

# LYMPHADENOPATHY

Year Two

“G’day doc. I’ve got a couple of glands up in my neck and just need some antibiotics.”  
**Lymph nodes are NOT glands.**

**Lymph nodes are concentrated around the neck, in the axilla and groin,  
along either side of the aorta and in the intestinal mesentery,  
but may be found scattered throughout the body.**

## OUTLINE

### LYMPHATIC SYSTEM

The lymphatic system regulates tissue fluid throughout the body and transports **chyle** (fats) from the small intestine to the venous system.

All the cells in the body are surrounded by fluid. This fluid is constantly fed with oxygen and nutrients from the bloodstream. As well as being topped up, fluid must be constantly removed or it would accumulate in the tissues. Some of it is removed through the bloodstream and some through the lymphatic system. After an injury to tissue that results in swelling, the vast majority of the excess fluid is slowly removed by the lymphatic system.

The lymphatic system consists of minute lymphatic capillaries leading into progressively larger lymphatic vessels, or **channels**, which eventually unite to form two large ducts that empty into the superior vena cava at the base of the neck - returning the fluid to the bloodstream. The larger of these drainage ducts is the **thoracic duct**. The lymphatic system thus complements the circulatory system.

The tissue fluid that is filtered into the lymphatic capillaries is called **lymph**. It is a colourless liquid not unlike blood plasma in its consistency and appearance, although it has a slightly different chemical composition. There are special lymph vessels in the small intestine to absorb fat after a fatty meal. These are called **lacteals**, because their fluid has a milky appearance.

All along the lymphatic vessels are tiny **lymph nodes** (often incorrectly called glands). These are bead-like structures that filter out bacteria, viruses, abnormal cells (eg. cancers) and toxins from the lymph, rather like an oil filter in a car. The lymph nodes also produce leucocytes (mainly lymphocytes and monocytes) that are suspended in a fibrous netlike membrane and enclosed in a capsule, and antibodies. They may become noticeably painful and swollen during an infection.

Unlike the circulatory system, which includes the heart, there is no pump to keep lymph moving through the lymphatic system. Therefore, frequent **valves** are found in the channels to stop the fluid flowing backwards and the circulation of lymph is maintained by intermittent pressure on the lymph ducts from breathing, muscle contractions and body movement.

The lymphatic network also includes three large lymph nodes - the **tonsils**, the **spleen** and the **thymus**. Each of these consists of lymphatic tissue and produces antibodies and leucocytes to fight infection. In particular, the tonsils act as a barrier to infections entering through the mouth. The thymus is present in the lower neck of children but shrinks after puberty.

### LYMPHADENOPATHY

The term lymphadenopathy refers to any disease affecting the lymph nodes, while lymphadenitis is an infection or inflammation of the lymph nodes.

Any **infection**, bacterial or viral, may result in the lymph nodes draining the affected area becoming enlarged and painful. For example, if a finger is infected, the lymph nodes in the axilla may become involved, while a throat infection will cause swelling and pain in neck nodes.

Some infections are more likely to cause swollen painful lymph nodes than others. These include glandular fever (infectious mononucleosis), measles, brucellosis (caught by meat workers), septicaemia (blood infection), tuberculosis (TB), toxoplasmosis (carried by cats), cat scratch disease, and the cytomegalovirus (with fever, joint pain and large liver). The sexually transmitted diseases syphilis, lymphogranuloma venereum, gonorrhoea and AIDS are other possible causes.

**Parasites** may enter the blood stream and infest lymph nodes. These are very uncommon in developed countries, but in poorer tropical countries diseases such as filariasis (elephantiasis) and trypanosomiasis may occur. The bacterial infections lymphogranuloma venereum (sexually transmitted disease with large lymph nodes in

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groin), tularaemia (infection of rats) and plague (black death with pus oozing nodes in axillae and groin) are also mainly limited to these countries.

Lyme disease is an infection passed from mice and deer to man by ticks. It is common in North America, but rare elsewhere. It causes a spreading rash, fever, chills, muscle pains, headache, arthritis and enlarged lymph nodes.

Other causes of lymph node pain or enlargement may include **cancer** that may spread (metastasise) from its original organ along the lymph ducts to the nearby lymph nodes, leukaemia, Hodgkin's lymphoma and lymphomas (cancer starting in the lymph nodes).

**Immunisation** (eg. for cholera and typhoid) may cause a temporary reaction in the nearby lymph nodes and some drugs (eg. phenytoin for epilepsy) may have enlarged lymph nodes as a side effect.

There are many rare causes of lymph node problems including systemic lupus erythematosus (an autoimmune disease in which the body inappropriately rejects some of its own tissue), serum sickness (a reaction to receiving a blood transfusion or other blood products), chronic fatigue syndrome and Felty syndrome (a complication of rheumatoid arthritis).

### LYMPHADENITIS

Adenitis (or lymphadenitis) is an **infection** or **inflammation** of one or more lymph nodes, usually in the neck, axilla or groin. Sometimes the infection overwhelms the lymph node, or cancer may arise in the lymph node (eg. leukaemia) or spread from another part of the body, causing it to become painful and enlarged.

Adenitis is characterised by **red, painful, tender** and **enlarged** lymph nodes, and the patient develops a fever and feels ill. Nodes affected by cancer tend to be stony **hard**. An untreated infection may cause an abscess.

All lymph nodes that cause discomfort must be investigated as the adenitis may be due to a cancer.

## SIGNS - EXAMINATION

Lymphadenopathy may be the cause of an unexplained abdominal or pelvic mass.

Always check for splenomegaly and hepatomegaly in patients with lymphadenopathy.

## INVESTIGATIONS - PATHOLOGY, RADIOLOGY ETC.

WCC – white cell count (AB)

ESR – erythrocyte sedimentation rate (H)

Specific viral serology (N or AB)

Chest x-ray (N or AB)

Ultrasound scan

Lymph node biopsy (AB)

### White Cell Count, Blood [WCC]

#### (Leucocyte count)

RI: Neonate 10-30 x 10<sup>9</sup>/L (10,000-30,000/mm<sup>3</sup>)

Infant 6-20 x 10<sup>9</sup>/L (6,000-20,000/mm<sup>3</sup>)

Child 5-15 x 10<sup>9</sup>/L (5,000-15,000/mm<sup>3</sup>)

Adult 4-10 x 10<sup>9</sup>/L (4,000-10,000/mm<sup>3</sup>)

Int: HIGH (**Leucocytosis**) - Bacterial infection, leukaemias, alcoholic hepatitis, cholecystitis, pregnancy

LOW (**Leucopenia**) - Leukaemia, viraemia (eg. viral hepatitis), autoimmune disease, post splenectomy, elderly

ABNORMAL FORMS - Bloch-Sulzberger syn., Bloom syn., eosinophilia-myalgia syn., May-Hegglin anomaly, myelodysplastic syn., Sézary syn., leukaemia

### Erythrocyte Sedimentation Rate, Blood [ESR]

RI: Child <20 mm/hour (Westergren method)

Male <10 mm/hour

Female <20 mm/hour

Elderly male <20 mm/hour

Elderly female 5 - 45 mm/hour

Algorithm for calculating mean ESR in elderly:-

Male mean ESR = Age in years/2

Female mean ESR = (Age in years + 10)/2

Ind: May indicate hidden infection, inflammation or neoplasia.

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- Int: V.HIGH - Collagen diseases [eg. myeloma, polymyositis], Mycoplasma infection, leukaemia (FBC?), myelomatosis, myocardial infarct  
HIGH - Pregnancy, bacterial & viral infections (FBC?), localised acute suppurations, some neoplasms, TB, Hodgkin's disease, SLE, polymyalgia rheumatica, temporal arteritis, subacute bacterial endocarditis, anaemia, hyperfibrinogenaemia, hyperbilirubinaemia, thyroiditis, rheumatoid or reactive arthritis, Reiter's disease, Sjögren syn., vasculitis, dermatomyositis, rheumatic fever, Crohn's disease, sarcoidosis, amyloidosis, end stage renal failure, drugs (eg. oral contraceptives, hydralazine, procainamide), obesity, smoking, idiopathic  
FALSE LOW - Polycythaemia, sickle cells, hypochromic microcytic anaemia, congenital heart disease, technical errors, drugs [eg. NSAIDs, corticosteroids, clofibrate]
- Phys: Two methods of determination:  
Wintrobe - fall of level of cells against plasma in fine tube held vertically for 1 hour.  
Westergren - more complex, but more accurate.  
ESR depends on the concentration of macromolecules in plasma, especially fibrinogen. ESR faster with macromolecules present. Nonspecific and inappropriate screening test

RI = reference interval

## POSSIBLE CAUSES OF LYMPHADENOPATHY

### Inflamed and/or enlarged lymph nodes

#### Infections

- Localised spread of viral or bacterial infection (superficial infective site, tenderness, erythema, fever)
- Septicaemia (fever, malaise, major organ infection)
- Tuberculosis [scrofula] (cough, haemoptysis, pustular lymph nodes)
- AIDS or primary HIV infection
- Actinomycosis (discharging sinuses, painless)
- Cytomegalovirus (fever, arthralgia, hepatomegaly)
- Filariasis (fever, oedema, orchitis)
- Toxoplasmosis (varied symptoms)
- Trypanosomiasis (apathy, neurological signs)
- Measles (rash, cough, coryza)
- Cat scratch disease (primary lesion, suppuration)
- Infectious mononucleosis (fever, malaise, splenomegaly)
- Brucellosis (fever, confusion, fatigue)
- Tularaemia (papule inoculation, fever, nausea)
- Plague (fever, headache, muscle aches)
- Syphilis (rash, varied tertiary symptoms)
- Mesenteric lymphadenitis (abdominal pain, fever, nausea)
- Lymphogranuloma venereum (inguinal nodes)
- Gonorrhoea (urethral discharge, dysuria)

#### Syndromes

- AIDS (splenomegaly, fever, cachexia, skin lesions)
- Chronic fatigue syn. (weakness, fever)
- Felty syn. (splenomegaly, migratory arthritis)
- Haemophagocytic syndrome (infection, fever, splenomegaly)
- Heerfordt syn. (uveitis, sarcoidosis)
- Idiopathic lymphadenopathy syn. (homosexual)
- Kawasaki syn. (rash, fever)
- Letterer-Siwe syn. (fever, rash, infant)
- Mikulicz syn. (parotitis)
- Sicca syn. (dry mouth, dry eyes)
- Uveoparotid syn. (uveitis, facial paralysis)

#### Other

- Leukaemia, chronic (pallor, malaise)
- Metastatic carcinoma
- Eczema
- Haemolytic anaemia
- Rheumatoid arthritis (joint pain)

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SLE (systemic lupus erythematosus)  
Hand-Schuller-Christian disease (eczema, infections)  
Sarcoidosis (splenomegaly, skin lesions)  
Hodgkin's disease (fever, fatigue, pruritus)  
Thyrotoxicosis (sweating, heat intolerance)  
Immunisation  
Serum sickness  
Lymphomas  
Lyme disease (myalgia, rash)  
Branchial cyst and other developmental remnants may be confused with lymph nodes  
Drugs (eg. phenytoin)

## LEUKAEMIA

Leukaemia is cancer of the white blood cells (leucocytes). Primitive white blood cells are formed in the bone marrow then gradually change into many specialised different types of cell, and so there are many types of leukaemia. At the simplest level, leucocytes are divided into two groups called lymphocytes and myelocytes. Cancer in these can cause lymphocytic (or lymphatic) leukaemia and myeloid leukaemia.

There are two other large divisions in leukaemia - the rapidly developing forms (acute leukaemias), and the slowly developing forms (chronic leukaemias). Combining these there are four possible combinations - acute lymphocytic, acute myeloid, chronic lymphocytic and chronic myeloid leukaemia. There are many less common types of leukaemia known (eg. hairy cell leukaemia, T cell leukaemia, myelocytic leukaemia, myelomonocytic leukaemia - Naegeli's leukaemia).

### ACUTE LYMPHOBLASTIC LEUKAEMIA

Acute lymphoblastic (lymphocytic OR lymphatic) leukaemia (ALL) is the most common form of leukaemia in childhood and usually starts between three and seven years of age, but only 33 in every one million children will develop any form of leukaemia. 20% of this type occurs in adults. It is now believed that the seeds of this form of leukaemia develop in the foetus but only activate in later life due to unknown stimuli.

Tiredness, recurrent infections, bruising, nose bleeds and bleeding from the gums are the main symptoms. Children develop progressively more severe infections, including skin infections, abscesses and pneumonia. Bleeding into joints may cause arthritic pains, and the liver, spleen and lymph nodes in the neck, armpit and groin may be enlarged. The child may become very ill with multiple serious infections.

The diagnosis is confirmed by blood tests and a biopsy of bone marrow.

Treatment will continue intermittently or continuously for some years, and a wide range of drugs are used, including cytotoxics and immunosuppressants, all of which have significant side effects. Constant monitoring and testing of the patient is required. Other treatments include blood transfusions, radiotherapy, spinal injections and bone marrow transplants.

Acute lymphoblastic leukaemia can be cured in 60% of children, and 95% achieve some remission. Adults have slightly poorer results.

### ACUTE MYELOID LEUKAEMIA

Acute myeloid leukaemia (AML) is normally a disease of the elderly but may also occur in children and young adults. The symptoms include tiredness, recurrent infections, bruising, nose bleeds, bleeding from the gums and joints, and enlargement of the liver, spleen and lymph nodes. Serious bleeding into organs and rapidly progressive infection may occur.

The different types of leukaemia are differentiated by specific blood tests and a bone marrow biopsy. The marrow biopsy is usually taken from the breast bone or the pelvic bone under local anaesthetic.

Cytotoxic and immunosuppressant drugs are used initially in treatment, but later blood transfusions and intensive radiotherapy are commonly required. Bone marrow transplants are possible in younger patients.

70% of adults can be given remission but fewer than 30% can be cured. If bone marrow transplantation is possible in younger patients, the cure rate rises to 50%.

### CHRONIC LYMPHOCYTIC LEUKAEMIA

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Chronic lymphocytic (lymphatic) leukaemia is a very slowly progressive form of leukaemia found almost exclusively in the elderly. Most patients have only vague symptoms of tiredness or enlarged lymph nodes. The liver and spleen may enlarge, and in severe cases bleeding from nose and gums and into the skin may occur. The diagnosis is frequently made after a routine blood test for another reason.

Because of its slow progress many patients are given no treatment, but if it becomes more active, steroid and cytotoxic drugs are given. Severe anaemia or excessive bleeding may require an operation to remove the spleen. The disease is slowly but relentlessly progressive, with an average survival time of eight years, but because the patients are elderly, they frequently succumb to other diseases before the leukaemia.

### CHRONIC MYELOID LEUKAEMIA

Chronic myeloid leukaemia (CML) is a slowly progressive form of leukaemia that occurs in middle-aged to elderly people. Patients complain of an intermittent fever, tiredness, excessive sweating and fullness in the abdomen. The spleen may also be enlarged. It is often discovered incidentally on a routine blood test, then the diagnosis is confirmed by further blood tests and a bone marrow biopsy.

There is no great urgency in treatment until the level of abnormal leucocytes reach certain levels, then cytotoxic or immunosuppressive drugs are given. Medication does not cure the disease, but slows its progress and makes the patient feel better. Another form of treatment is bone marrow transplantation but finding a compatible donor is difficult.

Once blood tests deteriorate to the point where treatment is necessary, on drug therapy alone the average survival time is four years. If a donor can be found and marrow can be transplanted, 60% of patients can be cured.

### HAIRY CELL LEUKAEMIA

Hairy cell leukaemia is a rare progressive chronic leukaemia that usually occurs in males over 40 years of age. Tiredness, enlarged lymph nodes and spleen and bleeding into the skin are the main symptoms, but serious infections due to destruction of leucocytes may also occur. It is diagnosed by blood tests and bone marrow biopsy.

The drug cladribine has been remarkably successful in inducing remissions, but splenectomy is the main form of treatment. 60% of patients survive for four years, but a permanent cure is uncommon.

## CURIOSITY

### SCROFULA

*Scrofula ("king's evil") is an uncommon form of tuberculosis that occurs in the lymph nodes of the neck in areas with very poor hygiene. In the Middle Ages it was thought that it could be cured by the touch of a king, thus giving the disease its nickname.*

*Large, hard masses develop in the lymph nodes of the neck and they may drain pus out onto the skin. In severe cases the infection may spread from the lymph nodes to other organs including the lungs, brain and heart. The bacterium *Mycobacterium tuberculosis* is responsible.*

*Swabs taken from discharging lymph nodes are examined to confirm the diagnosis.*

*Treatment involves cutting out the affected lymph nodes and giving antituberculous medications. Results are good with appropriate treatment, but permanent scarring usually occurs.*

## TOTALLY, COMPLETELY AND UTTERLY USELESS INFORMATION

*A **Sister Mary Joseph's nodule** is a raised umbilical nodule that is often erythematous and painless. It is caused by a disseminated intra-abdominal malignancy (eg. ovarian or gastric carcinoma) and retrograde lymphatic spread of the carcinoma to form an umbilical deposit.*

### ADVERTISEMENT

"Carter's Encyclopaedia of Health and Medicine" is available as an app for iPod, iPhone and iPad from Apple's iTunes store.

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