

SPECT-MRI fusion minimizes surgery for diagnosis of early-stage cervical cancer patients

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A recent study reported in the April issue of *The Journal of Nuclear Medicine* found that cervical cancer patients without enlarged lymph nodes could benefit from SPECT-MRI imaging of their sentinel lymph nodes (SLNs) to assess whether metastases are present.

Cervical cancer is the fourth most common cancer in women worldwide, with more than 500,000 new cases globally each year. According to a 2014 University of Maryland study, cervical cancer affects 18.6 women per 100,000 in the United States. Early diagnosis is critical. Although surgical removal and examination of the [sentinel lymph nodes](#) remains the most accurate way to determine whether the cancer has spread to the lymph nodes, SPECT-MRI imaging may reduce false negative MRI findings in early-stage [patients](#) and potentially save some from invasive diagnostic procedures.

Researchers at the University Medical Center Utrecht, Netherlands, used Tc-99m-nanocolloid SPECT-MRI fusion for the assessment of SLNs (for size and absence of sharp demarcation) in patients with early-stage cervical cancer.

Jacob P. Hoogendam, MD, the corresponding author of the study, notes, "An interesting aspect of this research, and the field in general, is that we are taking more and more steps toward combined technology to minimize invasive diagnostics in patients with cervical cancer." He adds,

"With these methods we aim to reduce morbidity via more tailored and informed selections between radical hysterectomy and chemo/radiation for each patient, instead of solely stage-based treatment selections."

Between March 2011 and February 2015, the research team evaluated stage IA1-IIIB1 cervical cancer patients who presented at the center. Patients with enlarged [lymph nodes](#) on MRI were excluded. The remaining patients underwent an SLN mapping procedure with preoperative Tc-99m-nanocolloid SPECT-CT. By creating fused datasets of the SPECT and MRI, SLNs could be identified on MRI with accurate correlation to the histological result of each individual SLN. An experienced radiologist, with no knowledge of the histology, retrospectively reviewed all fused SPECT-MRIs and scored morphologic SLN parameters on a standardized case report form. Logistic regression and receiver operating curves (ROC) were used to model the parameters against the SLN status. In 75 cases, 136 SLNs were eligible for analysis, of which 13 (9.6 percent) contained metastases (eight cases).

Hoogendam points out the value of evaluating patients with stage 1 or 2 [cervical cancer](#) for the non-invasive SPECT-MRI diagnostic procedure: "We need to be aware that a dichotomous lymph node cut-off on MRI, typically a 10mm short axis diameter to determine whether it is suspicious or not, is relatively crude and certainly does not fit all patients," he explains. "Our study investigated whether a more individualized, imaging-based assessment is possible for the small metastases that are currently missed on imaging (i.e., false negative on MRI)."

He elaborates, "The novelty of our study is the focused review of fewer than five sentinel nodes, instead of indiscriminately reviewing the entire pelvic lymphatic chain (up to 100 nodes per patient). Less is more." Hoogendam adds, "This new imaging approach is a first step, and we hope it sparks further research."

He also argues for an interdisciplinary approach to both clinical practice and research, stating, "This sentinel node focus requires a combination of preoperative [nuclear medicine](#) imaging (SPECT), radiology (MRI), and the gynecological oncology department (intraoperative sentinel node procedure). We should not be islands within a hospital; better interdisciplinary cooperation can synergistically lead to new insights, more relevant research questions, and better patient care."

More information: J. P. Hoogendam et al. 99mTc-Nanocolloid SPECT/MRI Fusion for the Selective Assessment of Nonenlarged Sentinel Lymph Nodes in Patients with Early-Stage Cervical Cancer, *Journal of Nuclear Medicine* (2015). [DOI: 10.2967/jnumed.115.164780](https://doi.org/10.2967/jnumed.115.164780)

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