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Probability data could better direct lymph node removal for thyroid cancer

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Surgeons operating on patients with advanced thyroid cancer are often conflicted when deciding how many lymph nodes they should remove to reduce the patient's risk of recurrence.

If surgeons don't evaluate enough lymph nodes, they could leave cancer behind; but extensive surgery close to structures such as nerves, the voice box and parathyroid glands can carry serious risks.

A new study from the Duke Clinical Research Institute and Duke Cancer Institute strives to establish objective, quantifiable information for patients and doctors regarding the minimum number of lymph nodes that should be analyzed around a tumor for thorough treatment without unnecessary risk. The retrospective study appears Aug. 15 in the *Journal of Clinical Oncology*.

"In these procedures, a lot is left to the surgeon. If the tumor is large or there's obvious evidence that the cancer is in the lymph nodes, you take them out," said author Julie Ann Sosa, M.D., chief of endocrine surgery and leader of the endocrine neoplasia diseases group at the Duke Clinical Research Institute and the Duke Cancer Institute.

"If there is no evidence of obvious invasion, you can remove them preventatively, but you might not have to," Sosa said. "That's the quandary faced by the entire health care team—for the surgeon, whether to take the lymph nodes out; for the endocrinologist, whether to give radioactive iodine, in part based on the information obtained about

lymph nodes during surgery; and for the patient, whether the information and treatment will result in better survival."

Surgeons and pathologists analyze lymph nodes to identify the stage of the patient's cancer and prognosis. The information is critical for surgeons, nuclear medicine physicians and endocrinologists to determine what additional treatment a patient may need.

For the study, the Duke researchers analyzed almost 39,000 cases of papillary thyroid cancer that had spread to patients' lymph nodes. The cases, accessed through the National Cancer Database, occurred between 1998 and 2012; each patient had undergone a thyroidectomy, at which time at least one lymph node was examined.

By the Duke researchers' calculations, surgeons operating on patients with a stage T1b tumor (more than 1 cm, but less than 2 cm at its widest point) can be 90 percent sure they have contained the cancer if they remove 6 lymph nodes around the tumor that test negative for the disease.

For patients with a stage T2 tumor (larger than 2 cm but no larger than 4 cm), surgeons and pathologists should test at least 9 lymph nodes around the tumor.

For patients with a stage T3 tumor (larger than 4 cm with minimal extension beyond the thyroid), surgeons and pathologists should be testing at least 18 lymph nodes.

"We are trying to quantify the risk," said senior author Terry Hyslop, Ph.D., director of biostatistics at Duke Cancer Institute. "We don't know the exact probability within each person, but this is based on patterns within a large set of data."

Some surgeons also opt for preventative removal of the lymph nodes in the central neck to limit the chance of recurrence in case the lymph nodes contain cancerous tissue not visible in pre-surgical imaging. The study suggests in these prophylactic operations, surgeons need to remove just 3 to 8 lymph nodes for an adequate evaluation, depending on the stage of the tumor.

The study has limitations, the authors noted. It is a retrospective analysis, and the data used didn't indicate the precise locations of lymph nodes that were removed, the authors said. Still, the authors hope the study can contribute to the development of guidelines for surgeons and help them explain to patients the risks and advantages of removing lymph nodes in surgery.

"This could guide physicians and patients to making better joint decisions regarding the benefits of additional postoperative treatment options, such as radioiodine ablation," Sosa said.

Provided by Duke University