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ORIGINAL RESEARCH

Survival in surgical non-small cell lung cancer in a French Hospital

Survie d'un cancer bronchique non à petites cellules dans un hôpital français

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ABSTRACT

Background. Lung cancer staging with positron emission tomography, and adjuvant treatments (AT) have been progressively used for the management of surgical non-small cell lung cancer (NSCLC). ***Aim and methods***. The objective of this retrospective study was to analyze the survival of surgically NSCLC in a French University hospital. This study included 1 562 patients between 1988 and 2011. Patients were assigned into 2 groups: G1=before PET, and AT introduction (1988-2002); G2=after PET, and AT introduction (2003-2011). Patients' clinical profile and survival were described, and compared using the Kaplan-Meïer method and Log-rank test. A multivariate analysis was conducted with a Cox model. ***Results***. Adenocarcinoma was the most frequent histological types in G2 (38.8%, p<0.0001). The percentage of women (G2: 21.2% *vs* G1: 13.1%, p<0.0001) as well as of non-smokers increased over time (7.3% *vs* 6.9%, p=0.009), and also for early stages NSCLC (29.2% *vs* 15.5%, p<0.0001). Comparing G2 to G1, more patients underwent an association of chemotherapy and radiotherapy after surgery (4.9% *vs* 1.2%), and postoperative chemotherapy was also more frequent (20.8% *vs* 6.5%, p<0.0001). G2 patients *vs* G1 had a better one-year survival (70% *vs* 48%, p<0.0001). Women had a better survival for the whole cohort (HR<0.0001), in G1 (HR<0.0001), and G2 (HR=0.03). The Cox model found a lower risk in G2 period (HR=0.52 [0.40–0.66] for adenocarcinoma, and HR=0.64 [0.50–0.80] for squamous carcinoma. ***Conclusions***. The survival of surgically NSCLC raised since 2003, with probably an impact of epidemiological, diagnostic, and therapeutic changes.

KEYWORDS: Non-small cell lung cancer; PET; Thoracic surgery; Survival.

RÉSUMÉ

Introduction. La stadification du cancer du poumon avec tomographie par émission de positrons et les traitements adjuvants (TA) ont été progressivement utilisés pour la gestion du cancer du poumon non à petites cellules (CBNPC) chirurgical. ***But et méthodes***. L'objectif de cette étude rétrospective était d'analyser la survie du CBNPC chirurgical dans un hôpital universitaire français. Cette étude comprenait 1 562 patients entre 1988 et 2011. Les patients ont été répartis en 2 groupes: G1 = avant TEP et introduction d'AT (1988-2002); G2 = après la TEP et l'introduction d'AT (2003-2011). Le profil clinique et la survie des patients ont été décrits et comparés à l'aide de la méthode de Kaplan-Meïer et du test Log-rank. Une analyse multivariée a été réalisée avec un modèle de Cox. ***Résultats***. L'adénocarcinome était les types histologiques les plus fréquents chez G2 (38,8%, p <0,0001). Le pourcentage de femmes (G2: 21,2% contre G1: 13,1%, p <0,0001) ainsi que de non-fumeurs a augmenté avec le temps (7,3% contre 6,9%, p = 0,009), ainsi que pour les stades précoces de cancer du poumon non à petites cellules (29,2%). vs 15,5%, p <0,0001). En comparant G2 à G1, davantage de patients ont subi une association de chimiothérapie et de radiothérapie après une chirurgie (4,9% contre 1,2%) et la chimiothérapie postopératoire était également plus fréquente (20,8% contre 6,5%, p <0,0001). Les patients G2 vs G1 avaient une meilleure survie à un an (70% vs 48%, p <0,0001). Les femmes avaient une meilleure survie pour l'ensemble de la cohorte (HR <0,0001), en G1 (HR <0,0001) et en G2 (HR = 0,03). Le modèle de Cox a révélé un risque plus faible pendant la période G2 (HR = 0,52 [0,40–0,66] pour l'adénocarcinome et HR = 0,64 [0,50–0,80] pour le carcinome épidermoïde. ***Conclusions.*** La survie du CBNPC chirurgical élevé depuis 2003, avec probablement un impact des changements épidémiologiques, diagnostiques et thérapeutiques.

MOTS CLÉS: Cancer du poumon non à petites cellules; PET; Chirurgie thoracique; Survie.

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INTRODUCTION

Lung cancer is the leading cause of death by cancer in the world. Its incidence is still rising, and its prognosis remains poor, with a 5-years survival of about 15% [1]. Only 20% of lung cancers can benefit from surgical treatment. For the other patients, chemotherapy and radiation remain only treatments [2].

In order to select patients suitable for surgery, a complete CT-Scan staging with a respiratory, and cardiovascular assessment are required. Over the last decade, staging with positron emission tomography (PET) has progressively shown to be more sensitive, and efficient than conventional CT-Scan in selecting patients for surgery; thus, PET is now routinely used [3,4].

Importantly, in the mean time, while PET was progressively introduced, lung cancer treatments also evolved due to several trials showing adjuvant treatment (AT) efficacy for patients undergoing surgery for lung cancer, namely chemotherapy, and/or thoracic radiotherapy [5]. Secondly, since 2005, adjuvant treatment prescriptions have been more frequent [6].

The aim of this paper is to evaluate the survival of surgically non-small cell lung cancer (NSCLC) in a cohort of 1 562 consecutive subjects undergoing surgery from 1988 to 2011 at Nancy University Hospital. The other aim was to identify the prognostic factors.

MATERIAL AND METHODS

Patients and study design

The CRB biobank (Centre de Ressources Biologiques) was created in 1988, and data from all consecutive surgically treated lung cancers were collected. For each patient, clinical, histological, and therapeutic data were extracted from this biobank patients' records, including: gender, age, histological type according to WHO classification [7,8], smoking status defined as follows: patients who had quit smoking for more than one year were considered former smokers, and patients who had smoked less than 100 cigarettes in their lifetime were defined as never smokers, TNM stage according to the WHO 2009 classification [9], type of surgery, use of neo-adjuvant or adjuvant chemotherapy, and/or radiation, and comorbidities (other cancers, other respiratory diseases, other diseases). All patients underwent a CT and brain scan, and all patients in G2 underwent a PET. Every 6 months, a systematic follow-up of all surviving patients was carried out, by asking their physicians. Patients received AT according to ASCO, and ESMO guidelines, according to TNM staging, comorbidities, and performance status [10]. All patients were discussed in tumor board, and stage Ib>4 cm, II, III have been treated by chemotherapy (cisplatine-vinorelbine or carboplatine-paclitaxel) and/or thoracic radiation for pN2.

In order to analyze the survival of surgically NSCLC, we created two groups of patients, those undergoing surgery from 1988 to Dec 31st 2002, before PET local availability for staging, and AT (First group=G1), and those followed since Jan 1st 2003 up to Dec 31st 2011, after PET availability, and AT (Second group=G2).

Statistical analysis

Patients' socio-demographic and clinical characteristics were described with mean ± standard deviation (SD) for quantitative and percentage for qualitative variables. To test the association between variables, the chi-square or Fisher exact test was used for qualitative and Student t test or Mann-Whitney test for quantitative variables. Using survival as the outcome, we determined the time to event (death) from the day of surgery to the day of death (due to any cause = overall survival). In order to observe at least 1 year of follow up for all patients, we decided to keep only patients who underwent surgery up to Dec 31, 2011.

Patients who were alive after Dec 31, 2011 or were lost to follow-up were censored. Survival curves were estimated by the Kaplan-Meier method and compared by the log rank test. Bivariate then multivariate analyses involved use of the Cox proportional hazards model to identify factors related to survival: period, age (as a continuous variable), sex, smoking status, cancer stage, and treatments. An analyze according to histological type was done. The proportionality assumption was checked for each of the variables under study with scaled Schoenfeld residuals and by the proportionality test [11-13]. Data were analyzed by use of SAS, v9.3 (SAS Inst. Inc, Cary, NC). Type I error threshold was set at 0.05.

RESULTS

Patients

Socio-demographic characteristics

A total of 1 562 patients undergoing surgery for lung cancer were included in this study, 765 patients for the first period from 1988 to December 2002 (G1), and 797 patients for the second period from January 2003 to 2011 (G2).

The proportion of women diagnosed with lung cancer was higher in the after- compared to before-period (21.2% *vs* 13.1%, p<0.001). Interestingly, there were less smokers in the after- compared to before-period (86.3% *vs* 90.7%, p<0.001). No mean age difference was observed *(Table 1)*.

TABLE 1 **Patients characteristics according to periods**

	Up to Dec 2002 N=765 (49.0%)			From Jan 2003 N=797 (51.0%)			p** <0.0001
	N	%	SD*	N	%	SD*	
Histologic							
Squamous cell	367	48.0		290	36.4		
Adenocarcinoma	261	34.1		309	38.8		
Large cell	44	5.8		50	6.3		
Metastases	14	1.8		75	9.4		
Basaloides and neuroendocrine	79	10.3		73	9.2		
Sociodemographic characteristics							
Age (mean)	765	61.1	10.1	796	62.0	10.5	0.0868
Sex							<0.0001
Men	665	86.9		628	78.8		
Women	100	13.1		169	21.2		
Smoking history							0.0005
Non smoker	53	6.9		58	7.3		
Smoker/ex-smoker	694	90.7		688	86.3		
Unknown	18	2.4		51	6.4		
Stages							
Stage							<0.0001
IA	117	15.5		211	29.2		
IB	128	17.0		116	16.0		
IIA	168	22.3		129	17.8		
IIB	81	10.7		82	11.3		
IIIA	199	26.4		142	19.6		
IIIB	24	3.2		4	0.6		
IIIN	1	0.1		0	0.0		
IV	36	4.8		39	5.4		

** standard deviation*
*** Chi-2 for qualitative variables, and Student t test for quantitative variables*

Clinical characteristics

Squamous cell carcinoma was the most frequent histological type up to 2002 *vs* adenocarcinoma (48.0% *vs* 34.1%), and then, on the opposite, adenocarcinoma outnumbered squamous cell carcinoma after 2003 (38.8% *vs* 36.4%, p<0.0001). More patients were diagnosed with stage IA since 2003 (29.2% *vs* 15.5%, p<0.0001). Interestingly, a familial, and personal history of cancer was more frequent after 2003 (familial: 26.0% *vs* 6.1%, p<0.0001, and personal: 18.0% *vs* 11.9%, p=0.005).

In the whole cohort, patients with adenocarcinoma, large cell carcinoma as well as basaloides-neuroendocrine, were younger than those with squamous cell carcinoma (60.4, 59.9, 57.8 *vs* 63.5 years, p<0.0001 respectively). Adenocarcinoma, and large cell carcinoma were the most frequent histological types in women (adenocarcinoma: 45.4%, large cell: 19.3%, p<0.001). Adenocarcinoma were more frequent in non-smokers compared to other histological types (10.9% *vs* 1.7% for squamous cell carcinoma, and 33.6% for large cell carcinoma, p<0.0001).

Patients with early stages were more frequent in non-smokers compared to more advanced stage (27.9% in stage IA, *vs* 7.0% in stage IV, p<0.0001). Concerning squamous cell carcinoma, pneumonectomies were more frequent than in adenocarcinoma (35.0% *vs* 18.6%, p<0.0001). Lobectomies were more frequent in adenocarcinoma than squamous cell carcinoma (76.0% *vs* 58.0%, p<0.0001), while adjuvant chemotherapy was more frequent in adenocarcinoma than squamous cell carcinoma (14.4% *vs* 9.0%, p<0.0001) – Data not shown.

In patients with squamous cell carcinoma, when comparing the second period to the first one, on an average patients were older (64.5±9.4 *vs* 62.7±9.5; p=0.01) and there were less smokers (94.1% *vs* 97.3%; p=0.04).

As for adenocarcinoma, when comparing the second period to the first one, the percentage of women increased (24.6% *vs* 17.6%, p<0.04), while the percentage of non-smokers remained stable (10.7% *vs* 11.1%,

p<0.3). No difference in their mean age was observed.

Anticancer treatments associated to surgery
Nearly 95% of the whole patients have been discussed in a tumor board. Comparing the second period to the first one, more patients underwent an association of chemotherapy and radiotherapy after surgery (4.9% *vs* 1.2%), and postoperative chemotherapy was also more frequent (20.8% *vs* 6.5%, p<0.0001).

Patients' survival
Overall, patients undergoing surgery during the second period had a better 1 year survival probability than patients followed during the first period 70% *vs* 48%, *(Figure 1, Table 2)*, and this was the case for adenocarcinoma 69% *vs* 48%, as well as for squamous cell carcinomas 68% *vs* 47%, and for N1 disease 43% *vs* 53%, and N2 disease 28% *vs* 48% *(Table 2)*.

TABLE 2 **1 year and 2 years survival according to periods**

	Survival before 2003		Survival after 2003		
	1 year	2 years	1 year	2 years	p
Cohort	0.49	0.40	0.70	0.63	<0.001
N1	0.43	0.32	0.53	0.43	0.009
N2	0.28	0.19	0.48	0.37	<0.001
Adenocarcinoma	0.48	0.37	0.66	0.61	<0.001
Squamous cells	0.48	0.42	0.68	0.60	<0.001

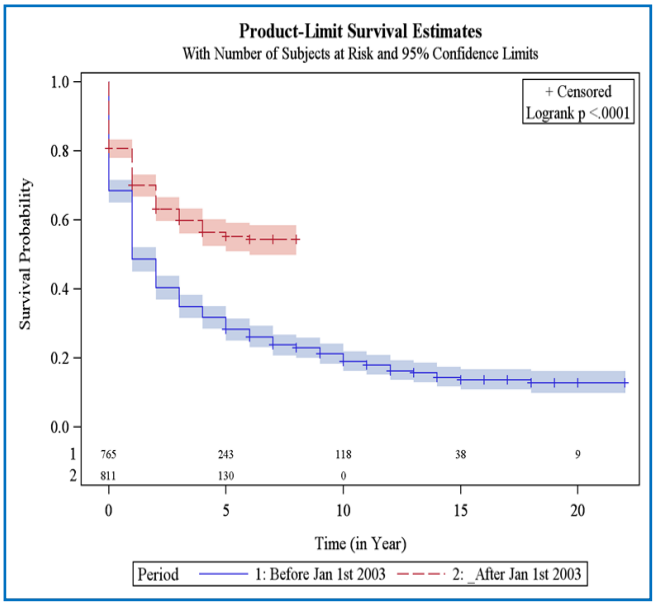

FIGURE 1. ***Survival of the cohort according to periods.***

Interestingly, women's probability to survive at 1 year after surgery was better than men (67% *vs* 58%, p<0.001) for the entire cohort. For the first period, they had a better 1 year survival probability than men (59% *vs* 47%, p=0.0006), and as well for the second period (73% vs 68%, p=0.03). Finally, for all patients diagnosed with an adenocarcinoma, women had a better 1 year survival probability than men (67% *vs* 57%, p=0.02); while for squamous cell carcinomas, no difference was observed (58% *vs* 57% p=0.2).

In the whole cohort, non-smokers had a better 1 year survival than current smokers and ex-smokers combined (70% *vs* 59%, p=0.004). The 1 year survival difference was also observed when comparing the smoking status according to period. Sixty-three percent of non-smokers in the period before-PET availability were more likely to be alive 1 year after the operation compared to 47% only if they were smokers (p=0.01), but no difference was observed for non-smokers *vs* smokers in the period after (75% *vs* 70%, p=0.3).

For patients diagnosed with an adenocarcinoma, 70% of non-smokers were more likely to be alive after 1 year compared to 59% in smokers, p=0.04. In contrast, in patients with squamous cell, no statistically significant difference in 1 year survival between non-smokers *vs* smokers was observed (58% *vs* 37%, p=0.07).

Factors related to patients' survival
Adenocarcinoma (n=570)
In bivariate analysis, period, sex, smoking status, disease stage and treatments independently predicted patients' survival. In multivariate analysis, patients in the G2 group had a lower risk of death (Hazard Ratio (HR) = 0.52 [CI 95% 0.40 – 0.66], p<0.001) compared to those in the 1 group. Older age (HR = 1.02 [1.01 – 1.03], p<0.002), unknown status of smoking history (HR = 2.37 [1.14 – 4.91], p=0.02, higher stages of cancer (HR = 1.58 - 19.95, p<0.001), and treatments with surgical act (HR = 2.13 - 3.30, p=0.002 to p<0.001) were related to a higher risk of death.
No interaction between variables was observed *(Table 3)*.

Squamous cell carcinoma (n=657)
In the bivariate analysis, period, stages of cancer and treatments independently predicted survival. In multivariate analysis, patients in the after-PET period had lower risk of death (HR = 0.64 [0.50 – 0.80], p<0.001). Stages IIB to IV of cancer were related to a higher risk of death (HR = 1.65 - 3.62, p=0.01 to p<0.001). No interaction between variables was observed *(Table 4)*.

TABLE 3 **Factors related to the survival of patients with adenocarcinoma**

Variables	Adenocarcinoma (n=570)					
	Bivariate analysis			Multivariate analysis		
	HR	95% CI	p	HR	95% CI	p
Period						
- Before-PET	1			1		
- After-PET	0.494	0.395 - 0.619	<0.001	0.517	0.402 - 0.665	<0.001
Sociodemographic characteristics						
Age	0.994	0.975 - 1.014	0.56	1.019	1.007 - 1.031	0.002
Sex						
- Men	1			1		
- Women	0.750	0.570 - 0.987	0.04	0.894	0.642 - 1.243	0.50
Smoking status						
- Non smoker	1			1		
- Smokers / ex-smokers	1.391	0.966 - 2.002	0.08	1.505	0.968 - 2.340	0.07
- Unknown	2.045	1.050 - 3.982	0.04	2.366	1.140 - 4.910	0.02
Clinical characteristic						
Stage of cancer						
IA	1			1		
IB	1.399	0.977 - 2.001	0.07	1.580	1.058 - 2.360	0.03
IIA	1.766	1.250 - 2.497	0.001	2.333	1.465 - 3.718	<0.001
IIB	2.253	1.419 - 3.579	<0.001	5.003	2.512 - 9.965	<0.001
IIIA	2.930	2.136 - 4.020	<0.001	8.856	3.933 - 19.927	<0.001
IIIB	6.579	3.512 - 12.326	<0.001	22.890	7.324 - 71.536	<0.001
IV	2.753	1.773 - 4.272	<0.001	19.956	6.007 - 66.293	<0.001
Treatments						
- Surgery only	1			1		
- Chemotherapy only	2.794	0.391 - 19.967	0.31	4.170	0.523 - 33.262	0.18
- Surgery and Chemotherapy	1.422	1.057 - 1.912	0.02	2.134	1.387 - 3.282	<0.001
- Surgery and Radiotherapy	1.966	1.502 - 2.572	<0.001	2.573	1.457 - 4.512	0.001
- Surgery and Chemo-Radiotherapy	1.489	1.055 - 2.102	0.02	3.304	1.531 - 7.131	0.002
Interactions						
Age by sex	0.997	0.972 - 1.024	0.86			
Age by smoking status	1.005	0.975 - 1.036	0.74			
Age by treatments	1.000	0.993 - 1.007	0.99			
Sex by smoking status	1.235	0.621 - 2.458	0.55			
Sex by treatments	0.967	0.812 - 0.151	0.70			
Smoking status by treatments	1.137	0.925 - 1.397	0.22			
Age by stage of cancer	0.998	0.993 - 1.004	0.61			
Sex by stage of cancer	1.059	0.913 - 1.228	0.45			
Period by treatments	1.121	0.959 - 1.311	0.15			

Note: No ignificant interaction between variables was observed in univariate analysis; therefore we did not include any interaction in the multivariate analysis.

TABLE 4 **Factors related to the survival of patients with squamous cell**

Variables	Squamous cell (n=657)					
	Bivariate analysis			Multivariate analysis		
	HR	95% CI	p	HR	95% CI	p
Period						
Before-PET	1			1		
After-PET	0.621	0.503 - 0.767	<0.001	0.636	0.503 - 0.805	<0.001
Sociodemographic characteristics						
Age	1.012	0.994 - 1.030	0.19	0.982	0.936 - 1.031	0.47
Sex						
- Men	1			1		
- Women	0.818	0.571 - 1.173	0.27	0.093	0.005 - 1.643	0.11
Smoking status						
- Non smoker	1			1		
- Smokers / ex-smokers	0.810	0.402 - 1.633	0.56	1.019	0.486 - 2.138	0.96
- Unknown	1.488	0.586 - 3.782	0.40	2.361	0.886 - 6.290	0.09
Clinical characteristic						
Stage of cancer						
IA	1			1		
IB	0.975	0.682 - 1.394	0.89	0.925	0.645 - 1.326	0.67
IIA	1.378	1.002 - 1.897	0.05	1.272	0.917 - 1.763	0.15
IIB	1.853	1.303 - 2.635	<0.001	1.647	1.148 - 2.362	0.007
IIIA	2.364	1.731 - 3.228	<0.001	2.166	1.546 - 3.034	<0.001
IIIB	4.628	2.414 - 8.872	<0.001	3.622	1.849 - 7.095	<0.001
IV	2.353	1.263 - 4.384	0.007	2.256	1.186 - 4.289	0.01
Treatments						
- Surgery only	1			1		
- Surgery and Chemotherapy	1.065	0.786 - 1.442	0.69	1.175	0.842 - 1.639	0.34
- Surgery and Radiotherapy	1.538	1.212 - 1.951	<0.001	1.123	0.853 - 1.477	0.41
- Surgery and Chemo-Radiotherapy	1.107	0.813 - 1.506	0.52	1.014	0.724 - 1.420	0.94
Interactions						
Age by sex	1.047	1.003 - 1.093	0.04	1.038	0.992 - 1.085	0.11
Age by smoking status	1.027	0.956 - 1.103	0.47			
Age by treatments	1.003	0.997 - 1.010	0.33			
Sex by smoking status	1.138	0.270 - 4.802	0.86			
Sex by treatments	1.019	0.816 - 1.272	0.87			
Age by stage of cancer	0.998	0.991 - 1.004	0.47			
Sex by stage of cancer	1.127	0.897 - 1.415	0.31			
Period by treatments	0.986	0.854 - 1.138	0.85			

Note: The multivariate analysis included also the interaction between age and sex.

DISCUSSION

This study, including 1 562 patients undergoing thoracic surgery, shows that over last 25 years, adenocarcinoma became the most frequent lung cancer histological type, that the proportion of women and non-smokers diagnosed with lung cancer increased, and that more early stages (stage I) were treated by surgery [14-19]. We observed that, as a whole, patients undergoing surgery for lung cancer diagnosed since 2003, when PET, and AT began to be adopted in daily practice, had a better 1 year and 2 years survival than those diagnosed before. In the same way, women and non-smokers experienced a better survival over the same period. Finally, patients undergoing surgery for adenocarcinoma or squamous cell carcinoma with N1 or N2 staging, had a lower risk of death at 1 and 2 years in the second period compared to those treated in the first one.

Our paper has some limitations. Firstly, it is a monocenter study, and readers should be cautious in generalizing the results. Secondly, comorbidities were not taken into account in the survival analysis. Notwithstanding, the number of patients included in this study, and the duration of the follow-up allow to draw significant conclusions.

Evolution of clinical profile of patients undergoing surgery for lung cancer over a period from 1988 to 2011

All our observations in this respect are consistent with the international literature. Indeed, adenocarcinoma was the most frequent histological type in our study, and its frequency increased from 1988 to 2011, from 34.1% to 38.8%, as previously observed in several reviews of the literature [20-23].

The percentage of women significatively increased from 13.1% to 21.2% in our observation. This is in accord with several previous, and recent publications [14-19].

In respect to smoking status, we observed a slight significant increase of non-smokers percentage from 6.9% to 7.6%, and this has already been shown in the literature [24 25].

Finally, the percentage of early stages among these patients undergoing surgery increased from 15.5% to 29.2%, as already published [20].

Evolution of patients' survival over a period from 1988 to 2011

Survival curves evaluation according to the Kaplan-Meiër method demonstrated a far better survival of patients undergoing surgery after PET, and AT introduction, with a 1 year survival of 49% in the first period, and 70% in the second one, and a 2 years survival of 40% in the first period, and 63% in the second one.

Taking into account the main observations found on the clinical profile of patients undergoing surgery for lung cancer, this significant increased survival could be explained by 5 main raisons, possibly combined:

increase incidence of adenocarcinoma: in the literature, this histological type has been shown to be associated with a better survival than squamous cell carcinoma [20]. However, in our study, the separate analysis of adenocarcinoma showed a better survival for those diagnosed, and followed after 2003; thus, it is not likely that this increased percentage of adenocarcinoma played a major role in the improvement of survival.

Increase of the percentage of women: in the literature, women, with the same clinical profile (age, histological type, TNM staging), do have a better survival than men [26-34]. This was the case in our study, since women had a better overall survival from 1988 to 2011; however we also found that women survival was better for those treated after 2003; thus, it is not likely that this increased percentage of women played a major role in the improvement of survival.

Increase of the percentage of non-smokers: in the literature, non-smokers have a better survival than smokers [35-38]. However, the increase of the percentage of non-smokers observed in our study was too small to explain the observed better survival.

Increase of the percentage of early stages: since the introduction of PET scan, the percentage of patients undergoing surgery for early stages has increased, suggesting that some patients diagnosed as late stages before PET avaibility were in fact more advanced cases which should not have been operated [3]. With the introduction of PET scan, the quality of mediastinal staging, and of the extrathoracic extension evaluation have improved, leading to a pre-surgery TNM staging of better accuracy. Thus the better survival could result from the absolute increase of lung cancer with early stages, but more importantly from a better selection of patients before surgery [39]. Few studies have analyzed the impact of PET on lung cancer survival. Dinan et *al.* included 97 007 patients with NSCLC, in a retrospective analysis of Surveillance, Epidemiology, and End Results (SEER) between 1998 and 2003, and found that PET introduction did not change the overall survival. The authors explained this finding by the fact that PET, at that time, was preferentially used in early lung cancer staging [40]. In a review of the literature on PET/CT use in therapy evaluation of patients with lung cancer, Langer et *al.* have shown that PET has a prognostic value [4].

Increase of the percentage of patients undergoing AT: some studies have demonstrated an increase of survival with AT in NSCLC [6,41-44]. Indeed, in the ANITA trial (Adjuvant Navelbine International Trialist Association), 840 stage IB-IIIA NSCLC were

included to receive cisplatin-vinorelbine or observation after surgery. After a median follow-up of 76 months, median survival was 65.7 months in the chemotherapy group, and 43.7 months in the observation group. The 5 years survival increased by 8.6% in the chemotherapy group [41]. Furthermore, in the CALGB 9633 trial, 344 stage IB NSCLC were randomized between chemotherapy (carboplatin-paclitaxel) or observation after surgery. Patients with tumors size ≥ 4 centimeters had a significant better survival in the chemotherapy group [43].

CONCLUSION

The clinical profile, and the survival of patients with lung cancer have evolved with an increase percentage of women, and adenocarcinoma subtypes, and an improvement in the survival. Theses epidemiological changes, the introduction of PET, and adjuvant treatments helps the physician for a better characterization of the patients' profile. The patients diagnosed with a late stages have a poorer prognosis than early stages.

CONFLIT OF INTERESTS

Non.

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