ENT-S01

Semi-supervised Learning for Diagnosis of Neck Lymphadenopathy Using Real-Time Ultrasound Elastography Images

Duan-Yu Chen
Professor & Dean, College of Electrical and Communication Engineering, Yuan Ze University

The diagnosis of neck tumors often relies on the physician's judgment based on the patient's living habits and physical examination. Tissue sectioning is performed when necessary, and the process takes a lot of time. Therefore, elastography has become another option, which can immediately check the condition of the lymph nodes in the neck through imaging. However, the features displayed by elastic ultrasound images are not very prominent, and it is difficult to distinguish benign and malignant tumors of the neck and neck. Therefore, we use deep learning methods to obtain the characteristics of tumor images in elastic ultrasound, so that we can identify whether the tumor is benign or malignant. In our study, we used elastography gray-scale images provided by Far Eastern Memorial Hospital as a source of data for the diagnosis of benign or malignant tumors. Using the Vision Transformer model for training, the data set has a total of 10039 records, including 171 patients. When the model uses the Self-Distillation training method, the data of the tumor images will be augmented first, and then these data-augmented images will be simultaneously input into the model for training. In this process, the similarity of the same tumor image and its data-augmented image is continuously compared, so that the model can learn the features of diversity, and then use the trained features to classify. The training method can achieve 94.6% and 92.5% in sensitivity and specificity, respectively, thus indicating that the model can correctly identify whether the tumor in elastic ultrasound is benign or malignant in real-world environment.

ENT-S02

The Past and Future of Carotid Duplex Ultrasound in Head and Neck Cancer Patients

Chuan-Yi Lin, MD
Department of Otolaryngology, Lotung Poh-Ai Hospital, Yilan, Taiwan

Head and neck cancer (HNC) was the seventh most common cancer worldwide in 2018 (890,000 new cases and 450,000 deaths)[1] and the 5th leading cause of cancer-related death in Taiwan[2]. Surgery and radiotherapy play a crucial role in the treatment of patients with HNC. Radiotherapy was administrated in approximately 80% of all HNC patients as primary treatment or achieved to better regional disease control[3]. However, the long-term consequences of radiotherapy such as radiation-induced vasculopathy with accelerated atherosclerosis and increased risk of carotid artery stenosis (CAS) was well recognized[4-6]. With the survival rates of HNC patients have risen in the past two decades[7], the long term quality of life in HNC patients and how to monitor and prevent this radiotherapy related complication become more and more important. We hope to establish a surveillance protocol for carotid artery stenosis screening in post radiotherapy HNC patients by using carotid duplex ultrasound.

Reference:
1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394-424.
2. Taiwan Cancer Registry Report. Health Promotion Administration, Ministry of Health and Welfare. 2017.
3. Borras JM, Barton M, Grau C, et al. The impact of cancer incidence and stage on optimal utilization of radiotherapy: Methodology of a population based analysis by the ESTRO-HERO project. Radiother Oncol. 2015;116(1):45-50.
4. Dorresteijn LD, Kappelle AC, Boogerd W, et al. Increased risk of ischemic stroke after radiotherapy on the neck in patients younger than 60 years. J Clin Oncol. 2002;20(1):282-288.

5. Dorresteijn LD, Kappelle AC, Scholz NM, et al. Increased carotid wall thickening after radiotherapy on the neck. Eur J Cancer. 2005;41(7):1026-1030.

6. Carpenter DJ, Mowery YM, Broadwater G, et al. The risk of carotid stenosis in head and neck cancer patients after radiation therapy. Oral Oncol. 2018;80:9-15.

7. Rettig EM, D'Souza G. Epidemiology of head and neck cancer. Surg Oncol Clin N Am. 2015;24(3):379-396.

8. Texakalidis P, Giannopoulos S, Tsouknidas I, et al. Prevalence of carotid stenosis following radiotherapy for head and neck cancer: A systematic review and meta-analysis. Head Neck. 2020;42(5):1077-1088.

ENT-S03
Ultrasound of Cervical Lymph Nodes

Yi-Chu Lin
Division of Otorhinolaryngology - Head and Neck Surgery, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

Cervical lymphadenopathy is commonly caused by infection, malignancy such as metastases or lymphoma, and reactive hyperplasia. Ultrasound examination of cervical lymph nodes is common in routine clinical practice because of its noninvasive, accessible and inexpensive. Before making an accurate diagnosis of pathologic lymph nodes, it is crucial to well-understand of the normal appearances of cervical nodes. The ultrasound parameters such as size, shape, margin, shortest diameter/longest diameter (S/L ratio), and internal echo structure may assist in differentiating between benign and metastatic lymph nodes. Although no single sonographic parameter can differentiate benign from malignant lymph nodes, combining these findings can provide accurate differentiation. Ultrasound-guided fine-needle aspiration cytology (FNAC) helps in diagnosis of lymph nodes with its high sensitivity and specificity.

ENT-S04
The Milan System for Ultrasound-guide Salivary Gland Aspiration Cytopathology – Changhua Christian Hospital Experience with Cell Blocks

Ming-Yu Hsieh
Department of Otolaryngology, Head and Neck Surgery, Changhua Christian Hospital

Fine-needle aspiration cytology (FNAC) is a well-established technique for evaluation of salivary gland lesions, but because of the heterogenicity and morphological overlap between spectrum of lesion, there are a few challenges in its wide use. Recently, "The Milan system for reporting salivary gland cytopathology" (MSRSGC) was introduced, providing guide for diagnosis and management according to the risk of malignancy (ROM) in different categories. The main goal of the MSRSGC is to improve communication between cytopathologists and clinicians, while also facilitating cytologic-histologic correlation, sharing of data from different laboratories for quality control, and research.

MSRSGC is a useful system for risk assessment and deciding the further treatment protocol. This retrospective series further validates the MSRSGC. The proposed diagnostic classification is reproducible with use of cell blocks.

ENT-S05
Application of Ultrasound in Uncommon ENT Cases

Chia-Chen Chang
Department of Otolaryngology, Taipei City Hospital – Zhongxiao Branch.

To present the application of ultrasound in rather uncommon ENT conditions, with ultrasonographic pictures: 1. Neck lymphadenitis as the first presentation of tuberculosis and the clinical

pictures; 2. Echo-guided drainage of deep neck abscess where surgical approach was difficult; 3. Metastatic lymphadenopathy presented as a large pure cystic mass in neck; 4. Lymphoma presented as a large thyroid nodule; 5. Squamous cell carcinoma diagnosed from a thyroid cyst; 6. Core needle biopsies in suprasternal neck.

ENT-S06
The Application and Choices of Ultrasound in LMD

Kuo-An Yeh, MD
The Yeh Clinic

The Ultrasound is a very useful tool in helping clinical physician in diagnosing head & neck and thyroid diseases in everyday practice. In the hospital, ultrasound is most commonly used for diagnosing head and neck tumor and for post operation follow up in preventing tumor recurrence. In local clinics, the ultrasound can also be a very helpful tool for differentiating the causes of lump throat, palpable neck lesion, which are very common complaints seen in LMD patients. By using ultrasound images, we can show the head and neck anatomy to the patient, and explain the possible causes of lump throat and neck lesions. It will intensify the communication between the doctor and the patient and is always more convincible when there are images showing where the problem is. With correct diagnosis by ultrasound, we can then provide better care and treatments for our patients.

In my opinion, local clinical physicians should not limit themselves only treating URIs, we can expand our practice and expertise on other head & neck and thyroid diseases, which are also very commonly seen among patients visiting our clinics. Today, I will talk about how ultrasound was used in my clinic and the diseases I have diagnosed by using it. Also, under limited budget, how to choose the right kind of ultrasound with fine resolution and clear images is also a very important topic today.

ENT-P01
Ultrasound Texture Analysis: The Association with Neck metastatic Lymphadenopathy

Li-Jen Liao[1,2,3], Wu-Chia Lo[1], Wan-Lun Hsu[4], Ming-Hsun Wen[1], Ping-Chia Cheng[1]
[1]Department of Otolaryngology, Far Eastern Memorial Hospital, Taipei, Taiwan,
[2]Head and Neck Cancer Surveillance & Research Group, Far Eastern Memorial Hospital, New Taipei, Taiwan,
[3]Department of Electrical Engineering, Yuan Ze University, Taoyuan, Taiwan,
[4]Genomics Research Center, Academia Sinica, Taipei, Taiwan

Background: High-resolution ultrasound (US) is widely used in neck lymph node assessment. Texture analysis has been applied to US image analysis and has potential in US differentiation. The aims of this study were to perform US texture analysis for neck lymphadenopathy and validate a previous US prediction model.

Materials and Methods: We collected 219 patients with neck lymphadenopathy, including 103 female and 116 male patients. We performed texture analysis with 2D-grayscale images for benign and malignant neck lymphadenopathy and validated our previous US prediction model.

Results: Entropy was significantly higher at 0, 45, 90, and 135 degrees, as was the mean gray level co-occurrence (GLCM) in texture analysis for metastatic carcinoma. There were no statistically significant differences for other texture characteristics, including ASM, contrast, correlation, IDM, dissimilarity, INV, variance, CS and CP. Entropy (mean) was a significant predictor of univariate logistic analysis (OR=2.35, 95% CI: 1.44-3.81); however, entropy was not an independent factor in multivariate analysis (OR=1.58, 95% CI: 0.92-2.68) after adjusting for age, sex and S/L ratio. The sensitivity, specificity, PPV, NPV and overall accuracy were 87.3 (80.0-95.1)%, 78.4 (71.7-85.0)%, 66.0 (56.4-75.5)%,

92.8 (88.3-97.3)% and 81.3 (76.1-86.4), respectively, for the US prediction model.

Conclusion: Entropy is a significant differentiating factor for metastatic neck lymphadenopathy and is associated with internal echogenicity. However, entropy alone was not an independent factor in predicting metastatic lymphadenopathy.