

**Blurred vision and diplopia in full term vaginal delivery women**

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**Abstract**

Pituitary apoplexy can be a life-threatening condition, which is not easily diagnosed or treated. Predisposing factors of pituitary apoplexy include bromocriptine treatment, head trauma, pregnancy, pituitary irradiation, anticoagulation. Apoplexy may occur during pregnancy with appropriately managed, visual symptoms often improve, but endocrinologic function may remain compromised. This case reported that 30-year-old female full term vaginal delivery after years of primary infertility presented in emergency department with headache and blurred vision and diplopia, CNS examination unremarkable except third cranial nerve palsy.

In conclusion, pituitary apoplexy is a rare cause of sudden and severe attack of headache during pregnancy. A multidisciplinary team needs to reduce morbidity and mortality.

**Keywords:** Pituitary apoplexy; Diplopia; Primary infertility

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**Introduction**

Pituitary apoplexy results in an estimated 1.5-27.7% of cases of pituitary adenoma, although the figure is probably closer to 10%. Apoplexy has a male-to-female ratio of 2:1. The usual age range is 37-57 years and pediatric pituitary apoplexy has been described [1].

Pituitary apoplexy (apoplexy meaning “sudden attack” or “to be struck down”) is a potentially life-threatening disorder due to acute ischemic infarction or hemorrhage of the pituitary gland [2]. As the primary event most often in-volves the adenoma, some authors suggested that the syndrome should be referred to as pituitary tumor apoplexy and not as pituitary apoplexy [3].

Pituitary apoplexy stems from an acute expansion of a pituitary adenoma or, less commonly, in a non-adenomatous gland, from infarction or hemorrhage [4]. The anterior pituitary gland is perfused by its portal venous system, which passes down the hypophyseal stalk. Some postulate that a gradual enlarging pituitary tumor becomes impacted at the diaphragmatic notch, compressing, and distorting the hypophyseal stalk and its vascular supply [5]. This deprives the anterior pituitary gland and the tumor itself of its vascular supply, apoplectically causing ischemia and subsequent necrosis [6].

However, one-fifth of all pituitary pathological tumors have evidence of infarction and only 7% of these neoplasms have clinical symptoms [7]. The apoplectic pituitary tumor has varied

clinical presentations but usually presented with acute onset ophthalmoplegia, with severe headache and altered sensorium [8].

The pituitary apoplexy may also occur in non-adenomatous or even the normal pituitary gland especially during pregnancy [6] and subclinical pituitary apoplexy is widely used to describe pathological evidence of asymptomatic pituitary ischemia [9].

The first case mentioned as fatal hemorrhage in a pituitary adenoma was by Bailey in 1898 and Sheehan (1938) pioneered the description of the prototype in obstetric cases [10] while, Brougham (1950) who first coined the term and reviewed the reported cases described till date [9].

Pituitary apoplexy can be a life-threatening condition, which is not easily diagnosed or treated [11]. When appropriately managed, visual symptoms often improve, but endocrinologic function may remain compromised [12]. Predisposing factors of pituitary apoplexy include bromocriptine treatment, head trauma, pregnancy, pituitary irradiation, and, perhaps, anticoagulation Apoplexy may occur during pregnancy [13]. Normally, the pituitary gland hypertrophies in pregnancy because of diffuse nodular hyperplasia of the prolactin secreting cells [14]. This hypertrophy, combined with locally released factors, mediates vascular spasm, and renders the pituitary more susceptible to infarction from compromised blood flow [15]. Sheehan syndrome refers to pituitary apoplexy of a nontumorous gland, presumably due to postpartum arterial spasm of arterioles supplying the anterior pituitary and its stalk [16]. Nine of the 11 cases had severe hemorrhage at delivery [17]. The other 2 cases had no hemorrhage but were gravely ill prior to delivery. ptosis. Usually, at least 1-2 liters of blood loss and hypovolemic shock are associated with a retained placenta. Sheehan syndrome occurs in 1-2% of women suffering significant postpartum hemorrhage [16].

The main complications of Sheehan syndrome include optic neuritis, acute ophthalmoplegia, increased intracranial pressure, extraocular muscle paralysis, adult optic neuritis, aneurysmal rupture meningitis, frontal lobe herniation and chiasmal herniation have been reported.

More recently, ten cases of pituitary apoplexy in the setting of COVID-19 infection have been confirmed in the literature [18].

### Case study

A 30-year-old female full term vaginal delivery after years of primary infertility presented in emergency department with headache and blurred vision and diplopia. On examination, she had CNS examination unremarkable except third cranial N palsy. Plain computed tomographic (CT) scan (after 6 hours of the onset of symptoms) showed hyperdense sellar mass, suggesting intrasellar bleed, indicative of apoplexy of pituitary adenoma.

Axial section of magnetic resonance imaging (MRI) scan, showing varying contrast-enhancing sellar mass as in figure 1.

Follow-up CT scan, 24 hours later, showed similar findings, but with the hemorrhagic tumor rupturing through the diaphragm into the subarachnoid space, cisternal spaces, sylvian fissures,

and interhemispheric fissure. As the patient was being investigated for hormonal status and prepared for surgery, immediately evaluate electrolytes, glucose, and pituitary hormones. Administer high-dose corticosteroids (most patients have hypopituitarism). Administer appropriate endocrinologic replacement therapy alone or combined with transsphenoidal surgical decompression of the tumor. Avoid the "head down" position, when possible. Moreover, call neurosurgery for potential surgical therapy.



**Figure 1.**

Sagittal and coronal T1-weighted MRI scans showing cystic lesion in the central and right side of pituitary, consistent with microadenoma.

## Discussion

Pituitary apoplexy can be a life-threatening condition, which is not easily diagnosed or treated. When appropriately managed, visual symptoms often improve, but endocrinologic function may remain compromised. [19]. Clinical presentation is marked by headache in 95% of cases [20]. The headache is sudden and postulated to result from stretching and irritation of the dura mater in the walls of the sella supplied by the meningeal branches of cranial nerve V. The headache also may result from irritation of the trigeminal nerve from the expanding mass. Frequently, it is retro-orbital in location and may be unilateral at onset, then becomes generalized [21]. Vomiting occurs in 69% of patients and often accompanies the headache. The mechanism is unclear but may be due to meningeal irritation or increased intracranial pressure [22].

Visual acuity defects (52%) and visual field defects (64%) result from upward expansion of the tumor, which compresses the optic chiasm, optic tracts, or optic nerve. The classic visual field defect is a bitemporal superior quadrantic defect. Optic tract involvement from a prefixed chiasm is less common and results in a contralateral homonymous hemianopia [23]. Optic nerve

compression from a postfixed chiasm is rare and may mimic optic neuritis with pain on eye movement, monocular visual acuity loss, and a central scotoma on visual field testing. Overall data of pituitary apoplexy associated with pregnancy is limited to case reports and small case series. Most incidents appeared in the second or third trimester. A current search in the PubMed database for the Medical Subject Headings (MeSH) terms pituitary apoplexy, pituitary disease and pregnancy shows 98 results, including 35 case reports and series [24].

Retrospective literature studies found that the principal symptoms of pituitary apoplexy in non-pregnant women and pregnant women are sudden headache (97% respectively 94%), nausea (80% respectively 30%) and loss of visual fields (71% respectively 61%) [25]. The symptoms are caused by an increase in pressure within the sella turcica produced by hemorrhage into the pituitary gland and its expansion into the cavernous sinus with compression of the optic and other cranial nerves, the optic chiasm, the brain stem and of the pituitary tissue itself [26].

Around 20% of patients will have a change in mental status varying from a mild encephalopathy to coma as consequence of the compression or in cases of hypopituitarism because of life-threatening acute central hypoadrenalism, hyponatremia or hypotension [27]. Most frequently reported precipitating factors for a pituitary apoplexy are pituitary stimulation, surgery, coagulopathy, and hypertension. Pregnancy itself is discussed as a precipitating factor due to the physiological changes in the pituitary gland [28].

Recently, published reported a case of a near-full-term gravid patient presenting with pituitary apoplexy and acute SARS-CoV-2 infection. It is unclear whether the COVID-19 infection was a contributing factor in the apoplectic event, or if these events were coincidental. Nevertheless, the minority of patients will have precipitating factors. The diagnostic modality of choice for pregnant women is MRI without contrast. There are few treatment recommendations, and they are often based on the approach used to treat non-pregnant women [29].

Therefore, a long-term hormone replacement therapy can be required in some patients. For all patients with pituitary apoplexy follow-up appointments with annual endocrine assessments and cranial MRI scans should be considered for 5-years to detect possible tumor regrowth and recurrent apoplexy [30].

Most data of obstetrical and fetal outcomes as well as for following pregnancies of affected patients are missing in the reported literature [31]. The available data show that both, conservative as well as operative treatment, have small impact on delivery and fetal well-being. Regarding the delivery mode, vaginal birth and caesarean section have been reported. Our case report indicates that affected women have a higher probability of reoccurrence of a pituitary apoplexy in the following pregnancies [32]. Thus, these women need close monitoring with repeated visual field and vision examination and hormonal workup in further pregnancies. Moreover, the higher risk should be kept in mind in the situation of precipitating factors, for example, hypertension or the use of anticoagulation. The diagnosis and treatment of pituitary apoplexy associated with pregnancy remains a clinical challenge. Given the complexity of the

disease pregnant women with pituitary disorders should be treated in specialized canters involving a multidisciplinary team.

### **Conclusion**

Pituitary apoplexy is a rare cause of sudden and severe headache during pregnancy. Rapid identification of this condition with potentially associated endocrine disturbances is important to ensure maternal and fetal well-being. A multidisciplinary team approach seems to reduce morbidity and mortality.

### **Competing interests**

The authors declare that they have no competing interests.

### **Authors' contributions**

Both shared in the conception and design and interpretation of data, drafting of the manuscript and critical revision of the case study for intellectual content and final approval of the version to be published. All authors read and approved the final manuscript.

### **Patient consent for publication**

Obtained with signed papers.

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