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Introduction

Lung cancer is the leading cause of cancer-related mortality in Canada and USA [1]. The American Cancer Society has estimated that in 2011 over 200 000 patients will be newly diagnosed with lung cancer, more than 15 000 patients will die of this disease. Non-small cell lung cancer (NSCLC) accounts for approximately 87% of lung cancers [2,3].

For last decades systemic chemotherapies especially platinum based doublets, have been used to treat NSCLC, but outcome improvements have reached a plateau [4,5]. The medium survival when platinum-based doublets are administered for advanced NSCLC has improved from 4 to 5 months if untreated to 8—10 months, but this treatment causes significant toxicities, which limit the number of cycles to be administered [6].

Current treatment algorithms for the treatment of NSCLC recommend both histologic and molecular diagnostics [7]. Recent advances in our understanding of malignant cell signaling pathways, their interconnections, importance of different receptors, biomarkers, and the interplay between various oncogenes have led to the development of targeted treatments which are improving efficacy and also the treatment safety. These treatments are aimed at specific, especially genetic changes of the malignant cells. Different NSCLC subtypes are associated with potentially targetable biomarker such as epidermal growth factor receptor (EGFR) mutations [8—12] — KRAS mutations [13] — echinoderm microtubule — associated protein like 4 (EML4), anaplastic lymphoma kinase (ALK) or fusion genes (EML4—ALK) [14,15] and c-MET over expression or amplification [16—19].

Our hope is to apply the knowledge of the treatments with targeted agents acquired in advanced stages of NSCLC to the earlier stages of NSCLC, too, thus being able to increase the NSCLC cure-rate. Combining different targeted agents or sequencing them properly will be very important in the new era of targeted individualized therapy.

In this publication, we will describe the importance of a team work from obtaining the tumor tissue, pathological diagnosis, molecular analysis, staging of the disease, the different treatments all the way to supportive care. You will learn about the different interventional procedures in order to obtain a satisfactory tumor specimen for analysis by pathologist and molecular biologists, to radiation and medical oncologist's treatments and ending with supportive care of patients. By this, we hope to give a complete review and guidelines for present and future approach to NSCLC patients.

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