

Pituitary Apoplexy Following Coronary Artery Bypass Grafting

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ABSTRACT

Pituitary apoplexy following cardiac surgery is a very rare complication and can be a potentially life-threatening clinical syndrome. It could be caused by acute infarction, hemorrhage or edema and sudden enlargement of a pre-existing and unknown pituitary adenoma. We report a case of hemorrhagic apoplexy of a pituitary gland macro-adenoma successfully managed by urgent trans-sphenoidal tumor resection in a patient after elective coronary artery bypass grafting (CABG).

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Introduction

Pituitary apoplexy, following coronary artery bypass grafting (CABG), is an acute and rare clinical syndrome in the post-operative course of cardiac surgery. It could be caused by acute infarction, hemorrhage or edema and sudden enlargement of a pre-existing and unknown pituitary adenoma (1).

The most common primary symptom is a severe headache, lethargy, confusion often associated with a rapidly worsening visual field defect or double vision, oculomotor palsy involving cranial nerves III, IV, and VI caused by increased pressure in and around

the pituitary gland and compression of nerves surrounding the gland. This is usually followed by acute symptoms caused by lack of secretion of essential hormones, predominantly adrenal insufficiency (2,3).

Here, we report a case of hemorrhagic apoplexy of a pituitary gland macro-adenoma requiring urgent trans-sphenoidal tumor resection in a 65-year-old male patient who underwent elective CABG.

Case Report

A 65-year-old man suffering from typical exertional chest pain and dyspnea with history of diabetes and hypertension was diagnosed to have three vessels coronary artery disease. The patient underwent on-

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pump beating CABG surgery according to standard practice. The operation was performed with three grafts and without any hemodynamic instability.

Total cardiopulmonary bypass (CPB) time was 55 minutes, lowest central body temperature was 34C, lowest mean arterial pressure (MAP) during CPB was 60 mmHg, peak activated clotting time (ACT) was 490 seconds and the lowest hemoglobin level was 7.0 g/dL.

The patient came off CPB easily with an uneventful recovery and he was extubated 6 hours later in the ICU. On the second postoperative day, the patient complained of a severe headache, along with visual field defect, and diplopia. In neurological examination, he was found confused with an isolated left third cranial nerve palsy and bitemporal hemianopsia. Funduscopic examination showed no papilledema nor hemorrhage. The visual acuity was faintly impaired. Clinical examination did not show any other remarkable neurologic signs.

An urgent magnetic resonance imaging (MRI) showed a pituitary macroadenoma with acute and ongoing bleeding leading to left-sided mass effect on the cavernous sinus (Figure 1. AH,HP). The pituitary function test results were within the normal range.

Trans-sphenoidal resection of the pituitary macroadenoma was performed urgently and the histopathologic examination of the resected tissue confirmed a necrotic pituitary adenoma with acute hemorrhage, consistent with pituitary apoplexy. The patient was discharged uneventfully 12 days after the initial CABG surgery with full recovery of vision in his left eye.

Discussion

Pituitary apoplexy was reported for the first time by Bailey in 1898 however, only few cases have been reported in the literature following cardiac surgery (4). Almost all cases of pituitary apoplexy arise from a pituitary adenoma, a benign tumor of the pituitary gland.

Amongst reported associations are surgery (especially coronary artery bypass graft, where there are significant fluctuations in the blood pressure), disturbances in blood

coagulation or medication that inhibits coagulation, radiation therapy to the pituitary, traumatic brain injury, pregnancy (during which the pituitary enlarges) and treatment with estrogens (5).

Tumors may also be more sensitive to fluctuations in blood pressure, and the blood vessels may show structural abnormalities that make them vulnerable to damage (5). Some of the possible implicated mechanisms of pituitary apoplexy after cardiac surgery include intensive anticoagulation with

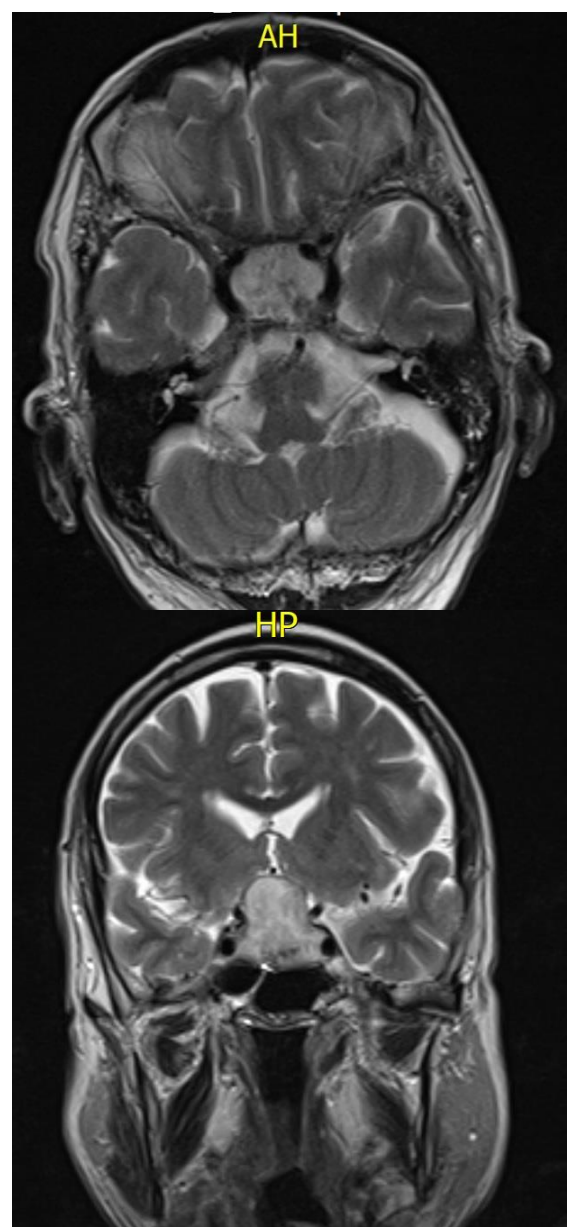


Figure 1. (AH&HP) MRI scan performed the day after the CABG demonstrates the large macroadenoma in the Sella turcica with hemorrhage in the gland.

heparin, decreased cerebral perfusion, extracorporeal circulation, cardiopulmonary bypass-induced edema, embolization, and intra-operative dampened arterial blood pressure, causing hypoperfusion of the pituitary gland with subsequent infarction (4).

Although pituitary adenoma texture itself is predisposed to necrosis and hemorrhage, hypotension, reperfusion injury, and hemodilution due to the priming of the pump circuit can also cause necrosis and hemorrhage. The absence of pulsatile flow during cardio-pulmonary bypass and reperfusion injury after restoration of the physiological pulsatile circulation after CPB can also increase the risk of bleeding in a pre-existing pituitary adenoma. Large amount of steroids secreted in response to the surgical stress can lead to the Excessive stimulation of a pituitary adenoma and is postulated to cause pituitary apoplexy (6).

It is recommended that magnetic resonance imaging (MRI) scan of the pituitary gland should be performed if the diagnosis is suspected; this method has a sensitivity of over 90% for detecting pituitary apoplexy (1).

Visual field testing is recommended as soon as possible after diagnosis, as it quantifies the severity of any optic nerve involvement and may be required for deciding on surgical treatment.

Pressure on the part of the optic nerve known as the chiasm, which is located above the gland, leads to loss of vision on the outer side of the visual field on both sides, as this corresponds to areas on the retinas supplied by these parts of the optic nerve; it is encountered in 75% of cases. Visual acuity is reduced in half, and over 60% have a visual field defect. 70% of people with pituitary apoplexy experience double vision due to compression of one of the cranial nerves in cavernous sinus. The Oculomotor (third cranial) nerve is predominantly affected as it lies closest to the pituitary gland followed by the fourth (Trochlear) and sixth (Abducens) cranial nerves. The cavernous sinus also contains the carotid artery, occasionally,

compression of the artery can lead to the symptoms of stroke (7).

The first priority in suspected or confirmed pituitary apoplexy is stabilization of the circulatory system. Cortisol deficiency can cause severe low blood pressure.

The decision on whether to surgically decompress the pituitary gland is complex and mainly dependent on the severity of visual loss and visual field defects. If visual acuity is severely reduced, there are large or worsening visual field defects, or the level of consciousness falls consistently, professional guidelines recommend that surgery is performed. Most commonly, operations on the pituitary gland are performed through transsphenoidal surgery. Surgery is most likely to improve the vision if there was some remaining vision before surgery, and if surgery is undertaken within a week of the onset of symptoms (8).

Those with relatively mild visual field loss or double vision only may be managed conservatively, with close observation of the level of consciousness, visual fields, and results of routine blood tests. If there is any deterioration, or expected spontaneous improvement does not occur, surgical intervention may still be indicated.

After recovery, people who have had pituitary apoplexy require follow-up by an endocrinologist to monitor for long-term hormonal evaluation. MRI scans are performed 3–6 months after the initial episode and subsequently on an annual basis (2,8).

Conclusion

Diagnosis of pituitary apoplexy needs a high index of clinical suspicion in any post-cardiac surgery patients with neuro-ophthalmological signs and symptoms, and usually urgent trans-sphenoidal decompression should be considered. Conservative medical management has also been reported successfully in few cases of pituitary gland apoplexy, though, surgery should not be delayed if an unexpected change in consciousness or persistent ophthalmopathy occurs.

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