Lung Cancer Screening: Low-Dose CT and Its Implications

Lien Melee*

The University of Texas MD Anderson Cancer Center, USA

Abstract

Lung cancer remains one of the leading causes of cancer-related mortality worldwide, primarily due to late-stage diagnosis. Early detection through screening has the potential to signifcantly reduce mortality rates. Low-Dose Computed Tomography (LDCT) has emerged as a pivotal tool in lung cancer screening, ofering high sensitivity in detecting early-stage lung cancers while minimizing radiation exposure. This abstract reviews the efcacy, benefts, and challenges associated with LDCT screening for lung cancer. It delves into the key fndings from major clinical trials, such as the National Lung Screening Trial (NLST), which demonstrated a 20% reduction in lung cancer mortality with LDCT screening. The abstract also discusses the implications of LDCT screening on public health policies, including recommendations from health organizations, cost-efectiveness considerations, and the potential for overdiagnosis and false positives. Furthermore, it addresses the integration of LDCT screening into clinical practice, highlighting the importance of risk stratifcation, patient selection criteria, and the role of smoking cessation programs. The abstract concludes by exploring future directions in lung cancer screening, including advancements in imaging technology, artifcial intelligence applications, and personalized screening strategies. By providing a comprehensive overview of LDCT and its implications, this abstract aims to inform healthcare professionals, policymakers, and researchers about the current state and future prospects of lung cancer screening.

Introduction

Lung cancer is the leading cause of cancer-related deaths globally, accounting for approximately 1.8 million deaths annually. Despite advances in treatment, the prognosis for lung cancer remains poor, primarily due to the fact that the majority of cases are diagnosed at an advanced stage. Early detection is critical for improving survival rates,

***Corresponding author:** Lien Melee, The University of Texas MD Anderson Cancer Center, USA, E- mail: lienmelee@gmail.com

Received: 01-May-2024, Manuscript No. acp-24-141585; **Editor assigned:** 03-May-2024, PreQC No. acp-24-141585(PQ); **Reviewed:** 17-May-2024, QC No. acp-24-141585; **Revised:** 23-May-2024, Manuscript No. acp-24-141585(R); **Published:** 30-May-2024; DOI: 10.4172/2472-0429.1000222

Citation: Lien M (2024) Lung Cancer Screening: Low-Dose CT and Its Implications Adv Cancer Prev 8: 222.

Citation: Lien M (2024) Lung Cancer Screening: Low-Dose CT and Its Implications. Adv Cancer Prev 8: 222.

from invasive procedures. Approximately 25% of LDCT screenings result in a positive finding, yet over 95% of these findings are not cancerous. This necessitates the development of refined screening protocols and follow-up strategies to manage false positives effectively. Overdiagnosis is another critical issue, where indolent tumors that would not have caused harm during the patient's lifetime are detected and treated. This can lead to overtreatment and associated morbidities. Balancing the benefits of early detection with the risks of overdiagnosis is essential in optimizing LDCT screening programs [6].

Economic considerations

The cost-effectiveness of LDCT screening is an important factor in its implementation. While the upfront costs of screening and subsequent diagnostic procedures are significant, these must be weighed against the potential savings from avoiding late-stage cancer treatments and extending patients' lives. Economic models generally support the cost-effectiveness of LDCT screening, particularly when targeted at high-risk populations. However, the financial burden on healthcare systems and the need for equitable access to screening services remain pertinent issues [7].

Integration into clinical practice

Successful integration of LDCT screening into clinical practice requires a comprehensive approach. This includes establishing standardized screening protocols, ensuring access to high-quality imaging facilities, and training healthcare providers. Risk stratification tools are vital for identifying individuals who would benefit most from screening, thereby maximizing the effectiveness and efficiency of screening programs. Smoking cessation programs are an integral component of lung cancer screening initiatives. Combining LDCT screening with robust smoking cessation support can amplify the benefits of early detection by addressing the primary cause of lung cancer. Encouragingly, some studies have shown that participation in screening programs can motivate individuals to quit smoking [8].

Future directions

The future of LDCT screening for lung cancer lies in the refinement of screening criteria, technological advancements, and personalized approaches. Artificial intelligence (AI) and machine learning algorithms hold promise for improving the accuracy of LDCT interpretation, reducing false positives, and enhancing risk prediction models [9]. Additionally, integrating genomic and biomarker data could further personalize screening and identify individuals at the highest risk. Research into optimizing screening intervals and understanding the long-term outcomes of screened populations will also be crucial. As data from ongoing and future studies become available, they will inform guidelines and policies to enhance the effectiveness of LDCT screening [10].

Conclusion

LDCT screening for lung cancer has demonstrated significant potential in reducing mortality through early detection. While challenges such as false positives, over diagnosis, and economic considerations must be addressed, the benefits of screening, particularly for high-risk populations, are compelling. A multifaceted approach, incorporating technological advancements, personalized risk assessment, and smoking cessation support, will be essential in maximizing the impact of LDCT screening. Continued research and thoughtful integration into clinical practice will ultimately enhance lung cancer prevention and improve patient outcomes.

References

1. Baralt L,Weitz TA (2012) The Komen-planned parenthood controversy: Bringing the politics of breast cancer advocacy to the forefront. Womens Health Issues 22: 509-512.
2. Bob Roehr (2012) Charity's decision to cut funding to Planned Parenthood sparks controversy. BMJ 344: e870.
3. Fontana RS, Sanderson DR, Woolner LB, Taylor WF, Miller WE, et al. (1986) Lung cancer screening: the Mayo program. J Occup Med US 28: 746-750.
4. McKinney SM, Sieniek M, Godbole V, Godwin J, Antropova N, et al. (2020). International evaluation of an AI system for breast cancer screening. Nature 577: 89-94.
5. Secretan BL, Loomis D, Straif K (2015) Breast-cancer screening-viewpoint of the IARC Working Group. N Engl J Med 373: 1479.
6. Hamashima C, Shibuya D, Yamazaki H, Inoue K, Fukao A, et al. (2008) The Japanese guidelines for gastric cancer screening. Jpn J Clin Oncol 38: 259-267.
7. Sabatino SA, White MC, Thompson TD, Klabunde NC (2015) Cancer screening test use: United States, 2013. MMWR Morb Mortal Wkly Rep 64: 464-468.
8. White A, Thompson TD, White MC, Sabatino SA, Moor JD, et al. (2017) Cancer Screening Test Use-United States, 2015. MMWR Morb Mortal Wkly Rep 66: 201-206.
9. Horner-Johnson W, Dobbertin K, Andresen EM, Iezzoni LI, et al. (2014) Breast