Case Report
Suprasellar granular cell tumor of the neurohypophysis with specific radiological features: a case report

Fangfang Xu, Demin Xu, Chao Wang

Department of Radiology, The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou 310009, Zhejiang, P. R. China

Received June 9, 2016; Accepted September 10, 2016; Epub October 15, 2016; Published October 30, 2016

Abstract: Granular cell tumour (GCT) is a rare tumour seen in the sellar suprasellar region which is believed to arise from either the infundibulum or the posterior lobe of the pituitary gland. Preoperative prediction of the diagnosis on the basis of radiological appearance is useful as these tumours carry specific surgical difficulties. A 63-year-old man underwent brain CT for a medical check-up at our hospital, and a suprasellar tumor was detected. Brain CT demonstrated a well-defined, homogenous, slightly hyperdense suprasellar tumor. Enhanced CT of brain demonstrated the mass showed obviously homogeneous enhancement. MRI detected a lobular tumor that was isointense on T1-weighted images, hypointense on T2-weighted images, and showed slightly heterogeneous enhancement after administration of gadolinium. MRI showed the lesion involved the pituitary stalk and spared the pituitary gland. Subtotal tumor resection was performed, and histological examination confirmed the diagnosis of granular cell tumor. We also review the literature focusing on radiographic findings of granular cell tumor of the neurohypophysis.

Keywords: Brain tumours, granular cell tumour, pituitary, neurohypophysis

Introduction
Granular cell tumor (GCT) of the neurohypophysis is a very rare suprasellar tumor that arises from pituicytes in the neurohypophysis. GCT of the neurohypophysis was first described as an infundibular mass in 1893 [1], but identified as a distinct neurohypophyseal tumor in 1921 [2]. The 2007 WHO Classification of Tumors of the Central Nervous System suggested GCT of the neurohypophysis was designated as a distinct diagnostic entity that was expressly distinguished from pituicytoma. GCT of the neurohypophysis usually is a small tumor that is discovered incidentally because GCT rarely grows to a sufficient size to cause mass effect symptoms. GCT is more common in women, usually presents in the fourth to fifth decades of life [3]. Previous reports suggested that GCT of the neurohypophysis was difficult to diagnose before surgery, owing to the lack of specific imaging features [4]. In this paper, we report a case of GCT of the pituitary stalk and discuss the features of CT and MRI for making a preoperative diagnosis.

Case report
A 63-year-old man underwent brain CT for a medical check-up at our hospital, and a suprasellar tumor was detected. He presented with a blurred vision and without a visual field loss. A pituitary function test revealed high levels of serum prolactin (366.1 mIU/L). Other laboratory findings for hormones and infection markers were normal. Brain CT demonstrated a well-defined, homogenous, slightly hyperdense tumor (Figure 1A). Enhanced CT of brain demonstrated the mass was obviously homogeneously enhanced (CT value =95 Hu) (Figure 1B). MRI of the brain showed a large suprasellar lobular mass arisen from the pituitary stalk, extending up to the floor of the third ventricle, and lifting and compressing the optic chiasm and the bilateral optic tract. The lesion was isointense on T1-weighted images with several small foci of hypointense (Figure 1C), hypointense on T2-weighted images with several small foci of hyperintense (Figure 1D), and showed slightly heterogeneous enhancement following the
Suprasellar GCT of the neurohypophysis

intravenous administration of gadolinium (Figure 1E). The pituitary gland could be identified separately below the lesion (Figure 1F). We concluded that the lesion involved the pituitary stalk and spared the pituitary gland. The tumor was approached via callosal craniotomy, and subtotal resection was performed because intraoperative frozen-section examination showed this tumor was benign and the complications of bleeding may be fatal. The postoperative course was uneventful, and this patient was discharged 3 weeks later after surgery. Histological examination of the resected specimen revealed that this tumor was composed of moderately large polygonal cells with abundant cytoplasm containing numerous eosinophilic granules. The nuclei were small, oval-to-spherical, and eccentric. No distinct mitotic figures were identified (Figure 2). Tumor cells were positive for CD68, TTF1, CD163 and S100. EMA was negative.

Discussion

GCT is a rare suprasellar tumor that arises from pituicytes (one of the types of glial cells), which
Suprasellar GCT of the neurohypophysis

was described for the first time in 1893 [5]. Small GCT was mostly found incidentally in 17% of unselected adult autopsies [5]. They rarely grow to a sufficient size to cause mass effect symptoms. Only a small number of symptomatic cases have been described [6, 7]. Typically, these patients present with insidious visual impairment and anterior pituitary insufficiency with mild hyperprolactinaemia [6].

A meta-analysis conducted by Covington et al. revealed that 28 of 45 GCT (62%) were suprasellar, while the remaining 17 GCT (38%) were both intrasellar and suprasellar, with none being purely intrasellar. The tumor showed hyperattenuation on unenhanced CT in 18/20 cases (90%). Postcontrast scans were available in 13/20 cases, with the tumor showing homogeneous enhancement in 11/13 (84%), heterogeneous enhancement in 1/13 (8%), and no enhancement in 1/13 (8%). T1WI was available in 24 cases, and the tumor was isointense in 18/24 (75%), hypointense in 4/24 (17%), and hyperintense in 2/24 (8%). T2-weighted images were available in 17 cases, with the tumor being isointense in 10/17 (59%), hypointense in 7/17 (41%) and no hyperintense tumors. Contrast-enhanced T1-weighted images were available in 23 cases, with the tumor being heterogeneously enhanced in 12/23 (52%) and homogeneously enhanced in 11/23 (48%) [1]. Although most GCT were solid, two cases of GCT with a cystic component have been reported [2, 3]. Besides, calcification was extremely rare [2, 3]. In the present case, CT revealed a well delineated, homogenous tumor with high density. MRI revealed the tumor was isointense on T1-weighted images, hypointense on T2-weighted images, and showed slightly heterogeneous enhancement. These findings were compatible with the features of GCT mentioned above, and also reflected the hyperattenuation of the tumor on CT because GCT was histologically hypercellular lesions infiltrating the posterior pituitary [8]. In addition, MRI (Figure 1F) indicated that this tumor arose from the infundibulum because this suprasellar mass was located posteriorly to the optic chiasm and the pituitary gland was not involved and appeared as a distinct structure inferior to the tumour. MRI may be useful for determining the origin of the tumor.

Treatment of choice, if feasible, is radical surgical resection, through transsphenoidal approach, which is often challenging in GCT patients because these tumors are characteristically firm and hypervascular lesions that cannot be removed by suction and are associated with a high risk of heavy bleeding during resection [9, 10]. Considering the high risk of bleeding, our patient was employed transcallosal craniotomy rather than transsphenoidal approach. Becker et al. accomplished only a subtotal resection in all the 6 cases via the subfrontal, transcallosal and transsphenoidal routes. They stated that the priority should be decompression of the optic apparatus, rather than complete tumor resection [11]. In our case, only subtotal resection was performed to decompress the optic apparatus. As a result of our experience with this patient, we conclude that preoperative diagnosis is valuable, as, unlike pituitary adenomas, transsphenoidal surgery is often difficult and unrewarding. GCT is generally considered as a benign tumor, adjuvant radiotherapy is indicated only in case of atypical or multirecurrent tumor with a clear proliferative activity [12].

In conclusion, GCT of the neurohypophysis is a rare suprasellar tumor, and it is difficult to diagnose properly before surgery. However, it is noted that GCT should receive diagnostic consideration for lesion that is hyperattenuated compared with brain parenchyma on noncontrast CT and of a purely suprasellar location, but should be excluded from the differential diagnosis of purely intrasellar location. It is also noted that MRI is particularly useful in determining the origin of the tumor.

Disclosure of conflict of interest

None.

Address correspondence to: Dr. Chao Wang, Department of Radiology, The Second Affiliated Hospital, School of Medicine, Zhejiang University, No. 88 Jiefang Road, Hangzhou 310009, Zhejiang Province, P. R. China. E-mail: wangchaosmart@163.com

References


