The role of ^{18}F-FDG PET-CT in Richter Transformation and accelerated CLL

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Objective:

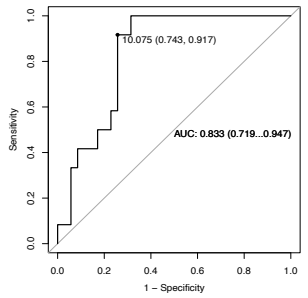
To investigate the diagnostic and prognostic value of ^{18}F-FDG PET-CT in Richter transformation (RT) and accelerated CLL (aCLL).

Methods:

- A total of 35 RT patients and 12 aCLL patients who had undergone ^{18}F-FDG PET-CT at Department of Hematology of Jiangsu Provincial People's Hospital were retrospectively examined.
- The analysis involves the imaging characteristics of ^{18}F-FDG PET-CT, measuring metabolic parameters, including maximum standard uptake value (SUVmax), tumor metabolic volume (MTV), total lesion glycolysis (TLG), maximum lesion distance (Dmax) and etc., with clinical, genetic and molecular biological data at the time of RT and aCLL diagnosis to investigate the diagnostic and prognostic value of ^{18}F-FDG PET-CT in RT and aCLL.

Results:

- RT patients have higher SUVmax (13.2 vs 7.9 in RT vs aCLL patients, p<0.001) and TLG (1651.9 vs 527.1 in RT vs aCLL, p<0.01). Multivariate analysis results suggest that SUVmax is a significant predictor for RT. A SUVmax cutoff value ≥10 (lesions with SUVmax ≥ 10 highly suspicious for transformation) shows a sensitivity, specificity, negative and positive predictive value of 74.3%, 92.3%, 57.1%, and 96.3%, respectively.



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- In comparison to aCLL, RT has a poorer prognosis, with a median overall survival (OS) of 13.5 months. Univariate COX analysis indicates that high MTV, high TLG, high Dmax, low β2-microglobulin, and complex karyotype (≥3 chromosomal abnormalities or structural abnormalities) are adverse prognostic factors for OS. In multivariate COX analysis, high TLG and complex karyotype are independently associated with shorter OS.

Conclusion:

- ^{18}F-FDG PET-CT is a useful diagnostic and prognostic tool for CLL/SLL patients with clinical suspicion of RT or aCLL. SUVmax is a significant predictor for RT, and lesions with SUVmax ≥ 10 should be highly suspected of transformation, warranting pathological biopsy or aspiration for confirmation. RT has a poorer prognosis, with high TLG and complex karyotype being independent associated with shorter OS.