Clinical Efficacy of Using Low-Dose CT Screening to Detect Lung Carcinomas

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Introduction
In regards to lung cancer, mass screenings to detect early lesions can be very beneficial in order to reduce the burden and mortality associated with the disease across the population. In order for mass screenings to be efficient, however, it is important to implement them only among groups that are considered high risk i.e. chronic smokers who are 55 or older. To reduce the incidence of lung cancer, there have already been countless studies performed in order to determine the most efficient way to screen for this disease. Several randomized trials using chest radiography (CXR) have been performed, but none of the results have shown a reduction in lung-cancer mortality; however, there is more evidence indicating that low-dose helical CT (LD-CT) provides better clarity and can detect more nodules and masses in lung compared to CXR. Based on this evidence, the National Cancer Institute created the National Lung Screening Trial (NLST) in 2002 in order to test the efficacy of LD-CT screening versus those that were detected and removed without the use of screening.

Through this study, we will be able to assess if there is any benefit of using screening to lung cancer among the patients at Lawrence General Hospital. Since the hospital does not have its own lung cancer screening program, the results found could provide the initial incentive to create a program for the Lawrence community.

LGH Lung Cancer Screening Study
In a preliminary glimpse at lung cancer cases at Lawrence General Hospital, the case study conducted suggests a benefit to implementing lung screening programs in order to detect early lung lesions and prevent the progression of lung cancer. Of the 53 patients analyzed between 1/1/2014 and 7/15/2015, only 15% of the patients utilized lung screening through an outside site. Compared to that, 43% of the patients analyzed were only treated after presenting with symptoms indicating a lung cancer. As is the case for any cancer, early detection and diagnosis leads to better prognosis and a higher rate of survival. Although most of the cases examined were low stages of tumors, the only patient who had a stage 3 tumor was a patient who presented with symptoms before being scanned. Of the patients who underwent screening, all them either stage 1 or stage 2 tumors, which are low stage tumors that are associated with a higher five year survival likelihood. In regards to any screening program, it is important to direct the intervention at groups who are considered high risk for developing the particular disease one is screening for. Currently, the National Guidelines for Lung Cancer Screening set by the US Preventative Services Task Force states that only those individuals who are between the ages of 55-80 and have had a 30 year history of smoking are eligible for lung cancer screenings. Based on this criteria for what they consider as individuals as high risk for developing lung cancer, 38 of the 53 cases were deemed high risk and therefore eligible for lung cancer screenings. Even though 38 patients would have been considered eligible, 72% of them either chose not to or did not have access to lung screening programs. If a similar screening program was offered more locally, it is possible that many of these patients’ lesions would have been detected much sooner.

Finally, it is also important for screening interventions to be efficient and precise in detecting lesions to be cancerous. Although it was a small sample size, the cases analyzed show that those lesions which were detected via screening were more likely to be cancers than those lesions which were detected after the patient developed symptoms. When a patient is scanned due to presentation of symptoms, the lesions could represent a variety of different diseases such as pneumonia, tumors, or even scar tissue from prior infections and masses. From the sample taken, the percent of lesions removed that turned out to be cancerous was ~74%, which indicates that there were precautionary surgeries taken which were not cancer. In theory, screening should detect cancer in its earlier stages in individuals who do not/ have not presented with any negative symptoms; with this inference, if a lesion were detected, it is more likely that the lesion is cancerous as opposed to another chronic disease affecting the lungs, which is reflected in 88% cancerous cases of the screened patients. Overall, screening interventions for lung cancer would be very beneficial to patients as early detection will lead to early detection and treatment, which in turn will lead to better prognosis and longer survival. Not only would these interventions help the patients, but it would also help alleviate long-term costs for the hospital. If patients were treated earlier for their lung cancer, then there would be less patients who were found with cancer in its later stages with worse prognoses; these patients who have worse prognoses would have longer hospital visits for palliative care and treatment, which would place a large burden of cost on the healthcare providers. Although this study only examined a small population, the general indications are that screening can aid in the detection of cancers more accurately, which can help reduce procedural costs associated with the surgical removal of these lesions.