EARLY COMPLICATIONS FOLLOWING ANATOMIC LUNG RESECTIONS - EXPERIENCE OF A THORACIC SURGICAL ONCOLOGY UNIT

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EARLY COMPLICATIONS FOLLOWING ANATOMIC LUNG RESECTIONS- EXPERIENCE OF A THORACIC SURGICAL ONCOLOGY UNIT (Abstract). Aim: To analyze the medical and socioeconomic impact of the complications of anatomic lung resections performed at the Thoracic Surgery Unit of the Iasi Regional Cancer Institute. Methods: This retrospective study included patients who underwent anatomic lung resections between January 2013 and August 2015. Results: Over this interval a total of 172 major lung resections were performed: 31 (18.02%) pneumonectomies, 5 (2.91%) bilobectomies, and 136 (79.06%) lobectomies. Complications occurred in 36 patients, including bronchial stump fistula in 7 patients (4.06%), bronchopneumonia (9/5.23%), pleural empyema without bronchoscopically documented bronchial stump fistula (1/0.58%), chylothorax (1/0.58%), postoperative arrhythmia (3/1.74%), early postoperative stroke (1/0.58%), prolonged air leak (requiring hospital stay longer than 14 days) (11/6.38%), and postoperative hemothorax requiring reintervention (3/1.74%). Secondary to complications, a number of 3 (1.74%) patients died early postoperatively. Conclusions: The incidence of immediate and early postoperative complications is comparable to those reported by other authors. Keywords: ANATOMIC LUNG RESECTIONS, EARLY COMPLICATIONS, LOBECTOMY, BILOBECTOMY, PNEUMONECTOMY.

Lung cancer surgery is associated, according to the literature (1, 2), with a wide range of complications that can occur in the immediate postoperative period. The most frequent are supraventricular arrhythmias, prolonged air leaks, atelectasis of the remaining parenchyma and hemorrhages, while pneumonia, empyema, bronchopleural fistulas, chylothorax, wound complications, lobar torsion and nerve lesions are less common (1, 2). Most of these complications can be treated conservatively, but have an important impact on quality of life and patient survival by prolonging the time interval from surgery to initiation of adjuvant therapy, especially considering the favorable outcomes of neoplastic bronchopulmonary lesions with adjuvant therapy even in elderly patients with good performance status (3).

The paper aims to analyze the medical and socioeconomic impact of immediate complications occurring in patients who have undergone major surgery in the Thoracic Surgery Unit of the IInd Surgical Clinic of the Iasi Regional Cancer Institute.
MATERIAL AND METHODS

This retrospective study was conducted on a group of 172 patients who underwent anatomic lung resections and aimed at conducting an audit of the early complications following this type of resection. The data for this study were collected from the medical records of patients who underwent anatomic lung resections between January 2013 and August 2015 in the Surgery Clinic II of the Iasi Regional Cancer Institute. In this study we used the term anatomic lung resections to define surgeries such as pneumonectomies, bilobectomies and lobectomies.

The data collected from medical records included: gender, area of residence, main and secondary diagnoses, type of surgery performed and histopathology report, reported complication, duration of the surgical procedure, time between surgery and complications and length of hospital stay.

RESULTS

Clinical data. Over the 32 months study interval 172 major lung resections have been performed, of which 31 (18.02%) pneumonectomies, 5 (2.91%) bilobectomies and 136 (79.06%) lobectomies. 36 (20.93%) of these patients experiencing complications: 28 following lobectomies, 7 following pneumonectomies, and 1 following bilobectomy.

The comparative analysis by gender, age, duration of surgery and length of hospital stay between all patients who underwent major lung resections and those who developed complications showed significant differences in incidence (tab. I)

<table>
<thead>
<tr>
<th>Characteristics of the group</th>
<th>Group of patients who underwent anatomic lung resections</th>
<th>Group of patients who experienced complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male/female</td>
<td>131/41</td>
<td>32/4</td>
</tr>
<tr>
<td>Age (years)</td>
<td>62.52 ± 9.29</td>
<td>62.7 ± 9.46</td>
</tr>
<tr>
<td>Length of hospital stay (days)</td>
<td>14.54 ± 8.16</td>
<td>20.27 ± 13.39</td>
</tr>
<tr>
<td>Duration of surgery (minutes)</td>
<td>154.1 ± 43.94</td>
<td>163.46 ± 42.95</td>
</tr>
</tbody>
</table>

Histological features. In the subgroup of patients who experienced complications 52.7% underwent surgery for bronchopulmonary adenocarcinoma. The distribution of patients experiencing complications by histological type of the lesion that required surgery showed: 19 (52.7%) adenocarcinomas, 10 (27.77%) squamous cell carcinomas, 2 (5.55%) small cell carcinomas and one case each (2.77%) of neuroendocrine carcinoma, pleomorphic sarcomatoid carcinoma, cystic adenomatoid malformation, bronchogenic cyst and aspergilloma.

Analysis of complications. Analysis of medical records allowed the classification of complications into pleuropulmonary and extrapulmonary (tab. II). In the analyzed study group 3 (1.74%) deaths secondary to complications of major lung resections were recorded. One of these patients required reoperation for hemothorax 3 hours after left pneumonectomy and death occurred as a result of nosocomial pneumonia in the remaining lung. The second death was caused by cardiorespiratory arrest secondary to pneumonia in the remaining parenchyma following right pneumonectomy. The third death was due to respiratory failure unresponsive to therapy following a right superior lobectomy.
TABLE II
Distribution of patients by type of complications

<table>
<thead>
<tr>
<th>General complications</th>
<th>Pleuropulmonary complications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complication type</strong></td>
<td><strong>No.</strong></td>
</tr>
<tr>
<td>arrhythmia</td>
<td>3</td>
</tr>
<tr>
<td>stroke</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>1</td>
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<td></td>
<td>1</td>
</tr>
</tbody>
</table>

DISCUSSION

Analyzing the obtained results, the general complications in the study group included 3 (1.74%) cases with postoperative arrhythmias and 1 (0.58%) patient with postoperative stroke. Comparatively, Mitsudomi et al. (4) reported a rate of postoperative arrhythmias of up to 35%. In our study there were no cases of pulmonary embolism, redoubtable complication of lung resection surgery as indicated in their works by Dent et al. (5) and Ziomek et al. (6).

As to the postoperative pleuropulmonary complications, other authors mention such complications requiring reintervention as hemothorax, bronchial stump fistulas and pleural empyema (7). According to these authors hemothorax is present in 52-75% of cases (8, 9). Currently it is estimated that the rate of hemorrhagic complications of lung resection surgery is of about 3% due to technical progress in the design of surgical instruments and surgical techniques in a multidisciplinary approach context (7). In our study postoperative hemothorax was present in 1.74% of cases.

Bronchial stump fistulas occurred in 7 (4.06%) of our study patients. Three (1.74%) of these 7 cases required reoperation consisting in completion pneumonec-tomy, repair of the bronchial stump followed by closure of the remaining stump and plasty of the suture using serratus muscle flap. In 4 (2.32%) patients the fistula was closed bronchoscopically with biological glue. Other authors (7, 8, 9) reported the presence of this complications in 17.8%-25.5% of the cases. Pleural empyema without documented bronchopleural fistula was present in 0.58% of the patients in our study, compared with 2-12% reported by Vallieres et al. (10). Lobar torsion was found by Wong et al. in 0.5% of cases (11). In our study no patient developed this complication, the explanation being the fixation of the middle lobe to the inferior lobe after all right upper lobectomies.

Prolonged air leaks, reported by other authors as a frequent problem with an incidence of up to 50% of patients (10) were found in 6.38% of our study patients. Along with bronchial stump fistulas they are associated with a significant increase in length of hospital stay with important economic implications, explaining the particular interest of other studies describing the development of predictive scores for persistent air leaks, such as IPAL (Index of Prolonged Air Leak) (10). A particular case in our study and rarely reported by other authors (12, 13, 14) was the occurrence of chylothorax following the surgical treat-
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The mean length of hospital stay in the group of patients with complications was about 5 days longer compared to the entire cohort of patients, demonstrating the negative impact of delayed initiation of adjuvant therapy on patient survival. The difference of about 10 minutes between the average duration of surgery for the entire study group and for the patients with complications suggests a possible relationship between case difficulty and complications.

CONCLUSIONS
Our findings on immediate and early complications after major lung resections are comparable to those in the literature. The impact of these complications on the quality of life and survival of patients due to the delayed initiation of adjuvant therapy remains a topic of major interest, and the periodic follow-up data of the patients in the study will be published later.

REFERENCES