PREFACE

Lung cancer

Lung cancer mortality has not changed much around the world in recent times and remains the commonest cause of cancer deaths, accounting for an estimated 1.5 million deaths in 2010 (1). Unlike many other solid cancers, the mortality from lung cancer continues to rise and much more work is needed to address the public health issue. Concerning too is the burden of disease in developing nations where smoking rates are still high, for instance exemplified by the predicted increases in lung cancers in China (2).

Against this backdrop, we have seen in recent years, several significant advances in lung cancer care and outcomes. These range from a better understanding of pathogenesis leading to novel therapies premised on biological weaknesses in the tumor as well as technological advances resulting in an effective screening strategy for the early detection of lung cancers.

Yang and colleagues provide us with a discussion of genetic susceptibility to lung cancer, in an attempt to understand why not every smoker develops lung cancer and other smoking related conditions (3). With the completion of the Human Genome Project (HGP), interest in this area continues to grow in an effort to discover and validate susceptibility genes.

One of the first steps in the evaluation of suspected lung cancer is to confirm a histological diagnosis of bronchogenic cancer, followed by WHO subtyping which carries predictive and prognostic significance. The role of anatomical pathology and the challenges for this field given the explosion of health technologies that are minimally invasive and safer, but providing only limited biopsies is carefully considered by Davidson and colleagues (4). Related is the newer branch of molecular pathology, a field which extends and complements conventional anatomical pathology well as both are fundamentally requisite for the modern multidisiciplinary team to formulate an effective management plan. This rapidly advancing field is comprehensively reviewed by Cooper and team (5).

Beyond classical single gene molecular pathology is the emerging role of cancer genomics. This area has exploded in the research data that is rapidly accumulating due to the HGP, technological innovations and competition giving rise to less costly platforms for interrogating the genome, the epigenome and transcriptome. The Cancer Genome Atlas (TCGA) is leading the effort in lung cancer, and this and other pioneering efforts are overviewed by Daniels *et al.* (6).

In most cases, the diagnosis of lung cancer comes from diagnostic bronchoscopy or trans-thoracic needle aspiration. The field of diagnostic bronchoscopy has changed considerably with the introduction of endobronchial ultrasound, navigation systems and dedicated instruments; these advances are highlighted by Leong and colleagues (7). Conversely, diagnostic radiology and biopsies are now enhanced by modern multi-detector CT scanners, and also exciting are the new local ablative radiology techniques such as radio-frequency ablation, microwave and others; as detailed by Lee and team (8).

For the very first time, there is now an effective screening tool: low-dose CT (LDCT), for lung cancer detection. The landmark NLST and other pivotal studies, current challenges and implementation issues are highlighted by Marshall *et al.* including Berg, a co-PI on the NLST (9). Other screening methods have not reached the same level of evidence as LDCT but are promising as many of these are premised on biomarkers in blood or breath. An update on the use of exhaled breath for lung cancer screening and early diagnosed is clearly provided by Dent and co-workers (10).

In terms of lung cancer therapeutics, there have also been dramatic changes ranging from very modern and complex radiation oncology platforms (11), the development of targeted therapies (12) based on tumor genome vulnerabilities optimally integrated with conventional chemotherapies for NSCLC (13), and modern SCLC chemotherapy (14). Surgery also continues to improve with an increasing focus on VATS and lesser resections (15); a modality of critical importance to the ultimate success of lung cancer screening programs. Last but never least is the key role of supportive and palliative care in lung cancer, a disease renowned for its poor overall prognosis. Our colleagues in this arena are likewise toiling to discover and implement new innovations in this area in order to address key patient centred outcomes, these data are reviewed by Yates *et al.* (16).

Knowledge that is not shared or translated to the bedside and clinic will not be able to deliver improved outcomes for our patients. In day to day care of our patients, up to date, trustworthy and implementable lung cancer guidelines have an impact that exploits afore-mentioned novel scientific discoveries; this important area is well described by von Dincklage and colleagues (17).

In summary, it has taken many years to now feel a guarded optimism for better patient centric outcomes throughout the lung cancer journey as a result of input from policy makers, funders, researchers, scientists, clinicians, patients, families and carers, advocates, industry and academia. These developments are highlighted here in the context of the global lung cancer burden. Nonetheless, we must never forget that the most effective way to impact lung cancer will come from effective tobacco control since smoking prevention and cessation remaining our most powerful and important tool and message.

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