

Original Research Article

Survival of patients with non-small cell lung cancer in King Abdulaziz University Hospital, Jeddah, Saudi

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ABSTRACT

Background: The improvement in the survival rate from cancer is increased due to advancement in the early detection, combined modality therapy and right therapeutic strategies. This study was aimed to assess the survival outcomes of patients diagnosed with non-small cell lung cancer (NSCLC) at King Abdulaziz University Hospital (KAUH).

Methods: This retrospective cohort study included all patients aged 14 years and older with a diagnosis of NSCLC from 2007 to 2017 using electronic medical records at KAUH. Data analysis was performed by using Stata SE, version 15.0. Survival was defined as the time the patient lived in months from the date of pathological diagnosis to the date of last follow-up or death. All variables in a univariate and multivariate analysis were included.

Results: Adenocarcinoma was the most common type of NSCLC observed in both genders, accounting for 43.70% of all cases. Of the patients diagnosed with NSCLC the overall median survival was 12.2 months (interval=16.9). And among all variables, surgical treatment was associated with a 71% relative reduction in risk of death (hazard ratio 0.29, $p<0.014$), and chemotherapy a 57% relative reduction in risk of death (hazard ratio 0.43, $p<0.013$).

Conclusions: The median age of diagnosis of NSCLC in Kingdom of Saudi Arabia (KSA) was younger than United States of America, this could be due to many factors including smoking. The number of lung cancer cases among women was lower than men.

Keywords: Lung cancer, Non-small cell lung cancer, Survival, Smoking, Adenocarcinoma, Squamous cell carcinoma, Large cell carcinoma

INTRODUCTION

Lung cancer is the number one killer among cancers worldwide. It has been estimated that 1.8 million people die from lung cancer annually. In the United States, data from the surveillance, epidemiology, and end results (SEER) registries describe the median age of patients and stage at cancer diagnosis, survival, number of new cases, and deaths per 100,000. These age-adjusted data show

that in 2012-2016, the number of new cases of lung and bronchus cancer was 54.9 per 100,000 men and women per year, and the number of deaths was 41.9 per 100,000 men and women per year.¹ In Saudi Arabia (SA), the incidence of lung cancer is increasing substantially, and it is claiming lives.² It ranks fourth in incidence among Saudi males and 17th among Saudi females. In 2014, there were 452 cases of lung cancer, accounting for 3.9% of all newly diagnosed cases among Saudis. The age-

standardized incidence rate for males is 9.1/100,000 in the Eastern region of Saudi Arabia.³ Non-small cell lung cancer (NSCLC) accounts for approximately 85% of all cases of lung cancer.⁴ It can be divided into three major histologic subtypes: squamous cell carcinoma (25-30% of cases), adenocarcinoma (40% of cases), and large cell lung cancer (5-10% of cases).⁵ The histopathological pattern among patients with lung cancer, according to SA study, showed that squamous cell carcinoma is most common (51.8%), followed by adenocarcinoma (27.2%).⁵ Survival from cancer has improved over the past three decades, mainly as a result of advances in early detection, therapeutic strategies, and the widespread use of combined modality therapy (surgery, chemotherapy, and radiotherapy). A study done in SA demonstrated a decrease in the odds of death for those diagnosed with NSCLC in 2013 compared with those diagnosed in 2009 (odds ratio=0.36, 95% confidence interval: 0.14–0.93).⁶

In this study, we aimed to determine the survival outcomes of patients diagnosed with NSCLC between 2007 and 2017 at King Abdulaziz University Hospital (KAUH).

METHODS

This retrospective cohort study was conducted at KAUH in Jeddah, Saudi Arabia. It was approved by the research ethics committee of the Faculty of Medicine at King Abdulaziz University.

Electronic medical records from 2007 to 2017 were reviewed. On the basis of our pathology review, all patients aged 14 years and older with a diagnosis of NSCLC at KAUH were included in the study. We collected the following data: demographics, date of diagnosis, cancer type (primary or secondary; only primary cancers were included in the study), histological subtype (adenocarcinoma, squamous cell carcinoma, large cell carcinoma, unspecified), cytological type

(negative, positive, atypical, insufficient), biopsy type, surgical treatment, margin involvement, lymph node involvement, chemotherapy, radiation therapy, date of last follow-up, and date of death. Any pulmonary resection of the primary tumor, such as pneumonectomy, lobectomy, segmentectomy, or wedge resection, was defined as surgery irrespective of the status of the surgical margin.

Statistical analysis

Data analysis was performed by using Stata SE, version 15.0. The primary outcome of this study was the survival of patients diagnosed with NSCLC. Survival was defined as the time the patient lived in months from the date of pathological diagnosis to the date of last follow-up or death. We included all variables in a univariate and multivariate analysis to determine the hazard ratio for each variable.

RESULTS

Demographic characteristics

A total of 194 cases of lung cancer were diagnosed during the study period, 135 of them NSCLC. Of the 135 NSCLC cases, 100 males (74%) and 35 females (26%) were identified. The median age at diagnosis was 62 years.

By histopathological type, adenocarcinoma was the most common type of NSCLC observed in both genders, accounting for 43.70% of all cases, followed by squamous cell carcinoma at 30.37%, unspecified at 24.44%, and large cell carcinoma at 1.48%.

Only 15 patients (11.11%) were treated surgically, whereas 44 (32.59%) received chemotherapy, and 17 (12.59%) received radiotherapy (Table 1).

Table 1: Baseline characteristics and socio-demographics of patients.

Variable	Numbers ^a	Percentage (%)
Mean age	62 years	
Gender	Male	74.05
	Female	25.93
Nationality	Saudi	45.19
	Non-Saudi	54.81
Histological diagnosis	Adenocarcinoma	43.70
	Squamous cell carcinoma	30.37
	Large cell carcinoma	1.48
	Unspecified	24.44
Surgical treatment	Yes	11.11
	No	88.89
Chemotherapy	Yes	32.59
	No	67.41
Radiation therapy	Yes	12.59
	No	87.41

^aData are expressed as numbers except where otherwise indicated.

Survival data

Our data showed an overall median survival of 12.2 months (interval=16.9).

Univariate analysis showed that, among all variables, surgical treatment was associated with a 71% relative reduction in risk of death (hazard ratio 0.29, $p<0.014$),

and chemotherapy a 57% relative reduction in risk of death (hazard ratio 0.43, $p<0.013$).

The results of multivariate analysis showed a 75% reduced risk of death in people who underwent surgery (hazard ratio 0.25, $p<0.01$) and a 65% reduced risk in those who received chemotherapy (hazard ratio 0.35, $p<0.003$) (Table 2).

Table 2: Univariate and multivariate analysis.

Variable	Univariate		Multivariate	
	Hazard ratio	P value	Hazard ratio	P value
Gender	0.6384934	0.250	0.6357807	0.261
Nationality	0.9558523	0.884	0.8353793	0.609
Age	0.9947341	0.734	0.9911122	0.577
Histological diagnosis	1.097774	0.323	1.028092	0.792
Surgical treatment	0.293838	0.014	0.2551092	0.010
Chemotherapy	0.4385137	0.013	0.3522463	0.003
Radiation therapy	0.8686303	0.770	0.9994465	0.999

Numbers in bold represent significant values.

DISCUSSION

The median age at diagnosis for our patients was 62 years old, which is younger than the reported 72 years in the SEER database.² This could be due to exposure to smoking at a young age (adolescence) as reported in a study done KSA in 2014 revealing that the mean age of smoking among Saudis was 19.1 years (± 6.5 years) and 8.9% of the study population smoked before the age of 15, this could be due to lack of knowledge about the effects of smoking and how it plays a major role in the development of lung cancer.⁷ Passive smoking is also an important contributor to the development of lung cancer among non-smokers. Although smokers may not intend to harm others, there are not enough smoke-free workplaces, public places, and homes that could help smokers cut down on smoking or stop smoking altogether.⁸

In our study, the number of lung cancer cases among women was lower than among men. This could be because women are less likely to smoke, as it is not widely acceptable for women to smoke for cultural reasons. This is now changing; however, as more women smoke than before and thus the incidence of lung cancer could increase among them.⁹ Nonetheless, we observed that females had a survival advantage over males, an advantage that was also observed in a study by de Perrot et al.¹⁰ They reported that there is a gender-protective effect linked to females that was observed with stage-I lung cancer but was absent in advanced-stage disease.¹⁰

In one US study, the incidence of adenocarcinoma was 38 % followed by squamous cell carcinoma at 20 %, but our data point to an increasing incidence of squamous cell carcinoma in both genders. These discrepancies between studies may be explained as the possible impact of (1) the data we collected involving a patient population from only a single centre, (2) the development of newer

histochemical staining techniques, and (3) increased knowledge about different tumors gained over the years.¹¹

There were no clear survival data following surgery in Saudi Arabia. In another study, however, disparity was shown in survival rates for surgical and nonsurgical outcomes of NSCLC (surgical: 52.00-63.00%; nonsurgical: 6.10-13.50%), which highlights the primary role of surgery in NSCLC therapy.¹²

For the remaining 59 patients who were diagnosed with NSCLC but had no available follow-up data in our electronic medical records regarding treatment, this was most likely because they transferred their care to another cancer centre.

Patients who underwent surgery showed a higher survival rate than those who did not, which may be attributed to the fact that they presented with earlier disease. Furthermore, patients who received chemotherapy had a 57% reduced mortality rate, which is lower than that for surgery, but this may be because they presented at a more advanced stage. Their overall survival rate was still better than for those who did not receive chemotherapy.

CONCLUSION

In conclusion, in this study, we aimed to assess the survival (or outcome) of patients diagnosed with NSCLC. We found that most patients who underwent invasive treatment, including surgery, radiation therapy, and/or chemotherapy, showed greater improvement and a higher survival rate than did those who did not undergo such treatment. Future efforts are needed to address the major issues concerning long-term NSCLC survivors and to formulate a comprehensive survivorship care plan to promote better survival outcomes and to improve patients' overall quality of life to pre-treatment levels.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of the Faculty of Medicine at King Abdulaziz University

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