Pearls and Pitfalls in Lung Cancer Screening

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Lung cancer remains the leading cause of cancer-related mortality worldwide, and early detection is key to significantly improving survival and disease control at the population level. Accordingly, numerous efforts have been made to develop modalities and strategies for early detection, and evidence from recent large randomized controlled trials has demonstrated that lung cancer screening (LCS) with low-dose chest computed tomography (LDCT) reduces lung cancer–specific mortality in high-risk populations with substantial cigarette smoking exposure. Based on these landmark studies, LDCT screening has been incorporated into national guidelines in many countries. Currently, the U.S. Preventive Services Task Force (USPSTF) and the American Cancer Society recommend annual LCS for individuals aged 50–80 years with a smoking history of at least 20 pack-years, with and without the consideration of years since quitting. In South Korea, following the success of the single-arm, multicenter, prospective feasibility study (the K-LUCAS project) that tested the implementation of LDCT screening in high-risk individuals, the Korean National Lung Cancer Screening Program was launched in 2019. This program targets current smokers aged 54–74 years with a smoking intensity of at least 30 pack-years.

Despite the promising evidence and widespread implementation of lung cancer screening worldwide, significant knowledge gaps remain. Current screening eligibility criteria are estimated to miss more than 50% of lung cancer cases. Therefore, ongoing efforts are focused on how to effectively expand eligibility to capture a broader population while minimizing potential harms. Screening uptake and adherence also remain suboptimal across various populations, underscoring the need for strategies to improve participation.

In this talk, we will review the current evidence, implementation status, and limitations of lung cancer screening, and discuss future directions and research priorities to address these challenges.