Title: Clinical value of survivin and its underlying mechanism in ovarian cancer: A bioinformatics study based on GEO and TCGA data mining

Authors: Xiao-jiao Li, Jin-shu Pang, Yao-mei Li, Farah Abdirahman Ahmed, Rong-quan He, Jie Ma, Fu-chao Ma, Gang Chen

PII: S0344-0338(17)31109-3
DOI: https://doi.org/10.1016/j.prp.2017.12.020
Reference: PRP 51979

To appear in:

Received date: 5-11-2017
Revised date: 10-12-2017
Accepted date: 31-12-2017

Please cite this article as: Xiao-jiao Li, Jin-shu Pang, Yao-mei Li, Farah Abdirahman Ahmed, Rong-quan He, Jie Ma, Fu-chao Ma, Gang Chen, Clinical value of survivin and its underlying mechanism in ovarian cancer: A bioinformatics study based on GEO and TCGA data mining, Pathology - Research and Practice https://doi.org/10.1016/j.prp.2017.12.020

Clinical value of survivin and its underlying mechanism in ovarian cancer: A bioinformatics study based on GEO and TCGA data mining

Xiao-jiao Li1, Jin-shu Pang2, Yao-mei Li2, Farah Abdirahman Ahmed, Rong-quan He2, Jie Ma2, Fu-chao Ma2*, Gang Chen3

1 Department of PET-CT, First Affiliated Hospital of Guangxi Medical University, 6 Shuangyong Road, Nanning 530021, Guangxi Zhuang Autonomous Region, P. R. China. Email: Lixiaojiao4269@126.com
2 Department of Medical Oncology, First Affiliated Hospital of Guangxi Medical University, 6 Shuangyong Road, Nanning 530021, Guangxi Zhuang Autonomous Region, P. R. China.
3 Department of Pathology, First Affiliated Hospital of Guangxi Medical University, 6 Shuangyong Road, Nanning 530021, Guangxi Zhuang Autonomous Region, P. R. China.

Corresponding author: Fu-chao Ma, Department of Medical Oncology, First Affiliated Hospital of Guangxi Medical University, 6 Shuangyong Road, Nanning 530021, Guangxi Zhuang Autonomous Region, P. R. China. Email: mafuchao@live.cn

Abstract

Objective: An increasing number of studies have confirmed that survivin (BIRC5) plays essential roles in ovarian cancer. Nevertheless, inconsistent or controversial results exist in some studies. In the present study, we sought to determine the clinical significance of survivin and its potential molecular pathways.

Methods: The correlation between survivin (BIRC5) expression and diagnostic value, prognostic value and clinicopathological features was assessed by meta-analysis with more than 4000 patients from literature, GEO and TCGA. In addition, the potential molecular mechanism of survivin in ovarian cancer was also determined.

Results: The pooled sensitivity and specificity were 0.71 (95%CI: 0.68~0.74) and 0.97 (95%CI: 0.94~0.98), respectively. The AUC of sROC was 0.8765. The results showed that there was also a significant relationship between survivin expression and poor overall survival (HR: 1.24, 95%CI: 1.14~1.35, $p < 0.001$), disease-free survival (HR: 1.53, 95%CI: 0.57~4.09, $p < 0.001$), as well as higher recurrence rate (HR: 1.11, 95%CI: 0.97~1.27). Moreover, survivin expression was also associated with tumor progression (cancerous vs. benign, OR: 11.29, 95%CI: 8.96~14.24, $p < 0.001$), TNM stage (III + IV vs. I + II, OR: 5.38, 95%CI: 4.16~6.97, $p < 0.001$), histological grades (G3 vs. G1~G2, OR: 4.36, 95%CI: 3.29~5.77, $p < 0.001$), and lymphatic metastasis (metastasis vs. non-metastasis, 3.35, 95%CI 2.36~4.75, $p < 0.001$). Bioinformatics analysis revealed the 50 most frequently altered neighboring genes of survivin in OC, and then Gene Oncology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) analysis were conducted. GO analysis showed that these genes were related to signal conduction, cell cycle, apoptosis, and metabolism. KEGG pathways analysis indicated that these genes were primarily enriched in mitotic prometaphase, PLK1 signaling events and the regulation of glucokinase by the glucokinase regulatory protein.

Conclusion: Survivin (BIRC5) expression might become a specific but low-sensitivity biomarker in ovarian cancer patients, and its presence indicated poor prognosis and worse TNM stages. This protein might function as an oncoprotein by influencing specific pathways involving the 50 genes identified herein. Additional studies are needed to confirm these results.

Key word: Ovarian cancer, survivin, meta-analysis, bioinformatics study.