



Veterinary uses of nuclear medicine and the implications for returning animals to their owners

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Hyperthyroidism is in Cats

- Hyperthyroidism in Cats
- Incidence of Hyperthyroidism in Cats
- Treatment of Hyperthyroidism
- What Criteria for sending cats home
- Other uses

Hyperthyroidism in Cats

Excess of thyroid hormone

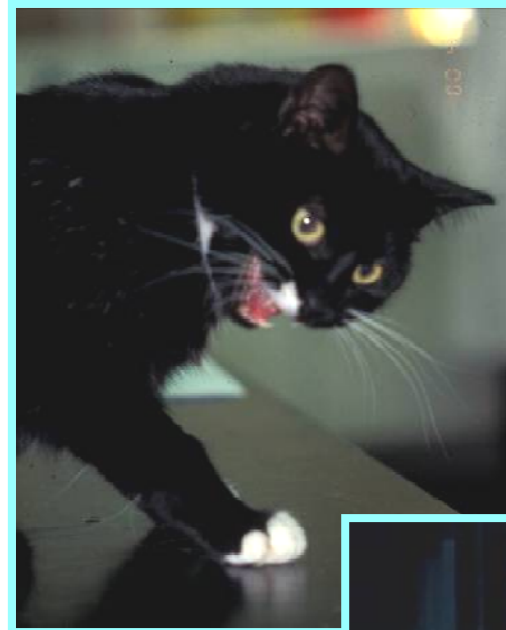
- Any cat
- 8 years
- Gradual onset



Hyperthyroidism in Cats

The symptoms

- Weight loss
- Heart problems
- Vomiting
- Diarrhoea
- Behavioural Problems



Hyperthyroidism in Cats

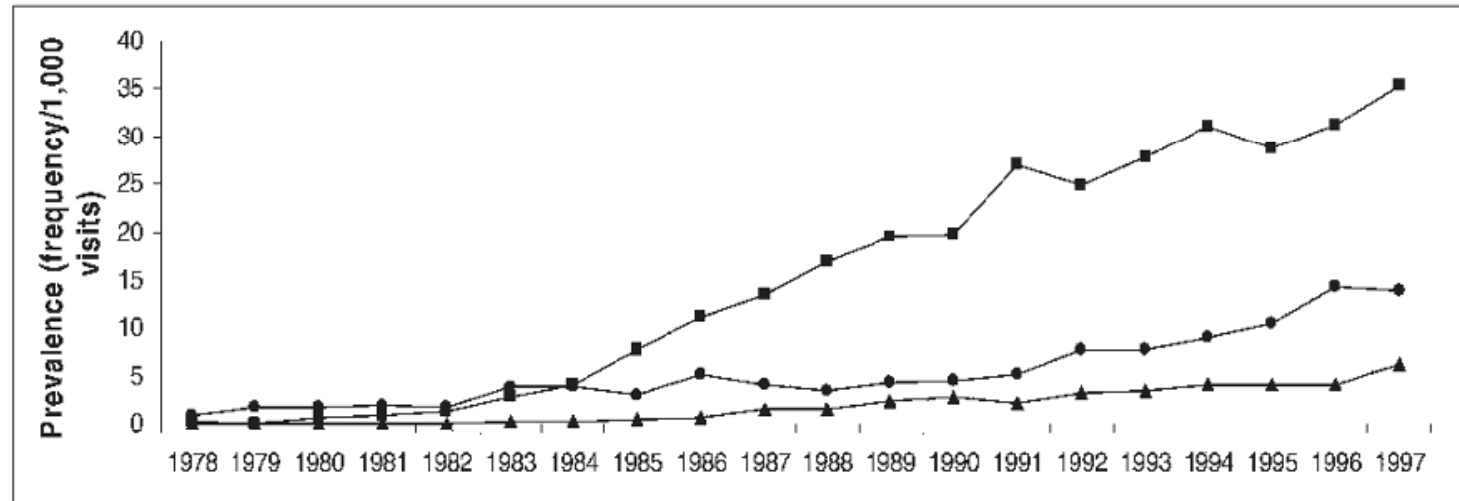


Figure 2—Hospital prevalence of hyperthyroidism (squares), diabetes mellitus (circles), and renal insufficiency (triangles) at 9 veterinary teaching hospitals from 1978 to 1997. Trends are significant ($P < 0.001$).

Edinboro and others (2004) *JAVMA* **224** : 879-886

Incidence of Hyperthyroidism

- Prevalence
 - Most common medical disorder of cats in UK
- Recent disease
 - Probably started in 1970s
- Geographic variation
 - HIGH: N.Europe, USA, Australia and New Zealand
 - LOW: Spain, Italy, Hong Kong and South Africa

Incidence of Hyperthyroidism

- Cause is unknown
 - Possibly cats living longer
 - Canned food
 - Litter trays
 - Flea protection
 - Less common in siamese cats
- Better detection
- Genetics

Treatment of Hyperthyroidism

- Medical
- Surgical
- Radiotherapy



Treatment of Hyperthyroidism

Radioiodine

- Single dose of I-131
- Typically 100-150MBq
- No anaesthesia needed
- Effective
 - 95% on first injection,
 - 100% on second
 - Nodules destroyed
 - average of 4 years increased life expectancy



Treatment of Hyperthyroidism

- Period of Isolation
 - How long ?



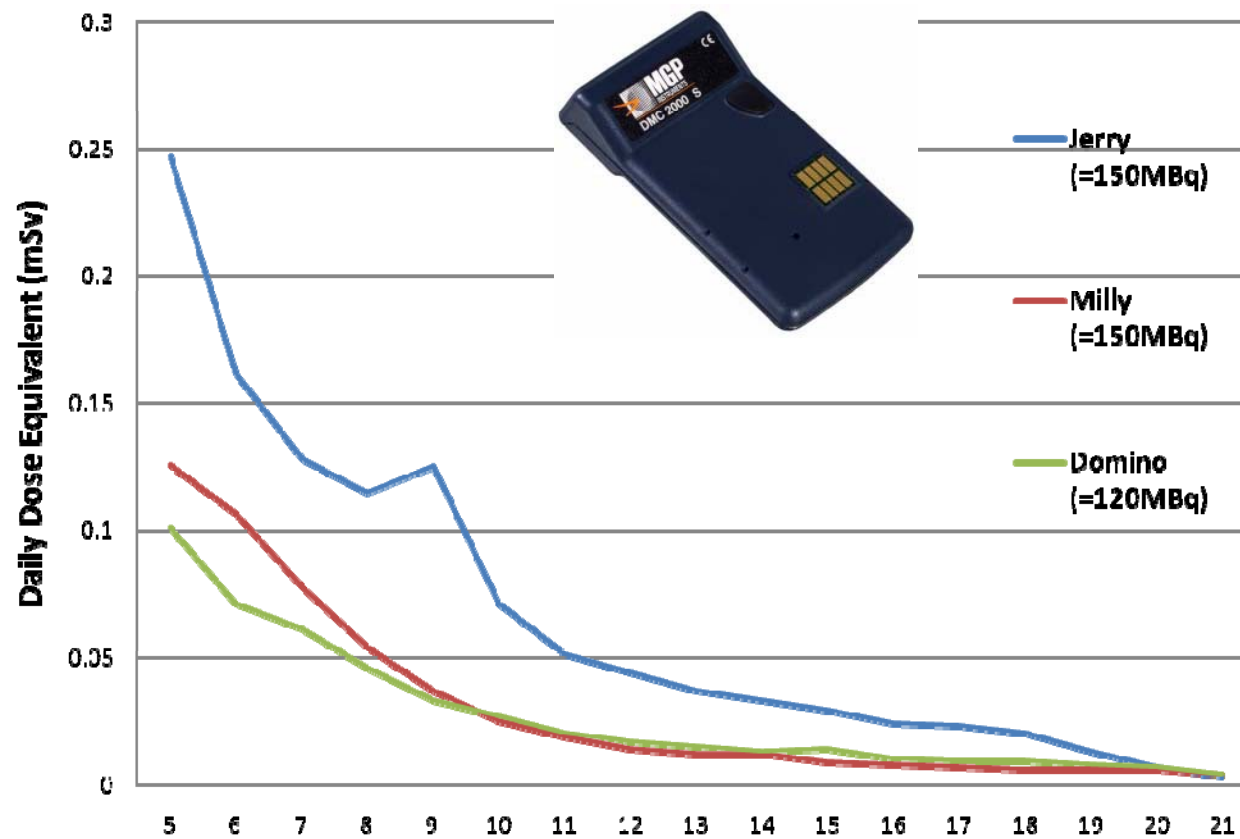
What criteria for sending the cat home ?

- Dose rates ?
 - <300 dose constraint or 20 $\mu\text{Sv/yr}$ whole body dose
 - committed dose from the ingestion of urine
 - Calculated dose rates ($\mu\text{Sv/hr}$) from 150MBq and 2.6 Effective Half Life (Uni of Glasgow)

Days after injection	Dose Rate @ 10 cm	Dose Rate @ 30 cm	Dose Rate @ 100 cm
1	755	84	8
7	153	17	2
14	24	3	<1

What criteria for sending the cat home ?

- Dosimetry Measurements at 30cm



Gunn (2012) data being collected

What criteria for sending the cat home ?

- Waste disposal
 - Activities measured in waste faeces and urine
 - Variability noted between cats
 - After 1 week 20kBq/g
 - After 2 weeks 1kBq/g
 - After 3 weeks <100 Bq/g
- Exempt levels of waste would be 400kBq /0.1m³

What criteria for sending the cat home?

- 1-2 or even 4 weeks after treatment ?
- May be longer period if there are children, infants at home
- Use of flushable litter or decay store
- Keep cats indoors
- Limit direct contact time with cats
- Extra hygiene care
- Provide consistent guidance

What criteria for sending a cat home ?

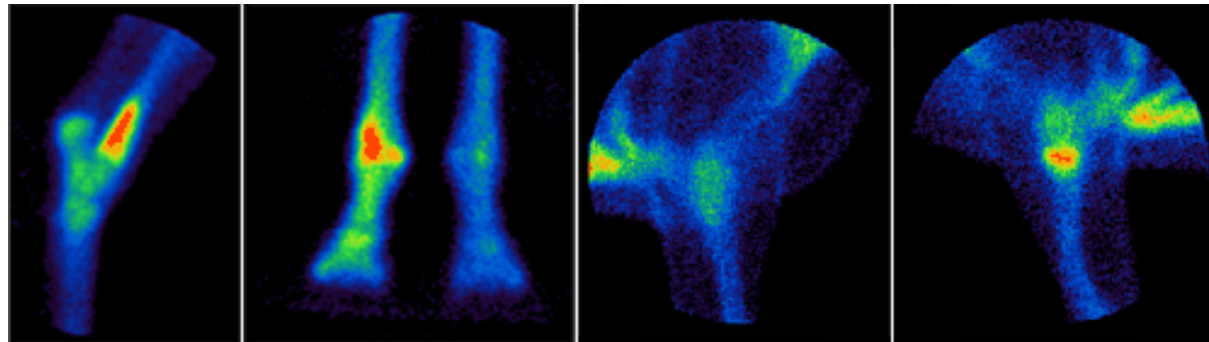
- Humans – upto 800MBq as an outpatient
 - No close contact with children for 14 days
 - No more than 15 mins at 1 arms length
 - pregnant women & under 3 for further 27 days
 - 3-5 for further 22 days
 - 5-16 for further 16 days
 - When travelling stay as far away from other passengers
 - Don't go to places such as cinema's until 1 day after the treatment

Other Uses

- Feline Thyroid Carcinoma
 - 1 GBq I-131
 - Lower treatment numbers
 - Would require longer stay
 - Could use the same criteria for going home

Other Uses

- Scintigraphy in Horses
 - Use of Tc-99m for diagnostic for purposes
 - Typically 5-7 GBq per dose



Other Uses

- Scintigraphy in Horses
 - Held for upto 48 hours in stable
 - Excretion rate estimated to be between 70-90%
 - Dose rate after 48 hours from horse $<0.5\mu\text{Sv/hr}$
 - Large volumes of solid waste generated
 - Decay store then disposal to composting/spreading on land
 - Tc-99 issues considered to be very small

Any questions ?

