

## Case Report

# Pituitary inflammatory pseudotumor with amenorrhea, polyuria, and impaired vision: case report and review of the literature

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**Abstract:** Background: Inflammatory pseudotumor (IPT) is a soft tissue lesion of unknown etiology. In 2002 the WHO classified it as a soft tissue tumor, and renamed it inflammatory myofibroblastic tumor. Inflammatory pseudotumor may involve various organs and tissues of the body, mainly the lungs and eyes. Primary intracerebral inflammatory pseudotumor is rare. If the differential diagnosis of IPT is made, surgical treatment can be avoided and the patient's trauma and risk can be reduced. Case summary: We present a case of a 25-year-old female who presented with amenorrhea, galactorrhea, polydipsia, and polyuria. Magnetic resonance image (MRI) demonstrated a tumor (15 mm in diameter) with suprasellar extension, optic nerve compression, and pituitary stalk involvement. Preoperative examination showed a large increase in prolactin and laboratory data showed elevation of the erythrocyte sedimentation rate, but other data were within normal ranges. We applied a lateral transfrontal approach by microscopic resection of the endplate saddle area, because it was large. Postoperative pathology confirmed IPT. Small doses of hormone and thyroxine were given after surgery, and most of the tumor was resected after re-examination. Two years after the operation, no recurrence or other abnormalities were found. Conclusion: Attention should be paid to the differential diagnosis of inflammatory pseudotumor of pituitary. Steroid hormone therapy can be used first to observe its effect. It can reduce the harm caused by invasive operation.

**Keywords:** Inflammatory pseudotumor, pituitary, IgG4, steroid hormone therapy

### Introduction

Inflammatory pseudotumor is a tumor-like mass lesion, a non-neoplastic process with unknown etiology [1]. It is characterized by an uncontrolled proliferation of inflammatory cells, including increased local invasion, rapid growth, and even tumor-like transformation. The histologic features of this tumor are proliferation of fibroblasts, myofibroblasts, plasma cells, eosinophils, lymphocytes, and histiocytes. The etiology is unknown and may be infectious (mycobacterial, cryptococcal, human herpesvirus 8, and Epstein-Barr (EB) virus), or may be due to an imbalance in the immune response (hyper IgG4 disease, IgG4 associated sclerosing disease, and IgG4-associated inflammatory pseudotumor) [2]. The manifestation of inflammatory pseudotumor of pituitary is often an obvious hormone level disorder and placeholder effect.

The patient we report was a 25-year-old female who was admitted with a chief complaint of

amenorrhea, galactorrhea, polydipsia, and polyuria for 3 months. Imaging examination suggested pituitary tumor. We applied a lateral transfrontal approach by microscopic resection of the endplate saddle area. Pathology suggested inflammatory pseudotumor. After surgery, a small dose of dexamethasone and thyroid hormone was given. Three years after surgery, there was no recurrence.

The typical treatment for intracranial inflammatory pseudotumor is surgery to achieve total removal and histologic verification, but before invasive treatment, it is feasible to try low-dose steroid therapy [3]. If it works, the patient does not need to undergo invasive surgery.

### Case presentation

#### *Chief complaints*

A 25-year-old female presented with amenorrhea, galactorrhea, polydipsia and polyuria. Uri-

ne volume was up to 5000 ml per day with progressive left eye blurring.

### *History of present illness*

The patient's symptoms of amenorrhea started a year ago and progressive left eye blurring was since three months ago.

### *History of past illness*

The patient had a negative previous medical history.

### *Physical examination*

Physical examination showed the bilateral eye movements were normal and pupils were sensitive to light reflex. The uncorrected visual acuity was 0.2 left, 1.0 right eye. No other abnormality was found by neurological and physical examination.

### *Laboratory examinations*

Preoperative endocrinological study showed a large increase in prolactin: 59.93 ng/mL (n.v., 3.1-14.1 ng/mL) and a slight reduction in FT4: 0.50 ng/mL (n.v., 0.61-1.52 ng/mL); other hormones showed normal values. Laboratory data showed elevation of the erythrocyte sedimentation rate, but other data were within normal ranges.

### *Imaging examinations*

Magnetic resonance image (MRI) demonstrated a lesion (15 mm in diameter) with suprasellar extension and optic nerve compression. The lesions displayed iso-T1 and iso-or short T2 signal, which were homogeneously enhanced after contrast administration. The pituitary stalk was involved (**Figure 1A-C**).

### *Treatment*

We applied a lateral transfrontal approach by microscopic resection of the endplate saddle area which is the key to explore the lesion, because it is large. We circumferentially incised the dura mater and gently lifted the frontal lobe. Then, we slowly released the cerebrospinal fluid of subarachnoid space. After the reduction of cerebral pressure to a satisfactory level, the chiasma opticum was exposed and prechiasmatic interspace and optic nerve-ICA inter-

space was narrow. After cutting down the endplate, the tumor tissue was seen with gray and white color, tough texture, clear boundary and general blood supply (**Figure 2**). Then it was cauterized and cut off in pieces so only a small amount of tumor remained which was tightly attached to the pituitary stalk and was not forcibly resected.

### *Outcome and follow-up*

Under the microscope, inflammatory cell infiltrate dominated by focal lymphocytes was seen in the nerve tissue; fibrous tissue hyperplasia was accompanied by collagenization, and immunohistochemistry showed: Vim (2+), GFAP (2+), CD34 (-), LCA (lymphocyte 2+), ki-67 (-/+), EMA (-/+) (**Figure 3A, 3B**).

Postoperative MRI examination showed that most of the mass was resected without bleeding and other complications (**Figure 4**). At follow-up visit, two years after surgery, patient had no recurrence (**Figure 5**).

## **Discussion**

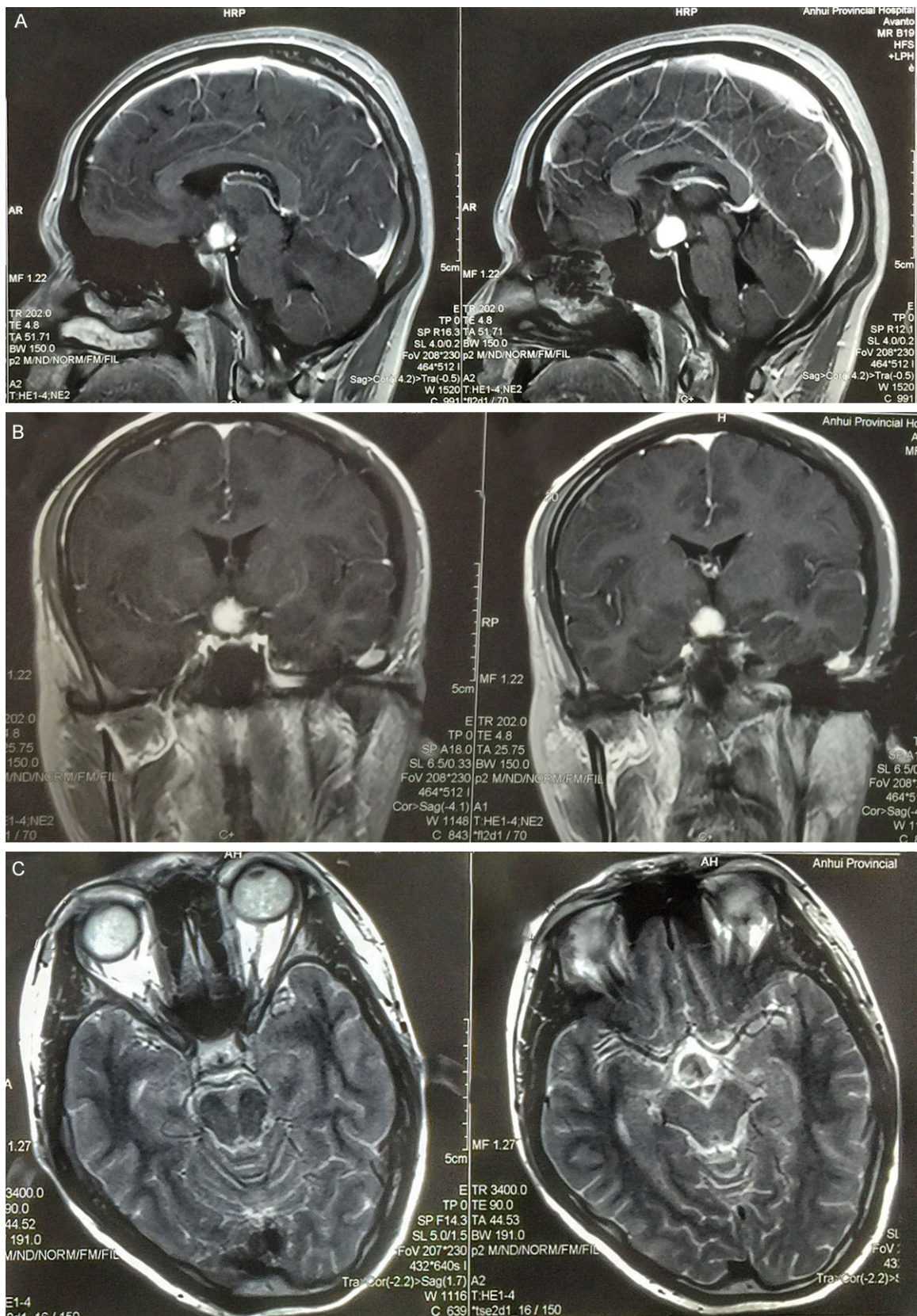
The pathogenesis of inflammatory pseudotumor is currently controversial, with difficulties in diagnosis and treatment methods not yet completely unified. We review relevant literature and give the following discussion.

### *Pathogenesis and pathology*

At present, the true pathogenesis of inflammatory pseudotumor is still unclear. Previous studies have suggested that the incidence of inflammatory pseudotumor is related to bacterial or viral infection. It has been reported in the literature that some patients with inflammatory pseudotumor had a single positive herpes simplex virus antibody [4]. Lin et al. [5] reported a case of inflammatory pseudotumor of the central nervous system in 2009, whose EB antibody detection showed positive EBNA-Ab, EBNA-Ab, and EB-VCA-IgG. However, it has also been reported that most patients with inflammatory pseudotumor have not had the virus isolated, and the PCR test results were all negative [6]. In a systematic review of Desai [3], he described that fungus and bacteria were absent in all biopsy samples reported. Of the few cases that disclosed inflammatory marker results, erythrocyte sedimentation rate (ESR)

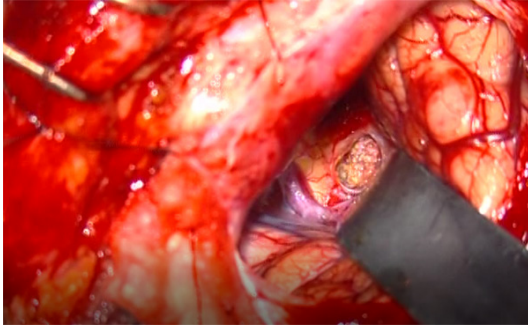


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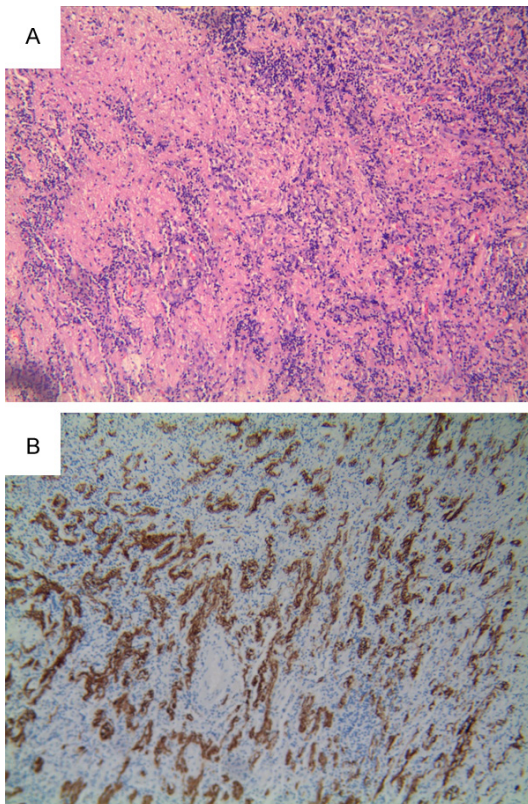


**Figure 1.** The lesion (15 mm in diameter) with suprasellar extension and optic nerve compression. The lesions displayed iso- or short T2 signal (C), which were homogeneously enhanced after contrast administration. The pituitary stalk was involved (A, B).





**Figure 2.** The endplate was cut open and masses were found.



**Figure 3.** A, B: Under the microscope, inflammatory cell infiltrate dominated by focal lymphocytes can be seen in the nerve tissue, there is fibrous tissue hyperplasia accompanied by collagenization, and immunohistochemistry showed: Vim (2+), GFAP (2+), CD34 (-), LCA (lymphocyte 2+), ki-67 (-/+ , <5%), EMA (-/+). A: H&E-staining. B: GFAP.

and C-reactive protein (CRP) were most common. Serologic detection of EBV and viruses was shown to be ineffective in this review. These negative results cannot be used as the basis for the patient not being infected with the virus, because the titer of the specimen is too

low or the virus at the time of detection has been killed by the autoimmune system and other reasons, all of which can lead to negative results. The reference value of viral serologic detection is weak.

Recent studies have shown that inflammatory pseudotumor may be associated with an immune inflammatory response. Inflammatory pseudotumor patients usually have increased serum immunoglobulin level and homocystinuria [7], and they mostly have immune dysfunction diseases, such as Crohn's disease, congenital multiple myositis, and sclerosis [8]. In Desai's systematic review [3], thirteen cases were reported to have IgG4 testing, 11 of which tested positive for the antibody. The presence of IgG4-positive plasma cells is the hallmark of IgG4-related diseases.

This suggests that the immune inflammatory response may be involved in the development of the disease. IgG4 may be a reliable diagnostic value.

Fibrosis in this lesion is common and severe, which is consistent with the gray-white, tough consistency and adhesions observed during surgery. Pituitary adenomas, by contrast, are usually gray, fleshy, and easily scraped.

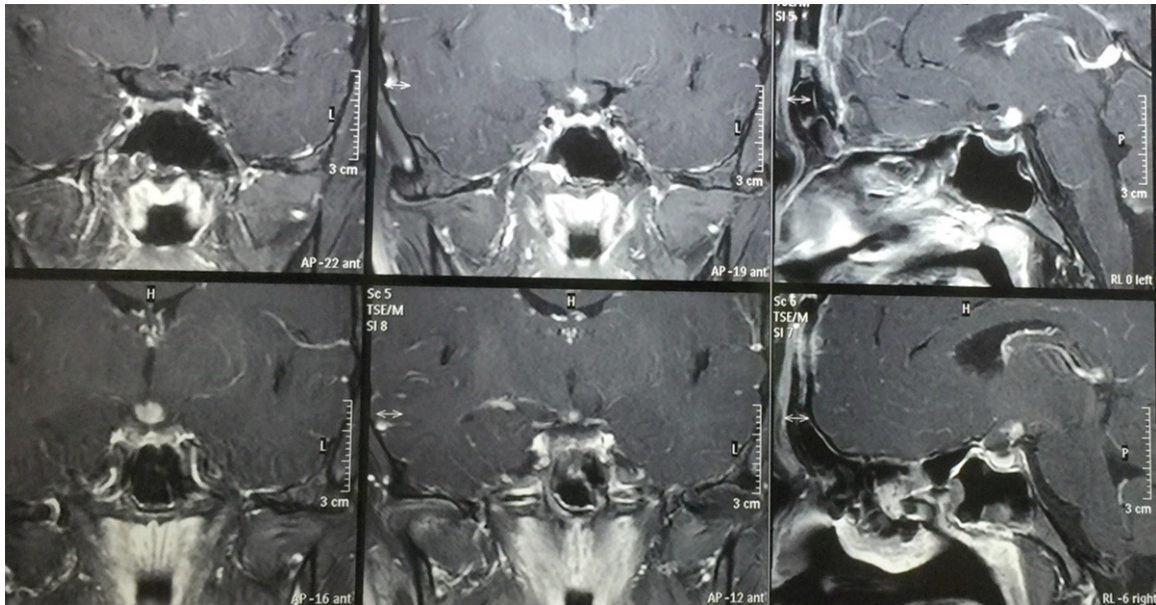
### Clinical diagnosis

#### *Clinical manifestation*

We summarized three main clinical manifestations: sellar compression, hypopituitarism, and diabetes insipidus. Other literature mainly reported these clinical manifestations as well.

Symptoms of sellar compression represented by headache and visual impairment are the most common and are usually the first complaints. Headache is thought to be the result of dilation and distortion of the sellar diaphragm caused by an enlarged pituitary mass. Visual abnormalities include visual field defects and decreased acuity that are secondary to compression of the optic chiasm by the upward-expanding pituitary mass. Diplopia due to lateral dilatation into the cavernous sinus, with compression of cranial nerves III, IV, or VI and subsequent dislocation of the eyeball.

The second most common symptom is due to lack or excess of anterior pituitary hormone,



**Figure 4.** One month postoperatively, most of the mass had been resected.

mainly ACTH, followed by TSH, gonadotropin and PRL. These defects are thought to be a direct result of autoimmune attacks on pituitary acinar cells. They produce typical symptoms and signs of dysadrenalism, thyroid dysfunction, and sexual dysfunction.

Finally, some rare symptoms, can be used in differential diagnosis. A deficit of the posterior pituitary (diabetes insipidus), can be attributed either to direct immune destruction or to compression of the posterior lobe and infundibular stem. Considering that diabetes insipidus is rarely seen in pituitary adenomas, we are in favor of the former. Because pituitary function is impaired, it results in disordered glucocorticoid secretion, Glucocorticoid inhibits the synthesis of aquaporin 2, and in the absence of glucocorticoid, the expression of ADH-acting receptors increases, leading to antidiuretic effects that mask the diuretic increase due to ADH deficiency [9, 10].

## Imaging diagnosis

Imaging examination shows no obvious specificity, but only pituitary enlargement accompanied by pituitary damage symptoms that can be considered pituitary inflammation. Anti-inflammatory treatment is effective to avoid the disadvantages of surgery. MRI showed that the spherical lesions in the sellar region with

enhancement effect, pituitary stalk thickening, or posterior pituitary enlargement were particularly noted.

## Treatment

The treatment of pituitary inflammatory pseudotumor is symptomatic. It involves reducing the size of a mass or replacing endocrine function. Size can be reduced by surgery, steroid hormones, chemotherapy, or radiation. Surgery has always been the most common treatment.

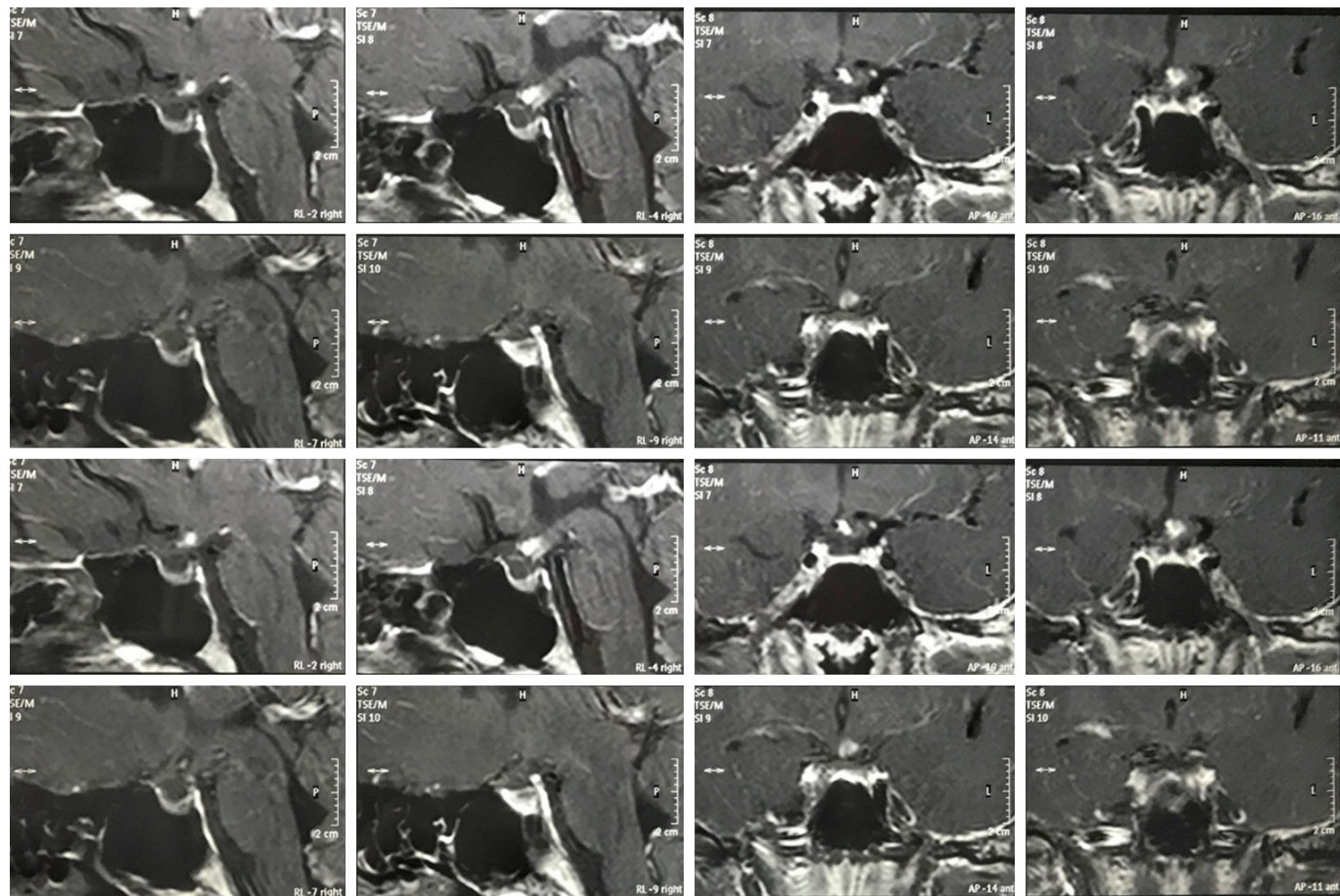
Surgery can effectively improve the saddle-area occupation causing headache and visual impairment, but it is difficult to improve the endocrine defects. The operation may lead to bleeding, cerebrospinal fluid leakage and other complications.

In the literature review of Shikuma, steroid hormone therapy was effective in 92.7% of patients [11]. Glucocorticoid can effectively treat inflammatory pseudotumor, can be used as an anti-inflammatory agent to reduce pituitary masses, and can replace the defective adrenal function. The most commonly used glucocorticoids have been prednisone (from 20 to 60 mg/d), hydrocortisone, and methylprednisolone (120 mg/d for 2 W).

Other immunosuppressive agents and radiotherapy are rarely used as initial treatment but



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**Figure 5.** After 2 years, there was no significant change in the residual mass.

are most commonly used when the disease is recurrent or when existing treatment options are ineffective.

## Conclusion

The differential diagnosis of sellar mass should include inflammatory pseudotumor, especially patients with polyuria and thickening of the pituitary stalk on imaging. Steroid therapy can lead to a satisfying resolution of the disease, so it is recommended to try steroids before other more toxic, invasive treatments are administered. The patient's decision is paramount.

## Disclosure of conflict of interest

None.

## Abbreviation

IPT, Inflammatory pseudotumor.

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