ETIOPATHOGENESIS OF BLOOD CANCER DEVELOPMENT SYSTEM

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Leukemias are a group of blood diseases with a malignant nature, which begin at the level of pathological processes in hematopoietic stem cells, have clonal characteristics, and are manifested by an increase and differentiation of various degrees of heavy hematopoietic elements. They occur with a frequency of 7-8 cases per 100,000 population.

Depending on the degree of differentiation of blood-producing cells compared to normal hematopoiesis, all leukemias can be divided into acute and chronic forms. In patients with acute leukemia, a clear deviation in the differentiation of hematopoietic cells is observed before the accumulation of blasts or undifferentiated cells. In chronic leukemia, cell differentiation is preserved, and it consists of mature and immature cells.

The etiology of leukemia, like other malignancies, has been established to determine its hereditary or acquired nature, as well as to identify an event that leads to uncontrolled proliferation of one cell from one population and unlimited growth compared to another population. The role of ionizing radiation in the development of leukemia has been widely described in the literature. The frequency of occurrence of chronic myeloid leukemia, acute myeloid leukemia, acute lymphoblastic leukemia, and acute erythromyelosis is directly related to the dose of ionizing radiation exposure. Chemical substances (benzene and its derivatives, cytostatic drugs) can also cause leukemia.

The viral theory of leukemia development is also present. The Burkitt lymphoma virus has been found in humans, and viral RNA has been identified as an enzyme that helps DNA synthesis, thus forming an oncogenic virus and endosymbiosis of the host.

Thus, the development of leukemia is polyetiologic, as no unconditional cause has been identified.

Leukemia is a blood cancer. It is based on the primary pathology of hematopoietic stem cells, their proliferation and differentiation processes being disrupted, as well as the formation of pathological leukemia clones. The progressive proliferation of immature cells leads to the suppression of the normal hematopoietic process.

The development of leukemia can be described in the following forms:

- Uncontrolled and unregulated proliferation of leukemia cells.
- Disruption of apoptosis in leukemia cells.
- Loss of differentiation and maturation characteristics of leukemia cells.
- Appearance of atypical cells that do not reach the peripheral blood.

- Occurrence of extramedullary hematopoiesis and hematopoietic foci in non-hematopoietic organs and tissues (liver, spleen, lymph nodes, skin, bone marrow, etc.).

- Suppression of normal hematopoietic elements.

- Bifurcated development: monoclonal and polyclonal.

- Gradual changes in the composition of mature cells and immature cells (blasts) by mature cell populations and immature cells in chronic leukemia.

- Metabolic atypism of cells - gradual loss of enzymatic specificity of leukemia cells.

- Morphological atypism of cells - gradual disappearance of morphological characteristics - changes in nucleus and cytoplasm (large cells are replaced by irregularly shaped cells with increased nucleus and cytoplasmic area).

- Metaplasia of other organs and systems (liver, kidney, lymph nodes, skin, nervous tissue, bone).

- The most important factor in the pathogenesis of leukemia is the disruption of apoptosis processes. Apoptosis plays a role in the death of blood cells that differ from necrosis. Cells shrink, chromatin condenses and fragments, apoptotic bodies are formed, and the remains of the cell are phagocytosed by macrophages. Genes involved in apoptosis(p53 gene) and genes that regulate apoptosis (bcl-2 gene) are present.

Mutations in the p53 gene contribute to the resistance of cancer cells to cytostatic therapy. In the pathogenesis of leukemia, changes in genes play a role, and their products regulate the proliferation and differentiation of cells. Two groups of genes are present - proto-oncogenes and oncogenes.

During oncogenesis, proto-oncogenes are activated and transformed into oncogenes. Depending on their functional activity, they can be divided into four groups:

- Oncogenes that promote cell growth;

- Oncogenes that activate receptors for growth factors;

- Oncogenes that produce mediators that transmit proliferative signals from the cell surface to the nucleus;

- Oncogenes that produce proteins associated with DNA, which regulate the expression of other oncogenes and enhance DNA replication.

The activation of these oncogenes leads to increased production of oncoproteins, which can enhance proliferation, disrupt normal processes of proliferation and differentiation.

The mechanisms of oncogene activation are diverse and not well understood. The main mechanisms are chromosomal translocation and deletion. Oncogenes are usually not randomly located on chromosomes. The main types of chromosomal mutations include:

- Translocation (exchange between non-homologous chromosomes);

- Deletion (loss of part of a chromosome);

- Duplication (amplification of a region);

- Inversion (reversal of a segment by 180°);
- Insertion (insertion of a segment into a new location);
- Amplification (increase in the number of copies of a chromosome segment).

A wide range of chromosomal changes is observed in cancer cells, but some changes are specific to certain types of malignancies, including leukemia.

Thus, the development of leukemia can be schematically represented as a chain of events starting from the increased variability of normal hematopoietic cells before the occurrence of leukemia cells, which is hidden during a latent period, and a specific mutation (or mutations) occurs in one of these normal cells, leading to the development and monoclonal expansion of leukemia cells, indicating the progression of the leukemia phase in a hematopoietic compartment. Later, additional mutations occur in leukemia cells, leading to the selection of autonomous subclones with specific mutations, which contribute to the further progression and shaping of the malignant process.

REFERENCES:

1. Касимова С.А., Бабаджанова Ш.А., Курбонова З.Ч. Влияние проведения генетичеких исследований на эффективность лечения у больных острым промиелоцитарным лейкозом // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 77-80.
2. Касимова С.А., Бабаджанова Ш.А., Курбонова З.Ч. Дифференциальная диагностика острого миелобластного лейкоза и острого лимфобластного лейкоза // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 80-82.
3. Курбонова З.Ч., Бабаджанова Ш.А. Цитологик ташхисга кириш: электрон ўқув қўлланма. 2022, 146 б.
4. Курбонова З.Ч., Бабаджанова Ш.А. Цитологик ташхисга кириш: ўқув қўлланма. Тошкент, 2022. 137 б.
5. Курбонова З.Ч., Бабаджанова Ш.А. Лаборатория иши: ўқув қўлланма. 2023, 150 б.
6. Abdiraimova A.N., Shaxmurova G.A., Kurbonova Z.Ch. Leykositlarning turlari va faoliyati // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 211-213.
7. Abdiraimova A.N., Shaxmurova G.A., Kurbonova Z.Ch. Qon va qon hujayralarining faoliyati // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 216-218.
8. Babadjanova Sh.A., Курбонова З.Ч. Qon kasalliklari: o'quv qo'llanma. 2023, 156 b.
9. Babadjanova Sh.A., Kurbonova Z.Ch. Gematologiya: darslik. Toshkent – 2023, 213 b.

10. Kurbonova Z.Ch., Babadjanova Sh.A. Mieloid leykemoid reaksiyalarning klinik ahamiyati // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 275-277.

11. Kurbonova Z.Ch., Babadjanova Sh.A. Eritremiya klinik laborator diagnostikasi // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 282-285.

12. Kurbonova Z.Ch., Babadjanova Sh.A. Qon yaratish tizimi o‘sma kasalliklari etiopatogenetik aspektlari // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 285-287.

13. Kurbonova Z.Ch., Babadjanova Sh.A. Leykositoz va uning klinik ahamiyati // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 287-289.

14. Kurbonova Z.Ch., Babadjanova Sh.A. Limfositar va monositar leykemoid reaksiya klinik ahamiyati // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 289-290.

15. Kurbonova Z.Ch., Babadjanova Sh.A. Mielom kasalligi klinik laborator diagnostikasi // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 290-293.

16. Kurbonova Z.Ch., Babadjanova Sh.A. O‘tkir leykoz klinik xususiyatlari // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 296-298.

17. Kurbonova Z.Ch., Babadjanova Sh.A. O‘tkir leykoz klinik laborator diagnostikasi // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 298-300.

18. Kurbonova Z.Ch., Babadjanova Sh.A. Surunkali limfoleykoz etiopatogenezi va klinik xususiyatlari // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 300-302.

19. Kurbonova Z.Ch., Babadjanova Sh.A. Surunkali limfoleykoz klinik laborator diagnostikasi // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 302-304.

20. Kurbonova Z.Ch., Babadjanova Sh.A. Surunkali mieloleykoz klinik xususiyatlari // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 304-306.

21. Kurbonova Z.Ch., Babadjanova Sh.A. Surunkali mieloleykoz laborator diagnostikasi // Klinik laborator diagnostikada innovatsion texnologiyalardan foydalanish, muammolar va yechimlar, 2023. - №2. – B. 306-308.

22. Kurbonova Z.Ch., Babadjanova Sh.A. Laboratoriya ishi: o‘quv qo‘llanma. Toshkent, 2022. 140 b.

23. Kurbonova Z.Ch., Babadjanova Sh.A. Laboratoriya ishi: elektron o‘quv qo‘llanma. Toshkent, 2022. 176 b.

24. Kurbonova Z.Ch., Babadjanova S.A. Sitologik tashxisga kirish: o‘quv qo‘llanma.

Toshkent, “Hilol nashr”, 2021. 152 b.

25. Kurbonova Z.Ch., Babadjanova Sh.A. Sitologik tashxis asoslari: o‘quv – uslubiy qo‘llanma. Toshkent, 2022. 47 b.

26. Kurbonova Z.Ch., Babadjanova Sh.A. Sitologik diagnostika asoslari: o‘quv – uslubiy qo‘llanma. Toshkent, 2022. 47 b.

27. Kurbonova Z.Ch. Rak oldi xolatlari, yaxshi va yomon sifatli o'smalar sitologik diagnostikasi: o‘quv-uslubiy qo‘llanma. Toshkent, 2021. 50 b.

28. Kurbonova Z.Ch. Klinik laboratoriya tashxisi: darslik. Toshkent – 2023, 187 b.