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Economic burden of resected (stage IB-IIIA) non-small cell lung cancer in France, Germany and the United Kingdom: A retrospective observational study (LuCaBIS)

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ABSTRACT

Objectives: New adjuvant treatments are being developed for patients with resected non-small cell lung cancer (NSCLC). Due to scarcity of real-world data available for treatment costs and resource utilization, health technology and cost-effectiveness assessments can be limited. We estimated the burden and cost-of-illness associated with completely resected stage IB-IIIA NSCLC in France, Germany and the United Kingdom (UK).

Materials and methods: Eligible patients were aged ≥18 years with completely resected stage IB-IIIA NSCLC between August 2009 and July 2012. Patients (living or deceased) were enrolled at clinical sites by a systematic sampling method. Data were obtained from medical records and patient surveys. Direct, indirect and patient out-of-pocket expenses were estimated by multiplying resource use by country-specific unit costs. National annual costs were estimated based on disease prevalence data available from published sources.

Results: 39 centers provided data from 831 patients of whom patient surveys were evaluable in 306 patients. Median follow-up was 26 months. The mean total direct costs per patient during follow-up were: €19,057 (France), €14,185 (Germany), and €8377 (UK). The largest cost drivers were associated with therapies received (€12,375 France; €3694 UK), and hospitalization/emergency costs (€7706 Germany). Monthly direct costs per patient were the highest during the distant metastasis/terminal illness phase in France (€15,562) and Germany

Abbreviations: NSCLC, non-small cell lung cancer; UK, United Kingdom; EUCAN, European Cancer Observatory; CI, confidence interval; QoL, quality of life; SAS, Statistical Analysis Software; MRI, magnetic resonance imaging; PET, Positron emission tomography; CT, computed tomography; ED, emergency department; SD, standard deviation; LuCaBIS, Lung Cancer Burden of Illness Study

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(€6047) and during the adjuvant treatment period in the UK (€2790). Estimated mean total indirect costs per patient were: €696 (France), €2476 (Germany), and €1414 (UK). Estimates for the annual national direct cost were €478.4 million (France), €574.6 million (Germany) and €325.8 million (UK).

Conclusion: To our knowledge, this is the first comprehensive study describing the burden of illness for patients with completely resected stage IB-IIIA NSCLC. The economic burden was substantial in all three countries. Treatment of NSCLC is associated with large annual national costs, mainly incurred during disease progression.

1. Introduction

Lung cancer is the most commonly diagnosed cancer and frequent cause of cancer death worldwide [1]. The majority of lung cancers are diagnosed as non-small cell lung cancer (NSCLC) [2]. Complete surgical resection is the recommended therapy in all guidelines, and is used to treat NSCLC Stages (I–II) and specific cases of Stage IIIA disease [3–5]. Cisplatin-based adjuvant chemotherapy recommended for patients with Stage II-IIIA disease provides a small (5.8%) benefit in the 5-year rate of disease-free survival, although the associated toxicity is substantial [6,7]. With standard treatment, patients with resected NSCLC have a 5-year overall survival of 58–73% for Stage I, 36–46% for Stage II and 24% for Stage III [3,4].

There is a need for improved NSCLC treatments with higher efficacy and reduced toxicity compared to platinum-based regimens. New treatments for advanced NSCLC, such as targeted therapies, anti-angiogenic agents and immune checkpoint inhibitors, are currently being investigated in early stage NSCLC [8,9]. However, cost and affordability have been identified as major factors contributing to inequitable access to NSCLC anti-cancer drugs in European countries [10]. In many countries, decisions concerning drug access are made by health technology assessment agencies and reimbursement authorities. Data describing treatment patterns, outcomes in routine clinical practice, and an understanding of resource use and costs, which are not collected during clinical trials, are necessary to the quality of the decisions made by these agencies. To our knowledge, there are no comprehensive burden-of-illness data for patients with completely resected stage IB-IIIA NSCLC.

We report a retrospective, observational burden-of-illness study in France, Germany and the United Kingdom (UK) among 831 patients with completely resected stage IB-IIIA NSCLC (LuCaBIS: a burden-of-illness study in patients with stage IB-IIIA Non-Small Cell Lung Cancer in France, Germany, and the United Kingdom). Using medical charts and patient surveys, we identified low use of adjuvant therapy in patients with Stage IB disease (15.1%). Higher treatment rates were seen in more advanced disease stages (Stage IIA, 52.0%; Stage IIB, 58.2%; Stage IIIA, 71.4%), for which available evidence more consistently shows a survival benefit.

A similar pattern of adjuvant treatment use was observed in each country in terms of stage, although for each stage and overall, adjuvant chemotherapy was administered most frequently in France (61.8% of patients), intermediately in Germany (51.9%), and was used the least in the UK (33.4%). 40% of patients had disease recurrence or died during the study follow-up period (median follow-up of 26 months). Here we report the resource utilization and monetary costs associated with patients with completely resected stage IB-IIIA NSCLC from the same study.

The clinical aspects of this study are reported in a back-to-back manuscript in this issue.

2. Materials and methods

The study (ClinicalTrials.gov identifier: NCT01772225) was conducted in 39 specialist cancer centers, teaching hospitals and tertiary referral centers in France (14 centers), Germany (11 centers) and the UK (14 centers), providing a range of geographic locations and institution types within each country. Medical records in each center were screened for patients presenting with (or progressing to) stage IB-IIIA NSCLC between 1 August 2009 and 31 July 2012. Each center aimed to enroll between 5 and 30 patients. A limit of 30 patients per center was imposed in order to avoid potential bias arising from differences among centers in treatment practices combined with an imbalance in the number of patients included from each center. In sites with more than 30 potentially eligible patients, a systematic quasi-random sampling method (i.e. based on a generated random number) was used for patient selection to minimize the potential for selection bias and domination of one site over the others.

2.1. Inclusion and exclusion criteria

Patients (living or deceased) identified by medical record screening were eligible if they were ≥18 years of age, had undergone complete resection (no residual disease) of stage IB-IIIA NSCLC, and if the investigator/study site had been the main care provider for the patient during the period of NSCLC treatment or management.

Patients were excluded if they had undergone wedge resection, if their resection was less than 1 month before study screening, if they had received investigational adjuvant systemic treatment within a clinical trial, if they had received treatment for concomitant cancer, or if they were lost to follow-up. Patients who participated in randomized trials of treatment after recurrence of NSCLC were included.

2.2. Study objectives and procedures

The objectives of the cost analysis were to estimate the level of resource utilization, direct and indirect costs associated with managing patients with resected stage IB-IIIA NSCLC during adjuvant treatment, prior to disease recurrence/progression, and after disease recurrence/progression. The study was designed to collect three types of resources (direct costs, indirect costs, and patient out-of-pocket expenses) in order to provide a real-world cost representation of NSCLC management. The cost analysis included surviving patients in order to collect information via a patient survey about healthcare resources from providers other than their main NSCLC treatment center (for example local hospital emergency care and general practitioner visits), indirect costs (lost productivity for patients and caregivers), patient out-of-pocket expenses (non-reimbursed transportation and childcare) and health-related quality of life (QoL) using the EQ-5D questionnaire. The study also included patients who were deceased in order to research the period of care up until the time of death.

Detailed information about demographic and disease characteristics, disease progression, adjuvant treatment, and resource utilization was extracted from patients' medical records by their physicians or site staff using a custom electronic data collection form. Information was collected from diagnosis until death, or until the last entry in the record. The patient survey was administered to patients still living at the time of the study. Patient surveys were completed from July 2013 through January 2014. The recall period of the patient survey was limited to 3 months to minimize recall bias, but included exceptional events such as hospitalizations and changes in employment status due to their NSCLC, which the patient would be expected to recall with more reliability and which represent substantial costs. Physicians did not send the survey to patients if they felt that this was inappropriate for that patient. Informed consent was collected only from living patients who