HealthManagement
Promoting Management and Leadership

Low-Dose CT Beats X-Ray in Lung Cancer Detection

Ultra-low-dose computed tomography (CT) technology worked better than x-ray examination in detecting lung cancer, according to results of a pilot study conducted in Norway.

Researchers tried to determine which imaging modality works best for the diagnosis of lung cancer by evaluating both x-ray images and ultra-low-dose CT scans of a small sample of patients for whom the researchers knew the correct diagnosis beforehand.

The radiologists who examined the images did not know what was wrong with the patients, although they were aware of being part of a research project. Their task was to look for all possible diseases of the chest region.

The key findings of the study include:

- With ultra-low-dose CT, the radiologists made a correct diagnosis in 89 percent of cases;
- With x-ray images, the radiologists found the correct answer in only 18 percent of the cases.

X-ray examinations are being done out of old habit, but with x-ray the lung cancer is detected rather late, said Dr. Trond Mogens Aalokken, from the department of radiology and nuclear medicine, Oslo University Hospital (Norway). The research data suggest the use of ultra-low-dose CT for detecting the disease in time, Dr. Aalokken added.

Each year, about 3,000 Norwegians develop lung cancer and most patients have their first diagnosis made by X-ray imaging. Oslo University Hospital performs 30,000 chest X-ray examinations yearly. In Norway, this number reaches more than one million.

However, no study has ever examined how well x-ray images function with a view to detecting lung cancer and other diseases of the chest region, Dr. Aalokken noted. “X-ray technology has remained nearly unaltered for 100 years.”

Dr. Aalokken, in cooperation with a group of physicists at the Intervention Centre, has made a comparison of the proportion of patients who obtain a correct diagnosis with X-ray images and how many patients might have obtained a correct diagnosis with CT.

X-ray images are two-dimensional, unlike CT images which are three-dimensional. Hence, CT scans can reveal the precise location of the tumour. But radiologists have been reluctant to use CT for an initial diagnosis of lung cancer because of radiation-related concerns. The radiation dose from examinations of lungs with CT has been 100 higher than from regular X-ray exams; a CT scan is equivalent to five years of natural background radiation.

Recently, CT scanners have become far more effective thanks to advances in technology. CT images now contain more data, while the radiation dose has gone down. Researchers from the Intervention Centre are now able to generate CT images with the same low radiation dose as a standard x-ray image.

“We still cannot achieve the same high-quality images by replacing standard full-dose CT with ultra-low-dose CT, but we have wondered whether the old low-quality x-ray examinations can be replaced by ultra-low-dose CT," said Associate Professor Anne Catrine Trægde Martinsen, who works at the Intervention Centre and the department of physics, University of Oslo. Even though the CT dose is almost as low as for a chest x-ray, there is far more information that can be obtained from the CT images, she noted.

In addition, the radiologists detected 15 times as many false-positives in the x-ray results. False positives entail unnecessary check-ups and additional costs for the patient. "With an X-ray examination, there is a high likelihood that you will not have any answer as to whether you are ill, and an answer that says that you are ill even though you are healthy," Dr. Aalokken said.

Their work drew attention at the world’s largest medical conference for radiology, the Radiological Society of North America, in 2012, held in Chicago. Their academic article was nominated as one of the 10 best from that conference. “Even though our results are extremely convincing, we need to undertake a full-scale test to be absolutely certain,” according to Dr. Aalokken.

Source: MedImaging.net
Image Credit: Flickr.com

Published on : Fri, 5 Sep 2014