

Should we convert segmentectomy to lobectomy for positive intraoperative N1 nodes?



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The standard surgical treatment for early-stage non-small cell lung cancer has been a lobectomy with complete lymph node dissection or comprehensive sampling. Recently, 2 randomized studies have shown that a segmentectomy with specific intraoperative lymph node analysis for cancers that are 2 cm or smaller and located in the outer part of the lung is at least as good as a lobectomy for overall survival.^{1,2} The intention for these trials was to only include patients who were node-negative. One of the natural questions that has arisen from these trials and, in general for patients who are to undergo a segmentectomy, is what to do if malignant intrapulmonary lymph nodes are identified. Does the patient need to have the segmentectomy converted to a lobectomy? This is a complex question that must encompass many issues.

RESULTS AND EXPERT OPINION

The most important issue affecting the answer to this question is the reason for the segmentectomy. If the patient has comorbidities or limited cardiopulmonary reserve that would make a lobectomy high-risk, then a lobectomy is probably not the best choice. In this case, a very thorough intrathoracic lymph node dissection including all nodes located along the pulmonary artery branches draining the lobe of interest as well as a complete mediastinal node dissection is of vital importance. If removing an adjacent pulmonary segment will facilitate this and the patient can tolerate it, then that might be a good compromise to try to minimize the chances of leaving any intralymphatic disease behind. If the patient is good risk for lobectomy, then for now the default is generally to complete the lobectomy and carry out a full hilar and mediastinal lymph node dissection, but there may be circumstances in which this is not necessary based on circumstantial evidence. An example of this might be a superior segmentectomy where one level 13 or 14 lymph node is positive and all level 12, 11, and 10 nodes are negative. In addition, other favorable features are important, such as a parenchymal



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CENTRAL MESSAGE

Recently, 2 randomized studies have shown that a segmentectomy of the lung is at least as good as a lobectomy for overall survival for early-stage non-small cell lung cancer. If N1 nodal disease is encountered further surgery may not be necessary.

margin that is well over 1 cm, tumor size that is well below 2 cm, and no high-risk pathologic features such as micropapillary or solid subtype of adenocarcinoma and no lymphovascular invasion or pleural invasion.

If the pathologist can comment on the frozen section regarding spread through air spaces and it is absent, that is helpful as well. In many cases, the surgeon will have incomplete information regarding these high-risk pathologic features at the time of surgery, so he or she must make the best decision possible at the time after reviewing the frozen section with the attending pathologist at the time of surgery. Generally, these pathologic features are not significant enough to support going back to the operating room to complete a lobectomy if identified in the postoperative period.

Other factors to consider are the amount of nodal disease present. A minute intracapsular microscopic focus of cancer in one lymph node is a very different situation than several positive nodes with extracapsular extension. Significant evidence of lymphovascular invasion within the segment removed also suggests that the remainder of the lobe may

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have lymphatic disease present and thus need removal. Removing all mediastinal nodes is important, and intraoperative analysis to rule out spread may affect the decision to perform only a segmentectomy. Whether the surgeon performs the mediastinal and hilar nodal dissection at the beginning of the operation or after the parenchymal resection is up to the surgeon, as there is no correct order. In either case if positive nodes are identified at the time of resection, the surgeon should be sure all nodes of interest are removed and if this means an adjacent segment or even the lobe needs to be removed, then that should be done. In general, there is scant evidence that removing more lung parenchyma for positive nodal disease will improve survival or even local control. Most thoracic surgeons when encountering a positive lobar node at the time of lobectomy do not convert to pneumonectomy assuming the nodal disease can be removed (a positive node at the base of the left upper lobe bronchus at the time of left upper lobectomy, for example). All patients with intrapulmonary nodal disease qualify for adjuvant systemic therapy, making the value of further parenchymal resection even more questionable. Currently, there is no role for adjuvant radiation therapy in case of N1 nodal cancer. The outcomes for patients who have had lobectomy or segmentectomy in the setting of N1 nodal disease are mixed, but recently there have been 2 National Cancer Database studies that have examined this question. Razi and colleagues³ looked at patients from 2004 to 2015 who had a lobectomy or segmentectomy and had unsuspected N1 disease for clinical T1N0M0 non-small cell lung cancer. This was found in 2.5% (228/9118 patients) who had a segmentectomy and 6.7% (8915/132,604 patients) who had a lobectomy. Undiscovered N2 disease was seen in 2.4% (224/9118) of those who had a segmentectomy and 3.9% (5192/132,604) of those who had a lobectomy. A propensity-matched analysis of those with unsuspected N1 disease showed equivalent 5-year survival, 41.9% versus 44.3%, for patients undergoing segmentectomy versus lobectomy. In that analysis, those who had adjuvant therapy had improved survival (Figure 1). At the 103rd Annual Meeting of The American Association for Thoracic Surgery, Mathey-Andrews and colleagues⁴ presented a similar study using a more recent cohort and including wedge resections. They evaluated patients with clinical T1a-bN0M0 in the National Cancer Database who had either a sublobar resection or a lobectomy from 2010 to 2018. They included patients who had N1 or N2 disease. The authors identified 4684 patients including 455 patients who had wedge resection, 166 patients who had a segmentectomy, and 4063 patients who had a lobectomy. They performed a multivariable-adjusted, propensity score-matched analysis. There was no difference in survival between those patients who had a segmentectomy (5-year overall survival of 73%) versus those who had a

lobectomy (5-year overall survival of 71%) and had N1 disease. The outcome was the same for patients younger than 65 years of age without comorbidities. The patients who underwent wedge resection did worse than the patients who underwent lobectomy.

In another study by Nomori and colleagues,⁵ this question was looked at from a different perspective. They examined 275 patients with clinical T1N0M0 cancer who had a segmentectomy. Fifteen patients were found to have pathologic N1 or N2 disease. Ten of the fifteen patients had a completion lobectomy. None of the 10 patients had any residual disease in the completion lobectomy specimen. Two of the 5 patients who did not have a completion lobectomy but just a segmentectomy had recurrence, but none of the recurrence was local. Their conclusion from this small study was that a radical segmentectomy with hilar and mediastinal node dissection and sufficient surgical margin may play a role in local control in patients with clinical T1N0M0 and who ultimately have pathologic N1 or N2 disease.

Another related scenario is how to manage a patient who is having an intended wedge resection and a positive N1 node is identified during the surgery. There are not much published data to help with this decision. The best option is to perform at least a segmentectomy (or lobectomy based on the principles espoused previously), which will optimize the intrapulmonary and hilar nodal dissection and likely improve the parenchymal margin. If this is not possible from a tolerability standpoint, then all possible N1 nodes and N2 nodes should be resected and adjuvant therapy carried out with close surveillance for locoregional recurrence.

SUMMARY

If a patient has a segmentectomy for early-stage lung cancer, such as a clinical T1a or T1b N0 tumor in the outer part of the lung along the lines of the 2 randomized studies^{1,2} and a positive N1 node is encountered, a good-risk patient should probably have a lobectomy and complete nodal dissection. However, if the patient has issues that would make a lobectomy high-risk procedure, then the data that are available would suggest that staying with the segmentectomy and performing a complete hilar and mediastinal nodal dissection should provide equivalent outcomes to those that would be seen if the patient had a lobectomy and similar nodal dissection. If the N1 node is identified after the surgery, it is not clear that performing a completion lobectomy is indicated unless other poor prognostic features are observed. This question is certainly open to further investigation including with a randomized study if feasible. It is important to emphasize that the indications for a segmentectomy in a good-risk patient only apply to patients with peripheral, 2 cm or less tumors and not central tumors or those bigger than 2 cm.

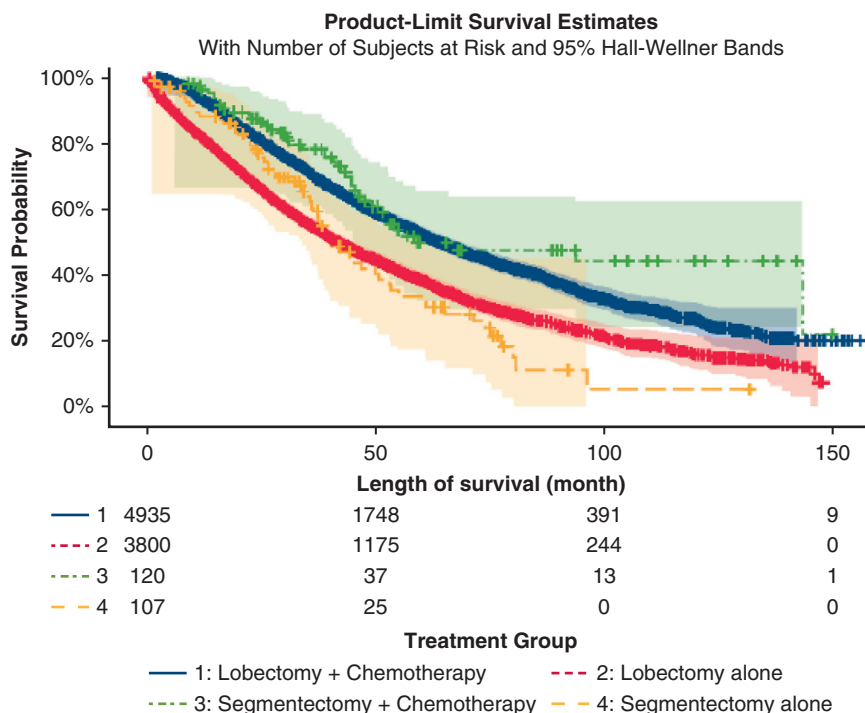


FIGURE 1. Survival curves of patients with T1N0 and unsuspected pathologic N1 who underwent segmentectomy or lobectomy with or without chemotherapy, derived using the Kaplan–Meier method. No differences were observed in median or 5-year overall survival between segmentectomy and lobectomy for unsuspected N1 metastases with adjuvant chemotherapy ($P = .114$). Reprinted, with permission, from Razi and colleagues.³

Conflict of Interest Statement

Dr Swanson is a consultant with Ethicon.

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