pathways can identify precancerous lesions and malignancy; however, screening effectiveness is highly dependent on completion of diagnostic follow-up, particularly timely colonoscopy after a positive FIT. In contrast, prostate cancer screening remains predominantly opportunistic with limited consolidated national reporting of screening yield and linkage to staging outcomes, restricting robust evaluation of program impact.

Overall, the combined evidence across breast, cervical, colorectal, and prostate cancers indicates that Iran's current screening landscape is characterized by partial coverage, regional inequity, and incomplete outcome linkage. Strengthening organized screening delivery–along with standardized reporting of test results, diagnostic confirmation, and stage at diagnosis–represents a priority pathway to improve early detection and to generate measurable reductions in avoidable cancer morbidity and mortality.

Conclusions

Cancer screening in Iran (2015–2025) has expanded but remains insufficient and inequitable, with coverage below recommended targets. Screening is associated with earlier-stage diagnosis, yet program impact is limited by lack of registry linkage and incomplete diagnostic follow-up. Implementing organized, registry-based screening with equitable access and standardized follow-up is essential to improve early detection and reduce avoidable cancer mortality.

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CORRELATION BETWEEN LUMINAL SUBTYPES, IMMUNOHISTOCHEMICAL BIOMARKERS, AND NOTTINGHOM GRADING SYSTEM IN BREAST CANCER

Introduction

Breast cancer, a malignant neoplasm originating from the epithelial cells of the mammary ducts or lobules, remains the most prevalent oncological pathology among the female population worldwide, serving as a primary indicator of the systemic challenges facing modern medicine [1]. Clinically, the disease is classified primarily through the TNM system and molecular subtyping – encompassing Luminal A/B, HER2-enriched, and Triple-Negative phenotypes – which dictates the therapeutic strategy [2]. While current clinical practice in Belarus relies heavily on standardized protocols – incorporating surgical resection, radiotherapy, and systemic therapy based on traditional staging – there remains a critical gap in refining prognostic accuracy. This research posits that the integration of the Nottingham Grading System with specific immunohistochemical (IHC) biomarkers and molecular luminal subtyping is essential for overcoming these diagnostic

limitations. By establishing a robust correlation between these parameters, clinicians can better predict tumor aggressiveness and therapeutic response, moving beyond the limitations of current histopathological assessments [3]. Addressing this correlation is not merely an academic exercise; it is a vital step toward modernizing the Belarusian diagnostic framework. By enhancing our ability to stratify risk through these molecular and histological markers, we can improve patient outcomes and optimize resource allocation, while simultaneously fostering nationwide awareness campaigns that emphasize the necessity of early, biologically-informed screening over generalized diagnostic procedures [4].

Goal

This study aims to evaluate the correlation between molecular luminal subtypes, progesterone receptors, estrogen receptors, HER2 proteins, ki-67 proliferation Index and Nottingham histological grading system**.**

Material and methods of research

The statistical analysis of the studied data was carried out in the Oncology department of the Gomel Regional Oncology Dispensary. A total of 75 breast cancer patients were analyzed in this study; 23 patients were in remission period and 52 patients were newly diagnosed at the Gomel Regional Oncology Dispensary of year 2025. When analyzing the medical records, histopathological classification, molecular classification, Immunohistochemical biomarkers, Nottingham grading system were taken into consideration.

The results of the research and their discussion

Out of 75 patients, the demographic analysis revealed a predominant distribution of post-menopausal cases (83%, n=62) compared to premenopausal cases (17%, n=13).

Histopathological evaluation showed that all of the cases were invasive type of breast cancers. Out of 75 cases of invasive breast cancers, 43% (n=32) were invasive ductal cancer, 32% (n=24) were invasive lobular cancer, 5% (n=4) were invasive mucinous adenocarcinoma, 4% (n=3) were invasive micropappilary carcinoma, 13% (n=10) were invasive nonspecific cancer and 3% (n=2) were invasive tubular adenocarcinoma. Molecular evaluation showed that, 56% (n=42) of patients have luminal A type cancer, 37% (n=28) were luminal B type cancer (n=22 were luminal B/HER2negative and n=6 were luminal B/ HER2positive type of cancer), 4% (n=3) were HER2positive cancer and 3% (n=2) have Basal like/ Triple-Negative type of cancer. So, 93% (n=70) were identified as Luminal subtypes and 7% (n=5) were non luminal subtypes.

Table 1 – Number of cases based on Immunohistochemical biomarker analysis of luminal breast cancer patients. (An additional 5 patients were excluded from the luminal analysis as they were ERnegative and PRnegative)

Immunohistochemical biomarkers	Luminal A (n=42)	Luminal B (n=28)
PR (+) (n=60)	n=39	n=21
PR (-) (n=15)	n=3	n=7
ER (+) (n=70)	n=42	n=28
ER (-) (n=5)	n=0	n=0
HER2 (+) (n=9)	n=0	n=6
HER2(-) (n=66)	n=42	n=22
Ki-67 (below 20%) (n=34) (low proliferation)	n=34	n=0
Ki-67 (20% and above) (n=41) (high proliferation)	n=8	n=28

According to the table 1, out of 42 cases of luminal A cancers, 93% (n=39) were PR(+) while 7% (n=3) were PR(-) and 100% (n=42) were ER(+) while, 0% (n=0) were ER(-). This shows that luminal A type breast cancers are strongly positive for both estrogen and progesterone receptors and these cancers are highly hormone-driven.

Out of 28 cases of luminal B cancers 75% (n=21) were PR(+) while 25% (n=7) were PR(-) and 100% (n=28) were ER(+) while 0% (n=0) were ER(-). This shows that luminal B type breast cancers are also typically positive for both estrogen and progesterone receptors.

Our study revealed that the both luminal groups are 100% sensitive for estrogen receptors while it showed a significant difference in progesterone receptor expression between the two luminal groups. 93% of luminal A patients-maintained PR positively, whereas PR expression dropped to 75% in luminal B group. This 18% decrease in PR expression in luminal B cases aligns with its more aggressive molecular profile. And also 25% (n=7) of luminal B patients are PR(-) while only 7% (n=3) of luminal A patients are PR(-). This proves that luminal B often "loses" its progesterone receptors comparing to luminal A, making it more aggressive.

Our study shows that luminal A is 100% (n=42) HER2 (-), while 79% (n=22) of luminal B cases are HER2 (-), and 21% (n=6) of luminal B cases are HER2 (+). Which means that luminal B cancers can be either HER2positive or HER2negative. Since all 6 of HER2positive luminal cases fell into the luminal B category, we can say that HER2 positivity is exclusive to luminal B. Furthermore, the analysis of patient records identified that 81% (n=34) of luminal A patients with low in Ki-67 (<20%) and 19% (n=8) of luminal A cases are high in ki-67 (>20%), while 100% (n=28) of luminal B cases high in ki-67 (>20%). This shows that luminal A type cancers are mostly lower ki-67 index, indicating a slower rate of cell proliferation, while luminal B cancers are higher in ki-67 index, indicating a more aggressive growth pattern.

Table 2 – Number cases based on Nottingham grading system of luminal cancer patients.

Nottingham Grading	Luminal A (n=42)	Luminal B (n=28)
G1 (n=13) (well differentiated)	n=13	n=0
G2 (n=32) (moderately differentiated)	n=29	n=3
G3 (n=30) (poorly differentiated)	n=0	n=25

Out of all luminal A cases, 31% (n=13) of cases were G1 and 69% (n=29) of cases were G2. Which means, luminal A cancers were predominantly lower grade, with 100% of cases falling into the G1 (31%) or G2 (69%) categories. This shows that if a cancer is well differentiated, it is almost certainly the less aggressive subtype. Luminal B cancers exhibited significantly more aggressive features with 89% (n=25) of cases classified as G3 and only 11% (n=3) of cases classified as G2. This shows that poorly differentiated (G3) cells always the faster growing luminal B type of non-luminal subtypes. While luminal A and B subtypes show varying degrees of differentiation, non-luminal subtypes such as Triple Negative/Basal like cancer and HER2positive cancers are characterized by a lack of hormone receptor expression and Predominantly high histological grade (G3), reflecting their aggressive biological nature.

Conclusions

Luminal subtypes demonstrate clear correlations with immunohistochemical biomarkers, proliferation index, and Nottingham histological grade. Luminal A tumors are uniformly ER positive, largely PR positive, HER2 negative, characterized by lower Ki-67 proliferation, and predominantly low to intermediate histologic grade. In contrast, luminal B tumors remain ER positive but show reduced PR expression, include the HER2-positive luminal cases, exhibit higher Ki-67 proliferation, and are predominantly high grade. Non-luminal subtypes are hormone-receptor

negative and generally high grade. Overall, loss of PR expression, elevated Ki-67, and HER2 positivity align with a more aggressive luminal B phenotype and higher Nottingham grade, while luminal A is more hormone-driven, lower proliferative, and lower grade. Immunohistochemical profiling together with Nottingham grading therefore offers complementary prognostic information and helps distinguish lower-risk from higher-risk breast cancers and helps to correctly choose the strategy of drug therapy.

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EARLY DIAGNOSIS AND MANAGEMENT OF ADULT MEDULLOBLASTOMA: CLINICAL RELEVANCE, PROGNOSTIC FACTORS, AND TREATMENT STRATEGIES

Introduction

Medulloblastoma (MBT) is a cancer that affects children primarily, but when it strikes adults, the situation is extremely rare. This rarity of the situation makes the diagnosis and treatment of the cancer more complicated in adults than in children, with the outcomes also being less satisfactory than in the case of the latter group. Therefore, the importance of the situation cannot be overemphasized by highlighting the importance of the factors that affect the outcomes and the treatment of the cancer in adults, as highlighted by the retrospective study from Belarus.

Goal

To determine the importance of the early detection and treatment of medulloblastoma among adults, identify the determinants of survival, and make informed recommendations to promote the best outcomes.

Material and methods of research

The retrospective cohort study recruited 203 adult medulloblastoma cases (ages 18 and older) diagnosed between 1980 and 2019 using data from the Belarusian cancer registry. Inclusion criteria were histologically confirmed cases of MBT with documented presentation, tumor location, histology, treatment, and follow-up.The study analyzed demographic and tumor characteristics, treatment modalities, and survival outcomes. Statistical analysis included the Shapiro-Wilk normality test, Kaplan-Meier survival analysis, Cox regression analysis of prognostic factors, and Spearman correlation analysis of age, treatment modalities, and survival outcomes. Significance was set at $p < 0.05$ using SPSS software.