

INTRODUCTION

Central precocious and delayed puberty are prevalent pediatric endocrinological disorders which can have a substantial effect on the physical and mental health of affected children which necessitates its adequate studying to improve the quality of care provided to the affected children.

Magnetic resonance imaging (MRI) is an innovative technique in the evaluation of affected children which can help unveil their underlying organic intracranial pathology which occur in varying incidencies in different genders and ages and therefore, routing evaluation of all affected children by MRI has longly been debatable.

AIM OF THE WORK

The aim of this study was to assess the prevalence of intra cranial abnormalities detected by magnetic resonance imaging in cases with central precocious or delayed puberty and assess their nature, ratio and correlate the clinical data to radiologic findings.

PATIENTS AND METHODS

Patients: The study was carried during the period between April and December 2024, and included (75) children; (44) cases with precocious puberty and (31) cases with delayed puberty referred to Alexandria Main University Hospital, Radiology department for brain and pituitary MRI evaluation.

Methods: All patients were subjected to: History taking with special emphasis on the appearance, timing and course of markers of puberty, past or ongoing treatments and neurological symptoms, Thorough clinical, neurological and psychological examination with plotting height, weight and body mass index on growth curves and recording the patient's sexual maturity rating, Laboratory testing particularly

serum levels of FSH, LH and testosterone in boys or estradiol in girls as well as thyroid function tests.

MRI of the brain and pituitary: MRI examinations were performed on a 1.5&3 Tesla Philips and 3T General Electric (GE) machines and included conventional brain sequences including 3D T1WI, axial, sagittal and coronal T2WI, axial FLAIR, DWI and SWI. Imaging of the sella included coronal and sagittal T1WI thin section (2 mm) pre and post-contrast, coronal and sagittal T2WI thin sections and dynamic T1WI post contrast.

RESULTS

MRI results of each group were divided into either normal or abnormal which was further divided into abnormalities of the hypothalamic-pituitary axis (HPA) with or without extra HPA abnormalities and isolated extra HPA abnormalities.

In this study we found a high prevalence of abnormal intra cranial imaging findings in both precocious and delayed puberty with the highest prevalence of abnormalities noted at the hypothalamic pituitary axis.

The prevalence of abnormal imaging findings did not correlate with Tanner stage, LH level or gonadotropins ratio in cases of precocious puberty. In delayed puberty, the prevalence of abnormal imaging findings also did not show correlation with LH level and gonadotropins ratio, but it did show significant positive correlation with combined hormonal disturbance or panhypopituitarism which occurred often in those cases.

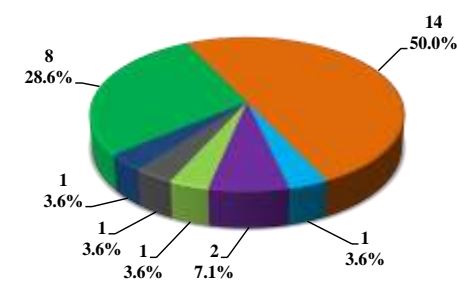
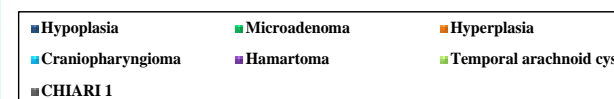


Figure 1: Pie chart representing distribution of the studied cases according to their MRI results in precocious puberty group (Group I).

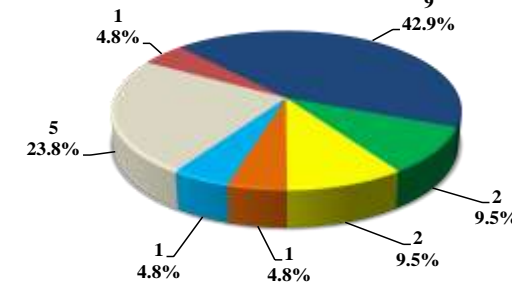
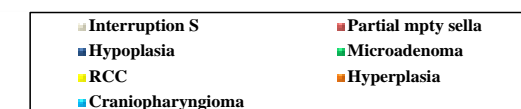


Figure 2: Pie chart representing distribution of the studied cases according to their MRI results in delayed puberty group (Group II).

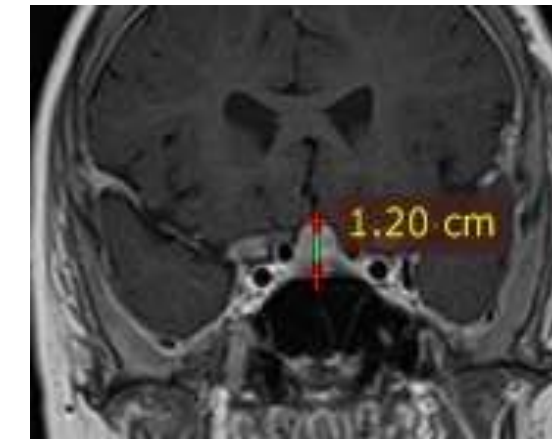


Figure 3: Anterior pituitary hyperplasia in an 8-year-old girl presenting with precocious puberty. Coronal post contrast T1WI showing enlarged anterior pituitary gland, notably its height with supra sellar extension stretching the optic chiasm, still with homogeneous post contrast enhancement and no focal lesions :

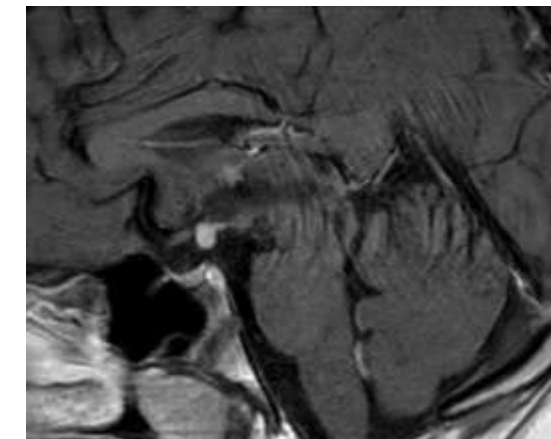


Figure 4: Pituitary stalk interruption syndrome in a 16-year-old male presenting with delayed puberty and panhypopituitarism. Sagittal post contrast T1WI showing abnormally located posterior pituitary bright spot noted at median eminence, the pituitary stalk is absent with marked anterior pituitary hypoplasia.

CONCLUSION

1. Abnormal brain and pituitary MRI findings are prevalent in children with precocious and delayed puberty, including females with precocious puberty aged 6 to 8 years old.
2. Abnormal MRI findings in children with precocious or delayed puberty can significantly impact the child's management plan.
3. MRI of the brain and sella is recommended for all children with central precocious puberty irrespective of their age, gender, gonadotropin level, Tanner stage or neurological status.
4. MRI of the brain and sella is recommended for all children with combined hormonal disturbance or panhypopituitarism or with abnormal neurological status