Chronic Myelogenous Leukemia - Adult (Greater than or equal to 18 years old)

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Notes: Consider Clinical Trials as treatment options for eligible patients. Leukemia patients should be referred and treated at a comprehensive cancer center.

INITIAL EVALUATION

1. **Chronic Phase**
   - Chronic Myelogenous Leukemia (CML)
   - Chronic
   - Myelogenous
   - Leukemia

2. **Accelerated Phase**
   - 1st or 2nd generation TKI or Clinical trials

3. **Blind Phase**
   - Lymphoid
   - Hyper-CVAD and TKI or Clinical trials

4. **Myeloid**
   - Idarubicin and cytarabine plus TKI or Clinical trials

TREATMENT

- Bone marrow aspiration and cytogenetics
- PCR in peripheral blood
- Mutation analysis
- Alternating TKI
- Stem cell transplant or Clinical trials
- Continue TKI or Clinical trials
- Consider treatment discontinuation
- PCR monthly for 6 months, then every 2 months for 6 months, then every 3 months for 12 months, then every 6 months thereafter

SURVEILLANCE

- Bone marrow aspiration and cytogenetics on months 6 and 12
- PCR (peripheral blood) every 3 months for 1 year (or until MMR), then every 6 months

- Stressed
- Sustained (greater than or equal to 2 years)
- undetectable BCR-ABL

- Hyper-CVAD and TKI or Clinical trials

- Stem cell transplant after second chronic phase

- Surveillance

Hyper-CVAD = hyper-fractionated cyclophosphamide, vincristine, doxorubicin, and dexamethasone
MMR = major molecular response
TKI = tyrosine kinase inhibitors

1 See Physical Activity, Nutrition, and Tobacco Cessation algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice
2 Leukemia newsletter: [http://www.mdanderson.org/leukemia](http://www.mdanderson.org/leukemia) (Available programs-treatment priorities)
3 If TKI, consider ponatinib
APPENDIX A: Definition of the Response of TKIs (any TKI) as First-line Treatment

<table>
<thead>
<tr>
<th></th>
<th>Optimal</th>
<th>Warning</th>
<th>Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>NA</td>
<td>High risk or CCA/Ph+, major route</td>
<td>NA</td>
</tr>
<tr>
<td>3 months</td>
<td>BCR-ABL1 less than or equal to 10% and/or Ph+ less than or equal to 35%</td>
<td>BCR-ABL1 greater than 10% and/or Ph+ equals 36-95%</td>
<td>Non-CHR and/or Ph+ greater than 95%</td>
</tr>
<tr>
<td>6 months</td>
<td>BCR-ABL1 less than 1% and/or Ph+ equals 0</td>
<td>BCR-ABL1 equals 1-10% and/or Ph+ equals 1-35%</td>
<td>BCR-ABL1 greater than 10% and/or Ph+ greater than 35%</td>
</tr>
<tr>
<td>12 months</td>
<td>BCR-ABL1 less than or equal to 0.1%</td>
<td>BCR-ABL1 greater than 0.1-1%</td>
<td>BCR-ABL1 greater than 1% and/or Ph+ greater than 0</td>
</tr>
<tr>
<td>Then, and at any time</td>
<td>BCR-ABL1 less than or equal to 0.1%</td>
<td>CCA/Ph- (-7 or 7+)</td>
<td>Loss of CHR, loss of CCyR, confirmed loss of MMR, mutations and CCA/Ph+</td>
</tr>
</tbody>
</table>

The definitions are the same for patients in chronic phase, accelerated phase, and blastic phase and apply also to second-line treatment, when first-line treatment was changed for intolerance. The response can be assessed with either a molecular or a cytogenetic test, but both are recommended whenever possible. Cutoff values have been used to define the boundaries between optimal and warning and between warning and failures. Because cutoff values are subjected to fluctuations, in case of cytogenetic or molecular data close to the indicated values, a repetition of the tests is recommended. After 12 months, if an MMR is achieved, the response can be assessed by real quantitative polymerase chain reaction (RQ-PCR) every 3 to 6 months, and cytogenetics is required only in case of failure or if standardized molecular testing is not available. Note that MMR (MR10 or better) is optimal for survival but that a deeper response is likely to be required for a successful discontinuation of treatment.

CCA/Ph+ = clonal chromosome abnormalities in Ph+ cells
CCyR = complete cytogenetic response
CHR = complete hematologic response
MMR, BCR-ABL1 less than or equal to 0.1% = MR10 or better
NA = not applicable
Ph = philadelphia chromosome

1 Per European LeukemiaNet (ELN) criteria
2 In 2 consecutive tests, of which one with a BCR-ABL1 transcripts level greater than or equal to 1%
SUGGESTED READINGS


This practice algorithm is based on majority expert opinion of the Leukemia Center Faculty at the University of Texas MD Anderson Cancer Center. It was developed using a multidisciplinary approach that included input from the following:

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