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Pituitary Apoplexy: A MRI Finding Case and Literature Review

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Abstract

Introduction: Pituitary apoplexy is an ischemic or hemorrhagic rearrangement within a pituitary adenoma. Pituitary apoplexy is a rare disease that constitutes a diagnosis and therapeutic emergency. Most of the time, apoplexy is the manifestation inaugural of an adenoma unknown, but it can also complicate a known adenoma. All adenomas can be concerned with the occurrence of apoplexy, with an equivalent risk, whether they are secreting or not and whatever the type of secretion. We report the case of a patient in whom the cranio-encephalic MRI enabled to make the diagnosis. **Observation:** A 57-years-old woman abruptly presented severe cephalodynia, followed by a left visual field defect. The clinical examination revealed an alteration of the consciousness to the type of obstruction and a decrease in left visual acuity is $4/10^{th}$. The cranio-encephalic MRI performed revealed an expansive intrasellar process with suprasellar extension of heterogeneous signal on all the sequences performed alternating hemorrhagic stigmata in the central tumor zone suggesting a macroadenoma having bled, compatible with pituitary apoplexy. She received medical treatment and hormonotherapy, followed by surgical excision. The outcome was satisfactory. **Conclusion:** Pituitary apoplexy is a rare but serious complication of pituitary adenomas. It is responsible for various neuro-ophthalmologic. Pituitary apoplexy involves the patient's functional and vital prognosis due to acute panhypopituitarism. It is a diagnostic and therapeutic emergency. MRI is a major contribution to diagnosis. Treatment is based on the combination of hormone replacement therapy and trans-sphenoidal tumor excision.

Keywords

Hypophysis, Cerebrovascular Apoplexy, Cranio-Encephalic MRI, Cephalodynia, Pituitary Adenoma

1. Introduction

Pituitary apoplexy corresponds to a sudden onset hemorrhagic or ischemic rearrangement within a pituitary adenoma [1]. It is an endocrine as well as neurosurgical emergency involving the vital prognosis [2]. Pituitary apoplexy is a rare complication most often inaugural of a pituitary incidentaloma [3]. It presents diagnosis difficulties. Medical therapeutic and sometimes neurosurgical decisions must be taken early. The classic clinical picture combines sudden installation headaches, consciousness disorders, endocrine disorders and ophthalmologic manifestations in the form of decreased unilateral or bilateral visual acuity in relation to acute compression of chiasma and oculomotor paralysis.

We case we report is the one of a patient who abruptly presented headaches secondly followed by a left visual field defect. The cranio-encephalic MRI performed allowed the diagnosis of pituitary apoplexy.

2. Observation

A 57-years-old female patient called K.A was received in a Radiodiagnosis and Medical Imaging Department of our town for cranio-encephalic MRI. At the interrogation, she had no particular antecedents. There was also no obvious endocrine disorder. Clinical examination revealed diffuse headaches and an alteration of the consciousness consciousness to the type of obstruction. Visual acuity was normal right for $10/10^{th}$ and $4/10^{th}$ left. The fundus of the eye was normal on the right with a retina and a papilla without any particular abnormality; But on the left there was a papillary edema. The field of vision was normal to the right. On the left, there was a temporal hemianopia. Magnetic resonance imaging (MRI) revealed an intrasellar expansive process with suprasellar extension. This lesion was containing heterogeneous signal on all the sequences performed [**Figure 1**, **Figure 2**], alternating hemorrhagic stigmata in the central tumor zone [**Figure 3**] that made us suggest a having bled macroadenoma, compatible with pituitary apoplexy. The contours of this mass were relatively regular. The tumor had an important mass effect on the optic chiasm which was stretched and pushed back up and down. The lesion invaded the suprasellar and infrasellar [**Figure 4**]. After the injection of gadolinium, a heterogeneous contrast-enhanced lesion was observed [**Figure 5**]. The 3DTOF sequence (arteriography sequence) did not highlight any thrombosed macro aneurysm. The hormonal assessment performed was normal.

The management of this pituitary apoplexy associated with left ophtalmoplegia consisted after neurosurgical advice in an ophthalmological consultation at first. Vitamin B therapy was instituted. This ophthalmological medical treatment was sanctioned by the gradual recovery of visual acuity. A cranio-encephalic MRI performed two weeks later showed results superimposable to the previous one. This ophthalmological medical treatment has been associated with hormonotherapy. The outcome was the total recovery of visual acuity.

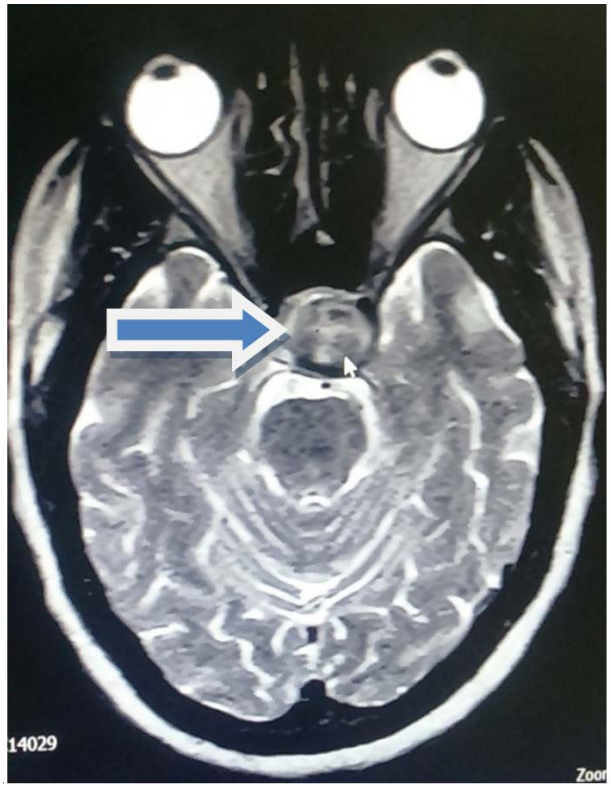

Figure 1. Axial EST2: Heterogeneous signal macroadenoma with suprasellar and lateral sellar extension (arrow head).

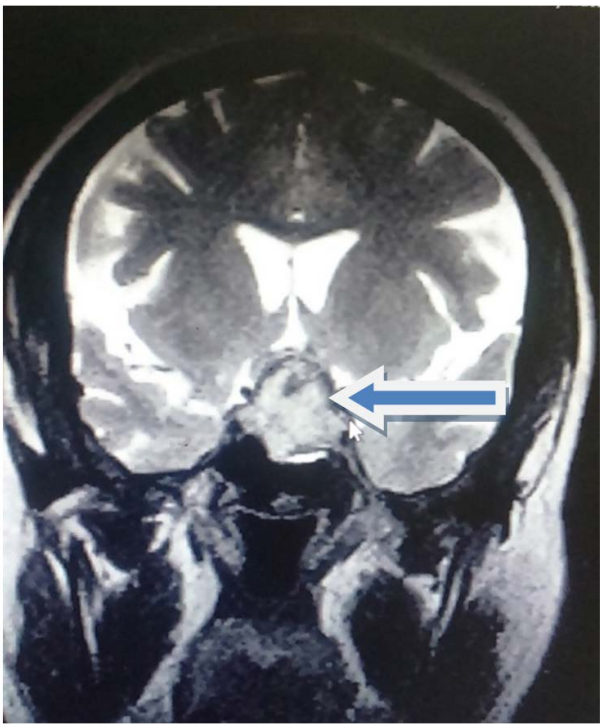

Figure 2. Coronale EST2: Heterogeneous macroadenoma compressing the optic chiasm with invasion of the left cavernous lodge (arrow head).

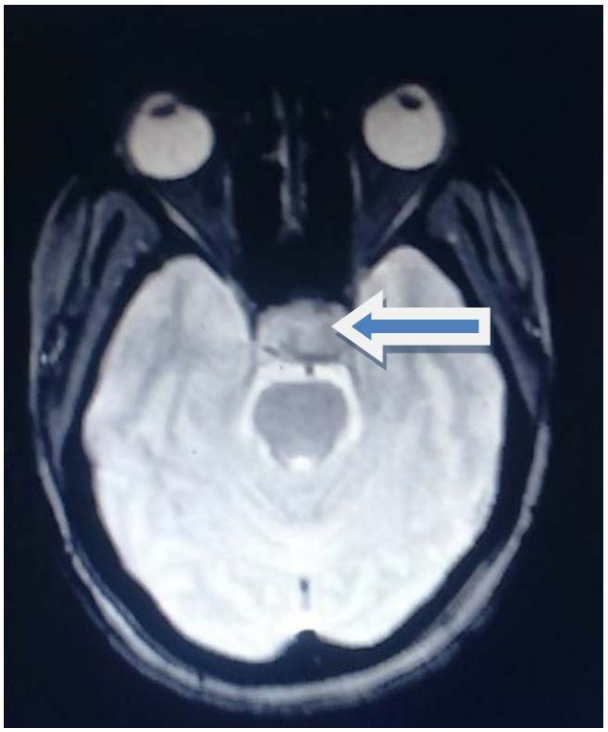

Figure 3. Axial gradient echo T2: Macroadenoma containing hemorrhagic stigmata (arrow head).

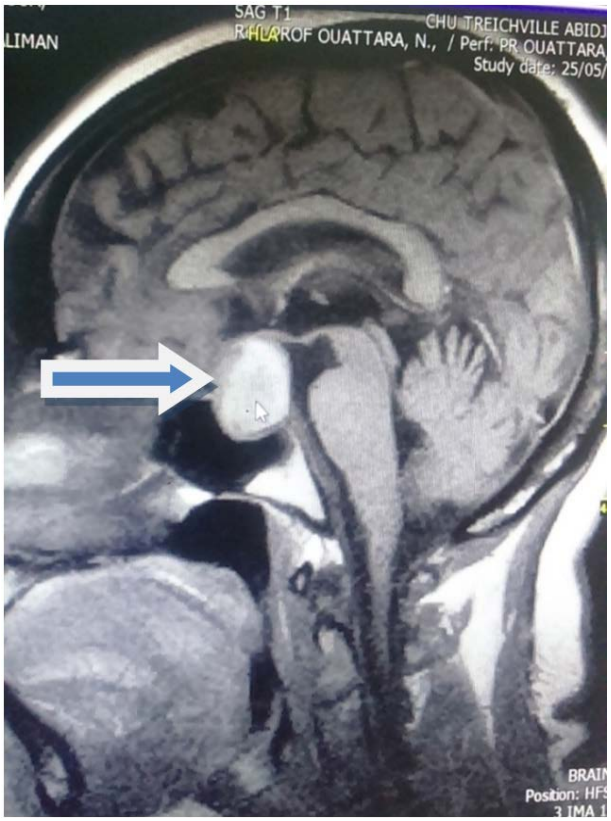

Figure 4. Sagittal EST1: Heterogeneous signal macroadenoma with suprasellar and infrasellar extension (arrow head).

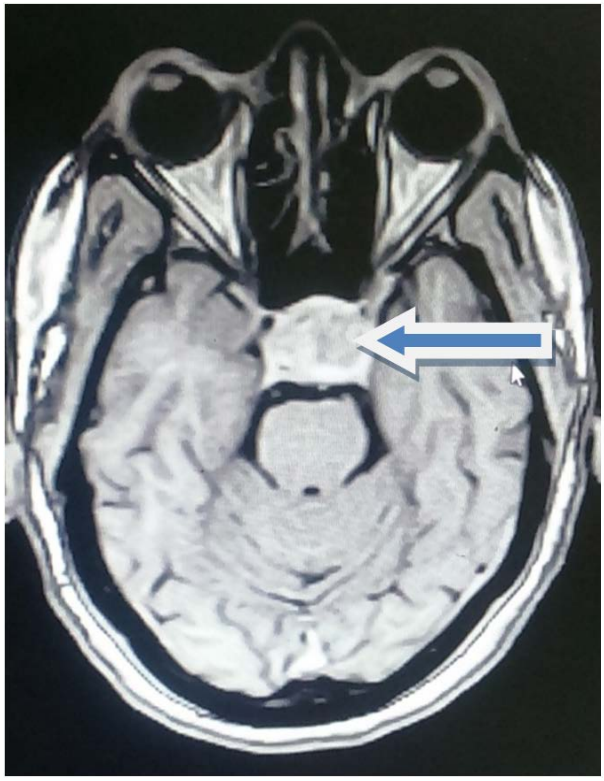

Figure 5. Axial ES T1 GADO: Heterogeneous contrast-enhanced of the Macroadenoma (arrow head).

3. Discussion

Pituitary apoplexy is a rare and unknown complication in patients with pituitary adenoma [**Table 1**] [4]. It affects both genders with an average age between 40 and 50 years old [5]. The age of our patient was close to authors description. It involves less than 4% of patients with pituitary adenoma. In most cases, patients do not know the existence of their adenoma. The acute complication being one of the circumstances of discovery of the adenoma. These are mostly acute accidents with dramatic consequences on both visual and endocrine function [3] [6].

Clinical manifestations of pituitary apoplexy are varied, with abrupt headaches, usually retro-orbital or frontal, and sometimes diffuse [7]. They are present in 76% of cases and can mimic the pain observed in meningeal irritations [8]. Anomalies of vision were found in 62% of cases [9] [10]. This decrease in visual acuity and alteration of the visual field are due to the expansion of the tumor with compression of the chiasma and/or optic nerves. The deterioration can range from simple bitemporal hemianopia to total blindness [11]. A diplopia with oculomotor disorder occurs in 40% of patients [12] [13]. The three pairs of oculomotor cranial nerves may be affected by compression or tumor invasion of the cavernous sinus. The third cranial pair is the most common [14]. The disorders of consciousness present in 17 to 38% of cases [15] going from simple somnolence to coma are related to the compression of the diencephalon. Endocrine disorders are very common with sudden anaphylactic insufficiency [8].

Table 1. Summary of previous large retrospective studies about pituitary apoplexy (PA) published in European journal of endocrinology.

Study	Number Of patients	Incidence of AP		Essential information
		n	%	
1)	560	51	9.1	AP is not correlated with sex, endocrine function or histological type of adenoma, but with age.
2)		37		In stable AP patients, surgical decompression should be performed as early as possible, as delays beyond 1 week may delay visual function recovery.
3)	799	39	4.9	The authors suggest surgical treatment in all AP cases to improve neurological and endocrine recovery.
4)	125	16	12.8	In AP, surgical treatment was associated with a better outcome than treatment with dexamethasone.
5)	982	35	3.2	Hypertension can be an important predisposing factor for BP. Trans-sphenoid surgery is safe and effective. It is indicated if there are associated abnormalities of visual acuity or field of vision.
6)		45		Patients with classical AP and none or only mild and non-progressive neuro-ophthalmic signs can be managed conservatively in the acute stage.
7)[a]	721	27	3.7	Anterior pituitary function was more often conserved, normalized or even improved after trans-sphenoidal surgery compared to transcranial surgery in patients with non-functional pituitary adenomas.
8)		62		Emergency surgery is required in patients with decreased consciousness, impaired vision, or sudden blindness. Isolated cranial nerve palsies can be effectively managed conservatively.
9)[a]	192	41	21	AP occurs more frequently than is usually assumed. In patients operated for a non-functional pituitary adenoma, survival is independent of the onset of AP.
10)	1540	24	1.6	AP is a rare event. Complete recovery is possible if the diagnosis is made quickly and proper management initiated on time. The surgical results are very satisfactory in most cases.
(11)	262	25	9.5	Classic AP is a rare event. The incidence of subclinical AP is higher than the standard AP. Patients with classical AP have a higher mean age and most patients are male (68%). Visual improvement is better in sub-clinical AP than in conventional AP. In classical and subclinical AP, the anterior pituitary function is able to recover.

[a]In these studies, only patients with non-functional pituitary adenomas were included.

In the case we involved, the clinical manifestations were similar to those described by other authors [4] [**Table 2**], except endocrine and alertness disorders which were absent. These constituted factors of good prognosis.

CT scan and MRI can easily be used to confirm this diagnosis, but cranio-encephalic MRI is the best reference for the diagnosis of the pituitary ade-

noma and the pituitary apoplexy complication [9]. MRI allows visualizing the tumor and assessing its extension. It also makes it possible to assess the hemorrhagic or ischemic rearrangement of the pituitary adenoma. Our observation we made described on the gradient spin echo sequences, hemorrhagic stigmata within the macroadenoma which exerted an important mass effect on the optic chiasm and the cavernous sinus.

The evolution of the clinical symptomatology depends on the delay of management. The treatment always involves substitutive hormonotherapy as well as taking into acount pituitary apoplexy predisposing factors [4] [**Table 3**]. The hormonotherapy is supplemented by surgical intervention which will consist in an excision of the necrosed adenoma by trans-sphenoidal approach [10]. Surgical intervention is urgently performed when there is a compression of the optic

Table 2. Symptoms associated with PA like published in European journal of endocrinology.

Symptoms	With AP (n = 42)		Control group (n = 84)		[a]P value
	n	%	n	%	
Ophthalmoplegia	32	76	4	5	<0.001
Deficiency of the visual field	16	38	46	55	0.091
Chronic headaches	5	12	20	24	0.156
Amenorrhea[b]	6	50	9	38	0.499
Galactorrhea[b]	2	17	4	17	1.00
Hypopituitarism	19	45	40	48	0.851

[a]Statistical analyzes using Fisher's exact test. [b]These calculations include only women with macroprolactinoma (n = 12 or 24, respectively.

Table 3. Pituitary apoplexy predisposing Factors published in European journal of endocrinology.

factors	With AP (n = 42)		Control group (n = 84)		[a]P value
	n	%	n	%	
Thrombolytic therapy	12	29	10	12	0.026
Diabetic sugar	4	10	8	10	1.00
Hypertension	9	21	19	23	1.00
Dopamine agonist	0	0	11	13	–
estrogen	2	1000	0		–
(Deposit injection)[b]	1	2	0	0	–
Bilateral adrenalectomy	1	2	0	0	–
Heart surgery	3	7	0	0	–

[a]Statistical analyzes made using Fisher's exact test. [b]These calculations include only women with macroprolactinoma (n = 12 or 24, respectively).

chiasm by the adenoma associated with alertness disorders [11]. It is therefore important that the surgical treatment being performed in order to avoid a recurrence of pituitary apoplexy [12]. In our study, the patient received ophthalmological treatment followed by hormonotherapy and surgical excision of the adenoma. The outcome was favorable marked by a recovery of left visual field and a disappearance of headaches.

4. Conclusion

Pituitary apoplexy is an emergency diagnosis complication of pituitary adenoma. It involves functional and vital prognosis. CT scan or cranio-encephalic MRI confirms the diagnosis. The combination of hormonotherapy and excision of the tumor by trans-sphenoidal approach results in favorable sequences and recovery of the visual function.

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