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# НОВЫЕ ТЕХНОЛОГИИ ЛУЧЕВОЙ ДИАГНОСТИКИ И ЛЕЧЕНИЯ



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$^{125}\text{I}$   
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foci were in the peripheral zone and on T2-weighted images (WI) were visualized as areas of reduced MR signal with fuzzy contours. After irradiation in a delayed period (after 6–12 months), atrophy and fibrotic changes occurred in the structure of the prostate gland, which led to a decrease in its size, uneven contours, and loss of normal zonal anatomy. On T2-WI, this manifested itself as a diffuse decrease in signal intensity and the impossibility of differentiation of the peripheral, central, and transient zones of the gland. The volume of seminal vesicles also decreased, their walls thickened due to fibrotic changes. In patients who were irradiated to the prostate gland and separately to the lymph nodes of the small pelvis, tomography in the delayed period (after 6–12 months) remained moderate swelling of the cellular tissue of the small pelvis, perineal muscles, and a decrease in the lymph nodes was detected.

After irradiation in the delayed period, atrophy and fibrotic changes occur in the structure of the prostate gland, which leads to a decrease in its size, uneven contours, and the inability to differentiate zonal anatomy on T2-WI. After radiation therapy, the intensity of the MR signal from the tumor on diffusion-weighted images with a high b-factor decreases, the difference in the measured diffusion coefficient

of the peripheral, transient zones and the tumor is almost leveled. After radiation therapy, the hypervascularity of the tumor progressively decreases, therefore, in the delayed period, in most cases, the 3rd type of contrast curve is observed with dynamic contrast enhancement. In general, MRI gives results consistent with the dynamics of the serum level of prostate-specific antigen. Before radiation treatment in all PC foci, the second type of contrast enhancement was observed (a curve of the «plateau» type - rapid accumulation and long-term retention of contrast by the tissue), due to the hypervascularity of the tumor. In patients undergoing radiation therapy, in the delayed period, predominantly (in 78% of cases), the third type of contrast enhancement was observed (slow increase - slow accumulation of the contrast agent), which is caused by post-radiation fibrosis. However, in one patient after radiation therapy, tomography showed signs of local progression without signs of biochemical progression.

**Conclusions.** Magnetic resonance imaging can be used as a method for early diagnosis of local recurrence of prostate cancer after external beam radiation therapy, but its clinical significance requires further study.

## MULTIPARAMETRIC MRI IN THE STAGING AND DYNAMICS OF CERVICAL CANCER

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**Introduction.** Cervical cancer (CC) ranks fourth in the structure of malignant neoplasms in women. Middle age of patients with CC is 49 years. The highest incidence rates in observed in the age group of 35–54 years - 49.9%. Until recently, following the 2009 FIGO guidelines, cervical cancer staging was based primarily on clinical examination. However, clinical staging is limited in assessing size, parametric tissue invasion, and regional lymph nodes that play an important role in treatment planning and prognosis. Currently, MRI is the «gold standard» in the staging of invasive, morphologically verified CC in IB1–IV stages. Possibilities of MRI in the diagnosis of microinvasive cervical cancer, i.e. tumors with 3–5 mm depth invasion are not so unambiguous and require further study. According to a number of authors, the use of such new techniques, T2WI with high resolution, DWI with construction of ADC maps and DCE-MRI will eventually solve this problem. By MRI staging of CC Ia1–Ia2 stages is difficult.

**Purpose of the study.** To improve the accuracy of MRI in the diagnosis of cervical cancer, including microinvasive, continued growth or disease recurrence after treatment using multiparametric MRI.

**Materials and methods.** 60 patients with cervical cancer, who were under examination at the RSPMC were observed. The studies were carried out on MRI with 1.5T and 3.0T. The mpMRI technique of the cervix included a number of MR sequences: High-resolution T2WI with and without fat suppression in three orthogonal projections, DWI at different levels of b-factor = 0, 800 and 1000 with the construction of ADC maps and dynamic MRI with contrast enhancement, which assumed the performance of T1VI before and after intravenous administration of contrast and measurement

signal intensity in the area of interest depending on the time after intravenous 1.0 molar «Gadovist» at a dose of 0.1 ml/kg patient weight.

**Results.** Two groups of patients with CC were identified: Group I - amounted to 40 patients before chemo-radiotherapy («primary») with Ib–IV stages; II group - amounted to 20 patients 9 months after chemo-radiotherapy with IIB–IV stages. For I group of patients «primary tumor» in DCE-MRI was characterized by hypovascular type of accumulation of MR-contrast preparation. In group II, when residual tumors in DCE-MRI - hypervascular type of accumulation. Areas of increased signal on T2WI, reduced signal on DWI and accordingly, reduced signal on ADC maps, and also actively increasing signal in the first minute after the introduction of contrast (wash-in) with its subsequent decrease in 3D T1WI TWIST due to washing out of the preparation (wash-out) were considered suspicious. Areas of decreased signal on T2WI, with no significant changes on DWI and ADC maps, with a gradual significant slow change in the signal on all 3D T1WI TWIST series after the introduction contrast were considered unsuspecting.

**Conclusions.** Multiparametric MRI allows to clarify the stage of CC, including tumor size, parametrial invasion, spread to adjacent organs and pelvic walls, regional lymph nodes, the presence of distant metastases, plan surgical and/or chemo-radiation treatment, predict and evaluate its effectiveness, to diagnose local recurrence of the disease after treatment. This approach can also significantly improve the accuracy, specificity and sensitivity in detecting microinvasive cervical cancer Ia1–Ia2 and, in fact, improve the prognosis of the disease.

## MULTISPIRAL COMPUTED TOMOGRAPHY IN THE DIAGNOSIS OF SPONTANEOUS NAZAL LIQUORRHEA

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**Objective.** Multiple computed tomography (CT) scans during disease monitoring are a risk factor for the development of radioinduced neoplasms. In oncological

patients, the number of such studies reaches 6 during the year, which determines the relevance of the search for new approaches to conducting CT.

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