Common Neck Swellings

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Swellings of the neck pose a common diagnostic challenge for surgeons, but a systematic approach will enable a correct diagnosis to be achieved quickly and safely. A basic understanding of the anatomy of neck structures, familiarity with common pathology, and a thorough examination technique will often allow a working diagnosis. When this is combined with the technique of fine needle aspiration cytology (FNAC) and other selected investigations such as ultrasound, it is nearly always possible to reach a diagnosis before contemplating any surgical intervention. This allows correct surgical planning, which is obviously in the best interest of both the patient and the surgeon.

This article outlines a strategy for assessment of neck swellings and discusses the presentation and management of the more common swellings encountered in clinical practice.

History and examination

As always a thorough history is essential and gives important clues to the origin of the swelling. There are three key areas to the history:

- history and symptoms of the swelling, including pain, duration and fluctuation in size.
- head and neck symptoms, such as throat pain, otalgia, dysphagia and voice changes
- symptoms of systemic illness, such as fever, malaise, weight loss and night sweats.

By convention the neck is divided anatomically into the anterior and posterior triangles. The posterior triangle is bounded by the trapezius muscle, the middle third of the clavicle and the posterior border of the sternocleidomastoid muscle. The anterior triangle is bounded by the anterior border of the sternocleidomastoid, the mandible and the mid-line of the neck anteriorly. In clinical practice the sternocleidomastoid muscle and the underlying structures are generally considered to be in the anterior triangle, though this is a controversial anatomical issue.

As well as determining the shape and size of any swelling, it is important to ascertain its relationship to surrounding tissues such as skin, muscles (relaxed and tensed), trachea (movement on swallowing) and hyoid bone (movement with tongue protrusion). FNAC of the swelling should also be conducted to obtain fluid, pus or cellular material for cytology or bacteriology. One should be able to answer four initial questions after examination.

- Is there more than one swelling?
- Where is it? (anterior/posterior triangle and level)
- Is it solid or cystic?
- Does it move on swallowing?

Based on this information it is often possible to arrive at a sensible differential diagnosis.

Commonly encountered neck swellings

Cervical lymph node enlargement

Enlargement of the cervical lymph nodes is the most common causes of a swelling in the neck. The three main causes of cervical lymph node enlargement are:

- infection
- metastatic tumour
- primary reticuloses.

When describing the location of an enlarged cervical lymph node, it is useful to refer to the levels of the neck as described by the Memorial Sloan-Kettering group (Figure 2). This describes a number of levels or regions in the neck that represent the first echelon lymph node sites for metastases from head and neck cancer primary sites. Specific anatomical areas of the head and neck characteristically drain to specific groups of nodes, such that an enlarged node at a particular level may give some clue as to the site of a primary malignancy or other area-specific pathology. For example, in 20% of nasopharyngeal carcinomas the initial mode of presentation is multiple bilateral nodes in the posterior triangle (level 5).

Infective lymphadenopathy

Nonspecific inflammatory lymphadenopathy commonly accompanies or follows an episode of acute tonsillitis, pharyngitis or laryngitis, and typically affects the upper deep cervical (level 2) lymph nodes (jugulodigastric or 'tonsillar' lymph node). Enlargement of posterior triangle neck nodes may occur as a result of nonspecific systemic viral infection.

Infectious mononucleosis usually affects young adults and is associated with clinical features of Epstein-Barr infection such as sore throat, fever, palatal petechiae, splenomegaly and a monocytosis on blood film.

Cat scratch disease manifests as acutely tender lymphadenopathy and is caused by small pleomorphic Gram-negative bacilli in the walls of capillaries and lymph node macrophages. Up to 90% of patients give a history of contact with cats and a primary papule often develops at the site of a scratch. The papule subsides over a few weeks and can be helpful in diagnosis.

Toxoplasmosis is caused by *Toxoplasma gondii*, a protozoan transmitted via cysts excreted in the faeces of infected cats or by eating undercooked meats. The acute infection presents with fever, aches and pain, but chronic toxoplasmosis may present with an isolated lymphadenopathy.

Tuberculous cervical adenitis - the enlargement of the node is usually painless and longstanding, though it can become suddenly painful if the node grows rapidly and necroses. Usually, patients are young immigrant adults or are elderly. Up to 50% of cases are associated with sinus formation, skin involvement and cold abscesses. In 90% of patients, tuberculous

cervical adenitis occurs in a single nodal group, usually the deep jugular chain.

In children, atypical mycobacterium infection may cause enlargement of lymph nodes in salivary glands.

Diagnosis is by a positive skin test, demonstration of acid-fast bacilli in the lymph node biopsy or possibly on FNAC, and positive culture.

Metastatic cervical lymph node enlargement: tumour may metastasize to cervical lymph nodes from any site but more commonly the site of the primary is in the head and neck region.

It is possible to predict the site of the primary tumour based on the distribution of cervical metastases (see above).

The patient generally complains of painless lumps, often seen or felt by chance. It is essential to perform a thorough head and neck examination when a lump is suspected as being a malignant node. This includes the draining cutaneous sites and the upper aerodigestive tract (ie, fibre-optic examination of the pharynx and larynx). The chest, abdomen and other superficial lymph node sites should also be examined.

Most head and neck primary tumours are squamous cell carcinomas and, even when a primary tumour is not obvious, it is usually possible to get a diagnosis by FNAC. This should be the first line of interventional investigation because performing an excision biopsy of a lymph node containing metastatic squamous carcinoma complicates treatment planning, increases the chance of local recurrence and may reduce 5-year survival.

Primary neoplasms of lymph nodes: lymphomas of any histological type can affect the cervical lymph nodes. The nodes are typically non-tender, smooth, and often rubbery in consistency. FNAC may suggest a diagnosis of lymphoma, though it is usually necessary to perform formal lymph node biopsy to obtain a diagnosis.

Neck swellings of the thyroid gland

Neck swellings of the thyroid gland are covered in detail elsewhere in this issue, but of particular note is the fact that the most common presenting feature of papillary thyroid carcinoma is a solitary cervical lymph node with no palpable abnormality of the thyroid gland.

Neck swelling of salivary gland origin

Anatomical position

Parotid: parotid swellings characteristically arise in the retromandibular sulcus, the immediate pre-auricular area, over the masseter, or in all of these areas and extending antero-inferiorly if the whole gland is involved.

Submandibular: arises in the submandibular triangle. The gland lies 2-3 cm in front of the anterior border of the sternocleidomastoid muscle. Bimanual palpation with one finger in the mouth assists in determining the size and physical characteristics of the gland.

Causes of salivary gland enlargement

Ageing: The submandibular gland, and to a lesser extent the parotid gland, becomes more prominent with age. This is because of slackening of the deep cervical fascia and the absorption of adipose tissue in the ageing process such that the glands become more obvious and palpable.

Inflammatory causes: There are many potential inflammatory causes of diffuse salivary gland enlargement.

Sialectasis is a salivary gland analogue of bronchiectasis. It is associated with progressive necrosis and disintegration of the alveoli, the debris from which blocks the duct system and causes hypertrophy, stenosis and duct dilatation.

Calculi (sialolithiasis) are more common in the submandibular gland, which is a mixed seromucinous gland that secretes high levels of calcium. The debris from sialectasis therefore calcifies more easily than in the serous parotid gland, in which the secretions are low in calcium.

Sjögren's syndrome is an autoimmune condition associated with lymphocytic infiltration of the salivary glands and lacrimal glands. It causes gland enlargement, usually of the parotid, in 40% of patients. Lacrimal gland involvement causes a xerophthalmia. Xerostomia, which results from decreased salivation, and xerophthalmia are classic features of this condition and are sometimes known as sicca complex. The disease will progress to a lymphoma in 1 in 6 patients.

Infective causes: Infection may arise as a sequela to inflammation of the salivary gland but may also occur spontaneously.

Viral parotitis as a result of mumps is common in childhood but the incidence of viral parotitis in young adults is also increasing owing to infection by echo or coxsackie viruses.

Acute bacterial parotitis is traditionally associated with elderly or infirm patients with poor oral hygiene.

Granulomatous parotitis tuberculosis must be considered in the differential diagnosis of acute or chronic salivary gland enlargement, especially in areas where tuberculosis is endemic. Tuberculosis of the parotid gland is usually a localized disease not associated with typical systemic symptoms, and thus there is often a delay in diagnosis. Atypical mycobacteria, usually *Mycobacterium avium* complex, may cause acute parotitis in children.

Intraglandular lesions: Lymph node enlargement in or around the glands can cause apparent gland enlargement. In particular, lesions of the skin of the ear and scalp can present in

this way.

Intraglandular cysts may occur in either gland. Multiple cysts causing bilateral parotid gland enlargement are a feature of HIV infection.

Neoplasms: About 80% of salivary gland neoplasms occur in the parotid gland, 80% of which are benign. When they occur, 80% of malignant salivary tumours arise in the parotid. Submandibular gland tumours account for 10% of salivary gland neoplasms but 50% of these are malignant. Malignancy of a submandibular swelling is suggested by an indurated tumour with an irregular surface and fixity of the mass on bidigital examination.

Pleomorphic adenomas (Figure 3) account for 85% of benign parotid gland tumours, the next most common being Warthin's tumour (adenolymhoma). Most benign parotid tumours occur in the lower posterior part of the gland. Pleomorphic adenomas present as round, firm, relatively well-demarcated tumours and have a tendency to nodularity as they grow. They are most commonly found between the ascending ramus of the mandible anteriorly, and the mastoid process and sternomastoid posteriorly. Warthin's tumours usually occur in elderly men, are ovoid in shape, are found in the lower pole of the gland and often feel soft on palpation. They may also occur bilaterally.

Whenever a parotid neoplasm is suspected it is essential to perform an intra-oral examination to determine whether there is deep lobe or parapharyngeal involvement as evidenced by the palate and the tonsils being pushed inwards.

Rare causes

Metabolic causes of salivary gland enlargement include myxoedema, Cushing's disease, gout, bulimia and alcoholism.

Drug-induced salivary gland enlargement may be the result of administering coproxamol, thiouracil or oral contraceptives.

Pseudoparotidomegaly may mimic sialomegaly. Causes include hypertrophic masseter, winged mandible, dental cyst and a facial nerve neuroma.

Congenital neck masses

Thyroglossal cysts

Thyroglossal cysts (Figure 4) are the most common mid-line neck cysts. They are thought to develop from active epithelial cells in the thyroglossal duct, which is a persisting remnant of the medial thyroid anlage. The thyroglossal duct can theoretically run from the thyroid gland, intimate to the hyoid bone, and end in the foramen caecum of the tongue. The reason for the cystic changes in the epithelial cells is unknown. They may contain elements of thyroid tissue

or even be the sole source of functioning thyroid tissue.

Thyroglossal cysts may present at any age, though the mean age is 5 years. 90% of cysts present in the mid-line, while 10% present laterally, of which 95% are on the left side, 75% occur at the pre-hyoid level, with the remainder presenting at the thyroid cartilage, cricoid cartilage or above the hyoid.

Thyroglossal cysts move on swallowing and when the tongue is protruded, because they are attached to the hyoid bone superiorly or the thyroid gland inferiorly. 15% have a fistula or sinus at presentation, which can cause difficulties in excision and lead to higher recurrence rates. An infected cyst should therefore be treated by repeated needle aspiration and long-term antibiotics rather than incision and drainage.

The preferred method of excision is by the Sistrunk procedure in which the mid-portion of the hyoid bone is removed in continuity with the cyst and tract, and preferably with some of the tongue base muscle. An ultrasound scan is recommended before excision to ensure the presence of a thyroid gland.

Dermoid cysts

Dermoid cysts present as solid or cystic painless masses in the neck, between the suprasternal notch and the submental region. They do not move with swallowing or tongue protrusion. There are three types.

Epidermoid cysts are lined only with squamous epithelium.

True dermoids often occur in the mid-line, lined with squamous epithelium and all other normal skin appendages.

Teratoid cysts are lined by respiratory or squamous epithelium and contain endodermal, ectodermal and mesodermal elements (eg, nails, teeth, thyroid, brain tissue).

Lymphangiomas

Lymphangiomas arise following an abnormality in the development of the embryonic lymphoid system, and therefore most present at birth or in the first few years of life. They may present later in life, however, when haemorrhage or infection causes a significant expansion in size in an existing lymphangioma.

Cystic hygromas are large lymphangiomas that occur in the neck and expand along the lax tissue planes. They are soft and cystic on palpation and usually transilluminate. Pressure effects on adjacent structures as they enlarge may lead to airway obstruction, or brachial plexus injury.

Developmental swellings

Branchial cysts

There is some controversy as to the origin of branchial cysts, though the most widely accepted theory is that they arise from epithelial inclusions in lymph nodes, rather than as an anomaly of branchial apparatus development. The evidence for this is that most branchial cysts have lymphoid tissue in their walls, a branchial cyst in a neonate is almost unknown and they have no internal opening.

The peak age of incidence is at 30 years and the male to female sex ratio is 3:2. Two-thirds of cases occur on the left side and one third on the right, with 2% being bilateral.

Two-thirds of branchial cysts are found anterior to the sternocleidomastoid in the upper third of the neck. The remaining one-third are found in the upper and lower third of the neck, and in other sites such as the parotid, pharynx and posterior triangle.

Most present as a non-tender, persistent swelling, though 20% present as intermittent swellings and 15% with infection, usually after an upper respiratory tract infection.

On FNAC they are classically said to contain a straw-coloured acellular fluid, rich in cholesterol crystals. In a clinical setting, however, they are commonly found to contain a creamy or turbid fluid. Treatment is by excision.

Parapharyngeal swelling

Parapharyngeal lesions may expand either medially, displacing the tonsil towards the mid-line, or by lateral displacement of the retromandibular portion of the parotid gland, thus presenting as a diffuse swelling in the upper deep cervical area. The most common cause is lymph node enlargement in the parapharyngeal space, though they may also result from deep lobe parotid tumours, lipomas and neurogenous tumours (eg, neurofibromas, paragangliomas).

Practice points

➤ Cervical lymph node enlargement is the most common cause of a swelling in the neck.

➤ A thorough examination of the upper aerodigestive tract is an essential step in the assessment of a neck lump.

➤ Fine needle aspiration of the neck lymph should be the first line interventional investigation - not excision biopsy.

➤ It is possible to predict the site of a primary tumour based on the distribution of cervical metastases.

➤ If in doubt, seek the advice of an otolaryngologist or head and neck surgeon.