Introduction

Lipodystrophy is a condition in which there is little or no fat tissue in the body. If a person is born with the condition it’s known as congenital lipodystrophy. Acquired lipodystrophy refers to the condition when it’s not inherited. Acquired lipodystrophy can arise because of medications, problems with the immune system, or for an unknown reason. A lack of body fat results in low levels of the hormone leptin. Leptin controls specific process in the body, and not having enough of this hormone can lead to other health problems, like too much fat in the blood and high blood sugar. Myalept is a drug that can be used in some cases to treat low levels of leptin. This policy describes when this drug may be considered medically necessary.

Note: The Introduction section is for your general knowledge and is not to be taken as policy coverage criteria. The rest of the policy uses specific words and concepts familiar to medical professionals. It is intended for providers. A provider can be a person, such as a doctor, nurse, psychologist, or dentist. A provider also can be a place where medical care is given, like a hospital, clinic, or lab. This policy informs them about when a service may be covered.

Policy Coverage Criteria

<table>
<thead>
<tr>
<th>Drug</th>
<th>Medical Necessity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myalept™ (metreleptin)</td>
<td>Myalept™ (metreleptin) may be considered medically necessary for treatment of congenital or acquired lipodystrophy when BOTH of the following conditions have...</td>
</tr>
</tbody>
</table>
**Drug** | **Medical Necessity**
---|---

*been met:*
- Leptin deficiency documented by an endocrinologist
**AND**
- Congenital or acquired generalized lipodystrophy*
  - In addition, patient needs to have at least 1 metabolic abnormality (diabetes mellitus, fasting blood glucose > 200, or insulin resistance).

*Documentation of the diagnosis must be submitted with the request.

**All other uses of Myalept™ (metreleptin) are considered investigational.**

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**Coding**

N/A

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**Related Information**

**Benefit Application**

This is managed through the Pharmacy benefit.

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**Evidence Review**
Description

**Disease Characteristics & Pathophysiology**

Lipodystrophy is a group of clinically heterogeneous metabolic disorders that are either acquired or inherited and result in loss of adipose tissue. This leads to disruption of various metabolic pathways. The disease is classified primarily based on 2 factors: whether it is genetic or acquired and whether fat loss is generalized or partial. Therefore, there are 4 major classifications:

- Congenital generalized lipodystrophy (CGL), also known as Berardinelli–Seip syndrome
- Familial partial lipodystrophy (FPL)
- Acquired generalized lipodystrophy (AGL)
- Acquired partial lipodystrophy (APL), also known as Barraquer–Simons syndrome

This general classification scheme is not inclusive of all lipodystrophies because rare lipodystrophies, such as mandibuloacral dysplasia, neonatal progeria, and atypical progeria, may not fit exactly into one of the 4 main subgroups. Further, one patient may fall into more than 1 main subgroups.

Many genetic mutations have been identified in congenital and familial lipodystrophies, such as AGPAT2, seipin, LMNA, PPARγ, ZMPSTE24, and LMNB2. These mutations can follow autosomal recessive (AGPAT2, seipin) or autosomal dominant (LMNA) inheritance patterns. Acquired lipodystrophies can be autoimmune-associated. Patients with CGL, AGL, and APL often present with metabolic abnormalities during childhood or adolescence, whereas those with FPL tend to present later in adolescence and adulthood.

Adipose tissue is an endocrinologically active tissue as it secretes multiple hormones (leptin and adiponectin) and cytokines. Leptin is a key regulator in energy homeostasis as well as fat and glucose metabolism. The relative leptin deficiency that occurs as a result of loss of adipose tissue has been implicated as a key pathogenic mechanism underlying lipodystrophy. Lipodystrophy is associated with deposition of fat in ectopic locations (eg, liver and muscle) and metabolic abnormalities (eg, insulin resistance, hypertriglyceridemia, and diabetes).

Common clinical complications and manifestations of lipodystrophy include:

- Insulin-resistant diabetes mellitus and resulting complications
- Severe hypertriglyceridemia, which may lead to acute pancreatitis
• Hepatic steatosis or steatohepatitis which may progress to cirrhosis
• Proteinuric nephropathies, which may lead to renal failure
• Severe cardiovascular complications, such as premature atherosclerotic disease and hypertrophic cardiomyopathy
• Reproductive and hormonal abnormalities in women
• Increased appetite leading to hyperphagia

Epidemiology and Risk Factors

Lipodystrophy is a rare disease. According to a 2004 review, approximately 800 cases of lipodystrophy (CGL, FPL, AGL, and APL, excluding HIV-related lipodystrophy) have been reported in the literature. Because of the rarity of the condition, epidemiologic data for this disease are not available.

Clinical Presentation

The clinical presentation of lipodystrophy varies by type of lipodystrophy and from patient-to-patient. Extreme loss of subcutaneous fat is apparent from birth in CGL, while it becomes apparent at puberty in patients with FPL. In APL patients, there is loss of fat from the face, neck, arms, and trunk, but legs are spared. In AGL patients, there is generalized loss of fat associated with tender subcutaneous nodules along with autoimmune or other diseases. Affected patients are predisposed to insulin resistance and its attendant complications, such as diabetes mellitus, dyslipidemia, hepatic steatosis, and acanthosis nigricans. Features of polycystic ovary syndrome that include hirsutism, oligoamenorrhea, and polycystic ovaries may develop in affected women. The impact of the disease on physical appearance can cause severe psychological distress in many patients.

Diagnosis

Generalized lipodystrophies are easily detected clinically and are usually diagnosed by pediatricians because of the characteristic features from birth onwards. Partial lipodystrophies, on the other hand, are more difficult to recognize, only causing metabolic abnormalities later in
life. Because many metabolic features of partial lipodystrophy resemble those of metabolic syndrome and/or type 2 diabetes mellitus, patients with FPL are often misdiagnosed. The only clinical signs that are unique to such patients are lipoatrophy and the onset of severe metabolic abnormalities.

The American Association of Clinical Endocrinologist has recently published a consensus statement for diagnosis of lipodystrophy. This consensus statement describes the clinical approach for diagnosis of lipodystrophy. These statements only summarize certain clinical features that may arouse suspicion of lipodystrophy but are not definitive of a diagnosis.

**American Association of Clinical Endocrinologist Criteria That Raise Clinical Suspicion of Lipodystrophy**

Core clinical characteristic for lipodystrophy:
- Loss or absence of subcutaneous body fat in a partial or generalized fashion

Core clinical characteristic for Familial partial lipodystrophy:
- Loss of subcutaneous body fat, typically occurring around or shortly after puberty, occurring in the extremities and/or gluteal region with sparing of fat loss or accumulation of excess fat in the face and neck or intra-abdominal area

Supportive clinical characteristics for lipodystrophy:
- Presence of diabetes with evidence of severe insulin resistance
- Diabetes mellitus with requirement for high doses of insulin, eg, requiring ≥200 d, ≥2 U/kg/d, or currently taking U-500 insulin
- Ketosis-resistant diabetes
- Other evidence of severe insulin resistance
- Acanthosis nigricans
- PCOS or PCOS-like symptoms (hyperandrogenism, oligomenorrhea, and/or polycystic ovaries)
- Presence of hypertriglyceridemia
- Severe hypertriglyceridemia (≥500 mg/dL)
- Triglyceride levels that are nonresponsive to therapy and/or modifications to diet (≥250 mg/dL)
- History of pancreatitis associated with hypertriglyceridemia
- Evidence of hepatic steatosis or steatohepatitis
- Hepatomegaly and/or elevated transaminases in the absence of a known cause of liver disease (eg, viral hepatitis) may be consistent with nonalcoholic fatty liver disease
- Radiographic evidence of hepatic steatosis (eg, on ultrasound or computed tomography)
- Family history of similar physical appearance and/or history of fat loss
- Prominent muscularity and phlebomegaly (enlarged veins) in the extremities
- Disproportionate hyperphagia (cannot stop eating, waking up to eat, fighting for food)
- Secondary hypogonadism in a male or primary/secondary amenorrhea in a female patient

**Therapeutic Options**

The primary goal of treatment in patients with lipodystrophies is to prevent morbidity and mortality as a result of diabetes mellitus, recurrent episodes of acute pancreatitis and cirrhosis.

Current treatment options for lipodystrophies include antidiabetic and lipid-lowering medications. These treatment options may address the metabolic abnormalities associated with lipodystrophy, but not the underlying pathophysiologic abnormalities. Further, these treatments are often rendered marginally effective by the severity of the abnormalities observed in patients with lipodystrophy.

Hypertriglyceridemia and hyperglycemia should be managed by lifestyle change. Low fat diet, regular exercise, aggressive glycemic controls are recommended. If hypertriglyceridemia persists despite changes in diet, regular exercise, and maintenance of euglycemia, patients should be treated with fibrates and high doses of fish oils containing n-3 polyunsaturated fats. Aggressive glycemic control is pivotal for the prevention of the long-term complications of diabetes. Oral hypoglycemic drugs, particularly metformin, which may additionally reduce appetite, induce weight loss, and improve the polycystic ovary syndrome and hepatic steatosis, is a particularly attractive therapeutic choice. Insulin may also be used if hyperglycemia is not adequately controlled by oral hypoglycemia agents. Estrogens, whether taken for contraception, polycystic ovary syndrome, or postmenopausal symptoms, may exacerbate hypertriglyceridemia and
should be avoided. Patients with hypertriglyceridemia and hepatic steatosis should be advised to avoid drinking alcohol.

Rationale

Efficacy of metreleptin consists entirely of small observational studies. The largest was an NIDDK sponsored open-label single-arm study of patients with generalized lipodystrophy (non-HIV-related) and diabetes, insulin resistance, or hypertriglyceridemia. There is some question about the size of the study, since the original publication reported 55 subjects (Chan, 2011), but a more recent abstract lists 64 and the prescribing information says 48. It is not clear why some patients were excluded from the FDA-approved label.

Treatment with metreleptin reduced mean HbA1c from baseline at 4 months -1.2% (95% CI, -1.6 to -0.8) (n=40) and at 3 years -2.1% (95% CI, -3.2 to -1.1) (n=18). Among all patients, the change in triglycerides from baseline to 4 months was -44.4 mg/dL (95% CI, -58.8 to -29.9) (n=40) and at 3 years it was -35.4 mg/dL (95% CI, -64.1 to -6.7) (n=19). These subjects were a heterogeneous group with varying type and level of metabolic abnormalities at baseline. In subgroups of patients whose HbA1c and triglyceride levels were elevated at baseline, the HbA1c reduction at 4 months and 3 years were -1.4 (95% CI, -1.8 to -0.9) and -2.6 (95% CI, -3.8 to -1.3) (n=14). The mean reduction in triglycerides among patients with elevated levels at baseline at 4 months and 3 years were -44.4 mg/dL (95% CI, -58.8 to -29.9) (n=30) and -51.2 mg/dL (95% CI, -87.5 to -14.8) (n=13), respectively. There was greater response in patients with elevated HbA1c and triglycerides at baseline. These results were consistent with those from smaller studies.

Due to the subjects’ heterogeneity and the absence of a control group, it is difficult to quantify the true treatment effect of metreleptin. Changes in concomitant medications, diet or exercise may have confounded the results. Eighty four percent of patients displayed immunogenicity and expressed anti-metreleptin antibodies. Anti-metreleptin antibodies with neutralizing activity are associated with loss of endogenous leptin activity as well as loss of metreleptin efficacy, as occurred in 6% of study patients.

Most common adverse reactions in clinical trials were headache (13%), hypoglycemia (13%), decreased weight (13%) and abdominal pain (10%). T-cell lymphoma has been reported in 2 patients (4%). Both patients had immunodeficiency and severely abnormal bone marrow biopsy specimens at baseline. However, there was one case of anaplastic large cell lymphoma in a patient receiving metreleptin who did not have hematological abnormalities before treatment. Eighty four percent of patients displayed immunogenicity and expressed anti-metreleptin antibodies. Anti-metreleptin antibodies with neutralizing activity associated with adverse events.
consistent with loss of endogenous leptin activity and/or loss of metreleptin efficacy. Severe infection and/or worsening metabolic control have been reported as a result of anti-metreleptin antibodies (increases in HbA1c and/or triglycerides) and observed in 6% of patients. For these two specific reasons metreleptin is only available through the MYALEPT REMS program. There were cases of acute pancreatitis in 5 patients (9%). All of these patients had a history of pancreatitis and severe hypertriglyceridemia. Chronic renal adverse events reported in 5 patients (9%), all of whom had a history of renal disease at baseline. Elevated LFT or events of liver disease are reported in 4 patients (7%). Given the small number of patient exposures, it is difficult to assess the probability of other less common but serious adverse events occurring.

2015 Update

A literature search from January 1, 2014, to June 28, 2015, was conducted. No new studies were found that would affect this policy.

2016 Update

A literature search from July 1, 2015, to December 6, 2016, was conducted. No new studies were found that would affect this policy. Additional reference included.

2017 Update

A literature search from July 1, 2016 to November 1, 2017 was conducted. No new studies were found that would affect this policy.

References


### History

<table>
<thead>
<tr>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/09/14</td>
<td>New policy, add to Prescription Drug section. Metreleptin (Myalept™) may be considered medically necessary for treatment of congenital or acquired lipodystrophy when all criteria are met; all other uses are considered investigational. Approved by P&amp;T Committee on May 22, 2014.</td>
</tr>
<tr>
<td>07/14/15</td>
<td>Annual Review. Policy updated with literature review. No change to policy statement.</td>
</tr>
<tr>
<td>01/01/17</td>
<td>Annual Review, approved December 13, 2016. Policy updated with literature review. No changes made to the policy statement. Additional reference included.</td>
</tr>
<tr>
<td>12/01/17</td>
<td>Annual Review, approved November 14, 2017. Updated Myalept™ criteria. One reference was added.</td>
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U.S. Department of Health and Human Services
200 Independence Avenue SW, Room S09F, HHH Building Washington, D.C. 20201, 1-800-368-1019, 800-537-7697 (TDD)
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Français (French):

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Deutsche (German):

Hmooj (Hmong):
Tsaab ntawv tshaj xo no muaj cov nthiab lus tseem ceeb. Tej zaum tsab ntawv tshaj xo no muaj cov nthiab lus tseem ceeb xog koi dain twaw thov kev pab los yoj kog qhov kev pab cuam los ntawn Premera Blue Cross. Tej zaum muaj cov hnuv tseem ceeb uas sau rau hauv dainm twaw no. Tej zaum koi juj yuav tau u ee yam uas peb kom koi uas tsib pib dhaus cov cajj nyog uas teev tsig rau hauv daim ntawv no mas koi juj yuav tau baais kev pab cuam kho moob los yoj kev pab pem tej niq kho moob ntawv. Koj muaj cai kom laww muab cov nthiab lus no uas tau muab sau u koj hom lus pub dawb rau koi. Hu rau 800-722-1471 (TTY: 800-842-5357).

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Daytoy a Pakdaar ket naglaon iti Napateg nga Impormasion. Daytoy a pakdaar mabalani nga adda ket naglaon iti napateg nga impormasion maipangeep iti aplikasyonno weny coverage babaen iti Premera Blue Cross. Daytoy ket mabalani dagiti importante a pelsa iti daytoy a pakdaar. Mabalani nga adda rumbeng nga aramidenyo nga addaung sakyab dagiti partikular a naituding nga addaaw tapno mapagtalainedyo ti coverage ti salu-anayo weny tulong kadagiti gastos. Adda karbenganyo a mangala iti daytoy nga impormasion ken tulong ti dukyodyo a pagasasao nga awan ti bayadanyo. Tumawag ti numero nga 800-722-1471 (TTY: 800-842-5357).

Italiano (Italian):
None