Two recent studies have suggested that pediatric patients with a history of Hodgkin disease (HD) are, in general, undergoing too much routine surveillance scanning. Most clinicians agree that scans are important in the early period after primary treatment, but it is not clear from the literature for how long routine surveillance scanning in asymptomatic patients should be performed.

Stephan Voss, MD, PhD, lead author and chief of oncologic imaging at the Boston Children’s Hospital in Massachusetts, and colleagues conducted a retrospective study of 216 patients enrolled on the Children’s Oncology Group (COG) multiinstitutional Pediatric Oncology Group 9425 trial, which was conducted from 1997 to 2001 (J Clin Oncol [published online ahead of print June 11, 2012]). All patients were aged younger than 21 years and had intermediate-risk (25%) or high-risk (75%) HD. At a median follow-up of 7.4 years, 25 patients had experienced a relapse. Nineteen of these patients had their relapse suspected by symptoms, blood tests, or physical examination. Six patients had a relapse found on surveillance imaging without any abnormal clinical or laboratory findings. Two of these relapses were discovered within the first year; therefore, of 216 patients, only 4 relapses were detected by routine imaging in asymptomatic patients after the first year of follow-up. The median time to relapse from the end of treatment was 7.6 months, with 64% of those cases occurring within the first year. The median time to relapse was 11.5 months in patients who had a rapid early response to therapy and 2.2 months for those with a slow early response. Salvage therapy was efficacious, with a 5-year event-free survival rate of 84% and an overall survival rate of 95% in those patients with relapse. Furthermore, most relapses were at the previous site of disease or at a new area along with previous sites, with only 2 patients (8%) developing a relapse solely at a new site. Rates of relapse were about the same for intermediate-risk and high-risk groups (approximately 12%). All 6 patients who died of disease after relapse had developed recurrence within 12 months, and there were no deaths noted among patients who relapsed later, regardless of how the relapse was detected.

“I think the take-home point is that surveillance imaging strategies should be tailored to the disease in question, and the patients’ inherent likelihood of relapse based on stage and other known risk factors,” says Dr. Voss. He does not suggest that imaging be eliminated for patients with aggressive tumors, for whom the early detection of relapse may impact outcome. However, for patients expected to have a favorable outcome, the data justify changing the approach to surveillance imaging. “This will reduce the number and frequency of scans and potentially lead to switching to modalities that minimize use of ionizing radiation, such as [magnetic resonance imaging] MRI,” he says.

In addition to unnecessary exposure to radiation, the authors also noted the financial implications of excess scanning. They estimated that if each patient in this study had undergone 6 fewer computed tomography (CT) scans of the chest, the amount saved would equal about $3.5 million.

In a second study, Nisha Rathore, MD, and colleagues also examined how much routine scanning is needed, given the largely successful outcomes for pediatric patients with HD.
with HD. They performed a retrospective study using the electronic medical records of 99 consecutive patients between the ages of 2 years and 22 years with HD who were treated at Texas Children’s Hospital in Houston from 2000 to 2010 (Pediatr Hematol Oncol [published online ahead of print May 25, 2012]). Thirteen patients relapsed, with 11 of these developing recurrence within the first year after primary therapy. The 2 remaining relapses occurred at 16 months and 17 months, respectively, after treatment. All but one of the relapses were found on scans alone without suspicion on clinical grounds. (This is in contrast to the COG study, in which the majority of relapses were suspected from clinical findings.)

A mean of 15 surveillance scans per patient were performed, with patients with higher stage disease receiving more scans. Imaging included chest x-rays; CT scans of the chest, abdomen, pelvis, or neck; positron emission tomography scans; and bone scans. No relapses were detected by chest x-rays. Radiation exposure from the scans increased with increasing stage of disease; patients with stage I HD received a mean of 31.97 millisieverts (mSV) and those with stage IV disease received 51.35 mSv. The authors note that the exposure from a single scan is small, but the cumulative radiation dose from surveillance scanning found in this study approached or exceeded the threshold dose associated with an increased incidence of solid tumors in the Radiation Effects Research Foundation Life Span Study cohort of atomic bomb survivors (Radiat Res. 2007;168:1-64).

It is estimated that 2% of future cancers in the United States may be attributable to radiation from CT scans and that 15% of these will be due to CT scans performed in pediatric patients (Arch Intern Med. 2009;169:2071-2077). In addition, children are more susceptible to the carcinogenic effects of radiation, and pediatric patients with HD are among the highest risk populations for developing second malignancies, especially those who receive therapeutic radiation.

Changes in the Standard of Care
“I think the data are compelling that pediatric patients with HD do not need as frequent scans as previously performed. In our HD consortium, we have limited imaging to the 1- and 2-year off-therapy anniversaries without detriment to our patients,” says Monika Metzger, MD, associate professor in the division of leukemia/lymphoma at St Jude Children’s Research Hospital in Memphis, Tennessee. At the Texas Children’s Hospital, clinicians have stopped surveillance scanning after 2 years and eliminated chest x-rays altogether. “Based on our data, we think there is enough evidence, so we have changed the surveillance scanning guidelines at our institution. Also, the COG data show similar results to ours and have altered the surveillance scanning in their Hodgkin’s disease protocols,” says Catherine Bollard, MD, corresponding author and associate professor, department of pediatric medicine, hematology-oncology, at Baylor College of Medicine in Houston, Texas. Specifically, Dr. Voss states that the recently closed COG AHOD0031 trial in patients with intermediate-risk HD was amended to reduce the number of required follow-up CT scans from 11 to 3: 1 scan each at the completion of therapy, at 6 months, and at 12 months after therapy. An 18-month scan is optional. Furthermore, the protocol amendment states that off-therapy CT scans should be limited to the original sites of disease involvement, and magnetic resonance imaging can replace CT scans at the investigator’s discretion.

Other tumor types are being studied as well, because overscanning may be present. “We are studying surveillance scanning benefits in patients with B-cell non-Hodgkin’s lymphoma and anaplastic large cell lymphoma, as overscanning may be a larger problem,” says Dr. Bollard. “Any pediatric cancer that is currently followed with often regular scans needs to be evaluated for its risks and benefits regarding its schedule,” notes Dr. Metzger.