DEVELOPMENT OF A PROGNOSTIC MODEL FOR LONG-TERM SURVIVAL IN LOCALLY ADVANCED GASTRIC CANCER

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ABSTRACT

Despite significant advances in the diagnosis and treatment of gastric cancer, locally advanced gastric cancer (LAGC) remains associated with poor long-term outcomes. The TNM classification remains the principal prognostic tool; however, patients with identical tumor stages often demonstrate markedly different survival rates, indicating that TNM staging alone is insufficient for accurate prognostic assessment.

Relevance

Despite significant advances in the diagnosis and treatment of gastric cancer, locally advanced gastric cancer (LAGC) remains associated with poor long-term outcomes. The TNM classification remains the principal prognostic tool; however, patients with identical tumor stages often demonstrate markedly different survival rates, indicating that TNM staging alone is insufficient for accurate prognostic assessment. The identification of additional clinicopathological and biological prognostic factors and their integration into a comprehensive prognostic model may improve individualized treatment planning and long-term follow-up. Moreover, implementation of such models in routine clinical practice may contribute to optimizing multidisciplinary decision-making in specialized oncology centers.

Objective of the Study

To develop and validate a prognostic model for predicting 5- and 10-year survival in patients with locally advanced gastric cancer based on clinicopathological, morphological, immunohistochemical, and surgical factors, and to evaluate its practical implementation in the Tashkent Regional Branch of the Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology.

Materials and Methods

The study included **267 patients** with locally advanced and disseminated gastric cancer who underwent surgical treatment at the **N.N. Blokhin National Medical Research Center of Oncology (Moscow, Russian Federation)** between **1999 and 2011**. The study population consisted of **62 patients who survived for more than 10 years**, **106 patients who survived between 5 and 10 years**, and a **control group of 99 patients** with survival of less than five years after treatment. Patients ranged in age from **24 to 74 years** (mean age **53.8 ± 10.6 years**), including **164 men** and **103 women**.

Clinical, pathological, and surgical characteristics were retrospectively analyzed, including age, sex, tumor localization, Lauren histological classification, tumor differentiation grade, TNM stage, lymph node involvement, extent of surgical resection, and immunohistochemical expression of **Ki-67, VEGFR, p53, and BCL-2**. Statistical analyses were performed to identify independent predictors of long-term survival and to develop an integrated prognostic model.

Results and Discussion

Female sex, age below 60 years, intestinal-type adenocarcinoma, well- and moderately differentiated tumors (G1–G2), and limited regional lymph node involvement were significantly associated with prolonged survival. Patients with diffuse-type gastric cancer, poorly differentiated tumors, advanced lymph node metastases, and extensive local tumor invasion demonstrated significantly poorer long-term outcomes.

Among surgical procedures, **gastrectomy** was associated with the highest probability of prolonged survival and remained the most effective radical treatment option for locally advanced gastric cancer. Incorporation of immunohistochemical biomarkers (Ki-67, VEGFR, p53, and BCL-2) significantly improved prognostic accuracy compared with conventional TNM staging alone, allowing more precise identification of patients with favorable and unfavorable prognostic profiles.

Based on the identified independent prognostic factors, an integrated prognostic model was developed to estimate the probability of 5- and 10-year survival after radical surgical treatment. The model combines clinicopathological, morphological, surgical, and biological parameters, providing individualized prognostic assessment. The developed algorithm was subsequently introduced into the clinical practice of the **Tashkent Regional Branch of the Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology**, where it is used during multidisciplinary treatment planning, postoperative follow-up, and risk stratification of patients with locally advanced gastric cancer.

Conclusions

The developed prognostic model provides a comprehensive and individualized assessment of long-term survival in patients with locally advanced gastric cancer by integrating clinicopathological, surgical, and immunohistochemical parameters. Compared with conventional TNM staging, the proposed model demonstrates greater prognostic accuracy and facilitates personalized treatment planning. Its implementation in the **Tashkent Regional Branch of the Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology** confirms its practical applicability and potential to improve long-term treatment outcomes and optimize clinical decision-making in specialized oncology practice.