Pituitary Apoplexy

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KEYWORDS

• Pituitary apoplexy • Emergency • Neurosurgery • Magnetic resonance imaging • Hemorrhage • Necrosis • Pituitary adenoma • Corticotropic deficiency

KEY POINTS

- Pituitary apoplexy is caused by sudden hemorrhaging or infarction of the pituitary gland, generally within an undiagnosed pituitary adenoma.
- Headache of sudden and severe onset is the main symptom, associated with visual disturbances or ocular palsy in half the cases.
- Corticotropic deficiency may be life-threatening if untreated.
- Computed tomography (CT) or MRI confirms the diagnosis by revealing a pituitary tumor with hemorrhagic and/or necrotic components: CT is most useful in the acute setting (24–48 h), whereas MRI is useful for identifying blood components in the subacute setting (4 days–1 month).
- As the course of pituitary apoplexy is highly variable, optimal management is controversial: some investigators advocate early transphenoidal surgical decompression, whereas others adopt a more conservative approach for selected patients, especially those without visual defects and with normal consciousness.
- Glucocorticoid treatment must always be started immediately, as it may be life-saving.

INTRODUCTION

Pituitary apoplexy (PA) is an acute clinical syndrome caused by sudden hemorrhaging and/or infarction of the pituitary gland, generally within a pituitary adenoma. The outcome of acute apoplexy within a pituitary adenoma is difficult to predict: the patient's clinical condition may deteriorate dramatically (subarachnoid hemorrhage from an apoplectic adenoma or cerebral ischemia secondary to cerebral vasospasm), or improve spontaneously, with or without sequelae, such as visual defects, neurologic disorders, and pituitary insufficiency. Apoplexy sometimes destroys the pituitary adenoma but regrowth from a tumor remnant may occur in other cases.

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EPIDEMIOLOGY, PREDISPOSING FACTORS, AND PRECIPITATING FACTORS

PA has a prevalence of 6.2 cases per 100,000 inhabitants[1] and an incidence of 0.17 episodes per 100,000 person-years.[2] Apoplexy, which occurs in 2% to 12% of patients with all types of adenoma[3–8] (preferentially nonfunctioning pituitary adenomas [NFPA][1,3,5,9–11]), is the first manifestation in 80% of them.[3] The risk of PA is low (0.2–0.6 events per 100 person-years) in patients with conservatively managed NFPA or incidentalomas.[12,13]

PA can occur at all ages but is most frequent in the fifth or sixth decade and shows a slight male preponderance.

Precipitating factors are identified in 20% to 40% of cases.[3,5,6,9–11,14–16] An acute increase in intracranial pressure, arterial hypertension, angiographic procedures, and major surgery (particularly cardiac surgery, because of blood pressure fluctuations and anticoagulant therapy) are well-known triggers. PA also can occur after dynamic testing (corticotropin releasing hormone [CRH], insulin tolerance test, thyrotropin releasing hormone [TRH] or growth hormone releasing hormone [GHRH]). Anticoagulation therapy, bleeding disorders, medications such as dopamine agonists and high-dose estrogen, radiation therapy, pregnancy, and head trauma also seem to be able to precipitate apoplexy.

PATHOPHYSIOLOGY

Apoplexy usually occurs in patients with macroadenomas. Pituitary adenomas are particularly prone to bleeding and necrosis, possibly because they outgrow their blood supply or because tumor expansion causes ischemia (and thus infarction) by compressing infundibular or superior pituitary vessels against the sellar diaphragm. The inherent fragility of tumor blood vessels may also explain the tendency to hemorrhage. Whatever the mechanism, the increase in intrasellar pressure[10,17] responsible for the swelling of neighboring structures may be more or less pronounced, explaining why the clinical spectrum ranges from “classic” acute PA to totally silent necrotic and/or hemorrhagic adenomas found on pathologic examination.

CLINICAL PRESENTATION

Headache

Headache is present in more than 80% of patients[18,19] and is generally the initial manifestation, with sudden and severe onset. It is probably due to dural traction or to extravasation of blood and necrotic material into the subarachnoid space, irritating the meninges.

Visual Disorders

Visual disorders are present at presentation in more than half of patients with PA.[3,10,18,20] They are due to a sudden hemorrhage/necrosis-related increase in tumor mass, compressing surrounding structures (mainly the optic chiasm or optic nerves, due to upward expansion of the tumor). Variable degrees of visual-field impairment may be observed, but loss of visual acuity and blindness are rare.[3,7,8,10,18]

More than half of patients with PA have ocular palsy,[21] due to functional impairment of cranial nerves III (the most affected), IV, and VI. This may be related to intracavernous expansion of the tumor mass, to a hematoma, or, most probably, to an abrupt pressure increase in the pituitary region.

Other Neurologic Signs

Signs and symptoms of meningeal irritation, such as photophobia, nausea, vomiting, meningismus, and sometimes fever, may be misleading. Consciousness may be