Lung cancer screening: the past, the present and the future

Lung cancer has a huge worldwide impact, resulting in an estimated 1.8 million deaths in 2018 (1). It is the leading cause of cancer mortality in men and the 2nd leading cause in women. In the United States, lung cancer remains the leading cause of cancer mortality in both men and women, accounting for over 20% of cancer-related mortality (2). Despite advances in treatment, the 5-year survival for lung cancer remains low, at 17% (2). A large part of this high mortality is the fact that the majority of patients are diagnosed at a late stage. In 2011, the National Lung Screening Trial (NLST) reported a 20% reduction in lung cancer mortality in high risk individuals with three annual screens with low-dose computed tomography (LDCT) (3). This was the first time that lung cancer screening was found to reduce lung cancer mortality. In Europe, the Nelson trial demonstrated a 24% reduction in lung cancer mortality in men and 33% in women (4).

Lung cancer screening has the potential to be one of the most impactful tools in the fight against lung cancer. However, a decade since the publication of NLST, there is still much work to do. It is estimated that only 4% of those who were eligible undergo LDCT for lung cancer screening (5). These reason behind this low utilization is likely multifactorial, including lack of awareness among both physicians and patients, screening fatigue among physicians, lack of available resources and concerns regarding the risk/benefit ratio.

In this special series on lung cancer screening, we have assembled an outstanding group of authors who are leading experts in the field of lung cancer screening. We will examine where we are now and how we got here, reviewing the evidence behind lung cancer screening, the risks and benefits of screening and the surgical results of screen-detected cancers outside of a clinical trial. We will discuss how we effectively increase the implementation of lung cancer screening, particularly in underserved populations, how to build a quality lung cancer screening program and how to incorporate smoking cessation into screening programs. Finally, we will focus on the possible future of lung cancer screening such as the use of risk prediction models to better determine those with the highest benefit from screening, including possible screening in light or never smokers. We will also examine the use of biomarkers, radiomics and machine learning to help guide the management of indeterminate pulmonary nodules.

I would like to personally thank all of our authors for their important contributions to this series and their expertise in the field of lung cancer. I hope that our readers gain some valuable information and insight into the past, present and future of lung cancer screening.

Footnote

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