CASE REPORT

IMAGING IN PITUITARY APOPLEXY
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ABSTRACT: Pituitary apoplexy is an acute clinical condition characterized by sudden onset of headache, vomiting, visual disturbance, ophthalmoplegia and altered sensorium occurring due to infarction or haemorrhage of pituitary gland and often involving the pituitary adenoma. Predominantly seen in non-functional adenomas and in functioning adenomas with prolactinomas having the highest risk. Patients usually present with headache, vomiting, altered sensorium, visual defect and/or endocrine dysfunction. Hemodynamic instability may result from adrenocorticotropic hormone deficiency. Imaging with either CT scan or MRI is performed in suspected cases. On CT, a recent hemorrhage appears as a single or multiple hyperdense lesions with no or little contrast enhancement. MRI is useful in estimating the onset of bleeding and to show the relationship between the tumor and the surrounding structures. CT or MR Angiography is done to rule out aneurysm. Treatment is conservative and surgery is reserved for those cases with deteriorating level of consciousness or increasing visual defect. Here we present a 47 year old male who presented with history of headache and visual disturbances for 6 weeks and was evaluated with radiograph, CT and MRI. A 47 year old male patient presented to the Neurosurgical Department of Vydehi Medical College and Research Centre with history of gradual blurring of vision in the left eye for 2 months. History of diabetes or hypertension was present. The man was hemodynamically stable. Radiograph of the skull showed widening of sella with erosion of the floor. He was advised CT. CT showed widening of sella and a pituitary lesion with fluid level. MRI was advocated for further evaluation. MRI axial and coronal showed sellar and suprasellar mass with figure of eight appearance mass suggesting pituitary mass. Hyper intense fluid level was seen suggesting bleed within the mass. Contrast MRI showed peripheral enhancement. Diagnosis of pituitary apoplexy was made. Patient was subjected to CT ANGIOGRAPHY to rule out aneurysm. CT Angiography did not show any aneurysm. Relevant hormonal levels were normal. Patient underwent transnasal endoscopic pituitary excision with fascia lata graft. Patient withstood the procedure well and patient was discharged. Histopathology revealed pituitary adenoma (Chromophobe type) with focal apoplexy.

KEYWORDS: Pituitary Apoplexy, Prolactinoma, Non-functioning adenomas, MRI.

INTRODUCTION: 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. As the primary event most often involves the adenoma, some authors suggested that the syndrome should be referred to as pituitary tumor apoplexy and not as pituitary apoplexy.¹ However, pituitary apoplexy may also occur in non-adenomatous or even the normal pituitary gland especially during pregnancy.
The first reported case of fatal hemorrhage in a pituitary adenoma was by Bailey in 1898 and Sheehan (1938) pioneered the description of the prototype in obstetric cases. Finally it was Brougham (1950) who first coined the term and reviewed the reported cases described till date.²

It has been reported in 21% of non-functioning pituitary tumors. Among functioning adenomas, prolactinomas have the highest risk.³

Most cases of pituitary apoplexy present in the fifth or sixth decade with a slight male preponderance ranging from 1.1 to 2.25:1.0. In the largest series from India studied at Vellore, the sex ratio was approximately 2:1 with mean age of presentation of 40.4.⁴

It is uncertain whether the pathological process is a primary hemorrhage or is a hemorrhagic infarction. Although pituitary apoplexy can occur without any precipitating factor, some well recognizable risk factors such as hypertension, medications, major surgeries, coagulopathies either primary or following medications or infection, head injury, radiation or dynamic testing of the pituitary.⁵

**CLINICAL FEATURES:** The clinical presentation is variable and many patients are asymptomatic. The most frequent presentation is headache, which is frequently retro-orbital in location. Its onset is usually sudden and severe and can precede the onset of other symptoms. Altered visual field or visual acuity can be due to involvement of the optic nerves, chiasma, or optic tracts. Altered mental status is fairly frequent, seen in around 20% of patients. Impaired consciousness may range from mild lethargy to stupor and coma. Nausea and vomiting may occur due to adrenal insufficiency. There can be massive subarachnoid and intraventricular hemorrhage.⁶

The majority of the patients (Nearly 80%) will have deficiency of one or more anterior pituitary hormones at presentation. Multiple pituitary hormonal deficiencies such as, GH deficit (88%), ACTH hypo secretion (66%), hypothyroidism (42%) and hypo gonadotropic hypogonadism (85%) can occur. Clinically, the most important endocrine dysfunction is adrenocorticotroph hormone (ACTH) deficiency. Reports have shown resolution of hyper secretory states following apoplexy, also described as ‘Auto-hypophysectomy.’⁷

**RADIOLOGICAL FINDINGS:** Plain radiography of the skull is a quick and inexpensive method for evaluating pituitary apoplexy and shows enlargement of the pituitary fossa and erosion of the sellar floor and dorsum sellae.⁸ (Figure-1) On CT scan, depending on the duration of the apoplexy the radiological appearances differ. A recent hemorrhage can appear as a single or multiple hyperdense lesions with no or little contrast enhancement. On subsequent days after hemorrhage a progressive reduction of lesion hyper density occurs and with contrast a peripheral ring may be seen around the lesion.⁹ Fluid blood density may be detected. (Figure 2) Brain CT can also demonstrate subarachnoid hemorrhage and involvement of brain and ventricles.

Magnetic resonance imaging (MRI) is usually less efficient than CT in the acute stage of pituitary apoplexy.⁹ but for sub-acute and chronic stages of pituitary apoplexy brain MRI is superior to CT. One of the advantages of MRI is the possibility of estimating the onset of bleeding and to show the relationship between the tumor and the surrounding structures. In the acute stage, hypo or iso intense lesion on T1- and T2-weighted images is seen. In sub-acute stage there is marginal signal reinforcement although the hematoma core remains isointense. In
chronic stage there is an overall increase on T1and T2 signal. CT or MR Angiography rules out aneurysm and vasospasm by showing peripheral enhancement.

(Figure 3) Coronal T1 (a) and axial T2 (b) shows a mass in sella with suprasellar extension having “Figure of 8” appearance. (Figure 4 and 5) In the acute phase (0–7 days), deoxyhaemoglobin leads to shortening of the T2 relaxation time due to the susceptibility effect and the MRI signal is hypo intense on T2-weighted imaging (T2WI) with isointensity or slight hypo intensity on T1-weighted imaging (T1WI). In the subacute phase (7–21 days), methaemoglobin shortens the T1 relaxation time and the haemorrhage will appear hyperintense on T1WI as well as on T2WI (Figure 6 and 7). In the chronic phase (>21 days), macrophages digest the clot and the presence of haemosiderin and ferritine causes a strong hypo intensity on both T1WI and T2WI.

Empty sella is a sequel of pituitary apoplexy and MRI shows sella turcica filled with cerebrospinal fluid.

Differential diagnosis is ruptured intracranial aneurysm and meningitis. Pituitary apoplexy and ruptured intracranial aneurysm both present with sudden onset headache, ocular palsy and altered mental status. The symptoms tend to develop more rapidly after the onset of headache in subarachnoid haemorrhage than in apoplexy. Cerebrospinal fluid analysis is useful in subarachnoid haemorrhage or meningitis.

MANAGEMENT: Acute secondary adrenal insufficiency is seen in approximately two-thirds of patients with pituitary tumor apoplexy and is an important cause of mortality associated with this condition. The immediate medical management of patients with pituitary apoplexy should include careful assessment of fluid and electrolyte balance, replacement of corticosteroids and supportive measures to ensure hemodynamic stability. Surgical intervention should be reserved for those with altered sensorium and increasing visual deficit. Once the acute event has subsided, all patients require at least an annual clinical review preferably by a combined endocrine and neurosurgical team. MRI scan is recommended at 3–6 months after an episode of pituitary apoplexy and thereafter an annual MRI scan should be considered for the next 5 years, then two yearly.

SUMMARY: Pituitary apoplexy is an acute clinical condition resulting either from infarction or haemorrhage in the pituitary. It can be seen in both functional and non-functional pituitary adenomas. Patients present with headache, altered sensorium and visual defect and may be confused with subarachnoid haemorrhage or meningitis. Imaging such as CT or MRI plays an important role in the diagnosis. Management is by conservative measures and surgery is reserved for those cases with increasing neurological deficit and visual defect.
Fig. 1: Showing widening and ballooning of sella consistent with sellar mass

Fig. 2: Axial CT shows hyperdense fluid Level in the suprasellar mass

Fig. 3: CT angiography showing peripheral enhancement of the sellar mass. No aneurysm seen

Fig. 4 & 5: Coronal T2 and sagittal T1 showing a mass in sellar region with suprasellar extension having “Figure of 8” appearance
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