Acute pharyngotonsillitis

Most of the time, acute pharyngotonsillitis is of viral origin. Only 5-10% of sore throats in adults are due to bacterial infections compared to 25-30% in children. Group A β-haemolytic *Streptococcus pyogenes* (GABHS) remains the most common bacterial cause. Because of its ability to cause rheumatic fever, glomerulonephritis, and other septic complications it needs to be differentiated from viral and other aetiologies. Treatment with antibiotics has been shown to prevent the development of rheumatic fever and septic complications, but not the development of glomerulonephritis. Fortunately, there has never been a GABHS isolate that showed resistance to penicillin.

Bacterial tonsillitis

GAHBS

- Humans are the natural reservoir
- Infections are more common in autumn and winter
- Peak incidence between 5-6 years
    - Second peak between 12-13 years
- Several pathogenic mechanisms
    - Patient factors (cytokines)
    - Enzyme production (streptolysin)
    - Cell wall factors (hyaluronic acid)
    - Exotoxins (A&B)

Symptoms of infective pharyngotonsillitis are not specific enough to differentiate between the different infective causes (bacterial versus viral). Symptoms in general include sore throat, fever, dysphagia, and halitosis. Symptoms in favour of acute viral pharyngitis include rhinorrhoea, cough, conjunctivitis, hoarseness, stomatitis, ulcer(s), diarrhoea. Therefore, the question remains how can we diagnose a bacterial pharyngitis and GABHS in particular? We advise using the **modified Centor criteria**. It can only be applied in patients with recent onset (≤3 days) acute pharyngitis. A score of more than 3-4 points correlates with a bacterial infection, and thus antibiotic use.

Modified Centor criteria

Criteria		Points
Age	< 3	0
	3-14	+1
	15-44	0
	> 44	-1
Cough	Present	0
	Absent	+1
Tonsillar exudates / swollen		+1
Temp > 38°C		+1
Anterior cervical lymphadenopathy		+1

Other options to diagnose a possible GABHS include:

- Rapid antigen testing
- Throat swab (PCR as well)
- Nucleic Acid Amplification Techniques (NAATs)

The following link gives a nice overview of subject: https://www.frontiersin.org/journals/cellular-and-infection-microbiology/articles/10.3389/fcimb.2020.563627/full.

Treatment of acute bacterial tonsillitis

- Antibiotics
    - Penicillin / Amoxicillin
        - Pen VK (30 minutes before meals)
            - 250 mg BD po x 10/7 (<27 kg)
            - 500 mg BD po x 10/7 (>27kg)
        - Amoxicillin
            - Children
                - 50 mg/kg OD po x 10/7 (max 1000 mg)
            - Adults
                - 500-1000 mg BD po x 10/7
    - B-lactam allergy
        - Children
            - Azitromycin 10-20 mg/kg/d OD x 5/7
            - Claritrhomycin 15 mg/kg/d in two dosages x 10/7
        - Adolescents and adults
            - Azitromycin 500 mg OD po x 3/7
            - Clarithromycin 500 mg BD x 10/7
- Supportive treatment
    - Adequate fluid intake
    - Pain relief – panado
        - Aspirin is contraindicated because of the risk of Reye's syndrome (encephalopathy and liver failure)
    - Rest

Please refer to the following article on the dosages: https://scielo.org.za/pdf/samj/v105n5/16.pdf

Complications due to infective (bacterial) pharyngotonsillitis includes:

- Infective
    - Peritonsillar abscess
        - Also known as Quincy abscess
        - Between tonsil and lateral pharynx wall
        - Follows after bacterial pharyngitis
        - Pain persists and increases
        - Odynophagia and dysphagia
        - Trismus and drooling
        - Grave prognosis in medical history
            - Due to spread down in neck
            - Not so anymore with treatment
        - Treatment
            - Surgical treatment changed that
                - Aspiration
                    - Preferred method
                    - You need to be able to do this at GP level
                    - See technique at the end of this chapter
                - Surgical drainage with scalpel blade
                - "Hot" tonsillectomy
            - Antibiotics
        - Almost immediate improvement
    - Parapharyngeal abscess
    - Deep neck space abscess
    - Septic shock
- Non-infective
    - Rheumatic fever

    - Glomerulonephritis
    - Paediatric auto-immune neuropsychiatric disorder
        - Sudden and rapid onset of obsessive–compulsive disorder (OCD) and/or tic disorder symptoms
    - Scarlet fever
        - Red rash. The rash looks like a sunburn and feels like sandpaper. It typically begins on the face or neck and spreads to the trunk, arms and legs. Pushing on the reddened skin makes it turn pale.
        - Red lines. The folds of skin around the groin, armpits, elbows, knees and neck usually become a deeper red than the other areas with the rash.
        - Flushed face. The face may appear flushed with a pale ring around the mouth.
        - Strawberry tongue. The tongue generally looks red and bumpy, and it's often covered with a white coating early in the disease.

Other specific entities

Ebstein Barr Virus

- Infective mononucleosis (kissing's disease)
- 90% of adults are seropositive for EBV
- Incubation of 3-7 weeks
- Prodrome of malaise, fever and chills for 1 week
- Followed by sore throat, exudative tonsillitis, lymphadenopathy
- Lymphadenopathy "out of proportion" in relation to the disease
    - Frequently causes acute onset sleep disordered breathing in children
- Hepatosplenomegaly is found in 50% of cases
    - Complicates the diagnosis because of simulating haematological malignancy
- Diagnosis
    - Clinical picture
    - EBV antigens
    - Atypical lymphocytes
- Treatment
    - Symptomatic
    - Penicillin causes a maculopapular rash in 95% of pt
    - Consider 2-3 days of steroids to reduced the size of the lymphoid tissue
- Complications
    - Secondary bacterial infection
    - Acute enlargement of lymphoid tissue with airway obstruction
    - Neurological – Guillain-Barre syndrome, meningitis, encephalitis, cranial neuropathies

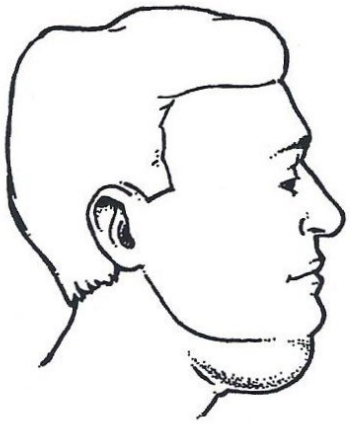
HIV seroconversion

Seroconversion is a short, flu-like illness that occurs in most people after contracting HIV. The symptoms of seroconversion usually appear one to four weeks after infection and can include:

- Sore throat
- Fever
- Rash
- Swollen lymph nodes in the neck, armpits, and groin
- Joint or muscle pain
- Headache
- Mouth ulcers
- Diarrhoea
- Weight loss
- Tiredness

Ludwig's Angina

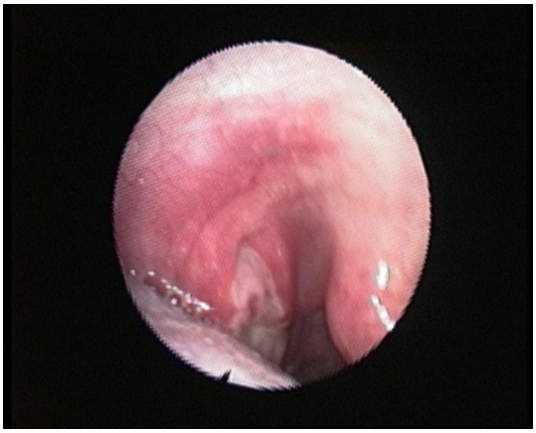
- Floor of mouth cellulitis usually secondary to odontogenic infections
- Mixed flora
- Cellulitis rather than abscess formation
- Commonly associated with HIV
- Treatment
    - AB
    - Airway management
        - Traditionally a tracheostomy
        - Nowadays high care units with airway monitoring
        - Consider stat dose of steroids
    - Refer urgently to Maxillofacial Surgery



Ludwig's angina. Note the brawny neck swelling, the ill appearance of the patient and the saliva drooling from the mouth.

Differential diagnosis of a membrane in the throat

- GABHS
    - Scarlet fever
- Candidiasis
- Diphtheria
- EBV (infective mononucleosis: dirty appearing tonsils)
- Agranulocytosis
- Vincent angina (necrotizing tonsillitis caused by fusobacteria or spirochete infections)



Endoscopic picture of right tonsil demonstrating the "dirty" appearance in EBV.

Adenotonsillectomy

The tonsil (palatine tonsil), adenoid, tubal tonsil, lingual tonsil, and numerous small lymphoid collections form part of Waldeyer's ring which is part of the mucosa associated lymphoid tissue (MALT). Apart from natural defenses (such as skin), these are the first line of defense. The lymphoid tissue consists mainly of B-lymphocytes (65%) and can produce immunoglobulins. T-lymphocytes make up 30% of the lymphoid tissue. The tissue is most active between the ages of 4-10 years. The ability to produce mainly immunoglobulins is also the tonsils' greatest limitation. It does not have the ability to kill more complex organisms, nor can it utilize the rest of the immune system to help. This is precisely the reason why certain patients develop repeated infections.

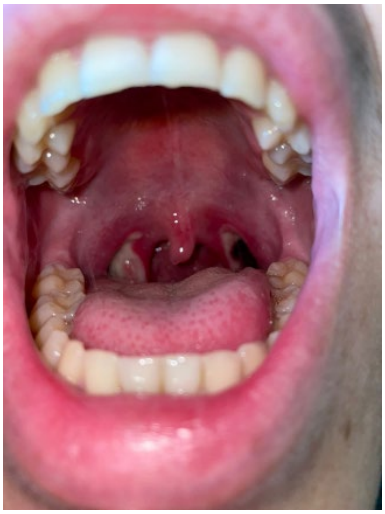
The first tonsil operations were done around 2000 years ago. It remains one of the most common operations, and in many cases is a patient's first contact with doctors and hospitals. It is estimated that one in eight children in America have their tonsils removed (>500 000/year). Three quarters of the operations are done for obstructive complaints. In South Africa more children are referred for repeated infections, and more focus should be placed especially on identifying children with obstructive symptoms.

As you will see in the indication for an adenotonsillectomy below, two conditions that are of vital importance to identify are obstructive sleep apnoea syndrome (OSAS) and suspected cancers. Chronic adenotonsillar obstruction leading to OSAS is the most common reason for an adenotonsillectomy in the world. It is mainly caused by exposure to passive smoking and chronic bacterial infection. These patients should be sent for a heart sonar to rule out or confirm pulmonary hypertension / cor pulmonale / congestive right heart failure. They may have facial features of “adenoid faces” such as an open mouth breathing, long faces, retrognathia, high palate, hypoplastic maxilla, small upper lip. These children should be preferably operated but only in hospitals with all the necessary infrastructure such as an PICU, paediatric anaethetist etc. Suspected cancer speaks for itself. A biopsy can be taken to investigate it further. The other indications are discussed below.

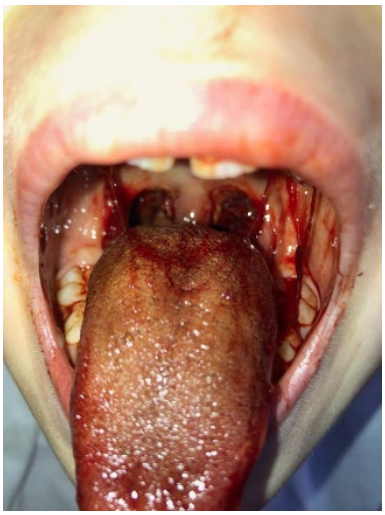
In most cases, there are no serious consequences / complications if it is decided not to remove the tonsils other than the two mentioned above. Complications of tonsillitis can be divided into infectious and non-infectious problems. Before the antibiotic era, dramatic infectious complications were described. These were mainly abscess formations in the throat (peritonsillar) and neck (retropharyngeal and parapharyngeal) but are fortunately very rare these days. Non-infectious complications are rheumatic fever, glomerulonephritis, paediatric auto-immune neuropsychiatric disorder, and scarlet fever. In South Africa we still have a high incidence of rheumatic fever following a GABHS. There are clinical criteria and laboratory investigations to identify a GABHS and this group of patients needs to be treated with antibiotics to prevent the development of rheumatic fever. An operation is also recommended in patients with already damaged heart valves from rheumatic fever, as well as in children in a community with a high incidence of rheumatic fever. Antibiotics does not prevent glomerulonephritis, but an operation is also recommended in the group to limit further damage. Remember that repeated use of antibiotics also has dangers. Antibiotics also destroy your commensal organisms (gut biome) and create the potential for a patient to be colonized with more resistant bacteria. Ironically, this is precisely a risk factor for more infections. There can also be severe gastrointestinal complications with the repeated use of antibiotics.

There are several dangers and complications that can occur post operatively. Patients should be aware of the common dangers, and then also potential serious and life-threatening complications. The global mortality figure is 1/30,000, however, we do not have any accurate figures in South Africa. In a recent study from the USA, it was found that the most common reason for death after surgery is related to medication overdose rather than bleeding (this was due to a genetic alteration in the codeine metabolic pathway and has not been described in South Africa). Parents should be very aware of the potential risk of overdosing children (especially with codeine containing medications). Bleeding from the raw tonsil bed occurs in 1%-10% of cases. This can be either early (<24 hours) or late (typically day 7-10). All post-tonsillectomy bleeds should be referred to a casualty department. As an interim measure you can advise the patient to suck on an ice cube. Remember that the patient will probably need to go to the theatre so instruct them not to eat or drink anything. In a casualty setting, you can use diluted hydrogen peroxide oral rinses (1-3% hydrogen peroxide gargles) or direct pressure with adrenaline-soaked gauze (if the patient is old enough and allows you) to try and stop the bleeding.

Pictures



Post-tonsillectomy picture with the “normal” greyish-white slough in the right tonsillar bed, and a blood clot in the left tonsillar bed.



Active post-tonsillectomy bleeding.

Another immediate complication is the “loss of the airway”. You need to be able, with your anaethetist, to manage an acute airway compromise in theatre / recovery room / in the ward. This is typically in the setting of and OSAS child with post-operative pulmonary oedema.

In rare cases, there can be velo-pharyngeal incompetence post-surgery. This causes a weak / funny voice and sometimes regurgitation of food / water through the nose while eating (this is why an adenoidectomy is a contra-indication in cleft palate patients). Fortunately, in most cases this will clear up spontaneously with time.

Chronic pain in the throat can rarely occur after an operation. Many more complications are described in social media, but these are the important ones.

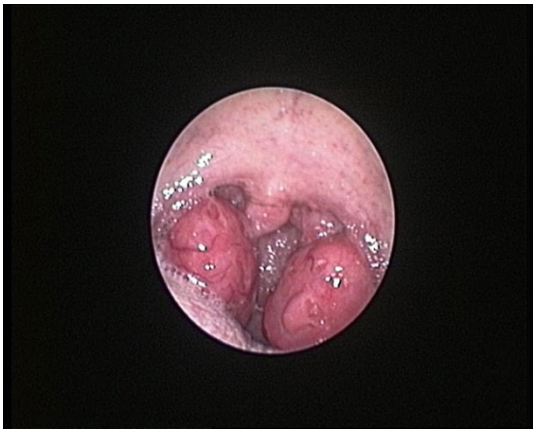
Yes, tonsils can grow back after complete removal (see techniques below – sometimes only a portion of the tonsil is removed). Although the tonsil is in a capsule, the lower part is sometimes continuous with the lymphoid tissue on the base of the tongue (lingual tonsil). There is also widespread lymphoid tissue all over the mucosal surfaces in the mouth and throat. In certain circumstances, this lymphoid tissue begins to enlarge and then fills the space where the tonsil was taken out, giving the appearance that the tonsil has grown back. Remember this also applies to the adenoid which does not have a true capsule to begin with. In these cases, the reason why this happened must be looked for, and in rare cases, the patients are operated on again.

Also remember that the normal incidence of pharyngitis (throat infections) is between 2-4 per year. So even if tonsils are removed, patients can get a sore throat after the operation. Furthermore, 90% of tonsil and/or throat

infections in children are viral and not bacterial. Remember we use repeated bacterial infection (and not viral) to decide to take out tonsils.

Indications for adenotonsillectomy

- Absolute
  - Suspected cancer
  - Obstructive sleep apnoea syndrome in children
    - Don't forget about adults, but a lesser role compared to children
- High priority
  - Repeated acute **bacterial** infections (Modified Paradise Criteria)
    - > 7 infections in 1 year
    - 5/year for 2 years running
    - 3/year for 3 years running
  - Repeated peri-tonsillar abscess
- Moderate
  - Repeated infections with
    - Multiple antibiotic allergies
    - Febrile seizures
  - Adults with OSAS
  - Halitosis (especially in adults)
    - Tonsilloliths (tonsil stones)
      - The tonsil surface has small slits / pouches. These can become blocked by food and tonsil secretions. In certain cases, this results in yellow-gray cheesy hard granules that can be squeezed out. This gives rise to especially bad breath (halitosis) and chronic sore throat. Most patients decide in favour of an operation.
  - Children with sleep disordered breathing and severe snoring, and possible enuresis / learning difficulties / emotional problems
  - Severe adenotonsillar hypertrophy with
    - Speech problems
    - Malocclusion
    - Swallowing problems – dysphagia to solids
- Maybe (Case-by-case individualised decision)
  - Infections with
    - GABHS carrier status
    - Rheumatic fever
    - Periodic fever, aphthous ulcers, pharyngitis, cervical adenopathy (PFAPA syndrome)
    - Chronic tonsillitis
  - Children with repeated AOM / OME
    - Adenoids can be removed separately in this group (see otology lectures)



Endoscopic picture of tonsillar hypertrophy.

Contra indications

- Bleeding tendencies
- Cleft palate
    - Occult cleft palate
- Age – relative. Be careful to operate the very young.

Technique

There are two main types of surgery, namely partial or complete tonsillectomy. A partial tonsillectomy has become more popular in European countries after a number of post-tonsillectomy deaths. Some of the newer instruments describe below also lend themselves better to partial techniques (guillotine tonsillectomies are still performed in some countries). Another way to describe it is extra-capsular versus intra-capsular techniques. Most intra-capsular techniques also aim to remove as much (near total) of the tonsil as possible.

In an extracapsular tonsillectomy the first step of the operation is to identify the capsule, which is the deep surface of the tonsil. Now there are several techniques for physically dissecting tissue, and this is where the differences come in. The choices include cold steel instruments, electric current instruments (bipolar and monopolar), plasma field energy instruments (coblation), CO2 laser, ultrasonic instruments (hormonic scalpel), radio frequency instruments and "powered" instruments (shavers). Worldwide, cold steel and bipolar forceps technique are the most common. Of course, there are a lot of personal preferences involved and also a lot of myths about what is best. There may also be additional techniques such as injecting local anesthetics and/or other fluids before or after the time. Stitches can also be inserted, just at the base or the entire length of the tonsil bed. The adenoid is usually removed through the mouth with curved instruments by scraping it out or "coblation" instruments. I prefer to do this under vision, by looking down the nose with a small rigid endoscope but many ENTs does this either blindly or with a mirror. Hemostasis is achieved by using different packs and/or the instruments as mentioned above.

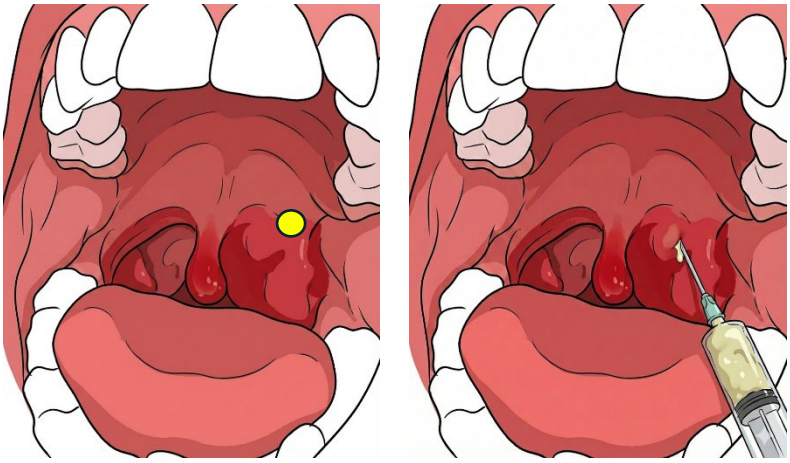
An intracapsular tonsillectomy can only be done with the newer type of instruments (plasma field instruments, ultra-frequency instruments). The core argument in favour of using intracapsular techniques rest on the principal that the diameter of blood vessels that enter the tonsil, after penetrating the capsule, halves in diameter. Therefore, it is mostly a bloodless dissection, requiring less haemostasis and therefore have less post-operative pain. The downside is the potential higher incidence of tonsillar regrowth and re-operations later.

A differential diagnosis for a “sore throat” includes

- Infective
    - Viral most common
        - Adenovirus, Coxsackie A virus, Influenza virus, Parainfluenza virus, Epstein Barr virus
    - Bacteria (5-30%)
        - Group A β-haemolytic *Streptococcus pyogenes* (GABHS)
        - Other
    - Fungi
        - Candida
    - Granulomatous
- Other
    - Irritant
    - Reflux
    - Tumours
    - Auto-immune
    - Trauma
    - Neuralgias

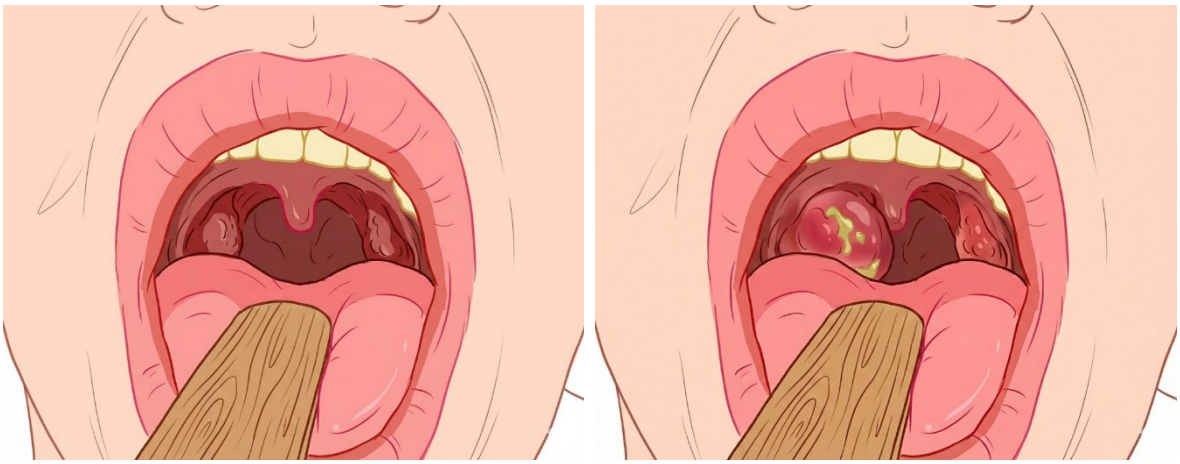
Aspiration of a peri-tonsillar abscess

Fortunately, it is uncommon in children, and the majority of patients are adults. Have the patient sit up and breath through the mouth. Trismus is common and can impair visualising the oropharynx. Inspect the oral cavity / oropharynx while using a headlamp and having both hands free. A peri-tonsillar abscess will produce varying degrees of swelling supero-lateral to the normal tonsil, pushing the uvula to the contra-lateral side. It is not unusual to have lymphadenopathy in the neck, but in severe cases the neck might have a generalised swelling due to deep neck space infection. Having accessed how wide the patient can open their mouth, decide on an appropriately sized syringe (if possible at least 10 ml) and attach a tick bore needle. If you are afraid of injuring vascular structures (internal carotid) deep to the abscess, a trick is to wind Sellotape / plaster 1.5 – 2 cm from the tip of your needle as a gauge not to insert the needle deeper. Aim for the area of maximum swelling (usually halve way between the uvula and ramus of the mandible. As you insert the needle, apply suction on the syringe. As soon as you aspirate pus, stop advancing and aspirate till no more pus comes out. Remember to send a MCS sample of your pus. Sometimes this needs to be repeated at intervals (12-24 hours). On average you will get less than 10ml of puss, but we have had patients with 70ml! Rarely, one sees a patient having all the features of a peri-tonsillar abscess, but you get no puss on aspiration. It is advisable that if you have any concerns to re-aspirate in 12-24 hours. The pictures below demonstrate the procedure.



The left picture demostrates a left sided peri-tonsillar abscess with the yellow spot indicating where you will aim. The right picture shows the pus after aspiration.

Sometime, an asymetrical tonsillar enlargement might fool you into thinking it is a peri-tonsillar abscess as shown below.



The picture on the left shows a normal throat with the picture on the right showing a massively enlarge (infected) unilateral tonsil. This is very suspicious for lymphomas and should be referred to an ENT.