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Case report

A case report of retroperitoneal Ewing sarcoma requiring adrenalectomy

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ABSTRACT

Introduction and importance: Ewing's sarcoma is a rare entity of malignant in both skeletal and extra-skeletal sites. There are few patients reported as Extra-Skeletal Sarcoma, and fewer reported cases for Extraskeletal Ewing sarcoma involving the retroperitoneal region. Reporting such a rare entity will add to literature in helping the diagnosis and management of such cases.
Case presentation: We present a case of 26 year old previously healthy female complaining of a vague abdominal pain and discovered to have retroperitoneal Ewing sarcoma adherent to left adrenal gland.
Clinical discussion: She was managed with a combination of neoadjuvant chemotherapy and resection through exploratory laparotomy.
Conclusion: In short, Ewing sarcoma should be considered in the differential diagnosis for young patient who is presenting with a retroperitoneal mass.

1. Introduction

Soft tissue sarcomas are rare adult malignancies that can be classified into over 100 histopathological subtypes. Ewing sarcoma (ES) is a subtype usually observed as "small round blue cells" on microscopic examination [1]. ES is usually characterized by the t(11;22)(q24;q12) translocation, which generates oncogenic chimeric fusion transcripts between the *EWSR1* and *FLI1* genes [2].

ES is Ewing sarcoma is further classified according to its site to: Skeletal Ewing Sarcoma (SES), and Extraskeletal Ewing Sarcoma (EES). ES has an incidence of 1 case per million per year with a lower incidence for EES [1].

ES can be further classified according to site into skeletal Ewing sarcoma (SES) and extraskeletal (extraosseous) Ewing sarcoma (EES). ES is already a rare tumor, with an incidence of 1 case per million per year, but the incidence of EES is even lowerwhich account 6% to 47% of all Ewing sarcoma [1,3]. EES most commonly occurs in the trunk and extremities however it's even less in the retroperitoneum only few cases have been reported in the studies [4,5]. When retroperitoneal ES does occur, its location makes it both a diagnostic and management challenge. Here we report a very rare retroperitoneal ES and its subsequent management.

2. Case report

This case report was done in line with the SCARE criteria, and written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

A previously healthy 26-year-old woman presented to clinic with a four-month history of progressive left-sided abdominal pain with no specific relieving or aggravating factors. The pain radiated to the back and left lion and was associated with generalized fatigue. There was no history of nausea, vomiting, change in bowel or urine habits, fever, loss of weight or appetite, nor night sweats. There was no past medical or surgical history of note, and she had two children.

On physical examination, the patient looked well, and her vital signs were within normal limits. Although the abdomen was not distended, soft, and there was no tenderness to palpation, a round, firm mass was palpable occupying the left upper and lower quadrants measuring approximately 13 × 10 cm.

All laboratory tests, including a pregnancy test, glucose, and tumor markers [carcinoembryonic antigen (CEA), carbohydrate antigen (CA19-9), cancer antigen (CA125), and alpha fetoprotein (AFP)] were normal.

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Computed tomography (CT) of the abdomen and pelvis with contrast revealed a complex but well-defined 17 × 12 × 10 cm bilobed retroperitoneal mass with cystic components running inferiorly in the peritoneum, displacing the pancreatic body and tail anteriorly and the upper part of left kidney posteriorly, but without invasion. The inferior part of the mass was inseparable from the third part of duodenum, proximal jejunum, and left adrenal gland. There was a small amount of free pelvic fluid and no evidence of regional or distant lymphovascular invasion in the abdominal CT (Fig. 1A).

The differential diagnosis included myxoid soft tissue sarcoma, adrenal cortical carcinoma, or, less likely, gastrointestinal stromal tumor (GIST). The abdominal CT showed an incidental finding of a septate or arcuate uterus without ovarian anomalies, for which abdominal and pelvic MRI was recommended for further evaluation. The subsequent abdominal and pelvic MRI was consistent with the CT findings: the mass measured 18.7 × 10.7 × 11.1 cm and showed high signal intensity in T2-weighed images and moderately intense signal in T1 images suggesting a myxoid component with hemorrhagic foci, central necrosis, and peripheral enhancement. Again, the mass was inseparable from the third and fourth parts of duodenum and proximal jejunum. Furthermore, the mass encased the inferior mesenteric vein with possible encasement of the inferior mesenteric artery (Fig. 1B). The mass abutted the left kidney and left renal vein posteriorly and pancreatic body and tail anteriorly without definite invasion. The liver showed mild hepatic steatosis without focal lesions and no intra or extrahepatic duct dilatation, the uterus was unremarkable, and there was no significant abdominal or pelvic lymph node enlargement. A CT chest with contrast was unremarkable. Whole body positron emission tomography (PET) showed hypermetabolic activity of the retroperitoneal mass but no evidence of metastasis.

The patient underwent an ultrasound-guided but inconclusive True-Cut needle biopsy, but a repeat biopsy showed round cell sarcoma. Fluorescence in situ hybridization (FISH) for the Ewing sarcoma breakpoint region 1 (EWSR1) gene rearrangement was positive.

The case was discussed at the multidisciplinary meeting, and the decision was made to start her on neoadjuvant chemotherapy: 6 cycles of vincristine, doxorubicin, and cyclophosphamide (VDC) and ifosfamide and etoposide (IE). She was started on leuprolide for ovarian preservation. Follow-up CT after neoadjuvant chemotherapy in November 2020 showed a significant 80% reduction in the tumor size (to 7.6 × 6 × 6.8 cm; Fig. 1C). Further multidisciplinary discussion resulted in adecision to proceed to surgery for resection while on chemotherapy.

The patient was prepared and consented for exploratory laparotomy with possible distal pancreatectomy, bowel resection, left nephrectomy, and left adrenalectomy. After midline incision, exploration revealed a retroperitoneal mass invading the left adrenal gland (Fig. 2A), which was completely resected along with apartial left adrenalectomy and paraortic lymph node excision (Fig. 2B and C). A frozen section from the root of the mass was negative for malignancy. Hemostasis was maintained and the abdomen and skin were closed in the usual fashion.

Post-operatively, the patient recovered well and wasdischarged home on day 5. Final histopathological analysis showedextensive necrosis, fibrosis, and hemorrhage consistent with a chemotherapy affect and focal residual round blue cell tumor consistent with Ewing sarcoma. The margins were free of tumor, so the resection was considered complete. The tissue was again EWSR1 rearrangement positive by FISH. The left adrenal specimen showed evidence of hemorrhage and necrosis with no evidence of malignancy. The para-aortic lymph node was negative for malignancy. Currently, the patient is completing her adjuvant chemotherapy without radiotherapy for residual disease to consolidate her treatment.

3. Discussion

Ewing sarcoma (ES) is a rare malignant tumor arising from mesenchymal cells. Its classical morphological appearance is of small round blue cells, and it can develop in bone or soft tissue [1]. ES is more common in children and it is rare in adults, with a peak incidence between 10 and 30 years of age [1]. It was previously believed that ES only occurs in the skeletal system, until Tefft et al. reported the first case of EES in Boston in 1969 [7]. Despite the fact that EES and skeletal ES harbor a similar genetic translocation, EES is reported to have a better five-year event-free survival [8]. The overall five-year survival rate can be up to 70% for localizeddisease but only 25% for metastatic and recurrent disease [9].

Retroperitoneal ES is an even rarer form of the disease, and it can be diagnostically challenging as it often presents with non-specific abdominal pain. EES often spares the regional lymph nodes but hasa higher rate of distant metastasis, especially to lungs and bones mandating thorough screening of the whole body prior to definitivemanagement. Different imaging modalities including CT, MRI, and PET are used to localize the disease and to assess for metastasis; however, the definitive diagnosis of ES is by tissue biopsy [10].

Retroperitoneal Ewing Sracoma is a less frequent entity of the disease and more diagnostically challenging. As it's presented with nonspecific abdominal pain. EES often spares the regional lymph nodes, but it has higher rate of distant metastasis especially to lungs and bones which mandate through screening of the whole body before management. Different imaging modalities CT, MRI, PET scan are used for localizing the disease and assessing for metastasis however the definitive diagnosis for Ewing Sarcoma is by core needle or true-cut biopsy [8].

Histological examination usually involves immunohistological assessment and FISH for the 22q12 (*EWSR1*) rearrangement, which is more specific for ES [11].

The management of retroperitoneal ES, including EES, consists of systemic chemotherapy and local control through surgical resection and/or radiotherapy. VDC chemotherapy in combination with

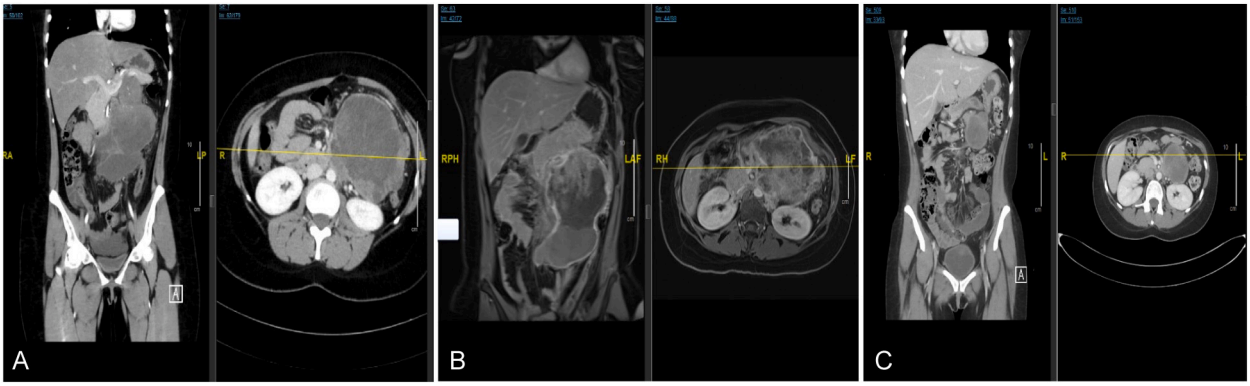

Fig. 1. A Computed tomography (CT) of the abdomen and pelvis with contrast revealed retroperitoneal mass.

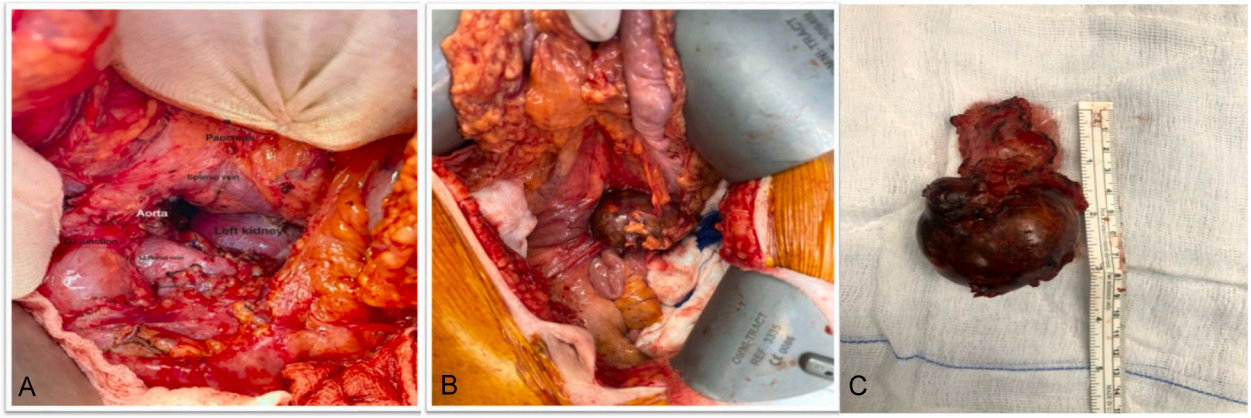

Fig. 2. Gross apperance of the mass.

ifosfamide and etoposide has been associated with a better five-year event-free survival overall survival in patients with non-metastatic ES [12]. Indeed, in our case, the patient responded well to this regimen in terms of immediate response, the reduction in size and local invasion allowing for local control with surgery alone and complete resection.

We elected to perform partial adrenalectomy, since the adrenal gland was adherent to the mass. Our decision to omit radiotherapy was based on existing data showing no difference in local recurrence after surgery and chemotherapy compared with surgery, chemotherapy, and radiotherapy [13]. Moreover, Cash et al. reported that radiotherapy was more often associated with positive margins when used for EES compared with SES [8].

In this case the response to neoadjuvant VDC, with ifosfamide and etoposide resulted in a good response in term of reduction the size and local invasion and allowed for local control with surgery alone obtaining clear margins.

She is currently undergoing the consolidation phase of treatment.

We conducted to do partial adrenalectomy to achieve oncological resection as it was adherence to the mass. Our decision for local control was to go for surgery without radiation therapy which consistent with the finding that surgery and chemotherapy did not affect the rate of local recurrence when compared with surgery, chemotherapy and radiation. [13] Moreover, Cash T et al., reported that using radiation therapy was associated with positive margins when used in EES more frequently than when it's used in SES. [7]

4. Conclusion

Retroperitoneal Ewing sarcoma is very rare type of sarcoma. We report a case of young female lady with retroperitoneal Ewing sarcoma. Although it's a rare disease, it should be considered in the differential diagnosis for young patient presenting with a retroperitoneal mass.

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Ethical approval

NA

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Dr. Rema AlRashed writing manuscript and primary author
Dr. Hussam alharbi and dr. Farouq fattah: writing manuscript.
Dr, Ibrahim Alhasan: Litreture review.
Dr. Feras Alsanna: Primary consultant, and final modifications.

Research registration (for case reports detailing a new surgical technique or new equipment/technology)

NA.

Guarantor

NA

Declaration of competing interest

No conflict of interest.

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