VOLUME - 12, ISSUE - 02, FEBRUARY - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Paediatrics

CASE REPORT ON NON-FUNCTIONING PITUITARY ADENOMA PRESENTING WITH SHORT STATURE, DELAYED PUBERTY AND PRIMARY AMENORRHEA

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ABSTRACT Delayed puberty in girls is defined as lack of secondary sexual characteristics by the age of 13 years and absence of menarche by the age of 16 years or 5 years after onset of puberty indicates pubertal delay. Constitutional delay of growth and puberty (CDGP) is the most commonly encountered cause of delayed puberty in girls. Pituitary tumors are not very common in childhood and adolescence, and prevalence of up to 1 per million children has been reported. Non-functioning pituitary adenomas (NFPAs) are benign adenohypophyseal tumors not associated with clinical evidence of hormonal hypersecretion. Patients with NFPAs usually come to medical attention as a result of "mass effects" symptoms like headaches, visual disturbances, and/or cranial nerve dysfunction caused by lesions large enough to mechanically compress and damage surrounding structures. Other manifestations are hypopituitarism as a result of mass effect by the compression of the normal anterior pituitary, and hyperprolactinemia due to pituitary stalk deviation can also be present. Here is a case of 16 year old female adolescent with pituitary adenoma presenting with delayed puberty and primary amenorrhea with short stature.

KEYWORDS :

Case

A 16-year old female adolescent presented with short stature and delayed puberty and primary amenorrhea. She had history of headaches from past 1 year. There were no vision problems, inability to detect odors, or galactorrhea was reported. There was no history of delayed growth/pubertal development in family. She was noted to be significantly short for her age (height for age $<3^{rd}$ percentiles). With thinness (BMI for age between 3^{rd} to 5^{th} percentiles) She was at Tanner stage II for breast development and pubic hair. There were no stigmata of turner syndrome. A complete neuro-ophthalmologic evaluation, including visual field and acuity examination was normal and no field defects were found in perimetry. The bone age was consistent with chronological age and complete growth plate fusion

Evaluation of baseline pituitary functions revealed possible hypogonadotropic hypogonadism, luteinizing hormone(LH) levels of 0.13 IU/L (normal values 1.03+_1.39) Follicle stimulating hormone (FSH)-1.6 IU/L (normal values 44.7-21.5), Estradiol 22.97 pg/ml (normal values 27-161).Insulin-like growth factor 1 (IGF-1) 44.2 ng/ml (normal level- 193-731). The rest of her pituitary function was normal. An ultrasound of the pelvis revealed a hypoplastic uterus.(Uterus measuring 1.6×0.5 cm. MRI brain shows well defined lobulated pituitary adenoma measuring 26×15×12 mm in sellar and suprasellar area. Superiorly reaching upto optic chiasma and anteriorly extending into anterio cranial fossa, laterally touching the intercarotid line on the left side and medially to the intercarotid line on the right side and inferiorly reaching to floor of sella and causing widening of sella. (Fig. 1)

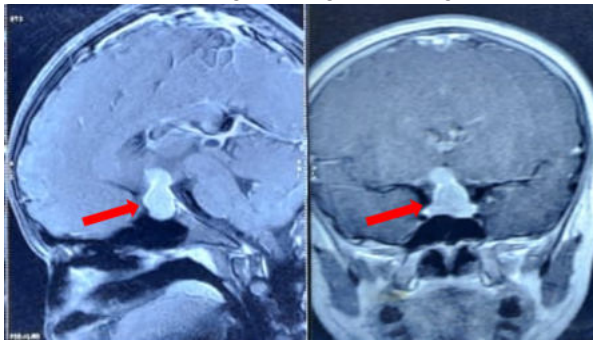

Figure 1. Magnetic resonance imaging (MRI) of the patient. T1 sagittal (**A**) and coronal (**B**) MRI showed a non-enhancing lesion in the posterior portion of pituitary gland measuring 26×15×12 mm in diameter. (Red arrow).

DISCUSSION

Pituitary adenomas comprise approximately 10-20% of intracranial tumors.(1,2) Non-functioning pituitary adenomas (NFPAs) are benign neoplasms that originate from the adenohypophyseal cells and are not associated with clinical evidence of hormonal hypersecretion (3A). NFPAs are categorized into eight different subtypes: silent gonadotroph, corticotroph, somatotroph, thyrotroph, lactotroph, plurihormonal Pit-1, null-cell, and double/triple NFPAs. Clinical features due to NFPAs vary greatly. Some patients are asymptomatic while others have signs and symptoms due to mass effects on surrounding structures, causing headache, visual defects, and/or hypopituitarism (3,4)

Other manifestations includes hormone deficiencies due to of mass effect by the compression of the normal anterior pituitary or hyperprolactinemia due to pituitary stalk deviation or less frequently, pituitary apoplexy(5,6) Some cases of NFPAs may be diagnosed incidentally through imaging studies performed for other purposes, the so-called pituitary incidentaloma. Most patients with NFPAs present with deficiency of one or more pituitary hormones resulting from the compression of the normal anterior pituitary. Hypogonadism can result from either a direct compressive effect on gonadotropic cells or by stalk compression-induced hyperprolactinemia that inhibits the pulsatile secretion of gonadotropin releasing hormone via interfering with hypothalamic kisspeptin-secreting cells (7).

In this case patient had symptoms of delayed puberty (Tanner 1 for breast, pubic hair and axillary hair) with primary amenorrhea. Evaluation of delayed puberty with primary amenorrhea starts with a complete family history and physical examination including the assessment of the external genitalia and internal female genitalia by ultrasonography as well as determination of hormonal status. Patient found to have hypogonadotropic hypogonadism. MRI brain suggestive of well-defined lobulated, pituitary adenoma measuring 26×15×12 mm in sellar and suprasellar area.

Indication for pituitary surgery in patients with non-functioning pituitary adenomas. Surgery is currently recommended in patients with adenomas abutting or

compressing the chiasma with visual field defect. In the absence of visual impairment, a conservative management may be considered. In these cases, an individualized surveillance including hormonal, radiologic, and ophthalmologic assessment is suggested. Hypopituitarism and headache alone are not a strong indication for surgery because improvement in pituitary function and relief from headache cannot be guaranteed. Therefore, treatment decision should be individualized and based on clinical context and patient preference. Surgery may improve pituitary function in up to 30% of patients with pre-existing hypopituitarism (8), but the risk of new hormone deficiency following surgery is 2–15% (9,10). Therefore, hypopituitarism alone is not an indication for surgical treatment. Unremitting headache may be an indication for surgery even though relief cannot be guaranteed. Pituitary function should be reassessed one to three months after surgery and treatment of hypopituitarism introduced according to hormone deficiencies. A sellar MRI should be obtained three to six months after surgery to assess the extent of tumor resection. Also, as a significant number of patients with NFPAs may develop tumor re-growth, long-term imaging surveillance is recommended.

Clinical Pearls

- A detailed history, including a family history of pubertal delay, and a good physical examination, including examination of secondary sexual characters, are essential in evaluating delayed puberty.
- The initial laboratory evaluation of delayed puberty in girls should include LH and FSH levels, prolactin levels as well as bone age.
- Magnetic resonance imaging is an essential investigation when working up pituitary hormone deficiencies.
- Surgical treatment should be performed with a trans-sphenoidal approach by an expert neurosurgeon dedicated to pituitary surgery and pre- and post-operative care should be carried out by a dedicated neuroendocrinologist .
- Careful optimization of treatment and follow-up strategies as well as a multidisciplinary approach may have a signifcant impact on long-term outcomes both in terms of quality of life and survival.

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