Imaging of Muscle Lesions in Oncology Patient

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Learning objectives

Variable muscle lesions are encountered in the oncological patients, our objectives are:

- To review the imaging criteria of different muscle lesions in the oncological patient.
- To increase awareness and recognition of uncommon lesions.

To illustrate the imaging features of each lesion.
Background

The radiologic evaluation of soft-tissue masses has changed dramatically within the last three to four decades. Before the advent of computer-assisted imaging, assessment of clinically suspicious soft-tissue masses was usually limited to radiographs. The emergence of CT improved this situation dramatically. Masses could be not only delineated with great confidence but well staged with excellent depiction of anatomic detail. However, diagnosis remained problematic, with images sufficiently characteristic to suggest the correct histology in only a minority of cases: typically, lipomas and hemangiomas.

The introduction of MR imaging was met with great enthusiasm because of the markedly improved soft-tissue contrast and multiplanar image acquisition capabilities. Attempts were made to develop rules analogous to those for bone tumors for differentiating benign and malignant processes on the basis of lesion morphology and signal intensity. It provides superior soft-tissue contrast, obviates iodinated contrast agents and ionizing radiation, and is devoid of streak artifacts commonly encountered with CT. Although initial investigations maintained that CT was superior to MR imaging in detecting destruction of cortical bone, later studies suggest that these two modalities are comparable in this regard.

Magnetic resonance imaging (MRI) is the mainstay of diagnosis, staging and follow-up of many musculoskeletal disorders. Conventional spin-echo, proton density and short tau inversion recovery (STIR) MRI sequences rely on the differing T1 and T2 relaxation characteristics of various pathological processes. Interpretations of the images are done qualitatively with analyses of signal intensity and morphology of anatomical structures on each of these sequences. However, some musculoskeletal diseases may have similar imaging characteristics, limiting the specificity of analyses, which can reduce diagnostic confidence. Diffusion-weighted magnetic resonance imaging (DWI) is a recent addition to the musculoskeletal MR sequences being employed at many institutions.

Clues to the correct diagnosis and whether biopsy is necessary are often present on the MR images, especially when they are correlated with clinical features and the findings from other imaging modalities.

Many benign and malignant tumors may also originating from the muscle such as rhabdomyosarcoma, myxoma, intramuscular lipoma and fibromatosis.

Another important muscle lesion may encountered in the ontological patient is the denervation, awareness of its radiological appearance is so important to avoid misdiagnosed as a neoplastic lesion especially at the subacute phase.

In spite uncommon, muscle infectious and inflammatory process may encountered in the cancer patient being in an immunocomprised status.
In this review article we will address some of the most common muscle lesions in association with cancer patients and broadly categorize them in five subgroups:

- Soft tissue masses (benign or malignant)
- Muscle edema (secondary to myositis, infection, radiation myopathy)
- Muscle atrophy (causing fatty infiltration, secondary to disuse or post chemotherapeutic neuropathy or denervation)
Findings and procedure details

I. Benign masses;

The differential diagnosis of a muscular mass is varied and includes traumatic lesions, abscesses, and tumors. These tumors are usually benign. Though malignancy is rare, the occurrence of a malignant lesion should always be kept in mind when evaluating a mass, even if it occurs in the setting of a local trauma. Soft tissue is derived primarily from mesenchyme and, by convention, consists of skeletal muscle, fat, fibrous tissue, and the serving vascular structures as well as the associated peripheral nervous system. Soft-tissue tumors are classified histologically on the basis of the adult tissue they resemble.

1. Muscular lesions

Benign striated muscle tumors (rhabdomyoma) are exceedingly rare. The 2 types of rhabdomyoma are neoplastic and hamartoma. The neoplastic variety is sub classified into adult, fetal, and genital types.

Some investigators believe that mature striated muscle is unlikely to develop neoplastic tissue. Therefore, they believe that rhabdomyoma may arise from fetal rests. The adult rhabdomyoma is a rare tumor. Very few cases have been reported in the literature. This tumor usually presents as a round or polypoid mass in the region of the neck. The head and neck area harbors 90% of adult rhabdomyomas and should be considered in a differential diagnosis in this region. Radiologically adult rhabdomyoma presents as homogenous lesion that is isointense or slightly hyperintense to muscle on T1-as well as T2-weighted MRI and slightly hyperdense on CT. It enhances homogenously. Differential diagnosis depends on the location of the tumor and may include neurogenic or vascular tumors, oncocytoma, granular cell tumor, and rhabdomyomasarcoma.

2. Vascular lesions

Hemangioma

Hemangiomas are the most frequent benign tumors of vascular origin. They can be divided into capillary, cavernous, venous or arteriovenous. They can be superficial in the subcutaneous tissue or deep-seated in the muscle. Phleboliths can be detected on plain radiographs in the majority of hemangiomas. On T1WI the vascular component of hemangiomas demonstrates a low-to-intermediate signal intensity, which can be altered by the presence of non-vascular soft-tissue elements such as fat, smooth muscle, #broustissue, hemosiderin or thrombus. T2WI shows multilobulated and septated lesions of high signal intensity, thought to reflect slow blood #ow in cavernous hemangiomas. Phleboliths are seen as nodular areas of low signal intensity on all
pulse sequences. Contrast-enhanced images usually show marked enhancement of the vascular components of the lesions. (Fig. 1).

2. Lipomas

Benign lipomatous lesions are extremely common and represent the largest single group of mesenchymal tumors.

Simple lipomas can have a characteristic appearance on MRI. A discrete, encapsulated, homogeneous fatty mass is most certainly a simple lipoma. Simple lipomas, however, may also contain muscle fibers, blood vessels, fibrous septa, and areas of necrosis or inflammation. However, All these intralesional nonadipose components can confound the correct imaging diagnosis because they can mimic findings associated with well-differentiated liposarcomas. In some studies, MRI was 100% specific in the diagnosis of simple lipoma when a grossly fatty mass had few or no thin septa and minimal or no areas of enhancement or high T2 signal. Infiltrative intramuscular lipomas are the exception to this description of lipoma.

3. Fibroblastic

Benign fibroblastic proliferations include entities such as nodular fasciitis and proliferative fasciitis, which usually are manifested as small (<4 cm) superficial masses. These highly cellular lesions initially tend to grow rapidly and clinically simulate malignant neoplasms. However, they have a self-limited course, rarely recur after excision, and never metastasize. Other distinct fibroblastic proliferations, such as elastofibromas, fibromas of the tendon sheath, and keloids, are more collagenous and less cellular than is nodular fasciitis. Fibromatoses, which may be broadly divided into superficial and deep forms, typically show more aggressive biologic behavior than do benign fibrous proliferations. Lesions in deep anatomic locations tend to grow more rapidly, reach a larger size (>5 cm), and more frequently recur locally after surgical excision than do superficial lesions.

a. Nodular Fasciitis

Nodular fasciitis is a benign proliferation of fibroblasts and myofibroblasts that may be mistaken for a sarcomatous lesion because of its rapid growth, abundant spindle-shaped cells, and mitotic activity.

Nodular fasciitis is probably the most common benign mesenchymal lesion that is histopathologically misdiagnosed as sarcoma, with resultant unnecessary or overly aggressive surgical therapy. Three general subtypes of nodular fasciitis may be identified on the basis of the lesion location (subcutaneous, intramuscular, or fascial). The histologic diversity of nodular fasciitis likely accounts for the variable MR imaging appearance of the lesions. The signal in hypercellular lesions appears nearly isointense
to that in skeletal muscle on T1-weighted images and hyperintense to that in adipose
tissue on T2-weighted images. Highly collagenous lesions have hypointense signal on all
MR images. Contrast enhancement is typically diffuse but may be peripheral in lesions
with a greater extra-cellular myxoid matrix and central fluid-filled spaces.

b. Proliferative Fasciitis and Proliferative Myositis

Proliferative fasciitis and proliferative myositis are uncommon fibroblastic reactive soft-
tissue lesions. Proliferative fasciitis is a pseudosarcomatous, benign proliferation of
myofibroblasts that is most often seen in patients older than 40 years (mean age, 54 years).
Proliferative myositis is the deep intramuscular counterpart of proliferative fasciitis. Proliferative myositis and intramuscular lesions of nodular fasciitis have similar
anatomic, pathologic, and clinical features and may be variants of the same fibroblastic
disorder.

c. Fibroma of the Tendon Sheath

Fibroma of the tendon sheath is manifested as a slow-growing lesion in adults between
the ages of 20 and 50 years (mean age, 31 years) The upper extremities, particularly
the fingers, hands, and wrists, are the site of 82% of lesions. At MR imaging, attachment
of the tumor to a tendon or tendon sheath is obvious in most cases. The tumor typically
has signal intensity that is equal to or lower than that of skeletal muscle on T1- and T2-
weighted images. In the case series described by Fox et al, 50% of lesions had signal
intensity equal to or lower than that of skeletal muscle on T2-weighted images, a finding
that likely is attributable to the high quantity of collagen in many of these tumors. If a
fibroma of the tendon sheath has hypointense signal on all MR images, it may have
imaging features that overlap with those of the localized type of giant cell tumor of the
tendon sheath. Because of hemosiderin deposition, gradient-echo images of a giant cell
tumor of the tendon sheath may show a "blooming artifact" of accentuated low signal
intensity.

Fibromatoses

Superficial Fibromatosis

Soft-tissue fibromatoses are divided into two major groups: superficial (fascial) and deep
(musculoaponeurotic) lesions.

Fibromatosis is a nonmetastasizing but locally aggressive tumor that is currently
classified by the World Health Organization as a mesenchymal tumor of intermediate
(borderline) malignancy. Approximately 10% of fibromatoses occur in the head and neck
region, where they may involve essentially any location. Palmar fibromatosis (Dupuytren
disease) is the most common type of superficial fibromatosis.
MR imaging may be helpful for planning the optimal timing of surgical treatment of palmar fibromatosis, given that mature collagenous lesions with relatively low signal intensity on T2-weighted images may be less likely to locally recur than are more cellular lesions with higher signal intensity on T2-weighted images.

Deep Fibromatosis

Deep fibromatoses, which have a fibrotic bandlike or tendonlike consistency, are also known as desmoid tumors.

Desmoid tumors originate from connective tissue in muscle, fascia, or aponeuroses and occur mostly in adults aged 25-35 years. Deep fibromatoses are classified according to their intraabdominal, abdominal (Fig.2), or extraabdominal location. The category of intraabdominal fibromatoses includes tumors that arise within the pelvis and mesentery. Although most cases of mesenteric fibromatosis are sporadic, some are associated with familial adenomatous polyposis (Gardner syndrome). Extraabdominal fibromatosis most frequently arises between or adjacent to the fasciae and muscles of the shoulder, chest wall (Fig.3), back, thigh, and knee. The most aggressive lesions usually occur in patients younger than 20 years, among whom the local recurrence rate may be as high as 87%. On MRI fibromatosis usually has heterogeneous signal intensity that likely reflects the different amounts and variable distribution of spindle-shaped cells, extracellular collagen, and myxoid matrix. Early-stage lesions are more cellular and have a predominantly hyperintense signal on T2-weighted MR images. As desmoid tumors evolve, collagen deposition increases and cellularity and extracellular spaces decrease, with a resultant decrease in signal intensity on T2-weighted images. Tumor enhancement with gadolinium-related contrast is typically moderate to marked in intensity. In 86% of cases of fibromatosis, T2-weighted images depict hypointense bands that likely correspond to dense conglomerations of collagen bundles seen at histologic analysis.

Peripheral nerves

Peripheral nerve sheath tumors are divided into two major benign categories, neurofibroma and schwannoma, and a malignant form, malignant peripheral nerve sheath tumor. Each category can be associated with neurofibromatosis.

Neurofibroma:

Three types have been described:

Localised neurofibroma, is the most common type of neurofibroma. It accounts for approximately 90% of neurofibromas. It is an isolated finding, not associated with NF1. Primarily affect superficial cutaneous nerves, however occasionally affect larger deep-seated nerves. They are known to be slowly growing, usually <5 cm in size at presentation.
Diffuse neurofibroma mainly affects children and young adults. Most frequently located within the subcutaneous tissues of the head and neck. 90% are solitary lesions and not associated with NF1.

Plexiform neurofibroma is graded WHO I arising from a proliferation of all neural elements, pathognomonic of NF1. It involves single or multiple nerve fascicles that arises from major nerve branches.

Findings on MR imaging reveal low-signal-intensity lesions on T1-weighted sequences, high-signal-intensity lesions on T2-weighted sequences, and avid contrast enhancement. Signal on T2-weighted images can be either homogeneously hyper intense or show a characteristic target sign, consisting of a central hypointense region.

Malignant soft tissue masses

Primary malignant musculoskeletal tumors are an inhomogeneous group of lesions originating from mesenchymal tissues. Soft-tissue sarcomas can derive muscles (leiomyosarcoma, rhabdomyosarcoma), connective tissue (fibrosarcoma), blood vessels (angiosarcoma), and neurogenic tissue (malignant peripheral nerve sheath tumor, malignant schwannoma). Others like atypical teratoid rhabdoid tumor.

1. Rhabdomyosarcoma

Rhabdomyosarcomas are solid tumors that are common in children, representing 5% of all childhood cancers. In contrast, rhabdomyosarcomas are rare in adults, with soft-tissue sarcomas making up fewer than 1% of malignancies in adults and rhabdomyosarcomas accounting for 3% of all soft-tissue sarcomas. The different subtypes of rhabdomyosarcoma are embryonal, alveolar, and pleomorphic. Overall, the embryonal subtype is the most common subtype, accounting for up to 49% of all rhabdomyosarcomas. It arises most frequently in the head and neck and most often occurs during the first decade of life. The alveolar subtype accounts for approximately 30% of all rhabdomyosarcomas and most commonly affects adolescents. It is most commonly an intramuscular tumor in the soft tissues of the extremities. The pleomorphic subtype is the least common subtype and almost exclusively affects patients older than 45 years. It arises most commonly in the skeletal muscles of the thigh. At MRI, rhabdomyosarcomas typically show nonspecific low signal intensity on T1-weighted pulse sequences and high signal intensity on T2-weighted sequences. Heterogeneous signal on T2-weighted imaging is common and has been reported previously to result from hemorrhage and necrotic areas. (Figs. 5 & 6) Adult rhabdomyosarcomas have certain imaging appearances in common with a number of other soft-tissue sarcomas (i.e., large mass, irregular enhancement, and necrosis), although because lymphadenopathy is so frequently observed, aggressive lymphoma is in the differential
diagnosis. Embryonal rhabdomyosarcomas tend to be more homogeneous, whereas alveolar and pleomorphic rhabdomyosarcomas frequently have areas of necrosis. The latter also has a predilection of ring-like enhancement. Because of the significant incidence of regional nodal spread in patients with extremity primary tumors (often without clinical evidence of involvement) and because of the prognostic and therapeutic implications of nodal involvement, extensive pretreatment assessment of regional (and possibly in-transit) nodes is warranted. The prognosis for a child or adolescent with rhabdomyosarcoma is related to the age of the patient, site of origin, tumor size (widest diameter), resectability, presence of metastases, number of metastatic sites or tissues involved, presence or absence of regional lymph node involvement, histopathologic subtype (alveolar vs. embryonal), and delivery of radiation therapy in selected cases.

2. Malignant fibrous histiocytoma

In 2002, the World Health Organization (WHO) reappraised and modified the terminology and classification of MFH and its subtypes. Pleomorphic sarcoma is the alternate name advocated by the WHO to replace MFH, as it provides an accurate description of the tumor without implying the origin of the tumor cells. The most common clinical presentation is an enlarging painless soft-tissue mass in the thigh, typically 5-10 cm in diameter. The majority of tumors are intramuscular. Rare signs and symptoms include episodic hyperglycemia and rapid tumor enlargement during pregnancy. Additionally, MFH has been associated with hematopoietic diseases such as NHL, HL, and malignant histiocytosis. MRI typically reveals an intramuscular mass with heterogeneous signal intensity on all pulse sequences. As with other soft-tissue neoplasms, the signal intensity pattern is nonspecific, usually low to intermediate on T1-weighted images and intermediate to high on T2-weighted images; low signal intensity of T1-weighted images and prominent high signal intensity on T2-weighted images may be a feature of myxofibrosarcoma/myxoid MFH, reflecting the high water content of these lesions.

3. Angiosarcomas

This is an uncommon malignancy that comprises a rare heterogenous group of vascular neoplasms associated with an aggressive clinical behavior and may originate from any anatomical site in the body, including deep soft tissue, visceral organs, breast and bone. Angiosarcomas arising at different sites and in different organs have some distinct features. Angiosarcomas are insidious, and they may not produce symptoms until the disease is well advanced. Patients with these angiosarcomas usually present with a moderately paced growing mass in the extremities. The rapid progression of the disease is sometimes the clue to the correct diagnosis. Frequently, the adjacent nodes are enlarged because the incidence rate of node metastasis is as high as 45% compared to other soft tissue sarcomas. MRI shows nonspecific decreased or variable signal intensity in T1 and an increased signal in T2. The lesions enhance with gadolinium. MRI is especially helpful in the characterization of the soft tissue extensions and involvement of neurovascular structures and joints.
4. Malignant peripheral nerve sheath tumors

Malignant peripheral nerve sheath tumors have also been referred to as malignant schwannomas, neurogenic sarcomas, malignant neurilemmomas, and neurofibrosarcomas. They most frequently affect patients who are 20-50 years old and represent 5-10% of soft-tissue sarcomas. A high proportion of malignant peripheral nerve sheath tumors (approximately 50%) occur in association with NF 1. On the other hand, only a small fraction of patients with NF 1 (approximately 5%) develop malignant peripheral nerve sheath tumors. Generally involve the major nerve trunks and present with pain and neurologic symptoms, as well as a possible soft-tissue mass. While Secondary malignant peripheral nerve sheath tumors can arise from prior radiation treatment, with a latency period of longer than 10 years. Malignant peripheral nerve sheath tumors tend to be larger than their benign counterparts (>5 cm). They may exhibit ill-defined margins suggesting infiltration of adjacent tissues and associated edema. They may exhibit ill-defined margins suggesting infiltration of adjacent tissues and associated edema. Heterogeneity with central necrosis on cross-sectional imaging is common in malignant lesions, although benign lesions with degeneration can also have a heterogeneous appearance. Similarly, calcification, more commonly associated with malignant lesions, can also be present in ancient schwannomas. In general, radiologic findings are nonspecific; however, given an aggressive mass lesion in the setting of neurofibromatosis, radiologists should consider an i malignant peripheral nerve sheath tumor.

Muscle atypical teratoid/rhabdoid tumor (ATRT)

- ATRT in the upper and lower limbs resemble the soft tissue sarcomas both in clinical and radiological appearance, it diagnosed on pathological background. We report a cases of ATRT in a 4 year female patient presented with right leg mass. MRI showed a large rather defined solid soft tissue mass lesion seen occupying the right popliteal fossa in the posterior aspect of the knee extending into the upper leg. The lesion is seen involving both heads of gastrocnemius muscle. It elicits low signal in T1wi that changed to high signal in T2 with evident heterogeneous post contrast enhancement (Fig.7). CT done and confirm absence of internal calcification and intact cortex of the adjacent bones. The patient developed metastatic pulmonary nodules later on (Fig.8).

Other less common primary muscle malignancies are infantile fibrosarcoma is also encountered ( Fig.9 )

Metastatic soft tissue lesions

Although skeletal muscle represents approximately 50% of total body mass and receives a large portion of total cardiac output, hematogenous metastatic disease to skeletal
Muscle is extremely rare. Several factors have been postulated to contribute to the resistance of skeletal muscle to metastatic disease. These factors include muscle motion and mechanical tumor destruction, inhospitable muscle pH and the muscle's ability to remove tumor-produced lactic acid that induces tumor neovascularity in other tissue. Despite these defensive factors, metastases to skeletal muscle have been reported from pancreatic, renal, colonic, pulmonary, gastric, and ovarian primary malignancies. Differentiation between a primary soft tissue sarcoma and metastatic carcinoma is difficult without biopsy. In some studies, the skeletal muscle of the thigh and the calf became the most common anatomical sites whereas the skeletal muscle of the upper limb and other sites were less involved. The most common histological type was adenocarcinoma of the lung or of the gastrointestinal tract. Compared with the MR image, a plain radiogram were of little value with regard to the character of the mass. Therefore, MR imaging is a valuable imaging modality both to establish the diagnosis and to plan treatment strategy. Especially MR imaging with intravenous gadolinium enhancement was helpful when planning the biopsy of these lesions as it is useful to evaluate the vascularity of the tumor. The extensive peritumoral enhancement associated with the central necrosis was one of the characteristic features of the skeletal muscle metastasis.

Although MR imaging is not specific for skeletal muscle metastasis as stated in several studies, yet it is an indispensable tool for the diagnosis and treatment with which clinicians may contemplate the general management of known cancer patients, with known primaries. (Fig.11).

Myopathies

These are skeletal muscle diseases that develop either as a result of autoimmune-induced inflammation, inherited or acquired metabolic defects in energy production, administration or use of drugs and toxins, infections, or miscellaneous causes.

Inflammatory Myopathies

Inflammatory myopathies can be classified as idiopathic or secondary. In case of radiologically detectable lesions; Polymyositis (autoimmune) and some-times paraneoplastic inflammatory myositis, can be assessed by MRI. The diagnosis is based on a typical clinical presentation, elevated serum skeletal muscle enzymes, and findings on electromyography and muscle biopsy. MRI accurately documents the extent and intensity of the muscle abnormalities. The inflammation is usually symmetric and classically involves the proximal muscle groups in both polymyositis and dermatomyositis, but muscle involvement can also be patchy and asymmetric. High signal intensity is seen in the active phase on STIR and fat-saturated gadolinium-enhanced T1-weighted images. Sometimes inflammation may extend only along or around individual muscles and muscle groups (myofascial distribution). In the chronic phase, fatty atrophy of the musculature is seen on T1-weighted images. In rare instances, a focal necrotizing myositis due to inflammatory granulation associated with central
necrosis of the muscle and perivasculitis can be encountered. On MRI, focal nonspecific, masslike muscular lesions with a strong peripheral signal, gadolinium enhancement, and central necrosis are found. The relationship of myositis to underlying malignancy remains controversial, and the frequency of this association is not well established. 2 types of cancer show a relationship with myositis: ovarian cancer and Non-Hodgkin lymphoma. Myositis can precede malignancy (as in a paraneoplastic syndrome), which is not to say that routine screening for malignancy is called for in patients presenting with myositis.

### Muscle Infection

Pyomyositis is an unusual infection of skeletal muscles that is seen primarily in immunocompromised and HIV-infected patients. In immunocompetent patients, it results either secondary to hematogenous spread or from direct spread after intramuscular injection or surgery. *Staphylococcus aureus* is the most common pathogen. On MRI, hyperintense focal lesions with massive perifocal edema, progressing usually to abscess. (Fig. 12.) Muscle involvement can occur with a viral infection (e.g., influenza, dengue, Coxsackie B virus) or parasitic invasion (e.g., trichinellosis, cysticercosis, or toxoplasmosis). In immunocompromised patients, musculoskeletal fungal infections (e.g., candidiasis, aspergillosis, or mucormycosis) can also occur. (Fig. 13) Acute rhabdomyolysis can be encountered with clostridial and streptococcal myositis. Focal myositis is a benign, rapidly growing painful soft-tissue intramuscular mass that is considered by some authors to be a localized type of polymyositis.

### Radiation myositis

Myositis due to radiation can be seen many years after the therapy, myositis can be seen as a late complication, usually within 4 years after treatment. It seems to be a vascular problem which doesn't disappear after cessation of the therapy. The history is usually the clue, but also you may see a band like appearance where the radiation changes in the muscles stop, corresponding with the radiation field. Radiation myositis is a rare complication after treatment with radiation therapy. Changes usually present as increased T2 signal connotating the presence of edema or inflammation. In the acute setting, these would be indistinguishable. However, in the chronic setting, persistent T2 signal in the constraints of a radiation port would indicate radiation myositis. Additional chronic changes to include muscle atrophy and fibrosis can also be seen.

### Muscle Atrophy

Muscle denervation results from a variety of causes including trauma, neoplasia, neuropathies, infections, autoimmune processes and vasculitis. Magnetic resonance imaging (MRI) offers a distinct advantage over electromyography, not only in diagnosing muscle denervation, but also in determining its aetiology. MRI demonstrates characteristic signal intensity patterns depending on the stage of muscle denervation. The
acute and subacutely denervated muscle shows a high signal intensity pattern on fluid sensitive sequences and normal signal intensity on T1-weighted MRI images. In chronic denervation, muscle atrophy and fatty infiltration demonstrate high signal changes on T1-weighted sequences in association with volume loss.
Fig. 1

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Fig. 2

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Fig. 3

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8 year old male presented with neck mass

large lobulated soft tissue mass is seen implicating the left parapharyngeal and carotid spaces. It measures about 5x7.5x6cm in its maximum APXTSXCC dimensions respectively, it exhibit low signal in T1 and high signal in T2 and FLAIR with post contrast enhancement. It is seen partially encroaching on the left parapharyngeal fat space with displacement anterioy, and abutting the left masticator space with no clear fat plane of cleavage.

Pleuform Neurofibroma

Fig. 4

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14 years old male presented with tongue mass

Fig. 5

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1 years old female presented with leg mass

A large well-defined soft tissue mass is seen in upper 2/3 of the left calf, infiltrating posterior group muscles displaying hypointense signal on T1WI and heterogenous hyperintense signal on T2WI and showing heterogenous enhancement on post contrast series.

Fig. 6

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4 years female presented with right leg mass

a large rather defined solid soft tissue mass lesion seen occupying the right popliteal fossa in the posterior aspect of the knee extending into the upper leg. The lesion is seen involving both heads of gastrocnemius muscle. It elicits low signal in T1wi that changed to high signal in T2 with evident heterogeneous enhancement.

Fig. 7

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CT confirmed the absence of calcification and intact bony cortex of adjacent bones. Multiple bilateral scattered pulmonary nodules.
A well defined soft tissue mass is seen at posterior aspect of left forearm infiltrating the related muscles, with no intra articular extension displaying iso SI in T1, high SI in T2 WI with avid post contrast. The lesion is seen crossing the inter-osseous membrane.
No evidence of underlying bone infiltration with normal marrow signal of examined bone.

Infantile fibrosarcoma of forearm
63 year old female with mantle cell Lymphoma

Diffuse infiltration of the left temporalis muscle, bilateral retro-ocular mass entangling the optic nerve. These masses are iso to hypointense on T1WI& T2WI with uniform enhancement.

Fig. 10

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Fig. 11

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10 year old male patient with leukemia

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Fig. 13

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Conclusion

Although uncommon, muscle lesions can have a major impact on staging and therapeutic planning of cancer patients. We highlight the role of cross sectional imaging modalities in the detection of these lesions.
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