

Treatment for cancer usually involves surgery, chemotherapy and radiation therapy (RT) in veterinary medicine. The brain tumor has many cases having difficulty in surgery, and RT becomes the adaptation. Therefore, in this study, we examined the therapeutic and adverse effects of RT against brain tumors in dog and cat.

The purpose of chapter 1 was to determine the therapeutic and/or adverse effects of RT against pituitary tumors in dogs with pituitary-dependent hypercortisolism, as monitored by frequent post-RT detailed MRI examinations, clinical signs, and changes in hormone concentrations. In conclusion, RT is effective to reduce pituitary size and the mass effect, but does not appear to affect blood hormone concentrations, necessitating additional medical treatment against hypercortisolism. Periodic MRI imaging post-RT enables early detection of adverse effects of RT.

The purpose of chapter 2 was determine the therapeutic and/or adverse effects of the combination of RT and hydroxyurea against meningioma in dogs, as monitored by frequent post-RT detailed MRI examinations, clinical signs, and tumor size. In conclusion, the combination of RT and hydroxyurea is effective to extend duration of survival. But the neurologic signs were recurred in relation to hemorrhage. As for the combination of RT and hydroxyurea, survival time was prolonged than a past report and the serious adverse effect did not happen.

In chapter 3, a 12-year-old, castrated male cat with diabetes mellitus was diagnosed with acromegaly and examined with magnetic resonance imaging (enlarged pituitary gland, 8 mm); serum hormone concentrations were measured. After the first course of radiation therapy (4 Gy, 12 fractions), insulin administration was not required from day 420 after diagnosis. Enlarged pituitary tumor (8 mm) recurred, and insulin dosage amount of the cat was increased on

day 1,065. The second course of radiation therapy (6 Gy, 4 fractions) was performed on day 1,201 and insulin administration was again discontinued. However, the cat died from lymphoma on day 1,397. Postmortem examination revealed pituitary adenoma. Most tumor cells were positive for chromogranin A, synaptophysin, and growth hormone immunohistochemistry. The pancreatic islet cells revealed diffuse hyperplasia. We achieved long-term successful management of an acromegalic cat with two courses of RT. However, a protocol for a second course of RT for feline recurrent pituitary tumor should be further discussed.

This study is the basic study to examine the therapeutic and adverse effects of RT against brain tumors in dog and cat. Therefore periodic MRI imaging post-RT enables early detection of adverse effects of RT and neurologic signs. RT against brain tumors in dog and cat is method to extend duration of survival and relax neurologic signs.