with us for longer. This does not include the cost of treatment for any concurrent medical problems or any unexpected diagnostic tests. Two weeks prior to the appointment your client will be contacted to confirm and finalise instructions and will be required to pay a deposit of £500 which will be non-refundable unless: a cancellation is made two or more weeks before the appointment, the patient dies or for some reason the cat is deemed not to be suitable for treatment. This will also apply to clients who wish to claim direct, the deposit being refunded on receipt of payment from the insurance company.

** Prices may be subject to increase.*

How successful is it?

A single radioactive iodine injection is successful in about 95% of cats that we treat.

How quickly will you know if it has worked?

The thyroid hormone concentration is generally normal or low one month after treatment. We are no longer measure thyroid hormone concentration prior to discharge, since we have established that this is too early to establish long term outcome with our earlier discharge date. We are now recommending that cats present to your practice 4 weeks after their treatment for repeat total T4 measurement in order to assess treatment efficacy. Further information can be found in the "Follow-up appointments" section below.

What needs to be done before the appointment?

1. Cats need to be confirmed as hyperthyroid on the basis of a total thyroxine (tT4) concentration above the laboratory reference range. Occasionally we see and treat cats with high-normal tT4 measurements where hyperthyroidism has been confirmed by other methods, but these cases are best discussed with us prior to referral. In our experience, free T4 measurements can be high in normal cats and therefore might be misleading. In house tests for T4 can also be unreliable.
2. Where possible, to allow evaluation of renal function and to minimise any clinical deterioration, we recommend that cats are treated with methimazole/carbimazole or Hill's Y/D until two weeks before we see them. Obviously, if the reason a cat is being referred for radioactive iodine treatment is that the cat cannot tolerate the medications, or the owner is not able to pill the cat, or the cat will not eat the diet, this will not be possible.
3. **Assessment of renal function.** Older studies show that up to 50% of hyperthyroid cats will become azotaemic with treatment irrespective of which method (i.e. medical / surgical / radioiodine) is used. This high rate of development of azotaemia may in part have been due to over-treatment of some cats and development of iatrogenic hypothyroidism, nonetheless even avoiding this complication, some cats will develop azotaemia. This occurs because the GFR is increased in the hyperthyroid state and the cat's true renal function can only be evaluated once GFR reduces with normalisation of thyroid hormone. It is reassuring if the creatinine concentration remains in the reference range when the tT4 is reduced to <35 nmol/l; these cats are ideal candidates for radioactive iodine treatment. Interestingly, although GFR changes quickly with control of hyperthyroidism it can take 3-months of euthyroidism before the creatinine concentration plateaus.

If cats are minimally azotaemic but clinically improved on medical treatment, we will still consider treating them, but please call us to discuss the case before referral.

4. The owners are instructed to stop the anti-thyroid drugs or dietary therapy two weeks before their appointment at the QMHA. Occasionally there will be patients with severe hyperthyroidism, or concurrent heart disease, where this cannot be done safely and we will only stop medicating very briefly prior to the injection – please ask us for advice if you feel this is pertinent to your case.
5. Sometimes the waiting list for radioactive iodine is quite long and a cat is presented to us for treatment that has not been examined for quite a long time. We kindly ask if possible that you examine the cats that you are referring within 2-months of their appointment with us, and if appropriate blood work is repeated to re-evaluate renal function (since medications will have been stopped when we see the patient and so this assessment cannot be made by us).
6. Cats need to be vaccinated for 'flu and enteritis' within the last year.

How long must the cat remain in isolation?

Our protocol regarding isolation of hyperthyroid cats has changed recently, so please read this carefully as owners may wish to discuss this with you. We no longer offer two different stay lengths - with all cats going home 12-days after they are admitted. We do recommend that owners that are pregnant, and children, stay slightly further away from the cat than other people. We no longer require owners to collect and store soiled litter, simply to follow normal hygenic precautions when cleaning the tray (pregnant women should not do this). We have provided lots of information about radiation safety here: https://rvc.padlet.org/hsyme1/iodineFAQowners.

The level of radioactivity emanating from the cats two weeks after treatment is relatively low, but is higher than background and will continue to be so for several weeks. The risks associated with this radiation level are small provided that sensible precautions are taken. To put this in context, radiation is all around us and owners receive a larger dose of radiation by living in Cornwall, or flying across the Atlantic, than by spending time with their cat following treatment with radioactive iodine.

The only group of cats that remain with us for longer than two weeks are those treated with high-dose I131 for thyroid carcinoma.

Which cats aren't suitable for treatment?

1. Naughty cats! We appreciate that hyperthyroid cats can be tetchy and it is not a particular problem if, for example, a cat is difficult to collect blood samples from. If the cat is less than angelic in its behaviour, it may be anaesthetised for the injection of radioactive iodine. The cats that we cannot accept for treatment are ones that will not allow their cages to be cleaned without attacking the Nurses, which increases the risk of contaminating them with radioactivity-containing urine. We have found that **pre-treating cats with gabapentin on the day of their appointment** with us can be helpful; if you would like more details of the dose to use, please refer to the padlet site: https://rvc.padlet.org/hsyme1/iodineFAQvets.
2. Cats with significant, concurrent, medical problems. If cats become ill after they are injected, we cannot attend to them without being exposed to high levels of radioactivity. Therefore we cannot take cats that are known to have other serious concurrent problems. Medications can be put in the cat's food, but the cats cannot be given tablets directly.
3. Unsuitable owners! Some cats would be fine to treat with radioactive iodine, but their owners will not be parted from them for the required time. We are unable to compromise on the amount of time that we keep the cats here in the hospital. It is not possible for owners to visit while their cats are with us.

Follow-up appointments:

Cats should have a check up at **one** and **six** months after their injection date. Although we can see the cats at the QMHA for these appointments if their owners prefer this, ideally we would like to hand their care back to yourselves, although we would still appreciate any updates that you can provide. This follow-up is very valuable to us, both for ongoing clinical research into the optimal treatment of hyperthyroidism, and also for our clinical audit of the service we provide. If you are emailing reception with records and/or test results to attach to the patient's record and you do NOT want/need to speak with us it can be very helpul to include NRN (no response necessary) in the subject line; sometimes we are left wondering when normal results have been sent in whether a vet wants to speak with us or not.

We recommend a complete physical examination, including body weight and blood pressure measurement, alongside thyroid testing and assessment of renal function via the measurement of creatinine (as well as urinalysis if the cat becomes azotaemic) at each visit.

In order to standardise the analysis, and the interpretation that we provide of results, we include the cost of the laboratory analysis at 1 and 6-months as part of the 'package price for radioactive iodine treatment' and provide the owners with a laboratory submission form for this purpose. Please submit 2mls of serum to the laboratory (additional copies of the form can be downloaded from the website if these are mislaid) together with details of any clinical information (weight, clinical findings, blood pressure and urine specific gravity). This testing is primarily aimed at determining if the cat has developed hypothyroidism (total T4 and TSH) and/or has developed azotaemia (creatinine and limited other paramenters).If the cat does develop hypothyroidism then guidance on whether this should be treated, and how, on the website. However if this is not clear, or you would like to consult with us about the case, then please use the on-line system for requesting a consultation with us or email via Reception QMHreception@rvc.ac.uk.

RAI site for Vets:

RAI site for owners: