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**Survivors of childhood leukemia, brain tumors
more at risk for strokes later in life**

DALLAS – Nov. 20, 2006 – Children who are successfully treated for brain tumors or leukemia are more likely to have strokes later in life, according to new research from UT Southwestern Medical Center.

In addition, childhood cancer survivors who received higher doses of cranial radiation therapy to kill the cancer showed even greater risk of stroke in later life, according to the study, which appears in today's issue of the *Journal of Clinical Oncology* and is available online.

"This is important because leukemia and brain tumors are the two most common types of childhood cancer, representing more than half of childhood cancers," said Dr. Daniel Bowers, associate professor of pediatrics and lead author of the study.

Other studies have shown that survivors of childhood leukemia or brain cancer are also at higher risk for cardiac dysfunction, obesity, short stature, and hormone and neurocognitive deficits. This is the first study to examine the risk to survivors for late-occurring strokes, which occur at least five years after their cancer diagnosis.

Leukemia and brain tumors account for 53 percent of all cancers among children younger than 15 years of age and are annually diagnosed in more than 4,400 U.S. children. Most patients live at least five years beyond their diagnosis to become long-term cancer survivors – 79 percent for leukemia and 73 percent for brain tumors.

The peak incidence for both leukemia and brain tumors is during vulnerable neurocognitive development, so researchers suspect that the radiation therapy typically received at such a crucial time may influence the later risk for stroke.

Among the study's findings:

- Compared with siblings, leukemia survivors were two to three times more likely to suffer a stroke.
- Brain-cancer survivors were eight to 10 times more likely to suffer a stroke.

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- Brain-tumor survivors treated with radiation therapy were 15 times more likely to suffer a stroke.
- Patients with a history of relapse of their cancer were at a greater risk for stroke, likely a result of increased radiation treatment, the researchers concluded.

The effects of late-occurring strokes, which can be life-threatening or result in permanent or severe disability, can be particularly devastating in these cases because they often hit when the childhood cancer survivors are reaching early adulthood – in their late 20s and early 30s.

“Many people think, ‘You’re five years out from your cancer, you must be cured, and you can get on with the rest of your life.’ But these patients suddenly develop a new complication of the cancer and its treatments,” Dr. Bowers said.

UT Southwestern is one of 26 sites participating in the Childhood Cancer Survivors Study on long-term side effects for cancer survivors. Children’s Medical Center Dallas is also a member and contributed patients to the study. The study established a database of information on some 14,000 patients who survived at least five years after being diagnosed with cancer during childhood. The national database includes about 4,000 leukemia survivors and about 1,700 survivors of brain tumors.

Dr. Bowers has been culling through the data involving strokes, and previously discovered a greater stroke risk for survivors of Hodgkin disease.

Brain tumors and leukemia might seem like apples and oranges because leukemia is a bone-marrow cancer and brain cancers are by definition tumors in the brain.

“But they are similar in important ways,” Dr. Bowers noted. “They both are most likely to occur in young childhood, and both groups also get targeted radiation therapy to the brain.”

The current treatment regimens for brain tumors and leukemia are aimed at reducing the use of radiation therapy, a move designed to lessen learning problems associated with radiation therapy.

“It would be interesting to see whether it may also impact the occurrence of strokes,” Dr. Bowers said.

Researchers are now formulating a follow-up study to identify a way of screening patients who might be at risk of having strokes, with the goal of eventually developing a preventive strategy.

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Other researchers involved in the study were senior author Dr. Kevin Oeffinger, a former faculty member at UT Southwestern, now with Memorial Sloan-Kettering Cancer Center, as well as researchers from UT M.D. Anderson Cancer Center, the Food and Drug Administration, the Fred Hutchinson Cancer Research Center, the University of Michigan, St. Jude Children's Research Hospital, and the Children's National Medical Center.

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