BMJ Best Practice

Lipoma

Straight to the point of care

Last updated: Oct 03, 2023

Table of Contents

Summary

Lipomas are benign tumours composed of adipose tissue.

They can occur in any area of the body, although they are most frequently found on the trunk or proximal limbs. They are most commonly found in subcutaneous tissues.

Lipomas may occur in deeper body cavities and within/adjacent to such organs as the gastrointestinal tract, adrenal glands, parotid glands, parapharyngeal space, breast, mediastinum, pleura, airways, heart, superior vena cava, brain, and intraspinal areas.

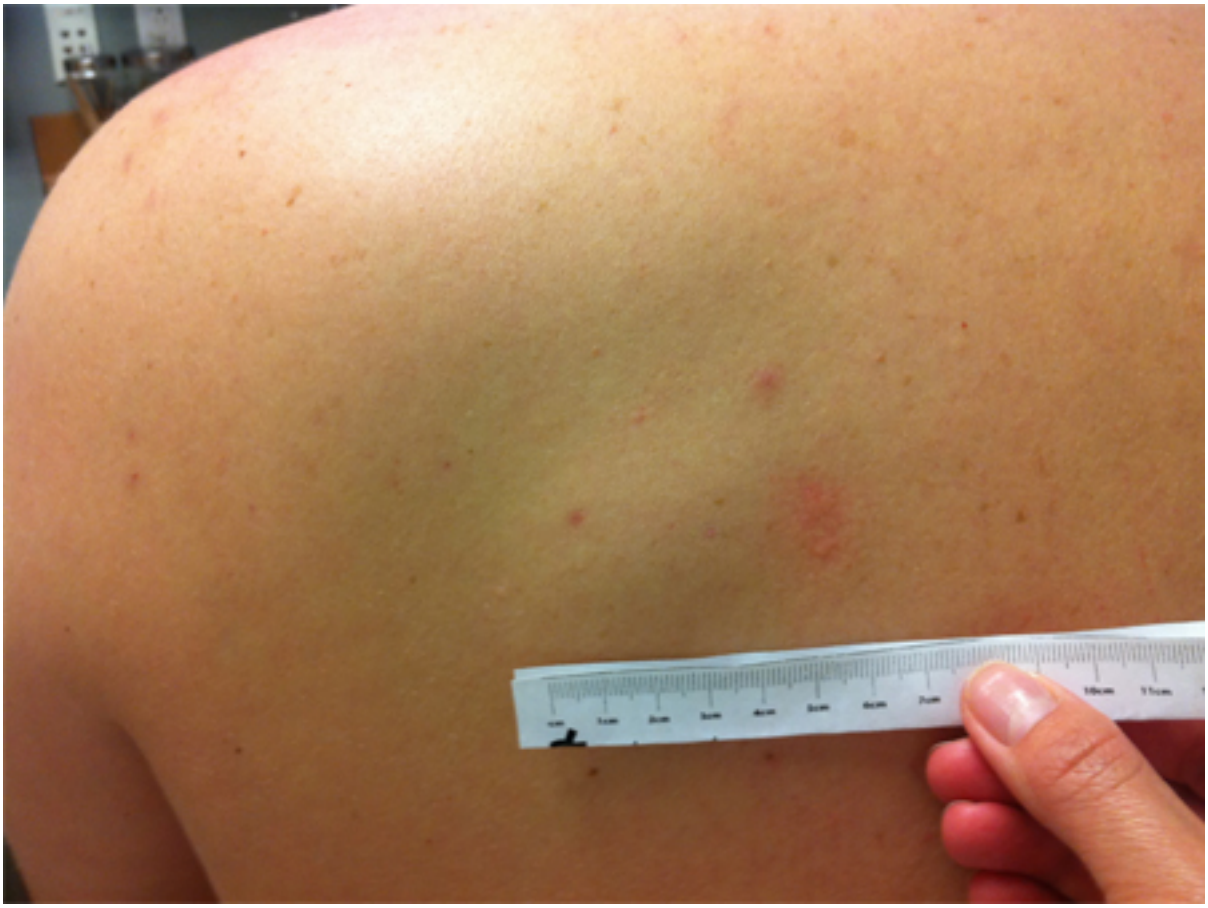
Cutaneous lipomas are usually soft, mobile, and superficial.

Lipomas have no malignant potential. However, the differential diagnosis of liposarcoma should be carefully considered.

Surgical resection is indicated for symptomatic relief, pathological confirmation, or cosmetic reasons, or if there is an increase in size.

Definition

Lipomas are slow-growing, benign, mesenchymal tumours that form well-circumscribed, lobulated lesions composed of adipocytes. They are demarcated from surrounding fat by a thin, fibrous capsule. They comprise 50% of soft-tissue neoplasms and are commonly encountered by primary care physicians, surgeons, and pathologists.[1] Lipomas usually arise in the subcutaneous tissues and may occur in any area of the body, although they most frequently occur on the trunk and proximal limbs. They have no malignant potential, but the differential diagnosis of liposarcoma must considered.



Subcutaneous lipoma on the trunk

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

Epidemiology

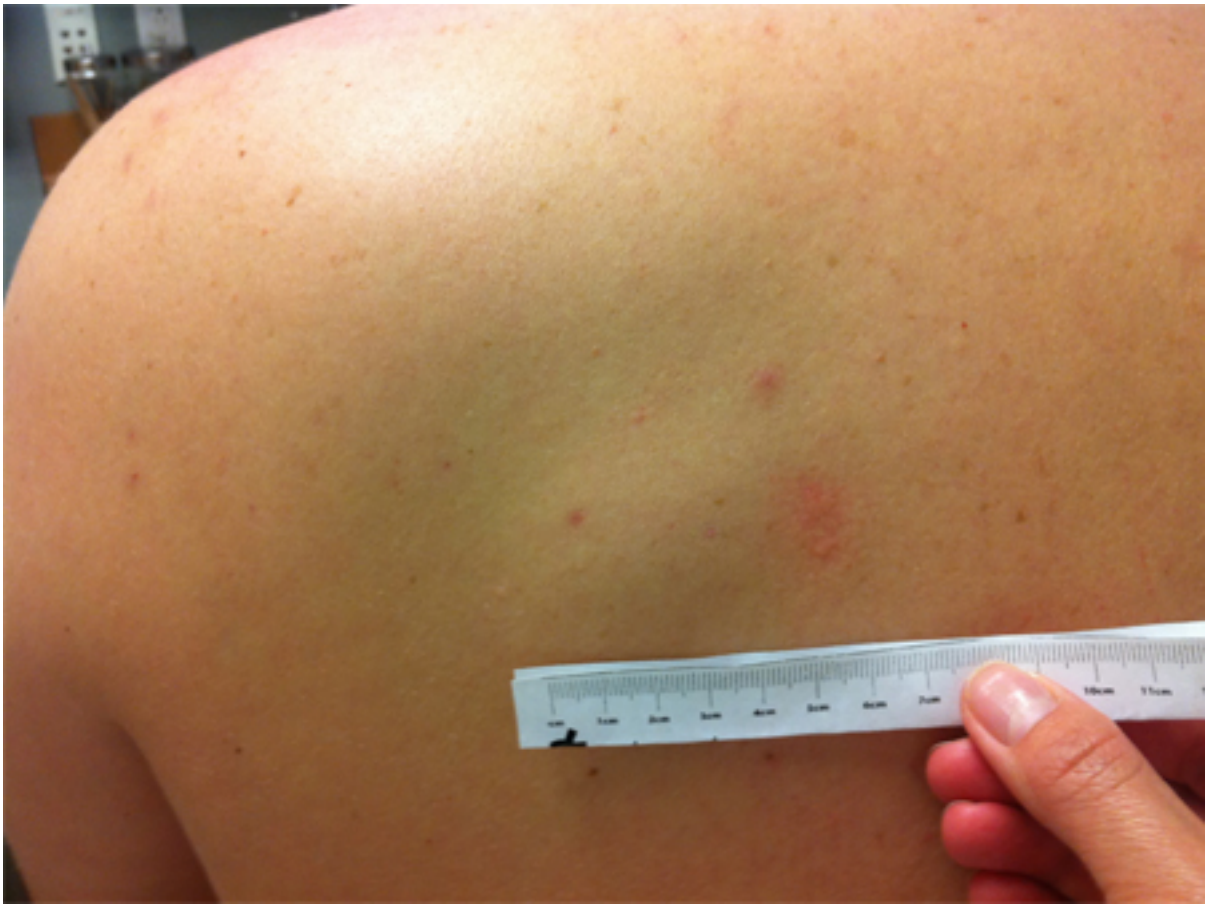
Approximately 1% of the general population has a lipoma. Although they can occur at any age, they are most common between 40 and 60 years of age.[5] Congenital lipomas have been reported in children.[6]

Aetiology

The aetiology for most lipomas is idiopathic. However, they may also appear on a hereditary basis in patients with familial multiple lipomatosis or in patients with Gardner's syndrome.[9][10][21] Studies have also shown a correlation between HMG 1-C gene mutation and lipoma development.[22] Madelung's disease, which features benign symmetric lipomatosis of the head, neck, shoulders, and proximal upper extremities, is associated with men with heavy alcohol consumption.[23] Dercum's disease, also known as adiposis dolorosa, occurs in middle-aged women and is characterised by painful lipomas on the trunk, shoulders, arms, and legs; its etiology is unknown.[14] Other syndromes that may manifest lipomas include Bannayan-Riley-Ruvalcaba syndrome, Proteus syndrome, and multiple endocrine neoplasia 1.[24][25][26] Although trauma has been postulated as a potential inciting agent, it is unclear whether it is a true causal factor.[27] [28]

Pathophysiology

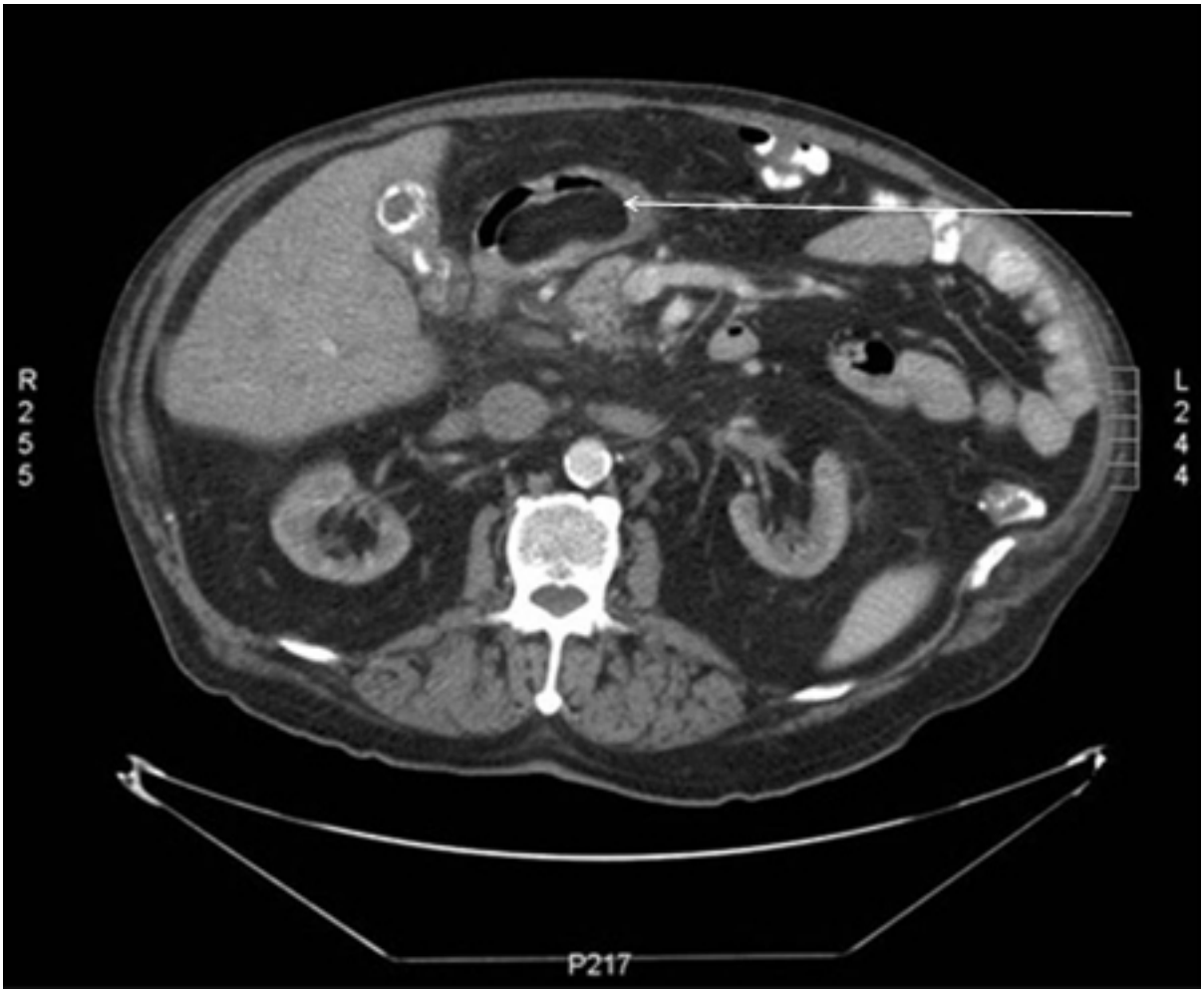
Lipomas are slow-growing, benign, mesenchymal tumours that form well-circumscribed, lobulated lesions composed of adipocytes. They are demarcated from surrounding fat by a thin, fibrous capsule. Subcutaneous lesions are most common and are usually superficial, round, mobile, and soft, and feel similar to subcutaneous fat.



Subcutaneous lipoma on the trunk

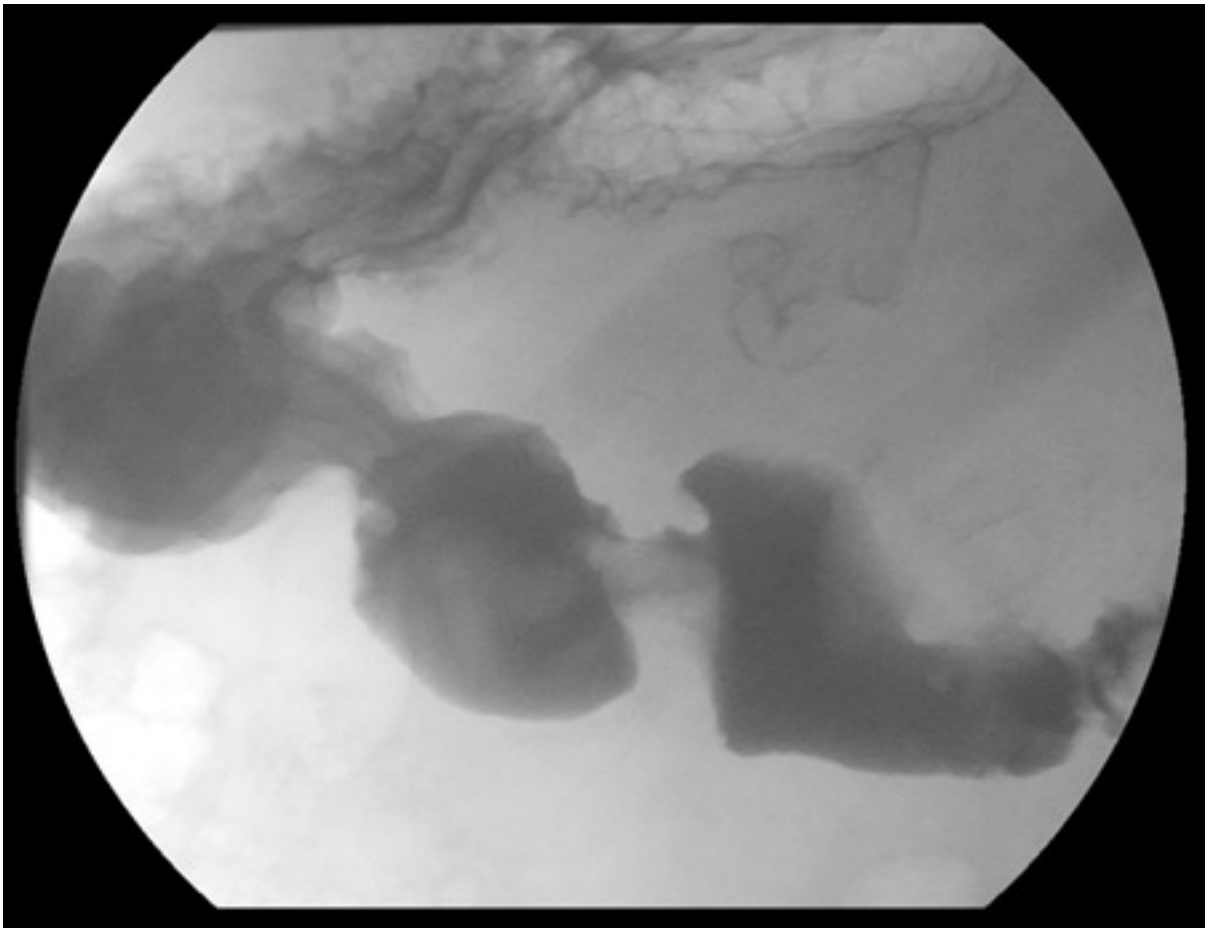
From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

Gastrointestinal lipomas are uncommon and occur as submucosal lesions, most commonly in the stomach, small intestine, and colon.[7] They may present with intestinal obstruction or bleeding.[29] Rarely, lipomas can also occur in locations such as the adrenal glands, parotid glands, parapharyngeal space, breast, mediastinum, pleura, major airway, heart, superior vena cava, brain, and intraspinal areas.[8]



Gastric submucosal lipoma, CT scan. Submucosal antral mass with fatty density throughout.

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

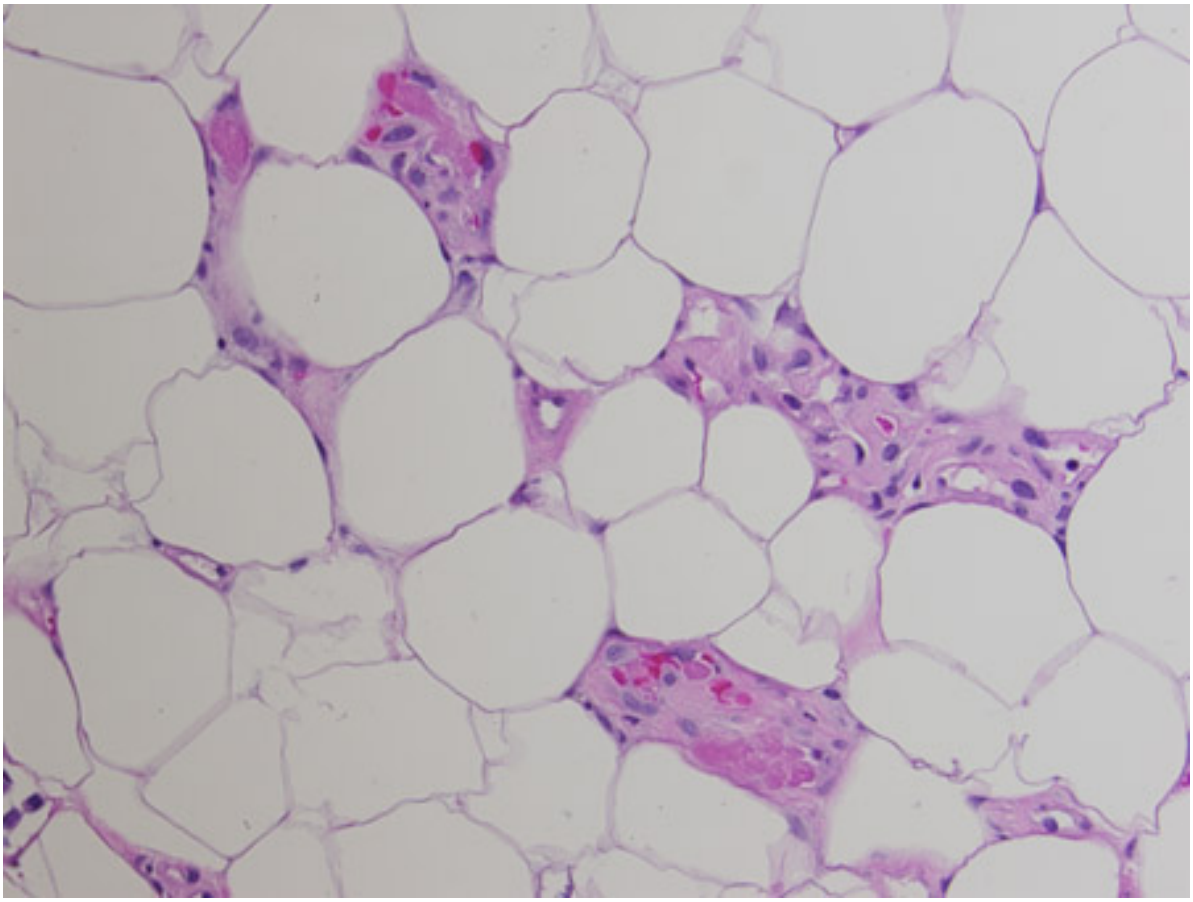


Gastric submucosal lipoma, upper GI contrast study. Filling defect in the distal antrum and pyloric channel suggesting antral mass prolapsing into pyloric channel

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

Different types of lipoma have specific histological features.

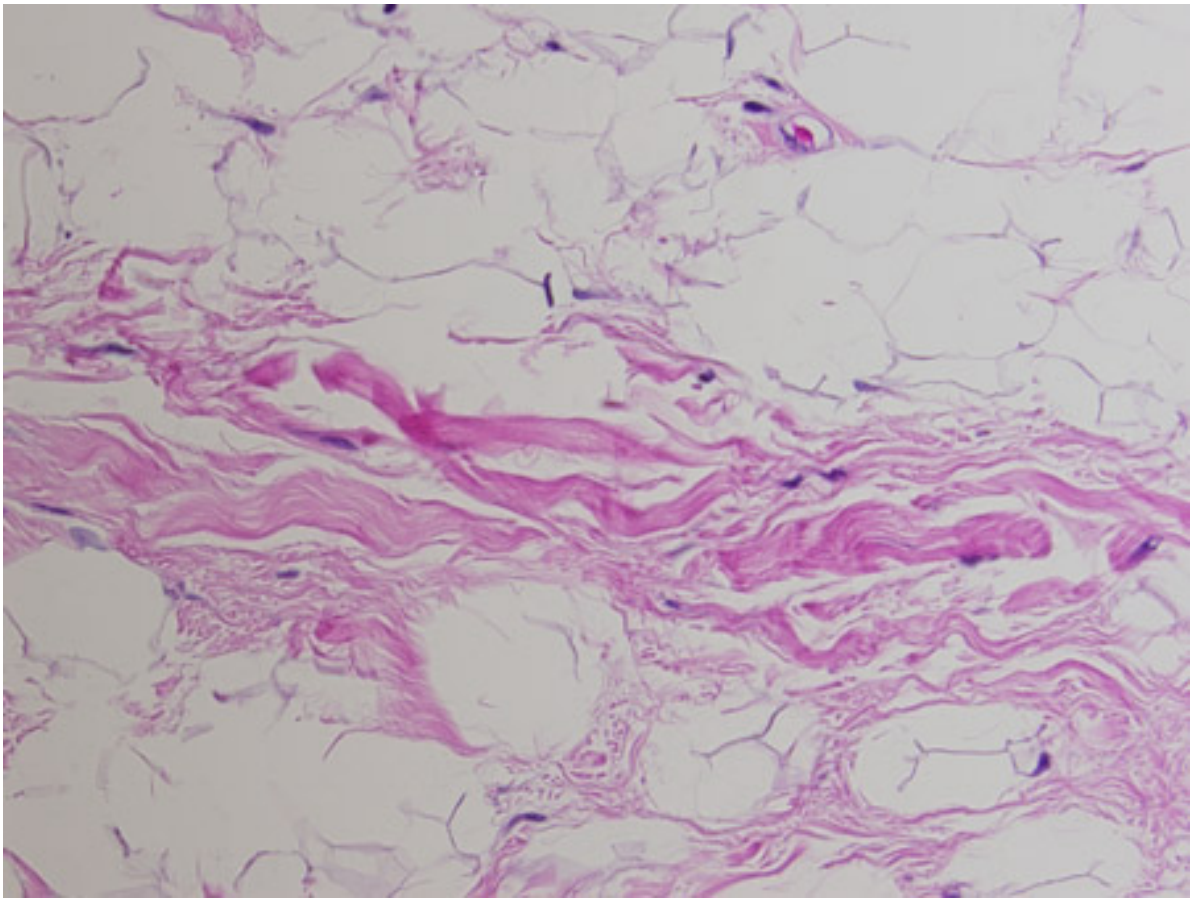
- Angiolipomas are composed of adipocytes with interspersed clusters of capillaries containing fibrin thrombi.



Angiolipoma. Mature adipose tissue with foci of endothelial proliferation containing micro-vascular thrombi. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

- Spindle cell lipomas are composed of collagen-forming spindle cells that have replaced mature fat.[17] [18]



Spindle cell lipoma. Mature adipose tissue with intervening strands of dense fibrosis with spindle cell areas and characteristic ropey collagen bundles. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

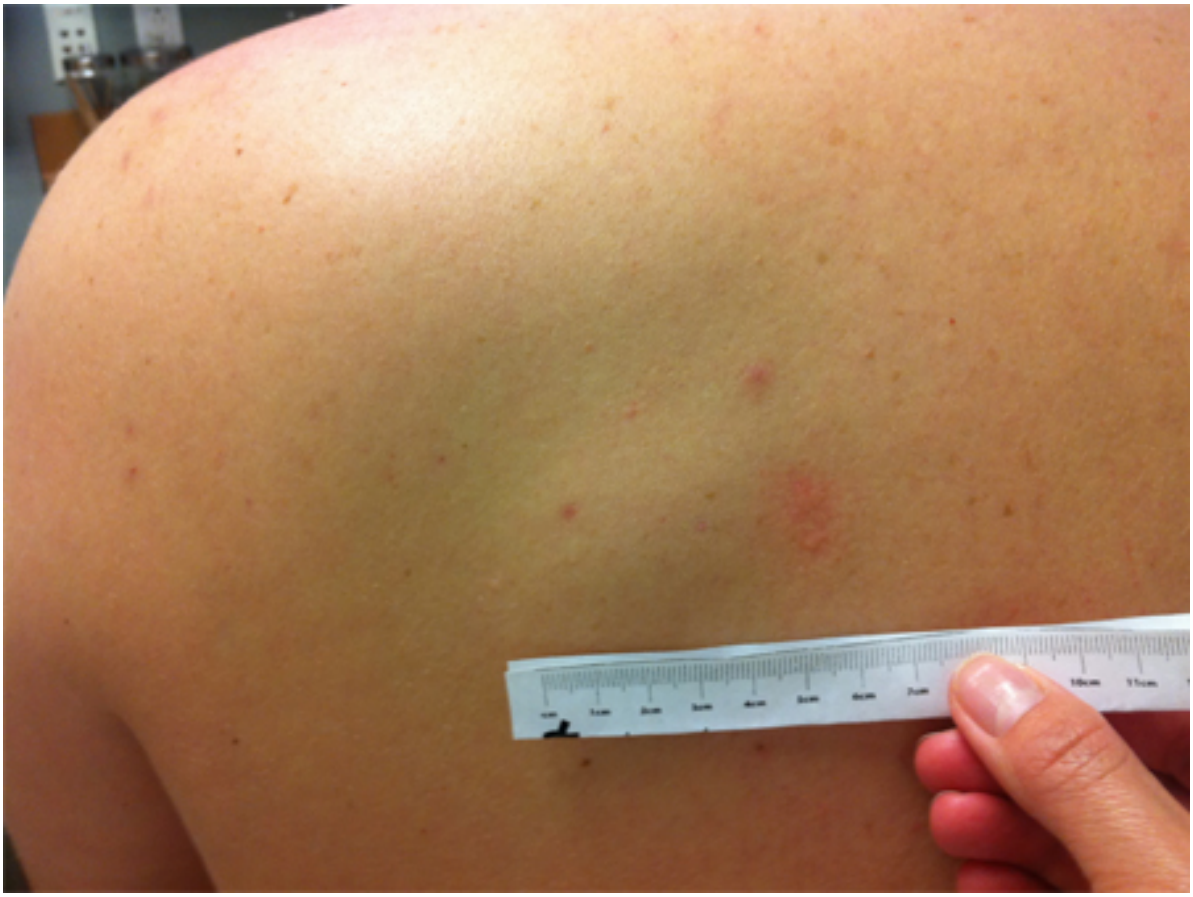
- Intramuscular lipomas are usually poorly circumscribed and infiltrative. With lesions in this anatomical position, it is important to exclude an atypical lipomatous tumour or well-differentiated liposarcoma as these are more common than a true lipoma in this position.[16][19] In order to confirm a diagnosis of atypical lipomatous tumour or well-differentiated liposarcoma, the excised specimen can be tested for MDM2 or CPM genes.[20] [30] A diagnosis of atypical lipomatous tumour or well-differentiated liposarcoma should also be considered in patients with retroperitoneal lesions.[20]
- Hibernomas resemble the glandular brown fat found in hibernating animals.[4] [16] They have a greater tendency to bleed during excision and recur if not fully excised.

Classification

Clinical classification

The different types of lipoma are:

- Superficial subcutaneous



Subcutaneous lipoma on the trunk

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

- Intramuscular
- Spindle cell: mature fat replaced by collagen-forming spindle cells
- Angiolipoma: adipocytes interspersed with capillaries containing fibrin thrombi[2]
- Lipoblastoma: variant found exclusively in infancy and early childhood[3]
- Hibernoma: tumours consisting of glandular brown fat.[4]

Lipomas most commonly develop between 40 and 60 years of age, but congenital lipomas have been reported.[5][6]

Case history

Case history #1

A 55-year-old woman presents with a right flank mass. She states she was recently diagnosed with diabetes mellitus, which she has been able to control with diet modifications. She lost 9 kg (20 pounds) within 3 months and then noticed a mass over her right lower rib cage. She denies pain but does report discomfort when she wears a jogging bra. On physical examination, the mass is soft, superficial, and mobile, and it measures 5 cm in diameter.

Case history #2

A 35-year-old man presents with a right thigh nodule and a recurrent left chest wall nodule at the site of a prior scar. He states that he noticed a bump on his right lateral thigh 2 years previously and that the left chest wall lesion had been removed in clinic 3 years prior. The nodules have grown slightly over recent months. He also states that they bother him when he touches them. On physical examination, the nodules are 1 cm x 2 cm, soft, and mobile, and they feel subcutaneous.

Other presentations

Lipomas can present in locations other than subcutaneously on the trunk or proximal extremities. Gastrointestinal lipomas are uncommon and occur as submucosal lesions, most commonly in the stomach, small intestine, and colon.[7] This type may present with intestinal obstruction or bleeding. Rarely, lipomas can also occur in locations such as the adrenal glands, parotid glands, parapharyngeal space, breast, mediastinum, pleura, major airway, heart, superior vena cava, brain, and intraspinal areas.[8]

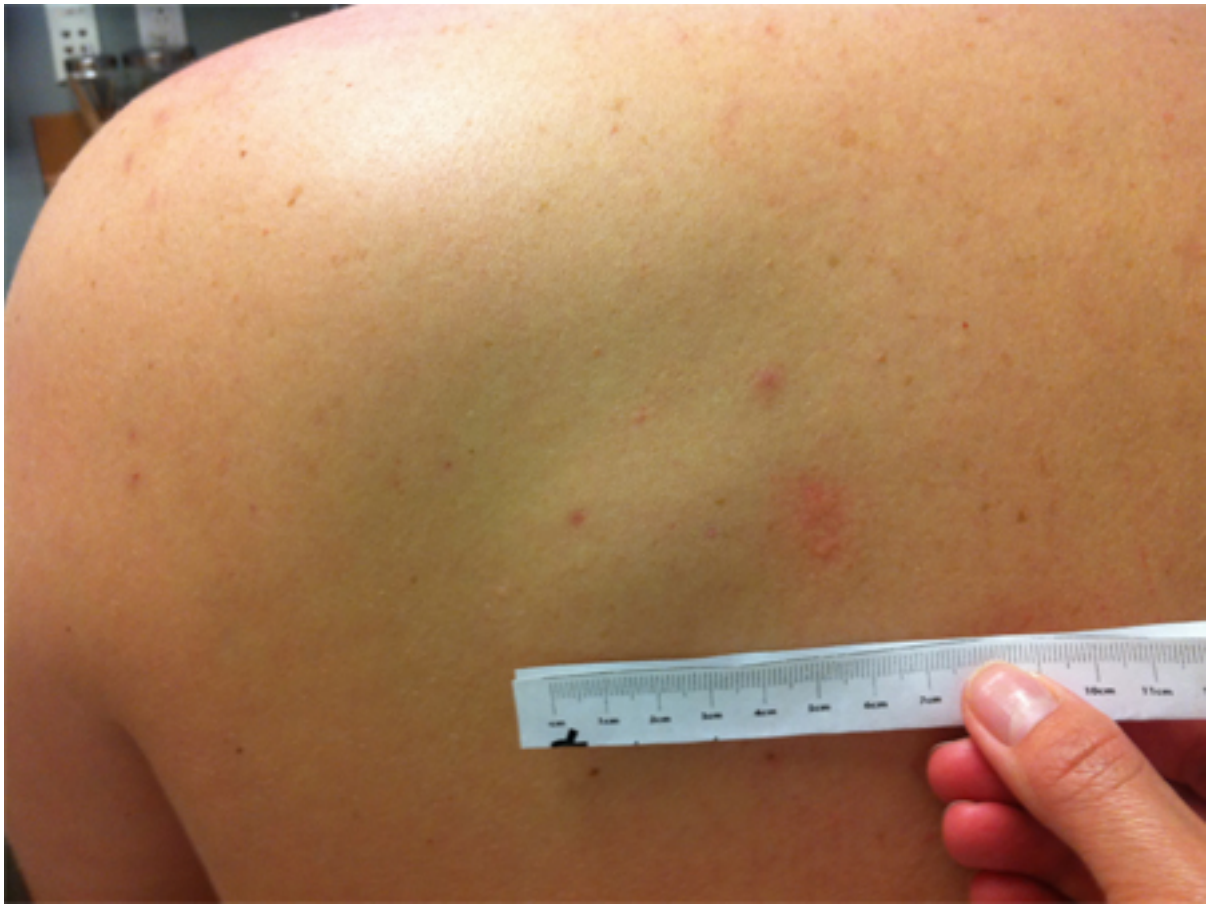
Lipomas can occur on a hereditary basis in patients with familial multiple lipomatosis.[9][10] Patients with this autosomal condition tend to be male and have multiple, widespread, symmetric lipomas of the extremities and trunk.[11] Other hereditary syndromes that involve lipomas include Madelung's disease, also known as multiple symmetric lipomatosis; Dercum's disease, also known as adiposis dolorosa; and Gardner's syndrome.[12] Madelung's disease is more common in men and is associated with chronic alcohol consumption in genetically predisposed individuals. Features include benign symmetric lipomatosis of the head, neck, shoulders, and proximal upper extremities.[13] Dercum's disease occurs in middle-aged women and is characterised by painful lipomas on the trunk, shoulders, arms, and legs.[14]

Angiolipomas account for approximately 10% of all lipomatous lesions.[15] They present as painful, subcutaneous nodules, usually in young adults, and are multiple in more than 50% of cases.[2][16] Angiolipomas are composed of adipocytes interspersed with clusters of capillaries containing fibrin thrombi.

Spindle cell lipomas, often seen in men between the ages of 45 and 65 years, occur in the posterior neck and shoulder area.[16] They are characterised by mature fat being replaced by collagen-forming spindle cells.[17][18]

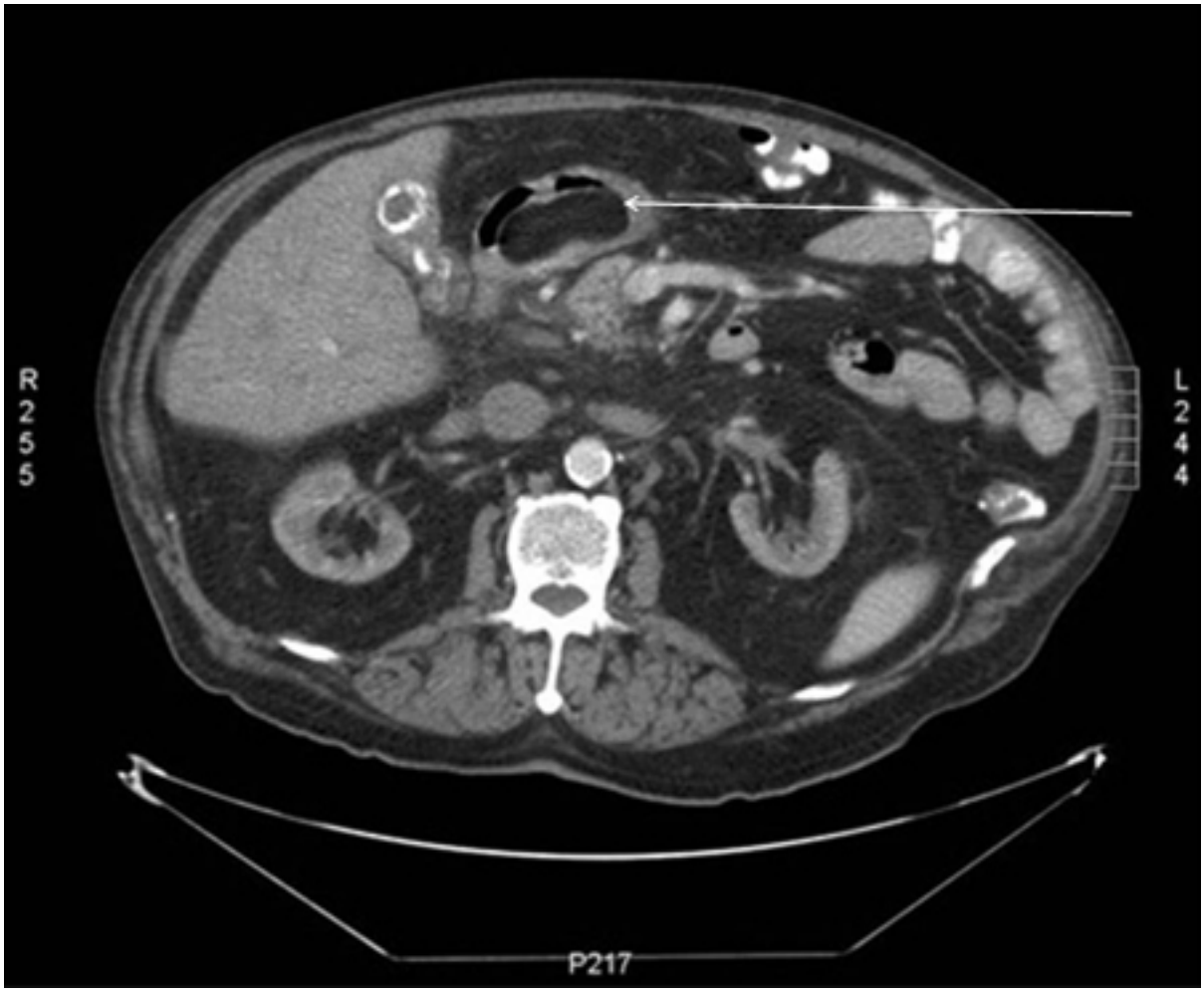
Intramuscular lipomas, which are usually poorly circumscribed and infiltrative, typically present in mid-adult life as slow-growing, deep masses located in the thigh or trunk. It is important to exclude an atypical lipomatous tumour or well-differentiated liposarcoma, as these are more common than an intramuscular lipoma in this anatomical position.[16][19] Retroperitoneal lipomas are very rare and a diagnosis of atypical lipomatous tumour or well-differentiated liposarcoma should also be considered in patients with retroperitoneal lesions.[20]

Hibernomas may arise in the trunk, retroperitoneum, and extremities and resemble the glandular brown fat found in hibernating animals.[4][16] They have a greater tendency to bleed during excision and recur if not fully excised.



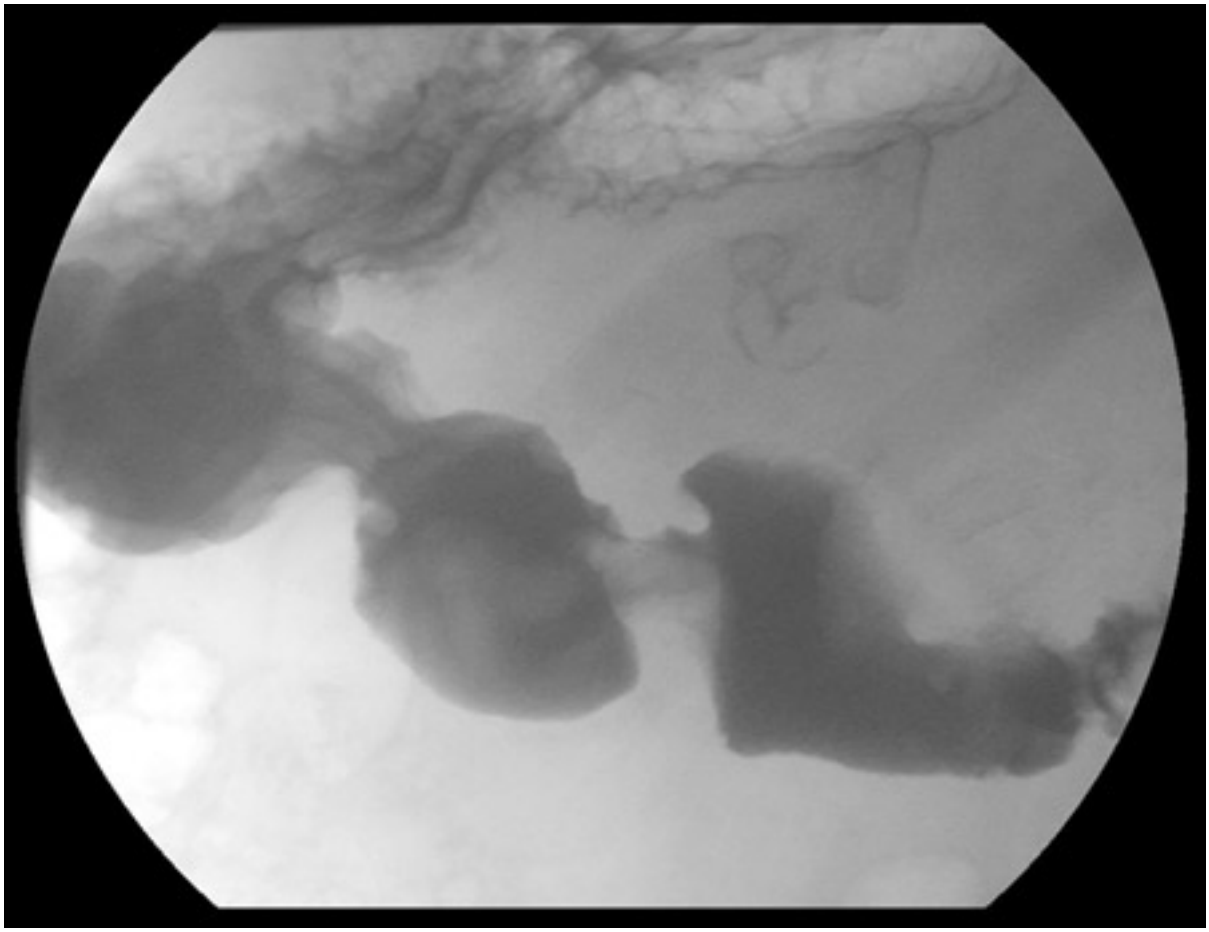
Subcutaneous lipoma on the trunk

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



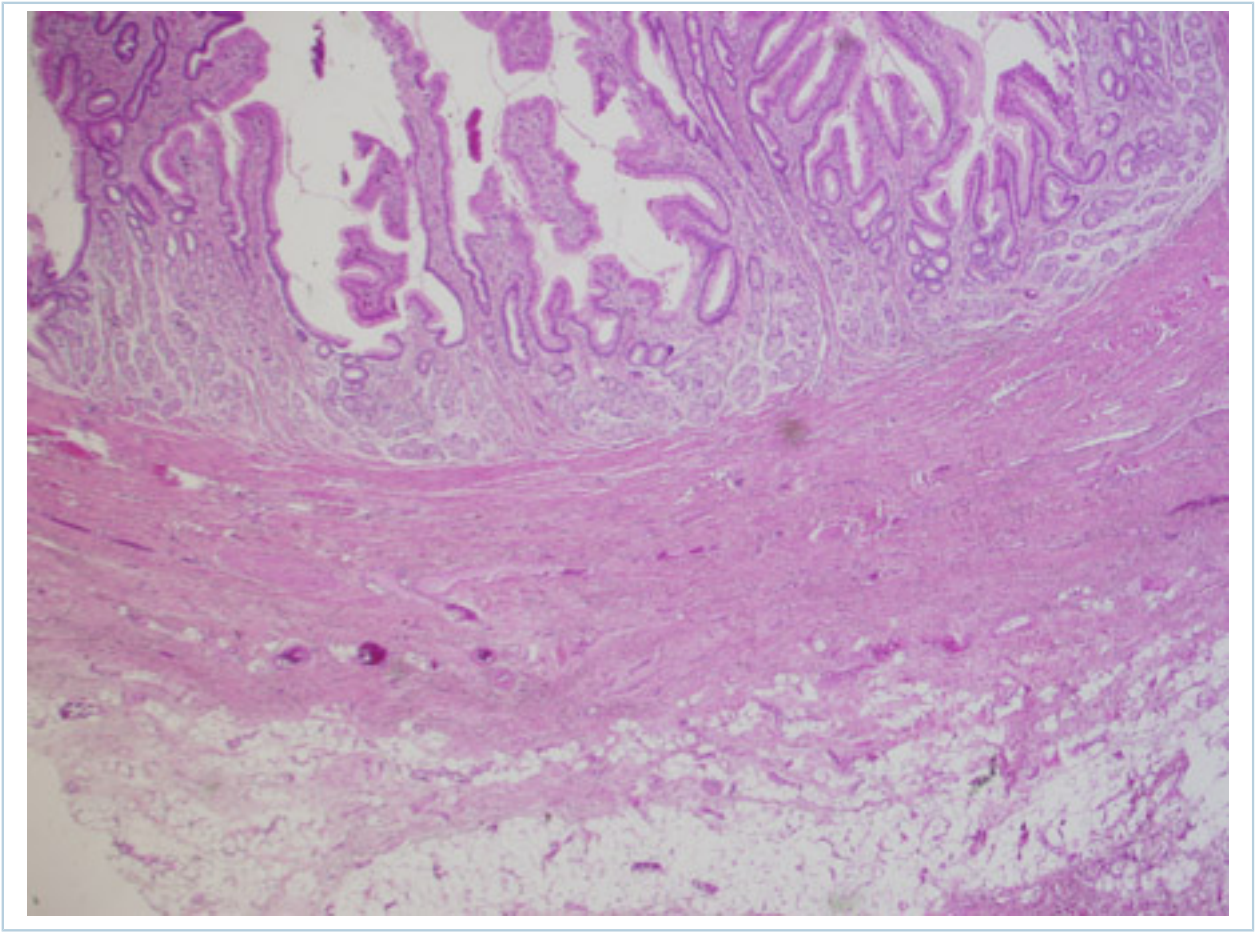
Gastric submucosal lipoma, CT scan. Submucosal antral mass with fatty density throughout.

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



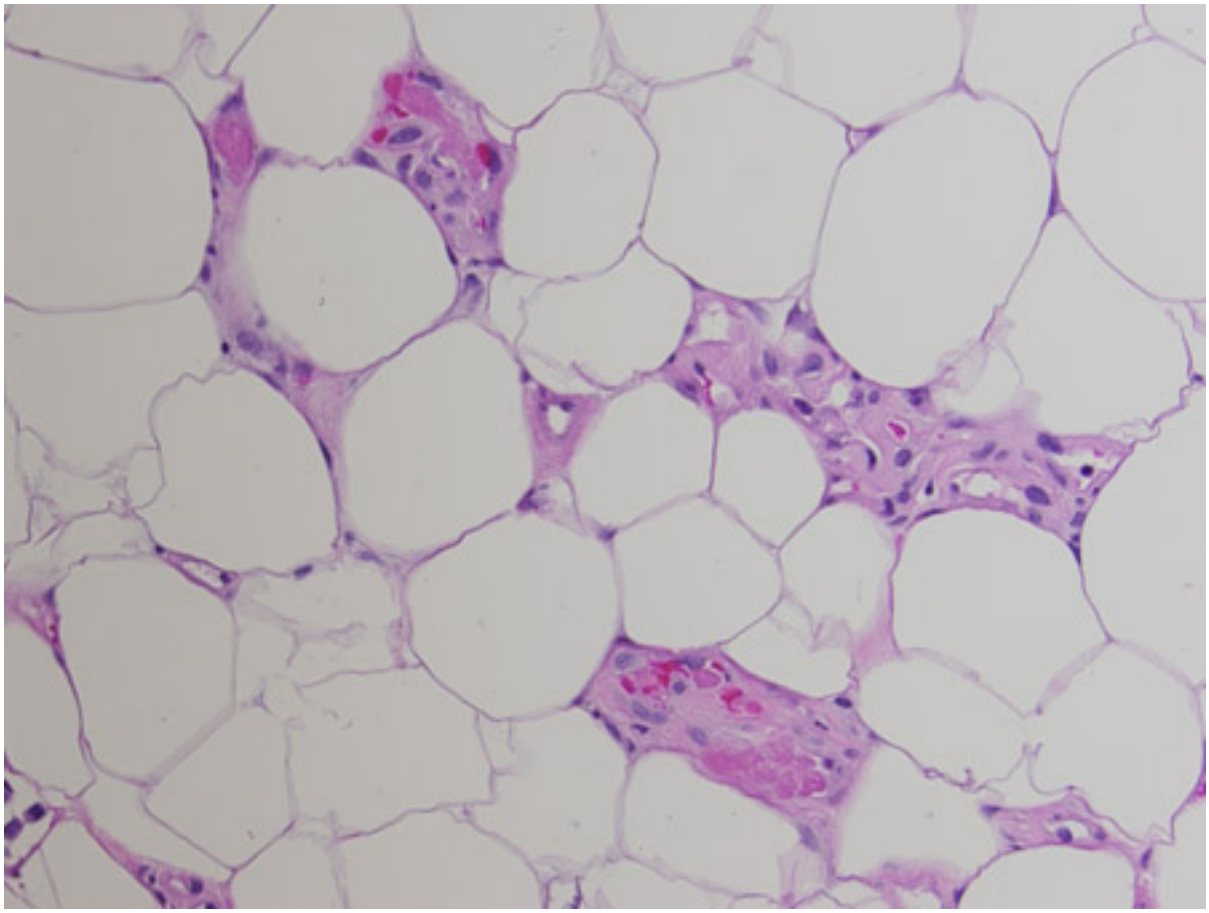
Gastric submucosal lipoma, upper GI contrast study. Filling defect in the distal antrum and pyloric channel suggesting antral mass prolapsing into pyloric channel

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



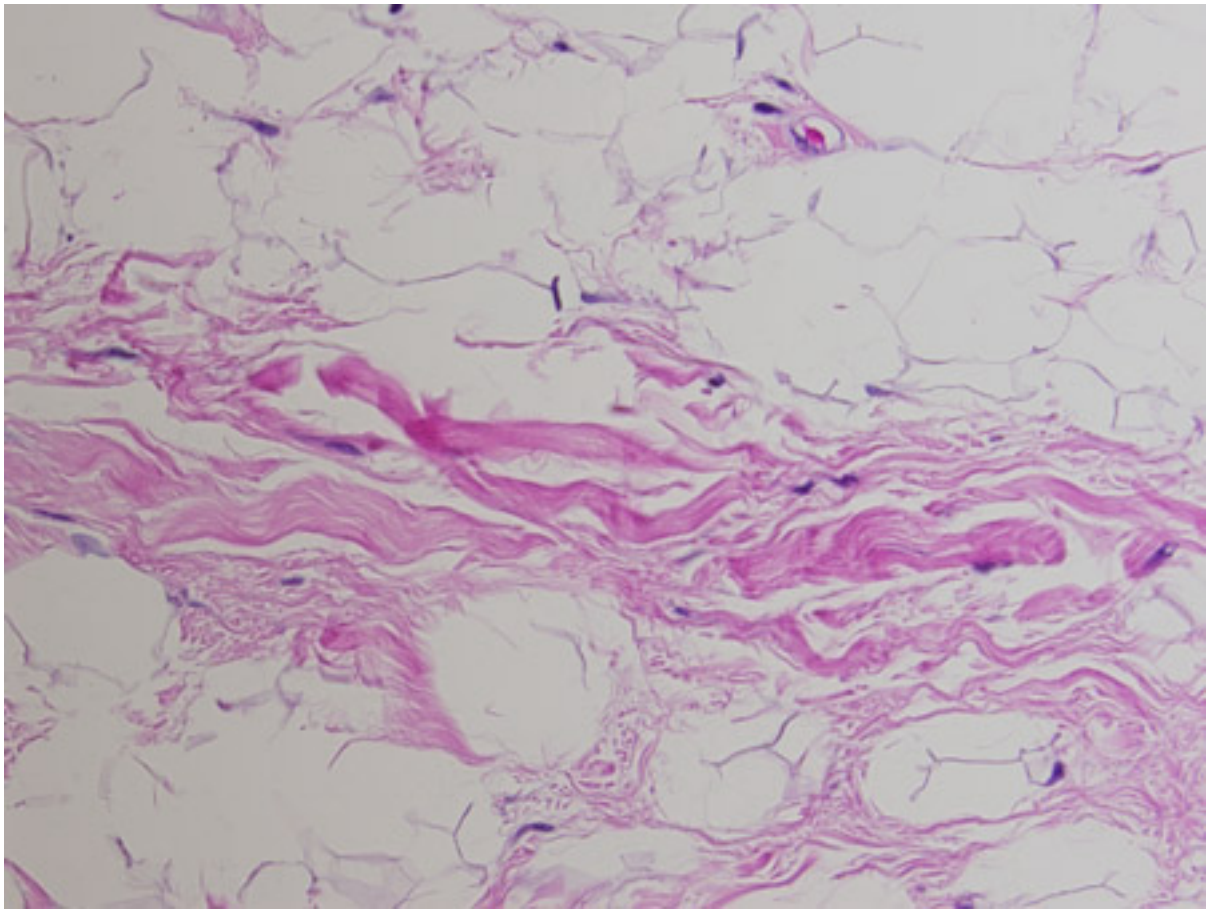
Gastric submucosal lipoma. A nodule of mature adipose tissue is present subjacent to gastric mucosa. Haematoxylin and eosin, 20x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



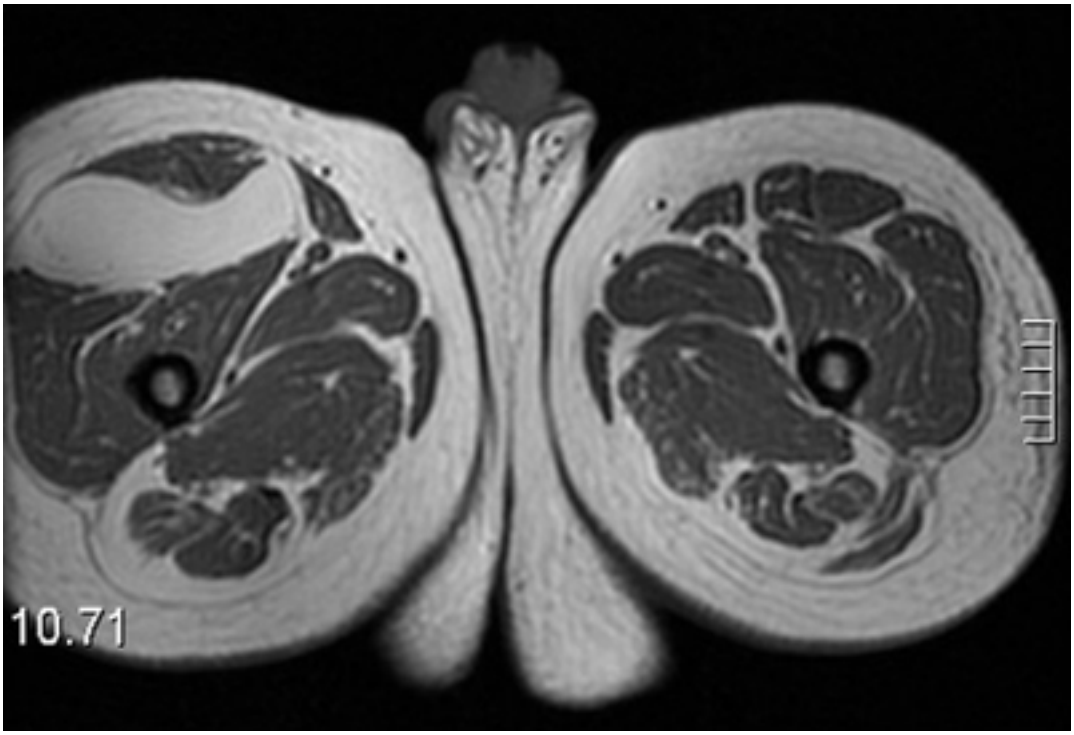
Angiolipoma. Mature adipose tissue with foci of endothelial proliferation containing micro-vascular thrombi. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



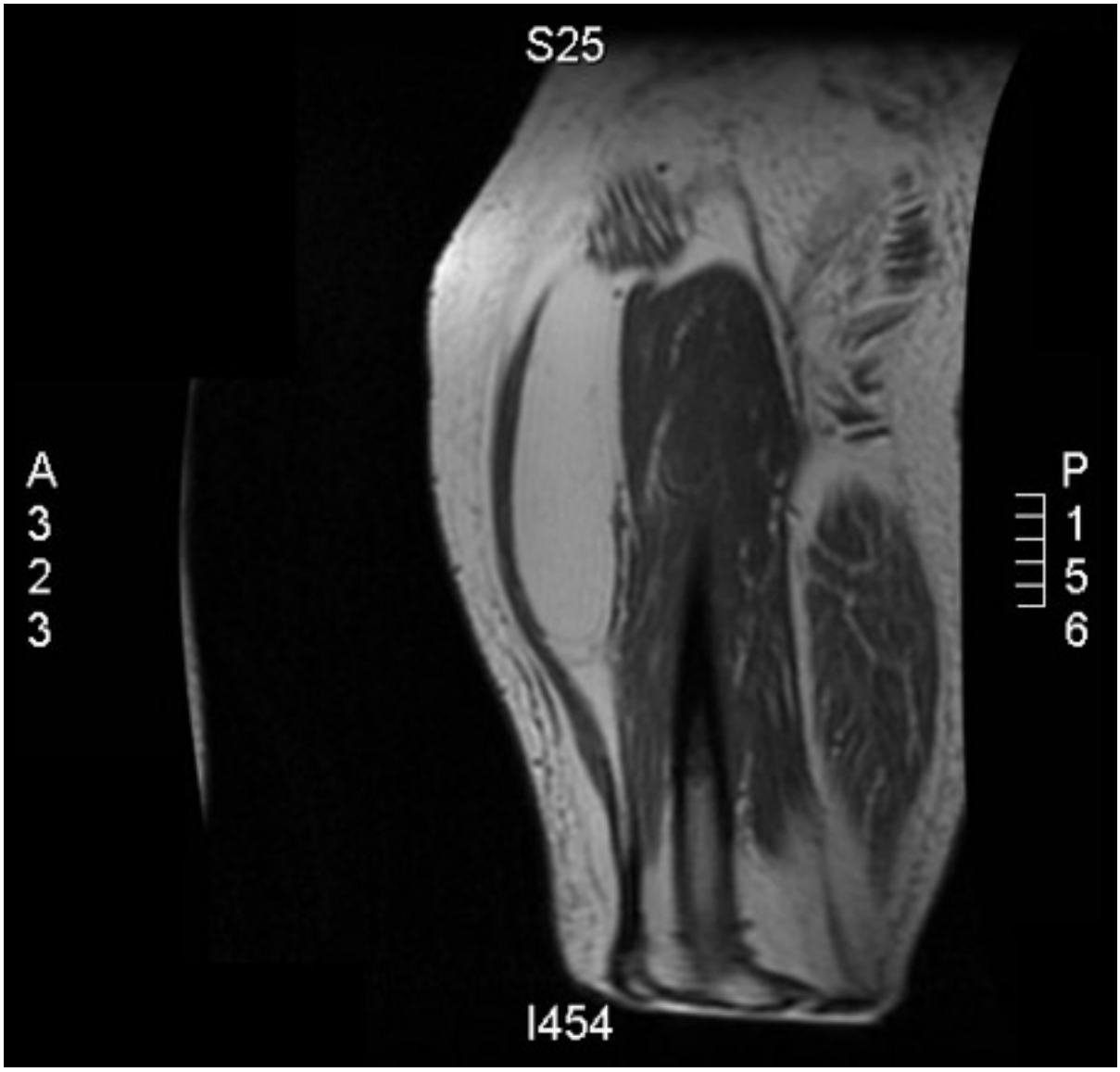
Spindle cell lipoma. Mature adipose tissue with intervening strands of dense fibrosis with spindle cell areas and characteristic ropey collagen bundles. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



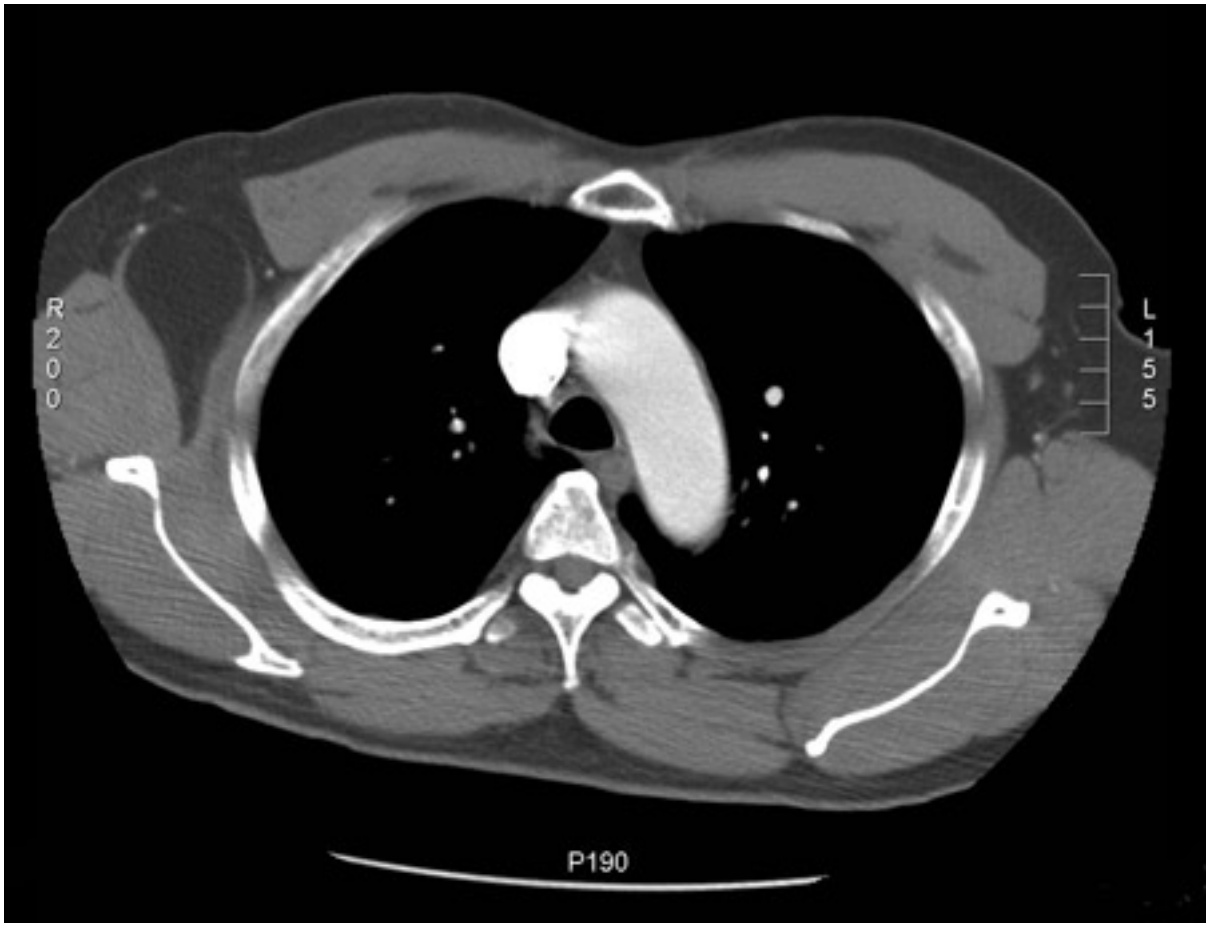
Intramuscular lipoma, right thigh. MRI, axial, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



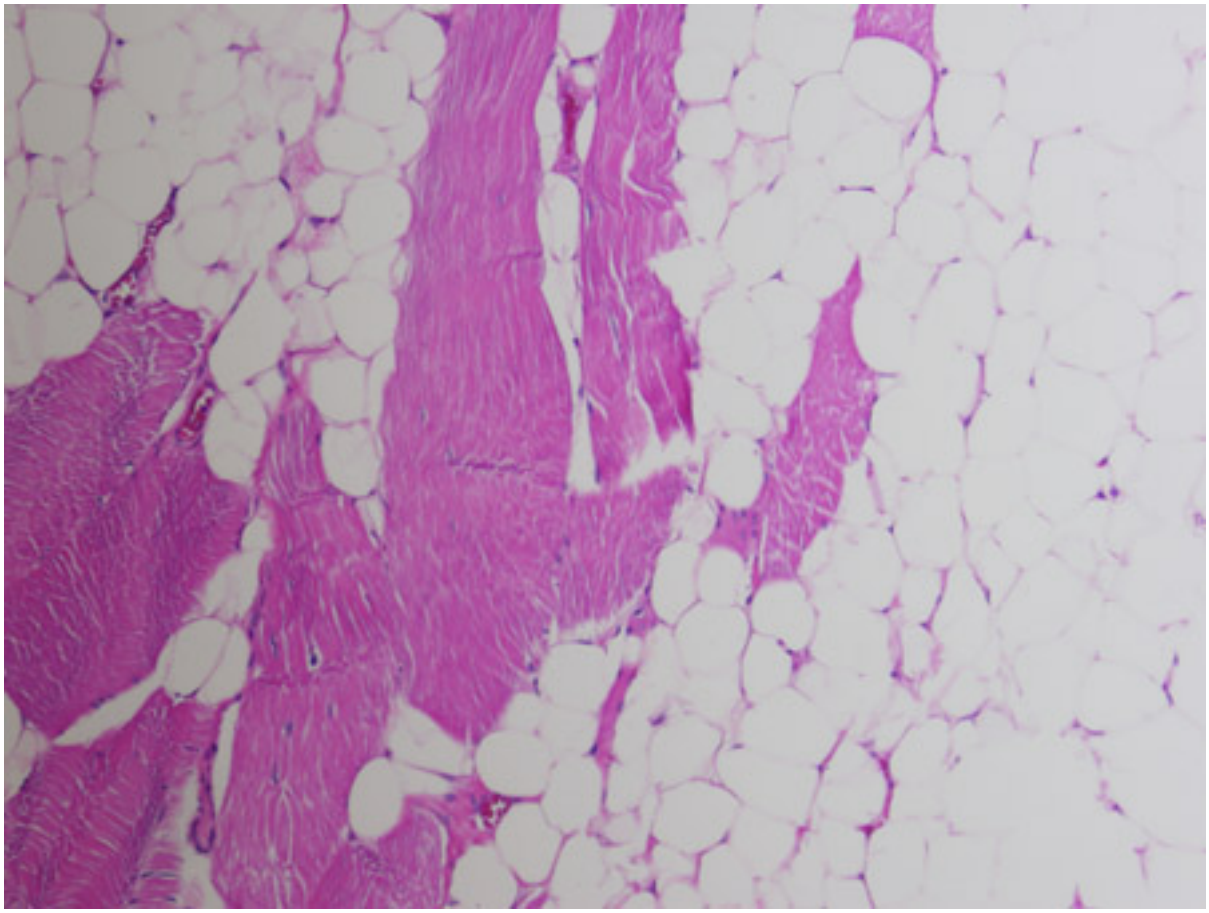
Intramuscular lipoma, right thigh. MRI, coronal, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



Intramuscular lipoma of subscapularis muscle, CT scan. Right axillary soft-tissue fatty mass with well-circumscribed margins

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



Intramuscular lipoma. Mature adipose tissue insinuating between skeletal muscle bundles. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

Approach

The approach used for the diagnosis of a lipoma will depend on its location and characteristics. Superficial cutaneous lipomas can often be diagnosed on history and physical examination alone. There are many subtypes of lipomas, and they are still considered benign. With lesions in other locations, imaging tests and biopsy may be required. Careful consideration of the differential diagnoses is important, particularly the possibility of liposarcoma.

History

History-taking is guided by the anatomical location of the lesion. Questions should explore factors such as:

- When the lump was first noticed
- What brought the lump to the attention of the patient
- The symptoms that are related to the lump
- Changes that have occurred to the lump since it first appeared
- Whether the lump ever disappears and what causes it to reappear
- Whether the patient ever had any other lumps and what they were like
- Whether there has been any loss of body weight
- Whether the lump has been treated before and has recurred.

Some lesions may be noted only incidentally on imaging studies. In these circumstances, history-taking is adjusted to explore the most likely effects, based on anatomical location of the lesion.

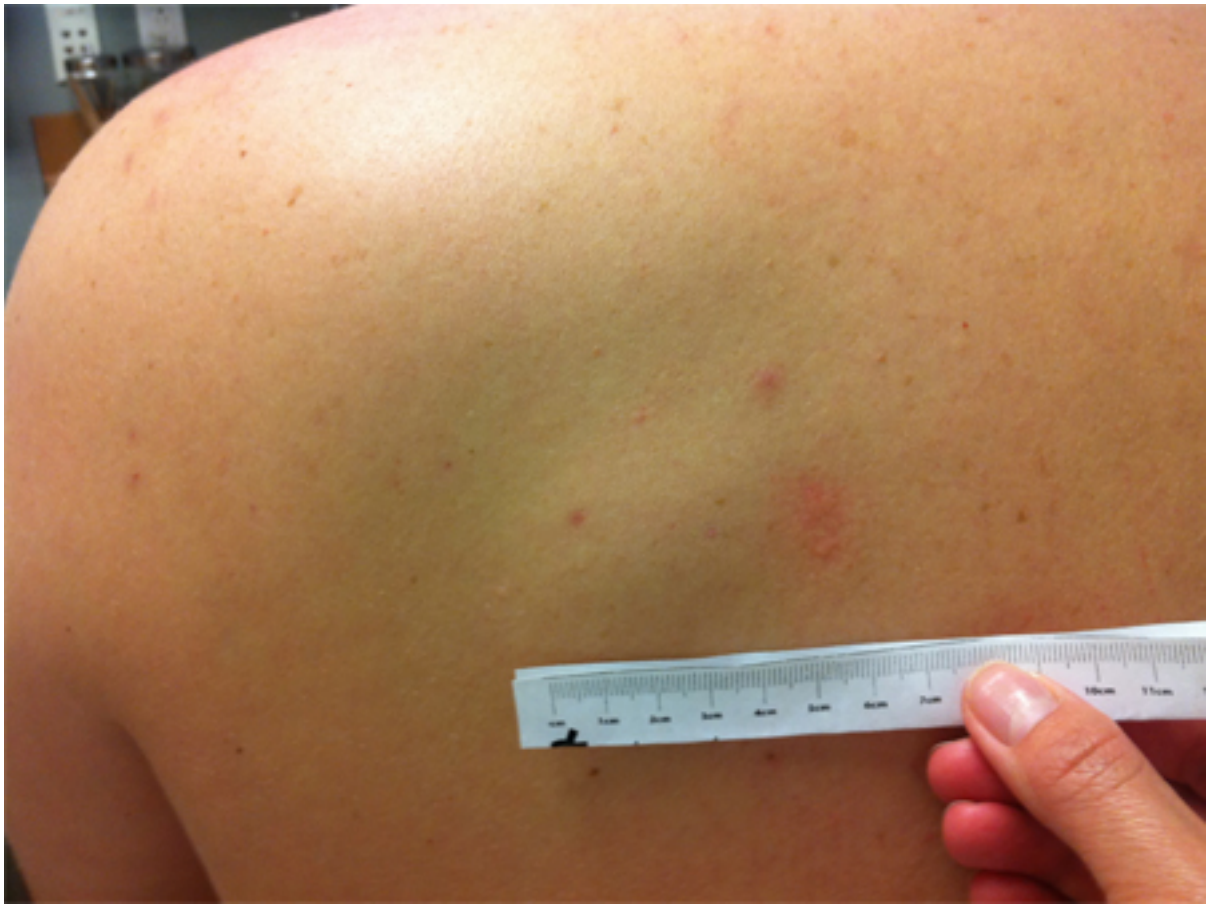
The lipomatous tissue in Dercum's disease can be very severe, debilitating, and progressive. The diagnostic criteria for Dercum's disease are generalised overweight or obesity and chronic pain (>3 months) in the adipose tissue.[12]

If a patient fulfils the criteria and has isolated painful lipomas, the diagnosis is nodular Dercum's disease. Pain differentiates patients with Dercum's disease from patients with lipomatosis, who do not have extreme chronic pain. Dercum's disease is a syndrome consisting of four symptoms: multiple, painful fatty masses; generalised obesity; weakness and fatigue; psychiatric disturbances such as depression, confusion, and dementia. The pain can last for hours and be intermittent or constant, and may worsen with movement. It can be associated with congestive heart failure, myxoedema, paroxysmal flushing, hypertension, headaches, and epistaxis.

Physical examination

Physical examination of an accessible lesion should include all the classic elements: look, feel, measure, press, percuss, move, listen, trans-illuminate, and examine surrounding tissue.

Most superficial cutaneous lipomas on the extremities or trunk are <5 cm in size and present as painless, rounded, mobile masses, which have a characteristic soft, doughy feel.



Subcutaneous lipoma on the trunk

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

Angiolipomas, which tend to be multiple and occur in young adults, may be painful when palpated. The overlying skin appears normal.[5] The differential diagnosis of a subcutaneous lipoma includes:[16]

- Epidermoid cyst: these are usually smooth, rounded, and subcutaneous and feel firm (rather than the soft, doughy feel of a lipoma); they usually have a central punctum through which a white exudate can be expressed
- Abscess: these are typically tender and surrounded by erythema
- Liposarcoma.

On an extremity, liposarcoma may present as a deep-seated, painless, enlarging mass. Liposarcomas grow either slowly over many years or rapidly over a short time scale, and can reach a very large size. The majority present at a size larger than 5 cm. Studies suggest that a size of 10 cm or larger is a strong discriminating feature for liposarcoma.[20] Definitive diagnosis is dependent on histological confirmation.[16]

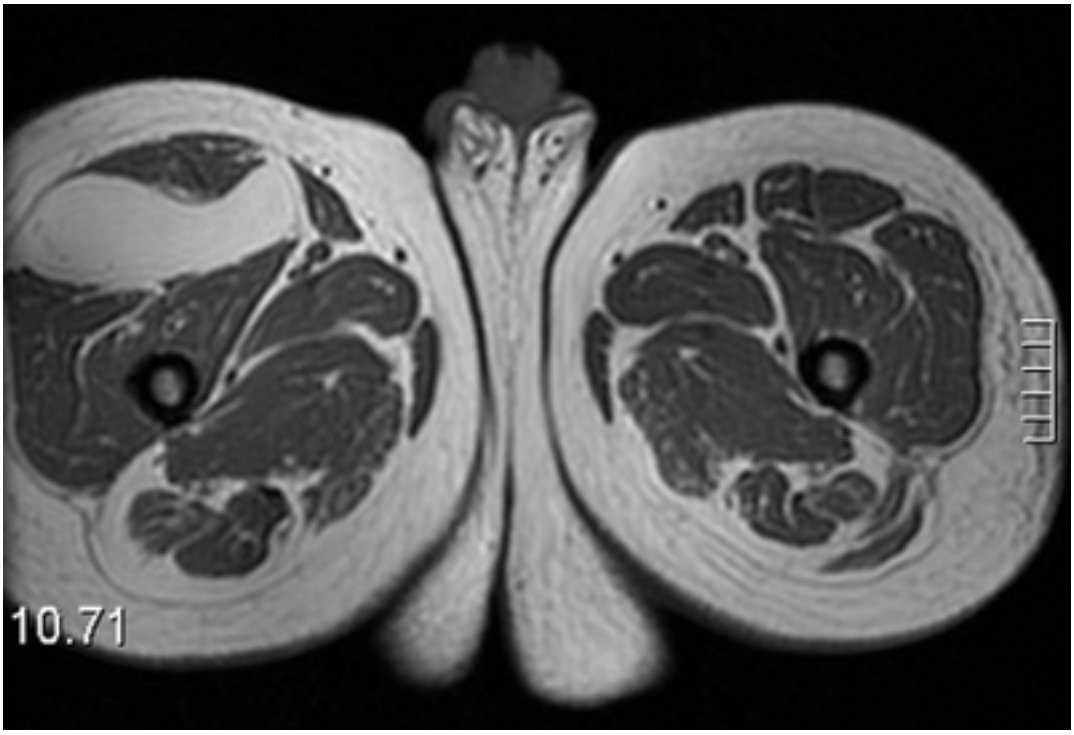
For lesions that are detected in more unusual locations, the physical examination should be modified to assess the organs most likely to be affected.

Imaging

Imaging is considered for lesions which are clinically deep to the superficial fascia, feel more solid than subcutaneous fat, immobile, or increasing in size.

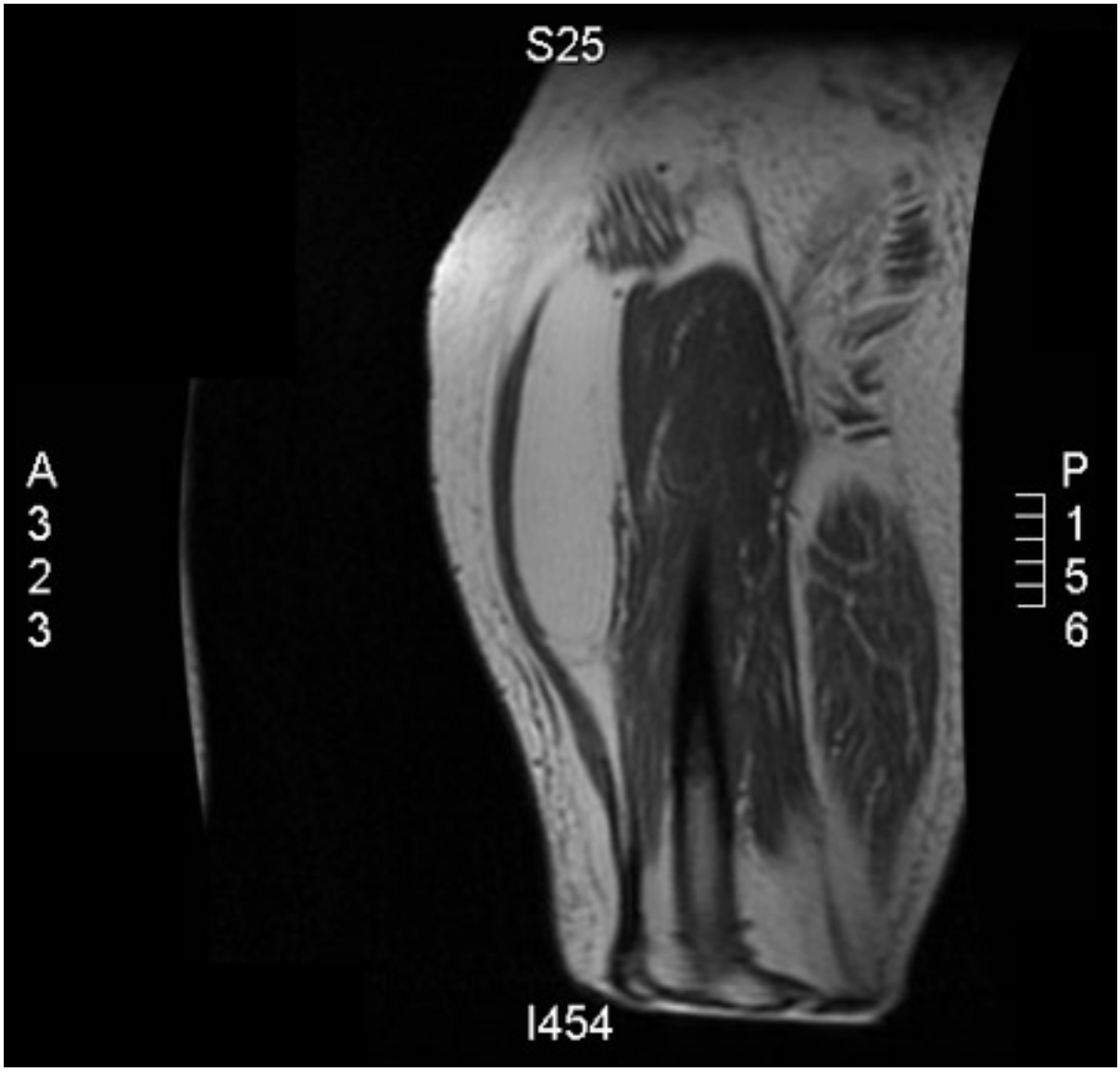
Initial imaging of superficial lesions, e.g., lesions on the extremities, head, or neck, is with ultrasound.[31] [32] Ultrasound has a sensitivity of 87% and a specificity of 96% for diagnosis of lipoma.[33] Urgent investigation is recommended for an unexplained lump that is increasing in size, to evaluate for soft tissue sarcoma.[34]

Magnetic resonance imaging (MRI) is a more detailed modality of choice due to its ability to attenuate bone artifact and discern the relationship of the mass to fascial planes, vessels, bones and nerves.[35] [36]



Intramuscular lipoma, right thigh. MRI, axial, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission



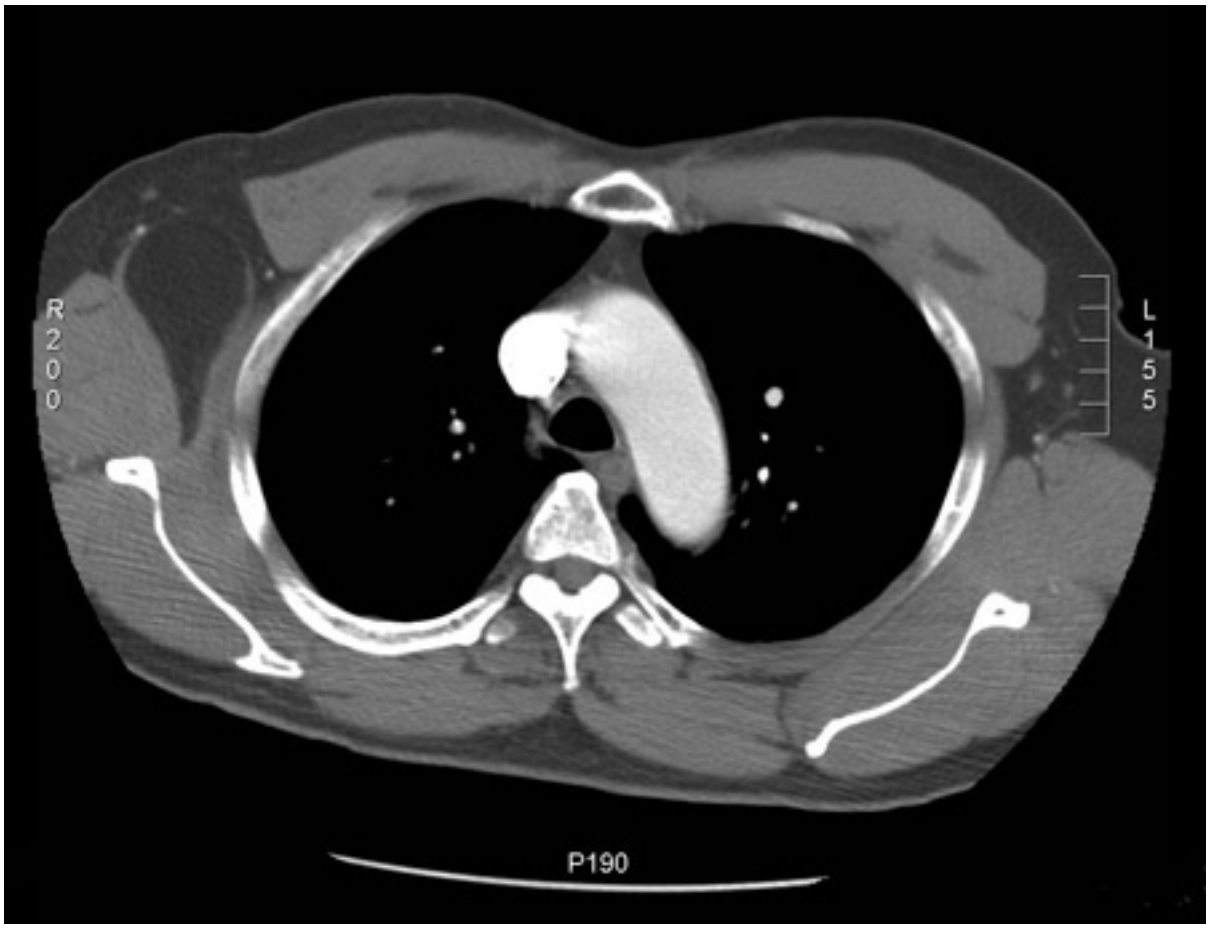
Intramuscular lipoma, right thigh. MRI, coronal, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

MRI is requested if the initial ultrasound is non-diagnostic.[31] Lesions that demonstrate septations or solid components, and are positioned deep to the superficial fascia or are infiltrating muscle, are likely to represent liposarcomas. In liposarcomas, septations or nodules generally demonstrate marked enhancement following administration of intravenous contrast (gadolinium).[20]

Conversely, lesions that appear homogeneous, with internal contents that are identical to subcutaneous fat on all MRI sequences, and that are located superficially, are likely to represent lipomas. Lipomas are typically non-enhancing or show only faint enhancement following administration of intravenous gadolinium.[20] However, lipomas may also contain muscle fibres, blood vessels, fibrous septa, and areas of necrosis or inflammation, which can make differentiation from well-differentiated liposarcomas difficult.[37]

If a lesion is on the trunk, particularly if it seems deep to the superficial fascia, computed tomography (CT) imaging is often preferred to MRI. CT with intravenous contrast may be ordered to evaluate deep tissue masses that are not amenable to ultrasound or radiographic evaluation.[31]



Intramuscular lipoma of subscapularis muscle, CT scan. Right axillary soft-tissue fatty mass with well-circumscribed margins

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

In patients with large gastrointestinal (GI) lipomas, a CT scan will demonstrate Hounsfield units identical to fat.[29] If a CT scan does not provide adequate information, an upper GI contrast study may provide additional functional information.[7] [38]

Biopsy

Excisional biopsy is recommended for cutaneous or subcutaneous tumours smaller than 3 cm that are growing, are symptomatic (e.g., causing pain or pressure effects), or seem to have a solid component more firm than subcutaneous fat.[16]

In an adult, a soft-tissue mass should be considered for biopsy after imaging studies are completed if it shows any of the following characteristics, regardless of whether the lesion is on an extremity or the trunk:

- Symptomatic
- Enlarging
- Larger than 3 cm in diameter
- Recent onset and persisting beyond 4 weeks.

A core needle biopsy is the preferred biopsy method, and for superficial extremity or truncal lesions this can usually be performed under local anaesthetic, guided by direct palpation. Core needle biopsy can provide accurate diagnosis, and assessment of malignant potential and grade if examined by an experienced pathologist.[39] Should the tissue obtained by core biopsy be inadequate, a repeat core needle biopsy can be planned. If this is also non-diagnostic, an open, linearly placed incisional biopsy along the longitudinal axis of the limb and wide excision of the mass can be performed. A longitudinal incision is used so that the entire biopsy tract can be excised and the wound closed primarily should the lesion prove to be a liposarcoma. Fine needle aspiration is not helpful for the primary diagnosis of a mass as it provides only cells and does not provide information about overall tissue architecture.

Gastrointestinal lipomas that are encountered during upper endoscopy may be biopsied. Biopsy may not be required if the lipoma has a typical yellowish appearance on white light endoscopy and demonstrates the 'pillow sign' (the lipoma is easily deformed when pressed with closed biopsy forceps).[29]

History and exam

Key diagnostic factors

presence of risk factors (common)

- Key risk factors include a genetic predisposition due to familial multiple lipomatosis, Gardner's syndrome, or Bannayan-Riley-Ruvalcaba's syndrome.

cutaneous mass <5 cm diameter (common)

- Most extremity or truncal lipomas are <5 cm in diameter. The majority of liposarcomas present at a size >5 cm. Studies suggest that a size of 10 cm or larger is a strong discriminating feature for liposarcoma.[20] Definitive diagnosis is dependent on histological confirmation.[16]

soft cutaneous mass (common)

- Lipomas tend to be soft and doughy in texture, similar to the consistency of subcutaneous fat. A firm texture may indicate liposarcoma. A smooth but tense superficial lesion may represent an epidermoid cyst.

mobile cutaneous mass (common)

- Most cutaneous lipomas are mobile. If a lesion appears fixed or tethered to the underlying fascia, a liposarcoma should be ruled out using imaging and biopsy.

superficial cutaneous mass (common)

- Most cutaneous lipomas are superficial. If a lesion seems deep to the superficial fascia, imaging should be considered to rule out liposarcoma.[16]

Other diagnostic factors

painless cutaneous mass (uncommon)

- Most lipomas are painless but can cause some discomfort if they undergo abrasion from clothing. Angiolipomas, which tend to be multiple and occur in young adults, can sometimes be painful to touch. Chronic pain is present in Dercum's disease but not in lipomatosis.

gastrointestinal obstruction (uncommon)

- Lipomas occur as submucosal lesions in the gastrointestinal (GI) tract, most commonly in the stomach, small intestine, and colon. Rarely these may present with intestinal obstruction.[7] [29] [38]

gastrointestinal bleeding (uncommon)

- Lipomas occur as submucosal lesions in the GI tract most commonly in the stomach, small intestine, and colon. Rarely these may present with GI bleeding.[7] [29] [38]

Risk factors

Strong

genetic predisposition

- The hereditary condition of familial multiple lipomatosis is characterised by multiple lipoma development.[9][10] Patients with this autosomal condition tend to be male and have widespread symmetric lipomas of the extremities and trunk.[11] Lipomatosis may also be associated with Madelung's disease, Dercum's disease, and Gardner's syndrome.[21] Studies have shown a correlation between HMG 1-C gene mutation and lipoma development.[22]

Weak

trauma

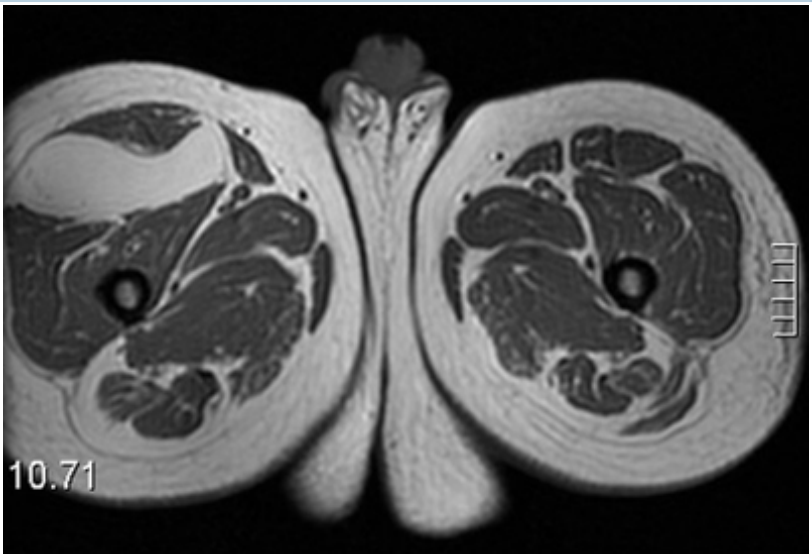
- Although trauma is implicated as a potential inciting agent, it is unclear whether it is a true causal factor.[27][28]

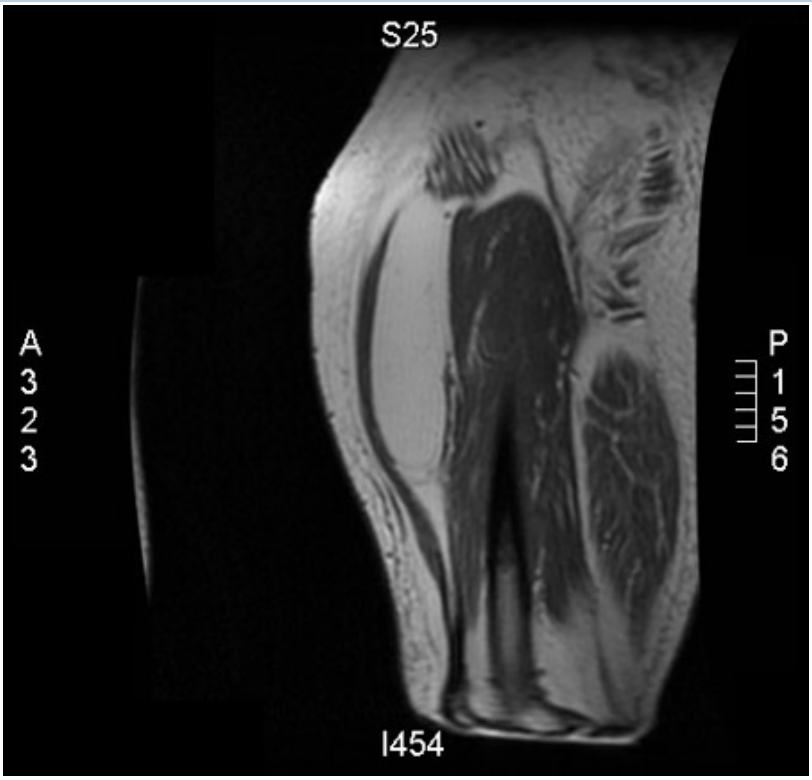
heavy alcohol consumption

- Madelung's disease, also known as multiple symmetric lipomatosis, features benign symmetric lipomatosis of the head, neck, shoulders, and proximal upper extremities. It is more common in men and is associated with chronic alcohol consumption in genetically predisposed individuals.[13]

Investigations

Other tests to consider

Test	Result
ultrasound • Initial imaging of superficial lesions, e.g., lesions on the extremities, head, or neck, is with ultrasound.[31] [32] Ultrasound has a sensitivity of 87% and a specificity of 96% for diagnosis of lipoma.[33] Urgent investigation is recommended for an unexplained lump that is increasing in size, to evaluate for soft tissue sarcoma.[34]	**typically discrete, encapsulated, homogeneous mass**
MRI • MRI is requested if the initial ultrasound is non-diagnostic.[31] MRI can attenuate bone artifact and discern the relationship of the mass to fascial planes, vessels, bones, and nerves.[35][36]  *Intramuscular lipoma, right thigh. MRI, axial, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh* *From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission*	**typically discrete, encapsulated, homogeneous mass, with few or no thin, discrete septa and minimal or no areas of enhancement or high T2 signal**

Test	Result
 *Intramuscular lipoma, right thigh. MRI, coronal, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh* *From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission*	
CT scan • If a lesion is on the trunk, particularly if it seems deep to the superficial fascia, CT imaging is often preferred to MRI. CT with intravenous contrast may be ordered to evaluate deep tissue masses that are not amenable to ultrasound or radiographic evaluation.[31] In patients with large gastrointestinal lipomas, a CT scan will demonstrate Hounsfield units identical to fat.[29]	**typically discrete, encapsulated, homogeneous mass, with few or no thin, discrete septa; density similar to normal fat**
core needle biopsy • In an adult, any extremity or truncal soft-tissue mass that is symptomatic or enlarging, larger than 3 cm, or new and persisting beyond 4 weeks should be biopsied by core needle biopsy. • This provides accurate information for diagnosis and assessment of possible malignant potential and grade when read by an experienced pathologist.[39] • Should tissue be inadequate, a repeat core needle biopsy can be planned. If this is also non-diagnostic, an open linearly placed incisional biopsy along the longitudinal axis of the limb and wide excision of the mass can be performed.	**histological appearance consistent with lipoma: subcutaneous lipomas are well-circumscribed, lobulated, mesenchymal tumours composed of adipocytes and demarcated from surrounding fat by a thin, fibrous capsule; angiolipomas are composed of adipocytes with interspersed clusters of capillaries containing fibrin thrombi; spindle cell lipomas are**

Test	Result
	composed of collagen-forming spindle cells that have replaced mature fat; intramuscular lipomas are usually poorly circumscribed and infiltrative and hibernomas resemble the glandular brown fat found in hibernating animals
incisional biopsy • If repeat core needle biopsy is inconclusive, an incisional biopsy is indicated. Lesions on the limbs are best sampled through a longitudinal incision centred over the mass in its most superficial location. Wide excision of the mass is performed. A longitudinal incision is used so that the entire biopsy tract can be excised at the time of definitive resection and closed primarily.[16]	**histological appearance consistent with lipoma: subcutaneous lipomas are well-circumscribed, lobulated, mesenchymal tumours composed of adipocytes and demarcated from surrounding fat by a thin, fibrous capsule; angiolipomas are composed of adipocytes with interspersed clusters of capillaries containing fibrin thrombi; spindle cell lipomas are composed of collagen-forming spindle cells that have replaced mature fat; intramuscular lipomas are usually poorly circumscribed and infiltrative and hibernomas resemble the glandular brown fat found in hibernating animals**
excisional biopsy • Excisional biopsy is recommended for cutaneous or subcutaneous tumours more than 3 cm in size.[16]	**histological appearance consistent with lipoma: subcutaneous lipomas are well-circumscribed, lobulated, mesenchymal tumours composed of adipocytes and demarcated from surrounding fat by a thin, fibrous capsule; angiolipomas are composed of adipocytes with interspersed clusters of capillaries containing fibrin thrombi; spindle cell lipomas are composed of collagen-forming spindle cells that have replaced**

Test	Result
	mature fat; intramuscular lipomas are usually poorly circumscribed and infiltrative and hibernomas resemble the glandular brown fat found in hibernating animals
upper gastrointestinal contrast study • If a CT scan does not provide adequate information, an upper gastrointestinal contrast study may provide additional functional information.[7] [38]	**submucosal mass with no invasion of surrounding muscle layers or with evidence of mucosal involvement**
gastrointestinal endoscopy • Gastrointestinal lipomas that are encountered during upper endoscopy may be biopsied. Biopsy may not be required if the lipoma has typical clinical features.[29]	**lipomas have a typical yellowish appearance on white light endoscopy and demonstrate the 'pillow sign' (the lipoma is easily deformed when pressed with closed biopsy forceps)**

Differentials

Condition	Differentiating signs / symptoms	Differentiating tests
Liposarcoma	• The majority of liposarcomas present at a size >5 cm, while most lipomas are <5 cm in size. Studies suggest that a size of 10 cm or larger is a strong discriminating feature for liposarcoma.[20] • Often feel firmer to palpation than the soft, doughy feel of a lipoma. • Liposarcomas can gain a very large size, either growing slowly over many years or rapidly over a short period of time. Lipomas are generally <5cm in size and grow slowly or remain static in size. • Retroperitoneal position is suggestive of a liposarcoma because lipomas in this position are exceedingly rare.	• Imaging with MRI or CT may provide evidence that a lesion is a liposarcoma. • In liposarcomas, septations or nodules generally demonstrate marked enhancement following administration of intravenous gadolinium (whilst lipomas are typically non-enhancing or show only faint enhancement).[20] • Histological examination of biopsy sample: adipocytes with nuclear atypia to include hyperchromasia, size variation, and nuclear membrane irregularities. Lipoblasts (atypical adipocytes with cytoplasmic vacuoles which indent the nucleus), when present in the appropriate histologic background, are strongly indicative of liposarcoma. • Liposarcomas are histologically subclassified into well-differentiated, dedifferentiated, myxoid, pleomorphic and mixed types, each with a unique morphologic pattern. • Atypical lipomatous tumour or well-differentiated liposarcoma can be confirmed by testing the excised specimen for MDM2 or CPM genes.[30]
Epidermoid cyst	• Subcutaneous epidermoid cysts are usually rounded and firm, whereas lipomas have a characteristic soft, doughy texture. • Central punctum often visible, through which a white exudate can be expressed.	• Definitive diagnosis is made upon excision and histological examination. • Histologic examination: benign simple cysts lined by stratified squamous epithelium with an intact granular cell layer. Within the cyst lumen, there is characteristic laminated keratin debris. In cysts that have previously ruptured,

Condition	Differentiating signs / symptoms	Differentiating tests
		a foreign-body giant cell reaction is often present.
Abscess	• Surrounded by erythema; may develop rapidly over a few days; usually warm and tender to touch. • Patient may be pyrexial.	• Aspiration usually yields pus.

Approach

Lipomas can occur in a wide variety of sites. The position, size, likely differential and other characteristics of a lesion determine what treatments are feasible and appropriate. Since lipomas do not have malignant potential they do not necessarily have to be removed, but this course of action depends on a number of factors, the most notable being the likelihood that the lesion could be a liposarcoma.

Superficial cutaneous lipomas on trunk or extremity

Lipomas of this type are often removed for a number of reasons:[5][16]

- For cosmetic appearance
- If they are painful or bothersome
- If they increase in size
- If there is concern regarding a potential liposarcoma.

The traditional treatment of small, superficial lipomas has been surgical excision under local anaesthesia. If multiple lipomas require removal or if the lesion is large, then general anaesthesia may be more appropriate. The surgical site is prepped and draped sterilely to prevent infection.[40] The incision line is marked over the lipoma in a position that minimises scarring and optimises exposure. For lesions on the trunk, the incision line should follow Langer lines. For lesions on the extremities, the incision should follow Langer lines or the long axis of the extremity, depending on the precise location of the lesion.

Local anaesthetic is infiltrated into the skin and subcutaneous tissue around the lesion and along the line of incision.

Once the skin is fully anaesthetised, the skin is incised through to the subcutaneous fat layer using a scalpel. Skin flaps are then raised to the borders of the lesion using electrocautery, taking care to avoid any nearby nerves or blood vessels. When the capsule of the lipoma is encountered, sharp or blunt dissection can be used to enucleate the lesion. Clamps can be attached to the tumour to provide traction for removal of the mass. Once it is freed from its surrounding tissue, the lipoma is delivered as a whole. The resultant cavity is palpated to ensure complete removal of the tumour. If margins are not fully removed or are 'positive', then the lipoma may recur.

Following removal of the tumour, haemostasis is achieved using electrocautery or suture ligation. The wound is then gently irrigated with normal saline. If the tumour and resultant cavity is large (e.g., a mass >5 cm), closed suction drains may have to be used. The skin is closed using buried, interrupted 2.0 or 3.0 vicryl sutures in the dermal layer. The skin is then approximated using 3.0 or 4.0 nylon vertical mattress suture vicryl sutures or monocryl as a running subcuticular suture. A pressure dressing is used to reduce the likelihood of haematoma formation. The patient is given routine wound care instructions, and the wound is checked in 5 to 10 days. Sutures are removed after 5 to 14 days, depending on the location of the tumour. Specimens are submitted for histological analysis.

Liposuction is generally not recommended as a treatment option for lipomas. Although it may result in less scarring due to a smaller incision, it may fail to remove the entire mass, making recurrence more likely.[44] Moreover, it will not provide adequate histopathology for confirmatory diagnosis. The injection of corticosteroids or phosphatidylcholine to trigger lipolysis is also not generally recommended, as elimination of the tumour is not achieved, recurrence is almost certain, and unpredictable scarring and fibrosis can occur.[45]

For patients with Dercum's disease, treatment includes symptom management, including excision of the most painful lipomas. Referral to a multidisciplinary team with expertise in chronic pain management is recommended.[12]

Gastrointestinal tract lipomas

If gastrointestinal tract lipomas are sufficiently large to be causing obstructive symptoms or significant bleeding, then surgical excision is indicated.[46] This may be achieved by laparoscopic or open segmental resection, depending on the exact location and characteristics of the lipoma.

Lipomas in atypical sites

Treatment of lipomas that arise in unusual sites such as the adrenal glands, parotid glands, parapharyngeal space, breast, mediastinum, pleura, airways, heart, superior vena cava, brain, and intraspinal areas are considered on a case-by-case basis. The general principle of treatment of such cases is close observation. However, if there is a concern that the lesion could potentially be a liposarcoma, surgical excision is indicated.

Treatment algorithm overview

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer

Acute		(summary)
superficial cutaneous lipoma on trunk or extremity		
	1st	**observation**
	2nd	**surgical excision**
Dercum's disease		
	1st	**symptom management**
symptomatic gastrointestinal lipoma		
	1st	**open or laparoscopic excision**
lipoma in atypical site		
	1st	**observation or surgery**

Treatment algorithm

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer

Acute

superficial cutaneous lipoma on trunk or extremity

1st **observation**

» Lipomas can occur in a wide variety of sites. The position, size, likely differential, and other characteristics of a lesion determine which treatments are feasible and appropriate. Since lipomas do not have malignant potential they do not necessarily have to be removed, but this course of action depends on a number of factors, the most notable being the likelihood that the lesion could be a liposarcoma.

2nd **surgical excision**

» Lipomas are removed if they become painful or bothersome to the patient.[5] They are also often removed if they increase in size, if there is any concern that they may be a liposarcoma or for cosmetic reasons.[16] Approximately 1% to 2% of surgically resected lipomas recur.

» Excision is usually achieved under local anaesthesia, although general anaesthesia may be appropriate if multiple lesions need to be removed or lesions are large. Incisions should follow Langer lines or the long axis of the extremity, depending on the precise location of the lesion. Once the lipoma is removed, the skin is closed using buried, interrupted 2.0 or 3.0 vicryl sutures in the dermal layer.

» The skin is then approximated using 3.0 or 4.0 nylon vertical mattress suture vicryl sutures or monocryl as a running subcuticular suture. Sutures are removed after 5 to 14 days, depending on the location of the tumour. Specimens are submitted for histological analysis.

Dercum's disease

1st **symptom management**

» For patients with Dercum's disease, treatment includes symptom management, including excision of the most painful lipomas. Referral to a multidisciplinary team with expertise in chronic pain management is recommended.[12]

symptomatic gastrointestinal lipoma

Acute

	1st	**open or laparoscopic excision** » If gastrointestinal tract lipomas are sufficiently large to be causing obstructive symptoms or significant bleeding, then surgical excision is indicated.[46] This may be achieved by laparoscopic or open segmental resection depending on the exact location of the lipoma.
lipoma in atypical site		
	1st	**observation or surgery** » Treatment of lipomas that arise in unusual sites such as the parotid glands, parapharyngeal space, breast, mediastinum, pleura, airways, heart, superior vena cava, brain, and intraspinal areas are considered on a case-by-case basis. » The general principle of treatment of such cases is close observation. However, if there is a concern that the lesion could potentially be a liposarcoma, surgical excision is indicated.

Patient discussions

Patients should be reassured that lipomas are benign lesions with no malignant potential. Advise patients that if further lesions develop or if current lesions change in character, they should return for reassessment. If there is a recurrence that becomes bothersome to the patient, the patient may return to clinic for surgical removal.

FOLLOW UP

Monitoring

Monitoring

Since these are benign lesions, lipomas do not require long-term monitoring.

Complications

Complications	Timeframe	Likelihood
wound infection	**short term**	**low**
Usually occurs in association with poor wound healing, which may be due to poor wound closure or patient factors such as diabetes or corticosteroid use. Treatment includes oral or intravenous antibiotics, depending on the severity of the infection, and careful wound management.		
seroma	**short term**	**low**
Occurs if the potential space resulting from the removal of the lipoma is large and leads to serous fluid formation that exceeds the patient's capacity for resorption. Treatment includes aspiration and a compression dressing, or placement of a drain percutaneously.		
haematoma/ecchymosis	**short term**	**low**
This complication results from inadequate haemostasis. Usually, this occurs if there is physical straining postoperatively or if a patient is started prematurely on anticoagulation for other medical problems.		
nerve injury	**variable**	**low**
Good anatomical knowledge and meticulous dissection are required to avoid this potential complication, which can result in permanent paraesthesia/anaesthesia.		
vascular compromise	**variable**	**low**
Major vessels are usually not affected. Meticulous dissection can help reduce the risk of this complication. If vascular compromise of the overlying skin does occur, debridement with skin grafting may be required.		
keloid or hypertrophic scarring	**variable**	**low**
Black people are especially prone to keloid scarring, though all races can develop excessive scarring. Treatment may include corticosteroid injections.		

Prognosis

Superficial cutaneous lipomas

Untreated, cutaneous lipomas tend to slowly increase in size or remain static. If excised, the majority heal without incident. There is a 1% to 2% recurrence rate, and these may require re-excision if the lesion increases in size or is symptomatic.[16]

Gastrointestinal lipomas

Most patients do well following excision of a gastrointestinal lipoma. However, these patients are followed up to ensure satisfactory postoperative recovery and to monitor for potential complications, such as anastomotic leak, obstruction, ileus or delayed gastric emptying.

Lipomas in atypical sites

Since lipomas are benign, prognosis of a resected lipoma is good and is related to any postoperative complications.

Diagnostic guidelines

United Kingdom

Clinical guidance: lipoma (https://www.pcds.org.uk/clinical-a-z-list)

Published by: Primary Care Dermatology Society **Last published:** 2021

North America

Soft tissue masses (https://www.acr.org/Clinical-Resources/Clinical-Tools-and-Reference/Appropriateness-Criteria)

Published by: American College of Radiology **Last published:** 2022

Treatment guidelines

United Kingdom

Surgical site infections: prevention and treatment (https://www.nice.org.uk/guidance/NG125)

Published by: National Institute for Health and Care Excellence **Last published:** 2020

Clinical guidance: lipoma (https://www.pcds.org.uk/clinical-a-z-list)

Published by: Primary Care Dermatology Society **Last published:** 2021

Key articles

- Primary Care Dermatology Society. Lipoma. Nov 2021 [internet publication]. Full text (https://www.pcds.org.uk/clinical-guidance/lipoma)
- Noebauer-Huhmann IM, Weber MA, Lalam RK, et al. Soft tissue tumors in adults: ESSR-approved guidelines for diagnostic imaging. Semin Musculoskelet Radiol. 2015 Dec;19(5):475-82. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/26696086?tool=bestpractice.bmj.com)
- National Institute for Health and Care Excellence. Surgical site infections: prevention and treatment. Aug 2020 [internet publication]. Full text (https://www.nice.org.uk/guidance/NG125)

References

1. Bancroft LW, Kransdorf MJ, Peterson JJ, et al. Benign fatty tumors: classification, clinical course, imaging appearance, and treatment. Skeletal Radiol. 2006 Oct;35(10):719-33. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16927086?tool=bestpractice.bmj.com)
2. Austin RM, Mack GR, Townsend CM, et al. Infiltrating (intramuscular) lipomas and angiolipomas. A clinicopathologic study of six cases. Arch Surg. 1980 Mar;115(3):281-4. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/7356383?tool=bestpractice.bmj.com)
3. Mentzel T, Calonje E, Fletcher CD. Lipoblastoma and lipoblastomatosis: a clinicopathological study of 14 cases. Histopathology. 1993 Dec;23(6):527-33. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/8314236?tool=bestpractice.bmj.com)
4. Ahn C, Harvey JC. Mediastinal hibernoma, a rare tumor. Ann Thorac Surg. 1990 Nov;50(5):828-30. Full text (https://www.annalsthoracicsurgery.org/article/0003-4975(90)90701-7/pdf) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/2241353?tool=bestpractice.bmj.com)
5. Salam GA. Lipoma excision. Am Fam Physician. 2002 Mar 1;65(5):901-4. Full text (https://www.aafp.org/pubs/afp/issues/2002/0301/p901.html) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11898962?tool=bestpractice.bmj.com)
6. Lellouch-Tubiana A, Zerah M, Catala M, et al. Congenital intraspinal lipomas: histological analysis of 234 cases and review of the literature. Pediatr Dev Pathol. 1999 Jul-Aug;2(4):346-52. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/10347278?tool=bestpractice.bmj.com)
7. Taylor AJ, Stewart ET, Dodds WJ. Gastrointestinal lipomas: a radiologic and pathologic review. AJR Am J Roentgenol. 1990 Dec;155(6):1205-10. Full text (https://www.doi.org/10.2214/ajr.155.6.2122666) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/2122666?tool=bestpractice.bmj.com)
8. Shu S, Wang J, Zheng C. From pathogenesis to treatment, a systemic review of cardiac lipoma. J Cardiothorac Surg. 2021 Jan 6;16(1):1. Full text (https://www.doi.org/10.1186/s13019-020-01379-6) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/33407682?tool=bestpractice.bmj.com)

REFERENCES

9. Leffell DJ, Braverman IM. Familial multiple lipomatosis. Report of a case and a review of the literature. J Am Acad Dermatol. 1986 Aug;15(2 pt 1):275-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/3745530?tool=bestpractice.bmj.com)

10. Toy BR. Familial multiple lipomatosis. Dermatol Online J. 2003 Oct;9(4):9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/14594582?tool=bestpractice.bmj.com)

11. Enzi G. Multiple symmetric lipomatosis: an updated clinical report. Medicine (Baltimore). 1984 Jan;63(1):56-64. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/6318013?tool=bestpractice.bmj.com)

12. Hansson E, Svensson H, Brorson H. Review of Dercum's disease and proposal of diagnostic criteria, diagnostic methods, classification and management. Orphanet J Rare Dis. 2012 Apr 30;7:23. Full text (https://www.doi.org/10.1186/1750-1172-7-23) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/22546240?tool=bestpractice.bmj.com)

13. Maximiano LF, Gaspar MT, Nakahira ES. Madelung disease (multiple symmetric lipomatosis). Autops Case Rep. 2018 Jul-Sep;8(3):e2018030. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6066263) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/30101135?tool=bestpractice.bmj.com)

14. Wortham NC, Tomlinson IP. Dercum's disease. Skinmed. 2005 May-Jun;4(3):157-62; quiz 163-4. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15891252?tool=bestpractice.bmj.com)

15. Primary Care Dermatology Society. Lipoma. Nov 2021 [internet publication]. Full text (https://www.pcds.org.uk/clinical-guidance/lipoma)

16. Dalal KM, Antonescu CR, Singer S. Diagnosis and management of lipomatous tumors. J Surg Oncol. 2008 Mar 15;97(4):298-313. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18286473?tool=bestpractice.bmj.com)

17. Fanburg-Smith JC, Devaney KO, Miettinen M, et al. Multiple spindle cell lipomas: a report of 7 familial and 11 nonfamilial cases. Am J Surg Pathol. 1998 Jan;22(1):40-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/9422314?tool=bestpractice.bmj.com)

18. Brody HJ, Meltzer HD, Someren A. Spindle cell lipoma. An unusual dermatologic presentation. Arch Dermatol. 1978 Jul;114(7):1065-6. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/686729?tool=bestpractice.bmj.com)

19. Kooby DA, Antonescu CR, Brennan MF, et al. Atypical lipomatous tumor/well-differentiated liposarcoma of the extremity and trunk wall: importance of histological subtype with treatment recommendations. Ann Surg Oncol. 2004 Jan;11(1):78-84. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/14699038?tool=bestpractice.bmj.com)

20. Al-Ani Z, Fernando M, Wilkinson V, et al. The management of deep-seated, lowgrade lipomatous lesions. Br J Radiol. 2018 Jun;91(1086):20170725. Full text (https://www.birpublications.org/doi/10.1259/bjr.20170725) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/29303371?tool=bestpractice.bmj.com)

21. Zuber TJ. Skin biopsy, excision, and repair techniques. In: Soft tissue surgery for the family physician. Kansas City, MO: American Academy of Family Physicians; 1998:100-6.

22. Arlotta P, Tai AK, Manfioletti G, et al. Transgenic mice expressing a truncated form of the high mobility group I-C protein develop adiposity and an abnormally high prevalence of lipomas. J Biol Chem. 2000 May 12;275(19):14394-400. Full text (https://www.doi.org/10.1074/jbc.m000564200) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/10747931?tool=bestpractice.bmj.com)

23. Uhlin SR. Benign symmetric lipomatosis. Arch Dermatol. 1979 Jan;115(1):94-5. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/760666?tool=bestpractice.bmj.com)

24. Erkek E, Hizel S, Sanlý C, et al. Clinical and histopathological findings in Bannayan-Riley-Ruvalcaba syndrome. J Am Acad Dermatol. 2005 Oct;53(4):639-43. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16198785?tool=bestpractice.bmj.com)

25. Costa T, Fitch N, Azouz EM. Proteus syndrome: report of two cases with pelvic lipomatosis. Pediatrics. 1985 Dec;76(6):984-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/4069870?tool=bestpractice.bmj.com)

26. Vidal A, Iglesias MJ, Fernández B, et al. Cutaneous lesions associated to multiple endocrine neoplasia syndrome type 1. J Eur Acad Dermatol Venereol. 2008 Jul;22(7):835-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18435740?tool=bestpractice.bmj.com)

27. Signorini M, Campiglio GL. Posttraumatic lipomas: where do they really come from? Plast Reconstr Surg. 1998 Mar;101(3):699-705. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/9500386?tool=bestpractice.bmj.com)

28. Aust MC, Spies M, Kall S, et al. Posttraumatic lipoma: fact or fiction? Skinmed. 2007 Nov-Dec;6(6):266-70. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17975353?tool=bestpractice.bmj.com)

29. Jacobson BC, Bhatt A, Greer KB, et al. ACG clinical guideline: diagnosis and management of gastrointestinal subepithelial lesions. Am J Gastroenterol. 2023 Jan 1;118(1):46-58. Full text (https://www.doi.org/10.14309/ajg.0000000000002100) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/36602835?tool=bestpractice.bmj.com)

30. Zhang H, Erickson-Johnson M, Wang X, et al. Molecular testing for lipomatous tumors: critical analysis and test recommendations based on the analysis of 405 extremity-based tumors. Am J Surg Pathol. 2010 Sep;34(9):1304-11. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/20679883?tool=bestpractice.bmj.com)

31. American College of Radiology. ACR appropriateness criteria: soft-tissue masses. 2022 [internet publication]. Full text (https://acsearch.acr.org/docs/69434/Narrative)

32. Noebauer-Huhmann IM, Weber MA, Lalam RK, et al. Soft tissue tumors in adults: ESSR-approved guidelines for diagnostic imaging. Semin Musculoskelet Radiol. 2015 Dec;19(5):475-82. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/26696086?tool=bestpractice.bmj.com)

33. Rahmani G, McCarthy P, Bergin D. The diagnostic accuracy of ultrasonography for soft tissue lipomas: a systematic review. Acta Radiol Open. 2017 Jun 30;6(6):2058460117716704. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/28717519?tool=bestpractice.bmj.com)

REFERENCES

34. National Institute for Health and Care Excellence. Suspected cancer: recognition and referral. Oct 2023 [internet publication]. Full text (https://www.nice.org.uk/guidance/ng12)

35. Varma DG. Optimal radiologic imaging of soft tissue sarcomas. Semin Surg Oncol. 1999 Jul-Aug;17(1):2-10 Abstract (http://www.ncbi.nlm.nih.gov/pubmed/10402633?tool=bestpractice.bmj.com)

36. Demas BE, Heelan RT, Lane J, et al. Soft-tissue sarcomas of the extremities: comparison of MR and CT in determining the extent of disease. AJR Am J Roentgenol. 1988 Mar;150(3):615-20. Full text (https://www.doi.org/10.2214/ajr.150.3.615) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/3257620?tool=bestpractice.bmj.com)

37. Gaskin CM, Helms CA. Lipomas, lipoma variants, and well-differentiated liposarcomas (atypical lipomas): results of MRI evaluations of 126 consecutive fatty masses. AJR Am J Roentgenol. 2004 Mar;182(3):733-9. Full text (https://www.doi.org/10.2214/ajr.182.3.1820733) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/14975977?tool=bestpractice.bmj.com)

38. Thompson WM. Imaging and findings of lipomas of the gastrointestinal tract. AJR Am J Roentgenol. 2005 Apr;184(4):1163-71. Full text (http://www.ajronline.org/doi/full/10.2214/ajr.184.4.01841163) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15788588?tool=bestpractice.bmj.com)

39. Heslin MJ, Lewis JJ, Woodruff JM, et al. Core needle biopsy for diagnosis of extremity soft tissue sarcoma. Ann Surg Oncol. 1997 Jul-Aug;4(5):425-31. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/9259971?tool=bestpractice.bmj.com)

40. National Institute for Health and Care Excellence. Surgical site infections: prevention and treatment. Aug 2020 [internet publication]. Full text (https://www.nice.org.uk/guidance/NG125)

41. Ostendorf W. Preparation for safe medication administration. In: Perry AG, Potter PA, Elkin MK, eds. Nursing interventions & clinical skills. 7th ed. St Louis, MO: Mosby; 2020.

42. WHO Best Practices for Injections and Related Procedures Toolkit. Geneva: World Health Organization; 2010 Mar. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/23741781?tool=bestpractice.bmj.com)

43. Jin JF, Zhu LL, Chen M, et al. The optimal choice of medication administration route regarding intravenous, intramuscular, and subcutaneous injection. Patient Prefer Adherence. 2015;9:923-42. Full text (https://www.doi.org/10.2147/PPA.S87271) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/26170642?tool=bestpractice.bmj.com)

44. Al-basti HA, El-Khatib HA. The use of suction-assisted surgical extraction of moderate and large lipomas: long-term follow-up. Aesthetic Plast Surg. 2002 Mar-Apr;26(2):114-7. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12016495?tool=bestpractice.bmj.com)

45. Bechara FG, Sand M, Sand D, et al. Lipolysis of lipomas in patients with familial multiple lipomatosis: an ultrasonography-controlled trial. J Cutan Med Surg. 2006 Jul-Aug;10(4):155-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17234112?tool=bestpractice.bmj.com)

46. Sharzehi K, Sethi A, Savides T. AGA clinical practice update on management of subepithelial lesions encountered during routine endoscopy: expert review. Clin Gastroenterol Hepatol. 2022

Nov;20(11):2435-43.e4. Full text (https://www.doi.org/10.1016/j.cgh.2022.05.054) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/35842117?tool=bestpractice.bmj.com)

Images

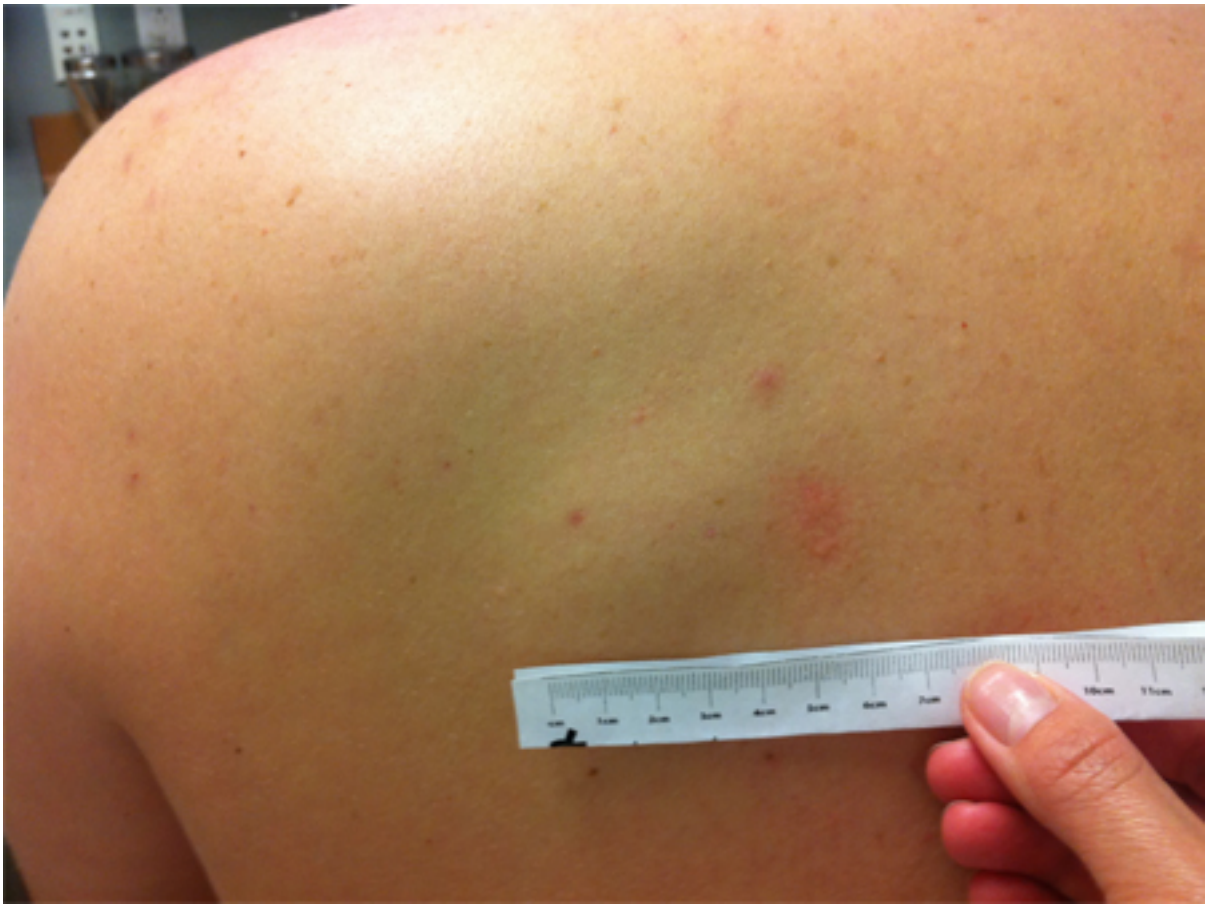


Figure 1: Subcutaneous lipoma on the trunk

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

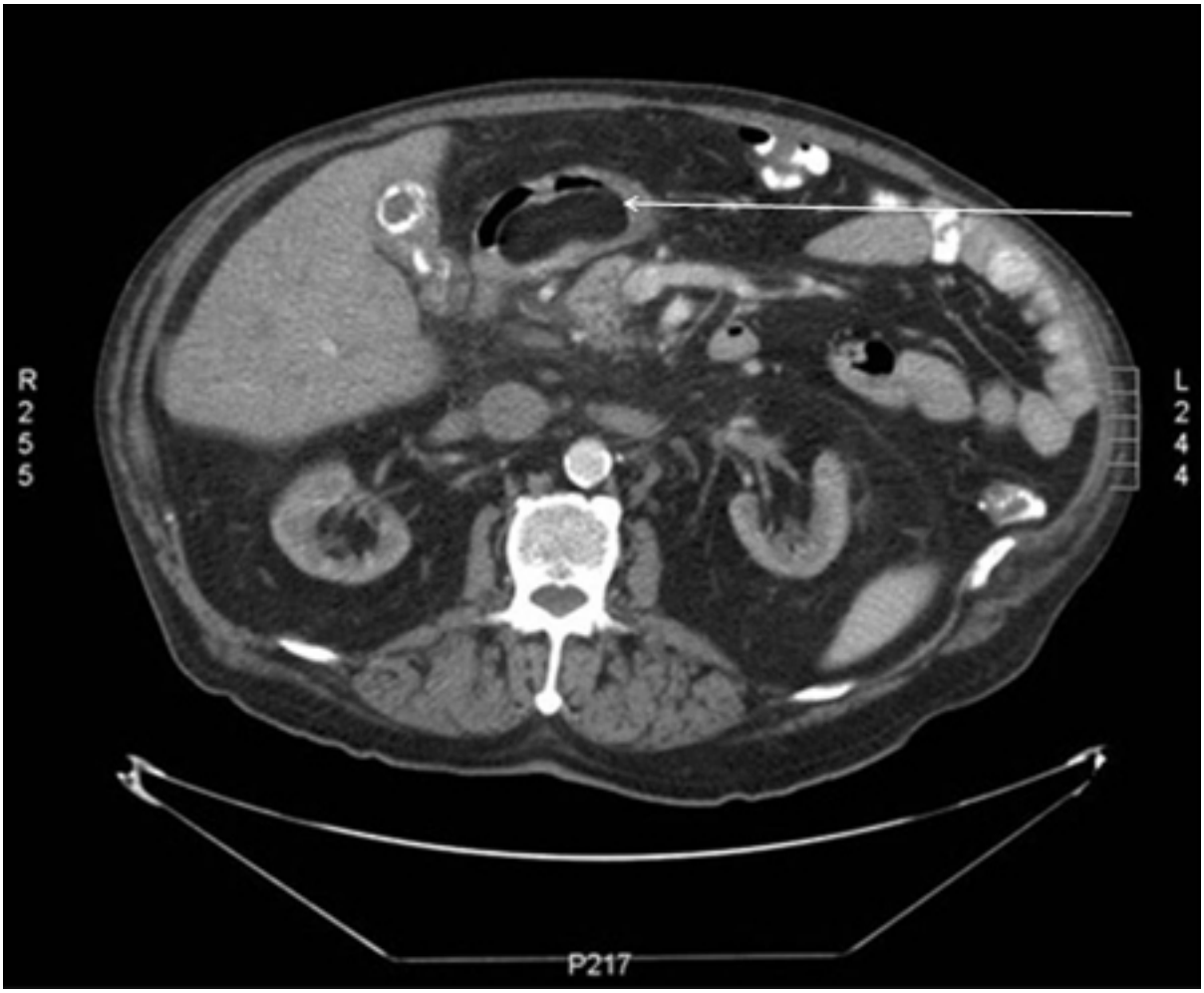


Figure 2: Gastric submucosal lipoma, CT scan. Submucosal antral mass with fatty density throughout.

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

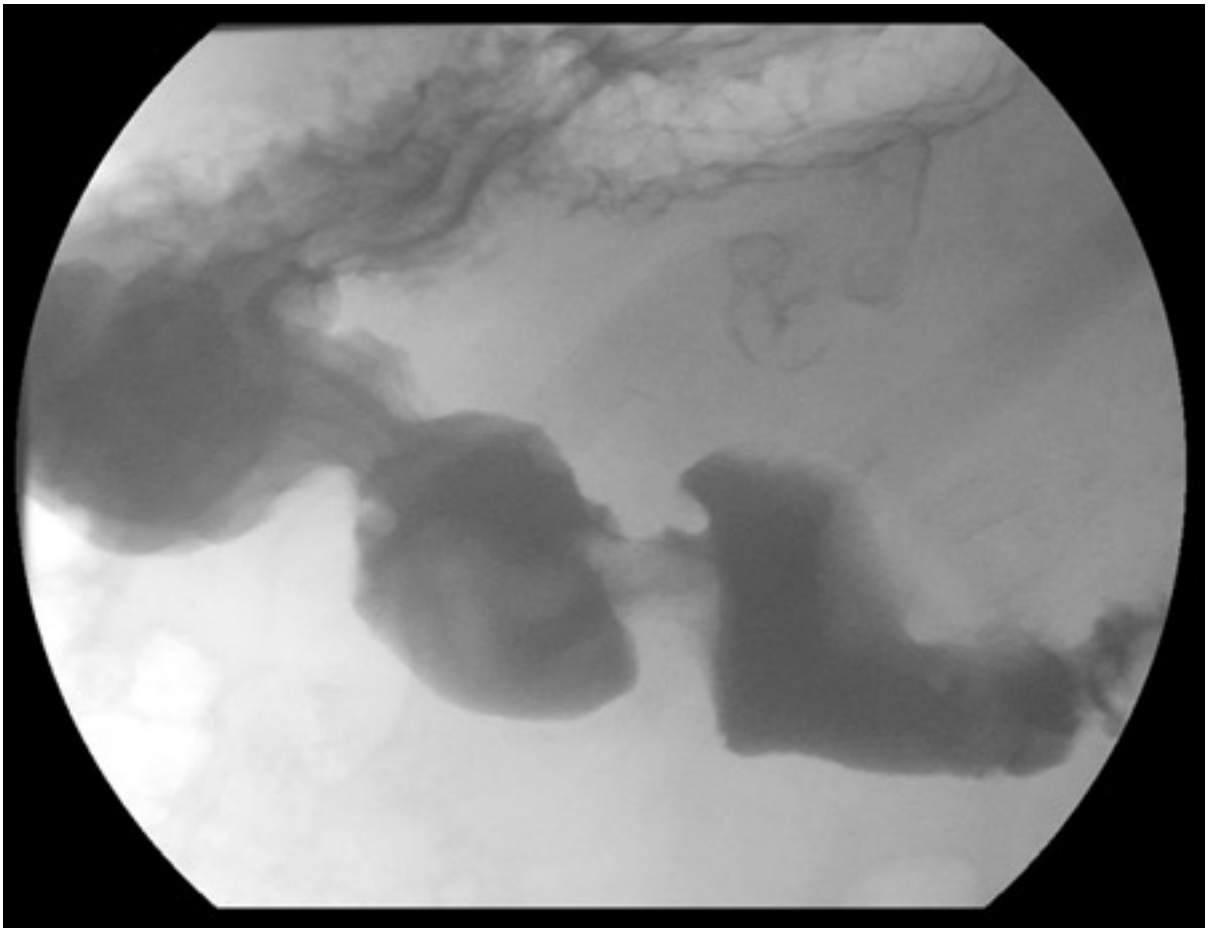


Figure 3: Gastric submucosal lipoma, upper GI contrast study. Filling defect in the distal antrum and pyloric channel suggesting antral mass prolapsing into pyloric channel

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

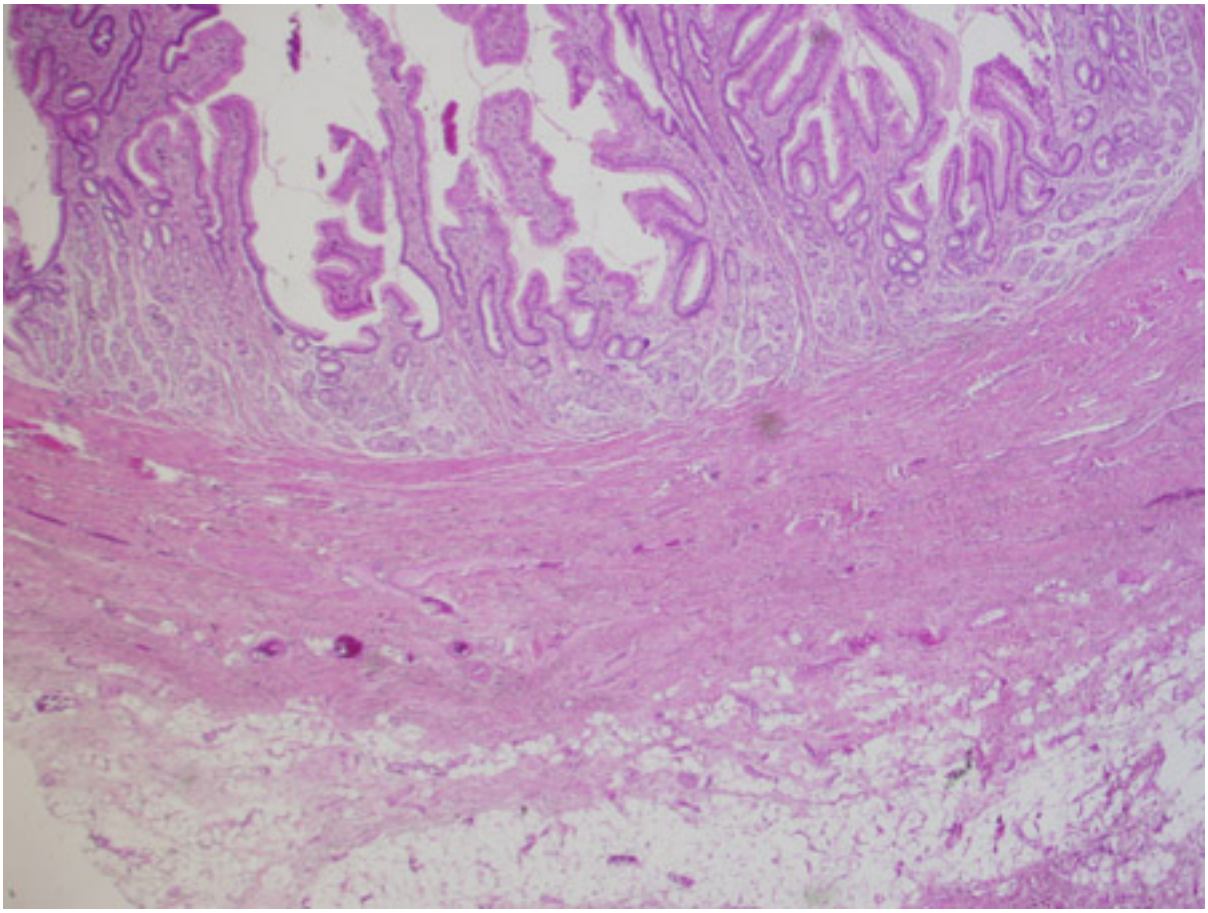


Figure 4: Gastric submucosal lipoma. A nodule of mature adipose tissue is present subjacent to gastric mucosa. Haematoxylin and eosin, 20x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

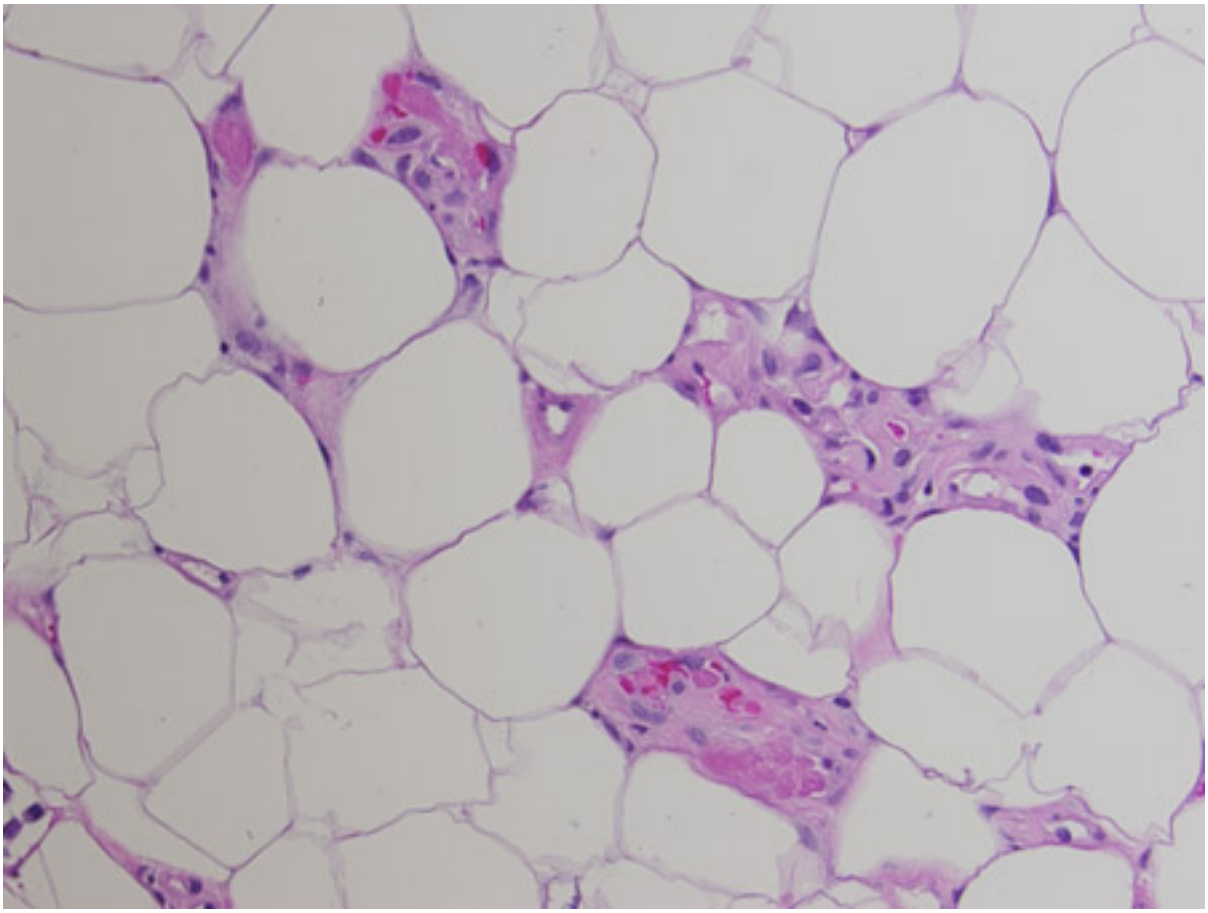


Figure 5: Angiolipoma. Mature adipose tissue with foci of endothelial proliferation containing micro-vascular thrombi. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

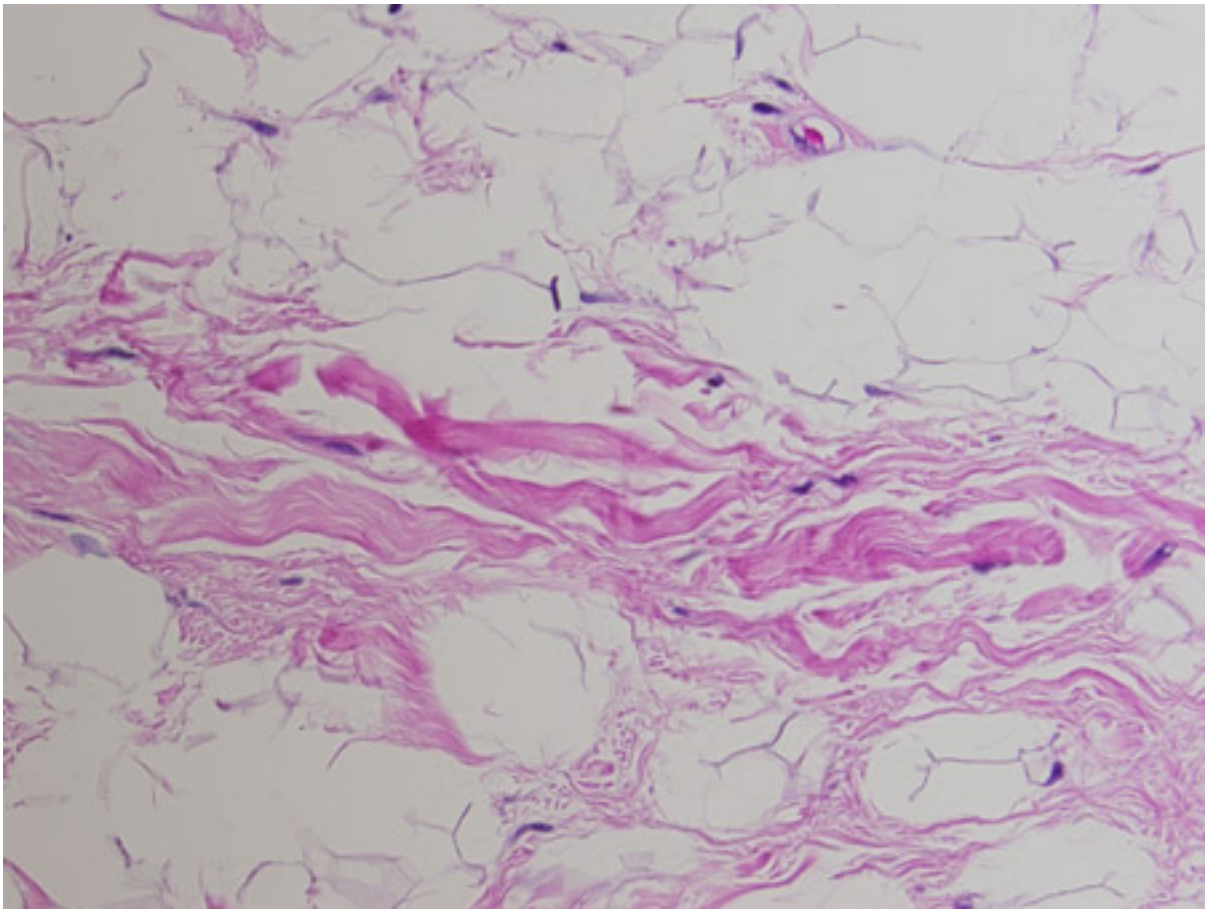


Figure 6: Spindle cell lipoma. Mature adipose tissue with intervening strands of dense fibrosis with spindle cell areas and characteristic ropey collagen bundles. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

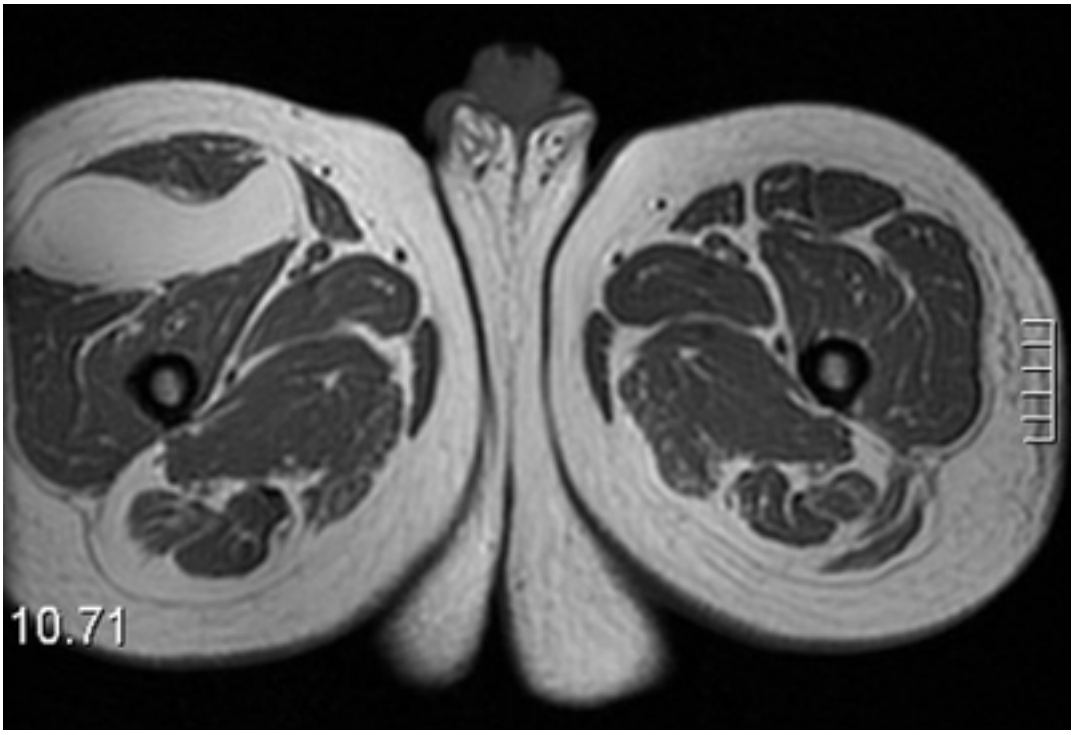


Figure 7: Intramuscular lipoma, right thigh. MRI, axial, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

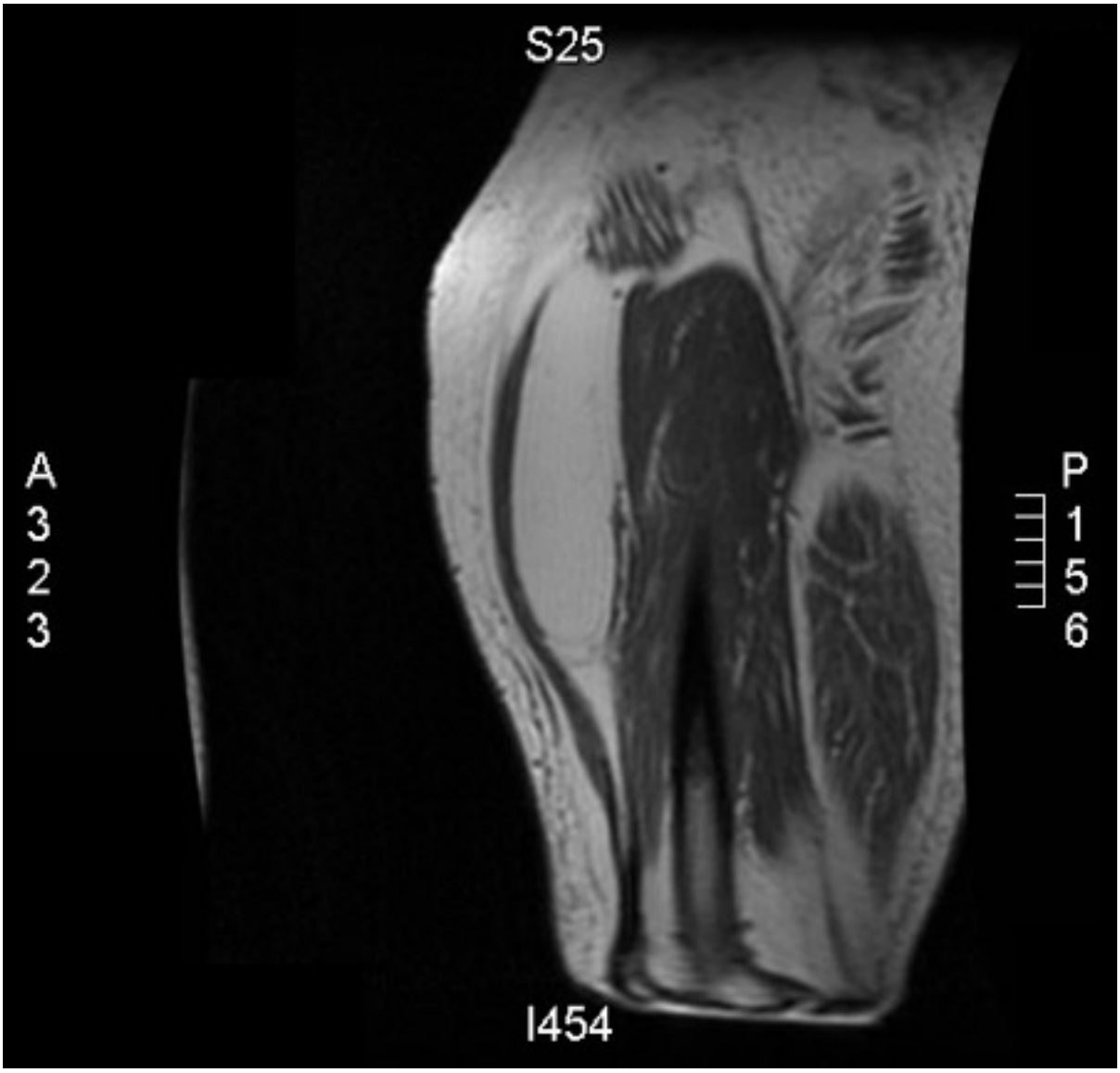


Figure 8: Intramuscular lipoma, right thigh. MRI, coronal, T1-weighted image. Lipomatous mass in the anterior aspect of the right thigh

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

IMAGES

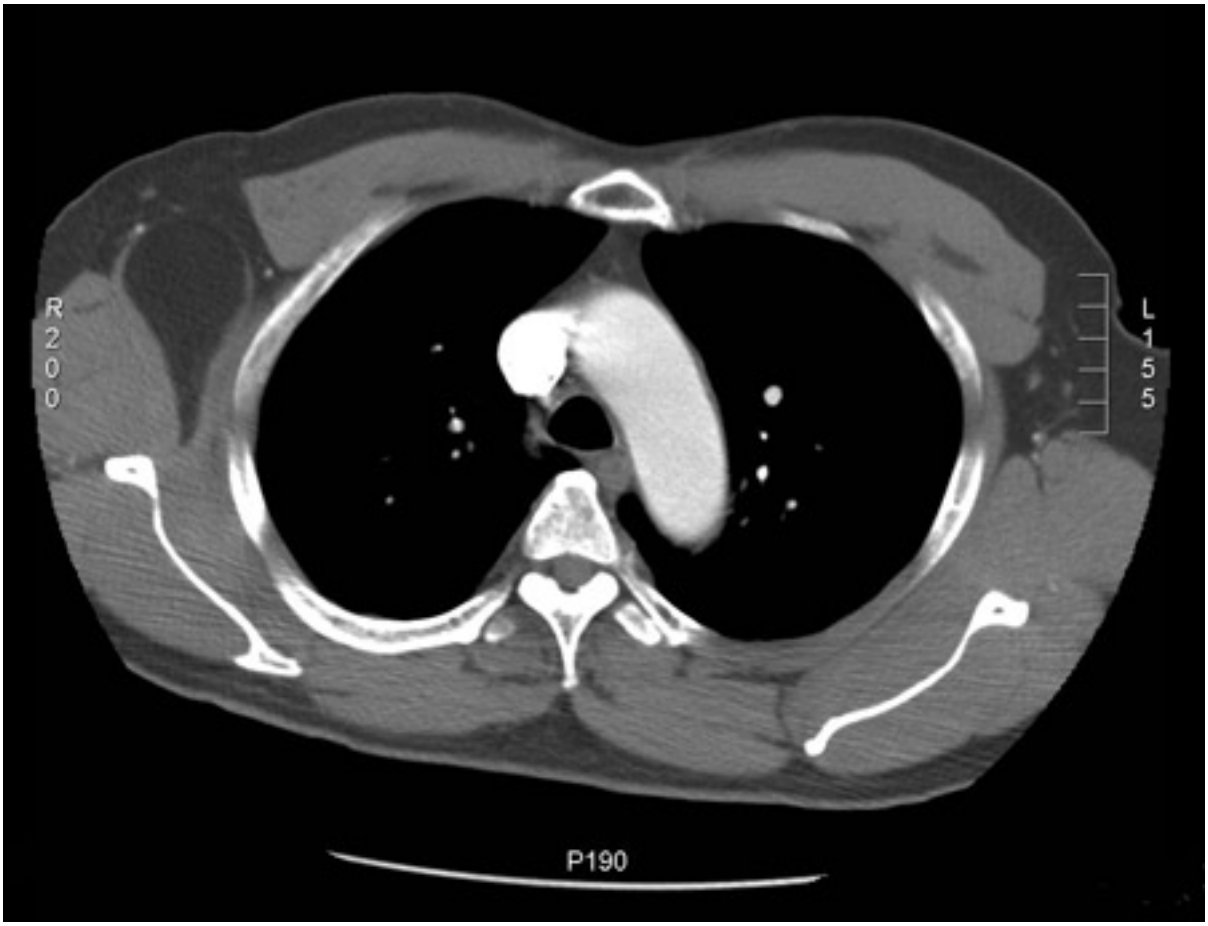


Figure 9: Intramuscular lipoma of subscapularis muscle, CT scan. Right axillary soft-tissue fatty mass with well-circumscribed margins

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

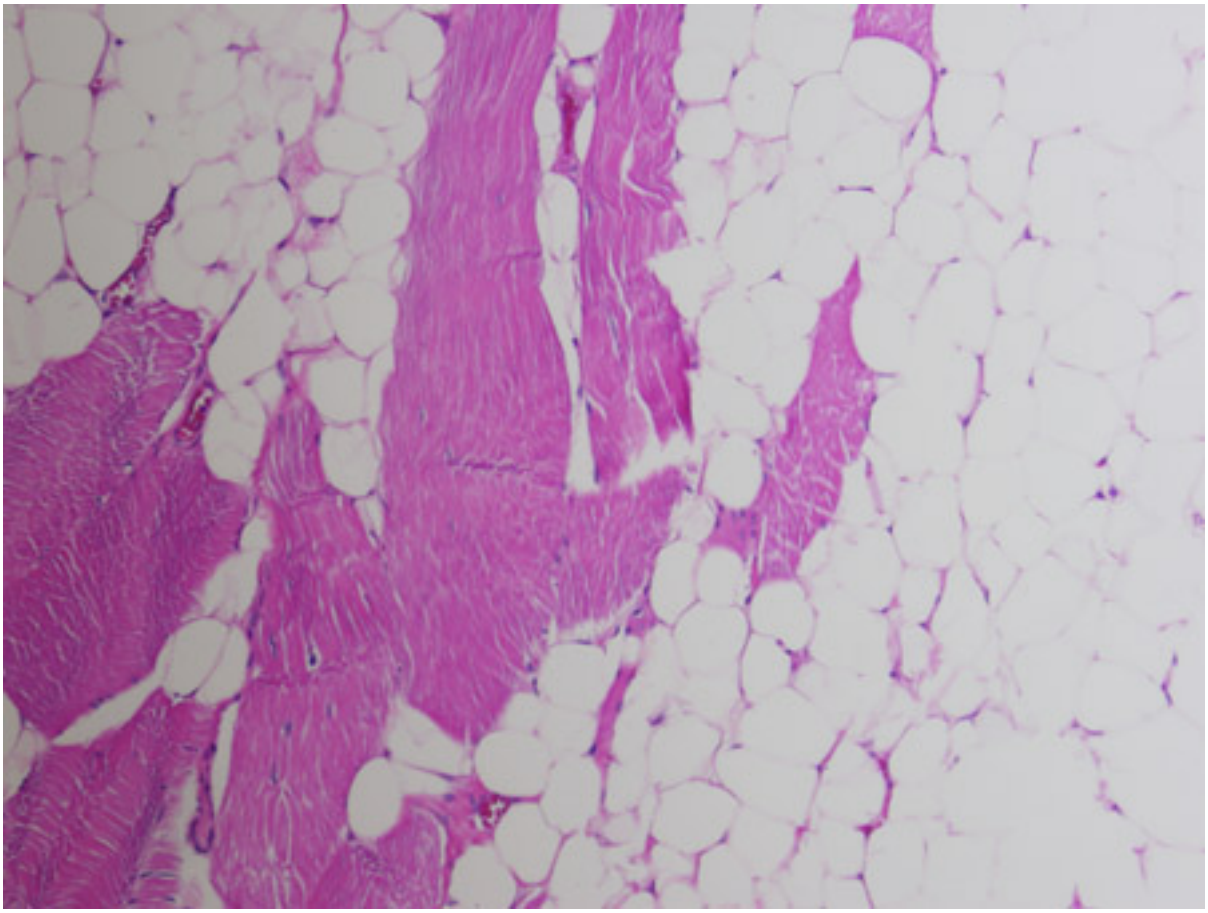


Figure 10: Intramuscular lipoma. Mature adipose tissue insinuating between skeletal muscle bundles. Haematoxylin and eosin, 200x magnification

From the collection of Dr Kimberly Moore Dalal and Dr Steven D. DeMartini; used with permission

Disclaimer

BMJ Best Practice is intended for licensed medical professionals. BMJ Publishing Group Ltd (BMJ) does not advocate or endorse the use of any drug or therapy contained within this publication nor does it diagnose patients. As a medical professional you retain full responsibility for the care and treatment of your patients and you should use your own clinical judgement and expertise when using this product.

This content is not intended to cover all possible diagnosis methods, treatments, follow up, drugs and any contraindications or side effects. In addition, since such standards and practices in medicine change as new data become available, you should consult a variety of sources. We strongly recommend that you independently verify specified diagnosis, treatments and follow-up and ensure it is appropriate for your patient within your region. In addition, with respect to prescription medication, you are advised to check the product information sheet accompanying each drug to verify conditions of use and identify any changes in dosage schedule or contraindications, particularly if the drug to be administered is new, infrequently used, or has a narrow therapeutic range. You must always check that drugs referenced are licensed for the specified use and at the specified doses in your region.

Information included in BMJ Best Practice is provided on an “as is” basis without any representations, conditions or warranties that it is accurate and up to date. BMJ and its licensors and licensees assume no responsibility for any aspect of treatment administered to any patients with the aid of this information. To the fullest extent permitted by law, BMJ and its licensors and licensees shall not incur any liability, including without limitation, liability for damages, arising from the content. All conditions, warranties and other terms which might otherwise be implied by the law including, without limitation, the warranties of satisfactory quality, fitness for a particular purpose, use of reasonable care and skill and non-infringement of proprietary rights are excluded.

Where BMJ Best Practice has been translated into a language other than English, BMJ does not warrant the accuracy and reliability of the translations or the content provided by third parties (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages). BMJ is not responsible for any errors and omissions arising from translation and adaptation or otherwise.Where BMJ Best Practice lists drug names, it does so by recommended International Nonproprietary Names (rINNs) only. It is possible that certain drug formularies might refer to the same drugs using different names.

Please note that recommended formulations and doses may differ between drug databases drug names and brands, drug formularies, or locations. A local drug formulary should always be consulted for full prescribing information.

Treatment recommendations in BMJ Best Practice are specific to patient groups. Care is advised when selecting the integrated drug formulary as some treatment recommendations are for adults only, and external links to a paediatric formulary do not necessarily advocate use in children (and vice-versa). Always check that you have selected the correct drug formulary for your patient.

Where your version of BMJ Best Practice does not integrate with a local drug formulary, you should consult a local pharmaceutical database for comprehensive drug information including contraindications, drug interactions, and alternative dosing before prescribing.

Interpretation of numbers

Regardless of the language in which the content is displayed, numerals are displayed according to the original English-language numerical separator standard. For example 4 digit numbers shall not include a comma nor a decimal point; numbers of 5 or more digits shall include commas; and numbers stated to be less than 1 shall be depicted using decimal points. See Figure 1 below for an explanatory table.

BMJ accepts no responsibility for misinterpretation of numbers which comply with this stated numerical separator standard.

This approach is in line with the guidance of the International Bureau of Weights and Measures Service.

Figure 1 – BMJ Best Practice Numeral Style

5-digit numerals: 10,000

4-digit numerals: 1000

numerals < 1: 0.25

Our full website and application terms and conditions can be found here: Website Terms and Conditions.

Contact us

+ 44 (0) 207 111 1105
support@bmj.com

BMJ
BMA House
Tavistock Square
London
WC1H 9JR
UK

Contributors:

// Authors:

Kimberly Moore Dalal, MD

Medical Director, Surgical Oncology
General Surgery, Mills-Peninsula Hospital, Palo Alto Medical Foundation, Burlingame, CA
DISCLOSURES: KMD is an author of a number of references cited in this topic.

Steven D. DeMartini, MD

Staff Pathologist
Oroville Hospital, Oroville, CA
DISCLOSURES: SDD declares that he has no competing interests.

// Peer Reviewers:

William Tseng , MD

Associate Professor of Surgery
City of Hope National Medical Center, Duarte, CA
DISCLOSURES: WT declares that he has no competing interests.