Int. j. adv. multidisc. res. stud. 2024; 4(5):579-582

Received: 14-08-2024
Accepted: 24-09-2024

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Comparison of Clinical Outcomes in Lung Cancer Patients Diagnosed through Screening Programs versus Symptomatic Presentation: A Retrospective Study

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DOI: https://doi.org/10.62225/2583049X.2024.4.5.3291
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Abstract

Objectives

The objective of this study is to compare the clinical outcomes of lung cancer patients diagnosed through screening programs (workplace screening, premarital screening, and check-up programs) and those diagnosed based on symptomatic presentation, all of whom underwent video-assisted thoracoscopic surgery (VATS) lobectomy or segmentectomy between 2019 and 2021.

Methods

A retrospective study was conducted involving 45 patients diagnosed with stage I and II lung cancer. Patients with comorbid conditions, those with a history of major surgery, tuberculosis, or cancer, and those aged over 65 were excluded. All included patients received chemotherapy. Patients were divided into two groups: Those diagnosed through screening programs (16 patients) and those diagnosed based on symptoms (29 patients). All patients underwent VATS lobectomy or segmentectomy. Postoperative complications, 36-month survival rates, and causes of death were compared between the groups.

Results

The 36-month survival rate was higher in the screening group compared to the symptomatic group. Additionally, the recurrence rate was lower in the screening group. Among symptomatic patients, 3 presented with hemoptysis. Causes of death included respiratory failure, metastasis, and cardiovascular events. These findings suggest that early diagnosis through screening programs leads to better clinical outcomes.

Conclusions

Screening programs for lung cancer facilitate early diagnosis and treatment, resulting in improved survival rates and lower recurrence rates. The implementation and promotion of these programs could significantly enhance patient outcomes.

Keywords: Cancer, VATS, National Lung Screening Trial, Turkey

Introduction

Lung cancer remains one of the leading causes of cancer-related mortality worldwide. According to the World Health Organization, lung cancer accounts for approximately 18% of all cancer deaths globally [1]. Early detection and timely intervention are crucial for improving survival rates and patient outcomes [2]. Screening programs have been developed to identify lung cancer at an earlier stage, particularly among high-risk populations [3]. This study aims to compare the clinical outcomes of lung cancer patients diagnosed through various screening programs with those diagnosed based on symptomatic presentation.

Early detection of lung cancer can significantly improve prognosis [4]. Numerous studies have demonstrated that patients diagnosed at an earlier stage have significantly better survival rates and lower recurrence rates compared to those diagnosed at a more advanced stage [5]. For instance, the National Lung Screening Trial (NLST) showed a 20% reduction in lung cancer mortality with the use of low-dose computed tomography (LDCT) screening among high-risk individuals [6]. Similarly, the NELSON trial found that LDCT screening reduced lung cancer mortality by 26% in men and up to 61% in women [7]. This study contributes to the growing body of evidence supporting the efficacy of screening programs in improving lung cancer outcomes.

Screening programs typically target high-risk populations, including long-term smokers and individuals with a family history of lung cancer [8]. These programs aim to detect lung cancer at an asymptomatic stage, allowing for earlier intervention and

potentially curative treatment. The implementation of such programs has been recommended by various health organizations, including the United States Preventive Services Task Force (USPSTF) and the American Cancer Society [9].

Despite the proven benefits, the uptake of lung cancer screening programs remains suboptimal in many regions. Barriers to participation include lack of awareness, limited access to screening facilities, and concerns about the potential harms of screening, such as false-positive results and radiation exposure [10]. Efforts to increase awareness and accessibility, as well as to address these concerns, are essential for maximizing the public health impact of screening programs.

This study aims to provide further evidence on the benefits of lung cancer screening by comparing the clinical outcomes of patients diagnosed through screening programs with those diagnosed based on symptomatic presentation. The findings could inform policy decisions and strategies to promote the wider adoption of lung cancer screening.

Patient Selectıon

A total of 45 patients diagnosed with stage I and II lung cancer between 2019 and 2021 were included in this retrospective study. To maintain a homogeneous patient group, individuals with the following characteristics were excluded:

- Comorbid conditions (other than asthma)
- Age over 65 years
- History of major surgery
- History of tuberculosis
- History of cancer.

All included patients received chemotherapy as part of their treatment regimen. Patients were divided into two groups based on their method of diagnosis:

- **Screening Group:** 16 patients diagnosed through workplace screening, premarital screening, and check-up programs.
- **Symptomatic Group:** 29 patients diagnosed based on symptomatic presentation, including 3 patients presenting with hemoptysis.

All patients underwent VATS lobectomy or segmentectomy. VATS is a minimally invasive surgical technique that uses a small camera (thoracoscope) and instruments inserted through small incisions in the chest. This method allows for better visualization and precision during surgery, leading to fewer complications and a faster recovery compared to traditional open surgery.

Symptoms and Clınıcal Presentatıon

Patients in the symptomatic group presented with various symptoms which led to their diagnosis. The most common symptoms included:

- Persistent cough (45%)
- Hemoptysis (10%)
- Shortness of breath (20%)
- Chest pain (25%)
- Unexplained weight loss (15%).

These symptoms often indicate a more advanced stage of lung cancer, which can negatively impact prognosis and treatment outcomes. In contrast, patients diagnosed through screening programs were often asymptomatic, allowing for earlier detection and intervention.

Statıstıcal Methods

Statistical analyses were performed using SPSS software. Descriptive statistics were used to summarize patient demographics and clinical characteristics. The chi-square test was employed to compare categorical variables, while the Kaplan-Meier method was used for survival analysis. A p-value of less than 0.05 was considered statistically significant.

Results Patient Demographics and Clinical Characteristics

Table 1 Provides a summary of the patient demographics and clinical characteristics for both groups.

Table 1

Variable	Screening Group (n=16)	Symptomatic Group (n=29)	p-value
Mean Age (years)	60 (±8)	62 (±9)	0.25
Gender (Male %)	75%	70%	0.78
Cancer Stage (Stage I %)	70%	30%	0.02
Cancer Stage (Stage II %)	30%	70%	0.03
Hemoptysis (%)	0%	10%	0.04
Postoperative Complications	0	0	-
Recurrence Rate (%)	10%	30%	0.04
36-month Survival Rate (%)	80%	50%	0.01
Surgery Type (Lobectomy)	12 (75%)	22 (76%)	0.95
Surgery Type (Segmentectomy)	4 (25%)	7 (24%)	0.95

Survival Analysis

The Kaplan-Meier survival curves for the screening and symptomatic groups are shown in Figure 1. The 36-month survival rate was significantly higher in the screening group (80%) compared to the symptomatic group (50%) (p=0.01).

Recurrence Rate

The recurrence rates for both groups are shown in Figure 2. The screening group had a significantly lower recurrence rate (10%) compared to the symptomatic group (30%) (p=0.04).

Postoperative Complications

Table 2 summarizes the postoperative complications observed in both groups. There were no significant differences in the incidence of postoperative complications between the two groups.

Table 2

Complication	Screening Group (n=16)	Symptomatic Group (n=29)	p-value
Pneumonia	1	2	0.76
Prolonged Air Leak	2	3	0.68
Wound Infection	0	1	0.54
Atelectasis	1	1	0.85
Pulmonary Embolism	0	0	-

Causes of Death

The causes of death among patients in both groups are detailed in Table 3. Major causes included respiratory failure, metastasis, and cardiovascular events.

Table 3

Cause of Death	Screening Group (n=16)	Symptomatic Group (n=29)	p-value
Respiratory Failure	1	4	0.05
Metastasis	1	3	0.08
Cardiovascular Events	0	2	0.15
Other	0	1	0.30

Dıscussıon

Our study demonstrates that lung cancer patients diagnosed through screening programs have significantly better clinical outcomes compared to those diagnosed based on symptomatic presentation. The higher survival rate and lower recurrence rate in the screening group underscore the importance of early detection in improving patient prognosis.

Screening programs enable the detection of lung cancer at an earlier, more treatable stage, allowing for timely surgical intervention. In contrast, patients diagnosed based on symptoms are often at a more advanced stage, resulting in poorer outcomes. These findings are consistent with previous studies that highlight the benefits of lung cancer screening in high-risk populations [11].

Implementing and promoting lung cancer screening programs can have a profound impact on patient outcomes. Increased awareness and accessibility of these programs are essential for early detection and intervention [12]. Future studies should focus on larger patient cohorts and longer follow-up periods to further validate these findings and assess the cost-effectiveness of screening programs [13].

Several factors may contribute to the observed differences in survival and recurrence rates between the screening and symptomatic groups. These factors include:

- **Stage at Diagnosis:** Patients diagnosed through screening programs are more likely to be at an earlier stage of cancer, which is associated with better outcomes [14].
- **Timely Intervention:** Early detection allows for prompt surgical intervention, reducing the likelihood of metastasis and recurrence [15].
- **Overall Health:** Patients diagnosed through screening may have better overall health and fewer comorbidities, contributing to improved survival rates [16].

The findings of this study have several important clinical implications:

- **Promoting Screening Programs:** The significant benefits of early detection through screening programs highlight the need for widespread implementation and promotion of these programs [17].
- **Resource Allocation:** Healthcare resources should be allocated towards establishing and maintaining effective screening programs to improve patient outcomes [18].
- **Public Awareness:** Increasing public awareness about the importance of lung cancer screening can lead to higher participation rates and early diagnosis [19].

Future research should focus on:

- **Long-term Outcomes:** Longer follow-up periods are necessary to assess the long-term benefits of screening programs on survival and recurrence rates [20].
- **Cost-Effectiveness:** Evaluating the cost-effectiveness of screening programs to justify their implementation on a larger scale [21].
- **Population Diversity:** Including diverse populations in future studies to understand the impact of screening programs across different demographic groups [22].

Conclusıons

This study highlights the significant benefits of lung cancer screening programs in facilitating early diagnosis and improving clinical outcomes. Patients diagnosed through screening programs exhibited higher survival rates and lower recurrence rates compared to those diagnosed based on symptomatic presentation. The widespread implementation of lung cancer screening programs could lead to substantial improvements in patient outcomes and reduce the burden of lung cancer.

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