Identifying mitoses in tumors and metastatic deposits in lymph nodes can be laborious and time-consuming tasks. Advances in digital pathology and machine learning algorithms have demonstrated promising results by automating these assignments in breast tissue and sentinel lymph node sections. These breakthroughs have made automated histopathological diagnosis a possibility. All prior studies have used high-resolution images from expensive whole slide image (WSI) scanners for training and detection of cellular events. Our aim was to investigate the efficacy of deep learning algorithms for automated detection of mitotic events on low quality images of oral squamous cell carcinoma (OSCC) produced by cellphone cameras.

Methodology: A FAST region-based convoluted neural network was trained on WSI from breast cancer. The mitotic events were highlighted through provision of pixel locations to the training algorithm, each patch was approximately 301×301 in size. The non-mitosis regions were randomly selected on the images. The final training data set comprised of 4407 image patches. Transfer learning was applied to generate results. Similar algorithms were employed on a data set of comparable size acquired through a cellphone camera from 13 different OSCCs at high-power (40x).

Results: The WSI demonstrated true positive rates of 0.46 and a false positive of 0.76 with an overall F1 precision of 0.57. The results from cellphone camera showed true positive rates of 0.46, and false positive rates of 0.54. The overall F1 score was 0.49.

Conclusion: Although WSIs outperformed cellphone images in identifying mitoses, enhancing image quality through modified algorithms may improve efficacy. This will facilitate use of low-cost data sets for training future algorithms for automated detection of cellular events, and widen its impact by making it accessible to every pathologist with a cellphone camera.

STRATIFICATION OF HEAD AND NECK SQUAMOUS CELL CARCINOMA USING COMBINED ANALYSIS OF PROGRAMMED DEATH LIGAND 1 AND SEMAPHORIN 4D EXPRESSION BY THE INFLAMMATORY CELLS IN THE TUMOR MICROENVIRONMENT.

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Objective: Inhibition of the immune check point PD-1/PD-L1 has shown unprecedented improvement in overall survival of platinum resistant head and neck squamous cell carcinoma (HNSCC) patients. PD-L1 immunohistochemical diagnostics showed to be more prognostic of the patient response. Yet, patients' response remains limited to 45% out of the PD-L1 positive cases, where PD-L1 can be expressed by the tumor cells or by the tumor associated inflammatory cells (TAIs). Semaphorin 4D (Sema4D) is an immune modulator molecule expressed by several inflammatory cells, as well as several tumor cell types including HNSCC. We have recently described a HNSCC stratification model based on combined analysis of PD-L1/ Sema4D IHC expression by the tumor cells. Here we would like to extend our analysis to further stratify HNSCC according to Sema4D/ PD-L1 expression by TAIs in the tumor micro-environment.

Findings: IHC analysis of Sema4D/PD-L1 in 136 HNSCC tissue cores showed: 61% (83 cases) to be Sema4D +ve in TAIs, and 29% (39 cases) to be PD-L1 +ve TAIs. Accordingly, we were able to stratify the examined HNSCC cores into 4 subtypes using the expression of Sema4D/PD-L1 by TAIs in the tumor micro-environment: (1) Sema4D only positive (37%) (50 cases), (2) PD-L1 only positive (4%) (6 cases), (3) Sema4D/PD-L1 (+ve/+ve) (24%) (33 cases), and (4) 35% (47 cases) to be (-ve/-ve). Sema4D only +ve TAIs were significantly higher than PD-L1 only +ve TAIs.

Conclusion: HNSCC stratification according to Sema4D/PD-L1 expression by TAIs in the tumor microenvironment can open new avenues for personalized targeted therapy and might interpret resistance or cytotoxic effects to PD-1/PD-L1 inhibition in HNSCC.

ADENOID CYSTIC CARCINOMA WITH HIGH-GRADE TRANSFORMATION: A RETROSPECTIVE STUDY FOCUSED ON CLINICOPATHOLOGICAL FEATURES AND PROGNOSTIC VALUE IN A SINGLE CENTER.

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Objectives: High-grade transformation of adenoid cystic carcinoma(ACC-HGT) is an extremely rare phenomenon. We reported 18 cases of ACC-HGT and focused on the clinicopathological features and prognostic value in this study.

Findings: 202 cases of ACC were included in the current study. According to the criteria for ACC-HGT had been published by Seethala et al., 18 cases were diagnosed as ACC-HGT. Compared to conventional ACC, ACC-HGT showed a slight male predominance (61.1% vs. 49.5%), higher lymph node metastasis (27.8% vs. 8.2%, p=0.021), higher recurrence rate (44.4% vs. 13.6%, p=0.003), higher vascular invasion rate (77.8% vs. 40.2%, p=0.002) and detected at an advanced stage (55.6% vs. 26.1%, p=0.008). Log Rank test was used to evaluated the prognostic value of the ACC-HGT. Patients with ACC-HGT had a much worse overall survival (OS) compared with conventional ACC (p<0.001). More importantly, compared with solid ACC, a subtype which generally accepted showing stronger invasiveness and having worse prognosis, ACC-HGT had even much worse OS (p=0.015).

Conclusions: Compared to conventional ACC, ACC-HGT showed a slight male predominance, higher lymph node metastasis, higher recurrence rate, higher vascular invasion rate and detected at an advanced stage. ACC-HGT had a much worse OS compared with conventional and solid type ACC. Those results suggesting that ACC-HGT is a highly aggressive tumor and should be considered for neck dissection and closer follow-up. Pathological distinction of this tumor has great significance for treating and predicting patients prognosis properly.

ANTIOXIDANT RICH TROPICAL HERBS TO COMBAT ARECA-NUT INDUCED OPMDS.

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