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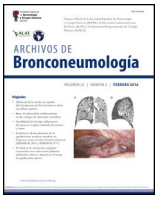

Editorial

Lung Cancer Surgery in the XXI Century☆

Tratamiento quirúrgico del cáncer de pulmón en el siglo XXI

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The 21st century has seen the introduction of new technologies and methods in the surgical treatment of lung cancer (LC), including minimally invasive surgery, mediastinal endobronchial or endoscopic ultrasound (EBUS/EUS), multidisciplinary teams, multimodal treatment, and new biomolecular technologies.

Both, patients and the nature of the disease are changing. The incidence of LC among men has begun to fall in countries with the highest Human Development Index (by 0.3% in Spain and 2.5% in the U.S. each year), although rates continue to rise among women (by 1.4% in Australia and 6.1% in Spain).[1] Patient age and the comorbidity burden (including previous cancers) have also risen progressively. Patients who may benefit from local treatment by surgery using the latest technology can be selected on the basis of individual surgical risk assessment, thus reducing postoperative morbidity and mortality and improving subsequent quality of life.[2] Histological types still vary between different countries, but there appears to be an increase in adenocarcinoma compared to squamous cell carcinoma, particularly among women.[1]

A multidisciplinary approach and the use of multimodal treatments has helped to increase the chances of achieving local control of the disease and to improve survival in cases in which such an outcome was previously impossible. Overall 5-year survival rates have increased, irrespective of disease stage and treatment.[3] The greater presence of adenocarcinomas in more peripheral sites and improvements in diagnosis and oncological treatment have influenced the surgical approach. The number of exploratory thoracotomies and pneumonectomies has fallen progressively, whereas the number of lobectomies and sublobar resections has increased.[3]

Lobectomy with a tumor-free margin and mediastinal lymphadenectomy is associated with better survival and is still the intervention of choice.[4] Nevertheless, the best surgical treatment for early-stage LC continues to be controversial. A retrospective analysis of the Surveillance, Epidemiology and End Results (SEER) database on the survival of 15,000 patients who underwent surgery for stage T1a non-small cell LC[5] concluded that lobectomy remains superior to other more conservative resections for all tumors measuring ≥2 cm; if sublobar resection is performed, anatomical segmentectomy is preferable when the lesion measures between 1 and 2 cm. Despite some limitations such as lack of data on disease recurrence, and the finding that patients with sublobar resection possibly suffer greater comorbidity, this study shows the benefit of more limited resection of small tumors with negative lymph nodes. As regards tumor histology, another retrospective study showed better results for lobectomy in squamous cell carcinomas, while protocolized segmentectomy was equivalent to lobectomy in adenocarcinomas.[6] The introduction of low-dose CT for screening means that cancers can now be diagnosed at an earlier stage, and due to the increased comorbidity of many patients, borderline candidates for lobectomy may potentially benefit from a more limited resection. However, these factors are still to be determined, and we hope that the ongoing randomized studies, CALBG 140503 and JCOG CALBG082/WJOG4607L comparing lobectomy with sublobar resection will help clarify this issue.[7]

The development of modern, narrow-gauge articulating endoscopic linear cutters, advances in video-assisted thoracoscopy camera technology (including 3D cameras), and the development of more accurate surgical robots have facilitated advances in minimally invasive surgery.[8] Since the end of the last century, surgeons have been developing surgical interventions in LC using video-assisted thoracoscopy (VATS), with progressively fewer ports, finally arriving at the uniportal VATS technique, which can now be used in increasingly complex cases. VATS surgery has many advantages: less postoperative pain, a shorter hospital stay, reduced inflammatory response, and quicker access to chemotherapy. Another aspect to be considered is robotic surgery. Although still in the early stages, this technique has considerable future potential, and results are similar to those of video-assisted thoracoscopy. However, the use of VATS in advanced disease stages is still rare, and this lack of acceptance is associated with fear of the risk of bleeding or a preference for more radical treatment. The information available on the Internet, the use of live surgical broadcasts during conferences, and courses in experimental surgery have shortened the learning curve and contributed to the development of new surgical procedures in the last decade.[8]

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However, in spite of the innumerable advantages of minimally invasive surgery, the choice of any specific approach should be based on scientific evidence, and radical treatment for the cancer and the best safety conditions must be offered. Minimally invasive surgery as a technique is here to stay, and has changed the attitude of thoracic surgeons towards surgical interventions. But, like all scientific procedures, minimally invasive approaches must find their place within the LC therapeutic arsenal and must undergo scientific scrutiny in terms of long-term survival and follow-up.[9]

Finally, new insights are emerging regarding the role of microRNA and stromal components as potential biomarkers for prognostic stratification and LC classification, and into the use of non-invasive blood biomarkers for early detection which should be of special interest to surgeons. In fact, the study of genetic mutations and their significance as predictors of response to chemotherapy and immunotherapy or as prognostic markers is already an essential feature of new surgical practices.[10] Over the next few years, then, the professional skills of the thoracic surgeon will expand to include an understanding of biomolecular technology and the adoption of a multidisciplinary approach to the disease, affecting diagnostic, prognostic and therapeutic applications in the treatment of LC.

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