

ORIGINAL ARTICLE

Coexistent Pituitary Adenoma with Rathke's Cleft Cyst: A Case Series

Varsha S Jagtap^{1*}, Anurag R Lila², Vijaya Sarathi¹, Amol P Bukan¹, Tushar R Bandgar³, Nalini S Shah⁴**Abstract**

Objective: Co existent pituitary adenoma and Rathke's cleft cyst (RCC) is a rare entity. Purpose of this study is to describe the clinical presentation, imaging findings, and management of patients with this combination.

Methods: Retrospective review of records from a single tertiary care center for a period of three years [2009-2012].

Results: Out of the total 284 pituitary adenoma patients in the study period, there were four patients one each of Cushing's disease, acromegaly, prolactinoma and non-secretory pituitary adenoma with coexisting RCC in all. Three of these were diagnosed to have coexisting RCC in preoperative MRI. All of them underwent transphenoidal excision of the lesions. Histopathology confirmed the collision sellar lesions in all four.

Conclusions: It is difficult to diagnose coexisting RCC preoperatively due to variable size, position and signal intensity. However when a nonenhancing cyst is incidentally detected by MRI in a patient with pituitary adenoma, the possibility of a coexisting RCC should be considered.

Introduction

Collision sellar lesions represent an uncommon entity. It comprises of combination of neoplastic, inflammatory, vascular or congenital lesions.¹ Majority of these cases are missed preoperatively but get diagnosed postoperatively on histopathology.

Rathke's cleft cysts (RCC) are commonly believed to be cysts derived from remnants of the Rathke's pouch. RCCs are cystic sellar and supra- or parasellar lesions. Although small asymptomatic RCCs are seen at autopsy in 13–22% of normal pituitary glands, symptomatic examples are relatively rare (2). RCC with pituitary adenoma is a rare combination with around 42 cases described in literature (2-8). The pituitary adenomas associated with RCC are mainly prolactinoma followed by acromegaly, non-secretory, corticotropinoma and TSHoma.¹

Methods

Retrospective review of the records of all pituitary adenoma patients attending the outpatient services of

endocrinology department of a tertiary care center in India was carried out for a period of three years (Jan 2009-Dec 2012). The histopathology reports of patients were studied and those patients with coexisting pituitary adenoma and RCC were included in the study. The clinical features, hormonal investigations, MRI characteristics and management offered were noted. All hormonal measurements were carried out by chemiluminescence assay (Immulate 1000, Siemens, Los Angeles USA). Intra-assay and interassay coefficients of variation were less than 8% and 10%, respectively, for all hormonal evaluation. MRI scans were performed in a 1.5 Tesla unit using T1-weighted sagittal and coronal scans using gadolinium contrast.

Results

Total 284 patients with pituitary adenoma (193 secretory and 91

nonsecretory) attended the outpatient services in the span of three year study period. On evaluation of the histopathology reports of operated patients, four were found to have coexisting RCC with pituitary adenoma. Herein we describe these four patients with coexisting RCC and Cushing's disease, acromegaly, prolactinoma and non-secretory pituitary adenoma. Three of the four patients were diagnosed to have coexisting RCC on preoperative radiology. In all patients histopathology was positive for pituitary adenoma and RCC.

Case 1

Fifty five year old postmenopausal housewife presented with chief complaints of weight gain, mooning of face, bilateral edema feet and proximal muscle weakness of two year duration (Figures 1a, 1b). She was found to be diabetic and hypertensive. Her evaluation revealed ACTH dependent endogenous hypercortisolism. MRI pituitary revealed a 13*16*11 mm macroadenoma with 8* 10*10 mm suprasellar cyst (T1 isointense and T2 hyperintense with no enhancement with thick wall) (Figures 1c, 1d). She underwent transsphenoidal excision of the adenoma and the cystic structure. Histopathology showed an adenoma with occasional cysts lined by pseudostratified columnar epithelium containing mucin (Figure 2). Cholesterol clefts and foamy histiocytes were also seen. The final histopathology report was pituitary adenoma with RCC. Unfortunately the patient died due to ventilatory complications on third post-operative day.

Case 2

Thirty three year old female presented with headache, progressive

¹Senior Resident, ²Assistant Professor, ³Associate Professor, ⁴Professor and Head of Department, Department of Endocrinology, Seth GS Medical College, Mumbai, Maharashtra; *Corresponding Author
Received: 02.07.2015; Accepted: 21.12.2017

acral enlargement, oligomenorrhoea and diminution of left eye vision since two years. She was found to have GH excess state with impaired fasting glucose. Her MRI revealed a 32*25*20 mm pituitary macroadenoma with suprasellar and right parasellar extension. It also revealed a cystic cleft within the adenoma (Figure 3). She underwent transsphenoidal excision of the adenoma. Histopathology revealed an adenoma with small cyst lined by pseudostratified ciliated columnar epithelium with intraluminal mucinous material. It was diagnostic of pituitary macroadenoma with RCC. Post operative evaluation revealed a residual macroadenoma with mainly parasellar component. There was no recurrence of RCC on MRI done 1.5 years later. The patient was subjected to fractional stereotactic conventional radiotherapy.



Fig. 1a: Case 1 with Cushing's disease with visible mooning of face and dorsocervical pad of fat



Fig. 1b: Case 1 with Cushing's disease showing hyperpigmentation of nail beds

Case 3

28 year old female comes with complaints of amenorrhoea, galactorrhoea and bitemporal hemianopia. Hormonal evaluation was diagnostic of hyperprolactinemia (Prolactin: 594 ng/ml). Her MRI revealed a giant 48*37*29 mm adenoma with suprasellar, sphenoidal and bilateral parasellar extension (Figure 4). The macroadenoma had cystic changes. She was started on cabergoline 1mg/week. The dose was gradually increased over the next three years to 5 mg/week due to the consistently elevated prolactin values. The patient then started having CSF rhinorrhoea. She was subjected to transsphenoidal surgery and postoperatively cabergoline

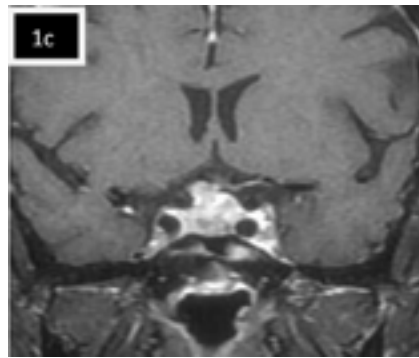


Fig. 1c: T1 weighted with contrast coronal image of pituitary macroadenoma (13*16*11 mm) in case 1

was restarted on low dose. The histopathology report was suggestive of atypical pituitary adenoma with RCC. The adenoma was composed of polyhedral cells with pleomorphic nuclei, focal squamous metaplasia, occasional mitosis, bony infiltration and small foci of psammomatoid calcification. Post operatively followup is available for 6 months; she has residual adenoma and requires cabergoline for hyperprolactinemia. There has been no recurrence of RCC.

Case 4

Forty-eight year old male comes with the complaints of visual disturbances. On evaluation he had bitemporal hemianopia. Hormonal evaluation was suggestive of secondary

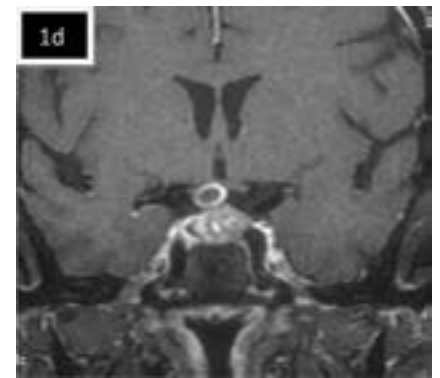


Fig. 1d: T1 weighted with contrast coronal image of RCC in case 1 showing non enhancing cyst

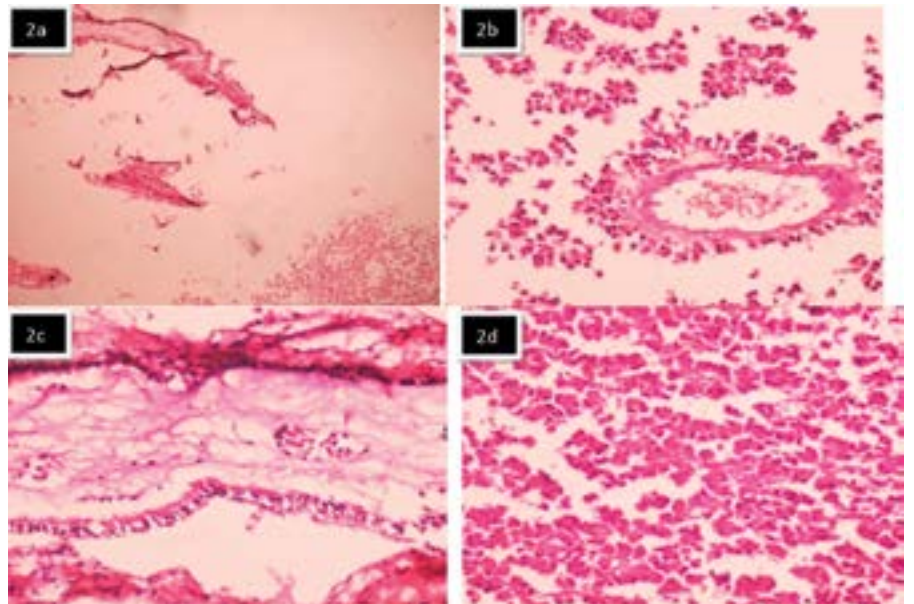


Fig. 2: Histopathology (H & E stain) of case 1 (RCC with Cushing's disease) showing low power (100X) view (2a); cyst containing mucin (200X) (2b); stratified ciliated columnar mucosal lining of the RCC (200X) (2c) and high power (200X) view showing pituitary adenoma cells (2d)



Fig. 3a: T1 weighted sagittal with contrast image of case 2 showing macroadenoma with nonenhancing cystic cleft within the mass

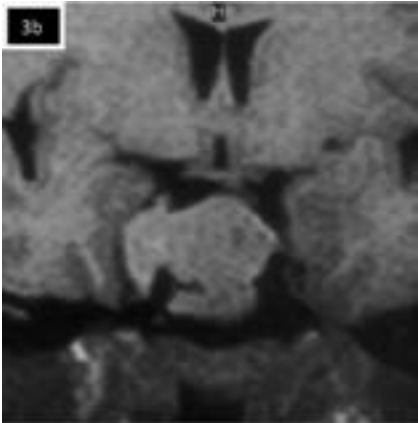


Fig. 3b: T1 weighted coronal image of case 2 showing macroadenoma (32*25*20 mm) with right parasellar extension

hypothyroidism, hypocortisolism and hypogonadism. His MRI revealed a giant 45*44*37 mm adenoma with suprasellar extension (Figure 5). The macroadenoma had multiple cystic changes (largest being 20*22*16 mm) which were hyperintense on T1 and T2. There was no contrast enhancement. The differentials on imaging were subacute hemorrhage or a cyst with proteinaceous content. He was subjected to transphenoidal surgery. The histopathology report was suggestive of atypical pituitary adenoma with RCC. The adenoma was composed of polyhedral cells with pleomorphic nuclei and occasional mitosis. Evaluation done at 1 year 2 months post surgery shows residual adenoma and there is no recurrence of RCC.



Fig. 4a: T1 weighed coronal image with contrast of case 3 showing a giant macroadenoma (48*37*29 mm) with suprasellar and bilateral parasellar extension. Also seen are nonenhancing cystic structures within.

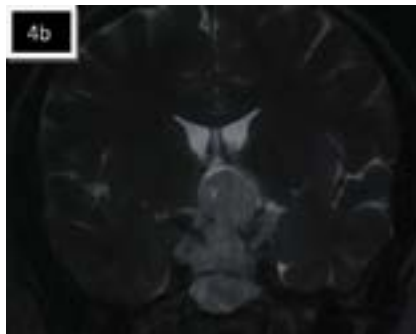


Fig. 4b: T2 weighted coronal image of case 3

Discussion

RCCs are remnants of Rathke's pouch.⁹ The relationship between pituitary adenomas and RCCs is controversial. Associations between these lesions have been reported to be only occasional and purely coincidental. In contrast other theory states that as pituitary adenomas also originate by clonal proliferation from anterior pituitary (derivative of Rathke's pouch), they have shared embryonic origin.¹⁰ Kepes considered that this collision lesion was derived from "transitional" cells between the lining of Rathke's cleft and the glandular cells of the anterior pituitary, and coined the term "transitional cell tumour of the pituitary gland" for this lesion.¹¹ However, electron microscopy and immunohistochemistry proved that the cyst within the pituitary adenoma differs from cysts found in the embryonic stage of the pituitary gland. Therefore this theory that the tumour originated from the epithelium of an RCC in the early developmental stage

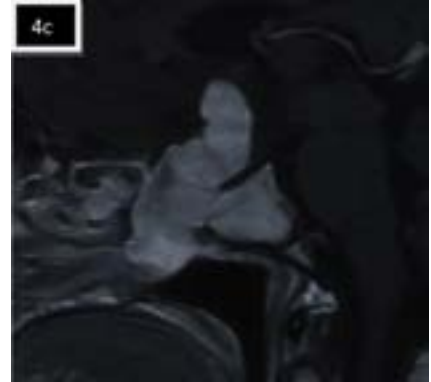


Fig. 4c: T1 weighted sagittal image of case 3 showing extensive suprasellar and sphenoidal spread

was rejected.¹² In spite of this shared embryonic origin, RCC and adenoma have a rare coexistence.

RCCs were associated with 1.4% of pituitary adenomas in our series. RCCs were associated with 1.7% of pituitary adenomas in a large study series involving 464 patients.¹³ In another recent study of 782 adenomas, 4 also had RCC (0.51%).² The clinical features can be due to pituitary adenoma or due to mass effect of the RCC.

Preoperative diagnosis of these collision lesions based on MRI findings is difficult. Although RCCs are rarely associated with pituitary adenomas; their presence may be overlooked in patients with pituitary adenomas. The differential diagnosis of incidental cysts in this region includes other lesions like cystic craniopharyngioma, cystic or haemorrhagic pituitary adenoma and arachnoid cyst. RCC show variable position, size and signal intensity.^{2,14} MR intensities of RCCs vary considerably depending on the cystic contents. High T1-weighted image intensity has been interpreted to indicate a high content of protein and mucopolysaccharide or the rare occurrence of haemorrhage.^{15,16} The cystic content of high- and iso-intensity RCCs on T1-weighted images is usually indicative of mucous with varying viscosity. By contrast, RCCs with low intensity on T1-weighted images usually contain CSF like transparent fluid with low viscosity. Some studies have reported the presence of intracystic nodules as characteristic for RCC but it was not observed in any of our cases.¹⁷

Out of 42 patients reported in literature, in 16 cases preoperative

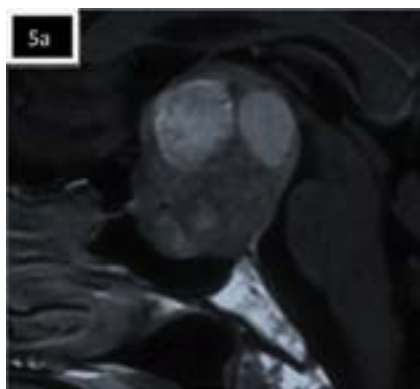


Fig. 5a: T1 weighted sagittal with contrast image of case 4 showing macroadenoma (45*44*37 mm) with non enhancing cystic changes

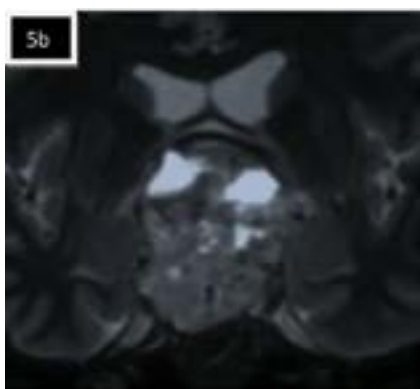


Fig. 5b: T2 weighted coronal image of case 4 showing macroadenoma with suprasellar extension and hyperintense cystic changes

diagnosis was made of coexisting RCC due to different signal intensity seen on MRI (Table 1).^{3,4} Three of our four patients were suspected to have coexisting RCC on preoperative radiology.

In all four patients histopathology was positive for pituitary adenoma and RCC. Complex sellar lesions consisting of pituitary adenoma admixed with RCC and metaplastic squamous epithelium have also been reported as was seen in case 3. Whether these tumors are true “transitional” neoplasms or simply examples of an intimate collision of adenoma and cyst is unclear.¹¹

The rate of recurrence for RCC varies from 0 to 33% due to variable followup.¹⁸ Since the longest followup in our case series was 1.5 years, we can not comment on recurrence. It is thought that recurrence rate would be reduced by complete removal of cyst wall.¹⁹ Hence in cases of pituitary

Table 1: Review of literature showing cases with coexisting RCC and pituitary adenoma

Author (year, ref)	No. of cases	Pre-operative radiological diagnosis	Histo-pathological confirmation	Followup (mths)	Recurrence	Type of adenoma
Shuangshoti S (1970, 20)	1	N	Y	NA	NA	NA
Trokoudes KM (1978, 21)	1	N	Y	NA	NA	PROL
Keppes JJ (1978, 11)	1	N	Y	NA	NA	NA
Kurisaka M (1982, 22)	2	N	Y	NA	NA	PROL
Swanson SE (1985, 23)	1	N	Y	NA	NA	PROL
Hiyama H (1986, 24)	1	Y	Y	NA	NA	NA
Ikeda H (1987, 25)	1	Y	Y	NA	NA	PROL
Matsumori K (1987, 26)	1	N	Y	NA	NA	PROL
Nishio S (1987, 13)	9	N	Y	2 to 60	N	PROL
Nakasu S (1989, 27)	1	N	Y	NA	NA	GH +PROL
Ikeda H (1992, 12)	1	Y	Y	NA	NA	GH
Miyagi A (1993, 28)	1	Y	Y	1	NA	PROL
Nishio S (1995, 29)	2	Y	Y	NA	NA	GH
Sumida M (2001, 14)	8	Y	Y-2	NA	NA	GH (6), ACTH (2)
Bader LJ (2004,8)	1	Y	Y	3	N	GH
Kaku S (2005, 30)	1	Y	Y	NA	NA	NFPA
Vancura RW (2006, 31)	1	N	Y	NA	NA	NFPA
Geller JL (2006, 32)	1	N	Y	NA	NA	PROL
Noh SJ (2007, 3)	1	Y	Y	6	N	GH
Koutourousiou M (2010, 1)	2	N	Y	27 to 55	N	ACTH (1), NFPA(1)
Radhakrishnan N (2011, 9)	1	N	Y	NA	NA	NFPA
You C (2012, 6)	1	N	Y	NA	NA	GH
Gupta V (2012, 5)	1	N	Y	3	N	GH
Wang K (2012, 4)	1	N	Y	6	N	NFPA
Our series	4	Y-3	Y	0 to 18	N	GH (1), PROL (1), ACTH (1), NFPA (1)

RCC: Rathke's cleft cyst, Y: Yes, N:No, NA: Not available, PROL: Prolactinoma, ACTH: Corticotropinomas, GH: Somatotropinomas, NFPA: Non-functioning pituitary adenoma

adenoma preoperative diagnosis of coexisting RCC may help in better surgical cure and reduce the recurrence rate.

Conclusion

In this paper we describe three patients with unusual combination of pituitary adenoma with RCC. It is difficult to differentiate between them preoperatively due to variable size, position and signal intensity. However when a nonenhancing cyst is incidentally detected by MRI in a patient with pituitary adenoma, the possibility of a coexisting RCC should be considered. Careful analysis of preoperative imaging could prevent incomplete resection of this rare condition.

References

- Koutourousiou M, Kontogeorgos G, Wesseling P, et al. Collision sellar lesions: experience with eight cases and review of the literature. *Pituitary* 2010; 13:8-17.
- Mukherjee JJ, Islam N, Kaltsas G, et al. Clinical, radiological and pathological features of patients with Rathke's cleft cysts: tumors that may recur. *J Clin Endocrinol Metab* 1997; 82:2357-2362.
- Noh SJ, Ahn JY, Lee KS, et al. Pituitary adenoma and concomitant Rathke's cleft cyst. *Acta Neurochir (Wien)* 2007; 149:1223-1228.
- Wang K, Ma L, You C. Pituitary adenoma and concomitant Rathke's cleft cyst: A case report and review of the literature. *Neurology India* 2012; 60:309-310.
- Gupta V, Grossman A, Kapadia A, et al. Acromegaly associated with symptomatic Rathke's cyst. *Indian J Endocr Metab* 2011; 15:140-142.
- You C, Qiao F, Jiang S, et al. Growth hormone secreting pituitary adenoma associated with Rathke's cleft cyst. *Neurology India* 2012; 60:310-311.
- Karavitaki N, Scheithauer BW, Watt J, et al. Collision lesions of the sella: co-existence of craniopharyngioma with gonadotroph adenoma and of Rathke's cleft cyst with corticotroph adenoma. *Pituitary* 2008; 11:317-23
- Bader LJ, Carter KD, Latchaw RE, et al. Simultaneous symptomatic Rathke's cleft cyst and GH secreting pituitary adenoma: a case report. *Pituitary* 2004; 7:39-44.
- Radhakrishnan N, Menon G, Hingwala DR, et al. Nonfunctioning pituitary adenoma and concomitant Rathke's cleft cyst. *Indian J Pathol Microbiol* 2011; 54:649-651.
- Shanklin WM. The histogenesis and histology of an integumentary type of epithelium in the human hypophysis. *Anat Rec* 1951; 109:217-231.
- Kepes JJ. Transitional cell tumor of the pituitary gland developing from a Rathke's cleft cyst. *Cancer* 1978; 41:337-343.
- Ikeda H, Yoshimoto T, Katakura R. A case of Rathke's cleft cyst within a pituitary adenoma presenting with acromegaly-do “transitional cell tumours of the pituitary gland” really exist? *Acta Neuropathol (Berl)* 1992; 83:211-215.
- Nishio S, Mizuno J, Barrow DL, et al. Pituitary tumors

- composed of adenohypophyseal adenoma and Rathke's cleft cyst elements: a clinicopathological study. *Neurosurgery* 1987; 21:371–377.
14. Sumida M, Migita K, Tominaga A, et al. Concomitant pituitary adenoma and Rathke's cleft cyst. *Neuroradiology* 2001; 43:755–759.
 15. Hayashi Y, Tachibana O, Muramatsu N, et al. Rathke cleft cyst: MR and biomedical analysis of cyst content. *J Comput Assist Tomogr* 1999; 23:34–38.
 16. Ikeda H, Yoshimoto T. Clinicopathological study of Rathke's cleft cyst. *Clin Neuropathol* 2002; 21:82–91.
 17. Byun WM, Kim OL, Kim D. MR imaging findings of Rathke's cleft cysts: Significance of intracystic nodules. *Am J Neuroradiol* 2000; 21:485–488.
 18. Trifanescu R, Ansoorge O, Wass JA, et al. Rathke's cleft cysts. *Clin Endocrinol (Oxf)* 2012;76:151–60.
 19. Kim JE, Kim JH, Kim OL, et al. Surgical treatment of symptomatic Rathke cleft cysts: clinical features and results with special attention to recurrence. *J Neurosurg* 2004; 100:33–40.
 20. Shuangshoti S, Netsky MG, Nashold BS Jr. Epithelial cysts related to sella turcica. Proposed origin from neuroepithelium. *Arch Pathol* 1970; 90:444–450.
 21. Trokoudes KM, Walfish PG, Holgate RC, et al. Sellar enlargement with hyperprolactinemia and a Rathke's pouch cyst. *JAMA* 1978; 240:471–473.
 22. Kurisaka M, Pearl GS, Takei Y, et al. Cystic prolactin secreting tumor. A light microscopic, ultrastructural, and immunocytochemical study. *Neurol Med Chir (Tokyo)* 1982; 22:453–60.
 23. Swanson SE, Chandler WF, Latack J, et al. Symptomatic Rathke's cleft cyst with pituitary adenoma: case report. *Neurosurgery* 1985; 17:657–659.
 24. Hiyama H, Kubo O, Yato S, et al. A case of pituitary adenoma combined with Rathke's cleft cyst. *No Shinkei Geka* 1986; 14:435–440.
 25. Ikeda H, Niizuma H, Fujiwara S, et al. A case of prolactinoma in close association with Rathke's cleft cyst. *No Shinkei Geka* 1987; 15:999–1003.
 26. Matsumori K, Okuda T, Nakayama K, et al. Case of calcified prolactinoma combined with Rathke's cleft cysts. *No Shinkei Geka* 1984; 12:833–838.
 27. Nakasu S, Nakasu Y, Kyoshima K, et al. Pituitary adenoma with multiple ciliated cysts: transitional cell tumor? *Surg Neurol* 1989; 31:41–8.
 28. Miyagi A, Iwasaki M, Shibuya T, et al. Pituitary adenoma combined with Rathke's cleft cyst—case report. *Neurol Med Chir (Tokyo)* 1993; 33:643–650.
 29. Nishio S, Fujiwara S, Morioka T, et al. Rathke's cleft cysts within a growth hormone producing pituitary adenoma. *Br J Neurosurg* 1995; 9:51–55.
 30. Kaku S, Tanaka T, Sawauchi S, et al. A case of non-functional pituitary adenoma associated with Rathke's cleft cyst. *No Shinkei Geka* 2005; 33:797–803.
 31. Vancura RW, Jacob KM, Damjanov I. A 70-year-old man with diplopia, nausea, and vomiting. Rathke cleft cyst concomitant with pituitary adenoma. *Arch Pathol Lab Med* 2006; 130:403–4.
 32. Geller JL, Fan X, Arteaga V, et al. A Symptomatic Prolactinoma Coexisting Within a Rathke Cleft Cyst Invading Bone: Case Report and Review. *The Endocrinologist* 2006; 16:91–94.

