Editorial

How to determine surgical management in octogenarian patients with lung cancer?

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There are various reasons for reading clinical papers, such as for intellectual curiosity, seeking better treatment, or laying a foundation for better clinical research (1). Papers, in particular, that involve clinical decisions with a lot of debate can be helpful for struggling physicians, especially thoracic surgeons who have to make critical decisions every moment. Among them, the debate on cancer surgery for octogenarians is one of the representative challenges (2,3). This is because not only removal of the cancer but also the survival and quality of life of elderly patients must be ensured, and the expected life depending on whether to treat or not should also be considered (4-6). Therefore, the paper presented by Peng *et al.*, which analyzed the Surveillance, Epidemiology, and End Results (SEER) database, is a sufficiently interesting and excellent topic because it can predict the need for surgery for patients aged 80 or older with lung cancer (7).

When thoracic surgeons plan surgery for elderly patients, they usually consider the following factors (8-11). First, is the clinical stage appropriate for the surgical indication? Second, is the cardiopulmonary function suitable for surgery? Third, is the risk posed by comorbidities worth taking? Based on this information, the surgeon determines the extent of resection. They may be a principled lobectomy or a parenchyma-saving segmentectomy that preserves lung function. Alternatively, if wedge resection is inevitable, surgeons will consider whether it can provide more benefits to the patient beyond diagnostic value. In this way, thoracic surgeons deploy their experience and knowledge to provide patients with the best clinical outcomes possible. However, selecting surgical options for elderly patients with unpredictable and vulnerable conditions may be the most challenging decision of all.

Peng *et al.*'s paper is outstanding in that it provides clues about surgery in elderly patients, but it is necessary to examine whether the information provided is immediately helpful in clinical decision-making and whether it has a robust logic (7). The paper used the SEER database to select patients with lung cancer aged 80 and over who underwent surgery and those who did not, and then applied propensity scoring method (PSM) for fair comparison (12). Thereafter, Cox-proportional analysis was applied to the surgery group to select prognostic factors for survival and create a nomogram which could provide the possible benefits for the surgery. The variables applied to the nomogram in the paper were age, gender, race, histologic types, grade, and TNM (tumour, node and metastasis). Even if we leave aside what grade (from I to IV) means, there is no information that can consider the patient's cardiopulmonary function or comorbidity. Moreover,

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since it is impossible to enter information on what type of resection (wedge, segmentectomy, or lobectomy) to proceed with (open thoracotomy, Video-assisted or Robot-assisted thoracic surgery), it is impossible to calculate the "real world" benefits of surgery. In addition, although the authors validated their nomogram, the most effective validation method is to apply it to actual clinical practice. The paper made an example as for the patient with white, and 83-year-old patients with grade I (I still don't know what the grade is) adenocarcinoma and it will result in an 81% benefit. However, there will be almost no thoracic surgeons who consider them to be surgical indications, and doctors who think that surgery (whatever surgery it is) will result in a such benefit are probably even rarer. Then, what is the reason for the results that are far from actual clinical practice? It may be related to the application of PSM and the selection of variables.

The process of PSM in this paper requires some modifications.

First, the authors performed PSM using variables of radiotherapy and chemotherapy. Therefore, 24% of non-surgical patients received radiation therapy and 15% received chemotherapy, and surgical patients received 27% radiation therapy and 17% chemotherapy. Because there was no statistically significant difference between the groups, the patients appear to be evenly distributed. However, from the perspective of overall treatment, at least 61% of non-surgical patients did not receive any treatment, while 100% of surgical patients did receive any treatment. Additionally, at least 17% of patients in the surgical group received two or more types of treatment. In other words, a comparison between 61% untreated and 100% treated with any type of method is not fair and this resulted in a significant difference in the survival analysis of the paper (13). Thus, while it may be statistically logical, it is not clinically appropriate. Consequently, it is difficult to consider that the surgical group generated by inappropriate PSM represents all patients who underwent lung cancer surgery, and therefore, the resulting nomogram is also difficult to consider as correct.

Second, the extent of resection was not taken into consideration. There is a substantial difference between lobectomy, segmentectomy, and wedge resection in terms of resection extent and lymph node removal. Furthermore, wedge resection may also be used for diagnostic purposes and is therefore recognized in guidelines as being used only in limited therapeutic circumstances (14). With consideration of the supplementary data, the authors have access to information for each type of surgery. Thus, it would have been more appropriate to conduct subgroup analysis for each surgery or to include only certain surgeries.

Third, they determined prognostic factors through Cox-regression and created the nomogram based on them. However, one of the basic assumptions for multivariate analysis is that each variable should be independent (15,16). However, T, N, and M are likely to be non-independent, and if grade implies stage, then stage is also not independent of TNM factors. Additionally, considering that radiotherapy and chemotherapy are determined by stage, it is also likely to be non-independent. In other words, multicollinearity may have been violated, and this should have been statistically verified, but it was omitted in this study (17).

Despite these limitations, this paper should be noted for the following reasons. First, the authors made efforts to find appropriate surgical indications in a vulnerable elderly group (octogenarians) using the reliable SEER database (18). As the number of elderly individuals continues to increase in many countries, and surgery for the elderly remains minimal, this could be a reliable resource for the societies entering an aged population (19,20). Second, the paper poses the question of what the standard surgical approach is for lung cancer patients over 80 years old. According to their supplementary data (*Fig. S4*) (7), Cancer-specific survival is superior with wedge resection limited to stage I. It may be more important for the treatment of patients over 80 years old to have limited resection with the lowest risk, rather than radical resection with moderate surgical risk. In other words, increasing surgical indications through the application of wedge resection, even if not pursuing lobectomy, may be positive for the overall survival of octogenarians (3). Finally, despite surgery, a group was identified where there was no improvement in survival rate. Through additional studies on this group, it is hoped that new guidelines for elderly surgery could be created.

In conclusion, Peng *et al.*'s paper is an interesting study that utilizes a SEER database with high reliability to identify appropriate surgical indications for octogenarian patients (7). However, it is necessary to critically read the paper from a logical perspective as there are some areas for improvement in the research methodology. More advanced information and insights are expected in future papers with the authors' excellent data processing abilities and sharp insights.

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Footnote

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