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Differential Diagnosis of Benign Cystic Formations in the Maxillofacial and Cervical Regions

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Abstract: Benign cystic lesions of the soft tissues in the maxillofacial and cervical regions do not constitute a genetically uniform group. Some are congenital malformations resulting from embryonic developmental disturbances, such as dermoid cysts, median and lateral neck cysts, parotid region cysts, and tongue root cysts. Others are acquired, including retention cysts of the sebaceous glands (atheromas), traumatic cysts, and salivary gland cysts. While formations such as ranulas, major salivary gland cysts, and cystic changes in excretory ducts may occasionally have a congenital origin, they more commonly develop during the postembryonic period. The appearance of these cysts in adulthood is often associated with inflammatory complications or endocrine activity characteristic of this stage of life. These cysts typically exhibit slow growth. Comprehensive knowledge of their clinical presentation, combined with the application of modern diagnostic techniques, enables both maxillofacial surgeons in hospitals and dentists in outpatient settings to establish an accurate diagnosis and provide timely, specialized treatment. Such an approach contributes to shorter rehabilitation periods and improved patient outcomes.

Keywords: Cyst, Lymph Nodes, Differential Diagnosis.

Benign neck lesions are categorized into congenital and acquired types. Congenital lesions are further divided into:

- Those arising from embryogenesis abnormalities: midline and lateral neck cysts, parotid or tongue-root cysts, and sublingual gland cysts;
- Cysts resulting from ectodermal development defects: dermoid and epidermoid cysts.

Acquired lesions include retention cysts of sebaceous glands (atheromas), traumatic cysts, and salivary gland cysts. Although ranulas, cysts of major salivary glands, and ductal cystic changes may occur congenitally, they more often develop postnatally.

Dermoid cysts originate from embryonic clefts formed by ectodermal folds or from displaced ectodermal elements. Morphologically, dermoid and epidermoid cysts are distinguished: the wall of a dermoid cyst includes all skin layers and appendages (sebaceous and sweat glands, hair), whereas the wall of an epidermoid cyst comprises only epidermis without skin appendages. Clinically, they are very similar.

Dermoid cysts can appear in various locations: lips, eyelids, nasolabial folds, nasal bridge, peri-auricular area, occiput, upper neck, or within the oral cavity — sites related to embryonic organogenesis. They show slow growth, are often asymptomatic, with elastic or doughy consistency, smooth surface, and clear borders. Patients typically present for cosmetic reasons or when cyst infection occurs. In large cysts, impairment of tongue mobility, swallowing, or speech may occur.

On the neck, congenital dermoid cysts usually lie between the anterior border of the sternocleidomastoid muscle and the posterior belly of the digastric muscle, which can complicate differentiation from lateral neck cysts. Parotid-region lesions often lie deep beneath the facial nerve or its branches, attaching to bony structures and causing subtle deformation of soft tissues.

Differential diagnosis of dermoid versus epidermoid cysts includes: tuberculous lymphadenopathy (requiring aspiration and morphological analysis), reticuloendothelial malignancies (rapid growth, multiple nodes, metastases), hematologic neoplasms, salivary gland adenolymphomas (using sialography, MRI/CT, aspiration cytology), and lateral or midline neck cysts (contrast cystography and aspiration). Fluid aspirated from a dermoid cyst is often sebaceous-like with flakes containing cholesterol crystals and epithelial cells. Macroscopically, the aspirate from an infected dermoid or epidermoid cyst may mimic that of an abscessed lymph node.

Clinically, dermoid and epidermoid cysts may resemble atheromas, but unlike atheromas they are not adherent to the overlying skin. Midline neck cysts are related to embryonic anomalies of the branchial apparatus, thyroid, or thymus glands, and are located along the midline between the hyoid bone and the upper thyroid cartilage. Some researchers believe midline cysts and fistulae result from persistent thyroglossal duct remnants.

K.I. Cherenova (1963) and V.M. Bezrukov (1965) proposed the **branchiogenic theory** of the origin of lateral cysts and fistulas of the neck. According to this theory, these formations represent remnants of the **second pharyngeal pouch**, located between the external and internal carotid arteries, with an internal opening near the **palatine tonsil**. Lateral cysts are typically found along the **neurovascular bundle** of the neck, most often at the level of the **bifurcation of the common carotid artery**. The term "branchiogenic" refers to their development from **residual elements of the pharyngeal pouches**.

Median and lateral cysts of the neck grow slowly and appear as round, painless swellings of firm elastic consistency that are not attached to the overlying skin. A distinguishing clinical feature of the **median cyst** is its limited downward mobility due to its attachment to the **hyoid bone**; however, during swallowing, it moves upward together with the bone. If the cyst communicates with the **oral cavity** through a persistent thyroglossal duct, its size may decrease following the discharge of its contents into the mouth.

Inflammation of median and lateral neck cysts occurs in about **60% of patients** (V.S. Dmitrieva et al., 1968), usually triggered by **respiratory infections** or **oral inflammation** spreading through the **foramen cecum** of the tongue root. Clinically, this manifests as **pain on swallowing** and a **painful infiltrate**. If the cyst ruptures spontaneously or is incompletely excised, a **persistent median or lateral cervical fistula** may remain.

Complete and incomplete external fistulas of congenital neck cysts present as small granulating wounds covered with a bloody crust. When the crust is removed and the fistulous tract is compressed, **mucopurulent discharge** can often be obtained. The skin surrounding the external opening may appear **scarred and retracted**, and palpation reveals a dense cord extending from the opening to the **hyoid bone**, which moves during swallowing. When the external opening closes, **pain and swelling** occur in the area.

Differential Diagnosis of Median and Lateral Neck Cysts

It should be performed with:

- **Chronic specific and nonspecific lymphadenitis** of the neck. Objective examination, **CT**, **MRI**, fine-needle **biopsy**, and **histological analysis** help clarify the diagnosis. Improvement with anti-inflammatory therapy suggests **serous lymphadenitis**.
- **Dermoid cysts** of the maxillofacial region.
- **Salivary gland tumors** – diagnostic tools include **contrast sialography**, **MRI**, and **CT**.

- **Carotid body tumors (chemodectomas)**, arising from the **carotid glomus** at the carotid bifurcation, located posterior or medial to the internal carotid artery. These tumors may also arise from **chemoreceptor tissue** near the **vagus nerve ganglion** close to the **jugular foramen**, and are often adjacent to the **hypoglossal (XII)** and **glossopharyngeal (IX)** nerves.
- **Metastatic tumors**, **lympho- and reticulosarcomas**, **hemangiomas**, and **lymphangiomas**.

Lateral fistulas must also be differentiated from those resulting from **suppuration of cervical lymph nodes**. **Cystography**, **fistulography**, **fine-needle aspiration**, and subsequent **cytological and histological examination** assist in establishing a definitive diagnosis.

According to **V.M. Bezrukov (1965)** and **V.S. Dmitrieva (1968)**, cysts and fistulas of the **parotid region** represent developmental anomalies of the **first branchial cleft**. These cysts are typically located **above the muscles attached to the styloid process**, **lateral to the facial nerve trunk**, and may communicate with the **external auditory canal** at the junction of its cartilaginous and bony parts.

Microscopically (K.I. Cherenova, 1963), the cyst wall consists of **dense fibrous and lymphoid tissue** containing **epithelial islands**. The inner lining is made up of **cylindrical and ciliated embryonic-type epithelium**. Differential diagnosis of parotid cysts is performed primarily with **parotid gland cysts and tumors**, as well as **lateral neck cysts**. **Fine-needle biopsy** confirms the diagnosis.

Cysts of the tongue root are developmental anomalies of the **thyroglossal duct**. However, they are often classified separately due to their **distinct localization, clinical features, and treatment**. These cysts are rare in **newborns**, but large ones located anterior to the **epiglottis** can **obstruct feeding and breathing**.

Cysts between the **foramen cecum** of the tongue and the **hyoid bone** are difficult to diagnose clinically; when infected, they may resemble a **tongue root abscess**.

Cysts of the sublingual salivary gland (ranulas) are more common in **young individuals**. According to **Rauch (1959)**, they are **developmental (dysembryogenetic)** cysts that arise from **diverticula of the Wharton's duct** near its opening. Congenital ranulas typically manifest during **puberty**, when developmental remnants become active.

Sebaceous gland cysts (atheromas) should be differentiated from **epidermoid cysts**, **lipomas**, **soft fibromas**, **chronic lymphadenitis**, and **retention cysts**. The **pathognomonic feature** of an atheroma is a **small central skin depression (crater)** over the cyst, corresponding to the **blocked duct of the sebaceous gland**, with the **skin adherent to the cyst capsule** at that site.

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