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Management of common head and neck masses

Thomas F. Tracy Jr, MD, Christopher S. Muratore, MD

From the Division of Pediatric Surgery, Department of Surgery, Brown Medical School, Hasbro Children's Hospital, Providence, Rhode Island.

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Head and neck masses are a common clinical concern in infants, children, and adolescents. The differential diagnosis for a head or neck mass includes congenital, inflammatory, and neoplastic lesions. An orderly and thorough examination of the head and neck with an appropriate directed workup will facilitate the diagnosis. The most common entities occur repeatedly within the various age groups and can be differentiated with a clear understanding of embryology and anatomy of the region, and an understanding of the natural history of a specific lesion. Congenital lesions most commonly found in the pediatric population include the thyroglossal duct cyst and the branchial cleft and arch anomalies. The inflammatory masses are secondary to local or systemic infections. The most common etiology for cervical adenopathy in children is reactive lymphadenopathy following a viral or bacterial illness. Persistent adenopathy raises more concerns, especially enlarged lymph nodes within the posterior triangle or supraclavicular space, nodes that are painless, firm, and not mobile, or a single dominant node that persists for more than 6 weeks should all heighten concern for malignancy. In this review, we discuss the current principles of surgical management of the most common head and neck masses that present to pediatricians and pediatric surgeons.

Head and neck masses are a common clinical concern in infants, children, and adolescents. The differential diagnosis for a head or neck mass across these age groups is broad and includes congenital, inflammatory, and neoplastic lesions (Table 1).[1,2] An orderly and thorough examination of the head and neck with an appropriate directed workup will facilitate the diagnosis. The most common entities occur repeatedly within the various age groups and can be differentiated with a clear understanding of embryology and anatomy of the region, and an understanding of the natural history of a specific lesion. In this review, we discuss the general approach to evaluate and manage the most common head and neck masses that present to pediatricians and pediatric surgeons.

Address reprint requests and correspondence: Thomas F. Tracy Jr, MD, Hasbro Children's Hospital, 593 Eddy Street, Providence, RI 02903.
E-mail: Thomas_Tracy@brown.edu.

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Overview of head and neck masses

Congenital lesions most commonly found in the pediatric population include the thyroglossal duct cyst and the branchial cleft and arch anomalies. Hemangiomas, lymphatic malformations, dermoid cysts, bronchogenic cysts, teratomas, and thymic cysts are other common congenital lesions.[3,4] The inflammatory masses are secondary to local or systemic infections. The most common etiology for cervical adenopathy in children is reactive lymphadenopathy following a viral or bacterial illness. Persistent unilateral adenopathy is concerning and can include acquired etiologies such as mycobacterium tuberculosis, the atypical mycobacterium spectrums such as mycobacterium avium intracellulare, and mycobacterium scrofulaceum, granulomatous processes, or cat scratch disease.[5] The midline lesions most commonly represented by thyroglossal duct sinus and cyst conditions and dermoid cyst are usually easily distinguished from the more lateral lesions represented by branchial cleft sinus and arch

Table 1 Differential diagnosis of pediatric head and neck masses*

Congenital masses	Inflammatory masses	Neoplastic masses
Thyroglossal duct cyst	Reactive lymphadenpathy	Benign (lipoma, fibroma, neurofibroma, thyroid nodule)
Branchial cleft cyst/sinus	Bacterial	Malignant (Hodgkin's lymphoma, non-Hodgkin's lymphoma, rhabdomyosarcoma, neuroblastoma, thyroid carcinoma, metastatic disease)
Vascular anomalies (hemangioma, lymphatic, capillary, venous, arterial, mixed)	Viral	
Dermoid cyst	Granulomatous	
Bronchogenic cyst	Mycobacterial (tuberculous, atypical)	
Teratoma	Histoplasmosis	
	Sarcoidosis	
	Cat scratch disease	

*Modified from Dickson and Davidoff.[1]

anomalies. Acute bilateral or diffuse cervical adenopathy is often the result of a recent viral infection and is usually a self-limited process. Acute unilateral adenopathy, particularly in infants and young children, may be associated with pyogenic sources such as Staphylococcus aureus or group B Streptococcal infections.[2,5,6] Persistent adenopathy raises more concerns but is usually still secondary to an infectious etiology. Enlarged lymph nodes within the posterior triangle or supraclavicular space, nodes that are painless, firm, and not mobile, or a single dominant node that persists for more than 6 weeks should all heighten concern for malignancy.[1] Malignant lesions such as non-Hodgkin's and Hodgkin's lymphoma, neuroblastoma, and thyroid carcinoma need to be differentiated from benign lesions. In the pediatric population, 80% to 90% of all head and neck masses represent benign conditions.[1] It is important, therefore, for surgeons to appreciate the relevant embryology, anatomy, and natural history of head and neck lesions and to be familiar with their appropriate evaluation and management.

Evaluation: History and physical examination

A detailed history and physical examination is the usual starting point. Historical information includes the patient's age, onset, and duration of symptoms, as well as any systemic signs of disease, such as fever, night sweats, fatigue, or weight loss. Although some congenital neck lesions, particularly cysts, may not present until later in childhood after the accumulation of secretions or becoming secondarily infected, many congenital lesions are present at birth or noted shortly thereafter.

Features from the history and examination should help to elicit and narrow the etiology. Specific questions to ask include whether the adenopathy is an acute or chronic process; whether the adenopathy was associated with a recent upper respiratory illness or following contact with an individual with a recent illness; whether the neck masses were associated with a systemic infection; if there had been any known animal bites or scratches; and whether there had been any recent changes in the character of the lesion. The physical examination should be directed at a systematic evaluation of each cervical lymph node region. The size, laterality, tenderness, overlying skin changes, and mobility should be noted. Finally, an examination of the chest, abdomen, groin, genitalia, and extremities must not be forgotten. A firm painless mass with fixation to underlying structures or overlying skin is always concerning for malignancy. Although most pediatric cervical adenopathy is of benign etiology, rapidly enlarging, nontender, or longstanding adenopathy, particularly within the supraclavicular space or posterior cervical triangle, are concerning for malignant disease.[1,2] The experienced clinician will seldom require laboratory evaluation for the classic midline or lateral congenital lesions associated with branchial arch anomalies; however, the workup for persistent adenopathy is more extensive and should include a complete blood count with differential, a chest x-ray, PPD skin test, and serological studies to investigate Epstein-Barr virus, cytomegalovirus, HIV, toxoplasmosis, or Bartonella.[5,6] Radiographic studies are usually unnecessary for evaluation of these lesions. However, persistent adenopathy suspicious for malignant disease warrants a chest x-ray. A plain chest x-ray might detect pulmonary or mediastinal lesions as a source for cervical or supraclavicular adenopathy. Ultrasonography has advantages, particularly in the pediatric population, because it does not involve ionizing radiation and is readily available. It can easily distinguish solid from cystic masses. It is helpful in evaluating the thyroid and parotid lesion and may be useful in diagnosing confusing congenital lesions. Ultrasound is also helpful in evaluating and char-