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Case of extragonadal germ cell tumor mimicking left adrenal tumor

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A B S T R A C T

A 30-year-old man presented to his previous physician with left abdominal pain. Computed tomography revealed a left retroperitoneal mass with calcification, measuring 15 × 9 × 6 cm, and the patient was referred to our hospital for further examination. Based on the endocrinologic examination and magnetic resonance imaging results, the patient was diagnosed with a nonfunctional left adrenal tumor, and laparoscopic left adrenalectomy was performed. Histopathology revealed well-defined boundaries between the tumor and the left adrenal gland, and the tumor was diagnosed as a non-seminoma consisting mainly of an immature teratoma with germ cell neoplasm in situ.

1. Introduction

Most germ cell tumors (GCTs) occur in the testis or ovary; however, 2%–5% of GCTs develop in the extragonadal regions.[1] Extragonadal GCTs (EGCTs) are also known to be associated with bilateral testicular atrophy, cryptorchidism, Klinefelter syndrome, and other urologic disorders.[1] An increased risk of treatment-related complications, such as myeloid leukemia and myelodysplastic syndrome, has also been reported.[1] Therefore, a detailed medical history is important for the diagnosis of EGCTs, especially in men, as well as a careful examination of the entire body, including the bilateral testes.[1] As with primary testicular GCTs, histologic diagnosis of the tumor is essential in selecting treatment for most patients with EGCTs.[1,2] In addition, the regimen recommended by the International Germ Cell Cancer Collaborative Group (IGCCCG) classification based on tumor markers and histology is implemented for these patients as the first line of treatment.[1,2] We report a case of EGCT that was histologically diagnosed after surgery and subsequently confirmed to be Klinefelter's syndrome.

2. Case presentation

A 30-year-old man presented to his physician with a chief complaint of left-sided abdominal pain. Computed tomography (CT) revealed a retroperitoneal tumor in the left kidney. The patient was referred to our institution for further evaluation. The patient was 182 cm tall, weighed 70 kg, and had no abnormalities upon physical examination. CT at our institution revealed a left retroperitoneal mass of 15 × 9 × 6 cm in size, with calcification (Fig. 1). Suspecting a left adrenal tumor, the following endocrine tests were performed, which revealed no abnormalities: adrenocorticotropic hormone, 30.7 pg/mL; cortisol, 9.5 μg/dL; aldosterone, 28.3 pg/mL; renin activity, 1.1 ng/mL/hr; and plasma free metanephrine, 27 pg/mL. Although a nonfunctioning adrenal tumor was diagnosed, adrenal carcinoma could not be ruled out owing to the size of the tumor. A laparoscopic adrenalectomy was performed. The operation time was 154 min, and the surgical specimen measured 15 × 9 × 6 cm and weighed 294 g (Fig. 2). Pathological examination of the surgical specimen revealed a compressed normal adrenal gland and diverse histology, leading to a diagnosis of nonseminomatous GCT consisting mainly of an immature teratoma with germ cell neoplasia in situ (Fig. 3). Therefore, when GCT markers were measured, only α-fetoprotein (AFP) had a high value of 62.6 ng/mL. AFP normalized 2 months after surgery and remained unchanged thereafter. Testicular ultrasonography was performed to evaluate the primary lesion, which showed bilateral testicular atrophy with no evidence of neoplastic lesions. Positron emission tomography-CT showed bilateral testicular hypoplasia with no evidence of obvious metastasis. Combination chemotherapy with bleomycin, etoposide, and cisplatin (BEP) was proposed for a good prognosis according to the IGCCCG classification, which was not performed because the patient refused further treatment.

Based on his relatively high stature, bilateral testicular atrophy, and the presence of EGCT, genetic counseling was conducted to investigate the possibility of Klinefelter's syndrome. Subsequently, a chromosomal

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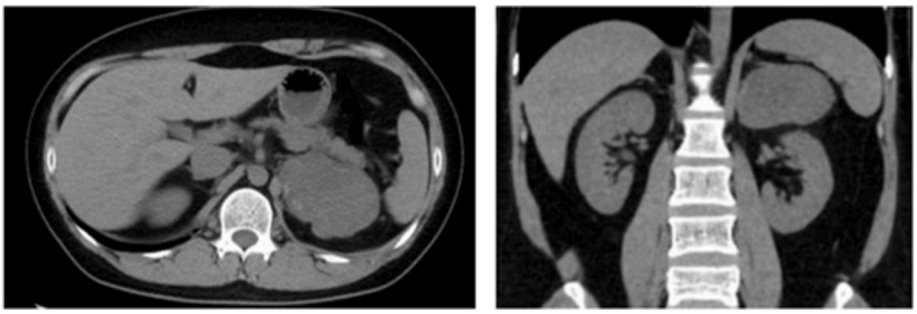

Fig. 1. Computed tomography revealed a left retroperitoneal mass measuring 15 x 9 × 6 cm.

Fig. 2. The size of the surgical specimen was 15 x 9 × 6 cm and weighed 294 g.

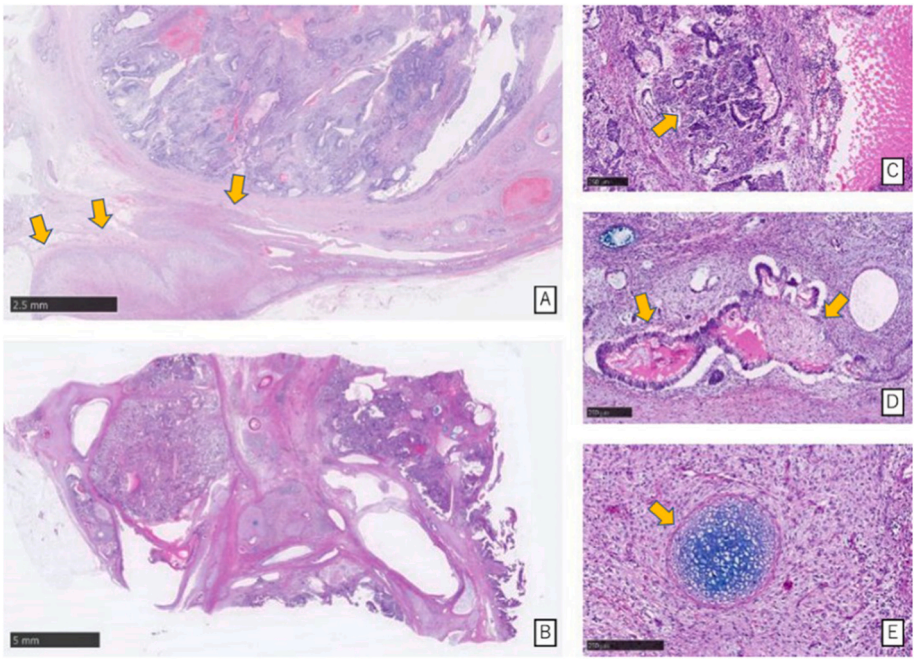

Fig. 3. The histopathological findings of the resected tumor.
The tumor compressed the normal tissue of the adrenal gland (3-A). The resected tumor shows various histological features (3-B), including neural tissue (3-C), glandular epithelial tissue, squamous epithelial tissue (3-D), and cartilaginous tissue (3-E).

test was performed, and the patient was diagnosed with XXY Klinefelter syndrome. Currently, the patient is undergoing a treatment-free follow-up with no evidence of disease recurrence.

3. Discussion

EGCTs tend to occur in the mediastinum and retroperitoneum, with a higher proportion of non-seminomas than seminomas.[1] In contrast, a higher proportion of seminomas are found in primary testicular tumors, which is different from EGCTs.[3]

Treatment for EGCTs often combines systemic chemotherapy, mainly BEP, and complete extirpation of the tumor to achieve a radical cure.[1,2] The prognosis of EGCTs is reported to be favorable for seminomas, which originate in the mediastinum and retroperitoneum, with a 5-year overall survival rate of 88%.[1] Conversely, non-seminomas are also reported to have a poor prognosis compared to seminomas, with 45% for mediastinal origins and 62% for retroperitoneal origins.[1] Regarding the occurrence site of non-seminoma, the 5-year survival rate for tumors of retroperitoneal origin is 94.7%, whereas that for tumors of mediastinal origin is 58.8%, suggesting that the prognosis is worse for

patients with non-seminoma of mediastinal origin.[4]

Regarding oncological outcomes assuming chemotherapy administration, the nomogram for predicting 3-year progression-free survival (PFS) was based on age, presence or absence of lung metastases, presence or absence of visceral metastases other than the lung, mediastinal origin, and pretreatment tumor marker values; furthermore, each factor was reported to be a potential independent prognostic predictor of outcome.[5] Using the aforementioned nomograms, the 3-year PFS rate was calculated to be approximately 94% in this case when chemotherapy was administered without preceding resection of the primary tumor. In the present case, EGCT was diagnosed after adrenalectomy; thus, there is currently no established treatment strategy for sequential treatment options after the preceding surgery. Therefore, when considering treatment strategies for such cases, further studies are needed to determine whether removal of the primary tumor alone is appropriate to improve prognosis and which regimen of postoperative systemic chemotherapy should be selected. For the diagnosis of retroperitoneal tumors, it is necessary to consider lymph node metastasis of testicular tumors and EGCTs as differential diagnoses and to confirm tumor markers and testicular findings.

4. Conclusion

EGCT is a relatively rare tumor, with limited reports. Treatment strategies, when the specimen is diagnosed after surgical tumor removal, remain unclear, and further accumulation of cases is needed.

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Author contributions

Hiroyuki Ito: Conceptualization; Data curation; Writing-original draft, Keita Nakane: Conceptualization; Writing - review & editing. Toyohiro Yamada: Data curation.Kazuhiro Kobayash: Investigation, Tatsuhiko Miyazaki: Invastigation.Takuya Koie: Conceptualization; Supervision.

Consent

Informed consent was obtained from the patient for the publication of this case report.

Declaration of competing interest

None.

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