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A Case of Postoperative Multiple Organ Metastases from Renal Ewing Sarcoma and Review of the Literature

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Abstract: The incidence of extra-osseous Ewing sarcoma is low, and extra-osseous Ewing sarcoma of renal origin is even less frequently reported. The clinical manifestation of Ewing sarcoma is non-specific and early diagnosis is difficult, and the diagnosis mainly relies on pathological histology and immunohistochemistry. The disease is highly malignant, with a high rate of local recurrence and distant metastasis, and is currently treated with a combination of surgery, chemotherapy and radiation therapy. The Department of Urology of the First Affiliated Hospital of Jinan University admitted a 71-year-old male patient in 2021 with carnal hematuria and lumbar and abdominal pain as the first manifestation, and the preoperative examination showed a type of round mixed signal mass in the right kidney. After admission, the patient underwent mass resection and inferior vena cava dissection, and the postoperative pathology showed a small round cell malignant tumor, which was considered as extraosseous Ewing sarcoma in combination with immunohistochemical results. Three weeks after surgery, the patient developed multiple organ metastases.

Keywords: Extraosseous Ewing Sarcoma, Kidney, Diagnosis, Treatment

Introduction

Extraskeletal Ewing sarcoma (EES) is a highly malignant tumor of soft tissue origin that shares similar histologic and molecular genetic features with Ewing sarcoma of bone.EES is a type of Ewing sarcoma and accounts for 6%-47% of all Ewing sarcomas [1].The incidence of EES is low and cases occurring in the kidney are reported to be very rare [2-4]. A case of EES with renal origin was diagnosed in the Department of Urology, First Affiliated Hospital of Jinan University in 2021, and is reported below, with a review of the relevant literature, in order to improve clinical workers' understanding of the disease and its diagnosis and treatment.

1. Patient Information

A 71-year-old male was admitted to our department on September 2, 2021, with "hematuria of the naked eye for more than 6 months and pain in the right side of the lower back and abdomen for 2 months". The patient reported that 6 months ago, he had painless hematuria with a small amount of blood clots, no difficulty in urination, no urinary frequency or urgency, and 2 months ago, he had pain in the right side of the lumbar abdomen with no obvious cause, which was persistent pinprick-like pain, and a Computed Tomography (CT) scan at a local hospital showed a right kidney tumor and cancerous thrombosis in the renal vein and inferior vena cava. On September 2, 2021, no obvious metastases were seen in head and chest CT of our hospital. On September 3,2021, our whole abdomen Magnetic Resonance Imaging (MRI): a type of round mixed signal mass was seen in the right kidney, with a size of about 7.5×8.3×9.3cm, the boundary of the mass was still clear, the morphology was irregular and lobulated, T1WI low signal was predominant, T2WI and T2 compression lipids were inhomogeneous and low signal. The solid part of the DWI showed heterogeneous high signal, and the solid part of the mass was mildly enhanced in all phases of the enhanced scan, with the degree of enhancement significantly lower than that of the normal renal parenchyma, with non-enhanced necrotic areas of varying sizes and clusters, and a stellate non-enhanced T2 compression lipid low signal scar shadow in the center; the mass involved the right pelvic calyx and adjacent right renal vein and inferior vena cava, and the length of the mass involving the inferior vena cava was about 7.2 cm. The mass involved the inferior vena cava of about 7.2 cm in length and was still clearly demarcated from the adjacent liver tissue. The patient underwent laparoscopic radical resection of right kidney cancer + removal of vena cava thrombus + angioplasty + partial resection of inferior vena cava + lymph node dissection of the para-aortic lymph node + release of perirenal adhesions under general anesthesia with intubation on September 06, 2021.Figure1.

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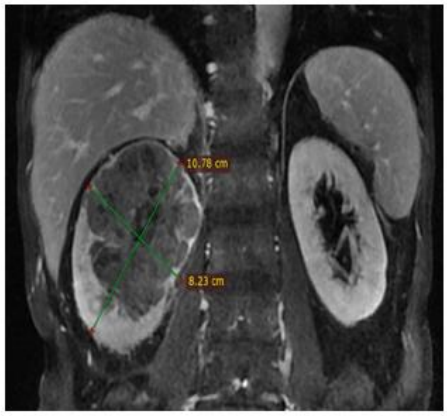

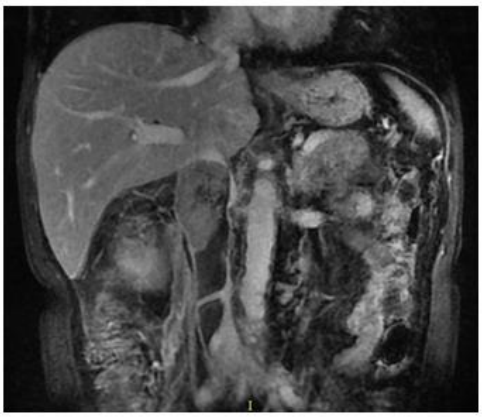

(A) (B)

Figure 1 (A) Preoperative right renal tumor (B) Preoperative inferior vena cava thrombosis

2.Surgery

After the top of the cancer thrombus was identified by intraoperative ultrasound in the esophagus, it was confirmed that there was no thrombus formation and dislodgement in the vena cava of the segment from the top of the cancer thrombus to the entrance of the right atrium. Intraoperative exploration confirmed that the cancer thrombus involved the wall of the inferior vena cava, and the long segment of the vena cava at the distal end of the cancer thrombus and the iliac vessel segment had thrombosis. After communicating with the patient's family and informing them of the necessity and risks of dissection of the inferior vena cava, the patient's family expressed understanding and agreed to perform dissection of the inferior vena cava, and signed the consent form for the operation. During the operation, 4U of concentrated red blood cells, 10U of cold precipitation, 600ml of plasma and about 500ml of bleeding were transfused, and the vital signs were stable during the operation.

3. Postoperative pathological results

(1) Mass specimens: (right kidney tumor) one kidney with fat capsule, size 13×7.5×6cm, the fat capsule was stripped, blood fluid flow was seen on the cut surface of the kidney tissue, a grayish gray-yellow swelling was seen, diffuse growth, poorly demarcated by the skin medulla, the swelling was soft, poorly demarcated from the surrounding kidney tissue, involving the renal pelvis, local breakthrough of the renal peritoneum was seen, the swelling area was 8×6cm; a grayish gray-red swelling was seen at the renal hilum. The swelling was grayish-red, with a size of 6.5×3.5×2 cm, grayish-grayish-red in cut surface and medium quality; with a section of ureter, 7.5 cm in length and 0.9 cm in diameter, the ureter was dilated by incision, the inner wall was smooth, and no obvious swelling was seen; in the fatty tissue around the kidney, no obvious nodules were seen.

(2)Pathological diagnosis: (right kidney tumor) Microscopically, the tumor consisted of small round cells distributed in tight patches or lobules, with fibrovascular intervals between the nests of tumor cells, and the nuclei of tumor cells were meticulously chromatinized and dusty, with translucent cytoplasm and easily visible nuclear schizophrenia. (+), CD56 (+), NSE (small foci, +), Fli-1 (weak +), CD99 (+), S100 (individual, +), Syn (-), SMA (-), desmin (-), WT-1 (-), ki67 about 90% (+). Consistent with extraosseous Ewing sarcoma tumor, FNCLCC classification grade III.

4. Postoperative metastasis

The patient had dizziness, nausea, vomiting and poor appetite 3 weeks after the operation without any obvious cause. On September 28, 2021, a CT scan of the head was performed at a local hospital, suggesting that the left cerebellar hemisphere, right temporal lobe and frontal lobe were large hypodense shadows. The patient is now indifferent, answerable, dizziness, nausea, vomiting, vomit is stomach contents, recent weight loss of about 10 Kg. Our CT of the chest and whole abdomen on October 3, 2021 suggests: right renal tumor post-radical surgery changes, right kidney, adrenal gland and upper ureter post-operative absence, a little fluid in the operative area; partial resection of the inferior vena cava and cancer embolus removal, local filling defect is still seen, please combine with Clinical; multiple nodular foci in the liver, consider metastases; multiple metastases in the hind limb of the left adrenal gland, para-abdominal aorta, peri-intestinal space and left perirenal space, increase in size compared to 2021-09-03 MR, partly new lesions; left renal cyst; multiple cysts in the liver; little effusion in the pelvis; nodular foci in the lower lingual segment of the upper lobe of the left lung and multiple ground glass nodules in both lungs, similar to the previous. 2021-10-3 On October 3, 2021, the cranial MR: multiple mass-like occupying lesions were seen in the

right frontotemporal lobe, the larger one was about 4.3×3.3×3.4 cm in size, with poorly defined borders, mixed signal in T1WI, mixed slightly high signal in T2WI, and increased signal in DWI. The left cerebellar hemisphere showed a lamellar occupying lesion of approximately 3.3×2.7×2.5 cm in size, with poorly defined borders and low signal enhancement on T1WI. Diagnosis: multiple occupying lesions in the right frontotemporal lobe and left cerebellar hemisphere, brain metastases. Figure 2.

The patient was admitted to the hospital with severe vomiting and dizziness, which was considered to be caused by intracranial hypertension of brain metastases. Radiation therapy/chemotherapy was recommended to control the tumor, but the family refused and was given symptomatic treatment of dehydration such as mannitol and dexamethasone, and nutritional support. The patient and his family refused to undergo anti-tumor treatment such as radiotherapy and were discharged from the hospital and loss of follow-up after discharge.

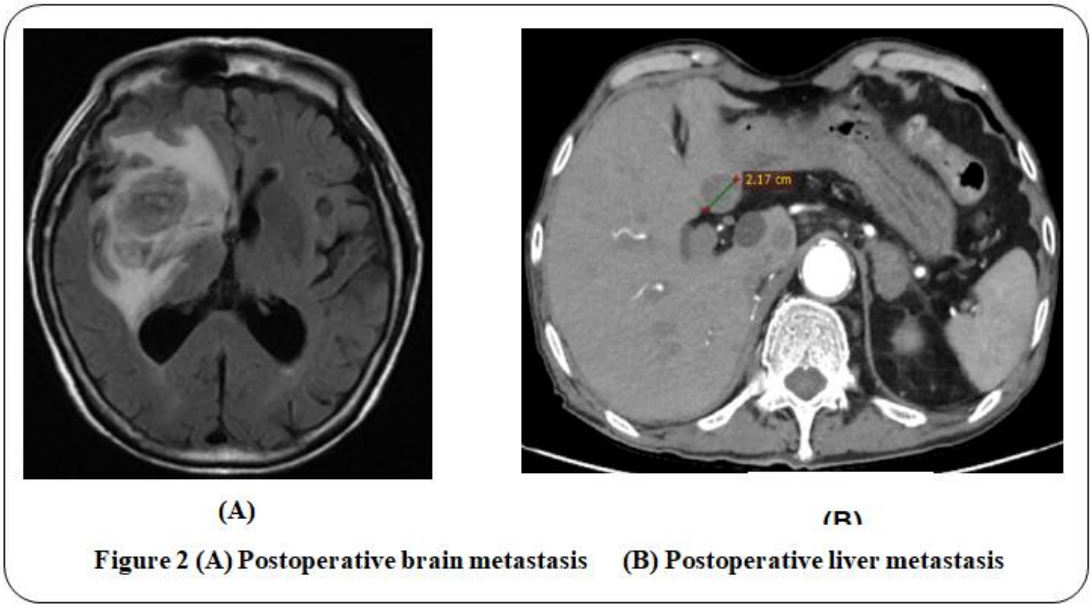

Figure 2 (A) Postoperative brain metastasis (B) Postoperative liver metastasis

Discussion

Tefft et al [5] first described EES in 1969 as a group of small round cell-like malignant tumors originating from soft tissues throughout the body, with tumor cells having varying degrees of neuroectodermal differentiation. EES is clinically rare, has a very low incidence, and can occur at any age, but is mostly seen in young adults, accounting for approximately 1% of all soft tissue sarcomas in all parts of the body [1].EES can occur in the kidney, pancreas, EES can occur in the kidney, pancreas, intracranial, lung, or female reproductive organs[6-11]. EES arising in the head and neck are usually located in the nasal cavity, sinuses, oropharynx, soft tissue of the skin, parapharyngeal space, and larynx [12-14]. In contrast, EES originating in the kidney is extremely rare.

The most common clinical symptom of EES is a mass, which is mostly deep, and because of the rapid growth of the mass, it is often large when the patient finds it. The secondary symptom is hemorrhage, and when the mass grows to a certain extent, necrosis and hemorrhage can occur in the tissue within the mass; in addition, the mass compression can lead to local limitation of muscle movement and other symptoms associated with tissue compression[15]. In EES with a renal origin, the most common clinical manifestations include lumbar passages, abdominal pain, palpable masses and hematuria[16]. The main symptom in this patient was carnivorous hematuria, and because the tumor invaded the collecting system of the kidney, EES rarely invades bone directly and there is no obvious calcification, and the radiographic signs do not have the onion skin-like imaging features characteristic of Ewing sarcoma of bone, so the radiographic examination is of little clinical significance. Medical ultrasonography generally shows hypoechoic or anechoic areas at the site of the mass, and CT mostly shows hypointense soft tissue images, often with uneven density due to hemorrhage and necrosis within the mass, with no special changes after enhancement. In this case, the solid part of the mass was mildly enhanced in all phases of the enhanced scan, and the degree of enhancement was significantly lower than that of the normal renal parenchyma, with non-enhanced necrotic areas of varying sizes and a stellate non-enhanced T2 compression lipid low signal scar shadow in the center, which was consistent with the CT manifestation of EES. Surgery confirmed that the changes in the cystic portion of the mass were due to hemorrhage and necrosis within the mass.

The clinical diagnosis of EES is difficult, and the diagnosis depends mainly on pathological histology

and immunohistochemistry. EES is pathologically similar to Ewing sarcoma of bone, and the microscopic tumor cells are characterized by uniform morphology, small round or ovoid shape, closely arranged, and diffusely distributed in a lamellar or irregular lobulated pattern. The immunohistochemical phenotype of EES has characteristic expression of neural differentiation, with high expression of CD99, FLI-1, NSE and Syn as relatively specific diagnostic indicators, while some patients may also have positive expression of S100 and CgA, but lack specificity. In contrast, lymphoma markers such as LCA, TdT and CD30, epithelial markers such as CEA and EMA, and myogenic markers such as ACT and MG are generally negative. It is generally considered that high expression of CD99 combined with FLI-1 is a more specific and sensitive immunohistochemical index to confirm the diagnosis of this disease[17]. In this case, CD99, FLI-1, NSE and S100 were all positive, which met the diagnostic criteria of EES.

Currently, the treatment protocol for Ewing sarcoma is based mainly on the National Comprehensive Cancer Network (NCCN) guidelines for the management of EES originating in the thyroid gland, which mostly uses a combination of local surgical resection, combined with postoperative chemotherapy and/or radiotherapy [18]. For some patients who are not suitable for surgery due to anatomical location or who cannot have extensive tumor resection, precise radiotherapy may be an effective treatment[19]. There are several chemotherapy regimens for EES, and alternating VDC and IE regimens is the preferred treatment regimen in the NCCN guidelines [20]. A clear effect relationship between chemotherapy dose and number of chemotherapy cycles and efficacy has not been established, and in most cases the regimen needs to be adjusted according to changes in imaging after chemotherapy, but the NCCN guidelines recommend a minimum of 12 weeks of chem. otherapy cycles. In this case, the patient underwent right nephrectomy and inferior vena cava dissection. Three weeks after surgery, the patient developed dizziness, nausea, vomiting, and poor appetite, and the CT scan of the head showed large hypointense shadow in the left cerebellar hemisphere, right temporal lobe, and frontal lobe. The patient and his family refused to undergo anti-tumor treatment such as radiotherapy and were discharged from the hospital without follow-up.

EES is very rare, difficult to diagnose preoperatively, and eventually needs to be confirmed in combination with microscopic pathology and immunohistochemistry. Due to its high malignancy and rapid growth, it is often painless, but has a high metastatic rate, is more prone to hematogenous metastases, and has a poor prognosis. The best treatment option is early surgical excision of the primary site and supplemented with local chemotherapy and/or radiotherapy, with routine regular postoperative follow-up required.

References:

1. Torabi SJ, Izreig S, Kasle DA et al. Clinical characteristics and treatment-associated survival of head and neck Ewing sarcoma. Laryngoscope 2020; 130: 2385-2392.
2. Shangpliang DM, Rangad G, Das JK, Chakma K. Primary Adult Renal Ewing's Sarcoma: A Rare Entity. Cureus 2022; 14: e22302.
3. Das S, Aggarwal G, Gupta S, Midha D. Primary renal Ewing's sarcoma in an adult: an enigma. Innov Surg Sci 2021; 6: 20200022.
4. Mukkunda R, Venkitaraman R, Thway K et al. Primary Adult Renal Ewing's Sarcoma: A Rare Entity. Sarcoma 2009; 2009: 504654.
5. Tefft M, Vawter GF, Mitus A. Paravertebral "round cell" tumors in children. Radiology 1969; 92: 1501-1509.
6. Mashriqi N, Gujjarlapudi JK, Sidhu J et al. Ewing's sarcoma of the cervix, a diagnostic dilemma: a case report and review of the literature. J Med Case Rep 2015; 9: 255.
7. Machado L, Al-Hamdani A, Sankhla DK, Al-Moundhri MS. Extraosseous Ewing sarcoma of the vagina: a rare entity. Ann Saudi Med 2013; 33: 182-186.
8. Saif MW, Kaley K. Extraosseous Ewing's Sarcoma of the Pancreas: An Uncommon but Treatable Disease. Cureus 2017; 9: e1882.
9. Shet N, Stanescu L, Deutsch G. Primary extraosseous Ewing sarcoma of the lung: Case report and literature review. Radiol Case Rep 2013; 8: 832.
10. Sohail AH, Sachal M, Maan MAA et al. Primary intracranial extraosseous Ewing's sarcoma. Childs Nerv Syst 2019; 35: 541-545.
11. Vrdoljak DV, Sitic S, Stanec M et al. Primary Ewing's sarcoma of the kidney: a case report. Coll Antropol 2012; 36: 673-676.
12. Adapa P, Chung TW, Popek EJ, Hunter JV. Extraosseous Ewing sarcoma of the thyroid gland. Pediatr Radiol 2009; 39: 1365-1368.
13. Maroun CA, Khalifeh I, Tfayli A, Moukarbel RV. Primary Ewing sarcoma of the larynx with distant metastasis: a case report and review of the literature. Curr Oncol 2019; 26: e574-e577.
14. Khosla D, Verma S, Punia RS et al. Extraosseous Ewing's Sarcoma of the Parapharyngeal Space - A Rare Entity - with Review of Literature. Iran J Otorhinolaryngol 2019; 31: 51-54.
15. Kennedy JG, Eustace S, Caulfield R et al. Extraskeletal Ewing's sarcoma: a case report and review of the literature. Spine (Phila Pa 1976) 2000; 25: 1996-1999.
16. Cheng L, Xu Y, Song H et al. A rare entity of Primary Ewing sarcoma in kidney. BMC Surg 2020; 20: 280.
17. M JA, Beigomi L, Azarpira N et al. The small round blue cell tumors of the sinonasal area: histological and immunohistochemical findings. Iran Red Crescent Med J 2013; 15: 455-461.
18. Biermann JS. Updates in the treatment of bone cancer. J Natl Compr Canc Netw 2013; 11: 681-683.
19. Donaldson SS. Ewing sarcoma: radiation dose and target volume. Pediatr Blood Cancer 2004; 42: 471-476.
20. Womer RB, West DC, Krailo MD et al. Randomized controlled trial of interval-compressed chemotherapy for the treatment of localized Ewing sarcoma: a report from the Children's Oncology Group. J Clin Oncol 2012; 30: 4148-4154.