Hydration in advanced cancer: The use of bioelectrical impedance vector analysis (BIVA) to evaluate fluid states in palliative care

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BACKGROUND

Current hydration assessment methods are limited in cancer patients approaching death.1 Bioelectrical impedance vector analysis (BIVA) is an accurate validated method of assessing body composition;2 however its clinical use in advanced cancer is uncertain.3

AIMS

To measure hydration in advanced cancer patients using BIVA, in order to determine the relationship between symptoms, biochemistry and performance status.

METHODS

An observational prospective analysis of advanced cancer patients within a specialist palliative care unit in Liverpool, UK.

BIVA was used to evaluate hydration. Total body water (TBW) was estimated using impedance index (height/Resistance (H/R)). Regression analysis was used to determine the predictive properties of clinical variables on the impedance index. Assessed items included: performance status (via Eastern Cooperative Oncology Group (ECOG) scale), symptoms (Burge-4 dehydration score5 – 0 [normal] to 5 [severe dehydration]), oedema, biochemistry (Ur:Cr ratio), age and gender. The BIVA graph was used to classify hydration status and compare vectors, to evaluate fluid states of subjects, based on clinical variables.

RESULTS

Ninety patients participated (recruitment rate = 76.3%). The majority of this sample were normally hydrated (n=43, 47.8%), with over-hydration (n=37, 41.1%) more prevalent than dehydration; however no statistical significant difference in fluid intake with dehydration; however no statistical significant difference in symptoms, physical signs or biochemistry was detected.

Classification of hydration status by BIVA

Hydration status N %
Normal 43 47.8
Dehydration 10 11.1
Over-hydration 37 41.1

Linear regression analysis of impedance index

<table>
<thead>
<tr>
<th>Variable</th>
<th>B(SE)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>96.96</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Age</td>
<td>13 (11)</td>
<td>.246</td>
</tr>
<tr>
<td>Female</td>
<td>-1.35 (2.52)</td>
<td>&lt;.001</td>
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<tr>
<td>ECOG</td>
<td>-0.5 (1.38)</td>
<td>.692</td>
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<tr>
<td>Oedema</td>
<td>10.94</td>
<td>&lt;.001</td>
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<tr>
<td>Ur:Cr ratio</td>
<td>-0.2 (0.2)</td>
<td>.423</td>
</tr>
<tr>
<td>Dehydration</td>
<td>-2.55 (1.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Signs</td>
<td>-23 (14)</td>
<td>.038</td>
</tr>
</tbody>
</table>

CONCLUSION

The prevalence of dehydration in advanced cancer (11%), as measured by BIVA, is lower than that reported in studies using biochemical criteria (44%).4 Hydration relates to clinically measurable signs and symptoms. In this sample, no difference in symptoms, signs or biochemistry was detected between dehydrated and non dehydrated patients. BIVA can potentially be used in future work to further evaluate fluid volumes and objectively classify hydration status.

REFERENCES