

Pediatric Neck Masses



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KEYWORDS

• Pediatric neck mass • Thyroglossal duct cyst • Brachial cleft cyst

KEY POINTS

- Most pediatric neck masses are infectious and resolve without intervention.
- Isolated masses less than 2 cm can be observed for 4 to 6 weeks.
- Pediatric histories should address sick contacts and other vectors.
- Atypical mycobacterium, Epstein-Barr virus, cytomegalovirus, human immunodeficiency virus, and toxoplasmosis should be considered for a suspected infectious process not responding to antibiotic therapy.

Introduction

Neck masses in the pediatric population are a common occurrence. Fortunately, 80% to 90% of pediatric neck masses are benign in nature, with the majority stemming from infectious sources. Infectious processes are usually self-limiting or respond to a short course of oral antibiotics. Other less common sources of pediatric neck masses include congenital malformations, benign neoplasms, and rarely malignancies. Although rare, a malignancy should always be considered in the pediatric patient with a neck mass, and at times biopsy may be indicated.

History and physical examination

A thorough history and physical examination are of utmost importance when dealing with pediatric neck masses. Unfortunately symptoms may be difficult to elicit from children, and much of the history must be obtained through parents or caregivers. This requires the clinician to maintain a high index of suspicion and a low threshold for ordering diagnostic studies. Patient cooperation may also limit physical examination, further lending to the need for additional studies. Vital points in a pediatric neck mass history and physical examination along with possible implications include

- Duration
 - Present since birth typically indicates a benign or congenital process; malignant processes are almost never congenital
 - Vascular malformations generally are present at birth and grow with the child

- Hemangiomas develop shortly after birth with a rapid growth phase
- New rapidly growing masses are typically infectious
- Constitutional symptoms
 - Fevers and tenderness are typically infectious signs
 - Recent upper respiratory tract infection suggests reactive lymphadenopathy
 - Symptoms such as fever, malaise, and weight loss may suggest malignancy
- Contact with pets or other vectors
 - Cats or cat feces
 - Wild animals
 - Tick bites
 - Contact with sick children or family members
 - Foreign travel
- Location of mass
 - Midline cystic lesions are typically dermoid or thyroglossal duct cysts (TGDC)
 - Lateral neck masses are most commonly reactive lymphadenitis or brachial cleft cysts
- Consistency and relationship to surrounding structures
 - Shotty lymphadenopathy (multiple small lymph nodes that feel like buckshot) typically indicates reactive lymphadenopathy
 - Hard irregular masses, fixed to deep or surrounding structures may indicate malignancy
- Size
 - Cervical lymph nodes up to 1 cm in size are normal in children younger than 12

A thorough history and physical examination should assist the clinician in placing the mass in one of 3 categories: congenital, infectious, or neoplastic. The most common etiologies of each category are summarized in [Table 1](#).

Initial workup

Although there is no high quality evidence to support the workup of pediatric neck masses, there are a few generally accepted guidelines based on expert opinion and observational studies.

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Table 1 Differential diagnosis of neck masses in children

Location	Developmental	Diagnosis	
		Inflammatory/Reactive	Neoplastic
Anterior sternocleidomastoid	Branchial cleft cyst, ^a vascular malformation	Reactive lymphadenopathy, ^a lymphadenitis (viral, bacterial), ^a sternocleidomastoid tumor of infancy	Lymphoma
Midline	Thyroglossal duct cyst, ^a dermoid cyst ^a	—	Thyroid tumor
Occipital	Vascular malformation	Reactive lymphadenopathy, ^a lymphadenitis ^a	Metastatic lesion
Preauricular	Hemangioma, vascular malformation, type 1 branchial cleft cyst	Reactive lymphadenopathy, ^a lymphadenitis, ^a parotitis, ^a atypical mycobacterium	Pilomatrixoma, salivary gland tumor
Submandibular	Branchial cleft cyst, ^a vascular malformation	Reactive lymphadenopathy, ^a lymphadenitis, ^a atypical mycobacterium	Salivary gland tumor
Submental	Thyroglossal duct cyst, ^a dermoid cyst ^a	Reactive lymphadenopathy, ^a lymphadenitis (viral, bacterial) ^a	—
Supraclavicular	Vascular malformation	—	Lymphoma, ^a metastatic lesion

^a Type of lesions that are more commonly found in that location.

From Meier JD, Grimmer JF. Evaluation and management of neck masses in children. *Am Fam Physician* 2014;89(5):354; with permission.

Laboratory Studies

- Routine complete blood cell counts (CBC) are not recommended as part of the initial workup. They may be considered, however, if enlarged lymph nodes fail to resolve after a course of antibiotics
- CBC may help with suspected malignancy
- *Bartonella henselae* titers may be indicated if cat exposure is suspected
- Epstein-Barr virus, cytomegalovirus, HIV, and toxoplasmosis titers may be considered for a suspected infectious process not responding to antibiotic therapy

Imaging Studies

- Ultrasonography is preferred for an afebrile child
- Ultrasonography should be performed for suspected thyroglossal duct cyst to confirm the presence of a normal thyroid gland
- Computed tomography (CT) with contrast for suspected malignancy or deep neck abscess
- MRI is recommended for vascular malformations
- MRI and CT imaging frequently require sedation in the pediatric population

Initial treatment

As mentioned previously, the most common pediatric neck mass etiology is infectious or inflammatory in nature, which ultimately lends itself to a period of watchful waiting. This recommendation is often necessary to avoid inappropriate or overtreatment of the child but frequently results in anxious parents. Official guidelines published by a national organization for the treatment of pediatric neck masses do not exist, but there are generally accepted treatment principles (Fig. 1):

- Observation for bilateral lymphadenitis, lymph nodes <2 cm without tenderness or erythema

- Empiric antibiotics considered for cervical lymphadenitis with systemic symptoms
- Most common infectious organisms are *Staphylococcus aureus* and group A streptococcus
- 10 day course of cephalexin, amoxicillin/clavulanate, or clindamycin

Biopsy should be considered for several situations:

- Hard, firm, or rubbery mass
- Fixed mass
- Supraclavicular mass
- Lymph node larger than 2 cm
- Persistent enlargement longer than 2 weeks
- Failure to respond to antibiotic therapy
- No decrease in size after 4–6 weeks

Surgical treatment

If surgical intervention is deemed necessary for a mass that is not responding to a waiting period or antibiotic therapy, several points should be kept in mind:

- Lymph node biopsies should always be sent fresh for flow cytometry to rule out lymphoma.
- Cultures should include acid-fast bacterium to rule out atypical mycobacterium infections (immunocompetence is a potential cause of chronic cervical lymphadenitis in children younger than 5 years).

Definitive surgical treatment should be considered for congenital neck masses and benign neoplasms to prevent future problems (superinfection or impingement on adjacent structures). A thorough understanding of embryology and anatomy of the developing region is paramount when undertaking the surgical treatment of these entities.

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