Topic : Biliary & Pancreas

ARTIFICIAL INTELLIGENCE-POWERED SPATIAL ANALYSIS OF TUMOR-INFILTRATING LYMPHOCYTES PREDICTS PROGNOSIS IN RESECTED GALLBLADDER CANCER

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Background : Tumor infiltrating lymphocytes (TIL) play an essential role in various cancer types. However, their prognostic significance in resected gallbladder cancer remains largely unknown.

Methods : This study included 225 patients who underwent curative resection for gallbladder cancer. H&E-stained whole slide images were analyzed using the Lunit SCOPE IO, an artificial intelligence (AI)-powered spatial TIL analyzer. Based on the density of intratumoral TILs in the cancer epithelium and stromal TILs in the cancer stroma, three immune phenotypes (IP) were defined: immune-inflamed phenotype (IIP), immune-excluded phenotype (IEP), and immune-desert phenotype (IDP). Survival outcomes were analyzed, with subgroup analysis conducted for early-stage (stage 0-II) and advanced-stage (stage III-IV) disease.

Results : Of the 225 patients, 58 (25.8%) had IIP, 151 (67.1%) had IEP, and 16 (7.1%) had IDP. During a median followup of 71 months, 82 deaths (36.4%) were recorded. Both IIP and IEP were significantly associated with longer disease-free survival (DFS) and overall survival (OS) compared to IDP.

Conclusions : Immune phenotypes identified through AI-powered spatial TIL analysis were associated with DFS and OS in resected gallbladder cancer, particularly in late-stage disease. These findings highlight the prognostic potential of immune phenotyping, especially in advanced diseases.

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