Primary Empty Sella Associated with Pituitary Adenoma Diagnosed by Inferior Petrosal Sinus Blood Sampling

Hang Su[1], Jian Zhou[1], Yu-Qian Bao[1], Yi-Fei Mo[1], Wei-Tian Zhang[2], Jun-Gong Zhao[3], Xiao-Jing Ma[1], Wei-Ping Jia[1]

[1]Department of Endocrinology and Metabolism, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, Shanghai Clinical Center for Diabetes, Shanghai Diabetes Institute, Shanghai Key Laboratory of Diabetes Mellitus, Shanghai Key Clinical Center for Metabolic Disease, Shanghai 200233, China
[2]Department and Research Institute of Otolaryngology, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, Shanghai 200233, China
[3]Department of Diagnostic and Interventional Radiology, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, Shanghai 200233, China

To the Editor: Primary empty sella associated with pituitary adenoma in diabetes patients is rarely reported. Here, we report a case of this association. A 63-year-old type 2 diabetic woman was admitted to our hospital on July 4, 2014. Laboratory examinations revealed HbA1c level was 8.6%. General physical examination revealed typical acromegalic features of the face [Figure 1a], hands, and feet while a static enhanced magnetic resonance imaging (MRI) examination indicated an empty sella without pituitary adenoma. Laboratory examinations revealed an elevation of urine cortisol of 24 h at 353.6 μg (reference range 28.5–214.0 μg). One milligram dexamethasone suppression test suggested the presence of hypercortisolemia, which could not be inhibited by 1 mg dexamethasone. The serum growth hormone (GH) level at 8 a.m. was 2.73 ng/ml. Other laboratory examinations were all within the normal range. Pituitary dynamic enhanced MRI showed the sella turcica was partially empty with a thin rim of pituitary tissue along the right rear part of its floor, where presented the abnormal signal after enhancing. The MRI result suggested an empty sella associated with pituitary adenoma [Figure 1b]. Adrenal gland computed tomography was performed and indicated the thickened left adrenal nodular [Figure 1c]. Subsequent bilateral inferior petrosal sinus sample (BIPSS) was performed for the localization diagnosis [Figure 1d], which demonstrated adrenocorticotrophic hormone (ACTH) level of inferior petrosal sinus and femoral vein at 0 min were 691.4 ng/L and 162.9 ng/L, at 5 min were 952.2 ng/L and 172.3 ng/L, respectively; GH level of inferior petrosal sinus and femoral vein at 0 min were 6.34 ng/ml and 3.88 ng/ml, at 5 min were 3.7 ng/ml and 2.38 ng/ml, respectively. The ratio of inferior petrosal sinus ACTH level and peripheral level was >2 at any time, suggesting that ACTH was derived from the pituitary gland. The patient's serum ACTH, cortisol, and GH levels normalized after the nasal endoscopic transsphenoidal sellar pituitary resection.

Access this article online

Quick Response Code:

Website: www.cmj.org

DOI: 10.4103/0366-6999.151123

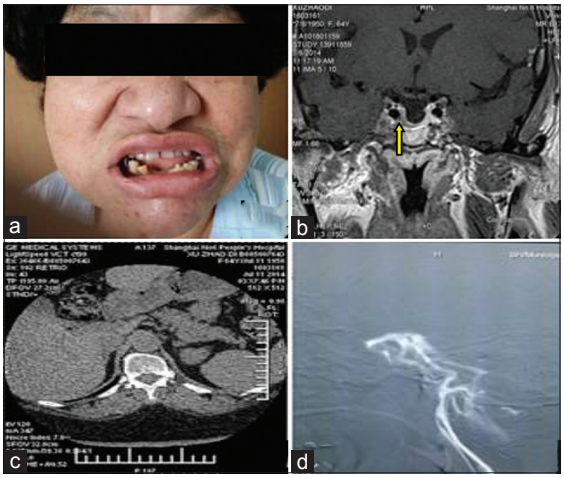

Figure 1: Primary empty sella associated with pituitary adenoma. (a) Patient's appearance; (b) Pituitary dynamic enhanced magnetic resonance imaging images. Arrows show abnormal signal accumulate on at the pituitary; (c) Adrenal gland CT images; (d) Bilateral inferior petrosal sinus sample.

Immunohistochemical test showed immunohistochemical test disclosed a plurihormonal adenoma, producing GH mainly. During the 2-month follow-up, patient's blood glucose was controlled satisfactorily with oral hypoglycemic drugs.

In this case, a static enhanced MRI indicated an empty sella without pituitary adenoma, which was not in accordance with typical acromegalic appearance and hypercortisolism. Meanwhile, dynamic contrast MRI and BIPSS were helpful in diagnosing under these circumstances, as the former test is useful in both evaluating the pituitary adenoma and assessing its location,[1] positive-rate of ACTH-secreting adenomas was 84.6% on MRI scans, and that of small microadenomas was 87.2% on dynamic enhanced MRI scans.[2] BIPSS has been established as a highly accurate diagnostic procedure to distinguish between pituitary and ectopic sources of ACTH, which is rather sensitive and specific at diagnosing difficult cases

Address for correspondence: Prof. Jian Zhou, Department of Endocrinology and Metabolism, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, No. 600, Yishan Road, Shanghai 200233, China
E-Mail: zhoujian@sjtu.edu.cn

of Cushing's syndrome.[3] One explanation of this case could be a role of local (paracrine action) GH action on bone and pituitary (negative feedback), resulting in the sellar enlargement and pituitary gland atrophy.[4] Another possible explanation is interrelated to most of the precursors of nasopharyngeal origin remained in the clivus during the formation of the anterior pituitary gland.[5]

References

1. Lee HB, Kim ST, Kim HJ, Kim KH, Jeon P, Byun HS, *et al.* Usefulness of the dynamic gadolinium-enhanced magnetic resonance imaging with simultaneous acquisition of coronal and sagittal planes for detection of pituitary microadenomas. Eur Radiol 2012;22:514-8.
2. Xing B, Deng K, Ren ZY, Su CB, Wang RZ, Yang Y, *et al.* Magnetic resonance imaging characteristics and surgical results of adrenocorticotropin-secreting pituitary adenomas. Chin Med Sci J 2008;23:44-8.
3. Fan C, Zhang C, Shi X, Bian L, Zhao W, Zhang H, *et al.* Assessing the value of bilateral inferior petrosal sinus sampling in the diagnosis and treatment of a complex case of Cushing's disease. Intractable Rare Dis Res 2013;2:24-9.
4. Liu W, Zhou H, Neidert MC, Schmid C, Bernays RL, Ni M, *et al.* Growth hormone secreting pituitary microadenomas and empty sella – An under-recognized association? Clin Neurol Neurosurg 2014;126:18-23.
5. Liu B, Zhuang Z, Luo J, Wang Y. A case report of an ectopic clival growth hormone adenoma associated with an empty sella and a review of the literature. Clin Neurol Neurosurg 2013;115:2533-6.

Received: 04-11-2014 **Edited by:** Yuan-Yuan Ji
How to cite this article: Su H, Zhou J, Bao YQ, Mo YF, Zhang WT, Zhao JG, Ma XJ, Jia WP. Primary Empty Sella Associated with Pituitary Adenoma Diagnosed by Inferior Petrosal Sinus Blood Sampling. Chin Med J 2015;128:567-8.

Source of Support: Nil **Conflict of Interest:** None declared.