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Perceived Stress and Depressive Symptoms Are Associated with Biomarkers Indicative of Shorter Disease-Free Survival in Head and Neck Cancer Patients

Washington, DC - Studies have shown that stress can affect the immune system and weaken the body's defense against infection and disease. In cancer patients this stress can also affect a tumor's ability to grow and spread. However, the biological mechanisms that underlie such associations are not well understood. Now, researchers at Fox Chase Cancer Center find that poor psychosocial functioning is associated with greater vascular endothelial growth factor (VEGF) expression – a signaling protein that not only stimulates tumor growth, but is also associated with shorter disease-free survival in head and neck cancer patients.

“There is research showing that high VEGF expression in other cancers, such as ovarian, is associated with psychosocial factors,” says Carolyn Fang, PhD, Co-Leader of the Cancer Prevention and Control Program at Fox Chase, who will be presenting the study at the 32nd Annual Meeting & Scientific Sessions of the Society of Behavioral Medicine on Thursday, April 28th. “This information coupled with what we already know about VEGF promoting tumor aggressiveness and poorer prognosis in head and neck cancer patients, certainly gave us a reason to look at this biomarker.”

VEGF not only plays a pivotal role in angiogenesis, but it is also regulated by stress hormones and key cytokines – a category of signaling molecules used extensively in intercellular communication.

In the current study, Fang and colleagues looked at 37 newly diagnosed, pre-surgical head and neck cancer patients, to see if psychosocial functioning, such as perceived stress and depressive factors, was associated with VEGF, a biological pathway relating to patient outcomes. The patients were predominantly male (70.3%), and approximately 57-years-old, with primary tumor sites of the oral cavity (65.9%), larynx (19.9%), and oropharynx (13.5%). Over 40% of them were classified as having early-stage disease.

Each patient was given a psychosocial questionnaire to complete prior to treatment, which required them to answer questions about social support, depression, and perceived stress. In addition, VEGF expression in tumor tissue obtained during surgery was evaluated using immunohistochemistry – a process that helps detect the presence of specific proteins in cells or tissues.

“Our analysis indicated that higher levels of perceived stress and depressive symptoms were associated with greater VEGF expression in the tumor tissue of these patients” says Fang.

Greater VEGF expression was, in turn, associated with shorter disease-free survival among patients.

The associations between psychosocial functioning and VEGF were strong among early-stage patients, but were less apparent among late-stage patients.

“It’s possible that in early stage disease, psychosocial stress makes patients more susceptible to cancer-related death, while in patients with advanced disease, other factors become more important in determining outcome,” says Miriam N. Lango, MD, Medical Director of Speech Pathology Service and Attending Surgeon in Head and Neck Oncology at Fox Chase. “In patients with advanced cancers, psychosocial interventions may have less of an impact since these cancers are inherently more aggressive.”

In the near-term, Fang and her colleagues hope to expand the study to look at a larger sample of patients and to incorporate other signaling pathways that are relevant to cancer, like EGFR, which researchers involved in Fox Chase’s Keystone Program in Head and Neck Cancer are already exploring.

“The next step is to conduct a longitudinal study that would allow us to examine patient psychosocial functioning in conjunction with biomarkers of disease aggressiveness and survival from pre-treatment through post-treatment and beyond, which would give us a more complete picture of how these factors may contribute to patient outcomes,” Carolyn adds.

Co-authors on the study include John A. Ridge, MD, PhD, Miriam N. Lango, MD, Barbara A. Burtness, MD, Brian L. Egleston, PhD, Margaret Einarson, PhD, and Andres Klein-Szanto, MD, PhD, of Fox Chase.

Fox Chase Cancer Center is one of the leading cancer research and treatment centers in the United States. Founded in 1904 in Philadelphia as one of the nation’s first cancer hospitals, Fox Chase was also among the first institutions to be designated a National Cancer Institute Comprehensive Cancer Center in 1974. Fox Chase researchers have won the highest awards in their fields, including two Nobel Prizes. Fox Chase physicians are also routinely recognized in national rankings, and the Center’s nursing program has received the Magnet status for excellence three consecutive times. Today, Fox Chase conducts a broad array of nationally competitive basic, translational, and clinical research, with special programs in cancer prevention, detection, survivorship, and community outreach. For more information, visit Fox Chase’s Web site at www.foxchase.org or call 1-888-FOX CHASE or (1-888-369-2427).

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This study was presented during the 2011 Annual Meeting and Scientific Session of the Society of Behavioral Medicine (SBM) from April 27 – 30 in Washington, DC. However, it does not reflect the policies or the opinion of the SBM.

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