SunKrist Publishing
Accelerate Scientific Knowledge in Open Access

Global Journal of Surgery and Surgical Techniques

Case Presentation *Volume: 1, Issue: 1* *Scientific Knowledge*

Cushing Disease Due to Ectopic Pituitary Adenoma

Cavalcante JBF[1*], Cembraneli PN[1], Cavalcante RBF[2], Valente Júnior VF[2], Cavalcante JES[3] and Caparroz FA[4]

[1]Medical Sciences Course, Health Sciences School, Faculdade Ceres (FACERES), São José do Rio Preto, SP, Brazil

[2]Neurosurgeon, Member of the Brazilian Society of Neurosurgery, Santa Mônica Hospital, Goiânia, GO, Brazil

[3]Neurosurgeon, PhD in Neurosurgery, Member of the Brazilian Society of Neurosurgery, Professor at Santa Mônica Hospital, Goiânia, GO, Brazil

[4]Ear-nose-and-throat surgeon, Professor at the Department of Medical Sciences Course, Health Sciences School, Faculdade Ceres (FACERES), São José do Rio Preto, SP, Brazil

1. Abstract

Adrenocorticotropic hormone (ACTH) - secreting pituitary adenomas are the most common cause of Cushing disease. A pituitary adenoma is rarely ectopic and suprasellar dependent (ectopic) ACTH -secreting pituitary tumors are extremely rare, with few cases described in the literature. Therefore, this study aimed to report the case of a patient with a diagnosis of Cushing disease because of a suprasellar ACTH-secreting tumor attached to the pituitary stalk, requiring a craniotomy.

2. Keywords: Neuroendocrine tumors; Ectopic ACTH-secreting pituitary adenoma; Cushing disease; Craniotomy

3. Introduction

Adrenocorticotropic hormone (ACTH)-dependent Cushing syndrome is most commonly caused by ACTH - secreting intraosseal pituitary adenomas (90%). Although just in rare cases (10%) pituitary adenomas are ectopic, they have been reported in several different sites such as cavernous sinus, sphenoid sinus, clavus, third ventricle and hypothalamus [1-3]. Suprasellar dependent ACTH-secreting pituitary tumors are extremely rare, with only few cases described in the literature to date [1]. Ectopic pituitary adenomas are more prevalent among females (62%) over the age of 50 years. Of these ectopic tumors, 40% are located in the sphenoid sinus and 33% in the suprasellar region [4]. Approximately one-third of these tumors do not secrete hormones and the remaining two-thirds usually secrete ACTH and can thus trigger the signs and symptoms of Cushing disease [5].

Ectopic ACTH syndrome is defined as endogenous hypercortisolism caused by nonpituitary solid tumors, most of which originate in the thoracic cavity. Accurately locating the source of the ACTH-secreting lesion is crucial to solve the condition by removing the primary ACTH - producing tumor [6,7].

As a way of minimizing the symptoms of macroadenomas with suprasellar extension, the aim of the treatment is not only the remission of hypercortisolism, but also the improvement in patients' vision [8]. The treatment can be surgical or pharmacological.

***Corresponding author:** Julia Brasileiro de Faria Cavalcante, Rua T-38, 1097, apart 602, Setor Bueno, 74223-045, Goiânia, GO, Brazil; Email: jubf.cavalcante@outlook.com

Received Date: December 15, 2019; **Accepted Date:** December 23, 2019; **Published Date:** December 25, 2019

Although the former results in high short-term remission rates in specialized centers (70% - 80%), a significant recurrence has been reported in patients who need other therapies to control hypercortisolism [9].

First-line therapy for ACTH - dependent Cushing syndrome, most often, consists of transsphenoidal endoscopic selective resection of the pituitary adenoma, because it has a high potential for cure [10,11]. Regarding surgical techniques, the tumor can be removed using the endonasal route or the transpalatal approach [12].

We report a case of a patient with a diagnosis of Cushing disease caused by a suprasellar ACTH - secreting tumor adhered to the pituitary stalk.

4. Case Presentation

A 19-year-old male patient had a major complaint of weight gain (29 kg in the previous 2 years), associated with a sudden onset of severe acne and striae with no definite cause.

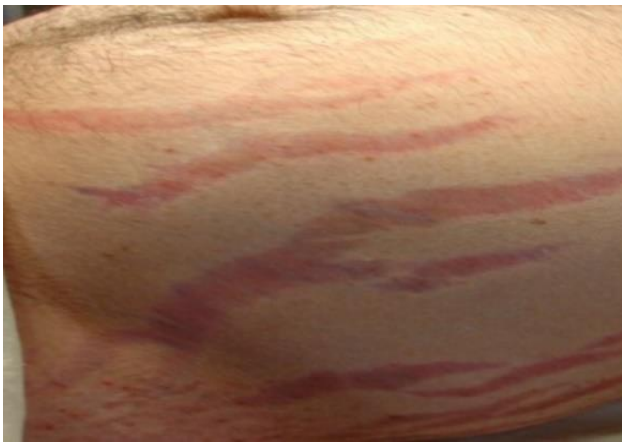

Figure 1: Violaceous streaks in the abdominal region.

Laboratory tests were requested for diagnostic confirmation and the results were: ACTH 82.4 pg/mL [Reference value (RV): < 60 pg/mL], morning cortisol 25.9 µg/dL (RV: 5.0–25.0 µg/dL) and evening cortisol 17.8 µg/dL (RV: 2.5–12.5 µg/dL).

In view of the clinical-laboratory situation, a diagnostic hypothesis of Cushing syndrome was made. Nuclear magnetic resonance imaging revealed a suprasellar tumor 0.5 cm in diameter, adhered to the pituitary stalk.

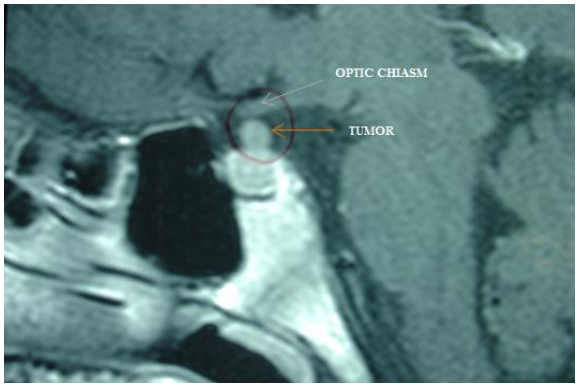

Figure 2: Nuclear magnetic resonance imaging showing a suprasellar ectopic tumor (sagittal section).

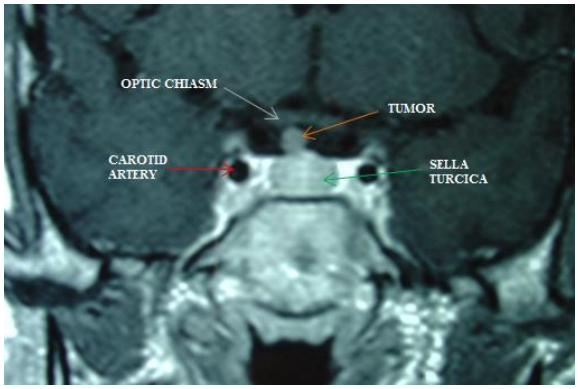

Figure 3: Nuclear magnetic resonance imaging showing a suprasellar ectopic tumor and adjacent structures (coronal section).

After confirming the diagnosis of Cushing disease due to a suprasellar tumor adhered to the pituitary stalk, the surgical management was chosen and a craniotomy for tumor resection was performed.

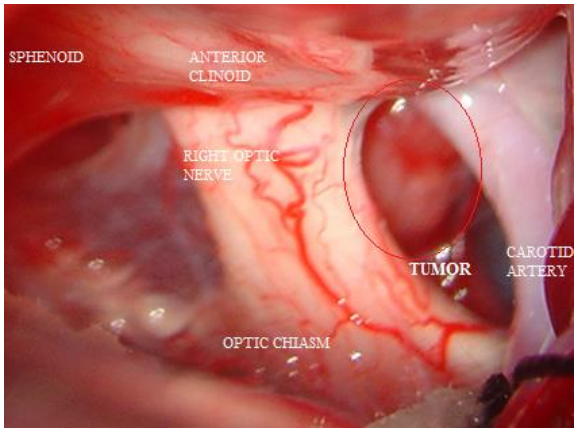

Figure 4: Microscopic image during the surgical procedure evidencing ectopic suprasellar tumor and structures: optic chiasm, optic nerve, carotid artery, anterior clinoid, and sphenoid bone.

The pathology report confirmed the diagnosis of ACTH - secreting pituitary adenoma and the immunohistochemical studies revealed positive clone O2A3.

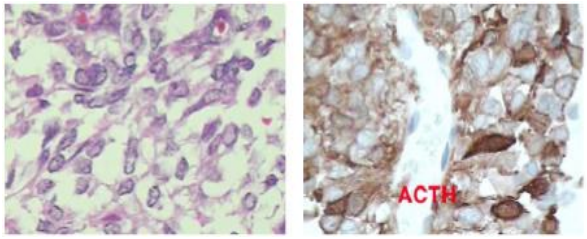

Figure 5: Immunohistochemical studies revealed ACTH expression in most neoplastic cells.

The patient was asymptomatic in the postoperative period and was discharged five days after the surgery. Laboratory control was performed six months after the surgical procedure and all the monitored parameters were within the normal range: ACTH 5.1 pg/Ml, morning cortisol 0.8 µg/dL and evening cortisol 4.1 µg/dL. The exams were repeated eight months after the surgery and the results remained under RV: ACTH 16.5 pg/mL, morning cortisol 10.1 µg/dL, evening cortisol 2.8 µg/dL. In addition, the signs and symptoms of Cushing syndrome were attenuated. The patient lost more than 20 kg and the acne and violaceous striae had significant improvements. A control nuclear magnetic resonance imaging was performed and showed complete excision of the tumor.

5. Discussion

Cushing syndrome is a set of signs and symptoms that result from prolonged exposure to glucocorticoids [13]. The ACTH - independent form of Cushing disease is characterized by the autonomic production of this hormone by the adrenal glands [14], mainly caused by adenomas, carcinomas and adrenal hyperplasia [14]. The ACTH - dependent form of this syndrome may originate from an ACTH - secreting pituitary tumor (80% of the cases), or an ACTH - secreting ectopic adenoma (20% of the cases), or more rarely from a corticotropin - releasing hormone tumor (< 1% of the cases) [13].

Almost all patients that undergo surgical treatment of pituitary tumors are submitted to transsphenoidal endonasal surgery, including those with macroadenomas [15,16]. Craniotomy is now considered an exception and is indicated in selected cases. Although some surgeons are able to achieve complete excision of supradiaphragmatic adenomas using the transsphenoidal or transnasal path [17,18], this approach does not appear to be adequate for all cases and certain advantages of a craniotomy over a transsphenoidal surgery have been pointed out in specific cases [17,19-21]. In the present reported case, the transcranial route was chosen because the tumor was located in the pituitary stalk and the neurosurgeon had experience in this route.

Many factors influence the remission rates of transsphenoidal surgeries, including the characteristics of the pituitary adenoma, the surgical technique and, particularly, the surgeon's experience [22]. In general, mean remission rates range from 70% to 90% [10,11,22-24]. It is worth mentioning that recurrence can take place several years later. In cases of macroadenoma (≥ 10 mm), remission rates vary from 50% to 70% [25], generally lower compared with those of microadenomas [23]. In a study with 40 participants, tumor size was the main factor affecting postoperative remission: 84% for microadenomas, 92% for macroadenomas and no remission for patients with no visible tumors during surgery [25].

The mortality rate of pituitary surgeries is low (0% - 1.5%). The most common complications are of endocrine origin such as transient diabetes insipidus (3% - 9%) and hypernatremia, which may result from secondary adrenal insufficiency or syndrome of inappropriate antidiuretic hormone secretion. Other complications are urinary bladder fistula (< 8%), bleeding or bruising (1% - 6%), epistaxis, infections (particularly acute rhinosinusitis) and thromboembolic events [10].

6. Conclusion

We reported the case of a patient with Cushing syndrome due to a suprasellar ectopic ACTH - secreting tumor adhered to the pituitary stalk. The chosen approach was craniotomy. The procedure was successful and the patient recovery was uncomplicated. Although ACTH - dependent ectopic

tumors are rare, physicians should be aware that these tumors can be risk factors for developing Cushing syndrome.

7. References

1. Dam-Hieu P, Irthum B, Seizeur R, Roudaut N, Besson G. Management of ACTH-secreting supradiaphragmatic adenomas. Clin Neurol Neurosurg. 2007; 109: 698-704.

2. Shahani S, Nudelman RJ, Nalini R, Kim HS, Samson SL. Ectopic corticotropin-releasing hormone (CRH) syndrome from metastatic small cell carcinoma: a case report and review of the literature. Diagn Pathol. 2010; 5: 56.

3. Yogi-Morren D, Habra MA, Faiman C, Bena J, Hatipoglu B, Kennedy L, et al. Pituitary MRI findings in patients with pituitary and ectopic ACTH-dependent Cushing syndrome: does a 6-mm pituitary tumor size cut-off value exclude ectopic ACTH syndrome? Endocr Pract. 2015; 21: 1098-1103.

4. Brito LBA, Tinoco P, Tinoco T, Ferreira FR, Carrara VL. Right ectopic sphenoid sinus pituitary adenoma. Braz J Otorhinolaryngol. 2014; 80: 5, 451-452.

5. Collie RB, Collie MJ. Extracranial thyroid-stimulating hormone-secreting ectopic pituitary adenoma of the nasopharynx. Otolaryngol Head Neck Surg. 2005; 133: 453-454.

6. Han SY, Kim BH, Jang HR, Kim WJ, Jeon YK, Kim SS, et al. Ectopic ACTH syndrome caused by pulmonary carcinoid tumor mimicking long-standing sclerosing hemangioma. Korean J Intern Med. 2016; 31: 794-797.

7. Salgado LR, Fragoso MCBV, Knoepfelmacher M, Machado MC, Domenice S, Pereira MAA, et al. Ectopic ACTH syndrome: our experience with 25 cases. Eur J Endocrinol. 2006; 155: 725-733.

8. Landolt AM, Schiller Z. Surgical technique: transsphenoidal approach. In: Landolt AM, Vance ML, Reilly PL, editors. Pituitary adenomas. New York: Churchill Livingstone. 1996; 315-331.

9. Nieman LK. Update in the medical therapy of Cushing's disease. Curr Opin Endocrinol Diabetes Obes. 2013; 20: 330-334.

10. Tritos NA, Biller BM, Swearingen B. Management of Cushing disease. Nat Rev Endocrinol. 2011; 7: 279-289.

11. Biller BM, Grossman AB, Stewart PM, Melmed S, Bertagna X, Bertherat J, et al. Treatment of adrenocorticotropin-dependent Cushing's syndrome: a consensus statement. J Clin Endocrinol Metab. 2008; 93: 2454-2462.

12. Rockall AG, Babar SA, Sohaib SA, Isidori AM, Diaz-Cano S, Monson JP, et al. CT and MR imaging of the adrenal glands in ACTH-independent cushing syndrome. RadioGraphics 2004; 24: 435-452.

13. Wagner-Bartak NA, Baiomy A, Habra MA, Mukhi SV, Morani AC, Korivi BR, et al. Cushing syndrome: diagnostic workup and imaging features, with clinical and pathologic correlation. AJR Am J Roentgenol. 2017; 209: 19-32.

14. Sharma ST, Nieman LK, Feelders RA. Cushing's syndrome: epidemiology and developments in disease management. Clin Epidemiol 2015; 7: 281–293.

15. Bonnelli FS, Huston J 3rd, Carpenter PC, Erickson D, Young WF Jr, Meyer FB. Adrenocorticotrophic hormone-dependent Cushing's syndrome: sensitivity and specificity of inferior petrosal sinus sampling. Am J Neuroradiol. 2000; 21: 690-696.

16. Flitsch J, Knappe UJ, Lüdecke DK. Direct intraoperative micromethod for hormone measurements of pituitary tissue in Cushing's disease. Surg Neurol. 1999; 52: 585-590.

17. Mason RB, Nieman LK, Doppman JL, Oldfield EH. Selective excision of adenomas originating in or extending into the pituitary stalk with

preservation of pituitary function. J Neurosurg. 1997; 87: 343-351.

18. Kato T, Sawamura Y, Abe H, Nagashima M. Transsphenoidal-transtuberculum sellae approach for supradiaphragmatic tumours: technical note. Acta Neurochir. 1988; 140: 715-719.

19. Dyer EH, Civit T, Abecassis JP, Derome PJ. Functioning ectopic supradiaphragmatic pituitary adenomas. Neurosurgery 1994; 34: 529-532.

20. Hou L, Harshbarger T, Herrick MK, Tse V. Suprasellar adrenocorticotropic hormone-secreting ectopic pituitary adenoma: case report and literature review. Neurosurgery 2002; 50: 618-625.

21. Jung S, Kim JH, Kim TS, Lee MC, Seo JJ, Park JW, et al. Supradiaphragmatic ectopic adrenocorticotropic hormone-secreting adenoma. Pathol Int. 2000; 50: 901-904.

22. Czepielewski MA, Rollin GAFS, Casagrande A, Ferreira NP. Criteria of cure and remission in Cushing's disease: an update. Arq Bras Endocrinol Metabol. 2007; 51: 1362-1372.

23. Nieman LK, Biller BMK, Findling JW, Murad MH, Newell-Price J, Savage MO, et al. Treatment of Cushing's syndrome: an Endocrine Society Clinical Practice Guideline. J Clin J Clin Endocrinol Metab. 2015; 100: 2807-2831.

24. Sheth SA, Bourne SK, Tritos NA, Swearingen B. Neurosurgical treatment of Cushing disease. Neurosurg Clin N Am. 2012; 23: 639-651.

25. Fomekong E, Maiter D, Grandin C, Raftopoulos C. Outcome of transsphenoidal surgery for Cushing's disease: a high remission rate in ACTH-secreting macroadenomas. Clin Neurol Neurosurg. 2009; 111: 442-449.

Citation: Cavalcante JBF, Cembraneli PN, Cavalcante RBF, Valente Júnior VF, Cavalcante JES, Caparroz FA. Cushing Disease Due to Ectopic Pituitary Adenoma. Global J Surg Surgical Tech. 2019; 1: 1006.