Sub acute apoplexy of pituitary tumors: Outcome of 8 cases with surgical decompression and review of literature

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Abstract: Background: Small cyst or minute hemorrhages within pituitary tumors have previously been referred to as "silent pituitary apoplexy" implying the absence of symptoms referable to the event. Acute Apoplexy is usually rare. Subacute degeneration within the tumor is common; this clinical condition is reportedly seen in less than 10% of pituitary tumors. **Objective:** Aim of this study is to show the surgical outcome in eight consecutive patients presented with headache with investigations proving the presence of pituitary apoplexy. **Materials and Methods:** This study included eight patients with pituitary tumors complicated by subacute degenerative changes "apoplexy"; they underwent full clinical & radiological diagnosis. All patients were operated upon. Then all patients had been followed up for 8-10 months. Patients were collected in an overall period of 14 months. **Result:** Rapid surgical decompression gave excellent outcome in regressing the severely presenting headache and neurological deficit through a period ranged between 4 days and 3 weeks. **Conclusion:** Subacute apoplexy within the pituitary tumors is a large clinical state. It needs rapid assessment and transsphenoidal decompression to save both life and sight.
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1.Introduction

Patients with pituitary neoplasm, usually present clinically with endocrine, visual or neurological abnormalities, and those symptoms are due to either vascular or mechanical compression of adjacent structures including the hypothalamus, third ventricle, optic chiasm and optic nerve. The development and progression of these symptoms occurs gradually during a time interval of many days to several weeks.[1] Commonly the syndrome was characterized by the sudden onset of headache, visual impairment, diplopia, and less commonly altered mentation or autonomic dysfunction; the initial new clinical presentation suggests an underlying pathogenesis. This condition is defined as “pituitary apoplexy” and is caused by the sudden enlargement of the tumor due to hemorrhage or infarction in its substance. This pathology usually occurs spontaneously, but many factors which include radiotherapy, head trauma, nasal catarrh, persistent cough, estrogen and anticoagulant therapy have been implicated as possibly precipitating this disorder.[2] Patients with pituitary tumors (whom have had like of this kind of pathology "hemorrhage, necrosis and cyst formation) with disturbed level of consciousness, or impaired vision should undergo surgical decompression as the precious goal for treatment. This paper aims to show the surgical outcome in eight consecutive patients presented with headache with investigations proving the presence of pituitary apoplexy.

2.Materials and Methods

A retrospective analysis was made of the clinical course of eight patients with suddenly complicated pituitary tumor. This group of patients was categorized as the following selective criteria; (a) patients have had pituitary tumor under conservative treatment and they were presented by sudden changes in the clinical course, (b) patients have had a history of pituitary tumor that received subsequently radiotherapy and presented by changes in the clinical course, and (c) patient's tumors were discovered accidentally and the first presentations were sudden headache, visual impairment and the investigation tools showed degeneration in the pituitary tumor.

There were eight patients. Five were females; three were males, with median age 39 years. Only two patients who had previously undergone transsphenoidal "partial excision" and one patient sought radio-therapy without surgery, those three patients were known to have definite histories related to pituitary tumors.

Prior to presentation with apoplexy, the other five patients the apoplectic syndrome, nearly, was the initial evidence that suggested the presence of a pituitary tumor; if even there were some of symptoms among these, for example, amenorrhea, galactorrhea and acromegaly. The onset of symptoms was demarcated by abrupt severe headache in all patients (100%), headache was the predominant and initial symptom, the headache which related to apoplexy was in fronto-temporal area and not preceded by other episodes of prodromal head pain, while double vision in horizontal plane was reported in two patients (25%), field defect in three patients (37.5%) and impairment of conciousness was

noted in one patient (12.5%); tables 1 and 2.

On clinical examination which include general & neuro-ophthalmic examination, Constriction of field were detected in three cases, third nerve palsy in two cases, and no neuro-ophalmic signs were found in two cases, whereas loss of vision & impairment of conscious level in one case, table (3).

Laboratory studies were preformed for seven patients (78.5%) which showed high serum prolactin > 200 ng/ml in four patients, while less than 100 ng/ml in two patients, and growth hormone was high in one patient 50 ng/ml.

CT appearance is used as an early diagnostic tool for recent tumor haemorrage, and it is used to identify sellar erosion, adjacent sphenoid sinus opacification, and suprasellar extension with hyperdense and hypodense areas in relation to surrounding brain tissue.

MRI was done in all cases and it was advantageous in terms of showing a reasonable estimate for age and course of the hemorrhage (see figure 2).

The initial management of all patients included the administration of the currently available forms of corticosteroids to correct any impairment of secondary adrenal insufficiency and reduce any brain edema. But the surgical procedure is the main goal of treatment. Transsphenoid approach was adopted for all patients to reduce or evacuate the tumor mass, decompress the visual structures and the hypothalamus. The histopathology was important to know if there is a relation between the apoplexy and type of adenoma.

Statistical Analysis

The statistical method used in the study is the mean measure, thereby all of the values are added together, then divided by the number of original values to calculate the *mean* average of the cases under study.

3. Results

The predominant outcome in this study was that the presenting headache and nausea were rapidly ameliorated during one week. In 7 cases, the field defects improved in 4 weeks and double vision improved in 6 months following the surgery. Only one patient got his conscious level worsened and died after 2 weeks from the surgery, (case 6, Table 2).

Further episodes of apoplexy or evidence of tumor recurrence were not observed in any patients studied and those patients have been followed for eight to ten months. The follow up included the general, neurological, ophthalmological state, serum prolactin level, CT brain and MRI sella, as shown in figure 3. All patients required Bromocriptine postoperatively and we reduce the doses according to the serum prolactin. Besides, corticosteroids and antidiabetic measures were advised to one patient, (case 3, Table 2).

Degenerated brown fragments and xanthochromic fluid were the characteristic gross appearance for all specimens on histopathological examination. The specimens available for histopathological studies were five diffuse, one sinusoidal, and one papillary cell tumor, figure (4).

Table (1) Patient population with their presenting symptoms and duration

Patient No	Age/Sex	History	Major clinical symptoms	Duration of new symptoms
1	F. 23 Y	Primary amenorrhea	Severe headache, field cut	6 days
2	F. 35 Y	Mild headache.	Severe headache , double vision	10 days
3	M. 51 Y	Acromegaly, impotence.	Severe headache, field cut	8 days
4	F. 45 Y	Pituitary tumor & trans -sphenoidal Surgery.	Severe headache	5 days
5	M. 43 Y	Headache, Malaise.	Severe headache, field cut, Nausea.	7 days
6	M. 55 Y	Pituitary tumor & radiotherapy loss of vision.	Headache, Vomiting impairment of conscious.	3 weeks
`7	F. 39 Y	Pituitary tumor & transsphenoidal surgery.	Severe headache , blurring of vision	6 days
8	F. 40 Y	Secondary amenorrhea. Galactorrhea, mild headache.	Severe headache, double vision.	11 days

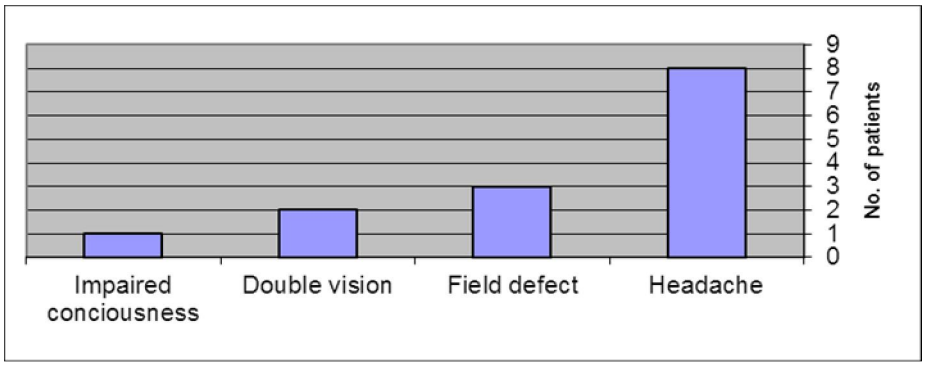


Figure (1) symptomatology and number of patients

Table (2) Clinical Signs, radiological findings & Management

No.	Neuro-ophtalmic finding	Endocrine finding	CT finding	MRI Finding	Management
1	LT. temporal field defect.	S.P>500ng/ML	Sellar mass with hyperdense area.	Recent Hge in sellar & suprasellar T	Transsphenoidal decompression.
2	Rt. 3rd nerve palsy.	S.P>400ng/ML	Sellar & suprasellar mass with hypo. & hyper dense areas.	Recent hge and other cyst formation at sellar & suprasellar. T	Transsphenoidal decompression.
3	Peripheral neuropathy, skin pigmentation, acromegalic features & Bitemporal hemianopia.	S.P.180ng/ ML & G.H 50 ng / ML	Sellar & suprasellar mass with erosion of floor.	Old & recent Hge inside the T	Transsphenoidal decompression.
4	No neuro – ophthalmic signs.	S.P. 250 ng / ML	Sellar & supersellar mass with incomplete seller floor resection	Old hge & cyst formation inside the mass	Transsphenoidal decompression.
5	Lt. lower quadrantric hemianopia	S.P. 70 ng/ML	Sellar mass with sph. Sinus erosion	Sellar & suprasellar mass with recent Hge elevating the chiasm.	Transsphenoidal decompression.
6	4th deg. papilledema contralateral optic atrophy, impairment of conscious level	Not. Taken	Sellar & suprasellar mass with obstructive hydrocephalus	Old & recent hge and cyst formation in sellar &suprasellar T.	C.S.F. shunting & T.S.S. Died after 2 weaks.
7	No neuro – ophthalmic signs.	S.P. 90 ng / ML	Sellar mass, incomplete sellar floor resection	Recent Hge inside the Tumor.	Transsphenoidal decompression.
8	Lt. 3rd nerve palsy	S.P. > 380 ng/ML	Sellar & suprasellar mass	Old & recent Hge with suprasellar extension more to the left.	Transsphenoidal decompression.

Abbreviations:

- S.P. = Serum Prolactin
- dg. = degree
- GH = growth hormone
- Sph= sphenoid
- T = Tumor
- CT=computerized tomography
- Hge = Hemorrhage
- T.s.s= Transsphenoidal
- MRI = Magnetic Resonance Image

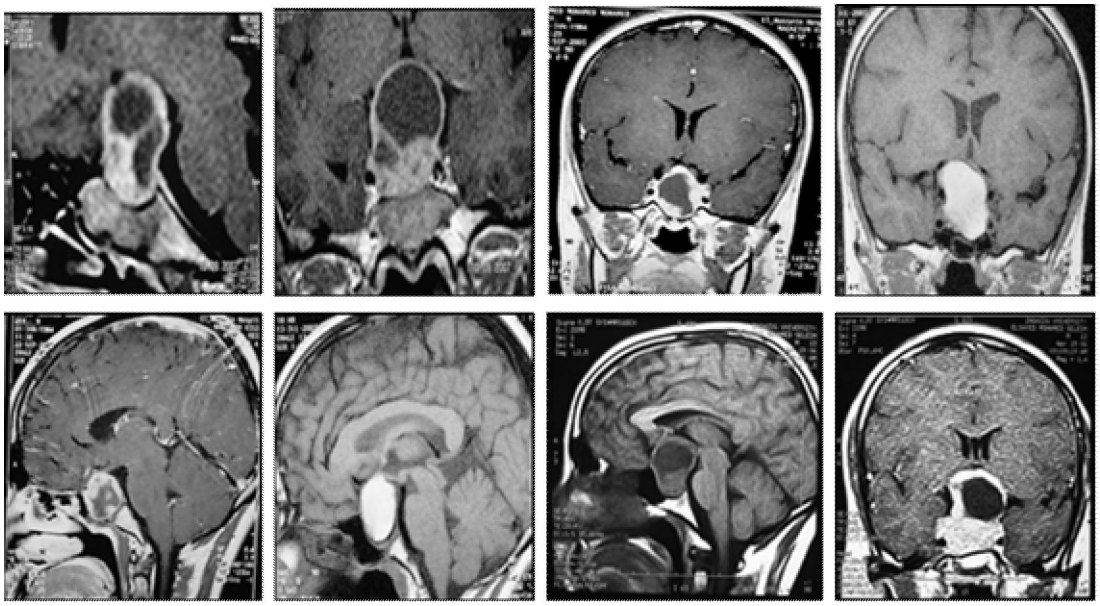


Figure (2) MRI sella sagital and coronal cuts showing different pictures for pituitary tumor apoplexy

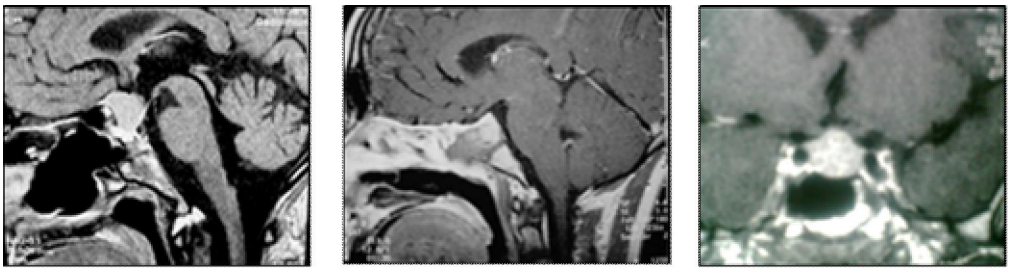
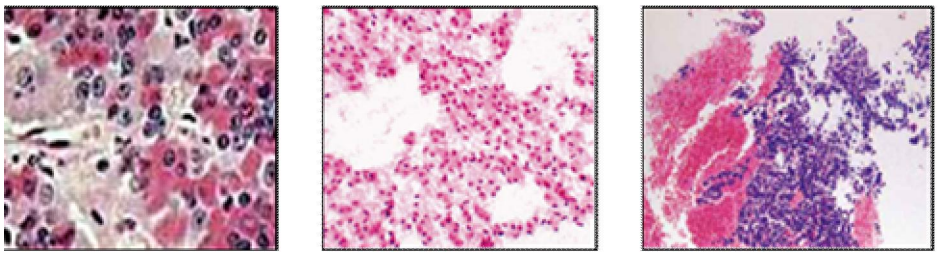


Figure (3) Follow up MRI sella for different patients



(Diffuse) (Sinusoidal) (Papillary)

Figure (4) Hematoxylin and eosin preparation (X 56) of a part of Pituitary apoplexy shows different types of Tumor cells with areas of Hemorrhage & Necrosis

4. Discussion

The syndrome of pituitary apoplexy is characterized by the sudden onset of headache with rapid visual & neurologic deterioration due to hemorrhage or ischemic necrosis within the substance of the tumor. This disorder occurred in 14 of 300 patients (4-6 per cent)[3] the incidence of this condition was believed to be related to secretory tumors because the metabolic requirements of the tumor outgrows the vascular supply. While in Poppen's [4] series the incidence was equal.

Review of the literature suggests that the incidence of pituitary apoplexy is proportionally higher in patients with secretory pituitary tumor more common than non-secretory tumors.[5] While in the present series seven of eight having pituitary apoplexy were non secretory "chromophobe cell pituitary tumors". Also the only clear relative precipitating circumstance in the production of apoplexy in our series association of pituitary tumor with radiotherapy (patient number 6), this is confirmed by many Authors.[2,6] Conservative management for apoplexy gives unsatisfied outcome. Wright and colleagues[7] managed two cases without operation, and both patients made good recoveries from ophthalmoplegia and visual impairment. The beneficial effects were presumably attributable to the corticosteroid therapy. Transsphenoid decompression is the rapid way to decompress the tumor mass and limit the neurological deficit. Rapid intervention within 2-3 days from the attack gives excellent outcome.[8-10]

Excellent outcome manifested by rapid disappearance of symptoms like headache, nausea and malaise through one week from surgery corresponding to many series as in those of Roth *et al.,* and Doron *et al.,* [11-12] Remarkable improvement of visual field occurred in two patients through four weeks due to rapid intervention which restored the normal position of the chiasm. This agrees with Dawson and colleagues[13] who found early surgical decompression is very important to save the acuity and field. In two series, Uihlen *et al.* [14], and Wolton *et al.,* [15] concluded that longstanding chiasmal compression more than two weeks suddenly made by apoplexy; do not fare so well and pursue an irreversible course. Double vision due to 3rd nerve compression improved through 6 months in the series of Scott[16] who included 11 patients, four of them had 3rd nerve palsy from whom only one patient improved while the other three had irreversible palsy. The Author clarifies the result attributes to delayed surgical decision. In analysis for fair outcome in the series of Leeds[17] where he discussed many factors sharing in the outcome like the size of tumor, age of apoplexy, preoperative period and route of surgery. Only one patient from our series died (patient number 6). This patient presented by bad general and neurological condition with a history of previous radiotherapy. Intra-operative excessive bleeding occurred; postoperatively, there were both endocrinal and cardio-respiratory failure, as

hypothermia, hypotension, periodic respiration and severe neurologic deficit. Some authors claims that surgery after radiation is not beneficial because tumors which have had prior degeneration, hemorrhage, necrosis and cystic changes are highly vascular and susceptible to hemorrhage and endocrinal failure.[1]

In the current study we found a relationship between the apoplexy and type of histology which was common in five patients who had diffuse type. Susumu[18] in a series, who included 24 patients, found a relation with the state of tumor histopathology and incidence of apoplexy. The diffuse type was more common than sinusoidal and papillary types.

Conclusion

We have summarized the study of eight cases of pituitary tumor apoplexy. Pathological verification of the neoplasm was accomplished in seven cases and in all instances revealed a chromophobe adenoma that had undergone varying degrees of infarction, necrosis, or hemorrhage. The clinical and radiographic concomitants of this syndrome have been delineated. We arrived to confirm that subacute pituitary apoplexy is the result of sudden ischemia, necrosis, or hemorrhage, the tumor when expanding suddenly becomes impacted in the sellar and suprasellar regions compressing all surrounding vital structures. This clinical state needs rapid assessment and transsphenoidal decompression to save both life and sight.

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