



Cervical lymphadenitis in children: Etiology and clinical manifestations

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INTRODUCTION

Cervical lymphadenitis is common in childhood. The incidence is difficult to ascertain because it is usually caused by a viral upper respiratory infection and is self-limited.

The etiology, pathophysiology, and clinical manifestations of cervical lymphadenitis in children will be reviewed here. The evaluation and treatment of cervical lymphadenitis in children is discussed separately, as is peripheral lymphadenopathy. (See "[Cervical lymphadenitis in children: Diagnostic approach and initial management](#)" and "[Peripheral lymphadenopathy in children: Etiology](#)" and "[Peripheral lymphadenopathy in children: Evaluation and diagnostic approach](#)".)

DEFINITIONS

- Cervical lymphadenopathy – Enlarged lymph node(s) of the neck, including preauricular, parotid, jugulodigastric, submental, submandibular, posterior cervical, superficial cervical, deep cervical, occipital, and posterior auricular (mastoid) ([figure 1](#)); lymphadenopathy encompasses both inflamed and noninflamed lymph nodes
- Cervical lymphadenitis – Enlarged, inflamed, and tender lymph node(s) of the neck; although strictly speaking, "lymphadenitis" refers to inflamed lymph nodes, the terms "lymphadenitis" and "lymphadenopathy" often are used interchangeably
- Acute lymphadenitis – Develops over a few days (but may persist for weeks to months)
- Subacute/chronic lymphadenitis – Develops over weeks to months

- Generalized lymphadenopathy – Enlargement of two or more noncontiguous lymph node regions (eg, cervical and axillary) and is the result of systemic disease (see ["Peripheral lymphadenopathy in children: Etiology", section on 'Generalized lymphadenopathy'](#))

ANATOMY

Lymph nodes frequently associated with cervicofacial lymphadenitis of childhood and the anatomic areas they drain are listed in the table ([figure 1](#) and [table 1](#)). More than 80 percent of childhood cervical lymphadenitis involves the submandibular or deep cervical nodes because they filter much of the lymphatic fluid from the head and neck. The jugulodigastric node, part of the superior deep cervical nodes and located below the mandible at the angle of the jaw, is commonly involved in cervical adenitis.

PATHOPHYSIOLOGY

The pathophysiology of cervical lymphadenitis has not been fully elucidated, but it is suspected that microorganisms penetrate the mucosa or skin of the head and neck, infiltrate the surrounding tissue, and are transported by afferent lymph vessels to lymph nodes. Although obvious infection of the anatomically drained area may be present, the infiltration of organisms often is asymptomatic, with no clinical evidence of an inoculation site. If the lymph nodes filter infectious and antigenic materials from the lymphatic fluid, lymphocytes proliferate, causing subsequent nodal enlargement.

Involvement of pyogenic organisms, such as *Staphylococcus aureus* and *Streptococcus pyogenes* (group A *Streptococcus*), usually results in acute reactions within the lymph node, manifested by a sudden onset of swelling, erythema, warmth, and tenderness. Recruitment of neutrophils to the lymph node may result in abscess formation. Mycobacterial, fungal, and *Bartonella henselae* infections generate a more chronic granulomatous inflammatory response with typically less dramatic clinical features, although suppuration can occur.

OVERVIEW

There are numerous infectious and noninfectious causes of cervical lymphadenitis ([table 2](#) and [table 3](#)). Cervical lymphadenitis in children is usually caused by an infectious process.

Infectious — Infectious causes of cervical lymphadenitis frequently are considered in four broad categories ([table 2](#)):

- Acute bilateral cervical lymphadenitis
- Acute unilateral cervical lymphadenitis
- Subacute/chronic bilateral lymphadenitis
- Subacute/chronic unilateral lymphadenitis

The clinical manifestations of the most common infectious causes of cervical lymphadenitis in children are described below. The diagnostic approach to children with cervical lymphadenitis is presented separately. (See ["Cervical lymphadenitis in children: Diagnostic approach and initial management"](#).)

Noninfectious — Noninfectious causes of cervical lymphadenopathy in children are less common but always should be considered in the differential diagnosis. Important noninfectious causes of cervical lymphadenitis in children include ([table 3](#)):

- Connective tissue disorders
- Leukemia
- Lymphoma
- Kawasaki disease
- Periodic fever, aphthous stomatitis, pharyngitis, adenitis (PFAPA)
- Kikuchi disease
- Medications

The clinical manifestations of the most common noninfectious causes of cervical lymphadenitis in children are described below. (See ["Noninfectious causes"](#) below.)

ACUTE BILATERAL

Acute bilateral cervical lymphadenitis is the most common clinical presentation. The evaluation and initial management of acute bilateral cervical lymphadenitis are discussed separately. (See ["Cervical lymphadenitis in children: Diagnostic approach and initial management"](#), [section on 'Subacute/chronic'](#).)

Viral upper respiratory infection — Acute bilateral cervical lymphadenitis is most often caused by a benign, self-limited viral upper respiratory infection (eg, enterovirus, adenovirus, influenza virus) ([table 4](#)). Patients often have a history of an ill contact and current or recent symptoms that may include sore throat, rhinorrhea, nasal congestion, and/or cough. (See ["The common cold in children: Clinical features and diagnosis"](#), [section on 'Clinical features'](#).)

The lymph nodes typically are small, rubbery, mobile, and discrete (so called "shotty" lymph nodes); minimally tender; and without erythema or warmth; they are often referred to as "reactive" lymphadenopathy. Although the clinical course is self-limited, the lymphadenopathy may last for weeks.

Group A streptococcus — Group A streptococcal (GAS) pharyngitis is a common cause of bilateral cervical lymphadenitis, which is often tender. GAS pharyngitis is discussed separately. (See ["Group A streptococcal tonsillopharyngitis in children and adolescents: Clinical features and diagnosis"](#), [section on 'Clinical features'](#).)

Other causes — Other viral and bacterial causes of acute bilateral cervical lymphadenitis include:

- Primary herpes simplex gingivostomatitis. (See ["Herpetic gingivostomatitis in young children"](#), [section on 'Clinical features'](#).)

- Epstein-Barr virus usually causes generalized lymphadenopathy but may present as acute bilateral cervical lymphadenitis. (See ["Clinical manifestations and treatment of Epstein-Barr virus infection"](#).)
- Cytomegalovirus usually causes generalized lymphadenopathy but may present as acute bilateral cervical lymphadenitis. (See ["Overview of cytomegalovirus infections in children"](#) and ["Overview of cytomegalovirus infections in children", section on 'Clinical manifestations'](#).)
- *Mycoplasma pneumoniae* pharyngitis. (See ["Mycoplasma pneumoniae infection in children", section on 'Clinical manifestations'](#).)
- *Arcanobacterium haemolyticum* pharyngitis occurs predominantly in adolescents [1-3]. Clinical features overlap with those of GAS. (See ["Group A streptococcal tonsillopharyngitis in children and adolescents: Clinical features and diagnosis", section on 'Other bacterial infections'](#).)

ACUTE UNILATERAL

Acute unilateral cervical lymphadenitis occurs less frequently than acute bilateral cervical lymphadenitis. Acute unilateral cervical lymphadenitis is usually caused by bacteria (*S. aureus*, group A *Streptococcus* [GAS], and, in young infants, *Streptococcus agalactiae* [group B *Streptococcus*, or GBS]) ([table 5](#)). The evaluation and initial management of acute unilateral cervical lymphadenitis are discussed separately. (See ["Cervical lymphadenitis in children: Diagnostic approach and initial management", section on 'Acute unilateral'](#).)

S. aureus and GAS — Between 40 and 89 percent of cases of acute unilateral cervical lymphadenitis are caused by *S. aureus* (increasingly methicillin-resistant *S. aureus*) ([picture 1](#)) or GAS [4-7]. Clinical features are usually not helpful in differentiating between staphylococcal and streptococcal adenitis. Most of these infections occur in children younger than five years of age (70 to 80 percent of cases). Patients may have a history of a recent upper respiratory infection or impetigo. (See ["Impetigo"](#).)

Although systemic symptoms of fever, tachycardia, and malaise may be present, the patient usually does not appear toxic. Submandibular nodes are affected in more than 50 percent of cases. The lymph node usually is 3 to 6 cm in diameter, tender, warm, erythematous, nondiscrete, and poorly mobile. One-fourth to one-third of infected nodes suppurate and become fluctuant, generally within two weeks of the onset of illness. (See ["Group A streptococcal tonsillopharyngitis in children and adolescents: Clinical features and diagnosis", section on 'Clinical features'](#).)

Group B Streptococcus — GBS cellulitis-adenitis usually is a manifestation of late-onset GBS infection (which has onset between 7 and 89 days of age or corrected gestational age for preterm infants), but it is a rare manifestation of this disease. Affected infants usually are between three and seven weeks of age, male, febrile, and irritable, and have poor feeding [8-10]. Examination reveals tender, erythematous facial or submandibular swelling with ill-defined margins. The majority (94 percent) also have bacteremia, and meningitis may also occur [7,11]. However, isolated cervical adenitis has also been described. (See ["Group B streptococcal infection in neonates and young infants", section on 'Other focal infection'](#).)

Anaerobic bacteria — Acute unilateral cervical lymphadenitis in older children with history of periodontal disease usually is caused by an infection with anaerobic bacteria. In one study, anaerobic bacteria were isolated from 38 percent of lymph node aspirates, collected primarily from children with dental disease [12]. Identification of periodontal disease during examination of the oral cavity may suggest anaerobic infection. However, lymph node examination cannot distinguish anaerobic infection from lymphadenitis resulting from *S. aureus* or GAS. Laboratory studies are necessary to determine the underlying etiology. (See "[Cervical lymphadenitis in children: Diagnostic approach and initial management](#)", [section on 'Acute unilateral'](#).)

Tularemia — Tularemia is a febrile illness caused by an infection with *Francisella tularensis* that usually occurs following contact with infected animals (eg, rabbits, pet hamsters, other rodents) or the bite of blood-sucking arthropods. The most common clinical presentation is the ulceroglandular syndrome, characterized by a papular lesion in the drainage field of the inflamed lymph node ([picture 2](#)); however, regional lymphadenopathy without an ulcer is also common. Most cases in the United States occur in the [south-central region](#). (See "[Tularemia: Microbiology, epidemiology, and pathogenesis](#)" and "[Tularemia: Clinical manifestations, diagnosis, treatment, and prevention](#)".)

SUBACUTE/CHRONIC BILATERAL

Subacute/chronic bilateral lymphadenitis is most commonly seen in Epstein-Barr virus (EBV) or cytomegalovirus (CMV) infections ([table 6](#)). It also may be caused by tuberculosis (TB), HIV, toxoplasmosis, and syphilis. The evaluation and initial management of subacute/chronic bilateral cervical lymphadenitis are discussed separately. (See "[Cervical lymphadenitis in children: Diagnostic approach and initial management](#)", [section on 'Subacute/chronic'](#).)

Epstein-Barr virus and cytomegalovirus — Subacute/chronic bilateral cervical lymphadenitis is most often caused by EBV or CMV infection. EBV causes infectious mononucleosis that may manifest as fever, exudative pharyngitis, lymphadenopathy, and hepatosplenomegaly. CMV also can cause a mononucleosis-like illness. (See "[Clinical manifestations and treatment of Epstein-Barr virus infection](#)" and "[Overview of cytomegalovirus infections in children](#)".)

Other causes — TB is an uncommon cause of chronic cervical adenitis that affects older children and adults more frequently than younger children. It is usually unilateral but occasionally can be bilateral. (See "[Tuberculous lymphadenitis](#)".)

Other uncommon causes of chronic bilateral cervical adenitis include HIV infection, toxoplasmosis, and syphilis, all of which are usually associated with generalized lymphadenopathy. (See "[Toxoplasmosis: Acute systemic disease](#)" and "[Pediatric HIV infection: Classification, clinical manifestations, and outcome](#)", [section on 'Clinical manifestations'](#)" and "[Syphilis: Epidemiology, pathophysiology, and clinical manifestations in HIV-uninfected patients](#)", [section on 'Clinical manifestations'](#)".)

SUBACUTE/CHRONIC UNILATERAL

Subacute/chronic unilateral cervical lymphadenitis is usually caused by nontuberculous mycobacteria (NTM) infections or *B. henselae*, the agent of cat scratch disease (CSD). However, it also may be caused by tuberculosis (TB) or toxoplasmosis ([table 7](#)). The evaluation and initial management of subacute/chronic unilateral cervical lymphadenitis are discussed separately. (See "[Cervical lymphadenitis in children: Diagnostic approach and initial management](#)", [section on 'Subacute/chronic'](#).)

Nontuberculous mycobacteria infection — Most NTM infections occur predominantly in immunocompetent children younger than five years of age. The organisms are ubiquitous and can be found in soil, dust, and water. The child may have a history of pica. The *Mycobacterium avium* complex (MAC) is responsible for the majority of NTM cervical adenitis, but previously uncommon species are being detected more frequently and may be responsible for some cases of culture-negative NTM lymphadenitis because they are fastidious. (See "[Nontuberculous mycobacterial lymphadenitis in children](#)", [section on 'Epidemiology'](#).)

NTM lymphadenitis generally presents as a unilateral firm, nontender node that slowly enlarges over several weeks. The submandibular, jugulodigastric, and parotid nodes are most commonly infected and usually are less than 4 cm in size. The overlying skin gradually changes from a pink color to a violaceous hue and thins to a parchment-like appearance ([picture 3](#)). Despite the discoloration, skin temperature is normal. Fever, pain, and tenderness are unusual, and this lack of pain is often referred to as "cold" nodes. Suppuration and formation of a draining sinus tract that can persist for months frequently occurs in untreated lymph nodes. (See "[Nontuberculous mycobacterial lymphadenitis in children](#)", [section on 'Clinical features'](#).)

Cat scratch disease — CSD is a relatively common infection caused by inoculation of *B. henselae* into the skin following a cat bite or scratch [[13-15](#)]. From 7 to 60 days following the scratch, the lymph node draining the site of inoculation becomes warm, tender, and slightly erythematous ([picture 4](#)). There is usually (but not always) a history of contact with a cat, often a kitten, although patients and parents frequently do not recall a bite or scratch. Careful physical examination may reveal a papule at the primary site of inoculation ([picture 5](#)). Axillary lymph nodes are most commonly affected, but approximately one in four children have isolated cervical nodes. Middle cervical and parotid nodes are affected more often than submandibular nodes [[7](#)]. (See "[Microbiology, epidemiology, clinical manifestations, and diagnosis of cat scratch disease](#)".)

Fever and mild systemic symptoms occur in 30 percent of patients and can last for four to six weeks. Nodes suppurate in up to one-third of affected children. Occasionally, infection may manifest as Parinaud oculoglandular syndrome, with conjunctivitis and ipsilateral preauricular or submandibular adenitis following conjunctival inoculation. (See "[Microbiology, epidemiology, clinical manifestations, and diagnosis of cat scratch disease](#)", [section on 'Parinaud oculoglandular syndrome'](#).)

Tuberculosis — Pediatric TB is uncommon in the [United States](#) but remains a significant cause of cervical lymphadenitis in other parts of the world ([figure 2](#)) [[16](#)]. Infection of the cervical nodes is usually caused by extension from the paratracheal nodes to the jugulodigastric and submandibular nodes [[17](#)]. It also can occur by direct spread from the apical pleura to the supraclavicular nodes. Clinical symptoms compatible with TB, an abnormal chest radiograph, a history of contact with persons who have symptoms of TB, or a history of travel to an endemic area for TB should prompt an evaluation for *Mycobacterium tuberculosis* disease [[18](#)]. (See "[Epidemiology of tuberculosis](#)" and "[Tuberculous lymphadenitis](#)".)

Toxoplasmosis — Acquired *Toxoplasma gondii* infection is symptomatic in only 10 percent of patients, in whom lymphadenopathy and fatigue without fever are common manifestations, although a mononucleosis-like illness with rash and hepatosplenomegaly is also described [19]. The majority of cases are benign and self-limited. Adenopathy usually affects posterior cervical nodes, is discrete, nonsuppurative, sometimes tender, and may persist for months. Oocysts are excreted from the stool of cats, the definitive host for *T. gondii*. Human infection occurs by ingesting poorly cooked meat that contains cysts or by inadvertently ingesting mature oocysts from soil, litter boxes, or contaminated food. (See ["Toxoplasmosis: Acute systemic disease"](#).)

NONINFECTIOUS CAUSES

Noninfectious causes of cervical lymphadenopathy in children are less common but always should be considered in the differential diagnosis.

Connective tissue disorders — Prolonged fever, rash, and arthralgias suggest a possible connective tissue disorder.

Neoplasm — Leukemia or lymphoma should be suspected in patients with persistent or progressive nontender cervical or generalized lymphadenopathy; no evidence of HIV, Epstein-Barr virus, or cytomegalovirus infection; and constitutional symptoms (eg, weight loss, fever, fatigue). (See ["Overview of the clinical presentation and diagnosis of acute lymphoblastic leukemia/lymphoma in children", section on 'Presentation'](#) and ["Overview of Hodgkin lymphoma in children and adolescents", section on 'Presenting symptoms and signs'](#).)

Kawasaki disease — Kawasaki disease should be considered in young children with acute unilateral cervical adenitis associated with fever for ≥ 5 days, rash, nonexudative conjunctivitis, mucositis, and swelling of the hands and feet, although incomplete presentations are increasingly recognized. The constellation of symptoms sometimes can be confused with a toxin-mediated *S. aureus* or group A streptococcal infection. (See ["Kawasaki disease: Clinical features and diagnosis"](#).)

PFAPA syndrome — Preschool-aged children with a history of recurrent fevers lasting four or five days, aphthous stomatitis, pharyngitis, and cervical adenitis have a benign periodic fever syndrome referred to by its abbreviation, PFAPA (periodic fever, aphthous stomatitis, pharyngitis, adenitis). (See ["Periodic fever with aphthous stomatitis, pharyngitis, and adenitis \(PFAPA syndrome\)"](#).)

Kikuchi disease — Kikuchi disease, or subacute necrotizing lymphadenitis, is a rare, benign condition of unknown cause usually characterized by cervical lymphadenopathy (although it may be more generalized) with or without fever [20,21]. It is discussed in detail separately. (See ["Kikuchi disease"](#).)

DIFFERENTIAL DIAGNOSIS

Causes of swelling in the neck must be distinguished from cervical lymphadenitis. Midline location is one feature that helps to distinguish thyroglossal duct cysts, epidermoid cysts, and lipomas from cervical adenitis

since midline lymph nodes are rare [7]. (See ["Thyroglossal duct cysts and ectopic thyroid"](#) and ["The pediatric physical examination: HEENT", section on 'Neck'.](#))

Other causes of neck swelling include [7,22]:

- Branchial cleft cyst – Branchial cleft cysts are palpable in the upper portion of the neck, anterior to the sternocleidomastoid muscle. These may occur at any age but are most common in school-aged children. (See ["The pediatric physical examination: HEENT", section on 'Neck'.](#))
- Cystic hygroma – Cystic hygroma typically presents as a painless soft mass superior to the clavicle and posterior to the sternocleidomastoid muscle [7]. Cystic hygromas may increase in size during upper respiratory tract infection. Transillumination and compressibility help to distinguish cystic hygroma from lymphadenitis. Most present in children younger than two years.
- Thyroid tumors – Thyroid tumors in children usually present as asymptomatic solitary nodules. (See ["Thyroid nodules and cancer in children".](#))

Causes of neck swelling that appear or are exacerbated during crying or straining include [23,24]:

- Superior mediastinal tumor or cyst – Superior mediastinal tumors or cysts are associated with widening of the mediastinum on plain radiographs.
- Laryngocele – Laryngoceles are outpouchings of the saccular mucosa in the area of the laryngeal ventricle that intermittently fill with air and cause episodic symptoms. They may present as neck masses if they extend through the thyrohyoid membrane. Laryngoceles are visualized as fluid- and air-containing cystic masses on plain radiography, ultrasonography, or computed tomography. (See ["Congenital anomalies of the larynx", section on 'Laryngoceles and saccular cysts'.](#))
- Phlebectasia of the jugular vein – Phlebectasia of the jugular vein is a fusiform or saccular dilation without tortuosity; the diagnosis can be confirmed with color Doppler ultrasonography [25-27].

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or email these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient education" and the keyword[s] of interest.)

- Basics topics (see ["Patient education: Swollen neck nodes in children \(The Basics\)"](#))
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SUMMARY

- There are numerous infectious and noninfectious causes of cervical lymphadenitis ([table 2](#) and [table 3](#)). (See ['Overview'](#) above.)
- Cervical lymphadenitis in children is usually caused by an infectious process. Infectious causes of cervical lymphadenitis frequently are considered in four broad categories.
 - Acute bilateral cervical lymphadenitis is usually caused by viral upper respiratory infection ([table 4](#)). (See ['Acute bilateral'](#) above.)
 - Acute unilateral cervical lymphadenitis is usually caused by bacteria. *Staphylococcus aureus* and *Streptococcus pyogenes* (group A *Streptococcus*) are the most common causes ([table 5](#)). (See ['Acute unilateral'](#) above.)
 - Subacute/chronic bilateral lymphadenitis is usually caused by Epstein-Barr virus or cytomegalovirus ([table 6](#)). (See ['Subacute/chronic bilateral'](#) above.)
 - Subacute/chronic unilateral lymphadenitis is usually caused by nontuberculous mycobacteria infections or *Bartonella henselae*, the agent of cat scratch disease ([table 7](#)). (See ['Subacute/chronic unilateral'](#) above.)
- Important noninfectious causes of cervical lymphadenopathy include connective tissue disorders; leukemia; lymphoma; Kawasaki disease; periodic fever, aphthous stomatitis, pharyngitis, adenitis (PFAPA); and Kikuchi disease ([table 3](#)). (See ['Noninfectious causes'](#) above.)

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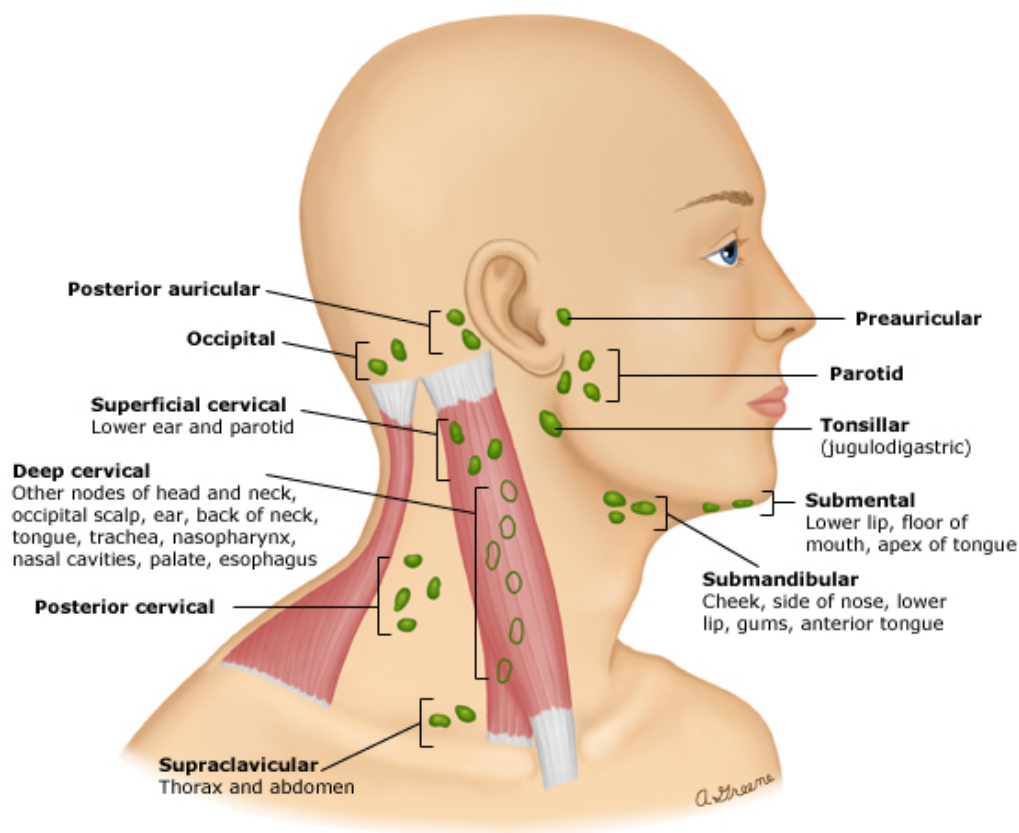
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Topic 5982 Version 19.0

GRAPHICS

Lymph nodes of the head and neck



This drawing schematically depicts the major lymph nodes in the head and neck area that are likely to be enlarged on physical examination in patients with various local or systemic diseases. The major nodal groups are shown here in bold, with the areas draining into these nodal groups noted when appropriate. While enlargement of both the left and right supraclavicular lymph nodes may reflect disease in the thorax, left supraclavicular nodal enlargement, because of its drainage pattern, may also reflect the presence of abdominal involvement (ie, Virchow node).

Graphic 69528 Version 4.0

Lymphatic drainage of the head and neck

| Lymph node group | Anatomic areas drained |
|------------------------------|---|
| Occipital | Posterior scalp |
| Postauricular | Temporal and parietal scalp |
| Preauricular | Anterior and temporal scalp, midface, nose, anterior ear canal and pinna, lateral conjunctivae |
| Parotid | Forehead and temporal scalp, midface, nose, external ear canal, middle ear, gums, parotid gland |
| Submandibular (submaxillary) | Cheek, nose, lips, anterior tongue, submandibular gland, buccal mucosa |
| Submental | Central lower lip, floor of mouth, tongue |
| Superficial cervical | Skin, lower larynx, lower ear canal, parotid |
| Superior deep cervical | Tonsil, adenoid, posterior scalp and neck, tongue, larynx, hypopharynx, thyroid, palate, nose, esophagus, paranasal sinuses, nasopharynx, other cervicofacial nodes |
| Inferior deep cervical | Dorsal scalp and neck, nasopharynx, superficial pectoral region of the arm, superior deep cervical |

Graphic 77551 Version 2.0

Infectious causes of cervical lymphadenitis in children

| Presentation | Common | Uncommon | Rare |
|--------------------|--|---|---|
| Acute bilateral | Rhinovirus Epstein-Barr virus*¶ Cytomegalovirus*¶ Herpes simplex virus Adenovirus Enterovirus <i>Mycoplasma pneumoniae</i> Group A <i>Streptococcus</i> <i>Arcanobacterium haemolyticum</i> Influenza | Roseola¶ Parvovirus B19¶ | <i>Corynebacterium diphtheriae</i> Rubella¶ Measles Mumps¶ |
| Acute unilateral | <i>Staphylococcus aureus</i> Group A <i>Streptococcus</i> Anaerobic bacteria | Group B <i>Streptococcus</i> Tularemia* Alpha <i>Streptococcus</i> <i>Pasteurella multocida</i> <i>Yersinia pestis</i> ¶ Gram-negative bacilli | <i>Yersinia enterocolitica</i> * Anthrax |
| Chronic unilateral | Nontuberculous mycobacteria Cat scratch disease | Toxoplasmosis¶ Tuberculosis¶ Actinomycosis | <i>Nocardia brasiliensis</i> Aspergillosis Sporotrichosis |
| Chronic bilateral | Epstein-Barr virus¶ Cytomegalovirus¶ | HIV¶ Toxoplasmosis¶ Tuberculosis¶ Syphilis¶ | Brucellosis¶ Histoplasmosis¶ |

HIV: human immunodeficiency virus.

* Infection can persist and become more chronic in appearance.

¶ Often associated with generalized lymphadenopathy.

Graphic 56712 Version 8.0

Noninfectious causes of cervical lymphadenopathy in children

| Condition | Possible associated clinical features |
|------------------------------------|--|
| Malignancy | |
| Lymphoma or leukemia | Persistent, or progressive, nontender cervical or generalized lymphadenopathy; constitutional symptoms (eg, fever, weight loss, fatigue) |
| Neuroblastoma | Constitutional symptoms (fever, weight loss); abdominal mass; GI symptoms; proptosis; periorbital ecchymoses; Horner syndrome; opsoclonus myoclonus ataxia; palpable subcutaneous nodules; bone pain; hypertension; unilateral nasal obstruction |
| Rhabdomyosarcoma | Localized, painless, enlarging mass; proptosis; ophthalmoplegia; nasal, aural, or sinus obstruction (without drainage) |
| Thyroid cancer | History of external radiation to the head and neck; hoarseness; dysphagia; medullary thyroid cancer may be associated with multiple endocrine neoplasias |
| Collagen vascular disease | |
| Juvenile idiopathic arthritis | Arthritis/arthralgia; fever; rash; other systemic involvement (eg, hepatosplenomegaly, pericarditis, etc) |
| Systemic lupus erythematosus | Arthritis/arthralgia; hematologic abnormalities (anemia, leukopenia, lymphopenia, thrombocytopenia); malar rash; oral ulcers; fever; renal disease |
| Drugs | |
| Phenytoin | Seizure disorder |
| Carbamazepine | Seizure disorder |
| Miscellaneous | |
| Kawasaki disease | Fever; rash; nonexudative conjunctivitis; enanthem; swelling of hands and feet |
| PFAPA | Recurrent fevers; aphthous stomatitis; pharyngitis; and adenitis |
| Kikuchi disease | Fever; rash; systemic symptoms (fatigue, weight loss); leukopenia; anemia; usually occurs in young women |
| Langerhans cell histiocytosis | Lytic bone lesions; rash (papular or eczematous); oral lesions (mass, gingivitis, ulcers, loose teeth); diabetes insipidus |
| Hemophagocytic lymphohistiocytosis | Hepatomegaly; rash; neurologic findings (seizures, mental status changes); anemia; thrombocytopenia; most frequent at age <10 months, but may occur in older children |
| Castleman disease | Lymph nodes may be >4 cm (1.6 inches); may have systemic symptoms (fever, night sweats, malaise); hepatosplenomegaly; anemia, thrombocytosis |
| Kimura disease | Painless subcutaneous masses in head and neck; eosinophilia; increased IgE |
| Postvaccination | Recent history of immunization (particularly diphtheria-tetanus-pertussis, polio, or typhoid fever vaccine) |
| Sarcoidosis | Extensive enlargement of cervical nodes; facial eruption (flat-topped papules); weight loss; lethargy; fatigue, cough; bone lesions (eg, cystic or sclerotic focal lesions, osteopenia, osteoporosis) |

GI: gastrointestinal; PFAPA: periodic fever with aphthous stomatitis, pharyngitis, and adenitis syndrome; IgE: immunoglobulin E.

Graphic 77911 Version 11.0

Infectious causes of acute bilateral cervical lymphadenitis in children

| Infection | Associated clinical features |
|-------------------------------------|---|
| Common causes | |
| Influenza virus | URI symptoms, fever |
| Epstein-Barr virus*¶ | Infectious mononucleosis (malaise, headache, fever, tonsillopharyngitis, fatigue, splenomegaly) |
| Cytomegalovirus*¶ | Mononucleosis-like illness |
| Herpes simplex virus | Gingivostomatitis or cold sore |
| Adenovirus | URI symptoms, pharyngitis, conjunctivitis |
| Enterovirus | URI symptoms, oral lesions, lesions on hands and feet |
| Rhinovirus | URI symptoms |
| Group A <i>Streptococcus</i> | Exudative pharyngitis |
| <i>Arcanobacterium haemolyticum</i> | Exudative pharyngitis, scarlatiniform rash; predominantly occurs in adolescents and young adults |
| <i>Mycoplasma pneumoniae</i> | Headache, malaise, fever, pharyngitis, cough |
| Uncommon causes | |
| Roseola¶ | Fever, irritability, rash |
| Parvovirus B19¶ | Fever, "slapped cheek" rash |
| Rare causes | |
| <i>Corynebacterium diphtheria</i> | Sore throat, malaise, fever, exudative pharyngitis, pseudomembrane; edema of the soft tissues of the neck |
| Rubella¶ | Rash that spreads from face to trunk and extremities |
| Measles | Prodrome of fever, conjunctivitis, coryza, and cough followed by rash that spreads from face to trunk and extremities; lack of immunization, international travel |
| Mumps¶ | Tenderness and swelling of parotid gland |

URI: upper respiratory infection.

* Infection can persist and become more chronic in appearance.

¶ Often associated with generalized lymphadenopathy.

Graphic 97716 Version 1.0

Infectious causes of acute unilateral cervical lymphadenitis in children

| Infectious agent | Clinical features |
|---|--|
| Common causes | |
| <i>Staphylococcus aureus</i> | Usually occurs in children <5 years; may have history of recent skin infection, upper respiratory infection, or facial trauma |
| Group A <i>Streptococcus</i> | Usually occurs in children <5 years; may have history of recent skin infection, upper respiratory infection, or facial trauma |
| Anaerobic bacteria (eg, actinomycosis; <i>Spirillum minor</i>) | Poor dental hygiene; periodontal disease |
| Uncommon causes | |
| Group B <i>Streptococcus</i> | Occurs in infants <3 months corrected gestational age; fever; irritability; poor feeding |
| Tularemia* | Contact with infected animal (eg, rabbit, pet hamsters) or bite of blood-sucking arthropod; may be papular lesion in the drainage field of the involved node |
| Alpha <i>Streptococcus</i> | Oral lesions |
| <i>Pasteurella multocida</i> | Cat or dog exposure (bite, lick, scratch) |
| <i>Yersinia pestis</i> ¶ (bubonic plague) | Intensely inflamed lymph node (red, swollen, tender) without fluctuance; possible, eschar, pustule, or necrotic lesion at site of flea bite |
| Gram-negative bacilli | History of ear, nose, and throat infections; may indicate need to test for underlying immunodeficiency (eg, <i>Serratia</i> spp) |
| Rare causes | |
| <i>Yersinia enterocolitica</i> * | Suppurative lymphadenitis; fever; diarrhea |
| Anthrax | Contact with infected animals or animal products; cuts or abrasions; begins as painless, often pruritic papule that rapidly enlarges and develops a central vesicle or bulla, followed by a painless ulcer |

* Infection can persist and become more chronic in appearance.

¶ Often associated with generalized lymphadenopathy.

Graphic 97718 Version 3.0

***Staphylococcus aureus* adenitis**



Acute unilateral cervical adenitis caused by *S. aureus*. Submandibular nodes are affected in more than 50 percent of cases. The lymph node is usually 3 to 6 cm in diameter, tender, warm, erythematous, nondiscrete, and poorly mobile.

Graphic 74121 Version 4.0

Tularemia adenitis



Ulceroglandular tularemia involving the submental node characterized by a papular lesion in the drainage field of the inflamed lymph node.

Graphic 52036 Version 1.0

Infectious causes of subacute/chronic bilateral cervical lymphadenitis in children

| Infection | Clinical features |
|-------------------------------------|---|
| Common causes | |
| Epstein-Barr virus (EBV)* | Infectious mononucleosis (fever, exudative pharyngitis, hepatosplenomegaly); positive monospot or EBV serology |
| Cytomegalovirus (CMV)* | Mononucleosis-like illness; positive CMV serology |
| Uncommon causes | |
| Human immunodeficiency virus (HIV)* | High-risk behavior (unprotected sexual contact, injection drug use, etc) |
| Toxoplasmosis* | Exposure to cat feces; ingestion of poorly cooked meat, soil, or contaminated food; posterior cervical involvement |
| <i>Mycobacterium tuberculosis</i> * | Birth in, travel to, or contact with a visitor from a region endemic for <i>Mycobacterium tuberculosis</i> ; tuberculin skin test usually with ≥ 15 mm induration at 48 hours; positive interferon-gamma release assay |
| <i>Mycobacterium bovis</i> | Ingestion of unpasteurized dairy products; exposure to cattle |
| Syphilis* | High-risk sexual behavior |
| Rare causes | |
| Brucellosis* | Travel to or living in endemic area; ingestion of unpasteurized dairy products |
| Histoplasmosis* | Associated skin lesions |

* Often associated with generalized lymphadenopathy.

Graphic 97719 Version 4.0

Infectious causes of subacute/chronic unilateral cervical lymphadenitis in children

| Infectious agent | Clinical features |
|-------------------------------------|---|
| Common causes | |
| Nontuberculous mycobacteria | Usually occurs in children <5 years; frequent involvement of submandibular and tonsillar nodes; nontender; gradual enlargement with fluctuance, violaceous discoloration, and development of sinus tract; lack of response to antistaphylococcal and antistreptococcal antibiotics; TST may show 5 to 15 mm of induration at 48 hours; negative interferon-gamma release assay* |
| Cat scratch disease | Cat exposure; papule at site of inoculation (not always present); possible conjunctivitis; positive <i>Bartonella henselae</i> serology |
| Uncommon causes | |
| Toxoplasmosis¶ | Exposure to cat feces; ingestion of poorly cooked meat, soil, or contaminated food; posterior cervical involvement |
| <i>Mycobacterium tuberculosis</i> ¶ | Birth in, travel to, or contact with a visitor from a region endemic for <i>M. tuberculosis</i> ; TST usually with ≥15 mm induration at 48 hours; positive interferon-gamma release assay |
| <i>Mycobacterium bovis</i> | Ingestion of unpasteurized dairy products; exposure to cattle |
| Cervicofacial actinomycosis | Slowly progressive nontender indurated mass that evolves into multiple abscesses, fistulae, and draining sinus tracts |
| Rare causes | |
| <i>Nocardia brasiliensis</i> | Cutaneous lesions |
| Aspergillosis | Trauma, including burns and surgical wounds |
| Sporotrichosis | Papule at site of inoculation that usually ulcerates but may remain nodular with overlying erythema; similar lesions along lymphatic channels ("sporotrichoid spread") |

TST: tuberculin skin test.

* With rare exception (eg, *Mycobacterium kansasii*, *Mycobacterium marinum*, *Mycobacterium szulgai*, *Mycobacterium goodii*).

¶ Often associated with generalized lymphadenopathy.

Graphic 97720 Version 3.0

***Mycobacterium avium* adenitis**



M. avium cervical lymphadenitis in the parotid and submandibular regions. The parotid node underwent incomplete excision and began to relapse. The submandibular node began to spontaneously drain and formed an overlying scab.

Graphic 69475 Version 4.0

Adenopathy in cat scratch disease



Left axillary adenopathy in a patient with cat scratch disease. The enlarged, erythematous lymph node may go on to suppurate.

Courtesy of David H Spach, MD.

Graphic 52407 Version 3.0

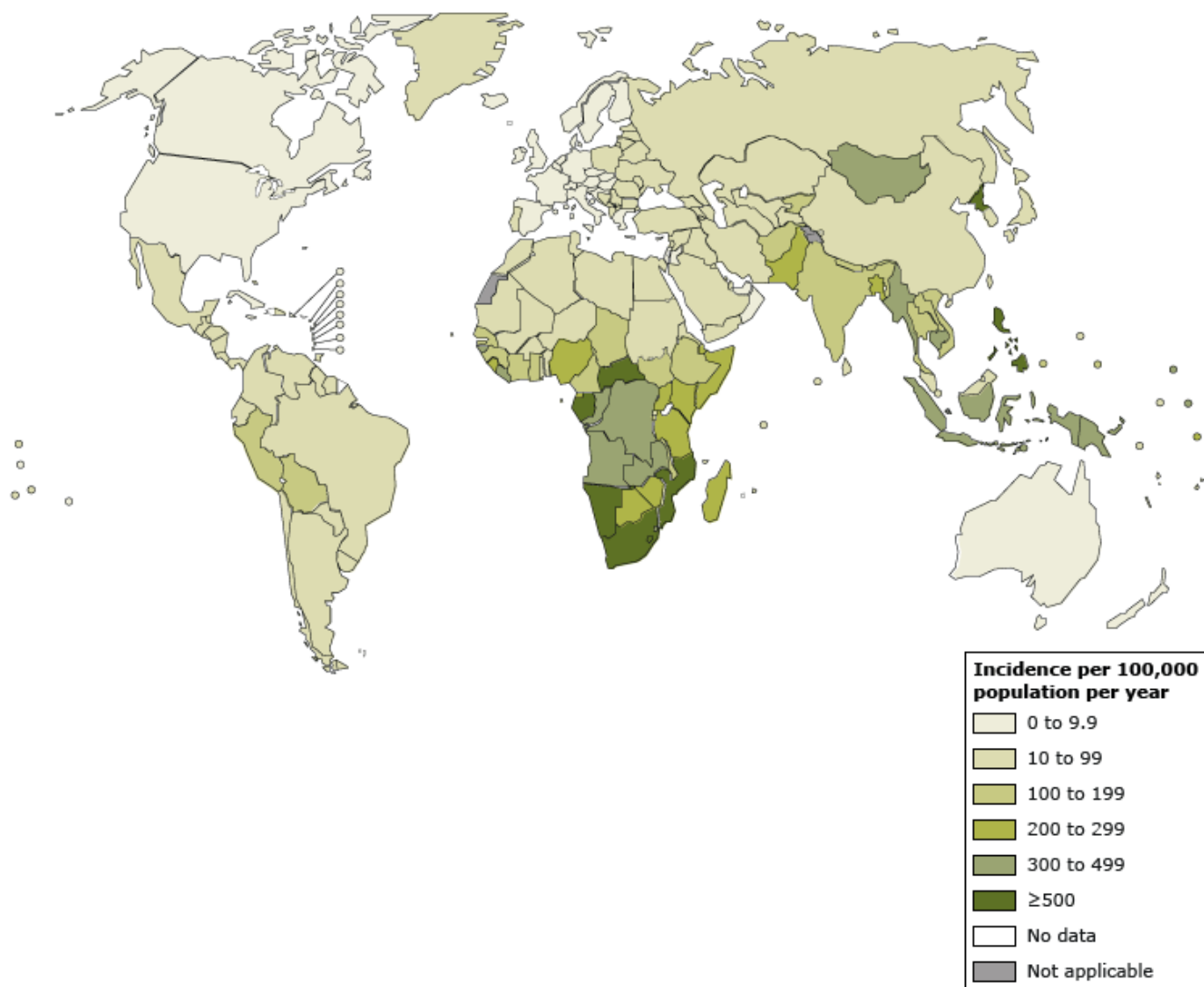
Typical papular lesion on the finger of a child with cat scratch disease



Courtesy of Sheldon L Kaplan, MD.

Graphic 78770 Version 2.0

Estimated tuberculosis incidence rates, by country, 2018



Reprinted from *Global Tuberculosis Report 2019*, World Health Organization, Copyright © 2019. Available at: https://www.who.int/tb/publications/global_report/en/ (Accessed on October 31, 2019).

Graphic 55097 Version 10.0

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