

## Case Report

# Pituitary Abscess Presenting as an Adenoma: A Case Report and Review of Literature

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### Abstract:

We report the case of a patient with a pituitary abscess who presented four months postpartum with pituitary insufficiency and a mass lesion diagnosed as an adenoma. The mass was found to be a sterile abscess at surgery. A pituitary abscess, although rare, should be kept in mind during evaluation for hypopituitarism and sellar masses, especially with systemic signs of infection. Treatment consists of debridement, systemic administration of antibiotics, and hormonal replacement.

**Key words:** Pituitary abscess, sellar mass, infection, pituitary adenoma.

### Introduction and Case Study

Simmonds first described a pituitary abscess in 1914.<sup>1</sup> Primary pituitary abscesses occur within a previously healthy gland, and secondary abscesses arise within an existing pituitary lesion.<sup>2</sup> We report the case of a 26-year-old Caucasian patient who gave birth to a healthy child via cesarean section at 40 weeks. Three weeks after delivery, the patient presented with dehydration, fever, and chills. The patient had cholelithiasis on ultrasonography but a negative nuclear medicine study for acute cholecystitis. The patient continued to have intermittent fevers, headaches, and flu-like symptoms and was treated with an oral first generation cephalosporin. The patient had a second episode of dehydration with increasing thirst, vomiting, and temperatures up to 40.2 degrees C and was admitted for intravenous hydration and antibiotics. Cultures including blood showed no growth. A chest radi-

ograph and transthoracic echocardiogram were normal. A computed tomography of the head utilizing 10.0-mm axial images from the canthomeatal line and 5.0-mm axial images through the posterior fossa was performed for recurrent headaches and showed no evidence of an acute intracranial pathology. During her workup, the patient was found to have a thyroid-stimulating hormone (TSH) level of 0.63  $\mu$ IU/mL (0.35-5.5  $\mu$ IU/mL) and free thyroxine 0.58 ng/dl (0.8-1.5 ng/dL) and was referred to Saint Louis University. The patient had lost 20 pounds, she complained of increasing thirst with a preference for ice-cold water, and awakened at night up to four times to drink water and urinate. She had a poor appetite, dry skin, loss of libido, sleeping disturbances, normal lactation, and remained amenorrheic following her delivery. She did not experience dizziness, cold intolerance, hoarseness, or visual problems. Physical examination was normal with no orthostatic changes in pulse or blood pressure. The patient had a normal neurological examination, and visual field biautomated perimetry disclosed no defects. A presumptive diagnosis of hypopituitarism was made, and additional laboratory testing was done (Table 1). Magnetic resonance imaging (MRI) of the brain done two weeks after the first CT scan demonstrated a 20 x 18 x 25-mm cystic mass in the sella turcica

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**Table 1. Patient's laboratory results and normal ranges.**

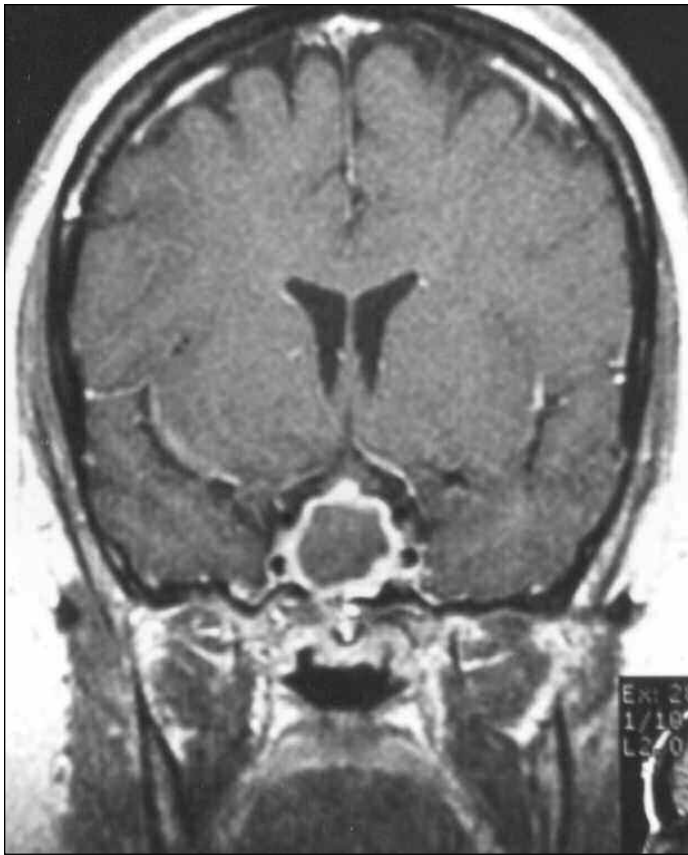
Test	Results	Normal Range
Arginine vasopressin	< 1.0 pg/mL	1.0-13.3 pg/mL
IGF-I	383 ng/mL	114-492 ng/mL
Alpha subunit	<0.2 ng/mL	<0.2 ng/mL
Estradiol	< 30 ng/L	<145 ng/mL
FSH	2.9 IU/L	2.5-10.2 IU/L
LH	< 0.1 IU/L	1.9-12.5 IU/L
TSH	0.63 $\mu$ IU/mL	0.35-5.5 $\mu$ IU/mL
F-T4	0.58 ng/dL	0.8-1.5 ng/dL
Prolactin	28.6 mcg/L	3.8-23.2 mcg/L
Total serum cortisol AM	<0.5mcg/dL	2-17 mcg/L
Plasma ACTH	11 pg/mL	9-52 pg/mL
Serum sodium	143 mmol/L	136-146 mmol/L
Serum osmolality	293 mosm/kg	275-300 mosm/kg
Urine sodium	15 mmol/L	
Urine osmolality	63 mosm/kg	50-1200 mosm/kg

extending into the suprasellar cistern. The rim of the mass became enhanced following administration of gadolinium. There was no significant compression of the optic chiasm, the optic nerves, or lateral extension into the cavernous sinus. A nonenhancing central portion that was cystic on noncontrast images was seen (Figure 1). The patient was started on replacement hormones consisting of prednisone 10 mg per day (after an inadequate cortisol response to a 250 mcg cosyntropin stimulation test), levo-thyroxine 75 mcg per day, and desmopressin two sprays once a day. The patient did well but continued to have recurrent headaches and fever. Repeat blood cultures were negative. Further evaluation was pursued with MRI scanning, and a repeat MRI at 8 weeks showed an interval increase in the size of the mass with moderate expansion of the sella. On T-1 weighting there was a low signal emanating from the central portion of the cystic lesion. A CT scan was done to evaluate the pituitary fossa for microcalcifications. The CT scan done 8 weeks from the initial CT with 1-mm sections showed a punctate focus of calcification in the solid-appearing suprasellar component. A diagnosis of a cystic adenoma was entertained with a differential diagnosis of postpartum pituitary necrosis, craniopharyngioma, or a Rathke's cleft cyst. The patient underwent a stereotactic image-guided craniotomy. Thick purulent material was drained from the pituitary fossa, and the wall of the cavity was fenestrated

and separated from the optic chiasm. A frozen section showed exudates with neutrophils, cell debris, and a fibrous wall with acute and chronic inflammation, consistent with a pituitary abscess and abscess wall. Permanent sections revealed a fibrotic abscess wall with mixed inflammatory infiltrate. The predominant cells were plasma cells with foamy macrophages, lymphocytes, and scattered foci of neutrophils (Figure 2). Small islands of unremarkable pituitary gland acini were seen trapped in the abscess wall (Figure 3). There was no evidence of granuloma or neoplasia. Cultures and special stains for bacteria, fungus, acid-fast bacilli, and spirochetes were negative. The patient was treated for a primary brain abscess and given intravenous metronidazole and ceftriaxone for four weeks. The patient has continued to have pituitary insufficiency on follow up. No further fever, chills, or headaches have been noticed. A repeat MRI six weeks after surgery showed postoperative resolution of the abscess.

### Discussion

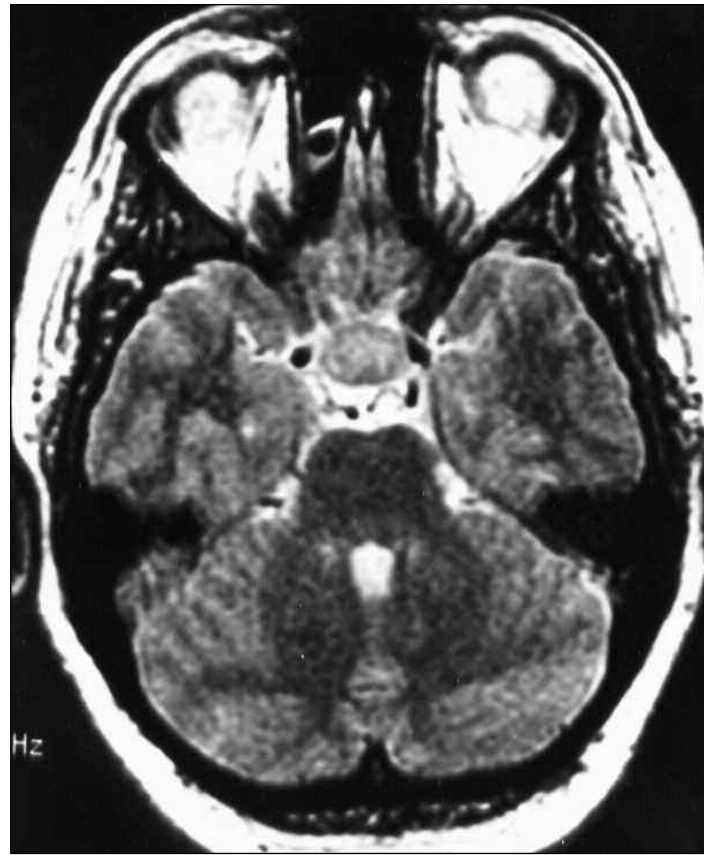
A pituitary abscess is a rare condition. An incidence of 0.6% of all neurosurgical cases has been reported from one large center in India.<sup>3</sup> There is no familial predisposition, and the signs and symptoms of the disease depend on the pituitary hormonal deficiencies, hyperprolactinemia from a stalk section effect, and a mass effect on the surrounding struc-



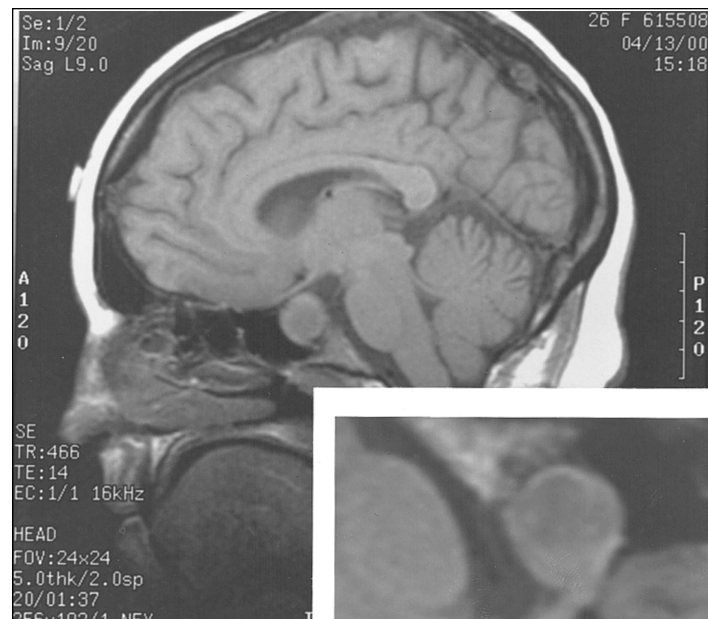
1a.

tures.<sup>4,5</sup> Clinically, these lesions often simulate non-secreting pituitary adenomas and present with headaches, visual disturbance, and suggestive radiological findings.<sup>2-5</sup> Our patient presented with headaches, hypothyroidism, central diabetes insipidus, and adrenocortical insufficiency. The elevated high prolactin level may have been related to a stalk section effect. Our patient presented with fever and constitutional symptoms. These have been reported to be present in most cases of pituitary abscess in one review<sup>6</sup> and may help differentiate abscesses from other pituitary masses. Meningeal syndrome has also been reported.<sup>7</sup> There has, however, been one case series where fever was present in only two out of six patients.<sup>3</sup>

Approximately one-third of abscesses are secondary arising within pre-existing lesions. Pituitary abscess can occur in association with a pituitary adenoma<sup>5,8</sup>, craniopharyngioma<sup>9</sup> or a Rathke's cleft cyst.<sup>10,11</sup> Other predisposing factors have included irradiation, surgery, infarction, and systemic immunosuppression.<sup>3,8</sup> The presence of diabetes insipidus may be valuable in distinguishing a pituitary abscess from an adenoma. Diabetes insipidus is present only in 10% of adenomas but occurs in up to



1b.



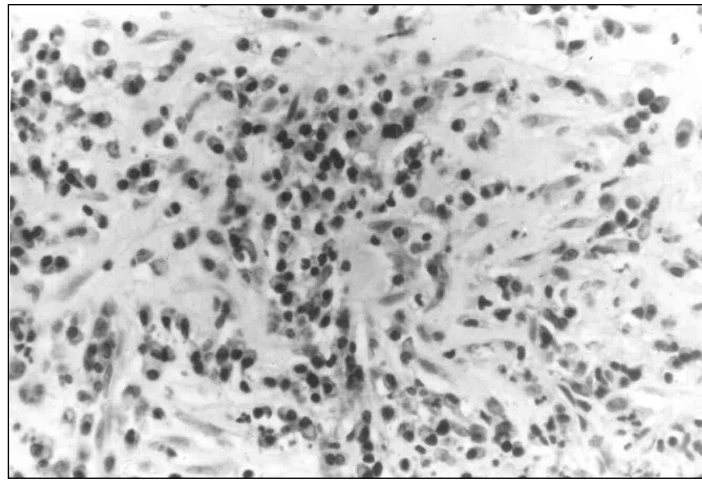
1c.

**Figure 1.** Coronal (a) and axial (b) sections of an MRI. Saggital MRI (c) without and with gadolinium enhancement. A 2.0 x 1.8 x 2.5-cm cystic mass is seen in the sella turcica extending into the suprasellar cistern. The rim of the mass enhanced following gadolinium. There is no significant compression of the optic chiasm, the optic nerves, or lateral extension into the cavernous sinus. A nonenhancing cystic central portion is seen on noncontrast images.

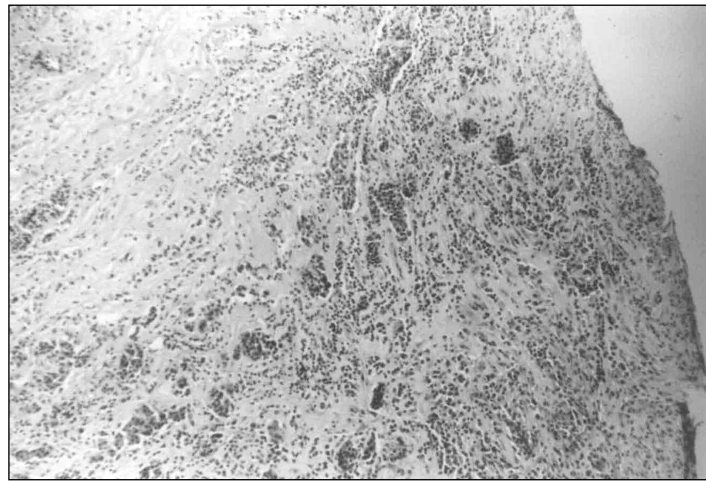
50% of patients with abscesses.<sup>12,13</sup> Our patient developed diabetes insipidus with increasing thirst and dehydration that improved on desmopressin nasal spray.

A pituitary abscess may arise from the sphenoid sinus with vascular or lymphatic spread or direct extension from an infected bone.<sup>6</sup> Cavernous sinus thrombosis has also been thought to predispose to a pituitary infection in a review.<sup>6</sup> It has also been suggested that cavernous sinus thrombosis is always associated with pituitary inflammation.<sup>14</sup> Our patient was four months postpartum at the time of detection. Hypopituitarism presents in Sheehan syndrome only when more than 50% of the gland is destroyed.<sup>15</sup> Postpartum pituitary necrosis may predispose to an abscess formation.<sup>15,16</sup> Our patient had no evidence of puerperal sepsis, although a diagnosis of Sheehan syndrome was initially entertained due to the temporal relationship of the hypopituitarism to the patient's delivery. We also entertained the possibility of postpartum lymphocytic hypophysitis. Our patient did not have a history of autoimmune disease, and review of the pathological material did not reveal an influx of lymphocytes.

CT scan findings of pituitary abscesses are similar to abscesses in other locations in the brain, with a relatively thin wall of uniform contrast enhancement surrounding a central area of low density. Our patient had an initial negative CT scan with 10-mm sections that did not reveal a focus that would suggest direct infection. This, however, may have missed a focus less than 10 mm at the time of scanning. Magnetic resonance imaging findings of pituitary abscesses are nonspecific. On T-1 weighted images, the signal intensity is similar to that of the brain, suggesting a solid lesion such as an adenoma; however, on T-2 weighted images high-signal intensity is observed.<sup>17</sup> Peripheral contrast enhancement has been reported representing an abscess capsule or residual pituitary tissue.<sup>17,18</sup> Contrast medium should be used for better differentiation between an adenoma and an abscess. Our patient's MRI showed a progression in the size of the mass over a period of time that supports the diagnosis of an infectious process. An Indium-111-labeled autologous white blood cell scan has also been used in the diagnosis of a pituitary abscess, although there are no other reports of such use.<sup>12</sup> A tagged WBC scan was not done, as we did not suspect a pituitary abscess preoperatively. MR spectroscopy may have been a useful adjunct, but experience with it is limit-



**Figure 2: High-power micrograph (40 X magnification) of abscess wall with fibroblasts and chronic inflammation.**



**Figure 3: A low-power micrograph (10 X magnification) of an abscess wall with chronic inflammation trapping pituitary gland parenchyma.**

ed at present.

More than half of pituitary abscesses have been reported to be sterile. This may be due to the use of preoperative antibiotics or inadequate isolation techniques, especially for anaerobic organisms and fungi.<sup>8</sup> Leakage of cyst contents from a Rathke's cleft cyst or a craniopharyngioma can produce an intense inflammatory reaction. It has also been postulated that a pituitary abscess is not a bacterial infection and may represent a normal tissue reaction to an infarction of a pituitary adenoma. The frequent association with negative cultures from the abscesses, previous sterile meningitis and endocrine disturbances, and concurrent rhinorrhoea have been explained by the inflammatory response.<sup>19,20</sup> Other authors feel that infarction may follow or mimic a pituitary abscess.<sup>5,8</sup> In

cases with positive cultures, gram-positive cocci (Staphylococcus, Streptococcus, or Pneumococcus) have been the most common isolates, although there are reports of other organisms, including fungi and mycobacterium.<sup>3</sup> Intraoperative cultures and special stains for bacteria, fungus, acid-fast bacilli, and spirochetes were negative in our patient. Although our patient's CT scan prior to surgery showed calcification, which is unusual for an abscess but typical for a craniopharyngioma, there are other aspects of her history that point to an abscess. These include the postpartum status, the presence of gallstones, which could be a focus for the infection, weight loss, fever, and the progressive enlargement of the mass during her illness.

Surgery is indicated if a pituitary abscess is suspected. Although the preferred approach is transphenoidal,<sup>5</sup> our patient underwent a stereotactic image guided craniotomy because of the progressive interval change in size, suprasellar extension of the mass, and the presence of a suprasellar punctate calcification with the possibility of a craniopharyngioma. In patients not receiving antibiotic treatment preoperatively, the suppurative findings during operative exploration necessitate immediate debridement and treatment with broad-spectrum antibiotics until an organism is identified and continued for two to six weeks. Hormonal replacement should be continued postoperatively.

### Conclusion

A pituitary abscess, although rare, should be kept in mind during evaluation for hypopituitarism and seller masses. This case highlights some of the rare causes of pituitary insufficiency. An abscess must be entertained in the differential diagnosis of a patient presenting with hypopituitarism and signs of systemic infection, and the patient should have an MRI evaluation. Treatment consists of debridement, systemic administration of antibiotics, and hormonal replacement.

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