SIMULTANEOUS RESECTION OF THE PULMONARY LOBE AND DESCENDING THORACIC AORTA ANEURYSM

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Simultaneous resection of the pulmonary lobe and descending thoracic aorta aneurysm is a rarely performed surgical procedure. As such, it is associated with increased risk of death and perioperative complications. In this study, the patient was subjected to excision of the left lower lobe and suturing of a dacron patch into the descending aorta without the use of cardiopulmonary bypass. The perioperative period proved uneventful. The patient was discharged from the hospital 10 days after the operation.

Key words: lung cancer, descending aorta aneurysm, one-stage operation

The coexistence of cardiovascular diseases in patients diagnosed with lung cancer can require one-staged or two-staged surgical management. The frequency of the above-mentioned problem will continue to increase, as it is connected with extended mean patient age, as well as progress in surgical techniques and postoperative care. The simultaneous excision of the pulmonary lobe and thoracic aorta aneurysm is a rarely performed operation, mostly concerning isolated cases or small patient groups.

CASE REPORT

G.S., a 70-year old patient (history number: 2049/129/2002) was admitted to the Department of Thoracoscrgy due to non-verified left lung carcinoma. Differential diagnosis suggested the possibility of a left lung abscess (fig. 1), and computer tomography showed the presence of a thick-walled cavity filled with fluid in the sixth segment of the left lung, 6.1 x 4.3 cm in diameter, communicating with the descending aorta. Mediastinal lymph nodes were not enlarged (fig. 2). Due to the

Fig. 1. Chest X-ray presenting lung tumor suggesting the presence of lung abscess
character and localization of the lesion, fine-needle biopsy was not performed. Bronchoscopy demonstrated no pathological changes. Spirometry results were as follows: VC amounted to 2,560 ml (82% of normal value), and FEV1 was 1,920 ml (45% of normal value). The ECG showed no signs of myocardial ischemia, while echocardiography demonstrated hypokinesis of the inferior wall and impaired contractility of the apical segment. The ejection fraction (EF) amounted to 62%. Additionally, the patient was treated for diabetes mellitus type 1 (80 units of insulin daily), hypercholesterolemia, and arterial hypertension.

The lung tumor was classified as stage IIB – T3N0M0 (1).

The patient was intubated, and the thorax opened by means of left-sided postero-lateral thoracotomy above the sixth rib. Initial tumor diagnosis of the sixth segment of the lower lobe was confirmed. The direct histopathological examination showed non-small cell lung cancer. Neoplastic infiltration of the aorta was not observed. However, an aortic aneurysm, 4x 3.5x3.5 cm in size was directly localized near the tumor. Similar to the descending aorta, the aneurysm was thick-walled (3 mm), except for its apex (<0.5 mm), where blood flowing inside the aneurysm was visible.

Simultaneous resection of the lung cancer and aortic aneurysm was performed. Initially, the lower lobe was excised. Arterial and venous vessels were supplied using ligatures and underpinning, and the bronchus was anastomosed to the lower lobe by means of a stapler. Afterwards, mediastinal lymphadenectomy was performed removing lymph nodes from the aortic-pulmonary (group 5), subcalcarine (group 7), interlobular (group 11), pulmonary ligament (group 9), and lobular windows (group 12). During the vascular stage, Satinsky’s maneuver was used and the aorta was clamped at the base of the aneurysm with partial aortic blood flow maintained. The aneurysm was excised and the aortic wall closed using a 4 cm in diameter dacron patch by means of prolene 4/0 continuous sutures. Tangent aortic clamping lasted 15 minutes.

The operation lasted 4.5 hours. The postoperative course proved uneventful, and the patient was discharged from the hospital after 10 days.

Histopathological verification was performed at the Department of Pathomorphology, JP II Specialistic Hospital in Kraków (Head of Department: W. Frasik). The histopathological examination was marked with the number 113827.

Histopathological diagnosis:
1. Lower lobe of the left lung
Carcinoma planoepithelialae G-3 pulmonis (1.3.1 wg WHO). The infiltration was 5 cm in diameter, comprising the visceral pleura, especially in the vicinity of the hilus. Surgical excision lines were free of neoplastic infiltration. Some lymph nodes contained carcinoma metastasis (2/7). The lung parenchyma, apart from the infiltration, showed signs of emphysema and multifocal catarrhal inflammation.

2. Aortic-pulmonary window lymph nodes (5) without cancer metastasis – 0/2.
5. Pulmonary ligament lymph node (9) without cancer metastasis – 0/2.

The postoperative stage of the disease was classified as pT3N1M0 – group IIIA. The patient survived 12 months, received no adjuvant therapy, and died due to generalization of the process.
Simultaneous excision of the pulmonary lobe or lung and descending aortic aneurysm is a rarely performed procedure, mostly concerning small patient groups (2-5). In our center, where we performed 330 lung parenchymal excisions and between 2300 and 2500 cardiac operations, the above-mentioned procedure has only been considered in a few cases. Apart from the presented patient, no other simultaneous operations were performed.

Lung parenchymal excision in patients with diagnosed cancer and concomitant cardiovascular diseases is burdened with an increased risk of perioperative complications (58%) and mortality (9%) (5). In case of classical procedures concerning descending aortic aneurysms with the implantation of a vascular patch, the risk of neurological complications is estimated to be 8.2% (6). This is one of the reasons why the operations are so rarely performed. The indications and possibilities of performing descending aorta aneurysm surgery with simultaneous anastomosis of intercostal arteries with the aortic prosthesis are rare. In selected cases, conservative management is also possible (7). Currently, the most effective and popular method consists in the implantation of stent-grafts by means of catheterization (8, 9).

The published data mention the difficulties concerning differential diagnosis and proper tumor stage evaluation, which can be misinterpreted as atelectasis or an aortic aneurysm (10, 11). The latter possibility should always be considered, with our case confirming the above-mentioned. The chest X-ray examination showed no suspicion of descending aorta aneurysm (fig. 1). Computer tomography suggested neoplastic infiltration of the descending aorta (fig. 2).

The decision concerning simultaneous resection of the left lower lobe and descending aortic aneurysm was undertaken on the basis of the following factors:

a) possibility to perform radical oncological lung surgery,

b) size and anatomy of the aneurysm, especially the risk of rupture during uncontrolled arterial pressure elevation,

c) favorable excision conditions – possibility of clamping at the base of the aneurysm with maintained partial blood flow. This enabled us to dispense with partial cardiopulmonary bypass, and limit the invasiveness of the operation,

d) an eventual hybrid procedure with endovascular stent-graft implantation was not possible, due to the need for a “made-to-measure” prosthesis, which would delay the operation.

In our opinion, one-staged treatment in the case described here was justified since the stage of the tumor enabled us to perform radical surgery. The preoperative stage of the tumor (T3N0M0 – IIB) enables five-year survival in 50% of patients (12, 13). Additionally, this approach enabled us to avoid repeated general anesthesia and re-thoracotomy, and the patient presented with additional risk factors, such as age, hypertension, diabetes, and atherosclerosis.

Oyama and co-authors (3) suggested that even poor prognosis should not disqualify patients from surgical treatment, enabling the avoidance of future vascular complications, additionally improving the patients’ quality of life. Ugurlu and co-authors (14) performed the excision of the descending aorta in cases of metastatic infiltration of lung carcinoma. The coexistence of lung cancer and aortic aneurysm requiring simultaneous excision is connected with high peri-operative risk of death, as well as possible purulent complications, such as vascular prosthesis inflammation. In one of the publications, the authors (15) used the greater omentum in order to prevent local prosthesis inflammation, as well as bronchial stump fistula development.

The therapeutic strategy remains ambiguous, and the clinical experience of the center should be the basic criterion. Tabayashi and co-authors (16) proposed a one-staged procedure in patients with lung cancer and thoracic aortic aneurysms, as well as endovascular prosthesis implantation in selected cases. Ambrogi and co-authors (5) analysed data of patients subjected to two-staged procedures demonstrating the unfavorable effect on survival, considering patients with neoplastic and concomitant cardiovascular diseases.

We fully agree with those stated opinions. Indications towards surgical intervention should be individually determined, as should oncologic prognosis. Such clinical cases will become more frequent, due to the growing number of elderly patients with increased incidence of neoplastic diseases and atheromatous aneurysms.
CONCLUSIONS

In conclusion, the therapeutic strategy in case of the patient described here proved justified, with the peri-operative period being uneventful. The operation enabled us to prolong and improve the patient’s comfort and quality of life.

REFERENCES


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