A novel diagnostic tool for the evaluation of hypothalamic-pituitary region and diagnosis growth hormone deficiency: Pons ratio

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Objective and Method

Recently, it has been reported that pons ratio (PR) has been suggested as a more sensitive marker for evaluation of pituitary gland in growth hormone deficiency (GHD) patients. The aim of the study is to evaluate the PR and its diagnostic value in the diagnosis of GHD. PR was defined as the pons height above the PA divided by total pons height. The PR of patients with GHD was compared with patients with no GHD.

Study included 133 patients with GHD (82 were male, and 95 were on prepubertal) and control subjects with no GHD. Totally, 121 patients had isolated GHD (91%), and 12 patients were followed with the diagnosis of multiple pituitary hormone deficiency (9%). Seventeen (12.7%) patients had organic lesions on MRI, and 100 patients (75%) had normal anterior pituitary height (APH) according to age and sex. The PR of the patient group was significantly higher than controls (mean: 0.32 ± 0.89; range: 0.14-0.63) (mean: 0.27 ± 0.63; range 0.19-0.44), respectively (p: 0.005). The optimal cut-off value of PR for GHD was 0.27 (sensitivity 71% specificity 53%). There was a negative correlation between APH SD and PR (p: 0.002; r: -0.27). MRI showed a significantly higher PR in patients with organic lesions than in those without organic lesions; respectively (median 0.407 IQR 0.139) (median 0.311 IQR 0.116) (p: 0.011). APH was increased but PR remained unchanged in pubertal patients, PR (mean 0.3 ± 0.07 range 0.18-0.44) (mean 0.33 ± 0.094 range 0.14-0.63) (p: 0.089). Bone age retardation, peak value in growth hormone test, and IGF1-SDS were correlated with PR, respectively (p: 0.000 r: -0.361) (p: 0.008 r: -0.231) (p: 0.005 r: -0.264).

Conclusion

PR measurement is a noninvasive and practical method that can be done using a sagittal section of routine pituitary MRI. Therefore, it has a cost-benefit clinical value. As is not affected by pubertal status, PR is potentially a more sensitive tool for evaluation pituitary gland in GHD patients compared to APH.

Table 1: The comparison between pons ratio, pituitary height and pituitary height SD

<table>
<thead>
<tr>
<th>Group</th>
<th>Pons Ratio</th>
<th>Pituitary Height</th>
<th>Pituitary Height SD</th>
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</thead>
<tbody>
<tr>
<td>GHD</td>
<td>0.32 ± 0.89</td>
<td>33.6 ± 5.3</td>
<td>0.14-0.63</td>
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<tr>
<td>No-GHD</td>
<td>0.27 ± 0.63</td>
<td>30.5 ± 4.6</td>
<td>0.19-0.44</td>
</tr>
<tr>
<td>Median±IQR</td>
<td>0.35±0.24</td>
<td>33.6±5.1</td>
<td>0.14-0.63</td>
</tr>
</tbody>
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Figure 1: Pons ratio = A/B.

Figure 2: The ROC analysis of patient’s and control’s pons ratio

Figure 3: The correlation between Pons Ratio and Pituitary Height SDS

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