Serum \textit{Beta}_2-microglobulin in Burkitt's Lymphoma: A Preliminary Report

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Summary

Onyemelukwe GC, Taqi A, Mohammed I and Oyeyinka G. Serum \textit{Beta}_2-microglobulin in Burkitt's Lymphoma: A Preliminary Report. \textit{Nigerian Journal of Paediatrics 1985; 12:125}. Serum \textit{Beta}_2-microglobulin, IgG, IgA, IgM and C-reactive protein were determined in 5 children with Burkitt's lymphoma (BL) and in 5 controls. The mean serum \textit{Beta}_2-microglobulin of 3.5\pm0.9mg/L (range 4.2–6.6mg/L) in the BL patients was significantly greater than the mean of 2.8\pm0.5mg/L (range 2.3–3.6mg/L) in the controls (p<0.001). Similarly, the C-reactive protein level was significantly greater in BL patients than in controls (p<0.001). However, mean serum IgG, IgM, IgA were not significantly different between patients and controls. It is suggested that serum \textit{B}_2-microglobulin estimation can serve as a predictive test for relapse and for central nervous system invasion in cases of BL.

Introduction

Human \textit{Beta}_2-microglobulin which forms the light chain of the histocompatibility antigen\textsuperscript{1} on cell surfaces of nucleated cells and platelets\textsuperscript{2}, is detectable in sera in values which increase with age, with falling glomerular filtration rate and in those with adenocarcinoma and lymphoma\textsuperscript{3,4,5}. The invasion of the central nervous system by lymphomas and leukaemia may be detected by monitoring the cerebrospinal fluid levels of \textit{Beta}_2-microglobulin\textsuperscript{6}.

The present paper presents a preliminary report on the serum levels of \textit{Beta}_2-microglobulin in Burkitt's lymphoma.

Materials and Methods

The subjects consisted of 5 children with Burkitt's lymphoma (2 males, 3 females; mean age 7 years; range, 6–8 years). Four of them had abdominal disease and one had stage IV disease with paraparesis; clinical staging was according to the criteria of Berard \textit{et al}\textsuperscript{7}. Five age and sex-matched apparently healthy children (controls) were also studied. Five to ten millilitres of venous blood was obtained from each subject and control. Serum samples obtained from the blood specimens were stored at -20°C until analysed. Blood urea
and creatinine were determined routinely. Beta₂-
microglobulin was determined by radio-immuno-
assay using Phadebas kit (Pharmacia, Sweden). Serum IgA, IgG, IgM and C-reactive protein
were determined by radial immuno-diffusion
technique. C-reactive protein values are expressed
as the percentage of high level C-protein sera
pooled from patients with typhoid fever. Statistical analysis was done using the student t test.

Results

The Table shows a significant elevation of mean
serum beta₂-microglobulin in BL patients com-
pared to controls (p < 0.001). Serum IgM and IgA
were higher in controls (323.3 ± 78.3 iu/ml and
93.3 ± 19 iu/ml respectively) than in BL patients
(294.4 ± 29.0 iu/ml and 77.2 ± 24.6 iu/ml respectivily) but these differences were not significant
(p > 0.5 and > 0.1 respectively). Conversely, serum
IgG was non-significantly higher in BL patients
(219.4 ± 119.5 iu/ml) than in controls (152.1 ±
72.2 iu/ml) (p > 0.5). C-reactive protein was
significantly higher in patients (39.2 ± 24.4%) than in controls (17.6 ± 2.6%) (p < 0.001). Blood
urea and creatinine were normal in both patients
and controls.

Discussion

Serum beta₂-microglobulin was found to be
elevated in BL patients in the present preliminary
study which involved too few patients for valid
conclusions to be drawn. Nevertheless, the results
suggest a trend which, if confirmed in studies
involving larger numbers, may be of importance
in the management of BL.

In Hodgkin's lymphoma, serum beta₂-mi-
icroglobulin increases with advancing clinical stag-
ing and in non-Hodgkin's lymphoma other than
BL, its rise has been associated with poor progno-
sis. The confirmation of central nervous system
involvement in leukemia and the lymphomas by
the finding of elevated beta₂-microglobulin in
cerebrospinal fluid has also been reported. The
findings in the present study would therefore,
suggest that the relapse of BL could be predicted
by the findings of an elevated serum beta₂-
microglobulin value in patients who have completed
courses of therapy and are apparently in remission,
while elevation of cerebrospinal fluid beta₂-
microglobulin could signify central nervous
system involvement. Further evaluation of its
prognostic value is currently under investigation.

The cost of beta₂-microglobulin determination
by radioimmunoassay as carried out in the present
study, may be minimised by the adoption of
radial immunodiffusion or ELISA technique for
beta₂-microglobulin which could then become
financially attainable in teaching hospitals in
Nigeria and other African countries.

Although serum IgA and IgM were lower in
patients than in controls, the higher level of serum
IgG suggests that humoral immunity and
B lymphocyte function were preserved in these
patients. Burkitt's lymphoma is a multifocal
B-cell neoplasia in which peripheral lymph node
and splenic involvement is rare and in which
intracytoplasmic immunoglobulin is not usually
detected within tumour cells. The serum
immunoglobulins in BL may include specific
anti-EB (Epstein-Barr) virus and anti-malarial
antibodies since aetiological postulate suggests
that chronic malaria stimulation and subsequent
infection with EB virus may lead to the develop-
ment of BL. The higher though non-significant
level of IgG in BL patients in this study may be
contributed to by such antibodies. The higher
serum C-reactive protein level in BL patients in
the present study is not surprising since C-
reactive protein is an acute phase protein which
is usually elevated in instances of inflammation,
infections, cancer or during pregnancy and may
play an important role in modulating lymphocyte
function and lymphokine production by
mechanisms yet to be classified in these condi-
tions, including Burkitt's lymphoma.
TABLE
Mean serum Betag-microglobulin, Immunoglobulins and C-reactive Protein Levels

<table>
<thead>
<tr>
<th></th>
<th>BL Patients</th>
<th>Controls</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>n = 5</td>
<td>n = 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>Betag-microglobulin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(mg/L)</td>
<td>5.8 ± 0.9</td>
<td>2.8 ± 0.5</td>
<td>&lt;0.001</td>
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<tr>
<td></td>
<td>(4.2-6.6)*</td>
<td>(2.3-3.6)</td>
<td></td>
</tr>
<tr>
<td>IgM (iu/ml)</td>
<td>294.4 ± 29.0</td>
<td>332.3 ± 78.3</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td></td>
<td>(254-322)</td>
<td>(244-428)</td>
<td></td>
</tr>
<tr>
<td>IgG (iu/ml)</td>
<td>319.4 ± 119.5</td>
<td>182.1 ± 72.2</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td></td>
<td>(104-384)</td>
<td>(86-317)</td>
<td></td>
</tr>
<tr>
<td>IgA (iu/ml)</td>
<td>77.2 ± 24.6</td>
<td>93.3 ± 19</td>
<td>&gt;0.1</td>
</tr>
<tr>
<td></td>
<td>(49-113)</td>
<td>(70-124)</td>
<td></td>
</tr>
<tr>
<td>C-reactive Protein γ</td>
<td>39.2 ± 2.4</td>
<td>17.6 ± 2.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>(21-66)</td>
<td>(5-25)</td>
<td></td>
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</tbody>
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BL = Burkitt’s lymphoma
SD = Standard deviation
*Figures in parentheses represent ranges.

References

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