Retroperitoneal leiomyosarcoma metastasis to the liver: A case report

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ABSTRACT

Introduction: Leiomyosarcomas are one of the most common primary retroperitoneal malignant mesenchymal tumors in adults and are associated with considerable diagnostic and therapeutic challenges.

Case Report: We report a 49-year-old female with a metachronous liver metastasis from retroperitoneal grade one leiomyosarcoma diagnosed a year prior. Hepatic metastasis has been identified as a common site for first primary metastasis in patients with retroperitoneal leiomyosarcoma; however, the incidence of hepatic metastasis is rare.

Conclusion: Gold standard treatment is a surgical therapeutic approach with radiologic imaging essential in the diagnosis, operative planning and follow-up of patients.

Keywords: Hepatic metastasis, Leiomyosarcoma, Management, Retroperitoneal

INTRODUCTION

Leiomyosarcoma is a malignant mesenchymal neoplasm that accounts for approximately 10% of all solid tissue sarcomas in adults [1]. The second most common sarcoma to affect the retroperitoneum, leiomyosarcoma is a spectrum of disease ranging from low-grade cutaneous lesions with benign behavior to aggressive deep lesions of the abdomen or extremities with significant metastatic potential [2, 3]. Retroperitoneal leiomyosarcomas may grow to large sizes before detection or be an incidental finding on imaging [4]. Typically diagnosed in middle-aged or older individuals, leiomyosarcomas can arise in a myriad of anatomical sites that include the retroperitoneum (35%), uterus (30%), skin and extremities (19%) but can also rarely occur in other locations, such as the thyroid gland, liver, and lung [4, 5]. Symptomatology is dependent on the tumor location and size but tumors can also present asymptptomatically [5]. The most frequent pattern of growth is an entirely extravascular mass but leiomyosarcomas may also demonstrate both extravascular and intravascular components [3]. Leiomyosarcomas are distinguished by their composition of smooth muscle features, characteristically positive for actin and desmin [1]. Although evidence is scarce regarding retroperitoneal leiomyosarcoma metastatic patterns, the liver has been identified as the site for first primary metastasis in up to 8.7% of cases and is associated with a poorer outcome unless treated [6].

Standard treatment for leiomyosarcoma metastasis to the liver remains surgical excision. Typically, large in size at detection, complete resection of metastasis is often unachievable, with adequacy of resection remaining the most important prognostic factor [3, 7]. There is currently no evidence for the efficacy of multi-modal therapies such as neoadjuvant, adjuvant chemotherapy, or radiotherapy
for hepatic metastasis [8, 9]. Radiological imaging is essential in the diagnosis and operative planning of patients with retroperitoneal leiomyosarcoma. Non-contrast computed tomography (CT) underestimates the presence of hepatic metastases in the follow-up period with contrast CT or magnetic resonance imaging (MRI) being considered first line for the screening of hepatic metastases [8, 9]. Given that early detection and resection of single hepatic metastasis leads to an improvement in prognosis, patients with retroperitoneal leiomyosarcoma should undergo screening for hepatic metastasis during the staging process or at follow-up after treatment [3, 8, 9].

CASE REPORT

A 49-year-old female was referred to the treating surgeon for a new liver lesion detected on follow-up CT scan in late 2020. 12 months prior, she had undergone a laparotomy and resection of a right-sided retroperitoneal mass for which the final histology revealed a grade 1 leiomyosarcoma with clear resection margins.

The patient also had a previous history of stage 2A triple negative breast cancer and was managed with neoadjuvant chemotherapy followed by wide local excision and sentinel lymph node biopsy and adjuvant radiotherapy.

Surveillance CT scan performed 6-months post-leiomyosarcoma resection, revealed a new hypodense, peripherally enhancing liver lesion measuring 18 mm × 18 mm × 20 mm arising within segment six of the liver (Figure 1). Not identified on previous images and asymptomatic at time of detection, correlating positron emission tomography (PET) scan showed moderate fluorodeoxyglucose (FDG) avidity medially located in liver segment six with no other areas of avidity detected.

Comprehensive laboratory workup revealed a mild normochromic, normocytic anaemia and elevated C-reactive protein of 42 mg/L, with no other abnormalities noted. All relevant tumor markers were negative. Given previous history of breast cancer and sarcoma, a diagnostic dilemma as to the origin of the liver lesion arose.

The patient underwent a midline laparotomy with solitary segment six liver resection. The resected specimen revealed a 20 mm white nodule with clear surgical margins (Figure 2). Hematoxylin and eosin staining demonstrated composition of spindled cells with eosinophilic cytoplasm, high grade nuclear atypia, and frequent mitotic figures (Figure 3).

The histological appearance of tumor was consistent with metastasis from the previously detected and resected grade one retroperitoneal leiomyosarcoma. The patient’s postoperative course was uneventful. Following a multi-disciplinary team meeting, the decision was made for active surveillance through annual CT scans, with no benefit for adjuvant chemotherapy.
DISCUSSION

With increasing life expectancy and multiple etiological factors that predispose patients to the development of multiple primaries, the overall frequency of this phenomena is growing and currently reported in the range 2–17% [10, 11] with a median time to a second malignancy in females with breast cancer, such as this patient, between 5 and 8 years [10, 12]. Epidemiological studies suggest patients with single primary malignancy are at a 1.29% increased chance of developing subsequent primary malignancies and as such the potential of this occurrence should be recognized and thoroughly investigated [13]. First reported in German literature in 1871, leiomyosarcoma is a rare retroperitoneal tumor, most often seen in women [14]. Diagnosis of these tumors is challenging in view of the non-specific nature of their presentation and the absence of significant serological abnormalities [3].

Retroperitoneal leiomyosarcomas are usually located in the perirenal or posterior pararenal spaces [11]. Retroperitoneal leiomyosarcomas exhibit three major patterns of growth, with the most common pattern being entirely extravascular followed by both intravascular and extravascular components and finally only intravascular [3, 15, 16]. Specifically, in extravascular retroperitoneal leiomyosarcoma, metastases are seen at the time of diagnosis in approximately 8% of cases but develop in the large majority of cases during follow-up. Intravascular leiomyosarcomas with inferior vena cava (IVC) involvement occur five times more commonly in women than in men and can be localized with respect to the hepatic and renal veins to three segments of the inferior vena cava [3, 15, 16]. In leiomyosarcoma with intravascular involvement, metastases are seen at diagnosis in 23% of cases and are common at follow-up. The most common sites of metastases are the lungs (65%), peritoneum (53%), and the liver (53%) [3, 15].

There are various theories postulating metastatic destination of malignant tumors. The anatomical-mechanical theory was proposed by Ewing et al. and postulates that the direction of blood flow determines the organ specificity of metastasis and this has been confirmed both clinically and in basic research [6]. As the blood flow from the retroperitoneum also passes through the portal vein, these results suggest retroperitoneal sarcoma is associated with the risk of hepatic metastasis consistent with this theory [6]. Metastases from leiomyosarcoma are rarely sensitive to chemotherapy, prognosis is often poor, with short survival rates in the literature [17].

The modality of choice for obtaining tissue for histologic diagnosis remains ultrasound; however, CT and MRI are sensitive and essential tools in establishing diagnosis and planning surgical treatment [2, 3, 18]. The typical leiomyosarcoma macroscopic appearance on CT is that of a solid lobulated retroperitoneal mass with cystic zones corresponding to areas of necrosis [2, 3, 18]. On MRI, these lesions are seen to be homogeneously or heterogeneously hypointense on T1 weighting and demonstrate T2 hyperintensity. Encapsulation is sometimes observed [2, 3]. Histopathological characteristics supporting the diagnosis of malignancy are the presence of atypical spindle-shaped cells arranged in a whorled or fascicles pattern, with areas of pleomorphism, high mitotic index, and coagulative necrosis [2, 3, 18]. Immunohistochemical staining which supports the diagnosis of leiomyosarcomas comprises positive staining for desmin, vimentin, and smooth muscle actin [2, 19, 20]. Therapeutic options for leiomyosarcomas include surgical resection, chemotherapy, and liver transplantation.

Without treatment, the median survival of patients with leiomyosarcoma hepatic metastases is no more than 14 months [5]. Aggressive surgical resection, where possible, is the preferred treatment although is generally not curative. The European Society for Medical Oncology and the National Comprehensive Cancer Network have recommended hepatic resection for hepatic metastases in combination with chemotherapy as a treatment option for leiomyosarcoma metastasizing to the liver [6]. This option remains not viable for those patients with multiple hepatic metastasis. Hepatic resection, whether performed alone or in combination with chemotherapy and/or radiation therapy, is a safe procedure with a surgical death rate of less than 5% [5]. The 5-year survival rate following hepatic resection has been reported to range from 20% to 30% [20]. DeMatteo et al. concluded that even after complete hepatic resection of sarcoma metastases, the rate of recurrence has been reported as high as 84% [4]. The role of chemotherapy and radiation therapy for all retroperitoneal sarcomas in general remains controversial. Interestingly, though, the most common treatment in the literature for hepatic metastases from leiomyosarcoma has been chemotherapy with the reported tumor response rates notably poor [4]. Recently, Mavligit et al. have obtained more encouraging results by chemoembolization with polyvinyl alcohol sponge particles mixed with cisplatin powder, followed by intrahepatic arterial infusion of vinblastine, reporting a 70% tumor response rate [21]. For those patients with resectable hepatic metastasis, hepatic resection should be offered as other current treatment options have demonstrated limited success.

CONCLUSION

Retroperitoneal leiomyosarcomas are a malignant mesenchymal neoplasm often fatal owing to the high rates local recurrence and distant metastases. Hepatic metastases of leiomyosarcomas are suggestive of poor prognosis. In view of the unfavorable results of chemotherapy and limited evidence regarding chemoembolization, aggressive surgical therapy is justified, with the aim of improving the poor prognosis and prolonging survival of patients with hepatic...
metastasis from retroperitoneal leiomyosarcoma. For retroperitoneal leiomyosarcoma, regular follow-up radiological imaging through contrast CT should be mainstay of treatment.

REFERENCES


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Madeleine Louise Kelly – Conception of the work, Design of the work, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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All relevant data are within the paper and its Supporting Information files.

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