Diffuse large B-cell lymphoma (DLBCL) and related entities are the commonest type of non-Hodgkin lymphomas. Lymphomas of the extreme ages are relatively rare and with only few studies. In this study, we focus on aggressive B-cell lymphomas (ABL) in patient’s younger than 30 and older than 90 years old.

Many large studies have shown variation in immunohistochemical and genetic features of aggressive B-cell lymphomas. The presence of a variety of immunohistochemical, genetic and clinical features have an impact on prognosis of these patients. Additional insight into prognosis and pathology of DLBCL will continue by using additional methods to subclassify cases. The goal of this study is to review a large number of cases of DLBCL and other aggressive B-cell lymphomas using a relatively uniform immunohistochemical panel and genetic methods. We assessed and compared the immunophenotypic and genetic findings of different age groups, and found distinctive features in patients in <30 and >90 years old group.

Cases were consultation cases sent to Clarient Pathology Services/Neogenomics (Aliso Viejo, CA). All cases were reviewed and diagnosed by DPO. The diagnoses were made in accordance with the 2008 WHO classification for hematopoietic and lymphoid tumors using a combination of immunohistochemical, genetic, and other studies, as appropriate, to establish the diagnosis. All research was performed in accordance with local standards for ethical research. The tissues were evaluated using standard hematoxylin and eosin (H&E) staining and immunohistochemistry. Immunohistochemical stains were performed on a variety of platforms from Ventana (Tucson, AZ), Leica Biosystems (Buffalo Grove, IL), and Dako ( Carpenteria, CA) using standard methodologies. Most cases were evaluated using an extensive panel of immunohistochemical stains including CD20, CD3, CD5, CD10, cyclin D1, BCL2, BCL6, EBER, Ki-67, CD30 and a panel of FISH studies (including MYC, Igh/BCL2 and BCL6). 28 cases (3%) of patients were less than 30 years old (<30) and 20 cases (2%) were patients older than 90 years (>90) were evaluated.

Majority of cases were DLBCL (57% [16/28] of <30, and 90% [18/20] of >90 group), followed by Burkitt lymphoma (21% [6/28] of <30, and 10% [2/20] of >90 group). Almost all cases were CD20 positive (93% of <30, 100% of >90). EBER stain was performed on most cases and was only positive in 20% of <30 group. C-MYC expression was higher in <30 group (~92%) compared to 55% in >90 group. All available FISH study results show 21% MYC rearrangement in both groups.

Lymphomas with combined BCL2 and BCL6 rearrangements were seen more frequently in >90 group (38%) compared to the <30 group (21%). 54% of cases <30 and 27% of cases >90 showed CD30 positivity.

BCL2 and CD50 are both B-cell lymphoma markers. The majority of cases were germinal center in <30 group, compared to non-germinal center in >90.

Results

<table>
<thead>
<tr>
<th>Age &lt;30</th>
<th>Age &gt;90</th>
<th>Overall age groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>CD10</td>
<td>13/22 (59%)</td>
<td>10/19 (52%)</td>
</tr>
<tr>
<td>BCL2</td>
<td>17/25 (68%)</td>
<td>15/19 (78%)</td>
</tr>
<tr>
<td>BCL6</td>
<td>22/25 (88%)</td>
<td>18/18 (100%)</td>
</tr>
<tr>
<td>MUM1</td>
<td>17/25 (68%)</td>
<td>10/19 (52%)</td>
</tr>
<tr>
<td>CD30</td>
<td>7/13 (53%)</td>
<td>3/11 (27%)</td>
</tr>
</tbody>
</table>

Discussion

- Majority of cases were DLBCL (57% of <30, and 90% of >90 group)
- Most cases were extranodal (71% in <30, 60% in >90).
- EBV positivity was seen in 20% of <30 group compared to the large group of lymphoma in all ages (8%).
- MYC expression was higher in >30 group (~92%) compared to 55% in >90 group.
- 54% of cases <30 and 27% of cases >90 showed CD30 positivity, as oppose to 23% in large lymphoma group.
- Combined BCL2 and BCL6 rearrangements were seen more frequently in >90 group compared to the <30 group (38%, 21% respectively).
- Based on Hans and tally classification, majority of cases were germinal center in <30 group, compared to non-germinal center in >90.

The immunophenotype in all groups showed similar expression for BCL2 and MUM1.

References