



## Editorial

Morbidity, Mortality and Survival After Surgery for Lung Cancer<sup>☆</sup>

## Morbilidad, mortalidad y supervivencia en las resecciones pulmonares en el carcinoma broncogénico

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Major lung resections, particularly lobectomy, have advanced greatly, and are now regularly performed in thoracic surgery departments. These procedures have undergone particular scrutiny in inter-departmental benchmarking processes, and auditing can provide a good indication of the quality of the unit.<sup>1</sup> There are, however, certain interventions that can be controversial in special circumstances, some of which are addressed in the articles reviewed below.<sup>2,3</sup>

*Lung Resection Surgery in Octogenarians*

Recent decades have seen a significant increase in the life expectancy of the population. In subjects over the age of 70, the incidence of lung cancer (LC) and consequent mortality is very high, and one of the most hotly debated issues in the surgical approach to these patients is whether age is a limiting factor for surgery. Specifically, the controversy centers on patients aged 80 or older. At this age, early stage LC diagnoses are common, and as such, many patients are candidates for surgery with curative intent. Although some authors working in the field have concluded that octogenarian patients undergoing lung resection have similar morbidity and mortality rates to the rest of the population,<sup>2,4,5</sup> elderly patients are obviously more frail. Some studies report higher mortality figures in patients of advanced age after major lung surgery, although the subject remains a matter for debate. The results of a study by Rodríguez et al. are consistent with others that found no differences in surgical risk associated with age: older and younger groups had similar postoperative cardiorespiratory complications and mortality.<sup>4–6</sup> However, significant differences were found in the logistical regression model for predicted postoperative FEV1% (ppoFEV1%), confirming that, as in the general population,

resection of the least possible amount of lung parenchyma should be attempted to avoid postoperative complications and loss of quality of life.

Another very important question to bear in mind is the patients' attitude toward surgery. Very few articles address this issue in depth, but in daily practice, we see that elderly patients do not approach their disease in the same way as younger ones, and they often question the real value of invasive surgery when their life expectancy is already limited. A joint discussion between the surgeon and patient is therefore essential, and must include a clear explanation of complications that can arise and expected postoperative quality of life. Screening of candidates for major lung resection must be particularly meticulous in the case of octogenarian patients.<sup>4</sup> When surgery is proposed, video-assisted thoracoscopic resections may be an improvement in terms of postoperative complications and survival in the elderly.<sup>7,8</sup> The alternative approach of sublobar resection or video-assisted thoracoscopic segmentectomy must also be considered where possible, as this procedure has shown some excellent results in stage I LC less than 2 cm in diameter.<sup>9,10</sup>

*Pneumonectomy and Possible Alternatives*

The incidence of complications and postoperative mortality after pneumonectomy is high,<sup>11,12</sup> up to 3 times the risk of lobectomy. Postoperative problems mainly involve bronchopleural fistulas and cardiorespiratory complications.<sup>12</sup> After the immediate postoperative stage, the intervention induces physiological changes that can significantly affect the pneumonectomized subject's quality of life and mortality, as reported in many studies, and in particular by Deslauriers et al.<sup>13</sup> It is interesting to compare pneumonectomy with lobectomy in stage IB LC. The skill and expertise of the surgeon may play a part in the surgical approach to these tumors. The future clinical course of a patient may depend on avoiding pneumonectomy, and opting for parenchyma-sparing techniques, such as angioplasty and bronchoplasty.<sup>14,15</sup> An additional advance in this type of surgery has been the use of cryopreserved grafts. These procedures may be technically complex, but morbidity and mortality rates have not been higher in the series published to date.<sup>16</sup> Indeed, as noted in the aforementioned arti-

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cle, the number of pneumonectomies carried out in a surgical unit decreases as surgeons acquire expertise.<sup>3</sup>

Nevertheless, there are occasions, such as infiltration of the hilar structures or interlobar extension, when pneumonectomy is unavoidable and lobectomy must be ruled out as a treatment option. In these cases, prognosis is poorer, due to both the intervention itself and tumor invasion across the fissure, which, in the opinion of some authors, suggests that the malignancy is more aggressive.<sup>17,18</sup>

#### *Pneumonectomy in Elderly Patients*

The second study we would like to discuss is related with the first, in that it addresses an issue also widely debated in the specialized literature: pneumonectomy in elderly patients. Older age, lower FEV1 and whole lung resection were factors for poorer survival and quality of life in the study reported by Rodríguez et al. This topic is of interest because several groups have explicitly advised against pneumonectomy in octogenarians,<sup>5</sup> or have classified this procedure as very high risk.<sup>4</sup> In these cases, then, the use of minimally invasive surgical techniques and alternatives to pneumonectomy also becomes more important, as discussed above.

#### **Conclusions**

These studies have their limitations, including the lack of DLCO assessments in the early part of the series, the limited number of cases, and scant information on the indication for pneumonectomy. A multicenter approach could be of interest for addressing these questions, and could help to clarify some unresolved issues in LC surgery.

#### **References**

1. Freixinet J, Varela G, Molins L, Rivas JJ, Rodríguez Paniauga JM, López de Castro P, et al. Benchmarking in thoracic surgery. *Eur J Cardiothorac Surg*. 2011;40:124–9.
2. Rodríguez M, Gómez MT, Novoa NM, Aranda JL, Jiménez MF, Varela G. Morbimortalidad de la resección pulmonar en octogenarios con cáncer de pulmón. *Arch Bronconeumol*. 2015. <http://dx.doi.org/10.1016/j.arbres.2014.07.008>.
3. Rodríguez M, Gómez MT, Novoa NM, Aranda JL, Jiménez MF, Varela G. La neumonectomía ofrece menor supervivencia a los pacientes con carcinoma de pulmón en estadio patológico IB. *Arch Bronconeumol*. 2014. <http://dx.doi.org/10.1016/j.arbres.2014.09.007>.
4. Guerra M, Neves P, Miranda J. Surgical treatment of non-small-cell lung cancer in octogenarians. *Interact Cardiovasc Thorac Surg*. 2013;16:673–80.
5. Pagni S, Federico JA, Ponn RB. Pulmonary resection for lung cancer in octogenarians. *Ann Thorac Surg*. 1997;63:785–9.
6. Fanucci O, Ambrogi MC, Dini P, Lucchi M, Melfi F, Davini F, et al. Surgical treatment of non-small cell lung cancer in octogenarians. *Interact Cardiovasc Thorac Surg*. 2011;12:749–53.
7. Port JL, Mirza FM, Lee PC, Paul S, Stile BM, Altorki NK. Lobectomy in octogenarians with non-small cell lung cancer: ramifications of increasing life expectancy and the benefits of minimally invasive surgery. *Ann Thorac Surg*. 2011;92:1951–7.
8. Saha P, Bender M, Ferraris VA, Davenport DL. Surgical treatment of lung cancer in octogenarians. *South Med J*. 2013;106:356–61.
9. Okada M, Koike T, Higashiyama M, Yamato Y, Kodama K, Tsubota N. Radical sublobar resection for small-sized non-small cell lung cancer: a multicenter study. *J Thorac Cardiovasc Surg*. 2006;132:769–75.
10. Sienel W, Dango S, Kirchbaum A, Cucuruz B, Hörth W, Stremmel C, et al. Sublobar resections in stage IA non-small cell lung cancer: segmentectomies result in significantly better cancer-related survival than wedge resections. *Eur J Cardiothorac Surg*. 2008;33:728–34.
11. Algar FJ, Álvarez A, Salvatierra A, Baamonde C, Aranda JL, López FJ. Predicting pulmonary complications after pneumonectomy for lung cancer. *Eur J Cardiothorac Surg*. 2003;23:201–8.
12. Kopec SE, Irwin RS. Sequeleae and complications after pneumonectomy. Up to Date [www.uptodate.com](http://www.uptodate.com)
13. Deslauriers J, Ugalde P, Miro S, Deslauriers DR, Ferland S, Bergeron S, et al. Long-term physiological consequences of pneumonectomy. *Semin Thorac Cardiovasc Surg*. 2011;23:196–202.
14. Gómez-Caro A, García S, Reguart N, Cladellas E, Arguis P, Sánchez M, et al. Determining the appropriate sleeve lobectomy versus pneumonectomy ratio in central non-small cell lung cancer patients: an audit of an aggressive policy of pneumonectomy avoidance. *Eur J Cardiothorac Surg*. 2011;39:352–9.
15. Berthet JF, Paradela M, Jiménez MJ, Molins L, Gómez-Caro A. Extended sleeve lobectomy: one more step toward avoiding pneumonectomy in centrally located lung cancer. *Ann Thorac Surg*. 2013;96:1988–97.
16. Berthet JF, Boada M, Paradela M, Molins L, Matecki S, Marty-Ané CH, et al. Pulmonary sleeve resection in locally advanced lung cancer with cryopreserved allograft for pulmonary artery replacement. *J Thorac Cardiovasc Surg*. 2013;146:1191–7.
17. Joshi V, McShane J, Page R, Carr M, Mediratta N, Shackcloth M, et al. Clinical upstaging of non-small cell lung cancer that extends across the fissure: implications for non-small cell lung cancer staging. *Ann Thorac Surg*. 2011;91:350–3.
18. Ohtaki Y, Hishida T, Yoshida J, Ishi C, Kawase A, Aokage K, et al. The clinical outcome of non-small cell lung cancer patients with adjacent lobe invasion: the optimal classification according to the status of the interlobar pleura at the invasion point. *Eur J Cardiothorac Surg*. 2013;43:302–9.