Metastasectomy With Standardized Lymph Node Dissection for Metastatic Renal Cell Carcinoma: An 11-Year Single-Center Experience

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Background. Pulmonary metastasectomy (PM) for metastatic renal cell carcinoma is an established method of treatment for selected patients. The incidence of intrathoracic lymph node metastases (ITLNM) and outcomes remain controversial. The purpose of this study was to determine the incidence of ITLNM and long-term outcome of PM for metastatic kidney cancer.

Methods. From January 1999 to December 2009, 116 patients (82 men, age 61.7 ± 9.0 years) with metastases from kidney cancer underwent PM and systematic lymph node dissection with curative intent. Kaplan-Meier analyses, log-rank test, and Cox regression analyses were used to estimate survival and to determine prognosticators of survival.

Results. Overall survival rates were 49% at 5 years and 21% at 10 years (median survival, 56.6 ± 9.2 months). Complete resections could be achieved in 108 patients (93.1%). Forty patients (34.5%) had systematic therapy before metastasectomy. Partial regression was observed in 11 patients (27.5%). Surgical morbidity and mortality rates were 13.8% (16 of 116) and 0.9% (1 of 116), respectively. ITLNM were found in 54 (46.6%). Patient age (≥70 years; \( p = 0.003 \)), female gender (\( p = 0.016 \)), and number of metastases (≥2 metastases; \( p = 0.012 \)) were associated with inferior survival after PM in the univariate analysis. The presence of ITLNM and type of lung resection did not significantly affect survival. Patient age remained the only significant prognostic factor when a multivariate Cox proportional hazards model was applied.

Conclusions. PM and systematic lymph node dissection can be performed safely with low morbidity and mortality. Long-term survival is achievable in selected patients even with ITLNM. We recommend that systematic lymph node dissection should be demanded in every patient due to the high prevalence of ITLNM. Patients aged 70 years or older should be selected carefully for PM.

Patients and Methods

Institutional Review Board approval was obtained for this study. The study was conducted according to the revised Declaration of Helsinki and the requirements of good clinical practice.

All patients with thoracic metastases of RCC were analyzed retrospectively between January 1999 and December 2009 at a single institution. An interdisciplinary tumor board consisting of thoracic surgeons, medical oncologists, and urologists decided the individual indication for metastasectomy. In brief, indications for metastasectomy were local control of primary tumor, complete resections of all thoracic metastases possible, no extrathoracic metastases, no better treatment for the pulmonary metastases available, and adequate performance status and cardiopulmonary reserve [18]. After diagnosis of the metastases, observation for 2 months, followed by restaging, was mandatory. If disease was stable after the 2-month observation time, the indication for metastasectomy was made.

Staging procedures included chest computed tomography (CT), abdominal CT or ultrasonography, bone scan, magnetic resonance tomography (MRT) of the brain, or in recent years, F18-fluorodeoxyglucose positron emission tomography/CT (FDG-PET/CT).

All patients underwent metastasectomy, including systematic mediastinal, hilar, and interlobar lymph node resection. As a routine for all oncologic operations, right-sided thoracotomies include lymph node stations 4L, 5, 6, 7, 8, 9, 10R, 4R, 4L, 7, 8, 9, 10R, 10L, 11, and 12 [19].

Follow-up data were obtained from clinical records, telephone interviews, and correspondence from attending physicians. Time to death was defined as the time from the metastasectomy until death from any cause. All patients alive at last follow-up were censored. Operative death included patients who died within 30 days after metastasectomy or during the same hospital stay.

Survival curves were estimated by the Kaplan-Meier method, and the log-rank test was used to compare survival between groups. The Student t test or Fisher exact test was used to analyze associations between categoric variables. A Cox proportional hazards model was used to identify independent predictors of survival, with adjustment for relevant clinical covariates. Values of $p$ of less than 0.05 were considered statistically significant. The analyses were performed with SPSS 15.0 software (SPSS Inc, Chicago, IL).

Results

During the study period, 116 patients (82 men [70.7%]) underwent 178 procedures. Their demographic and clinical information is listed in Table 1. The patients had a median age of 61.7 ± 9.4 years at the time of PM.

A radical nephrectomy was performed in 114 patients previously. Lymph nodes of the primary tumor were classified as N0 in 62 patients and as N1-N2 in 54. Forty-six patients had synchronous metastases with the primary tumor and 70 had metachronous metastases. Pulmonary metastases were solitary in 35 patients, multiple unilateral in 59, and bilateral in 22. Forty patients received systematic chemotherapy before PM, and partial regression was observed in 27.5%.

Unilateral metastases (n = 94) were always resected by posterolateral thoracotomy. Bilateral metastases (n = 22) were resected by sternotomy in 2 patients and by sequential bilateral thoracotomy in 20 patients. Eight patients had only a unilateral exploratory thoracotomy (nonresectable metastases or pleuritis carcinomatosis). Finally, 442 metastases were resected in 108 patients (range, 1 to 38).

Single or multiple wedge resections were performed in 110 patients. Additional resections to achieve complete resections were segmentectomy in 19, lobectomy in 8, and sleeve lobectomy in 6. In addition to lung resection, chest wall resection was performed in 5 patients and diaphragm resection in 3 patients.

Postoperative complications occurred in 16 patients (13.8%) and included pneumonia in 8, supraventricular arrhythmia in 3, recurrent nerve palsy in 2, chylothorax in 2, and upper gastrointestinal bleeding due to diffuse gastritis on esophagogastroduodenoscopy in 1. The mortality rate was 0.9% (1 of 116). When related to the number of performed procedures (n = 178), the mortality rate was 0.6%. The resection was complete in 108 of 116 patients (93.1%). Resections in 8 patients were incomplete due to metastases that were not resectable or pleuritis carcinomatosis.

The mean number of dissected lymph nodes was 37 (range, 13 to 88). Lymph node metastases were found in 54 patients (46.6%), hilar, interlobar, or lobar lymph metastases were found in 15 patients (12.9%), and mediastinal lymph node metastases were detected in 39

Table 1. Surgical and Pathological Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of pulmonary resection</td>
<td></td>
</tr>
<tr>
<td>Wedge resection</td>
<td>110</td>
</tr>
<tr>
<td>Segmentectomy</td>
<td>19</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>8</td>
</tr>
<tr>
<td>Sleeve lobectomy</td>
<td>6</td>
</tr>
<tr>
<td>Resected metastases, No.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td>2–14</td>
<td>72</td>
</tr>
<tr>
<td>≥15</td>
<td>9</td>
</tr>
<tr>
<td>Thoracic lymph node metastases</td>
<td></td>
</tr>
<tr>
<td>N0</td>
<td>62 (53.4)</td>
</tr>
<tr>
<td>Hilar/interlobar/lobar</td>
<td>15 (12.9)</td>
</tr>
<tr>
<td>Mediastinal</td>
<td>39 (33.6)</td>
</tr>
<tr>
<td>Completeness of resection</td>
<td></td>
</tr>
<tr>
<td>R0</td>
<td>108 (93.1)</td>
</tr>
<tr>
<td>R1</td>
<td>0</td>
</tr>
<tr>
<td>R2</td>
<td>8 (6.9)</td>
</tr>
</tbody>
</table>
patients (33.6%). Patients with ITLNM had median survival of 37.1 months (95% confidence interval, 14.7 to 60.7 months) compared with 71.9 months (95% confidence interval, 35.6 to 108.2; $p = 0.10$) in patients without ITLNM.

Overall estimated long-term survival was 49% at 5 years and 21% at 10 years (Fig 1). The median survival of all patients was 56.6 months (95% confidence interval, 38.0 to 74.0 months). In the long-term, 29 patients underwent a subsequent second thoracotomy, 5 patients a third, and 4 patients a fourth thoracotomy for recurrent mRCC.

Univariate analysis (Table 2) demonstrated that patient age (Fig 2), female gender, and number of metastases (Fig 3) were significant prognostic factors. However, a short (< 24 months) or long (≥ 60 months) disease-free interval from nephrectomy to the diagnosis of metastasis, chemotherapy before surgical intervention, pathologic results, the presence of lymph node metastases, or type of lung resection did not significantly affect on survival. Multivariate analysis showed that only patient age was associated with worse prognosis (Table 2). The number of metastases as an independent prognosticator did not reach statistical significance ($p = 0.064$).

**Comment**

In this large single-center series of patients undergoing PM with standardized lymph node dissection for mRCC, we found a high rate of ITLNM. However, even in the presence of ITLNM, we observed a high rate of complete resections, with low rates of operative morbidity and mortality and promising long-term survival.

The role of systematic mediastinal and hilar lymph node dissection at the time of PM is controversial and not routinely done by all surgeons. In a European Society of Thoracic Surgeons survey, 64% of responding surgeons expressed the belief that the presence of clinically positive lymph nodes is a relative contraindication to PM. However, only 55.5% of the surgeons perform mediastinal lymph node sampling, and 13% perform complete mediastinal lymph node dissection at the time of PM [20]. To the best of our knowledge, this is the first study to report standardized systematic lymph node dissection for PM in all patients. Approximately 37 lymph nodes (range, 13–88) were dissected per patient in this study, depending on unilateral or bilateral procedures.

Experienced surgeons performed all operations, and the senior author (J.S.) supervised all procedures. Systematic lymph node dissection is a standardized routine procedure in our center for all oncologic operations. The quality of the procedure, especially in terms of lymph node dissection, was based on the number of dissected lymph nodes and the documentation form with regard to the evaluated and dissected lymph nodes. The high rate of ITLNM detected during standardized systematic lymph node dissection suggests that this approach should be used in every patient. The high rate of complete resections achieved with PM and standardized lymph node dissection could suggest that this approach might be an important factor in achieving prolonged survival. We believe that open thoracotomy is the approach of choice because it allows palpation of the lung and complete lymph node dissection. The standardized lymph node dissection technique is analogous to lung cancer operations [21].

Previous data from the 1990s showed an ITLNM incidence of between 12.5% and 26.1% [15, 18, 22]. Recent studies reported ITLNM in 34.5% to 40.0% of patients [17, 23, 24]. In the present study, we found ITLNM in 46.6%. This wide range might be explained by the completeness

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**Table 2. Univariate and Multivariate Survival Analyses**

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>Survival, mos (95% CI)</th>
<th>$p$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Univariate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;70 y</td>
<td>89</td>
<td>67.0 (41.0–93.0)</td>
<td>0.003</td>
</tr>
<tr>
<td>≥70 y</td>
<td>27</td>
<td>56.0 (38.0–74.0)</td>
<td>0.016</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>82</td>
<td>67.0 (42.0–92.0)</td>
<td>0.121</td>
</tr>
<tr>
<td>Female</td>
<td>34</td>
<td>30.2 (8.4–52.0)</td>
<td></td>
</tr>
<tr>
<td>Metastases, No.</td>
<td></td>
<td></td>
<td>0.021</td>
</tr>
<tr>
<td>1</td>
<td>35</td>
<td>Not reached</td>
<td>0.232</td>
</tr>
<tr>
<td>2–14</td>
<td>72</td>
<td>46.9 (32.2–61.5)</td>
<td>0.347</td>
</tr>
<tr>
<td>≥15</td>
<td>9</td>
<td>38.8 (5.4–72.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Multivariate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrathoracic lymph node status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N0</td>
<td>62</td>
<td>71.9 (35.6–108.2)</td>
<td></td>
</tr>
<tr>
<td>N1</td>
<td>15</td>
<td>50.7 (8.9–92.4)</td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>39</td>
<td>36.0 (23.9–48.0)</td>
<td></td>
</tr>
</tbody>
</table>

CI = confidence interval.
of lymph node dissection. We have performed standardized systematic lymph node dissection as a routine procedure for PM since 1992, analogous to lung cancer operations. A mean of 37 lymph nodes were dissected in the present study. Previously, thoracic lymph nodes were dissected only if they seemed to be involved.

Interestingly, we found more mediastinal lymph node involvement (33.6%) than lobar, interlobar, or hilar lymph node metastases (12.9%). There is no proof about the pathway of lymph node metastases. Explanation only by skip metastasizing might be not appropriate. One possible mechanism might be the lymph drainage from the subpleural lymph plexus of the lung segments extending directly to the mediastinal lymph nodes without involving the bronchopulmonary lymph nodes. This direct drainage to mediastinal lymph nodes might be found right-sided in 22% and left-sided in 25% [9]. Furthermore, ITLNM can even be present without associated lung metastases [25]. Lymph node involvement in those patients may be explained by the renal lymph drainage to the thoracic duct and implementation of mediastinal lymph node metastases along the thoracic duct [26]. Future studies should analyze the role of the lymphatic system and the biology of metastatic cells to further clarify the pattern of spread of mRCC.

Patients without ITLNM have superb long-term survival, with reported median survival between 64 and 108 months and 10-year survival of up to 41.6% [17, 23]. We observed a median survival of 72 months in our study. However, the presence of ITLNM is discussed as an important prognostic factor in PM for most extrapulmonary malignancies [10, 25–27]. A common finding for patients with and without ITLNM is that a wide range of survival is reported for the same patient groups. PM is very well accepted for patients without ITLNM. In contrast, patients with ITLNM are often not considered to be candidates for PM. Patients with prior nephrectomy, pulmonary metastases, and mediastinal lymph node metastases are at poor risk according to the Memorial Sloan-Kettering and Cleveland Clinic Foundation Prognostic Factors Model for Survival in patients with previously untreated mRCC [28, 29]. Median survival for those patients varies between 4.5 and 7.3 months. However, patients at favorable risk in terms of no or only one poor prognostic factor have a median survival of between 26.0 and 28.6 months. Median survival was 12.9 to 26.0 months for patients with ITLNM for mRCC in recent published studies [17, 23]. In this series we show that long-term survival is achievable even in patients with ITLNM, with a median survival of 37.1 months. Thus, the switch from a poor-risk to a favorable-risk group is possible, provided that complete resection is achievable in this highly selected group. As defined for almost all solid malignancies, resection is defined as incomplete (R2) if the tumor resection is macroscopically incomplete or positive lymph nodes are left behind [30].

Furthermore, median overall survival was 19.3 months for sorafenib-treated patients and 16.4 months for sunitinib-treated patients with mRCC if the above-mentioned outcomes for surgically directed therapies are compared with results of nonsurgical therapies [31, 32]. If disease dissemination can potentially be caused by pulmonary metastases and lymph node metastases, surgical intervention may interrupt this cascade of tumor dissemination [33]. Thus, systematic lymph node dissection might have not only diagnostic but also therapeutic value in terms of complete resection in highly-selected patients with ITLNM but without disease progression during a 2-month observation period before PM. However, the role of PM in the presence of

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Fig 2. Median survival assessed by age was 67 months for patients aged < 70 years (green line) and 56 months for patients aged ≥ 70 years (blue line); p < 0.001.

Fig 3. Median survival assessed by intrathoracic lymph node status was 72 months for N0 (green line), 51 months for N1 (blue line), and 36 months for N2 (gray line); p = 0.232.
ITLN will have to be further clarified, and additional prognosticators are needed. Previous studies reported that the number of pulmonary metastases might have an effect on the prognosis of PM [15, 34, 35]. The group assignment of metastases number varied from 1 and more than 1, 1 compared with 2 to 6 and more than 6, as well as 1 to 7 compared with more than 7 [15, 26, 35–37]. In the present study, the number of metastases (1 vs 2 to 14 vs more than 15) was a significant prognostic factor in the univariate analysis. Median survival for a solitary metastasis was not reached. Patients with 2 to 14 pulmonary metastases had a median survival of 46.9 months. Even the number of metastases beyond 15 was associated with a prolonged median survival of 38.8 months. This observation is highly clinically relevant but failed to reach statistical significance in the multivariable analyses. Thus, patients with a single metastases might profit most from PM. PM still seems to be justified in patients with multiple but completely resectable metastases.

Older age at the time of diagnosis of the pulmonary metastases was an independent prognostic factor for decreased survival in this study. In multivariable analysis, an age of 70 years or older remained the only factor independently associated with decreased survival. Advanced age can be associated with decreased performance status, more comorbidities, and frailty. Further investigations should include, for example, the Karnofsky Performance Scale Index or use validated scales to classify frailty [38]. Nonetheless, patients aged 70 years or older should be selected carefully for PM.

The surgical treatment of pulmonary metastases is now an established technique in the interdisciplinary concept of oncolologic therapy [18]. The aim of PM is to achieve complete resection while leaving adequate postsurgical pulmonary reserve. Some authors hypothesize that lung metastases induce lymph node metastases, because lymph node involvement is found during lung metastases resection, and suggest treating solitary lung metastases similarly to non-small cell lung cancer [8, 24, 27]. To the best to our knowledge, no study has proven that lobectomy reduces local recurrence rates in patients with pulmonary metastases and ITLN. However, satellite tumor cells might be a potential source for local recurrence and were found in a high number patients around colorectal lung metastases [6]. Welter and colleagues [39] recommended a safety distance of 3 mm for small metastases, and 8 to 10 mm for larger metastases must be maintained around the lesion to prevent local recurrence. Nonetheless, there are no comparable studies for mRCC.

However, parenchyma-sparing wedge resection or laser resection was the mainstay of PM in the present study. Major pulmonary resections may be indicated, depending on the size and location of the pulmonary or lymph node metastases. We had to perform major pulmonary resections for PM, defined as anatomic segmentectomies, lobectomies, and sleeve lobectomies, in 33 patients. The type of lung resection had no significant effect on survival. We did not observe a higher incidence of recurrence in patients who underwent wedge/laser resection and ITLN. The postoperative morbidity and mortality rates were low, at 13.8% and 0.9%. One patient died postoperatively of pneumonia. These results are comparable to the range reported in previous studies [15, 24]. Thus, PM with systematic lymph node dissection is a safe operation.

This study has some limitations. It represents a single-center experience. Because of the retrospective design, quality of the data depends on complete and accurate documentation and interpretation of medical records. Furthermore, our treatment strategy was heterogeneous because the multimodality treatment with PM, chemotherapy regiments, and immunotherapy was highly individualized according to unique patient and tumor characteristics. Different medical treatments were applied during the study period; especially, the number of patients who received targeted therapies was too low to detect major effects on outcomes. The better-than-expected promising survival rates in patients with ITLN could be attributed to the combination of patient selection, observation time, systemic therapy, and PM with systematic lymph node dissection.

We have only reported overall survival because our data set did not allow us to analyze cancer-specific survival. Consent for histologic proof of recurrence and autopsy in patients with mRCC is difficult to obtain. The cause of death in most of the patients was assumed to be mRCC. We had no differentiation between the different histologies of the primary tumor. This might have an influence on outcome.

In conclusion, patients with ITLN should not be denied surgical intervention. PM and systematic lymph node dissection can be performed safely with low morbidity and mortality. Long-term survival is achievable in selected patients, even those with ITLN. We recommend that systematic lymph node dissection should be the standard in every patient due to the high rate of ITLN. Patients aged 70 years and older should be selected carefully for PM.

References


**DISCUSSION**

**DR ZANE T. HAMMOUD** (Detroit, MI): I am a little puzzled by your conclusion that a systematic lymph node dissection should be added to every one of these patients. We know systematic lymph node dissection is not benign, and your data show it did not make a difference in survival, so how do you justify that?

**DR KUDELIN:** We think that systematic lymph node dissection should be performed due to the high prevalence of the metastases and that patients may profit from this dissection when they have these metastases.

**DR HAMMOUD:** But your data say there is no difference, so where is the benefit?

**DR BÖLLÜKBAS:** I am one of the coauthors and mentor of Dr Kudelin. There is no statistical significance, but if you look at the data, our N0 patients survive much longer, twice as long as patients with N2 disease. And the other point is if you leave lymph nodes behind, then you have only R2 resection, and you leave tumor behind. That is the indication for us to do systematic lymph node dissection.
DR DANIEL J. BOFFA (New Haven, CT): Yes, I agree. I was actually going to ask that question. I think there are two ways to interpret your findings. One is that lymph nodes don’t matter at all, and the other is that lymph nodes that are completely resected have no impact as long as they are completely resected. I don’t think that is, unfortunately, knowable right now, but I think you could make an argument for either case.

DR HAMMOUD: Again, based on the picture that you showed, I am sure you do a complete mediastinal lymph node dissection, you are doing a wedge, and then you are doing this rather radical lymph node dissection. Obviously, you are going to find more lymph nodes, but if it doesn’t impact survival, you have to question why you are doing it.

DR KE-NENG CHEN (Beijing, China): There are lots of different cancers that can metastasize to the pulmonary tissues, including colon cancer, breast cancer, and sarcoma cancer. My question is: Why did you only choose the renal cell carcinoma to analyze this?

DR KUDELIN: We analyzed the other cases also, but they are different studies.

DR CHEN: Do you have a similar result about lymph node dissection?

DR KUDELIN: Yes. We perform a systematic lymph node dissection in all patients with metastases.

DR CHEN: It is your routine?

DR KUDELIN: It is our routine at our center, yes.

DR CHEN: Do you have only results without lymph node dissection cases?

DR KUDELIN: Not with curative intent, just in case we need the diagnosis.

DR CHEN: Okay, thank you.

DR KUDELIN: Thank you.

DR SVETLANA KOTOVA (Los Angeles, CA): Do you have any idea how the survival of the patients who have had lymph node dissection compared to those who didn’t have any lymph node dissection but they all underwent metastasectomy?

DR KUDELIN: I cannot say that because we performed this dissection in all patients, so we had no other group to compare.

DR MARK I. BLOCK (Hollywood, Florida): I hate to beat a dead horse, but it is the same thing. If you don’t have a group where you did not do the dissection, then you can’t say the dissection was beneficial. What you can say is that when you do a dissection, whether there are lymph nodes involved or not doesn’t make any difference. But without a group where you didn’t do the dissection, you can’t say that the dissection made a difference.

DR KUDELIN: Yes, but we think it is not ethical to make two groups, and the one group will have no dissection, the other will have one.

DR SCOTT I. REZNIK (Temple, TX): If you knew preoperatively that you had unilateral lung disease with contralateral mediastinal lymph node disease, would you offer that patient an operation or a sternotomy for a complete mediastinal lymph node dissection?

DR KUDELIN: None of our patients had N3 preoperatively, but more than half of the patients had thoracotomy on both sides, so we performed the dissection on both sides on those patients, so it doesn’t matter.

DR BOLUKIAS: We compared it to the other cancers, metastatic to the pulmonary tissue, and you have a different incidence of lymph node metastases. I think the incidence of lymph node metastases, particularly in renal cell cancer is, as our group has shown, is present in about 50% of the patients because there are two mechanisms of lymph node metastases, particularly in renal cell cancer. One is because of the thoracic duct, when the primary tumor has lymph node metastases, there is a spread along the thoracic duct, and the second one is because of the pulmonary metastases, there is a chance to get lymph node metastases comparable to lung cancer. There are two pathways. We think this is one of the reasons we had these kinds of incidences. And we cannot say it is N3 disease in metastatic disease, it’s everything M1.

DR BASIL NASIR (Birmingham, AL): One question: Does the presence of lymph node metastases impact whether you would provide any additional therapy postoperatively, specifically, any additional systemic therapy?

DR KUDELIN: No, just in case of recurrence.

DR RISHINDRA M. REDDY (Ann Arbor, MI): Were all of these thoracotomy approaches, or do you ever perform a video-assisted thoracoscopic surgical (VATS) approach for a small peripheral nodule?

DR KUDELIN: We performed two sternotomies for these patients. The VATS only would be performed in case we need the diagnosis, but not in curative intent. All of these patients had a posterolateral thoracotomy.

DR BOFFA: I do think this gives us an idea of what happens when you do a complete lymphadenectomy, but I agree that there has to be some comparative to know the true impact of that lymphadenectomy.

DR REDDY: I would be careful about the figures stating N1, N2, and N3 lymph node staging, because the lesions that you are resecting are not lung cancers. Maybe using the descriptive terms hilar and mediastinal would be better to describe the lymph node involvement.

DR KUDELIN: N2 position, so that would be correct.