

V37 MICRONUCLEUS INDUCTION AS A MEASURE OF ¹³¹I RADIATION EXPOSURE

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The change of cell numbers in the peripheral blood following irradiation has been studied for many years, particularly in patients undergoing radiotherapy. Recently, attention is directed towards the use of cytogenetic-mutagenetic methods to estimate the biological effects of received radiation dose. The aim of our study was to identify the difference in number and distribution of micronucleus, depending of applied therapeutic dose of iodine-131. According to their diagnosis, six patients have received iodine-131 in range from 80 to 140 mCi, while in the other group of patients the dose values varied from 7 to 32 mCi. On in vitro peripheral blood lymphocyte cultures micronucleus test was applied. Micronucleus analyses were carried out before the treatment, 24, 48 and 96 hours after the oral application of radiopharmaceutic.

The number of micronucleus is showing increase, depending on applied radioactivity of iodine-131 and duration of exposition. The clear dose response relationship was never found. These results illustrate the problem associated with the inhomogenous distribution of dose which results from the concentration of incorporated radionuclide into thyroid or other tissues.



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V38 DETECTION OF RADIOIODINE-INDUCED CYTOGENETIC ALTERATIONS IN CIRCULATING LYMPHOCYTES OF THYROID PATIENTS

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Radioiodines are often used for experimental purposes and for diagnosis and therapy in clinical practice. Human population might also be exposed to radioiodines in nuclear accidents. The ionizing energy of radioiodine affects not only the thyroid where it concentrates but also other tissues, especially the lymphocytes during their circulation through and around the gland containing the radioisotopes. Therefore, it seemed to be of interest to carry out investigations concerning the cytogenetic alterations in blood lymphocytes of patients treated with Iodine-131. The method of choice was the relatively easily performable micronucleus assay in cytokinesis-blocked cultures of human peripheral lymphocytes. The test was performed on blood samples of 30 patients before the radioisotope treatment and one, two and four days afterone as well as 6 and - in a few cases - 12 weeks later. The amounts of Iodine-131 injected were dependent on the clinical practices to reach the therapeutic radiation doses for hyperthyroidism and adenomas and were in the range of 220 and 5180 MBq. it was observed that the micronucleus frequency increased in the treated hyperthyroid patients while in patients with toxic adenomas the radioiodine did not result in an increase or even as compared to the pretreatment values in a few cases decreased values were seen. The results suggest individual differences in radiosensitivity as well as that the frequency of cytogenetic alterations depend on the physiological or pathological conditions of the thyroid. The significance of this observation will be discussed for dose assessments by cytogenetic techniques due to internal radioiodine.



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V39 NGA/INSULIN RECEPTOR SCANNING

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^{99m}Tc-galactosyl-neoglycoalbumin (NGA) is one of the first receptor-based radiopharmaceuticals which specifically recognizes the hepatic binding protein (HBP) located on the surface of the hepatocytes. The exclusive interaction of NGA with HBP provided the basis for a kinetic model for the evaluation hepatocellular function. During the last years we have used NGA in more than 300 patients with various liver diseases including liver cirrhosis (Stages Child A to Child C), viral hepatitis, and carcinomas. In these studies, the calculated HBP densities, after i.v.-injection of ^{99m}Tc-NGA, significantly correlated with the clinical course of the diseases. Furthermore, similar to conventional Tc-colloid, NGA provided excellent demonstration of "cold spots" for hepatic masses. In a further approach we used another hepatocyte receptor-seeking radioligand, ¹²⁵I-Tyr-A14-insulin, and found, that its in vitro-binding to hepatocellular carcinomas is greatly enhanced over normal hepatic tissue. On this basis, we developed a double-tracer method using NGA and insulin in a single study. Thus, areas of "cold spots" identifying hepatic masses on NGA scans, take up ¹²⁵I-Tyr-A14-insulin immediately after i.v.-injection. This was true for hepatocellular hepatomas, but not for adenocarcinomas. In conclusion, NGA/insulin receptor scanning could be a novel and save method for the demonstration of hepatocellular hepatomas.



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V40 COMPARISON OF SPECT AND WHOLE-BODY PLANAR IMAGING IN RADIOIMMUNOSCINTIGRAPHY WITH Tc-LABELED ANTIBODIES

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The authors of some recent clinical studies suggested 20-24 hours SPECT imaging as a mandatory procedure in radioimmunoscintigraphy with Tc-labeled antibodies.

The aim of our study was to compare whole-body (WB) planar imaging versus SPECT as well as 4-6 hours SPECT to 20-24 hours one.

For this purpose we analyzed 33 lesions in 12 postsurgical patients with colorectal carcinoma. Each patient received intravenously 0.5-1.0 mg anti-CEA BW 431/26 murine monoclonal IgG-antibodies labeled with Tc-99m (814-1110 MBq). WB and SPECT imaging were performed at 4-6 and 20-24 hours post infusion.

20-24 hours WB scan imaged more "hot" and less "cold" lesions than 4-6 hours one. SPECT scan showed significantly more lesions than WB scan. 20-24 hours SPECT scan detected more "hot" lesions than 4-6 hours SPECT. At the same time the number of "cold" lesions decreased in 20-24 hours SPECT in comparison to 4-6 hours one.

As a conclusion we can say that our results suggest a superiority of SPECT imaging in comparison to WB scan. Except that, in our opinion performing of a 20-24 hours SPECT scan in radioimmunoscintigraphy with Tc-labeled antibodies should be mandatory.



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