Establishing the differential diagnosis of neck lesions

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A thorough physical examination of the head and neck should be included as part of the evaluation of every dental patient. Although they most often represent a self-limited inflammation, a benign neoplasm, or a congenital anomaly, neck lesions can also be malignant. Because the pathologic lesions that can arise in the neck are varied and diverse, the diagnostic thought process should be orderly and inclusive so that a reasonable differential diagnosis can be established and prompt, effective treatment can be rendered.

(Key words: classification, differential diagnosis, neck lesion, physical examination, tumor)

Anatomically, the neck constitutes only a small percentage of the total body area, but it contains many vital anatomic structures and diverse tissue types. Consequently, the pathologic lesions that can arise in the region are equally as varied and diverse. An examination of the neck for lesions should be included in the evaluation of every dental patient.

Various classifications of neck lesions have been proposed. Some are based on anatomic location, i.e., median or paramedian swellings of the neck, while others are based on tissue of origin. Sarnat and Shour differentiated between primary and secondary swellings, while Sedgwick divided the swellings into midline, lateral, and low-lying lesions. Another classification used the organ systems approach (vascular, nervous, etc.). Park grouped neck lesions according to their etiologic origin as inflammatory, neoplastic, or congenital. Burton and Pransky included palpable normal anatomic masses, such as the transverse process of C2, the styloid process, the mastoid tip, the greater cornu of the hyoid bone, and the thyroid cartilage, in their classification. Otto and Bowes grouped lesions by patients' age, and McGuirt used an algorithmic approach to the diagnosis and treatment of neck masses. All classifications, however varied, are useful in that they help the clinician to order the diagnostic thought process and form an initial impression of the clinical findings.

Clinical evaluation must always begin with a thorough history and attention to symptoms. Most diagnostic errors occur because the history and physical examination are inadequate and there is an overreliance on sophisticated imaging techniques. Patients at risk for serious clinical problems can often be identified through the findings on history taking, such as progressive enlargement of the mass or prolonged hoarseness. A careful history will also begin to narrow the range of possible lesions and guide deductive reasoning. For example, age can be a factor. In adults older than 40 years, metastatic neoplasms are strong possibilities and should be considered. For example, a nonthyroid neck mass in an older patient has an 80% probability of being neoplastic, and 80% of these are malignant. In young adults and teenagers, inflammatory lesions, especially from a third molar pericoronitis, are common. Infectious mononucleosis and thyroid malignancies should also be suspected in patients in this age group. Developmental lesions, as well as the more common lymph node response to infection and inflammation, should be considered in children.

The patient's report of the duration that a lesion has been present is also helpful information. A rule of thumb states that a mass present for 7 days is inflammatory, a mass present for 7 months is neoplastic, and a mass present for 7 years is congenital. Because certain lesions are found in discrete anatomic locations, a knowledge of those associated with specific regions in the neck is useful in the differential diagnosis. The following discussion uses this approach.
DIFFERENTIAL DIAGNOSIS OF MIDLINE LESIONS

The following conditions can result in midline swelling of the neck:

1. Thyroglossal duct cyst
2. Epidermoid cyst
3. Dermoid cyst
4. Submental lymphadenitis
5. Submental abscess
6. Thyroid gland tumors
7. Ectopic thyroid

Midline swellings of the neck are characteristically caused by conditions such as the congenital thyroglossal duct cyst (elevates with tongue protrusion) (Fig 1), the developmental epidermoid or dermoid cyst (does not elevate with tongue protrusion) (Fig 2), and neoplastic growths from the thyroid and its isthmus.

The presence of ectopic thyroid tissue is rare but merits consideration. This midline mass can appear at the base of the tongue in the region of the foramen cecum (lingual thyroid), more deeply situated infralingually, or high in the midline of the neck. Symptoms, when present, include dysphagia, difficulty with speech, and a feeling of fullness in the throat. Before a lesion is removed, care must be taken to establish that the patient has a normally functioning thyroid gland. Removal of ectopic thyroid tissue without such confirmation can cause hypothyroidism or a myxedematous state because it may represent the patient's only thyroid tissue.

The submental lymph nodes drain the lip, anterior tongue, and the region of the mandibular incisors and anterior gingiva. Enlargement of these nodes (submental lymphadenitis) reflects possible pathosis in these areas. An infection from a mandibular incisor can cause an abscess in the submental space (Fig 3). An abscess occupying this space presents as an anterior swelling, which may be accompanied by dysphagia and dyspnea. Swelling of the submental space along with bilateral swelling of the submandibular and sublingual spaces is termed Ludwig's angina; this condition can be life-threatening unless treated aggressively.

DIFFERENTIAL DIAGNOSIS OF LATERAL CERVICAL SWELLINGS

Lateral cervical swellings can be either discrete or multiple and located high or low in the neck. Because of their variability, they tend to present difficult diagnostic problems.

Discrete lateral swellings

High-level swellings. These lesions (Table 1) are very often related to the major salivary glands. The ranula is
TABLE 1: High-level lateral cervical swellings

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salivary gland tumor</td>
<td>Neoplastic</td>
</tr>
<tr>
<td>Sialadenitis</td>
<td>Inflammatory</td>
</tr>
<tr>
<td>Carotid body tumor</td>
<td>Neoplastic</td>
</tr>
<tr>
<td>Branchial cleft cyst</td>
<td>Developmental</td>
</tr>
<tr>
<td>Cystic hygroma</td>
<td>Neoplastic</td>
</tr>
<tr>
<td>Neurofibroma</td>
<td>Neoplastic</td>
</tr>
<tr>
<td>Fibroma</td>
<td>Neoplastic</td>
</tr>
<tr>
<td>Hemangioma</td>
<td>Neoplastic</td>
</tr>
<tr>
<td>Plunging ranula</td>
<td>Traumatic</td>
</tr>
<tr>
<td>Enlarged nodes</td>
<td>Neoplastic/Inflammatory</td>
</tr>
</tbody>
</table>

Sialadenitis should be considered if the swelling is acute and painful (Fig 5). Bidigital palpation will often help to define the presence of calculi within the glandular or duct system. Radiographs (Fig 6) and sialography will confirm the diagnosis. The forming calculus may not have calcified and, consequently, may not be evident on the radiograph. However, the contrast medium used for the sialogram will usually not flow past such an obstruction and thus indicates its presence.

Other discrete high-level lateral cervical swellings include the carotid body tumor, the branchial cleft cyst, and the cystic hygroma. The branchial cleft cyst (Fig 7) is developmental in origin, grows slowly, and is generally found in adolescents and young adults. The freely mobile, painless lesion is usually located anterior to the sternocleidomastoid muscle in the upper third of the neck. Aspiration will reveal cholesterol crystals, which are diagnostic for the lesion.

a form of mucus retention phenomenon that develops in association with either the sublingual or submandibular gland ducts. On occasion, the ranula herniates through the mylohyoid muscle and is subsequently referred to as a plunging ranula (Fig 4). This lesion is palpable high in the neck toward the midline.

The pleomorphic adenoma is the most common salivary gland tumor and is typically associated with the parotid gland; however, it can involve the submandibular gland. When arising from the parotid gland, the tumor will be palpable as a firm, discrete, nonfixed mass in the region of the mandibular angle. Pleomorphic adenomas of the submandibular gland are located in the submandibular triangle. The masses are usually freely mobile, discrete, and not adherent to the overlying skin. Malignant tumors of the submandibular gland should be suspected if the patient is an older adult and the swelling is firm and fixed, continues to enlarge, and is painful.

Fig 4: Plunging ranula.

Fig 5: (left) Obstructive sialadenitis.

Fig 6: (below) Panoramic study revealing calculus deposit in glandular system.
Carotid body tumors are small, discrete masses located beneath the angle of the mandible at the bifurcation of the common carotid artery. They are usually asymptomatic and can be confused with the branchial cleft cyst. However, carotid body tumors are located deeper, usually are firm, and cannot be displaced vertically as readily as the branchial cleft cyst.

The cystic hygroma (lymphangioma) is usually found in infants and children. It is palpable as a soft mass posterior to the sternocleidomastoid muscle. The lesion is initially asymptomatic but can enlarge to produce symptoms of pressure in the region of the trachea. They are frequently associated with karyotypic abnormalities and various malformation syndromes. Neurofibroma, lipoma, fibroma, and hemangioma should also be included in the differential diagnosis of discrete lateral cervical swellings.

The sternocleidomastoid tumor of infancy (STOI) is relatively uncommon, presenting as a firm, well-circumscribed mass within the sternocleidomastoid muscle in infants 1 to 8 weeks of age; the tumor may be associated with torticollis. The STOI must be considered in any infant with a lateral neck mass. It usually is a unilateral condition, but bilateral involvement does occur.

**Low-level swellings.** The following conditions can result in low-level lateral cervical swelling:

1. Intrathoracic goiter
2. Esophageal fibroma
3. Metastatic carcinoma
4. Sarcoidosis

The goiter can be palpated in the root of the neck above the clavicle. It causes deviation of the trachea and ascends and descends with swallowing. The esophageal fibroma is a rare tumor. It too ascends and descends with swallowing and cannot be differentiated clinically from a goiter.

Firm, palpable lymph nodes in the supraclavicular region may represent metastatic carcinoma from the gastrointestinal tract. In addition, a supraclavicular mass requires evaluation for generalized adenopathies and possible infraclavicular neoplasms (eg, lung, breast, ovary, testes, colon), because masses in the lower neck commonly arise from pathosis below the clavicle.

Sarcoidosis is a disease of unknown etiology characterized by epithelioid-cell follicular formations within the organs involved. The lungs and lymph nodes are frequent sites of involvement. Lymphadenopathy is most marked in the peribronchial region. Consequently, enlarged lymph nodes may be palpated low in the neck above the lung apices.

**Multiple lateral cervical swellings**

Multiple lateral neck swellings usually involve the lymphatic system. Enlarged, tender cervical lymph nodes are frequently observed in young children. Odontogenic infection and tonsillitis are common causes. Frequently, following acute infection, the involved nodes will remain enlarged for extended periods. For example, cervical nodes enlarged because of infection with the gram-negative bacteria that cause cat-scratch disease will remain enlarged for 2 to 4 months following remission of the disease. These nodes are freely movable, occasionally tender, but not unduly firm.

Pulmonary tuberculosis may be disseminated by either lymphatic or vascular spread. Localized infection of the cervical lymph nodes is termed scrofula. The infected nodes become swollen and palpable, and these nodes are typically painful or tender. They may abscess or remain as a granulomatous lesion.

Fixed, firm, enlarged, and painless nodes in the neck may be indicative of lymphatic spread of a primary carcinoma in the oral cavity, oronasal pharynx, maxillary sinus, nasal cavity, or facial region. A neck swelling may be the first clinical manifestation of such cancers. These masses are typically located behind and below the mandibular gonial angle. A thorough oral, nasal, and pharyngeal examination should be performed to rule out a primary lesion. Enlarged, matted cervical nodes can also be indicative of a primary disease such as lymphoma, leukemia, Hodgkin's disease, or tuberculosis.
DISCUSSION

This article describes a simple method of distinguishing cervical masses based on their particular location in the neck. Such swellings should always be viewed with a high index of suspicion. Because of the possibility of primary tumors arising in the neck and the frequent occurrence of metastatic lymph nodes, many clinicians consider all neck lesions as malignant until proven otherwise. This approach, while sound, should be used tactfully so as not to cause undue alarm in the patient.

Careful evaluation of data assembled from the history, physical examination, plain radiographs, computed tomography, and magnetic resonance imaging will help to establish a preliminary clinical diagnosis. Fine-needle aspiration and/or surgical biopsy will establish the definitive diagnosis and dictate the final course of treatment.

REFERENCES


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