Preoperative PET and the Reduction of Unnecessary Surgery Among Newly Diagnosed Lung Cancer Patients in a Community Setting

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Abstract

The goals of this study were to examine the real-world effectiveness of PET in avoiding unnecessary surgery for newly diagnosed patients with non–small cell lung cancer.

Methods: A cohort of 2,977 veterans with non–small cell lung cancer between 1997 and 2009 were assessed for use of PET during staging and treatment planning. The subgroup of 976 patients who underwent resection was assessed for several outcomes, including pathologic evidence of mediastinal lymph node involvement, distant metastasis, and 12-mo mortality. We anticipated that PET may have been performed selectively on the basis of unobserved characteristics (e.g., providers ordered PET when they suspected disseminated disease). Therefore, we conducted an instrumental variable analysis, in addition to conventional multivariate logistic regression, to reduce the influence of this potential bias. This type of analysis attempts to identify an additional variable that is related to receipt of treatment but not causally associated with the outcome of interest, similar to randomized assignment. The instrument here was calendar time. This analysis can be informative when patients do not receive the treatment that the instrument suggests they "should" have received.

Results: Overall, 30.3% of patients who went to surgery were found to have evidence of metastasis uncovered during the procedure or within 12 mo, indicating that nearly one third of patients underwent surgery unnecessarily. The use of preoperative PET increased substantially over the study period, from 9% to 91%. In conventional multivariate analyses, PET use was not associated with a decrease in unnecessary surgery (odds ratio, 0.87; 95% confidence interval, 0.66–1.16; $P = 0.351$). However, a reduction in unnecessary surgery (odds ratio, 0.53; 95% confidence interval, 0.34–0.82; $P = 0.004$) was identified in the instrumental variable analyses, which attempted to account for potentially unobserved confounding.

Conclusion: PET has now become routine in preoperative staging and treatment planning in the community and appears to be beneficial in avoiding unnecessary surgery. Evaluating the effectiveness of PET appears to be influenced by potentially unmeasured adverse selection of patients, especially when PET first began to be disseminated in the community.

Preoperative PET cuts unnecessary lung surgeries in half

Date:
March 26, 2014
Source:
Society of Nuclear Medicine

New quantitative data suggests that 30 percent of the surgeries performed for non-small cell lung cancer patients in a community-wide clinical study were deemed unnecessary. Additionally, positron emission tomography (PET) was found to reduce unnecessary surgeries by 50 percent, according to research published in the March issue of the Journal of Nuclear Medicine.

PET imaging prior to surgery helps stage a patient's disease by providing functional images of tumors throughout the body, especially areas where cancer has spread, otherwise known as metastasis. Few studies have been able to pin down exactly what impact preoperative PET has on clinical decision-making and resulting treatment. Preliminary review of the data from this long-term, observational study of an entire community of veterans was inconclusive about the utility of PET, but after a more thorough statistical analysis accounting for selection bias and other confounding factors, the researchers were able to conclude that PET imaging eliminated approximately half of unnecessary surgeries.

"It has become standard of care for lung cancer patients to receive preoperative PET imaging," said Steven Zeliadt, PhD, lead author of the study conducted at VA Puget Sound Health Care System and associate professor for the University of Washington in Seattle, Wash. "The prevailing evidence reinforces the general understanding within the medical community that PET is very useful for identifying occult metastasis and that it helps get the right people to surgery while avoiding unnecessary surgeries for those who would not benefit."

For this study, researchers reviewed newly diagnosed non-small lung cancer patients who received preoperative PET to assess the real-life effectiveness of PET as a preventative measure against unnecessarily invasive treatment across a community of patients. A total of 2,977 veterans who underwent PET during disease staging from 1997 to 2009 were included in the study. Of these, 976 patients underwent surgery to resect their lung cancer. During surgery or within 12 months of surgery, 30 percent of these patients were found to have advanced-stage metastatic disease, indicating an unnecessary surgery.

Interestingly, the use of PET increased during the study period from 9% to 91%. Conventional multivariate analyses was followed by instrumental variable analyses to account for unobserved anomalies, such as when patients did not undergo PET when it would have been clinically recommended to do so. This new data has the potential to change policy and recommendations regarding the use of oncologic PET for more accurate tumor staging.

"We will likely build more quality measures around this research so that preoperative PET is more strongly recommended to improve the management of care for these patients," added Zeliadt.

Story Source:

S. B. Zeliadt, E. T. Loggers, C. G. Slatore, D. H. Au, P. L. Hebert, G. J. Klein, L. G. Kessler, L. M. Backhus. **Preoperative PET and the Reduction of Unnecessary Surgery Among Newly Diagnosed Lung Cancer Patients in a Community Setting**. *Journal of Nuclear Medicine*, 2014; 55 (3): 379 DOI: 10.2967/jnumed.113.124230