CTや核医学検査を繰り返すことにより乳がんリスクが上昇する（Abstract＃LL-HPS-TU3A）

心臓や胸部CT画像を繰り返すことにより若年女性の10年間の乳がんリスクが2倍以上になる

Repeat cardiac and chest CT imaging more than doubles a young woman's 10 year risk of breast cancer

約250,000人の女性における2000～2010年の記録を再検討した結果、若年女性や検査を繰り返された患者など一部の女性においてCTや核医学検査が多いことにより乳がんリスクが上昇することが示されたとの研究結果が、2012年Radiological Society of North America年次集会で発表された。研究者らは、乳房被曝のCT検査を施行された患者1,656人のCT放射線量情報を収集し、新たな自動計算法を用いて患者の有効被曝量および乳房に吸収された放射線量を推定した。また核医学検査を受けた患者5,507人における放射線医薬品の用量およびそれに伴う被曝量を解析した。その後、女性らの画像検査に関連した乳がんリスクを推定し、潜在的乳がん発症リスクとを比較した。胸部およびまたは心臓CT検査を数回受けた女性は、乳がん発症リスクが20%高かった。乳がんのリスクファクターを有さない小児または若年成人であれば、10年間の乳がん発症リスクは倍になると考えられる。画像検査関連リスクを低下させるために筆者らは、各々の検査に伴う被曝量を解析し多時相プロトコールの使用を減らし可能な限り被曝量軽減ソフトウエアを導入し被曝量を最小とするように助言している。

Full Text

Researchers reviewing the records of approximately 250,000 women enrolled in an integrated healthcare delivery system found that increased CT utilization between 2000 and 2010 could result in an increase in the risk of breast cancer for certain women, including younger patients and those who received repeat exams. According to the study, which was presented at the 2012 annual meeting of the Radiological Society of North America (RSNA), nuclear medicine examinations may also contribute to increased breast cancer risk.

"When a woman undergoes CT or nuclear medicine imaging of her chest, abdomen or spine, her breast tissue will absorb some radiation," said senior author Rebecca Smith-Bindman, M.D., professor of radiology and biomedical imaging at the University of California, San Francisco. "Breast tissue is one of the tissues in the body known to be sensitive to developing cancer as a result of radiation exposure."

The study, led by Ginger Merry, M.D., M.P.H., breast imaging fellow at Prentice Women's Hospital – Northwestern Memorial Hospital in Chicago, found that among the system's female enrollees, CT utilization increased from 99.8 CT scans per 1,000 women in 2000 to 192.4 CT scans per 1,000 women in 2010 (an annual increase of 6.8 percent). In 2010, 46 percent of those CT examinations exposed the breast to radiation. Nuclear medicine imaging decreased from 39.3 scans per 1,000 women in 2000 to 27.5 scans per 1,000 women in 2010 (a 3.5 percent annual decline); however, in 2010, 84 percent of nuclear medicine studies exposed the breast to radiation.

"Until now, the impact of this increased use of imaging on radiation exposure to breast tissue and the subsequent risk of breast cancer has not been known," Dr. Smith-Bindman said. "Our goal was to quantify imaging utilization and radiation exposure to the breast among women enrolled in an integrated healthcare delivery system and to use these data to determine the imaging-related risk of breast cancer from those studies."

The research team collected CT dose information from 1,656 patients who underwent CT examinations that exposed the breast to radiation and, using a new automated computational method, estimated the patients' effective radiation dose and the amount of radiation absorbed by the breast. The team also analyzed the radiopharmaceutical volume and associated radiation exposure used in 5,507 nuclear medicine exams that exposed the breast to radiation. "We found that the estimated breast radiation doses from CT were highly variable across patients, with the highest doses coming from multiple-phase cardiac and chest CT examinations, where successive images of the organ being studied are captured," Dr. Smith-Bindman said.

The researchers then estimated the women's imaging-related risk of breast cancer and compared it to their underlying risk of developing breast cancer. Each woman's 10-year imaging-related risk of developing breast cancer, beginning 10 years after her exposure to imaging and based on her age at exposure, was estimated using the breast-specific radiation data and a statistical risk model. A women's underlying risk of developing breast cancer was estimated based on data collected by the National Cancer Institute-funded Breast Cancer Surveillance Consortium.

"Young women receiving several chest and or cardiac CTs had the greatest increased risk of developing breast cancer at approximately 20 percent," said Diana Miglioretti, Ph.D., study coauthor and senior investigator at the Group Health Research Institute. "A child or young adult with no risk factors for breast cancer would double her 10-year risk of developing breast cancer."

To lower imaging-related risk of developing breast cancer, Dr. Smith-Bindman said imaging providers should analyze the radiation doses associated with each exam, reduce the use of multi-phase protocols and employ dose-reduction software wherever possible to minimize exposures.

"If imaging is truly indicated, then the risk of developing cancer is small and should not dissuade women from getting the test they need," she said. "On the other hand, a lot of patients are undergoing repeat chest and cardiac CT, many of which aren't necessary. Women, and particularly young women, should understand there is a small but real potential risk of breast cancer associated with cardiac and chest CT, and the risk increases with the number of scans."

Coauthors are Choonsik Lee, Ph.D., and Eric Johnson, M.S.

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