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***Pediatric Neck Masses***

The most common neck masses in children are:

* Cervical lymphadenopathy.
* Thyroglossal duct cyst.
* Branchial cyst and fistula.
* Cystic hygroma.
* Sternocleidomastoid tumor***.***

***Cervical Lymphadenopathy***

Cervical lymphadenopathy is defined as enlargement of the cervical lymph nodes . It is the most common cause of neck masses in children. The causes of cervical lymphadenopathy are :

* Inflammation : Reactive hyperplasia .
* Infection (lymphadenitis) :

 - Bacterial as Streptococcus, Staphylococcus , tuberculosis , and b brucellosis.

* + Viral as infectious mononucleosis and HIV.
	+ Protozoal as Toxoplasmosis.
* Malignancy :
	+ Primary as lymphoma.
	+ Secondary as squamous cell carcinoma.

***Acute Cervical Lymphadenitis:***

Acute cervical lymphadenitis is acute infection (mainly bacterial) of the cervical lymph nodes. The source of infection is from the nearby structures as oral and nasal cavities, pharynx, larynx, ear, scalp and face. The affected lymph nodes are enlarged , firm , hot , and tender associated with general constitutional symptoms as pyrexia, anorexia and malaise. The treatment is directed to the primary focus of infection, for example tonsillitis or a dental abscess. If the affected lymph nodes became fluctuant , red with thining of the overlying skin it indicates abscess formation which require surgical drainage. Any enlarged lymph node present for more than 6 -8 weeks not responding to appropriate antibiotics should be completely excised & send for culture and histopathology to exclude atypical infections as TB and neoplasm.

***Tuberculous adenitis:***

It is chronic infection of the cervical lymph nodes with Mycobacterium tuberculosis. The deep upper cervical nodes are most commonly affected, but there may be a widespread cervical lymphadenitis . In most cases, the

tubercular bacilli gain entrance through the tonsil of the corresponding

side . In approximately 80 per cent of patients, the tuberculous process is limited to the clinically affected group of lymph nodes, but a primary focus of TB in the lungs must always be suspected.

Typically, the nodes are only mildly tender , discrete, mobile, and gradually increase in size associated with fever , weight loss , and sweating . If treatment is not instituted, the affected nodes became matted together and fixed to surrounding structures due to periadenitis. They then caseate , liquefy and break down with the formation of a cold abscess in the neck. The pus is initially confined by the deep cervical fascia but with time it extends to the superficial fascia resulting in two abscess pockets (deep & superficial) connected by a tract which is called ‘Collar-Stud’ abscess. The superficial abscess pocket enlarges steadily and may breakdown through the skin forming a discharging sinus. Thus , tuberculous adenitis progress in five stages (Jones & Campbell Stages):

*Stage1:* Adenitis.

*Stage 2* : Periadenitis and lymph nodes matting.

*Stage 3* : Cold abscess formation.

*Stage 4* : Collar Stud abscess formation.

*Stage 5*: Sinus formation.

The diagnosis is done by tuberculin skin test and fine needle aspiration (FNA) of the affected nodes to identify the presence of acid-fast bacilli. Chest X ray must be done to all patients to exclude pulmonary TB.

The treatment of tuberculous adenitisis with appropriate Anti- TB chemotherapy . If there is no response despite appropriate chemotherapy; drainage of the abscess (deep & superficial pockets) and excision of its surrounding fibrous capsule together with the affected lymph nodes is necessary .

 ***Thyroglossal duct cyst***

Thyroglossal duct cyst is the most common midline neck mass in children. Embryologically , the thyroid gland develops early in fetal life from the base of the tongue (foramen cecum) , the gland then descends

towards its position in the lower neck with the isthmus lying over the second and third tracheal rings. The tract of descend is called thyroglossal duct and may pass in front of or behind the hyoid bone but most commonly through it . Normally the thyroglossal duct is obliterated after complete thyroid descend . Incomplete obliteration of the thyroglossal duct results in a thyroglossal duct cyst formation. Thus the cyst can be found anywhere along the pathway of the thyroglossal duct, from the foramen cecum at the base of the tongue to the thyroid isthmus , most commonly seen just below the hyoid bone.

Clinically, thyroglossal cyst presented in the preschool aged children with central anterior neck mass . The cyst is firm , not tender with smooth border and moves upwards on swallowing and with tongue protrusion due to attachment to hyoid bone. Thyroglossal cyst may become infected by the oral flora that pass through the foramen cecum . Infected cyst is tender, red , and hot and may rupture onto the skin of the neck forming thyroglossal fistula which is always an acquired condition ( not congenital).

The treatment of thyroglossal duct cyst is by complete excision of the cyst and the entire duct (including the central portion of the hyoid bone to decrease the recurrence rate) up to the base of the tongue *(Sistrunk operation).* Infected cyst is treated initially with antibiotics and the surgical removal should be delayed until the infection and associated inflammation is subsided as excision of infected cyst associated with high risk of recurrence.

***Branchial cyst and fistula***

Branchial cyst and fistula are remnants of the second branchial cleft. Branchial cyst is lined by squamous epithelium, and contains thick, turbid fluid full of cholesterol crystals. It presents clinically in old children as a cystic mass in the anterior triangle of the neck anterior to the upper and middle thirds of the sternocleidomastoid muscle. The cyst is soft , non-tender unless it is infected , fluctuation of the cyst size over time is common. Sometimes , the cyst is deep to the sternocleidomastoid muscle and difficult to palpate .

A branchial fistula is a congenital abnormal communication between the skin and the pharynx, it may be unilateral or bilateral and lined by ciliated columnar epithelium . The external orifice of the fistula is situated in the lower part of the anterior triangle of the neck near the anterior border of the lower third of the sternocleidomastoid muscle. The tract penetrates the platysma & cervical fascia to ascend along the carotid sheath then pass between the external and internal carotid arteries to end in the tonsillar fossa . Sometime , the internal aspect of the tract may end blindly at or close to the lateral pharyngeal wall forming a branchial sinus rather than a fistula . Branchial fistula presented clinically in infants and young children as a tiny orifice in the lower neck with recurrent mucous or mucopurulent discharge .

The treatment of the branchial anomalies is surgical excision. If a cyst is present, a skin crease incision is made over the cyst and is carefully dissected out . While in branchial fistula , an elliptical incision is made around the external orifice and the whole tract is excised up to the pharynx. The dissection should be kept close to the fistula tract as much as possible to avoid injury to the nearby structures as internal carotid artery, glossopharyngeal, and hypoglossal nerves . In infants and young children , fistula excision can be done by one incision only . While in older children and adults ; a second higher transverse incision is needed for complete resection (Stepladder incision) . Identification of the fistula tract can be done intra operatively by insertion of a lacrimal probe or injection of methylene blue dye into the tract.

***Cystic hygroma***

Cystic hygroma (lymphatic malformation) is a congenital malformation of the cervical lymphatic sacs . The cysts are filled with clear lymph and lined by a single layer of endothelium and they may be microcytic (diameter <1 cm), macrocystic (diameter >1 cm) or a combination of both.

Cystic hygroma usually presents at birth , and sometime it may be large enough to cause obstructed labor. The mass located in the lower part of the posterior neck triangle and may extend to involve the parotid area, submandibular area , tongue and floor of mouth and even the axilla. The mass is soft , not tender , transilluminate , partially compressible, and increase in size during coughing , crying , and in association with upper respiratory infections.

Ultrasound and MRI imaging are used to determine the extent of the lesion and whether it is macrocystic or microcystic.

The treatment of cystic hygroma depend primarily on the extend of the lesion. Localized mass is treated by complete surgical resection , care should be taken to avoid injury to adjacent structures. The other therapeutic option is non operative treatment by using sclerosing agents to induce fibrosis and subsequently obliteration of the cysts . This modality of treatment (Sclerotherapy) is indicated for diffuse mass infiltrating vital structures that make complete resection is not feasible ( as floor of the mouth, tongue, pharynx) .The most common agents used in sclerotherapy are ethanol , doxycycline , sodium tetradecyl sulfate and picibanil (OK-432). The sclerotherapy is associated with a higher recurrence rate than complete surgical resection .

***Sternocleidomastoid tumor***

***(fibromatosis colli)***

Sternocleidomastoid tumor is a benign condition characterized by fibrosis and shortening of the sternocleidomastoid muscle mainly in the right side. .

The etiology of this condition is unclear but there is a strong association with abnormal intrauterine position as breech presentation and with extracted vaginal delivery , both conditions can cause injury and subsequently fibrosis of the sternocleidomastoid muscle .

Clinically, sternocleidomastoid tumor presented between the second and eighth weeks of life as a firm mass within the sternocleidomastoid muscle mainly in the middle or lower third . About two thirds of the patients have a fibrous tumor and one third have diffuse fibrosis without a mass. The mass is not tender and the affected muscle is tight pulling the head and neck to the side of the lesion and the chin to the opposite side.

The treatment is usually non operative by physiotherapy including full range-of-motion and stretching exercises to rotates the head toward the opposite side . The majority of the cases are resolved by physiotherapy , however if there is no or inadequate response ; surgical correction is undertaken which include complete transection of the sternocleidomastoid muscle at its middle third .

***Good Luck***