CASE REPORT

Oncocytic adrenocortical carcinoma—a rare pathological variant

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Accepted 1 April 2015

SUMMARY

Oncocytic adrenocortical carcinoma is a rare histopathological variant of adrenocortical carcinoma with very few instances reported in the literature to date. With progressive research, new insights have emerged in the molecular profiling of these tumours. This advancement has led to more clarity in reporting of this tumour. We report a case of oncocytic adrenocortical carcinoma with its attending clinical presentation, immunohistochemical profiling and characteristic electron microscopy findings.

BACKGROUND

Oncocytic adrenocortical carcinoma (OAC) represents a rare subgroup of oncocytic adrenocortical neoplasms (OANs) with approximately 36 cases documented in the literature.¹ With progressive research, new insights have emerged in the molecular profiling of these tumours. This advancement has led to more clarity in reporting of this tumour. It is important to discriminate an OAN from an ordinary adrenocortical tumour, as applying the Weiss system of classification to this subset of neoplasms will lead to a diagnosis of adrenocortical carcinoma that is not appropriate given the benign behaviour of most of these lesions. These oncocytic tumours should be further classified on the basis of the Lin–Weiss–Bisceglia (LWB) system to discriminate their malignant potential and have a better prognostic classification.² We report a case of OAC with its attending clinical presentation, immunohistochemical profiling and characteristic electron microscopy findings.

CASE PRESENTATION

A 34-year-old man was referred to our clinic with an incidentally detected left suprarenal mass on ultrasound scan. He was normotensive, and physical examination was essentially normal with no feature suggestive of an endocrine abnormality. All laboratory tests, including serum cortisol, 17 ketosteroids, urinary metanephrines, full blood counts and renal and hepatic function tests, were normal. Contrast-enhanced CT findings revealed a 14×10 cm heterogeneously enhancing left suprarenal mass with delayed washout. The patient underwent a left open adrenalectomy by subcostal approach. Macroscopically, the tumour was a well-encapsulated solid 16×11×8 cm lesion with the cut section showing lobulated yellow to grey-brown soft tumour components compressing a part of the normal adrenal gland along one edge.

Based on histopathological and electron microscopic features, a diagnosis of oncocytic variant of adrenocortical carcinoma was considered. Patient recovery was uneventful and he is on regular follow-up.

INVESTIGATIONS

Histopathological examination revealed sheets of tumour cells showing an abundant amount of eosinophilic granular cytoplasm, central to eccentrically placed nuclei with a marked degree of nuclear atypia (figure 1A, B). A mitotic rate of 3/10 hpf including atypical mitosis with vast areas of necrosis was seen (figure 1C). On immunohistochemistry (IHC), these cells were positive for inhibin and melanin A (figure 2A, B) while negative for chromogranin (figure 2C). Electron microscopy showed round to oval cells with plenty of membrane-bound secretory granules with a few cells showing a large number of mitochondria (figure 3A–C).

DIFFERENTIAL DIAGNOSIS

- ▶ Conventional adrenocortical carcinoma
- ▶ Oncocytic variant of pheochromocytoma
- ▶ Eosinophilic variant of chromophobe renal cell carcinoma.

TREATMENT

The patient underwent left open adrenalectomy.

OUTCOME AND FOLLOW-UP

The patient recovered well from surgery.

The patient is on regular follow-up. There was no evidence of local recurrence or distant metastasis clinically and on imaging performed at 3 months postsurgery.

DISCUSSION

OANs represent a rare group of tumours with approximately 147 cases reported in the literature so far.² Of these, approximately 36 cases of OACs have been documented in the literature.¹ OANs consist predominantly of oncocytes (epithelial cells with abundant granular eosinophilic cytoplasm), with tumours showing diffuse, nested, or trabecular patterns of large, neoplastic polygonal oncocytic cells with round nuclei, prominent nucleoli and abundant granular eosinophilic cytoplasm.^{1 2}

OANs are classified on the basis of the LWB system with the following major criteria: a mitotic rate of >5 mitoses/50 hpf, and any atypical mitoses or venous invasion. The minor criteria include large size (>10 cm and/or >2000 g), necrosis and

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To cite: Kalra S, Manikandan R, Srinivas BH. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-208818

Figure 1 (A) Sheets of tumour cells with marked atypia (H&E×200). (B) Tumour cells with abundant dense granular eosinophilic cytoplasm (H&E×400). (C) Tumour with adjacent areas of necrosis (H&E×100).

capsular or sinusoidal invasion. The presence of any one of the major criteria indicates malignancy (OAC), and the presence of one to four minor criteria is indicative of uncertain malignant potential, while the absence of all the major and minor criteria indicates benign behaviour (adrenocortical oncocytoma).³ In our case, two major and two minor criteria were present.

OACs are usually solitary lesions presenting in adults and have no sex predilection. In contrast with OACs, conventional adrenocortical carcinomas affect children and also adults (range 43–67 years), and have a female preponderance.⁴ Histologically, OACs differ from conventional adrenocortical carcinomas owing to the presence of oncocytes. Positivity for calretinin is a novel finding in this group of neoplasms, as it is absent in conventional adrenocortical carcinoma.^{3 4} The differential

diagnoses considered in this case were an oncocytic variant of pheochromocytoma, eosinophilic variant of chromophobe renal cell carcinoma and conventional adrenocortical carcinoma. Negativity of chromogranin on IHC ruled out the oncocytic variant of pheochromocytoma. However, positive IHC for α inhibin and melanin A, along with electron microscopic features of numerous mitochondria in the cytoplasm, strongly favoured this tumour as an oncocytic variant of adrenocortical carcinoma over an eosinophilic variant of chromophobe renal cell carcinoma and conventional adrenocortical carcinoma.⁵ Hormone production in these tumours was previously thought to be rare, but recent reports have documented these tumours to be functional in as many as 30% of the cases.⁶ The incidence of a locally advanced disease at presentation is uncommon in OAC

Figure 2 Immunohistochemistry (IHC) of the tumour cells positive for (A) Inhibin, (B) Melan A and (C) negative for Chromogranin (IHC×200).

Figure 3 (A) Cytoplasm of tumour cells shows plenty of membrane bound secretory granules (uranyl acetate and lead citrate, $\times 2000$). (B and C) Many cells show prominence of distorted mitochondria in cytoplasm (uranyl acetate and lead citrate (B) $\times 12\,000$, (C) $\times 50\,000$).

compared to conventional adrenocortical carcinoma.^{2–4} Wong *et al*⁶ determined that the overall median survival for patients with these tumours is 58 months, giving the first insight that the prognosis of malignant OANs is more favourable than that of conventional adrenocortical carcinomas. The median survival of patients with conventional adrenocortical tumours is between 14 and 32 months. Surgical extirpation is the primary therapeutic approach for conventional and OAC. However, a multimodal approach has always been a matter of discussion. Radiotherapy, in adjuvant or as palliative settings, seems to be helpful.⁷ Studies with adjuvant mitotane have shown to delay and possibly prevent recurrence especially in locally advanced disease such as positive lymph node status or surrounding tissue infiltration.⁸

Learning points

- Oncocytic adrenocortical carcinoma represents a distinct subset of adrenal neoplasms that differs from conventional adrenocortical carcinoma on clinical and prognostic grounds.
- Oncocytic adrenocortical neoplasms should be classified on the basis of the Lin–Weiss–Bisceglia system to discriminate their malignant potential and have a better prognostic classification.

Contributors SK and RM performed the literature search and gave structure to the manuscript. BHS was the pathologist in charge of the case and reviewed the manuscript.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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