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ACUTE MYELOMONOCYTIC LEUKAEMIA: A REVIEW

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Abstract

Acute myelomonocytic leukaemia is a form of acute myeloid leukemia that involves a proliferation of CFUGM myeloblasts and monoblasts. More specific symptoms are bruises and/or (excessive) bleeding, coagulation disorders (DIC), neurological disorders and gingival hyperplasia Acute myelomonocytic leukaemia (AML-M4) is a common type of pediatric AML. However, the condition is rare. Children with AML-M4 carrying the inv abnormality have a better prognosis

Keywords*: acute myelomonocytic leukaemia, Leukaemia, bleeding, DIC*

INTRODUCTION

Acute myelomonocytic leukaemia (AMMoL) is a form of acute myeloid leukemia that involves a proliferation of CFUGM myeloblasts and monoblasts. It is classified as "M4", it is classified under "AML, not otherwise classified" in the WHO classification. Translocations have been observed. Progression from myelodysplastic syndrome has been reported. For most types of cancer, determining the stage (extent) of the cancer is very important. The stage is based on the size of the main tumor and how far the cancer has spread. This can be helpful in predicting a person's outlook and deciding on treatment (Yamamoto *et al.*, 2002).

Acute myeloid leukaemia (AML), on the other hand, does not usually form tumors. It generally is widespread throughout the bone marrow and, in some cases, has spread to other organs, such as the liver and spleen. Therefore AML is not staged like most other cancers. The outlook for a person with AML depends instead on other information, such as the subtype of AML

(determined by lab tests), the patient's age, and other lab test results (Obeagu *et al.,* 2018; Obeagu *et al.,* 2020; Obeagu *et al.,* 2021; Obeagu, 2018).

Knowing the subtype of AML can be very important, as it sometimes affects both a patient's outlook and the best treatment. For example, the acute promyelocytic leukemia (APL) subtype is often treated using drugs that are different from those used for other subtypes of AML. If you're not sure which subtype of AML you have, ask your doctor about it, and about how it might affect your treatment (Zhang *et al.,* 2007).

Two of the main systems that have been used to classify AML into subtypes are the French-American-British (FAB) classification and the newer World Health Organization (WHO) classification.

PROGNOSTIC FACTORS FOR ACUTE MYELOID LEUKAEMIA (AML)

The subtype of AML can be important in helping to determine a person's prognosis (outlook). But other factors can also affect why some patients with AML have a better outlook than others. These are called prognostic factors. Prognostic factors help doctors determine a person's risk of the leukemia coming back after treatment, and therefore if they should get more or less intensive treatment (Hallek *et al.,* 2010). Some of these include:

- Chromosome (cytogenetic) abnormalities: AML cells can have many kinds of chromosome changes, some of which can affect a person's prognosis. Those listed below are some of the most common, but there are many others. Not all leukemias have these abnormalities. Patients whose AML doesn't have any of these usually have an outlook that is between favorable and unfavorable.
- Favorable abnormalities: Translocation between chromosomes 8 and 21 (seen most often in patients with M2), translocation or inversion of chromosome 16, translocation between chromosomes 15 and 17 (seen most often in patients with M3)
- Unfavorable abnormalities: Deletion (loss) of part of chromosome 5 or 7, translocation or inversion of chromosome 3, translocation between chromosomes 6 and 9, translocation between chromosomes 9 and 22. Abnormalities of chromosome 11 (at the spot q23) Loss of a chromosome, so the cell has only 1 copy instead of the normal 2 (known as monosomy). Complex changes (those involving 3 or more chromosomes).

GENE MUTATIONS

People whose leukemia cells have certain gene mutations may have a better or worse outlook. For instance, people with AML that has a mutation in the FLT3 gene tend to have a poorer outlook, although new drugs that target cells with this abnormal gene might lead to better outcomes. Mutations in the TP53, RUNX1, and ASXL1 genes are also linked with a worse outlook.

On the other hand, people whose leukemia cells have changes in the NPM1 gene (and no other abnormalities) seem to have a better prognosis than people without this change. Changes in both copies of the CEBPA gene are also linked to a better outcome (Hirji *et al.,* 2013).

MARKERS ON THE LEUKAEMIA CELLS

If the leukemia cells have the CD34 protein and/or the P-glycoprotein (MDR1 gene product) on their surface, it is linked to a worse outlook.

- Age

Generally, people over 60 don't do as well as younger people. Some of this may be because they are more likely to have unfavorable chromosome abnormalities. They sometimes also have other medical conditions that can make it harder for them to handle more intense chemotherapy regimens.

- White blood cell count

A high white blood cell count (>100,000/mm3) at the time of diagnosis is linked to a worse outlook. Prior blood disorder leading to AML Having a prior blood disorder such as myelodysplastic syndrome is linked to a worse outlook (Howlade *et al.,*2014).

- Treatment-related AML

AML that develops after a person is treated for another cancer is linked to a worse outlook. **Infection**: Having a systemic (blood) infection when you are diagnosed is linked to a worse outlook.

- Leukemia cells in the central nervous system

Leukemia that has spread to the area around the brain and spinal cord can be hard to treat, since most chemotherapy drugs can't reach that area.

Status of AML after treatment

How well (and how quickly) the leukaemia responds to treatment also affects long-term prognosis. Better initial responses have been linked with better long-term outcomes. A remission (complete remission) is usually defined as having no evidence of disease (NED) after treatment. This means the bone marrow contains fewer than 5% blast cells, the blood cell counts are within normal limits, and there are no signs or symptoms from the leukemia (Howlader *et al.,* 2014). A complete molecular remission means there is no evidence of leukemia cells in the bone marrow, even when using very sensitive tests, such as PCR (polymerase chain reaction).

Minimal residual disease (MRD) is a term used after treatment when leukemia cells can't be found in the bone marrow using standard tests (such as looking at cells under a microscope), but more sensitive tests (such as flow cytometry or PCR) find evidence that there are still leukemia cells in the bone marrow.

Active disease means that either there is evidence that the leukaemia is still present during treatment, or that the disease has come back after treatment (relapsed). For a patient to have relapsed, they must have more than 5% blast cells in their bone marrow.

ACUTE MYELOMONOCYTIC LEUKAEMIA

Acute myeloblastic leukaemia (AML) is a group of malignant bone marrow neoplasms of myeloid precursors of white blood cells. Acute myelomonocytic leukaemia (AML-M4) is a common type of pediatric AML. However, the condition is rare and represents approximately 3% of all leukaemias during childhood and has an incidence of 1.1 –1.7 per million per year. The symptoms may be aspecific: asthenia, pallor, fever, dizziness and respiratory symptoms.

More specific symptoms are bruises and/or (excessive) bleeding, coagulation disorders (DIC), neurological disorders and gingival hyperplasia (Jaeger *et al.,* 2012). Diagnostic methods include blood analysis, bone marrow aspirate for cytochemical, immunological and cytogenetical analysis, and cerebrospinal fluid (CSF) investigations. A characteristic Chromosomal abnormality observed in AMLM4. Treatment includes intensive multidrug chemotherapy and in

selected cases allogeneic bone marrow transplantation. Nevertheless, outcome of AML remains poor with an overall survival of 35-60%. Children with AML-M4 carrying the inv abnormality have a better prognosis (61% 5-year overall survival). New therapeutics is required to increase the probability of cure in this serious disorder (Jones *et al.*, 2014).

Conclusion

Acute myelomonocytic leukaemia is a form of acute myeloid leukemia that involves a proliferation of CFUGM myeloblasts and monoblasts. However, the condition is rare. Children with AML-M4 carrying the inv abnormality have a better prognosis

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