Cervical Lymph Nodes

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Learning Targets

- Sonographic features of normal and pathological cervical lymph nodes
- Techniques of ultrasound-guided interventional procedures in the diagnosis of cervical lymphadenopathy
Normal anatomy

- **Outer cortex-lymphoid follicles**
- **Inner medulla-lymphatic sinus, connective tissue, blood vessels**

There are about 300 lymph nodes in the neck.
Neck triangles

- Anterior and posterior (SCM)
- Supra and infrahyoid (hyoid bone)
- Submandibular and submental
Classification of cervical lymph nodes (LN)

- 1- submental
  submandibular
- 2- upper cervical
  above the level of hyoid bone
  along the internal jugular chain
- 3- middle cervical
  between the level of hyoid bone and
  cricoid cartilage
  along the internal jugular chain
- 4- lower cervical
  below the level of cricoid cartilage
  along the internal jugular chain
- 5- posterior triangle
- 6- anterior triangle
- 7- upper mediastinum
- 8-
LN Distribution

- Metastases from oropharynx, hypopharynx, larynx
- Metastases from oral cavity
- Metastases from nasopharyngeal
- Metastases from papillary carcinoma of the thyroid
- Metastases from non-head and neck
- Lymphoma
- Tuberculosis

Metastatic, lymphomatous and TB LNs are site-specific

- Internal jugular chain
- Submandibular, upper cervical
- Upper cervical, posterior triangle
- Internal jugular chain
- Supraclavicular fossa, posterior triangle
- Submandibular, upper cervical, posterior triangle
- Supraclavicular fossa, posterior triangle
LN Size

- Malignant nodes tend to be large, but...
- Inflammatory nodes can be as large as malignant nodes
- Metastatic deposit can be found in small nodes

Size cannot be used as the sole criterion in DD
LN Shape

- Malignant and tuberculous nodes are usually *round* with a short to long axis (S/L) ratio > to 0.5

- Reactive and normal nodes are usually long or oval

Shape should be considered as the sole criterion in DD
LN Vascular pattern

- Normal and reactive LN have hilar vascularity or are apparently avascular
- Metastatic LN show peripheral or mixed vascularity
- Lymphomatous nodes have mixed vascularity

Peripheral and mixed vascularity are highly suspicious of malignancy
Other Sonographic Features

- Nodal border
- Echogenicity
- Micronodularity
- Calcification
- Necrosis
Normal LN

long or oval-shaped

≥ 0.5 short/long axis

echogenic hilum

hilar vascularity/ avascular
Biopsy: suspected toxoplasmosis, no malignancy

- Reactive, hypertrophic, inflammatory LN

- Homogeneous hypoechoic
- Round to oval, larger than 5 mm in short diameter
- Echogenic hilum with increased central vascularity
- Major complication: abscess formation
Malignant LN Lymphoma

- Very hypoechoic, round
- Peripheral or mixed vascularity
- No central hilum

Biopsy: Small cell lymphocytic lymphoma
Malignant lymph nodes: Papillary thyroid CA

microcalcifications

peripheral and central vascularity
Pre-therapeutic assessment of metastatic nodes

- Jugular vein thrombosis
- Bilateral involvement
- Subclinical ipsilateral nodes
- Volumetric data - for monitoring response to therapy
LN in Children

- Cervical lymphadenitis is the most common cause of a pediatric neck mass
- Submandibular or deep cervical LN are involved in 80% and may persist for months after adequate treatment

The *asymptomatic* neck mass is the one that should get your attention!
US-guided lymph node biopsy
LN Biopsy
Technique

- HR linear array transducer
- 14 -16 gauge long throw core biopsy needle in biopsy gun
- Transducer aligned and fixed immobilizing the lesion
- Needle advanced to the edge of the lesion under US guidance
LN Biopsy Technique

- Biopsy gun fired while US confirms that the needle has traversed the lesion
- Sample placed in 10% formaldehyde solution
- Repeat the procedure for 3-5 times
Technical difficulties

- Proximity to cervical vessels
- Calcifications/air tracking
- Mobile lesion
- Deep lesion
- Superficial lesion
- Small lesion
Complications

- Hematoma requiring treatment
- Infection
- Pneumothorax
- Vasovagal reaction
Advantages

- US guidance allows real time observation of needle passage and entry into the lesion
- Cost effective, obviates surgical procedures if benign
- Cost saving compared to surgical biopsy
- No ionizing radiation
Conclusion

- US is a useful imaging modality in the *assessment* of cervical lymph nodes

- Distribution, shape, echogenicity and color Doppler are useful to *identify the cause* of cervical lymphadenopathy
Conclusion

US is an accurate and efficient method of guidance for core needle biopsy of cervical lymph nodes.
Conclusion

- US has a high sensitivity (98%) and specificity (95%) when combined with fine-needle aspiration cytology (FNA) or core needle biopsy (FNB)
Thank you