СПИСОК ИСПОЛЬЗОВАННОЙ ЛИТЕРАТУРЫ

1. *Лазаревич, А. А.* Синдром гетеротаксии у плодов в первом триместре беременности / А. А. Лазаревич // Forcipe. – 2022. – Т. 5, № S2. – С. 294–295.

2. *Ермакова, И. А.* Патология сердца у детей с различными вариантами синдрома гетеротаксии / И. А. Ермакова // Научно-практическая подготовка ординаторов – основа здоровья населения : Материалы II Всероссийского конгресса ординаторов медицинских вузов, Санкт-Петербург, 29–30 мая 2024 года. – Санкт-Петербург : Санкт-Петербургский государственный педиатрический медицинский университет, 2024. – С. 392–393.

3. *Жуков, И. В.* Пренатальная диагностика синдрома гетеротаксии с полисплением в сочетании с агенезией венозного протока и гипоплазией тимуса / И. В. Жуков, Л. Т. Николаев // Ультразвуковая и функциональная диагностика. – 2009. – № 6. – С. 95–100.

4. Loss-of-function mutations in the EGF-CFC gene CFC1 are associated with human left-right laterality defects / R. N. Bamford, E. Roessler, R. D. Burdine [et al.]. // Nat. Genet, 2000.

УДК 618.14-006.6:611.018.21]:57.085.23

O. A. Uyokpeyi, I. I. Slepokurova, A. Farooq

Scientific Supervisor: PhD, Associate Professor D. A. Zinovkin

Educational Establishment
«Gomel State Medical University»
Gomel, Republic of Belarus

CD31+ VESSEL DENSITY AND VASCULOGENIC MIMICRY AS PROGNOSTIC BIOMARKERS IN ENDOMETRIOID ADENOCARCINOMA

Introduction

Micro vessel function in endometrial endometrioid adenocarcinoma (EA) is becoming more widely acknowledged as a significant determinant of cancer outcome. Micro vessels are tiny blood vessels that give tumors oxygen and nutrition. They are important for tumor growth, metastasis, and overall patient outcomes [1].

The process of angiogenesis, which creates new blood vessels from preexisting ones, is largely indicated by micro vessel density (MVD). Higher MVD has been linked to worse disease-specific survival and disease-free survival in different types of endometrial cancer. Tumors with elevated MVD frequently behave aggressively, according to studies, which increases the likelihood of metastasis and recurrence [1]. The growth and metastasis of tumors are facilitated by micro vessels, which give the tumor cells oxygen and nourishment. Tumor progression can result from cancer cells invading surrounding tissues with the help of micro vessels [2].

Goal

The aim of this study was to evaluate the role of vasculogenic mimicry (VM) and CD31+ MVD in the progression and prognosis of EA.

Material and methods of research

A total of 188 cases of endometrioid adenocarcinoma of the uterine body were selected for analysis. Patients were categorized into two outcome groups: 40 patients who experienced disease recurrence or succumbed to disease progression were assigned to the unfavorable outcome group, while 148 patients without tumor progression or disease-related mortality were placed in the favorable outcome group. The number of vessels per 1mm² in VM and CD31+ micro vessels was quantified in five non-overlapping high-power fields at ×400 magnification using the MVD analyzer. Comparisons between study groups were conducted using the Mann-Whitney test and Fisher's exact test. ROC analysis was performed to determine the confidence interval (CI) and the area under the ROC curve. Progression-free survival was assessed using the Mantel-Cox test.

The results of the research and their discussion

Vasculogenic mimicry (VM) in both groups was observed in a tubular form. In the unfavorable outcome group, VM structures were located within the tumor stroma among "typical" blood vessels, forming an extensive vascular network. In contrast, most cases in the favorable outcome group predominantly exhibited clusters of CD31+ vessels. A statistically significant difference ($p<0.0001$) was found, with VM being more frequently observed in the unfavorable outcome group (34/40) compared to the favorable outcome group. Progression-free survival was significantly lower ($p<0.0001$) in patients with endometrioid adenocarcinoma (EA) who had VM vessels/mm².

In the unfavorable outcome group, a large number of CD31–positive thin-walled, irregularly shaped micro vessels with mild endothelial atypia were observed within the cancer stroma. In contrast, in the favorable outcome group, CD31–positive micro vessels were predominantly thick-walled, oval-shaped, and exhibited only slight endothelial atypia. A significantly greater number of CD31+ vessels was detected in the unfavorable outcome group compared to the favorable outcome group ($p<0.0001$). ROC analysis of CD31+ vessel counts showed an area under the curve of 92.3% (95% CI: 88.4–91.3; $p<0.0001$). The sensitivity was 75.2% (95% CI: 63.0–83.1), specificity was 91.4% (95% CI: 81.1–99.9), and the threshold value was 74.1 vessels/mm². Progression-free survival was significantly lower ($p<0.0001$) in patients with EA who had more than 74.1 CD31+ vessels/mm².

Our findings indicate that vasculogenic mimicry (VM) plays a significant role in the progression of endometrioid adenocarcinoma (EA). The higher prevalence of VM in the unfavorable outcome group suggests that VM contributes to tumor aggressiveness, likely by providing an alternative blood supply independent of endothelial-lined vessels [3]. This mechanism may enhance tumor survival, invasion, and resistance to standard anti-angiogenic therapies, which primarily target endothelial cell-dependent vasculature. The significant association between increased VM density and lower progression-free survival further supports its potential as a prognostic marker in EA.

The observed differences in CD31 – positive micro vessels between the two outcome groups highlight the role of tumor angiogenesis in disease progression. The unfavorable outcome group exhibited a significantly higher density of thin-walled, irregularly shaped CD31+ vessels with mild endothelial atypia, indicative of a poorly structured and unstable vascular network. Such abnormal vasculature has been associated with increased hypoxia, tumor cell dissemination, and a more aggressive tumor phenotype. In contrast, the favorable outcome group displayed predominantly thick-walled, well-formed micro vessels with slight atypia, suggesting a more organized and less aggressive angiogenic process.

ROC analysis of CD31+ vessel counts further reinforces the prognostic value of angiogenesis in EA. The high area under the curve (92.3%) demonstrates the strong discriminatory power of this parameter in distinguishing patients with favorable versus unfavorable outcomes. The high specificity (91.4%) suggests that elevated CD31+ vessel density is a reliable indicator of poor prognosis, while the moderate sensitivity (75.2%) indicates that not all high-risk patients will be captured using this marker alone. Nevertheless, the identified threshold of 74.1 vessels/mm² provides a clinically relevant cutoff for risk stratification.

The significant association between increased CD31+ vessel density and lower progression-free survival suggests that excessive microvascular proliferation contributes to a more aggressive disease course. This finding underscores the importance of angiogenesis in EA progression and highlights the potential for anti-angiogenic strategies as therapeutic interventions. Future studies should further explore the functional role of these vascular alterations and investigate whether targeting both VM and endothelial-dependent angiogenesis could improve patient outcomes.

Conclusions

Overall, our results support the use of VM and CD31+ vessel density as potential prognostic markers in EA. Their integration into clinical decision-making may enhance risk assessment and guide personalized treatment approaches.

LITERATURE

1. *Eminovic, S.* Blood Vessel Invasion Is an Independent Prognostic Factor in Endometrial Endometrioid Carcinoma Compared to Lymph Vessel Invasion and Myometrial Invasion Pattern / S. Eminovic, Emina Babarovic. – MPDI. – URL: https://www.mdpi.com/2072-6694/16/13/2385. (date of access :14.03.2025).

2. *Carmelit, P.* Angiogenesis in cancer and other diseases / P. Carmelit, R. K. Jain. – Pub med. – URL: https://pubmed.ncbi.nlm.nih.gov/11001068/. (date of access :15.03.2025).

3. Endometrial Cancer Treatment // National Cancer Institute. – URL: https://www.cancer.gov/types/uterine/hp/endometrial-treatment-pdq. (date of access:14.03.2025).

4. *Otero-Garcia, M. M.* Role of MRI in staging and follow-up of endometrial and cervical cancer: pitfalls and mimickers / M. M. Otero-Garcia, A. Mesa-Alvarez, O. Nikolic / SpringerOpen. – URL: https://insightsimaging.springeropen.com/articles/10.1186/s13244-019-0696-8. (date of access:13.03.2025).

УДК 618.14-002-006.6-037-084

A. Errati, K. Rishitha

Scientific supervisor: M D, Ph D G. V. Tishchenko

Educational Establishment
«Gomel State Medical University»
Gomel, Republic of Belarus

ENDOMETRIAL CARCINOMAS: MOLECULAR ABERRATIONS, RISK FACTORS, AND PREVENTIVE STRATEGIES

Introduction

Uterine corpus cancer is the most common gynecologic malignancy in the U. S., with over 66,000 new cases projected in 2023. The majority of cases are endometrial carcinomas, classified as type 1 (endometrioid) or type 2 (serous/clear cell). Clinical presentation typically includes abnormal uterine bleeding and pelvic pain, with management involving surgical staging and adjuvant therapies for advanced disease.

Advances in the understanding of endometrial carcinoma have elucidated key molecular mechanisms underlying its pathogenesis. Type 1 carcinomas are strongly associated with prolonged estrogen exposure unopposed by progesterone, leading to endometrial hyperplasia and malignant transformation. Key mutations in PTEN, KRAS2, and microsatellite instability – particularly in cases linked to Lynch syndrome – highlight the molecular heterogeneity of this subtype. In contrast, type 2 carcinomas are more aggressive and arise independently of hormonal influences, often exhibiting TP53 mutations and HER2/neu overexpression, necessitating distinct therapeutic approaches.

Preventive strategies such as hormonal contraceptive use and intrauterine devices have demonstrated protective effects, particularly in high-risk populations. Lifestyle factors, including obesity, early menarche, and polycystic ovary syndrome, remain critical areas for intervention. Notably, coffee consumption has been associated with reduced endometrial cancer risk, although further studies are warranted to confirm these findings.

Recent advancements in molecular subclassification and clinicopathological evaluation have facilitated personalized treatment strategies. The 2023 updates to staging criteria emphasize lymphovascular invasion as a key prognostic factor, underscoring the importance of precise surgical and pathological assessment. While aggressive histologic subtypes, such as serous and