Clinical Case Report

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Adult neuroblastoma in the retroperitoneum

A case report

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Abstract

Rationale: Neuroblastoma is the most common extracranial malignant solid tumor that occurs during childhood. It arises from primitive cells and is found in the adrenal medulla and sympathetic ganglia of the sympathetic nervous system. Huge neuroblastoma in the retroperitoneum, especially adult involvement is extremely rare.

Patient concerns: A 20-year-old female patient with complaints of left abdominal discomfort for 1 week was reported.

Diagnosis: Multi-detector computed tomography (MD-CT) of the abdomen revealed a huge enhanced mass in the retroperitoneum. Histopathological findings showed neuroblastoma and immunohistochemical results were as follows: actin(–), CD34(–), CD99(–), CK(–), CgA(+), desmin(–), EMA(–), Ki-67(+, approximately 1%), NSE(+), S-100(+), Syn(+), and vimentin(–).

Interventions: We performed a total surgical resection. The CYVADIC (cyclophosphamide, vincristine, adriamycin, and dimethyl triazeno imidazole carboxamide) and James (cyclophosphamide and vincristine) regimens had been administered to this patient.

Outcomes: Postoperatively, the patient's symptoms were partially relieved and the patient experienced recurrence after 3 months. The patient did not respond to treatment and died 6 months after the operation.

Lessons: Besides surgical resection, the treatment also included chemotherapy and radiotherapy. However, the optimal treatment remains controversial. Therefore, we should exert all our energies on the exploration of etiology and targeted drugs for this disease.

Abbreviations: CT = computed tomography, CYVADIC = cyclophosphamide, vincristine, adriamycin, and dimethyl triazeno imidazole carboxamide, HVA = homovanillic acid, INSS = International neuroblastoma staging system, LDH = lactic dehydrogenase, MD-CT = multi-detector computed tomography, NSE = neuron-specific enolase, VMA = vanillylmandelic acid.

Keywords: huge neuroblastoma, in adult, in retroperitoneum

1. Introduction

Neuroblastoma is derived from undifferentiated sympathetic ganglion cells. It belongs to primitive neural crest cells derived from the sympathetic nervous system with ganglion cell tumors and ganglion cell neuroblastoma, but the difference between these is the degree of differentiation.[1] Neuroblastoma occurs in the sympathetic ganglia or bilateral adrenal medulla, accounting for 8% to 10% in all pediatric malignancies, and it has an annual incidence of 0.3 to 5.5/100,000. Furthermore, it is the most common extracranial malignant solid tumor during childhood.[2] Neuroblastoma occurs more commonly in children, but is extremely rare in adults, especially in the retroperitoneum and its total incidence according to foreign studies is 1/10 million.[3,4]

2. Case presentation

A previously healthy 20-year-old female Han Chinese visited our outpatient department in August 2016 with a chief complaint of discomfort at the left lower abdomen for 1 week without obvious inducement. The discomfort was painful, irregular, did not radiate to the surroundings and it had nothing to do with the menstrual cycle. Furthermore, postprandial symptoms worsened, and there were no symptoms of nausea and vomiting, hematemesis and melena, or hiccups and acid reflux. There was no family history of related disease, such as tumors, immune disease, and so on. Lower abdomen computed tomography (CT) scan revealed that there was a huge density shadow of soft tissue with a diameter of approximately 20 cm in the left abdominal cavity. The density of the tissue was uniform. The margins were relatively clear and there were multiple patchy cystographic shadows. The left kidney was pushed and displaced to the right and down. The enhanced scan revealed that the lesions were not uniform (Fig. 1). CT angiography of the urinary system revealed that there were nodules of soft tissue in the fat gap around the lower end of the esophagus, and the nodules had an uneven enhancement. On this basis the possibility of lower esophageal metastasis was considered.

Editor: N/A.

XLW and YJD have contributed equally to this study.

The authors of this work have no conflicts of interest to disclose.

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Medicine (2018) 97:51(e13750)

Received: 19 July 2018 / Accepted: 26 November 2018

http://dx.doi.org/10.1097/MD.0000000000013750

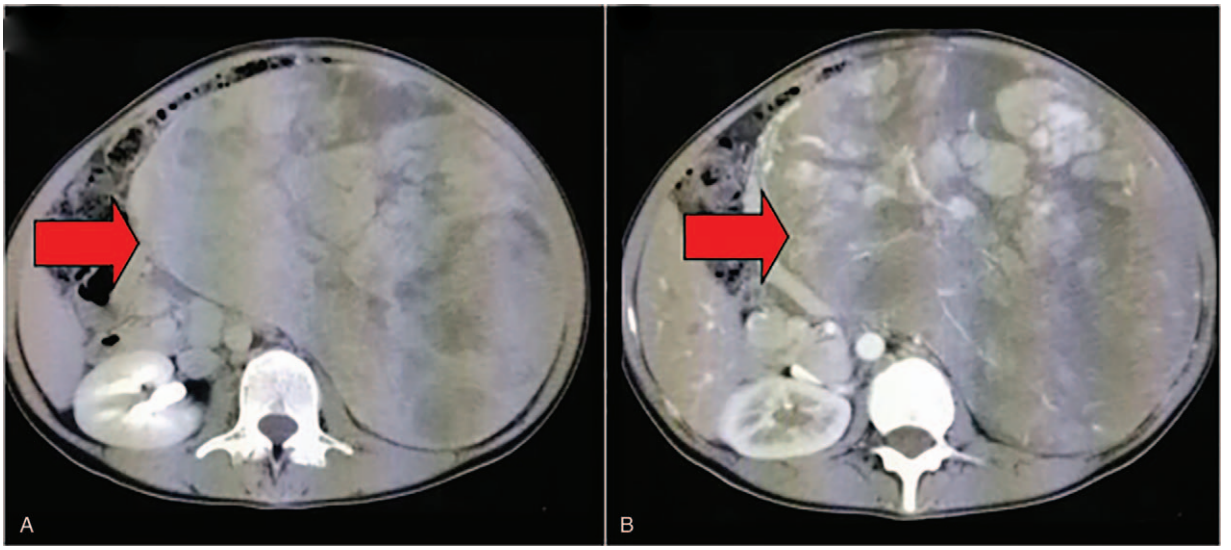

Figure 1. Computed tomography of the abdomen. (A) Conventional scanning reveals the left abdominal cavity with a diameter of approximately 20 cm (arrowhead). (B) Enhancement scanning reveals the lesions is not uniform and obvious (arrowhead).

The following were observed during the surgery: there was a huge cystic mass which approximately $25 \times 12 \times 18$ cm in the left retroperitoneal space (Fig. 2). The huge cystic mass reached up to the diaphragm (invading the diaphragm, an area of approximately 5×5 cm) and invaded the lateral abdominal wall, the spine (adjacent to the left renal vein and splenic vein). The huge cystic mass reached down to the pubic symphysis, squeezed the left kidney to the level of the anterior

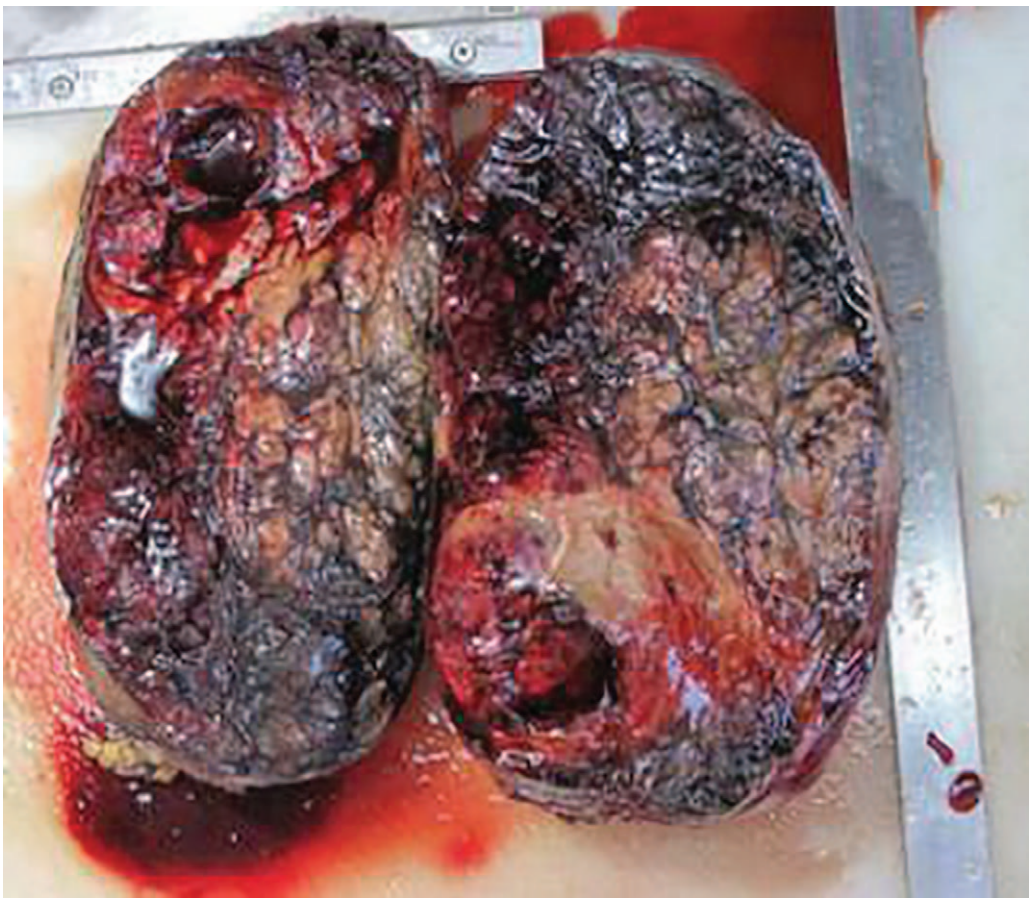

Figure 2. A huge cystic mass resected.

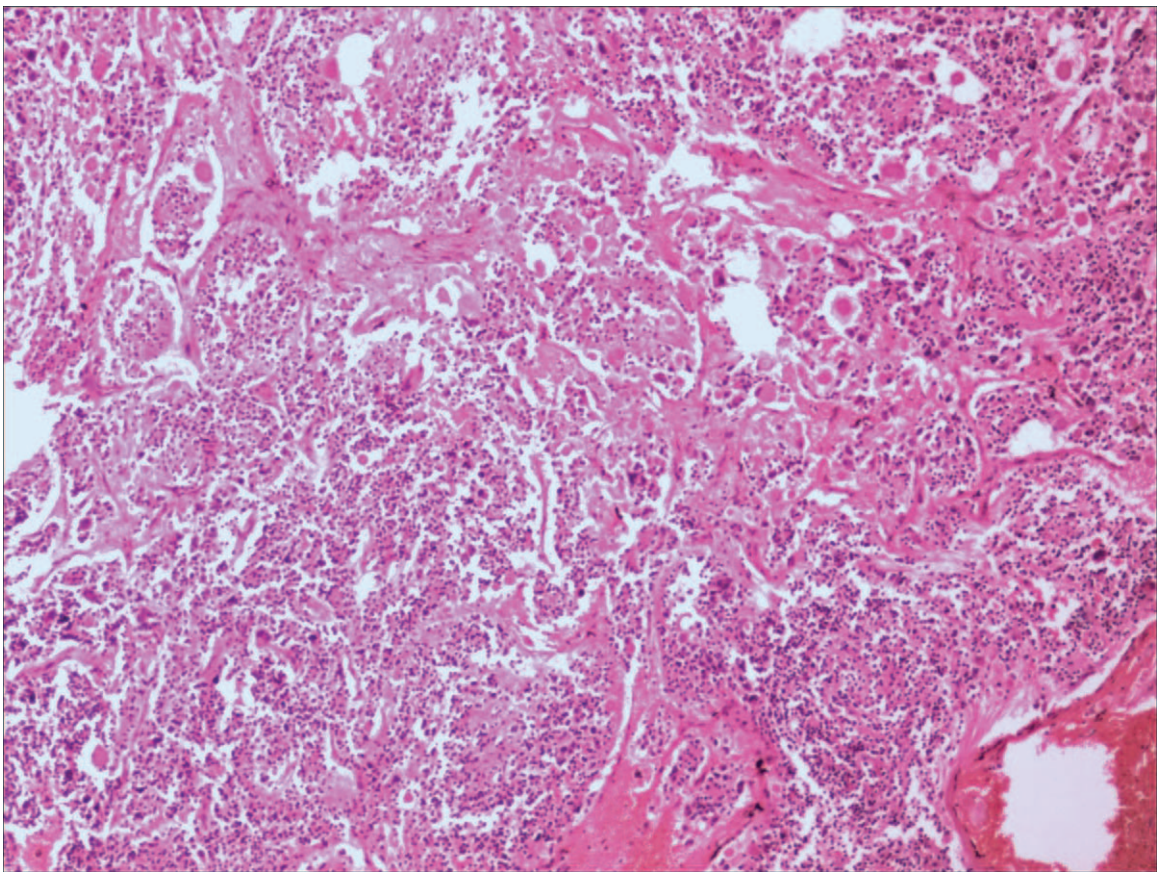

Figure 3. Pathological manifestation of neuroblastoma: undifferentiated cells in fibrillary background with neural tubule-like structures (H&E 200). Ganglionic differentiation was also focally identified.

superior iliac spine. At the top cover of the pancreas, the tumor invaded the left kidney, the left kidney vein, the splenic vein and pancreas, the retroperitoneal tissue, the left colon, and its mesangium. The tumor was completely removed by a combination of blunt and sharp dissection. Besides, the CYVADIC (cyclophosphamide, vincristine, adriamycin, and dimethyl triazeno imidazole carboxamide) and James (cyclophosphamide and vincristine) regimens had been administered to this patient.

The pathology report presented that neuroblastoma invaded the diaphragm, lymph node metastasis was observed (3/3). Immunohistochemistryic results: actin(–), CD34(–), CD99(–), CK(–), CgA(+), desmin(–), EMA(–), Ki-67(+, approximately 1%), NSE(+), S-100(+), Syn(+), and vimentin(–). After active treatment, the patient recovered well and was discharged after 1 week. The patient presented with a mass in the left clavicle with generalized pain at 3 months after discharge during the postoperative visit. Ultrasound examination revealed that there was a possibility of metastases. CT revealed multiple enlarged lymph nodes in the left supraclavicular fossa, indicating a possibility of tumor recurrence. The patient did not respond to treatment and died 6 months after surgery (Fig. 3).

This study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the First Affiliated Hospital of Hebei North University. Written informed consent was obtained from the patient for publication of the case details and the images.

3. Discussion

Neuroblastoma is extremely rare in adults, probably because of the tendency of neuroblastoma cells to naturally degenerate without any treatment.[5–7] The natural degradation of the tumor refers to the reduction or disappearance of the primary tumor or metastatic lesion in the absence of any treatment. Neuroblastoma has been considered to be the most common tumor that has a natural degradation potential, and other kinds of kidney cancer, malignant melanoma, choriocarcinoma, and lymphatic malignancies can also occur naturally. Furthermore, patients with this tumor are more likely to get sick, early symptoms are concealed, and the mid- and late-stage symptoms are not obvious. The expression is correlated to the position of the tumor itself, and usually manifests as pain or discomfort caused by the tumor extrusion. In addition, fever, bone pain, diarrhea, and weight loss can also occur. Neuroblastoma is easily metastasized through blood, and its common parts include the bone, marrow, liver, lung, and pleura. Different metastases cause different symptoms. If it metastasizes to the bone, bone pain and joint pain occur, while if it metastasizes to the lungs, coughing and shortness of breath occur. In addition to these, some clinically less symptoms may also occur. However, the diagnosis of the disease can be determined by combining with other tests. For example, 2% to 4% of children can be associated with ocular clonoclonic-ataxia syndrome, while 70% to 80% of children can be associated with chronic neurological deficits with cognitive, motor, behavioral, and language development delays.[8]

CT is an important diagnostic method for neuroblastoma. Tumors on CT images can appear as divided lobes or round soft tissue masses. Its main characteristic is a large number of plaques and sand-like calcification, which is an important basis for diagnosing the disease.[9] Neuroblastoma can secrete catecholamine and various components of the metabolic pathway. It mainly consists of vanillylmandelic acid (VMA) and homovanillic acid (HVA). VMA have high sensitivity and specificity in the labeling of neuroblastoma, and its positive rate can reach 85%. The determination of catecholamine and its metabolites and the ratio between these are important for the initial screening and diagnosis of neuroblastoma patients, and follow-up evaluation for treatment efficacy and relapse. Catecholamine levels will increase in most children with neuroblastoma. However, this rarely occurs in adult serum. In addition, lactic dehydrogenase (LDH) also has high sensitivity and accuracy in monitoring the relapse and progression of neuroblastoma.[10] Neuron-specific enolase (NSE) has some value for patients with neuroblastoma, and its increase often indicates poor outcome. However, ultimately, the diagnosis of low pressure (the systolic pressure is <90 mmHg) still needs to be based on pathological examination. The typical neuroblastoma pathology is the diffuse arrangement of tumor cells, which present as small, circular, or ovoid cells, the cytoplasm is minimal and the nuclei are deeply stained, and the nerve or chrysanthemum structure in it could be observed.[11]

At present, there is no consensus on the treatment of adult neuroblastoma. In general, it follows the risk group classification of the International neuroblastoma staging system (INSS). According to tumor location, surgical margin and other structures, the neuroblastoma was divided into 4 stages by the INSS.[12] A small number of cases are usually reported in the late stages (stage 3 and 4), which frequently recur. The treatment is chemotherapy, surgery (this includes lymph node dissection), and radiotherapy. However, surgical treatment is performed in few cases at the later stage of neuroblastoma. Recently, the new genome sequencing technology of neuroblastoma has facilitated the identification of genes and the development of new targeted drugs, and such targeted drugs may someday lead to adult neuroblastoma treatment.[13,14]

In summary, the early symptoms of neuroblastoma are not obvious, and are difficult to be detected in the early stage. When its symptoms become obvious, the tumor can easily metastasize distally. Imaging and laboratory tests are important in neuroblastoma diagnosis. Adult patients with neuroblastoma have the worse prognosis. At present, there is no preferred treatment protocol. The combination of surgery, chemotherapy, and radiotherapy should be performed. The recurrence rate is very high in few reported cases. Therefore, close follow-up is recommended. Gene therapy is expected to be effective in the future. Due to the limited data published in literature, further multi-center researches and experiences are necessary.

Author contributions

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Writing – review & editing: Xueliang Wu, Yong-Jun Dai, Jun Xue.

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