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Case Report

Case Report: Hyperprolactinemia In Suprasellar Meningioma

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ABSTRACT

Introduction: Hyperprolactinemia is a condition in which abnormally elevated prolactin levels (normal prolactin levels are 10-28 g/L) is a common endocrine disorder. Establishing the diagnosis and etiology of hyperprolactinemia should include a thorough medical history and the use of drugs, physical examination, laboratory tests, analysis of the pituitary, and sella turcica features. Pituitary tumor imaging analysis using MRI remains the method of choice. The main goals of managing hyperprolactinemia are restoring and maintaining fertility function and preventing osteoporosis. The choice of treatment depends on the underlying etiology.

Case Presentation: A 33-year-old woman complained that her right side of vision could not function properly, and her left side of vision began to blur, which started four years ago with irregular menstrual disorders, and milk came out of her breasts. On breast examination, Tanner 5 was found with galactorrhea and pubic hair Tanner stage 3. On Laboratory examination found FSH (5.50 mIU/mL), LH (1.7 mIU/mL) and prolactin (1125 IU/mL). The MRI examination showed an extra-axial solid mass, broad-based on the planum sphenoidal to the dorsum sellae, suggesting a meningioma; with compression of the optic chiasm, middle cerebral artery, and bilateral anterior cerebral arteries, size 3.1 x 2.8 x 2.3 cm.

Conclusion: Hyperprolactinemia with meningiomas is a unique case. First-line therapy for prolactinomas is dopamine agonist administration and, in this case, is followed by surgery, which showed significant results.

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INTRODUCTION

Hyperprolactinemia is a condition in which abnormally elevated prolactin levels (normal prolactin levels are 10-28 g/L), a common endocrine disorder. Hyperprolactinemia occurs due to several causes, namely physiological, pathological, pharmacological, and idiopathic causes. Hyperprolactinemia occurs in 10% of the population. In adults, the incidence of hyperprolactinemia ranges from 0.4% and increases in prevalence in women with reproductive disorders by around 9-17% [1]. At the same time, meningiomas are one of the most common types of benign intracranial neoplasms that develop from arachnoid epithelial cells and account for as much as 20% of the total number of all intracranial tumors. Meningiomas incidences are 2:1 higher in women than men [2,3].

Clinical symptoms that can occur with hyperprolactinemia include amenorrhoea (abnormality/absence of menstruation for three months or more in women of childbearing age) and galactorrhea (discharge of milk from women's breasts who are not lactating). Generally, menstrual disorders occur in women ranging from oligomenorrhea to amenorrhea, which is very dependent on serum prolactin levels. Prolactin levels> 100 ng/ml always cause amenorrhoea. Sometimes patients complain of headaches accompanied by amenorrhea and visual disturbances

[4]. Establishing the diagnosis and etiology of hyperprolactinemia should include a thorough medical history and the use of drugs, physical examination, laboratory tests, analysis of the pituitary, and sella turcica features. Pituitary tumor imaging analysis using MRI remains the method of choice [5,6].

The main goals of managing hyperprolactinemia are restoring and maintaining fertility function and preventing osteoporosis. The choice of treatment depends on the underlying etiology. Some authors recommend conservative management without surgery in postmenopausal women because of the adverse effects of hyperprolactinemia on bone health, weight gain, and insulin resistance but still require ongoing monitoring for tumor development. Dopamine agonists are the first-line treatment for hyperprolactinemia patients. One of the dopamine agonist drugs is bromocriptine. Surgery may be considered for tumor management in hyperprolactinemia where maximum doses of dopamine agonists are ineffective or intolerable [7].

Recently, hormone testing and advances in neuroimaging are more precise, and the diagnosis of pituitary tumors can be made earlier. There are 30% of patients with pituitary tumors complain of visual problems, and neuro-ophthalmological manifestations are the initial symptom in less than 10% of cases [8]. A 33-year-old female patient with hyperprolactinemia in meningiomas is the subject of this case report. The patient was treated with bromocriptine and will undergo surgery. The existence of this case is considered to need a more in-depth discussion.

CASE PRESENTATION

A 33-year-old woman referred from the ophthalmology outpatient clinic came complaining that her right side of vision could not function properly, her left side began to blur, and milk came out of her breasts. The patient complained that the reduced eyesight accompanied by irregular menstruation had been felt in the last four years (2018); however, she had not been examined before. Then, three years later (2021), in October, the patient complained that the right eye could not see clearly, and the vision on the left began to decrease. The patient was examined in the hospital and diagnosed with meningioma, then was made a referral to RSUD Saiful Anwar Malang. In addition, the patient also said that menstruation was irregular, and the last menstruation occurred on August 5th, 2021. Due to complaints of irregular menstruation and milk discharge from the breast, the patient was consulted at the fertility clinic. Previous menstrual history 1x/month, with a duration of 5-6 days and changing pads 2-3x/day. There was no history of head tumors in the family, obstetrical disease, previous obstetric surgery denied, and weight loss. The patient also admitted that she did not have comorbid disorders such as hypertension, asthma, heart disease, and diabetes mellitus.

Investigation

On examination, the general condition was good with compos mentis consciousness. On breast examination, Tanner 5 was found with galactorrhea and pubic hair Tanner stage 3. Laboratory examination found FSH (5.50 mIU/mL), LH (1.7 mIU/mL) and prolactin (1125 μIU/mL). The MRI examination showed an extra-axial solid mass, broad-based on the planum sphenoidal to the dorsum sellae, suggesting a meningioma; with compression of the optic chiasm, middle cerebral artery, and bilateral anterior cerebral arteries, size 3.1 x 2.8 x 2.3 cm.

Treatment

The patient was given bromocriptine 2 x 2.5 mg for 30 days and was scheduled for neurosurgery trepanation on January 20th. In addition to medical therapy, patients are routinely monitored for prolactin levels every month.

Outcomes and follow-up

Trepanation surgery on the patient went smoothly without a hitch. Postoperatively the patient seemed to improve with a tendency for prolactin hormone levels to decrease one month after surgery, around 4.4 mIU/mL. In addition to prolactin levels, other hormone levels such as LH and FSH were also checked where the LH level in this patient was in the range of 5.0 mIU/mL, and FSH was 6.91 mIU/mL.

DISCUSSION

Hyperprolactinemia Diagnosis Pathway

In the anamnesis of this patient is a referral from the field of ophthalmology who complained of galactorrhea six months ago. The patient is not currently pregnant and breastfeeding. The patient also complained of reduced eye vision accompanied by pain in the head that had been felt in the last four years but had not received adequate treatment. In the obstetrics outpatient clinic, laboratory tests for prolactin, LH, and FSH were carried out to confirm the diagnosis of hyperprolactinemia.

Prolactin is a pituitary hormone that plays a significant role in various reproductive functions, such as milk production after birth. This hormone is produced by the anterior pituitary gland's lactotroph cells. Its secretion is increased during times of stress, pregnancy, exercise, and trauma. Furthermore, prolactin can secrete pituitary hormones that regulate gonadal function, such as follicle-stimulating hormone (FSH) and luteinizing hormone (LH) [9]. Based on the serum prolactin concentration, it is divided into 3, namely mild hyperprolactinemia (20-50 ng/mL), short luteal phase,

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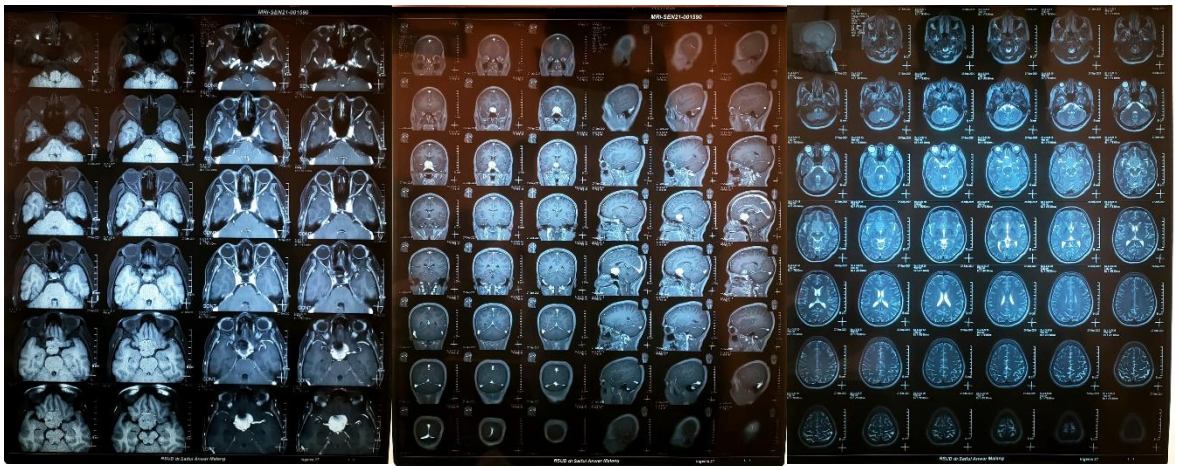

Fig. 1. MRI of The Head Without and With Contrast Impressive Meningioma

causing poor development of preovulatory follicles, moderate hyperprolactinemia (50-11 ng/mL, often causing oligomenorrhea or amenorrhea, severe hyperprolactinemia (> 100ng/mL). mL) marked hypogonadism with low estrogen levels, with clinical implications.

The causes of hyperprolactinemia include physiological, pathological, or pharmacological causes. Pathological and pharmaceutical hyperprolactinemia is symptomatic with unintended long-term consequences, but physiological hyperprolactinemia is transitory and adaptive. Physiological causes include pregnancy, lactation, exercise, and stress. Then, pathological causes include pituitary disorders, hypothalamic disorders, the occurrence of pituitary stalk preventing the flow of dopamine in the pituitary gland, chronic kidney failure, and primary hypothyroidism. Meanwhile, pharmacological causes include estrogen therapy and thyrotropin-releasing hormone [10,11]. Supportive examinations were carried out to establish the diagnosis of hyperprolactinemia, including examination of the prolactin hormone, MRI examination, measurement of TSH hormone, measurement of creatinine urea level, and CT scan.

Pathological causes of amenorrhea can be caused by an increase in the hormone prolactin or what is commonly referred to as hyperprolactinemia. Increased prolactin can also occur physiologically, as in pregnancy and lactation. Lactational amenorrhea is linked to lower LH-pulse amplitude and frequency, as well as lower LH reactivity to estrogen, as does prolactin-induced amenorrhea [12]. The effect of hyperprolactinemia on menstruation status is due to its effect on GnRH pulsatility. Gonadotropins are repressed when the normal GnRH pulsatility is interfered with, and estrogen levels drop as a result [13].

Meningioma Diagnosis Pathway

Meningiomas develop from the central nervous system's meningeal membranes. The incidence is approximately 5 per 100,000 people. It is the most common primary tumor in the central nervous system, accounting for up to 30% of all cases. Meningiomas are diagnosed as a result of neurological symptoms (epilepsy, neurological deficit, increased intracranial pressure) or as a result of associated nonspecific symptoms, such as tinnitus or headache, on brain imaging pictures. Magnetic resonance imaging (MRI) is frequently used to confirm a diagnosis and determine the exact location and size of the tumor. Meningiomas are more frequently reported in women in a 4:1 ratio [14]. Meningiomas are classified into 15 subtypes based on histologic features, according to the WHO classification in 2000/2007/2016, and there are several aggressiveness criteria (necrosis, mitosis, cellular aspects). More than 80% are grade I benign tumors, with atypical grade II accounting for 4-5% of meningiomas and grade III malignant tumors accounting for just 1-3% of cases. [15].

Management of Hyperprolactinemia in Meningiomas

The treatment of hyperprolactinemia is determined by the cause. Once the physiological reasons for hyperprolactinemia have been ruled out, the symptomatic patient should be treated while looking for additional probable systemic causes. In this patient, the hyperprolactinemia experienced was caused by the presence of a stalk in the pituitary. According to the hyperprolactinemia management algorithm, this patient was treated with medication and surgery.

There are various medications for managing hyperprolactinemia, and dopamine agonists have been the first-line treatment for most hyperprolactinemic patients. The Endocrine Society Guidelines recommend dopamine agonist therapy for symptomatic individuals with microadenomas or macroadenomas to reduce

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prolactin levels, tumor size and normalize gonadal function. Dopamine agonists are the first choice of treatment for prolactinomas. Although all dopamine agonists are effective, cabergoline and bromocriptine are the most widely utilized. This drug can normalize prolactin levels. Cabergoline is administered once or twice a week and has a longer duration of action than bromocriptine. Bromocriptine was introduced in 1971. Bromocriptine is given once a day. If serum prolactin levels are normal and no adenoma is visible on MRI, dopamine agonist medication can be reduced and discontinued after two years of continuous treatment [10,16].

Bromocriptine normalizes prolactin levels in 80-90 percent of patients with macroprolactinomas, improves gonadal function, and shrinks tumor sizes. Normalization of prolactin levels and tumor size reduction occurs in around 70% of patients with macroprolactinomas, which is associated with relief of headache and visual field defects. In a retrospective study of 455 individuals, cabergoline treatment also lowered prolactin levels, and treatment restored PRL levels in 86% of 425 patients. Both drugs can be used in the treatment of hyperprolactinemia [16].

Cabergoline is a specific agonist for the dopamine D2 receptor, has a long half-life, and is administered weekly. Based on these characteristics and several comparative studies, cabergoline is considered superior to bromocriptine for treating hyperprolactinemia and is effective in many patients resistant to bromocriptine. Surgical intervention is also considered in some cases [16,17].

Management of Visual Impairment in Hyperprolactinemic Patients with Meningiomas

The most prevalent neuro-ophthalmological symptom is visual problems produced by the suprasellar expansion of the adenoma compressing the optic chiasm. The degree and location of nerve compression determine the type of visual defect. Although both eyes are frequently affected, 33 and 16 percent of individuals may have unilateral or altitudinal abnormalities, respectively. Diplopia may occur due to parasellar expansion of the adenoma compressing the oculomotor nerve, and the fourth, fifth, and sixth cranial nerves may also be affected on occasion. However, the most common visual field deficit associated with pituitary tumors is bitemporal hemianopia, recorded in around 40% of patients [18–20].

Surgical resection is the mainstay of treatment for symptomatic patients with NFPA, i.e., those with neuro-ophthalmological symptoms and/or tumors impacting the optic pathway. Patients with apoplexy who present with neuro-ophthalmologic problems should also have surgery immediately. In the opinion of some experts, tumors larger than 2 cm should also be evaluated for surgery because they tend to grow [21].

Management of Galactorrhea in Hyperprolactinemia with Meningiomas

Galactorrhea is the six-month discharge of breast milk in women who are not breastfeeding. Secretions may be intermittent or persistent, scanty or profuse, free-flowing or expressed, unilateral or bilateral. This condition is more common in women aged 20 to 35 years and women who have given birth than in children and women who are nulligravida [22].

A study by Gayatri and Hidayati [6] said an improvement in clinical conditions and a decrease in total prolactin levels by 79.70% (before action 198.10 ng/mL, after treatment 40.20 ng/mL) in patients with pituitary macroadenoma accompanied by hyperprolactinemia after administration. Bromocriptine 2.5 mg daily for 14 days of hospitalization and Endoscopic Endonasal Transsphenoidal Approach (EETA) surgery. This patient was also given bromocriptine 2 x 2.5 mg and evaluated after one month. This medication was given before surgery and continued until after surgery [23].

Prognosis of Hyperprolactinemia with Meningiomas

Most hyperprolactinemic patients with meningiomas have a favorable prognosis, and their prolactin levels normalize with treatment. Meningioma surgical success rate is inversely related to tumor size and prolactin levels. Although micromeningioma surgery has a high success rate, recurrence of hyperprolactinemia is relatively high, accounting for approximately 17% of patients who are declared initially cured, so a CT scan evaluation is needed every year to prevent recurrence [10].

CONCLUSION

We report a case of a 33-year-old woman with hyperprolactinemia with meningioma. This patient was given medication and surgery. Treatment of hyperprolactinemia with the administration of dopamine agonist drugs, namely bromocriptine, followed by excision of the suprasellar meningioma tumor during surgery, the tumor was found between the hypothalamus and pituitary. In the evaluation after surgery, clinical improvement was found in the patient; complaints of blurred vision improved, headaches were reduced, and there were no complaints of galactorrhea. In the evaluation laboratory examination, there was a significant decrease in prolactin levels after surgery, and hormonal therapy was continued and evaluated one month ahead.

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CONFLICT OF INTEREST

The authors state that they have no conflicts of interest.

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