Proton Irradiation of Mast-Cell Tumors on the Eyelids of Cats ◇

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The tumor resection on eyelids is difficult and can necessitate the enucleation of the eye. The treatment with X-rays suffers from the difficulty of delivering a uniform dose to the entire tumor volume, so that surrounding structures may suffer. Irradiation with accelerated protons using the spread-out Bragg-peak (SOBP) technique can avoid these problems.

Two cats, each with a malignant mast-cell tumor on the eyelid, were irradiated in 3 fractions, 2 days apart, by 22 MeV protons with a dose of 8 Gray per fraction. A diaphragm machined to the tumor outline (with a 2 mm safety margin added) and a 0.7 mm gold cap covering the cornea resticted the beam to the tumor. The beam energy was wobbled to give a uniform dose to a depth of 4.5 mm in tissue.

Each cat was anesthesised by Xylazin and Ketamin and bedded on vacuum pillows. The head was supported by a face mask in such a way that the tumor surface was perpendicular to the vertically upward beam direction. On its way to the tumor the beam traversed a thin 45^0 mirror allowing the cat's eye to be seen through the diaphragm during irradiation. A preparation time of 20 minutes was sufficient for accurate positioning for an exposure of 100 seconds. Half a year later the tumor of both cats is gone and hair has regrown on the eyelid.

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