A novel dignostic 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.

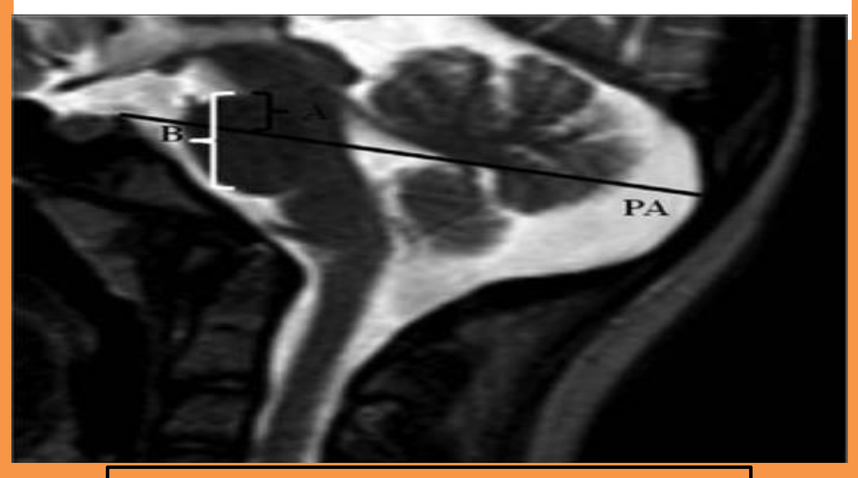

Figure 1: Ponsratio=A/B.

Conclusion

PR measurement is a noninvasive and practical method that can be done using a saggital 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.

Results

	Pons ratio	Pituitary height	Pituitary height SD
Organic lesion	0.40(IQR 0.13)†	2(IQR 1.5)†	-3.02(IQR 1.86)†
No organic lesion	0.31(IQR 0.11)†	3.2(IQR 1)†	-1.26(IQR 1.32)†
p value	0.011**	0.000**	0.000**
İsolated GHD	0.31(IQR 0.11)†	3(IQR 1.1)†	-1.27(IQR 1.46)†
Multiple GHD	0.36(IQR 0.22)†	3(IQR 2)†	-1.55(IQR 1.38)†
p value	0.52**	0.35**	0.27**
Pubertal	0.30(±0.07)††	4(IQR 1)†	-1.33(IQR 1.52)†
Prepubertal	0.33(±0.09)††	3(IQR 2)†	-1.31(IQR 1.45)†
p value	0.089*	0.005**	0.83**
Male	0.33(±0.09)††	3.1(IQR 1)†	-1.26(IQR 2.22)†
Female	0.31(±0.08)††	3(IQR 2)†	-1.55(IQR 1.03)†
p-value	0.203*	0.229**	0.317**
Patient	0.32(+0.89)††		
Control	0.27(+0.63)††		
p-value	0.005*		
Small pituitary size	0.36(±0.11)††		
Normal pituitary size	0.31(±0.076)††		
p value	0.004*		

* Independent samples t test ** Man Whitney U test †† Mean (± Standart Deviation) † Median (IQR: Interquartile Range)

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

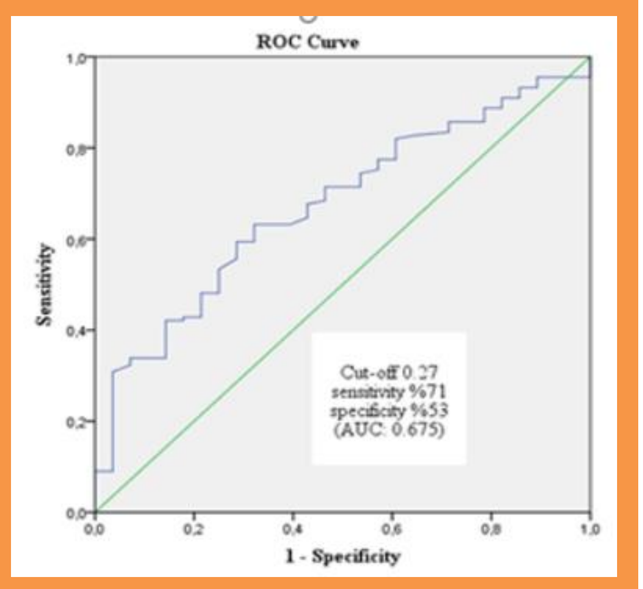

Figure 2: The ROC analysis of patient's and control's pons ratio

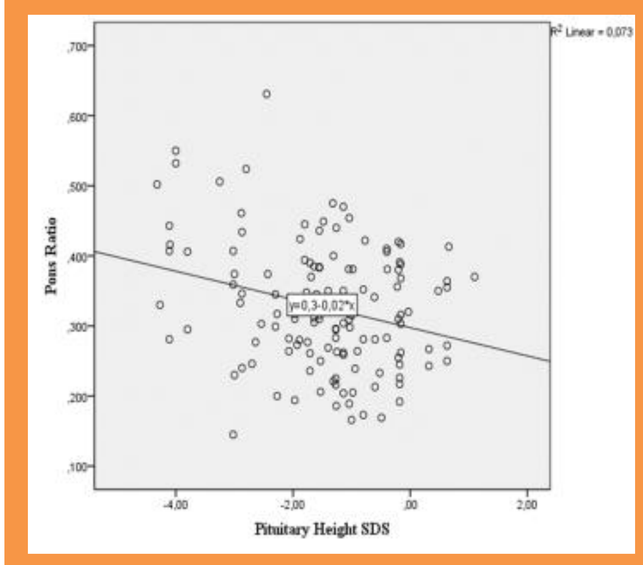

Figure 3: The correlation between Pons Ratio and Pituitary Height SDS

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: 0005). 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).