



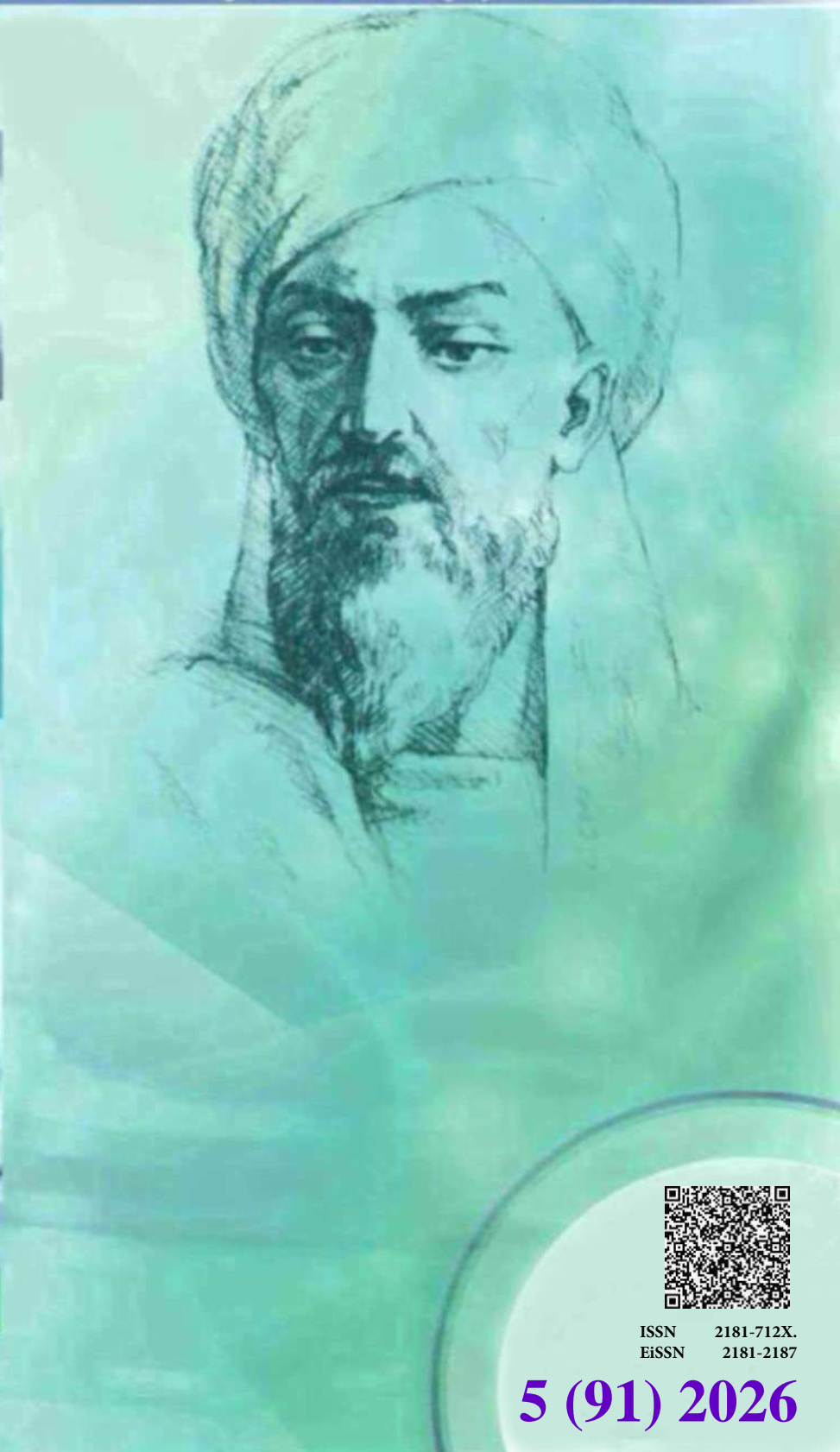
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**ТИББИЁТДА ЯНГИ КУН
НОВЫЙ ДЕНЬ В МЕДИЦИНЕ
NEW DAY IN MEDICINE**

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SONOELASTOGRAPHY IN THE DIAGNOSIS OF ENDOMETRIAL CANCER

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✓ Resume

The diagnostic value of multiparametric ultrasound in diagnosing endometrial cancer progression was studied and determined. Ultrasound criteria for the complete therapeutic effect of endometrial cancer after combined radiation and chemotherapy were identified.

Keywords: ultrasound examination, uterine cancer, radiation and chemotherapy.

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✓ Rezyume

Endometriyal saraton rivojlanishini tashxislashda ko'p parametrlil ultratovush tekshiruvining diagnostik qiymati o'rganildi va aniqlandi. Birgalikda nurlanish va kimyoterapiyadan so'ng endometriyal saratonning to'liq terapevtik ta'siri uchun ultratovush mezonlari aniqlandi.

Kalit so'zlar: ultratovush tekshiruvi, bachadon saratoni, nurlanish va kimyoterapiya.

СОНОЭЛАСТОГРАФИЯ В ДИАГНОСТИКЕ РАКА ЭНДОМЕТРИЯ

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✓ Резюме

Изучена и определена диагностическая информативность мультипараметрического ультразвукового исследования в диагностике прогрессирования рака тела матки. Выявлены ультразвуковые критерии полного лечебного эффекта рака тела матки после сочетанной лучевой и химиотерапии.

Ключевые слова: ультразвуковое исследования, рака тела матки, лучевая и химиотерапия.

Relevance

Due to the increasing incidence of uterine cancer (UBC), a pressing issue in gynecological oncology is the diagnosis and treatment of recurrent disease in this category of patients. The prevalence of cervical cancer has increased significantly in recent years, and this pathology ranks second in the structure of gynecological oncology pathology and fifth in the structure of all tumors in women [1,3,5,7,9, 12]. UBC ranks sixth in the structure of overall oncological morbidity in women [2,4,6,8,10]. The main cause of death in patients with UBC is the occurrence of disease recurrence. According to the

authors, cervical cancer relapses most often (62.3%) occur in the first eighteen months after completion of treatment for the primary tumor, relapse was noted in 20.3% of patients within 19 to 24 months, and after 2 years - in 9.7% of patients with cervical cancer. The most frequently diagnosed cervical cancer relapses are local relapses and metastases in the pelvic tissue and vaginal wall [4,7,17]. Despite the fact that cervical cancer has a fairly high cure rate, the recurrence rate at stage I is 15.9%, and at stage II – 30.1% [3,11,13,15]. The quality and life expectancy of patients with cervical cancer and cervical cancer directly depend on timely diagnosis and early detection of disease relapses. To date, there are no clear ultrasound criteria in the specialized literature that allow for the early diagnosis of cervical cancer relapses, which is necessary for choosing the correct management tactics for this category of patients. Moreover, there are isolated studies on the application of modern technologies in this problem. A number of authors recommend diffusion-weighted magnetic resonance imaging (MRI) as the optimal method for diagnosing cervical cancer relapses (sensitivity – 97%, specificity – 91%, accuracy – 93%, positive predictive value – 94% and negative predictive value – 95%) [4,12,16]. However, the use of MRI, especially for follow-up, has a significant drawback: the high cost of the examination, which does not always allow for the frequent use of this diagnostic method as necessary for follow-up examinations of cancer patients. Ultrasound occupies a leading position in modern gynecologic oncology due to its advantages, such as its non-invasiveness, safety, the possibility of repeated examinations, and affordability.

The advent of new technologies, such as color Doppler mapping and elastography, have improved the quality of diagnostics. Nevertheless, a number of unresolved issues remain regarding the follow-up of patients during and after surgical and radiation treatment for tumours. The role of ultrasound in the diagnosis of tumour recurrence and metastasis remains unclear. Current literature lacks clear ultrasound criteria for diagnosing tumour recurrence and metastasis and for differential diagnosis with postoperative changes using modern ultrasound technologies.

Purpose of the study: improving early diagnosis of recurrence and progression of uterine cancer after surgical and radiation treatment using modern ultrasound technologies.

Materials and methods

To achieve the objectives, we analyzed and processed the results of examinations of 135 patients treated at the Kharezm Oncology Center between 2022 and 2025. Uterine cancer (134 patients) and primary multiple cervical cancer (PCMC) (1 patient) were diagnosed. The patients' ages ranged from 30 to 77 years, with an average age of 57.8 ± 3.2 years. The median recurrence time in patients diagnosed with PCMC and regional metastases was 11.8 months. Half of the patients with criterion N1 relapsed within the first year after treatment, and the other half within the second year. This suggests that more active monitoring is necessary for this category of patients to promptly detect disease progression. Criterion M was diagnosed in two patients diagnosed with cervical cancer, in whom relapse developed 6 and 7 months after treatment. According to the results of a multivariate analysis, adverse factors significantly associated with the timing of cervical cancer and cervical mucosal cancer recurrence were the presence of the initial criteria N1 and M1 ($p=0.007$) and the treatment site ($p=0.03$). In 100% of cases, local tumor recurrence was confirmed morphologically: in 98 cases, by cytological examination of smears from the periosteal region and in 6 cases, by morphological examination of surgical specimens. In 5 cases (8.7%), a puncture biopsy of the retroperitoneal lymph nodes was performed with subsequent verification. In 16 cases (27.2%), when visualizing metastatic changes in the retroperitoneal lymph nodes, the ultrasound findings were confirmed by other imaging methods. Ultrasound examinations were performed using Siemens S2000, Toshiba Aplio, Hitachi Ascendus, and Hitachi Arietta V70 systems with software for CEG, color Doppler imaging, endoscopy, and CEUS. Patients were examined in real time using multifrequency transducers, namely a convex transducer with a frequency of 1.8-7.5 MHz, a transvaginal transducer with a frequency of 3.5-8 MHz, and a linear transducer with a frequency of 5-15 MHz. Comprehensive ultrasound diagnostics included examination of the abdominal organs, retroperitoneal space, pelvis, and regional lymph nodes according to a developed algorithm at specific time points: before treatment, one month, three and six months after treatment, and one, one and a half, two, and three or more years after treatment. Scanning in standard B-mode in two projections (transverse and longitudinal) transabdominally during examination of the abdominal organs and retroperitoneal space made it possible to assess the condition of the internal

organs, parietal and visceral peritoneum, greater omentum, intraperitoneal and retroperitoneal lymph nodes, their topographic relationship, identify the presence of metastases and the extent of spread of the disease during the initial examination, and evaluate the effectiveness of the therapy during dynamic observation.

Results and discussion

Our experience has shown that transvaginal ultrasound should begin at the vaginal introitus and anal ring to assess the vaginal walls, paravaginal, mesorectal tissue, and paraurethral area. The examination was performed through the anterior and posterior vaginal fornix. Regional lymph nodes (cervicosupraclavicular and inguinal) were examined using multiple projections, analyzing their echo structure, shape, contours, anatomical layers, size, and degree of vascularization. We examined 9 (4.5%) patients diagnosed with RTM using contrast-enhanced ultrasound. Focal liver lesions were detected in 5 of these patients during treatment effectiveness monitoring. Four patients underwent contrast-enhanced ultrasound of the cervix and retroperitoneal lymph nodes at 1 and 3 months after completion of treatment. According to the morphological variant, squamous cell carcinoma with keratinization was diagnosed in 4 patients (1.9%), squamous cell carcinoma without keratinization in 3 patients (1.4%), and glandular squamous cell carcinoma in 2 patients (0.9%). During the monitoring of the treatment effectiveness, focal lesions in the liver were detected in 5 patients. Following the examination in gray-scale mode, a decision was made to conduct an additional examination in contrast-enhanced mode to evaluate the nature of the accumulation and washout of microbubbles in all 3 phases in the liver parenchyma and the identified foci. Our results are consistent with the experience accumulated by foreign specialists. With contrast-enhanced ultrasound, in 3 patients, closer to the portal phase, foci determined in gray-scale mode became hypoechoic at 38-40 seconds and completely anechoic by the late phase (at 120 seconds).

According to international experience [2,3], a specific sign of metastatic liver disease is anechoicity of focal lesions in the venous and late phases of the study. A similar picture was obtained by us using ultrasound with contrast enhancement. In one observation, a new lesion was detected in contrast enhancement mode, not determined in B mode. In 1 patient, hyperechoic lesions were visualized throughout the arterial phase, which at 40 seconds in the portal phase became isoechoic, comparable with the echogenicity of the liver parenchyma and remained stably unchanged in structure throughout the late phase. In 2 observations, ultrasound with contrast enhancement allowed us to clarify the benign nature of the focal changes detected in the liver. Severe hyperperfusion in the arterial phase and visualization of an iso- or hyperechoic lesion in the portal and late phases [1]. A similar pattern of contrast agent accumulation and washout, according to foreign authors [17], corresponds to nodular hyperplasia. In one case, a hyperechoic lesion detected by us in grayscale mode, with contrast enhancement in the arterial phase, was characterized by peripheral accumulation of microbubbles in a centripetal direction, and in the venous and late phases by partial or complete filling with microbubbles, which is typical of hemangioma. Our findings confirmed the results of MRI with intravenous contrast. During ultrasound examination of the pelvic organs in patients diagnosed with cervical cancer, in order to evaluate the effectiveness of the treatment, we used the contrast enhancement mode in 4 cases at 1 and 3 months after the end of treatment (during dynamic observation). Since cervical cancer is characterized by pronounced hypervascularization, the dynamics after treatment could be judged by its degree of severity and the rate of accumulation and washout of the contrast agent. To improve visualization, we used the MC-MTI option. Grayscale imaging demonstrated complete therapeutic response in the cervix in two cases after three months; however, in one case, a tumor conglomerate was visualized in the iliac lymph nodes. Contrast-enhanced ultrasound showed limited tumor accumulation in the unchanged cervix throughout the entire study, with a predominantly isoechoic structure uniform with the uterine body.

During contrast-enhanced ultrasound of the retroperitoneal lymph nodes in the arterial phase, contrast accumulation began at 18 seconds in a lymph node conglomerate posterior to the right external iliac vessels. At 43 seconds, at the beginning of the venous phase, hypoechoic foci appeared in its structure, clearly visible against a background of circulating microbubbles in the iliac vessels. In the late phase, as a result of gradual washout of the microbubbles, closer to the 6th minute, the detected conglomerate became almost completely anechoic against a background of preserved microbubbles in the iliac vessels. It should be noted that when using contrast-enhanced ultrasound, the size of the tumor conglomerate exceeded that determined in grayscale mode. Thus, the use of contrast-enhanced ultrasound in patients diagnosed with cervical cancer allows for a more detailed study of the tumor structure and its spread. However, due to the small number of cases, it is difficult to draw conclusions about the value of this technique for improving the quality of cervical cancer diagnostics. Contrast-enhanced ultrasound should be considered as a promising method for further study.

Conclusion

1. The most significant ultrasound features for differentiating local recurrences of uterine cancer from postoperative changes are: local hyperechoic inclusions in the vaginal stump wall ($p=0.003$), absence of local hypervascularization ($p=0.002$), elastotype II, and a stiffness coefficient of 0.9 ± 0.05 ($p<0.05$).

2. Thus, multiparametric ultrasound is a highly informative method for the early diagnosis of uterine cancer recurrence after surgical treatment. The use of standard ultrasound in combination with elastography in monitoring the effectiveness of combined radiation therapy and chemoradiation therapy is entirely justified, as it allows for the timely detection of signs of disease progression or the confirmation of a complete therapeutic effect.

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