EVALUATION OF THE EFFECT OF TUMOR THERAPY BY USING IN VIVO 31P-NMR
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The effects of several kinds of therapies on living tumor tissue in rats were investigated by measuring the 31P-NMR spectra using the surface coil method. Rat glioma cells (EA285) were inoculated subcutaneously in the lumbar region of CDF rats. After the tumor grew over 1.5 cm in diameter, several kinds of therapies were made on the rats; (1) chemotherapy with various dose of vincristine, cyclophosphamide and methotrexate, (2) photoradiation therapy and (3) RF hyperthermia using the same surface coil in the NMR spectrometer. Before and after these therapies, in vivo 31P-NMR spectrum was measured sequentially with a SCM-200 spectrometer (JEOL, Japan). In the pre-treatment group, peaks of ATP and phosphomonoesters (PME) were high and a Pi peak was low. After a large dose administration of each chemotherapeutic agent, peaks of ATP and PME decreased and a Pi peak increased, resulting in a dominant Pi peak pattern after several hours. In the photoradiation group with preinjection of hematoporphyrine derivitives, 31P-NMR spectrum became a dominant Pi pattern within one hour after the 60-min irradiation with white light. In the RF hyperthermia group, 31P-NMR spectrum became a dominant Pi pattern immediately after 60-min RF heating at 8 watt. These changes in the spectrum occurred much earlier than the histological changes. Measurements of in vivo 31P-NMR spectrum proved useful not only to investigate the energy metabolism in tumor tissue but also to detect the effects of tumor therapies.

MAGNETIC RESONANCE IMAGING OF THYROID GLAND.

Magnetic resonance (MR) imaging of thyroid gland was studied with a 0.256 tesla superconducting MR scanner (VISTA MR, Picker International) Installed in April 1984. Transverse MR images were routinely obtained by spin-echo and inversion recovery sequences. Computed T1 and T2 images were taken from these. Since June 1985, a newly developed surface coil for cervical region has been used. With this surface coil, scanning time has shortened to about a half of that with body coil, and spatial resolution has been maintained equally. But computed T1 and T2 values with the surface coil tended to be different from those with body coil, and images were disturbed by remarkable halation in some cases, so the surface coil should be used with care.