Lung Cancer Screening Using Low-Dose CT:

nodules, cancer, mortality …. and what's beyond?

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The advent of low-dose helical computed tomography (LDCT) screening introduced for the early detection of lung cancer in the early 1990`s has resulted in widespread interest and numerous publications on the utility of LDCT for lung cancer screening.

From these publications we gained valuable information on the CT presentation of lung nodules, defined algorithms for follow up protocols and learned about the biological behavior and the manifold CT appearance of different lung cancers.

Moreover, there has long been consensus in the literature that LDCT screening can detect lung cancer in an asymptomatic population at risk, and that most of these cancers are indeed found at an early stage, when curable treatment options are still available.

The impact on mortality has been the focus of several randomized trials in the United States and in Europe. The largest randomized study, the National Lung Screening Trial (NLST), released their preliminary results in November 2010, and published their data this summer in the New England Journal of Medicine: they report a 20% mortality benefit in LCDT screened individuals, compared to a control group screened with chest radiographs only.

This documented mortality benefit has been stunning, and it is currently heavily discussed if and to which extent LDCT lung cancer screening should be included in future clinical guidelines. Given the costs of the NLST, this will likely be the only study of its kind. The European studies are smaller, have different control groups (general care instead of chest x-rays), and are not expected to release their results in the near future.

Beyond what we learned about nodules, lung cancer and the effect of LDCT screening on mortality, there are several issues yet to be addressed before recommendations can be in place:

Most importantly, there is the concern about the high number of positive screening results, potentially inundating the health care systems. "False positives" are lung nodules found on CT that ultimately turn out to be benign and may result in unnecessary, sometimes even invasive,

investigations. The rate of false positives needs to be maintained at a low level, and there is no consensus on the definition of a “positive” scan. Image analysis tools are needed to differentiate benign and malignant nodules.

Moreover, the definition of the high-risk population needs to be improved. Radiation exposure from repeated LDCT screening has to be considered, and a consensus is needed on how long and how often a screening CT should be recommended.

There is little doubt that LDCT screening is a valuable tool for the early detection of lung cancer and that the ongoing debates will soon result in new guidelines for people at risk.