

## Posterior Pituitary Bright Spot Normal Dimensions on MRI

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### ABSTRACT

**Aim:** To assess the measurements of posterior pituitary bright spot on MRI in Khyber Pakhtunkhwa

**Methods:** The study was done in RMI, Peshawar. Duration is January, 2016 to February, 2019. 78 patients with normal pituitary MRI studies were selected for study. MRI without contrast was done along cranio caudal and antero posterior axis on sagittal T1WI. Three cases of ectopic posterior pituitary were also included.

**Results:** Dimensions were taken in antero posterior and cranio caudal axis on sagittal T1WI. Dimension of PPBS was 1.8--8.6mm in cranio caudal axis and 0.8-6mm in antero posteriorly. Mean±SD of cranio caudal measurement was 5.09±1.28mm and of antero posteriorly 2.42±0.9mm. Pearsons analysis showed direct correlation i.e. as value of cranio caudal diameter increased, the antero posteriorly also increased.

**Conclusion:** PPBS was identified in 100% of normal pituitary glands. Mean PPBS size normally ranged from 1.8 to 8mm i.e. mean± SD was 5.09±1.28mm craniocaudally. There is a direct correlation in cranio caudal and antero posterior dimensions of PPBS.

**Keywords:** Pituitary, Magnetic resonance imaging. Posterior pituitary bright spot

### INTRODUCTION

The posterior pituitary releases antidiuretic hormone and oxytocin and it contains collection of axonal projections from the hypothalamus<sup>1</sup>.

The posterior pituitary is visualized as a tiny area of increased signal intensity posteriorly in the posterior part of pituitary gland on T1-weighted MRI (T1WI), called the "posterior pituitary bright spot" (PPBS)<sup>2</sup>. Due to the hyperintense signals of posterior pituitary on T1-weighted images, Anterior and posterior lobes of the pituitary gland can be differentiated by MRI<sup>3</sup>.

On MRI, presence of posterior pituitary bright spot is confirmed only when the signals in posterior pituitary gland are differentiated as separate signal from the signal of the dorsum sellae fatty marrow<sup>4</sup>. When evaluating T1WI of the pituitary gland, it is identified which is a normal PBS and which is a T1 hyperintensity outside the boundary of normal gland.

The objective of the study was to assess the measurements of posterior pituitary bright spot on MRI in Khyber Pakhtunkhwa

### METHODOLOGY

Normal MRI Pituitary was selected for the study. Departmental imaging consisted of high-resolution MRI of pituitary gland. Approval was granted from Institutional Ethical Review Board. The longest axis of PPBS was taken as cranio caudal and antero posteriorly and diameter was measured perpendicular to the longest axis.

### RESULT

A total of 78 patients were selected.

The reference lines on Sagittal image correspond to the Coronal T1WI seen on right side, which shows non-visualization of normal PBS

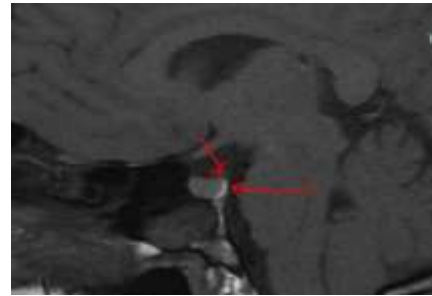


Fig. 1(a). Sagittal T1WI showing normal PBS (Arrows pointing at posterior T1 hyperintense PBS in normal pituitary gland)

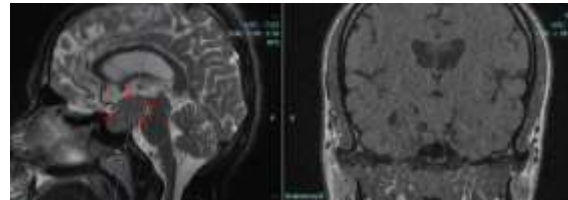


Fig1(b). Sagittal T2WI showing large sellar mass with suprasellar extension and significant mass effect (Arrows pointing at sellar mass consistent with pituitary macroadenoma)

Table1: PBS in patients with normal MR pituitary.

	CC	AP
Mean	5.0938	2.4247
SD	1.28649	.90166
Minimum	1.80	.80
Maximum	8.60	6.00

Table 2: Pearson Correlation.

		CC	AP
CC	Pearson Correlation	1	.300(**)
	Sig. (2-tailed)		.008
	N	78	78
AP	Pearson Correlation	.300(**)	1
	Sig. (2-tailed)	.008	
	N	78	78

\*\* Correlation is significant at the 0.01 level (2-tailed)

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## DISCUSSION

With the recent evolution in MRI, pituitary imaging has enhanced drastically<sup>5</sup>. Dynamic contrast-enhanced MRI is really very helpful in diagnosing pituitary microadenomas<sup>7</sup>. There are variety of recently evolved a MR techniques which are helpful in diagnosing certain important cases. These include 3D volumetric analysis of pituitary volume<sup>8</sup>, high-resolution MR imaging at 3 Tesla (T) for evaluating pituitary stalk<sup>9</sup>, diffusion-weighted imaging, MR Spectroscopy, magnetization transfer ratio, and intraoperative MRI<sup>6</sup>.

PPBS should measure between 1.8-8.6mm in cephalo caudal and 0.8-6mm in antero posterior diameters. As diameter of cranio caudal axis increases so does the antero posteriorly as proved by Pearsons correlation.

In our study, statistically non significant difference is found in posterior pituitary dimensions between males and females. This study is consistent with study done by Tapasavi et al<sup>3</sup>. Fujisawa et al<sup>10</sup> found that mean PPBS diameters i.e. 4.1±1.6 mm for men and 5.3 ± 1.0 mm for women along the cranio caudal axis. While 3.1±0.9 mm (men) and 3.6±0.8 mm (women) were antero posteriorly.

Ju et al<sup>11</sup> in their study showed that the mean of vertical and horizontal dimensions of posterior pituitary gland was 5.8mm and 2.9mm. In our study, PPBS was in 100% of the normal patients. PPBS was detected in all of our cases, however, 99.85% of all pituitary MRIs should show a PPBS with diameters 1.8 mm in the cranio caudal axis and 0.8 mm in antero posteriorly. This suggests that the true absence of a PPBS on a good-quality pituitary MRI should raise the need to investigate for other causes.

In this study, inverse relation was seen in size of PPBS and age of subject. It may be due to release of AVP from the posterior pituitary. Elevated plasma osmolality in the older people causes depletion of the neuro secretory granules in the posterior pituitary gland thus causing absence of the posterior pituitary bright signal.

## CONCLUSION

PPBS was identified in 100% of normal pituitary glands and the mean PBS size in normal pituitary glands ranged from 1.8-8mm i.e. mean±SD of 5.09±1.28mm and there is a direct relation in cranio caudal and antero posterior dimensions of PPBS.

**Conflict of interest:** Nil

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