Fatal Bilateral ACA Territory Infarcts after Pituitary Apoplexy: A Case Report and Literature Review

Sandeep Mohindra, M.Ch., F.R.C.S.Ed.,¹ Priyamvada Kovai, M.S.,¹ and Rajesh Chhabra, M.Ch.¹

ABSTRACT

Apoplexy of pituitary tumors is a common occurrence. In addition to commonly known presentations, cerebral infarcts and consequent focal neurologic deficits are a rare presentation. A rare case of pituitary apoplexy with associated subarachnoid bleed and bilateral anterior cerebral artery infarcts is described. Vasospasm leading to cerebral infarcts and consequent focal neurologic deficits as a presentation of pituitary apoplexy needs to be better appreciated.

KEYWORDS: Pituitary apoplexy, cerebral infarcts

Owing to their unusual anatomy, the pituitary tumors are predisposed to autoinfarction or apoplexy.¹ Even when one-fifth of all pituitary tumors have pathologic evidence of infarction, only 7% of these neoplasms become symptomatic.² Apoplectic pituitary tumor may have varied presentations. Sudden onset ophthalmoplegia, with severe headache and altered sensorium, is the usual presentation.

In this report, we describe a rare case of pituitary apoplexy developing fatal bilateral anterior cerebral artery (ACA) territory infarcts, consequent to associated subarachnoid bleed and vasospasm.

CASE REPORT

A 22-year-old female presented in surgical emergency with altered sensorium, without any antecedent history suggestive of sellar pathology. On examination, she had a right-sided ophthalmoplegia, with no pupillary reflex.

Left-sided pupil reacted normally to light and had normal left-sided ocular movements. Plain computed tomographic (CT) scan (after 2 hours of the onset of symptoms) showed hyperdense sellar mass, suggesting intrasellar bleed, indicative of apoplexy of pituitary adenoma (Fig. 1). Magnetic resonance imaging (MRI) of the sellar region confirmed hemorrhage within the pituitary tumor, with a suprasellar extension (Figs. 2–4). There was no subarachnoid blood in MRI scans. Follow-up CT scan, 12 hours later, showed similar findings, but with the hemorrhagic tumor rupturing through the diaphragm into the subarachnoid space, cisternal spaces, sylvian fissures, and interhemispheric fissure (Fig. 5). As the patient was being investigated for hormonal status and prepared for surgery, she deteriorated to decerebrating status. While on hydrocortisone infusion, intensive resuscitation, and mechanical ventilation, the patient underwent CT scan, which showed symmetrical bilateral frontal hypodensities,

¹Department of Neurosurgery, Postgraduate Institute of Medical Education and Research, Chandigarh, India.

Address for correspondence and reprint requests: Dr. Sandeep Mohindra, M.Ch., F.R.C.S.Ed., Assistant Professor, Department of Neurosurgery, Postgraduate Institute of Medical Education and Research, Chandigarh, India (e-mail: sandeepneuro@gmail.com).

Skull Base 2010;20:285–288. Copyright © 2010 by Thieme

Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA. Tel: +1 (212) 584-4662.

Received: May 14, 2009. Accepted after revision: December 7, 2009. Published online: March 1, 2010.

DOI: <http://dx.doi.org/10.1055/s-0030-1249243>.

ISSN 1531-5010.

Figure 1 Axial section of plain computed tomographic (CT) scan, showing hyperdense sellar mass.

Figure 2 Axial section of contrast-enhanced magnetic resonance imaging (MRI) scan, showing varying contrast-enhancing sellar mass.

Figure 3 Coronal section of contrast-enhanced magnetic resonance imaging (MRI) scan, showing massive suprasellar extension of sellar tumor.

Figure 4 Sagittal section of T2-weighted scan, showing hemorrhagic sellar lesion, with suprasellar extension.

Figure 5 Axial section of computed tomographic (CT) scan, showing interhemispheric fissure bleed.

Figure 6 Axial section of computed tomographic (CT) scan, showing infarcts involving both the frontal lobes, pertaining to both the anterior cerebral arteries.

Table 1 Pituitary Apoplexy Leading to Cerebral Infarcts

Author (Year)	Presentation	Radiology	Infarct Site	Management	Outcome	Pathophysiology
Schnitker and Lehnert (1952) ¹	Focal hemispheric signs (R)MCA, (R)ACA (L)Hemiplegia	X-rays	Gliosis (autopsy)	Nil	Death	Compression (autopsy)
Rosenbaum et al (1977) ⁷	Headache, drowsiness	Angio – (R)ICA block	Bleed into infarction	Surgery	Death	Compression
Cardoso and Peterson (1983) ³	(R)III Nerve palsy (R)Homo-hemianopia Headache, vision loss	X-rays – enlarged sella	Multiple cortical	Surgery	Death	Vasospasm
Majchrzak et al (1983) ⁴	Comatose, disoriented (L)Hemiparesis Headache, photophobia Dysphasia, (R)hemiplegia (R)Homo-hemianopia Headache, drowsiness (L)III, VI Palsy Headache, vomiting	Angio – (R)ACA block	(R)ACA	Surgery	Partial recovery	Compression
Clark et al (1987) ⁹	Headache, photophobia Dysphasia, (R)hemiplegia (R)Homo-hemianopia Headache, drowsiness (L)III, VI Palsy Headache, vomiting	CT scan – hemorrhagic mass Angio – (L)ICA block (R)ICA narrow	(L)ACA (L)MCA Head of caudate (R)Parietal	Radiotherapy Hormonal	Favorable	Compression
Pozzati et al (1987) ⁸	Headache, drowsiness (L)III, VI Palsy Headache, vomiting	CT scan – hemorrhagic mass X-rays – enlarged sella	(R)Parietal	Hormonal	Partial recovery	Vasospasm
Lath and Rajshekhar (2001) ¹⁰	Vision loss, altered sensorium (L)Hemiplegia (L)III Nerve palsy Frontal lobe syndrome Vision loss, headache	CT scan – hemorrhagic mass	(R)ICA	Surgery	Death	Compression
Catenox et al (2002) ⁶	(L)III Nerve palsy Frontal lobe syndrome Vision loss, headache	CT scan	(R)Lenticulostriate			
Bhansali et al (2005) ⁵	Confused, neck rigidity (L)III Nerve palsy (R)Hemiplegia	CT scan – tumor bleed, SAH MRI – pituitary apoplexy DSA – B/L A1 elevation, spastic	(L)ACA territory, acute preexisting stenosis	Conservative elective surgery	Partial recovery	Vasospasm
Lomban et al (2006) ²	Confused, neck rigidity (L)III Nerve palsy (R)Hemiplegia	CT scan – isodense sellar mass MRI – pituitary apoplexy DSA – (L)ICA compressed (L) Cervical ICA stenosis	(L)MCA Preexisting stenosis	Nil	Partial recovery	Compression
Present case	Unconscious, (R)III nerve palsy Decerebrating posture	CT scan – tumor bleed, SAH MRI – tumor bleed	Bilateral ACA	Nil	Death	Vasospasm

ACA, anterior cerebral artery; CT, computed tomography; DSA, digital subtraction angiography; ICA, internal carotid artery; MCA, middle cerebral artery; MRI, magnetic resonance imaging; SAH, subarachnoid hemorrhage.

indicating infarcts in relation to both the ACAs (Fig. 6). On the fourth postapoplectic day, the patient expired, defying all resuscitative efforts.

DISCUSSION

Histologically, 17% of all pituitary tumors have evidence of infarction, but only 7% present symptomatically.¹ Various precipitating factors like bromocriptine therapy, estrogen replacement, radiation therapy, head trauma, and anticoagulant therapy have been described, but a majority have no obvious presentation. Pituitary tumors are prone to autoinfarction or apoplexy because of the local vascular anatomy. Asymptomatic vasospasm in pituitary apoplexy or sellar surgery remains an underestimated entity.² A few of these cases eventually become symptomatic after developing focal cerebral deficits, which may be irreversible consequent to infarct formation. Pathophysiology of vasospasm following pituitary apoplexy remains unknown.^{3,4} Transdiaphragmatic rupture of the sellar tumor into the subarachnoid space is a probable cause behind vasospasm. Ten cases of infarcts in association with pituitary apoplexy have been described (Table 1). Even when focal cerebral dysfunctions are uncommon, pituitary apoplexy, hemiplegia, or hemiparesis remain the commonest described presentation.^{1,2,5,6} Such cases have remained on the records for nearly half of a century, but the pathophysiology remains far from understood. Documented cases of cerebral infarction in consequence to pituitary apoplexy are few (Table 1). Cerebral vasospasm and mechanical obstruction of vessels making the *circle of willis* are the two major causative factors behind vascular insults. Further, mechanical obstruction has been cited by many authors and described on the basis of angiograms. Intratumoral pressures in comparison with arterial pressures have not been documented. Total occlusion seen on angiograms has been presumed to be indicative of mechanical obstruction.⁷ We feel severe vasospasm will also depict similar vascular occlusion on angiogram.⁸

It is either ACA or internal carotid artery (ICA) that gets compromised on account of vasospasm after pituitary apoplexy.^{2,5,6,9} We propose that it should always be ICA or ACA that gets mechanically obstructed on account of sellar tumor, whereas middle cerebral artery (MCA) not being a part of closed loop escapes mechanical brunt.¹⁰ However, partial occlusion of ICA mechanically may cause MCA territory ischemia, especially when MCA is the end artery and ACA has dual supply.

Bilateral ACA infarcts have not been reported earlier as a consequence to pituitary apoplexy. The present case remains unique as there was no focal or side preponderance of symptomatology, thereby delaying investigations and management. Repeat scans showed symmetrical bilateral ACA infarcts. In the present case, ongoing deterioration defied all resuscitative efforts. Surgical intervention for such a case remains debatable as hemorrhage into infarct always remains a possibility.

CONCLUSION

Spasm of vasculature of *circle of willis* remains a rare but possible complication after apoplexy of pituitary tumor. Such a vasospasm may prove fatal, if infarcts of large cerebral territories ensue. Awareness of such a catastrophe may bring forth more cases of pituitary apoplexy, which end fatally unnoticed.

REFERENCES

1. Schnitker MT, Lehnert HB. Apoplexy in a pituitary chromophobe adenoma producing the syndrome of middle cerebral artery thrombosis; case report. *J Neurosurg* 1952; 9:210–213
2. Lomban E, Bonneville F, Karachi C, Abdenour L, Dormont D, Chiras J. Massive stroke in a patient with pituitary apoplexy, cervical carotid artery stenosis and hypotension. *J Neuroradiol* 2006;33:259–262
3. Cardoso ER, Peterson EW. Pituitary apoplexy and vasospasm. *Surg Neurol* 1983;20:391–395
4. Majchrzak H, Wencel T, Dragan T, Bialas J. Acute hemorrhage into pituitary adenoma with SAH and anterior cerebral artery occlusion. Case report. *J Neurosurg* 1983; 58:771–773
5. Bhansali A, Dutta P, Khandelwal N, Pathak A, Vashisht R. Pituitary apoplexy: an unusual cause of frontal lobe syndrome. *Australas Radiol* 2005;49:127–131
6. Catenioix H, Nighoghossian N, Honnorat J, et al. [Necrosis of a hypophyseal adenoma and ischemic cerebral vascular accident]. *Rev Neurol (Paris)* 2002;158:734–736; [Article in French]
7. Rosenbaum TJ, Houser OW, Laws ER. Pituitary apoplexy producing internal carotid artery occlusion. Case report. *J Neurosurg* 1977;47:599–604
8. Pozzati E, Frank G, Nasi MT, Giuliani G. Pituitary apoplexy, bilateral carotid vasospasm, and cerebral infarction in a 15-year-old boy. *Neurosurgery* 1987;20:56–59
9. Clark JD, Freer CE, Wheatley T. Pituitary apoplexy: an unusual cause of stroke. *Clin Radiol* 1987;38:75–77
10. Lath R, Rajshekhar V. Massive cerebral infarction as a feature of pituitary apoplexy. *Neurol India* 2001;49:191–193