Acute Lymphoblastic Leukemia and Lymphoblastic Lymphoma (ALL) – Adult (Greater than or equal to 18 years old)

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**PHILADELPHIA NEGATIVE PRECURSOR B (Pre B) LYMPHOBLASTIC LEUKEMIA/LYMPHOMA**

**CLASSIFICATION**
- Pre B ALL
  - CD19, CD10 (+), CD20 (+), CD22 (+)
  - MPO (-)
  - TdT (+)
  - BCR-ABL (-)

**TREATMENT**

**Age greater than or equal to 60 years**
- Consider clinical trial:
  - Hyper-CVD plus inotuzumab with or without rituximab

**Age greater than 30 years to 59 years**
- Hyper-CVAD with or without rituximab
- Consider clinical trial:
  - Hyper-CVAD with ofatumumab
  - Hyper-CMAD with or without rituximab
  - Hyper-CVAD with blinatumomab

**Age less than or equal to 30 years**
- Augmented BFM or
- Consider clinical trial:
  - Augmented BFM with or without ofatumumab
  - Hyper-CVAD with ofatumumab
  - Hyper-CVAD with blinatumomab

**ASSESSMENT OF RESPONSE**
- Complete remission?
- Yes
  - Consolidation/Maintenance
  - Blinatumomab
- No
  - Salvage therapy clinical trial
  - Mini-HCVD inotuzumab
  - Chimeric Antigen Receptor (CAR) T-cell therapies
  - Blinatumomab

**POST-REMISSION THERAPY/MINIMAL RESIDUAL DISEASE**

1 Hyper-CVD (hyper-fractionated cyclophosphamide, vincristine, dexamethasone) plus inotuzumab; rituximab if CD20 greater than or equal to 20%
2 Hyper-CVAD (hyper-fractionated cyclophosphamide, vincristine, doxorubicin, dexamethasone); rituximab if CD20 greater than or equal to 20%
3 Hyper-CMAD (hyper-fractionated cyclophosphamide, liposomal vincristine (Marqibo®), doxorubicin, dexamethasone); rituximab if CD20 greater than or equal to 10%

Augmented BFM, Berlin-Frankfurt-Munster (daunorubicin, vincristine, high dose prednisone, pegylated asparaginase); ofatumumab if CD20 greater than or equal to 1%

**NOTE:** Consider clinical trials as treatment options for eligible patients. Stem Cell Transplant (SCT) guidelines are not included with this algorithm.

Leukemia patients should be referred and treated at a Comprehensive Cancer Center

Department of Clinical Effectiveness V4

Approved by the Executive Committee of the Medical Staff on 12/13/2016
# Acute Lymphoblastic Leukemia and Lymphoblastic Lymphoma (ALL) – Adult

(Greater than or equal to 18 years old)

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## PHILADELPHIA CHROMOSOME (Ph) POSITIVE ACUTE LYMPHOBLASTIC LEUKEMIA

### CLASSIFICATION

<table>
<thead>
<tr>
<th>Age greater than or equal to 60 years</th>
<th>Age less than 60 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-CVAD plus dasatinib&lt;sup&gt;1&lt;/sup&gt; with or without rituximab or</td>
<td>Hyper-CVAD plus dasatinib&lt;sup&gt;1&lt;/sup&gt; with or without rituximab or</td>
</tr>
<tr>
<td>Consider clinical trial&lt;sup&gt;2&lt;/sup&gt;:</td>
<td>Consider clinical trial&lt;sup&gt;2&lt;/sup&gt;:</td>
</tr>
<tr>
<td>Hyper-CVAD plus ponatinib with or without rituximab&lt;sup&gt;1&lt;/sup&gt; or</td>
<td>Hyper-CVAD plus ponatinib with or without rituximab&lt;sup&gt;1&lt;/sup&gt; or</td>
</tr>
<tr>
<td>Hyper-CMAD plus dasatinib (or imatinib) with or without rituximab&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Hyper-CMAD plus dasatinib (or imatinib) with or without rituximab&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Blinatumomab plus ponatinib</td>
<td>Blinatumomab plus ponatinib</td>
</tr>
<tr>
<td>Inotuzumab plus bosutinib</td>
<td>Inotuzumab plus bosutinib</td>
</tr>
</tbody>
</table>

### TREATMENT

- CD19, CD10 (±), CD20 (±), CD22 (±)
- CD13 (±), CD33 (±)
- CD117 (-)
- MPO (-)
- TdT (+)
- t(9;22)(q24;q11.2)
- BCR-ABL (+)

### ASSESSMENT OF RESPONSE

- Yes
- No<sup>3</sup>

- Consolidation/Maintenance or Allogeneic SCT
- Complete remission?

- Asses ABL mutation status
- Consider clinical trial<sup>2</sup>
- Salvage therapy:
  - Blinatumomab plus ponatinib
  - Hyper-CVAD plus ponatinib
  - Hyper-CVAD plus dasatinib (or imatinib) with or without rituximab<sup>1</sup>
  - Inotuzumab plus bosutinib
  - CAR T-cell therapies

### POST-REMISSION THERAPY

1. Hyper-CVAD (hyper-fractionated cyclophosphamide, vincristine, doxorubicin, dexamethasone); rituximab if CD20 greater than or equal to 20%
2. Hyper-CMAD (hyper-fractionated cyclophosphamide, liposomal vincristine (Marqibo®), doxorubicin, dexamethasone); rituximab if CD20 greater than or equal to 10%
3. Fail after INDUCTION with hyper-CVAD based regimen means no response after 2 cycles of chemotherapy

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**NOTE:** Consider clinical trials as treatment options for eligible patients. Stem Cell Transplant (SCT) guidelines are not included with this algorithm. Leukemia patients should be referred and treated at a Comprehensive Cancer Center.
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<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>TREATMENT</th>
<th>ASSESSMENT OF RESPONSE</th>
<th>POST-REMISSION THERAPY</th>
</tr>
</thead>
</table>
| Burkitt, Burkitt-like ALL or HIV+ Burkitt | - Hyper-CVAD with rituximab¹  
- Consider clinical trial:  
  - Hyper-CVAD with ofatumumab or  
  - EPOCH with ofatumumab² | Complete remission? | Yes → Consolidation  
No³ →  |
| slg (+), CD20 (+)  
MPO (-)  
TdT (-)  
BCR-ABL (-)  
c-myc (+)  
t(8;14)(q24.1;q32)  
t(8;22)(q24;q11)  
t(2;8)(p12;q24) |  |  |  |

1 Hyper-CVAD (hyper-fractionated cyclophosphamide, vincristine, doxorubicin, dexamethasone) plus rituximab  
Hyper-CVAD (hyper-fractionated cyclophosphamide, vincristine, doxorubicin, dexamethasone) plus ofatumumab  
EPOCH (etoposide, prednisone, vincristine, cyclophosphamide, doxorubicin) plus ofatumumab

2 Leukemia Newsletter: http://www.mdanderson.org/leukemia (Available programs-treatment priorities)

3 Fail after INDUCTION with hyper-CVAD based regimen means no response after 2 cycles of chemotherapy
**Acute Lymphoblastic Leukemia and Lymphoblastic Lymphoma (ALL) – Adult** (Greater than or equal to 18 years old)

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**NOTE:** Consider clinical trials as treatment options for eligible patients. Stem Cell Transplant (SCT) guidelines are not included with this algorithm. Leukemia patients should be referred and treated at a Comprehensive Cancer Center.

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**CLASSIFICATION**

- **T ALL**
  - CD1 (+), CD3 (+), CD5 (-), CD7 (+), CD4 (-), CD8 (-)
  - MPO (-)
  - TdT (+)
  - BCR-ABL (-)

**TREATMENT**

- **Age greater than 30 years**
  - Hyper-CVAD1 with nelarabine

- **Age less than or equal to 30 years**
  - Augmented BFM1 or
  - Hyper-CVAD1 with nelarabine

**ASSESSMENT OF RESPONSE**

- Complete remission?
  - Yes: Consolidation/Maintenance
  - No:
    - Yes: XRT if mediastinal disease
    - No:
      - Consider clinical trial2
      - Salvage therapy

**POST-REMISSION THERAPY**

- Consolidation/Maintenance
- Consider clinical trial2
- Salvage therapy

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**XRT** = radiation therapy

1 Hyper-CVAD (hyper-fractionated cyclophosphamide, vincristine, doxorubicin, dexamethasone)

2 Augmented BFM, Berlin-Frankfurt-Munster (daunorubicin, vincristine, high dose prednisone, pegylated asparaginase)

3 Leukemia Newsletter: http://www.mdanderson.org/leukemia (Available programs-treatment priorities)

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SUGGESTED READINGS


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DEVELOPMENT CREDITS

This practice guideline 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 medical oncologists.

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