Leiomyosarcoma Diagnosis through Imaging

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Introduction

Leiomyosarcoma is a rare, aggressive form of malignant soft tissue sarcoma that occurs in middle aged to older adults. Common sites for the tumors are the uterus, retroperitoneum, superficial dermis, blood vessels, and deep extremity.[1] These tumors can be difficult to diagnose, but through a combination of multimodalities the best diagnosis and treatment plan can be made.

Some risk factors for developing a leiomyosarcoma include radiation from previous treatments, and genetic make-ups.[2] The symptoms to be aware of are any new or existing lumps that are growing over time, if the mass is 5 cm or deep to the deep fascia.[3] Symptoms of sarcomas of the abdomen include worsening abdominal pain, blood in vomit or stool, or black, tarry stools.[4]

Diagnosis

Early diagnosis is very important when it comes to leiomyosarcomas to ensure the best results and prevent metastasis. There are multiple modalities used to diagnose these tumors including radiographs, ultrasound, magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography (PET) scans. A diagnostic radiograph of a sarcoma can show any calcifications or if the tumor has any bone involvement (see Figure 1).[5]

The main modality used to image a leiomyosarcoma would be an MRI.[6] This would produce the best images for a diagnosis to determine the origin of the mass and the involvement of the surrounding structures.[7] These tumors are poorly outlined with no limiting membrane. Contrast is usually given, which can show the enhancement of thick and irregular rims and central necrosis of the tumor (see Figure 2).[8] If a lesion is larger and deeper than it tends to show up more heterogeneous on an MRI compared to superficial lesions (see Figure 3).[7] This heterogeneous contrast enhancement is a strong predictor that the mass is malignant.[9]

A soft tissue leiomyosarcoma of the retroperitoneum is better visualized with a contrast enhanced computed tomography scan (see Figure 4).[10] Retroperitoneal leiomyosarcomas often appear as large heterogeneous masses with low density and cystic or necrotic changes.[7] When diagnosing if the mass is malignant or not, calcification patterns are looked at in CT. If the lesion has more radical or peripheral calcifications than it is more likely to be malignant.[9]

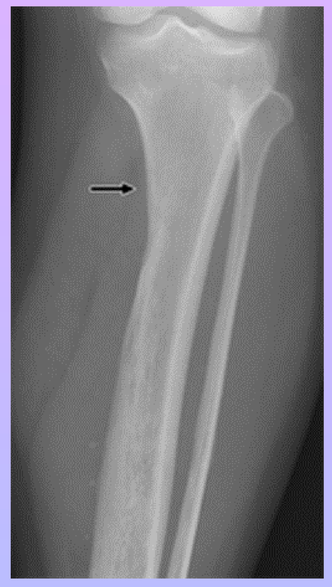

Figure 1. *Pressure from mass caused a smooth erosion on the proximal tibia.*[5]

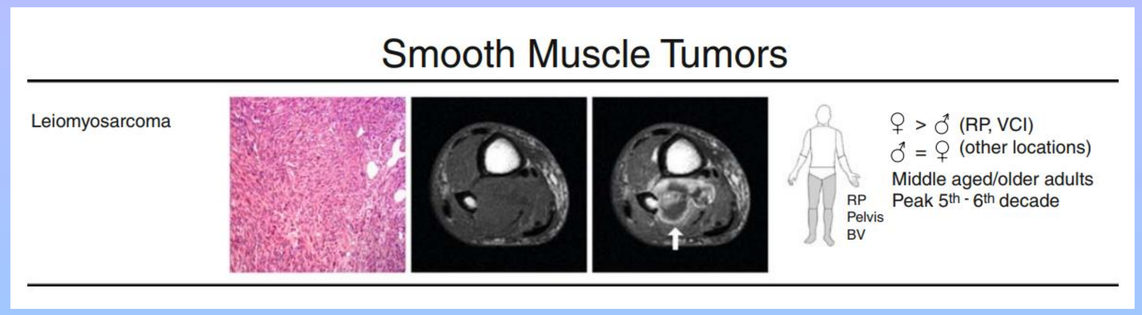

Figure 2. *Histological image, then MRI shown without, then with contrast.*[8]

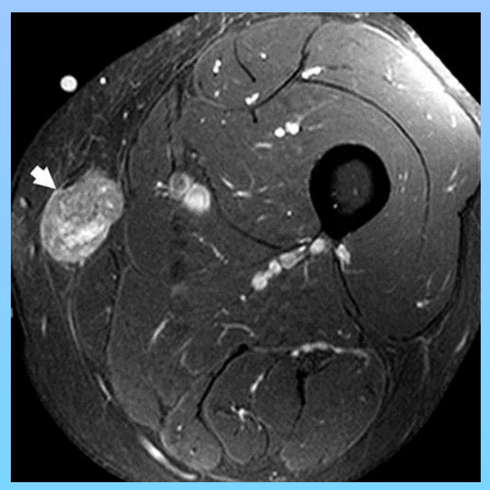

Figure 3. *"Axial gadolinium-enhanced T1-weighted fat-suppressed MR image."*[7]

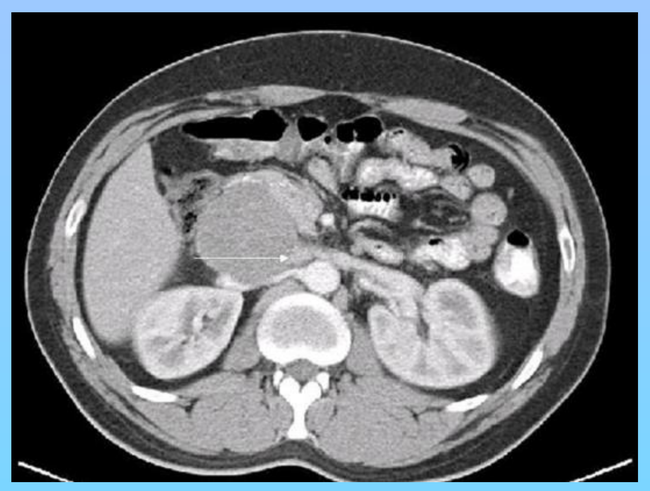

Figure 4. *CT Image showing retroperitoneal tumor obstructing the inferior vena cava.*[10]

Ultrasounds can be used to diagnose and in ultrasound guided biopsies. In ultrasounds, dopplers are used and the masses appear with central, peripheral, or whole-lesion hypervascularization. There is a correlation between the signal strength of the doppler and the malignancy of the soft tissue mass.[9]

Prognosis

After the diagnosis is made on whether the tumor is malignant or not then it will be staged, this is most commonly done using a system produced by the American Joint Committee on Cancer (AJCC). The treatment will then be determined based on these results. Treatments options include surgery, radiation therapy, and chemotherapy. The prognosis for each patient varies greatly depending on the stage, size, and depth of the tumor along with the patients age and existing health.[3] The lifespan after diagnosis is estimated to be around five years.[7] An early diagnosis can have a major affect on the patients effectiveness of treatment and prognosis.

Conclusion

Diagnostic radiography, MRI, CT, ultrasound, and PET scans all play an important role in the diagnosis of these soft tissue masses. A biopsy is also required to officially diagnose and to stage the tumor. After the diagnosis and staging, a treatment plan can then be put in place. The main treatment options are surgery, radiation therapy, and chemotherapy. The more people are informed and aware of these facts, the earlier these tumors can be detected. An early diagnosis is the best way to ensure the best prognosis of the patient.

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