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Case report

Surgical management of a patient with combined heart pathologies and lung cancer. A simultaneous coronary artery bypass surgery, aortic valve replacement, tricuspid valve repair and pulmonary resection



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ABSTRACT

Coexisting coronary artery disease and significant heart valve disease represent a considerable risk factor in patients undergoing pulmonary resection. The possibility to perform concomitant (simultaneous) heart and lung surgery could be a good option for many patients.

In the presented case report, the intervention was performed on two valves, triple coronary artery bypass and pulmonary resection, which has not been published in literature to date.

A 68-year-old woman with coronary artery disease, aortic valve stenosis, tricuspid valve regurgitation and pulmonary disease (malignant pathology) presented with triple vessel disease, moderate aortic valve stenosis, severe tricuspid regurgitation and tumorous infiltration in the upper lobe of the left lung. She underwent combined heart and pulmonary surgery-left upper lobectomy, aortic valve replacement, tricuspid valve repair and coronary artery bypass surgery. On the eight day of surgery, she was discharged. She continues to do well on follow-up.

Simultaneous cardiac surgery and pulmonary resection for malignancy become almost standard treatment of patients who require heart and lung surgery. The most often approach is midline sternotomy that enables a comfortable cardiac intervention as well as an acceptable access to lungs. The left lower lobectomy remains an exception, in which pulmonary resection during extracorporeal circulation (ECC) is more often an option of left thoracotomy. If the use of ECC is inevitable, some authors prefer pulmonary resection before starting up ECC if the location of the neoplasm does not require resection during ECC.

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Introduction

Coexistence of heart pathology represents a considerable risk factor in patients undergoing pulmonary resection. Despite the fact that symptoms in those patients coincide, major centers present only a 0.5% rate of patients requiring both surgical interventions [1]. Moreover, the rate of e.g. smokers in this group of patients is according to published literature merely 54% in comparison to 49% in patients with lung tumor without a cardiac finding [2,3]. On the other side, the rate of patients undergoing thoracotomy and requiring a cardiac surgery performs up to 5% [4].

The first paper presenting simultaneous cardiac surgery for coronary artery disease and pulmonary resection for lung cancer by the authors Davydov et al. dates back to 1978 [5]. To the present day, numerous case reports have been published as well as small clinical groups presenting simultaneous cardiac and pulmonary surgery. However, explicit management of such patients has not been determined yet. If the pulmonary resection in patients with coronary disease is indicated, four specific approaches are presented in literature. The first is resection of the lung in advance of cardiac intervention – two stage procedure. The second is percutaneous coronary intervention (PCI) in case of coronary artery disease (CAD) followed by pulmonary resection. However, this management is not applicable if simultaneous valve surgery is indicated. The third approach is heart procedure and subsequent lung surgery – two stage procedure. The fourth alternative is simultaneous cardiac operation and lung – one stage procedure (Tables 1 and 2) [1].

The first option is possible only in patients with an appropriate cardiac status, in who cardiac intervention is not inevitable. Primary PCI in advance of lung intervention is eligible merely for an appropriate coronary angiography without a heart valves pathology. Moreover, an increased risk of in-stent thrombosis at the time of lung surgery six weeks after the PCI has been presented in literature [6]. Some authors confirm an increased risk and they suggest to postpone pulmonary resection up to 3 months, which could be almost unacceptable regarding the oncological status of patient [7].

Therefore these two procedures are not applicable in the majority of patients. The choice of a two-stage operation, whereas cardiac surgery is carried out in advance, is suitable in each patient. Nevertheless, it carries a higher risk for the

patient due to two anesthesiological and surgical accesses, which is obviously more painful, and undoubtedly, worsening of cost-effectiveness is also present. An advantage of thoracotomy is a better accessibility of lymphatic nodes in the posterior mediastinum as well as a better accessibility of the left lower lobectomy or the left-side pulmectomy, which makes this surgical access partly preferable [8]. If a midline sternotomy is performed, exploration of posterior mediastinum is often inevitable in this location [1,9]. The present-day view of essential total lymph nodes dissection is yet controversial with regard to prolonged operation time and increased of morbidity [2]. The fourth possibility of performing both cardiac and lung interventions simultaneously represents an appropriate method for many patients. The opportunity of option if either sternotomy or thoracotomy as well as the timing of surgeries (and necessity of ECC) provides a wide spectrum of methods and individualization of the procedure with respect to the needs of a specific patient. Heparinization with a higher risk of bleeding in the bed after lung surgery could be a possible complication [10]. Pavia et al. present a paper with a total of 189 patients with cardiac surgery in advance and followed by pulmonary resection (two-stage procedure) as the most eligible method. The second most frequently used approach was combined cardiac and lung surgery (one-stage procedure) [11].

Case report

A case report of a 68-year-old woman with a personal history of hypertension and autoimmune thyroiditis with struma nodosa is presented. The patient was hospitalized in a regional hospital for subacute non-ST elevation myocardial infarction and transferred to our institution. Cardiac catheterization

Table 2 – Explanation of abbreviations.

CABG	Coronary Artery Bypass Grafting
CAD	Coronary Artery Disease
ECC	Extracorporeal Circulation
X-clamp	Cross aortic clamp
SJM	St. Jude Medical, St. Paul, Minnesota, USA
Off-pump	Cardiac procedure performed without using of Extracorporeal Circulation
AVR	Aortic Valve Replacement
STEMI	ST Segment Elevation Myocardial Infarction

Table 1 – Comparison of advantages and disadvantages of varying timing of intervention for coronary artery disease and pulmonary cancer.

	(+)	(-)
LS → CABG/VR	Timely oncological intervention	High preoperation and early postoperative risk at thoracic operation
PTCA → LS	Reliability	Reliability necessity to postpone thoracic surgery 6 weeks to 3 months, necessity of adequate cardiac finding
CABG/VR → LS	Lower bleeding risk in comparison to simultaneous performances	Load of double anesthesia, two surgical wounds, short-dated delay of thoracic onco-logical operation, financial demands
CABG/VR+LS	Lower load with one anesthesia less pain with one access	Access via sternotomy with necessity of left lower lobectomy, bleeding risk at heparinization

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