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Research Article

Piwi-Interacting RNAs As Diagnostic and Prognostic Biomarker in Cancer: A Pooling Analysis of Retrospective Studies

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ABSTRACT

Background: P-element induced wimpy testis (PIWI)-interacting RNAs (piRNAs) are the most mysterious class of small non-coding RNAs. They limit gene expression in gonads and sequence diversity. Dysregulated piRNAs can led to all kinds of cancers. Recently, piRNAs were postulated to be potentially useful biomarkers for tumor diagnosis and prognosis. However, there lack a systematic review of prognostic and diagnostic piRNAs in neoplasms. The study aimed to decipher the relationships between piRNAs expression, diagnostic and prognostic outcome in tumors.

Methods: This study systematically searched Google Scholar, MEDLINE, Scopus, PubMed, Embase, ScienceDirect, Ovid-Medline, Chinese National Knowledge Infrastructure, WanFang and SinoMed databases for relevant articles published before July 13, 2022. The study is registered in PROSPERO (CRD42020208717).

Results: Thirty relevant studies were included in the meta-analysis: 19 on diagnosis and 23 on prognosis. The pooled adds ratio, 95% confidence intervals (Cl) and hazard ratios (HR) of the studies were used to investigate the clinical parameters and overall survival (OS) of cancer patients. The area under the curve (AUC), sensitivity, and specificity was 0.82, 79%, and 77% in tumors, respectively. Though abnormally expressed piRNAs were associated with poor and unfavorable impacts on the OS time of cancer patients (HR=1.00, 95% Cl: 1.00-1.00, P<0.00001). Meanwhile, piRNAs in the breast cancer had favorable impacts on the OS (HR=0.70, 95% CI:0.45-1.09). However, the piRNAs in cell renal cell carcinoma, colorectal cancer, diffuse large B-cell lymphoma and gastric cancer had bad favorable impacts on the OS (HR=1.46, 95% CI:1.37-1.55; HR=1.56, 95% CI:1.24 -1.95; HR=2.19, 95% CI:1.25-3.86; HR=1.01, 95% CI:0.97-1.04, respectively).

Conclusions: The results strongly suggested that piRNAs were potential novel prognostic and diagnostic indicators in tumors.

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