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Case Report

An infant with rare adrenocortical carcinoma

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Abstract: Adrenocortical tumors (ACT) include both adrenocortical adenomas (ACA) and adrenocortical carcinomas (ACC). Carcinomas are rare in children and adolescents. In the United States, Surveillance Epidemiology and End Results (SEER) data from the National Cancer Institute show that the proportion of adrenocortical tumors (ACT) in childhood carcinoma is only about 1.3%, and the proportion of ACT in childhood malignancies is only about 0.2%. With childhood ACC being less common, there were only 36 cases of adrenocortical carcinomas younger than age 20 years reported to SEER during 20 years period of 1975-1995, 18 of them occurred in children younger than 5 years of age. Herein, we report our experience of a 9 monthes old female infant ACC case presenting with huge abdomen mass as the main clinical manifestation. The patient has a favorable outcome combined with surgical and chemotherapy treatments.

Keywords: Infant, adrenocortical tumors, outcome

Case report

A 9 monthes old female infant was admitted in our hospital on April 10, 2015. She presented with frequently vomiting, and accompanied with no fever, diarrhea or fatigue. The girl was full-term normal delivery, neonatal period was healthy. Linear growth was normal. Physical examination demonstrated that a huge mass was palpated below the right costal margin. Examination of her genitalia revealed mild clitoromegaly, and hypertrophy of the labia major. She was normotensive without Cushingoid features. The abdominopelvic ultrasound (US) revealed a hypoechoic mass measuring 8.8 cm×6.3 cm×6.0 cm in the right suprarenal area, which was suspected neuroblastoma. The abdominopelvic spiral computed tomography (CT) scan with intravenous contrast identified a well-defined heterogeneously enhanced mass with areas of necrosis in the right adrenal site with downward displacement of the underlying kidney (**Figure 1**). No focal lesion was observed in the liver. A chest CT scan was normal. Initial laboratory investigations revealed normal hematological and biochemical parameters. Neuron-specific enolase (NSE) and vanillylmandelic acid (VMA) were normal. There was no evidence of bone and bone marrow metastasis as investigated by a whole body bone scan and bone marrow aspiration with biopsy, respectively.

So the patient underwent an exploratory laparotomy. A large hemorrhagic and necrotic mass replacing the whole adrenal gland on the right side was detected. There were no signs of local invasion to the right liver lobe and thrombosis in the inferior vena cava (IVC) were observed during the surgery, with no evidence of regional lymphadenopathy, but the capsule of the mass was destructed. An adrenalectomy was performed for the patient. On gross appearance, there were multiple irregular fragile tissue fragments, with areas of cystic change, in total measuring 10 cm×10 cm×8 cm^3 and weighing more than 300 g. A microscopic examination revealed large atypical cells with pleomorphic atypic nuclei, prominent nucleoli, and moderate eosinophilic cytoplasm arranged in a lobular and solid pattern (**Figures 2**, **3**). Extensive hemorrhage and necrosis, high mitotic activity with atypical mitoses, and both vascular and capsular invasions were evident. Mitotic figures revealed >1/10 HPF. Immunohistochemical stain showed Melan-A (++), Vimentin (++), Ki-67

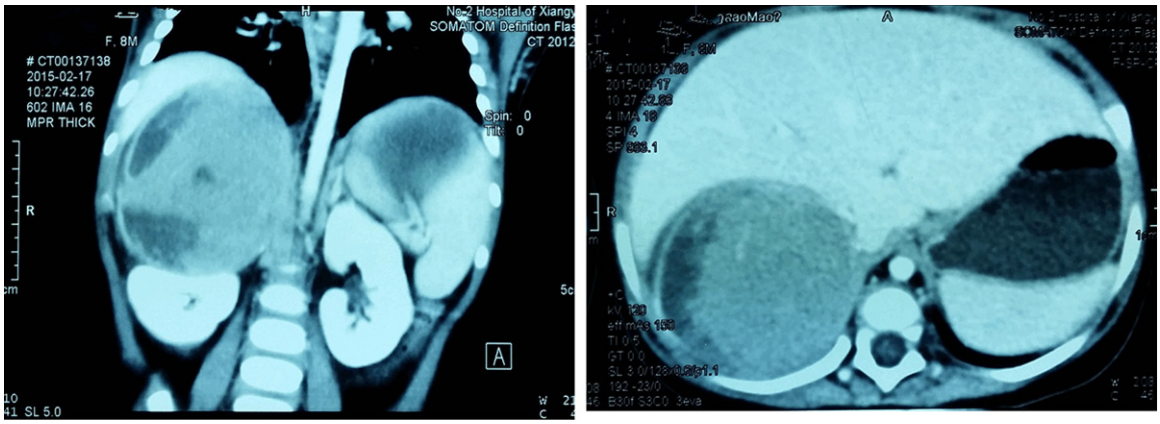

Figure 1. An abdominopelvic CT scan image shows a large oval shaped heterogeneous mass arising from the right adrenal gland with heterogeneous enhancement and pressure effect on right lobe of the liver.

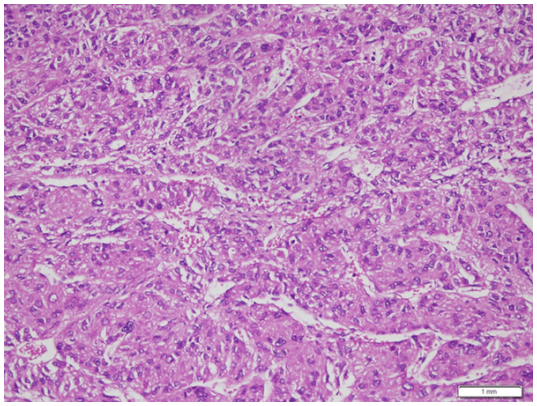

Figure 2. A low-magnification (20X) pathology image showing the neoplasm composed of atypical cells with pleomorphic nuclei and abundant eosinophilic cytoplasm arranged in sheets with vascularized stroma.

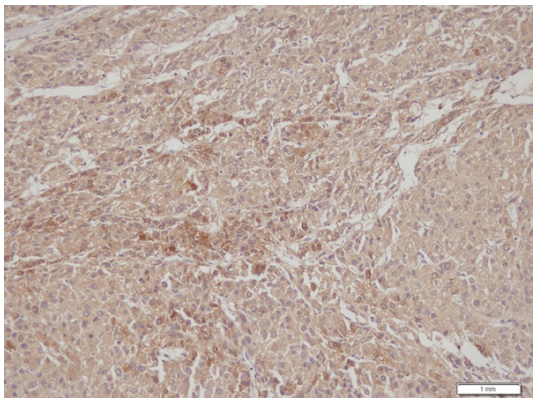

Figure 3. Immunostaining for Melan A (+~++).

10% (+), SYN (+). According to the clinic features and imaging findings as well as pathological study that based on the criteria of Weiss et al. [1], a pediatric ACC was confirmed; thus hormonal studies were performed and the results were as follows: esterone, 17-OH progesterone and testosterone were normal range. There were no clinically evident signs of Cushing syndrome, plasma levels of cortisol and urinary free cortisol levels were measured and found to be within the normal range. The patient had no signs of distant metastasis. Based on the basis of Children's Oncology Group (COG) classification and the modified staging system of International Pediatric Adrenocortical Tumor Registry (IPACTR) [2], the capsule of the mass was destructed as well as extra adrenal invasion, the tumor was considered as Stage III. She was scheduled to receive the combination chemotherapy with Cisplatin, Etoposide, and Doxorubicin for four cycles every three weeks. During the treatment, the patient was assessed by clinical examination every 6 weeks (after 2nd chemotherapy cycle). Biochemical evaluations and abdominopelvic CT/magnetic resonance imaging (MRI) were performed at the end of the chemotherapy and the followed three-month follow-up visits. Up to December 15, 2015, the patient remained in a complete remission with no sign of recurrence.

Discussion

Pediatric ACT comprises two main histopathological subtypes, adenoma and carcinoma (ACC) [3]. As mentioned above, ACC is a rare malignancy comprising only about 0.2 % of all childhood cancers [4]. Date [4] from International Pediatric Adrenocortical Tumor Registry (IPACTR) which provide descriptive analysis worldwide registered pediatric ACT

that younger than 20 years of age had the clinic features of ACT. Approximately 60% of patients were younger than 4 years of age, Girls predominated in the age groups 0 to 3 years (ratio, 1.7:1). A review [4] of 254 children enrolled in the International Pediatric Adrenocortical Tumor Registry showed that signs of virilisation were the most common clinical manifestation (84.2% of patients). The presenting features of virilisation include pubic hair, facial acne, clitoromegaly, voice change, facial hair, hirsutism, muscle hypertrophy, growth acceleration, and increase in penis size. Virilisation was observed either alone (virilising tumors) or accompanied by clinical manifestations of the overproduction of other adrenal cortical hormones, including glucocorticoids, androgens, aldosterone, or estrogens. About 10% of patients showed no clinical evidence of an endocrine syndrome at presentation (non-functional tumors). Otherwise, Stewart [5] report 9 cases of children with adrenocortical tumors resection between 1974 and 2003, The mean tumor weight was 125 g to 336 g with a mean volume of 139 cm^3 (range, 30 cm^3 to 626 cm^3). Our patient was diagnosed at the age of 9 monthes, which is in the range of peak incidence years of ACT occurrence, and presenting rarely huge carcinoma mass of diameter 10 cm was detected. The predominant features of this case are abdomen huge mass and mild clitoromegaly as well as hypertrophy of the labia major. There are no other signs of endocrinopathy.

Interestingly, ACC in children have less aggressive clinical behavior when compared with their adult counterparts [6, 7]. It has been shown [1, 6, 7] that among patients who undergo complete tumor resection, favorable prognostic factors include age <4 years, smaller tumor size, signs of virilisation alone at presentation, and adenomatous tumor histology.

As to the treatment of ACC, Surgery is the most common treatment but it does not always remove all of the cancer, and it can return. IPACTR [4] has reported the outcome of worldwide pediatric cases that registered. Tumors were completely resected in 83% of patients. Patients with disseminated or residual disease received mitotane, cisplatin, etoposide, and/or doxorubicin, and rarely, radiation therapy. At a median follow-up of 2 years and 5 months, 61.8% survived without evidence of disease and 38.2% had died. The 5-year event-free survival estimate was 54.2%. The tumor in our patient did not behave aggressively in spite of exhibiting huge mass, and the case had a good outcome after complete tumor resection and followed induction chemotherapy.

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Disclosure of conflict of interest

None.

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