Heart, Lung and Circulation (2019) **28,** 1099–1101
1443-9506/04/$36.00
https://doi.org/10.1016/j.hlc.2018.08.019

ORIGINAL ARTICLE

Assessment of Cardiac Complications in Patients Undergoing Pulmonary Resection

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Received 12 September 2017; received in revised form 20 July 2018; accepted 30 August 2018; online published-ahead-of-print 12 September 2018

Background Patients who underwent lung resection in our clinic were retrospectively investigated in terms of development of postoperative cardiac complications.

Methods The file records of 207 patients who underwent lung resection between the years 2010 and 2014 were reviewed. One hundred and eighteeen (118%) (57%) of the patients were evaluated by the preoperative cardiologist and the risk level of the patients was determined according to the Lee index. Postoperative cardiac complication relation was compared with each parameter.

Results The difference between the mean age of the patients with and without complication was statistically significant (p = 0.024). When the patients were grouped as over and under 65 years old, the risk of developing postoperative complications was higher and statistically significant (p = 0.015) in patients over 65 years of age. When the patients were evaluated in line with the presence of additional disease, smoking and electrocardiogram (ECG) findings, patients with hypertension developed more complications than those without hypertension (p = 0.002). When the logistic regression was adjusted according to age and sex, the development of cardiac complications in patients with hypertension was 3.25 times greater.

Conclusions It should be kept in mind that the presence of hypertension in patients who will undergo lung resection and advanced age increases the risk of cardiac complications and that preoperative cardiology care may be appropriate for these patients.

Keywords Lung resection • Cardiac complication

Introduction

Patients who underwent lung resection in our clinic were retrospectively investigated in terms of development of postoperative cardiac complications. Additional disease, age, sex, history of smoking and the effect of type of surgery on the development of cardiac complications were evaluated.

Materials and Methods

The file records of 207 patients who underwent lung resection between the years 2010 and 2014 were reviewed. One hundred and eighteen (118%) (57%) of the patients with known cardiac disease, cardiac drug use, or who were older than 65 years were evaluated by the preoperative cardiologist and the risk level of the patients was determined according to

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the Lee index [1]. The Lee index is a prospectively validated model that predicts the risk of a cardiac event in patients undergoing non cardiac surgery. The six independent predictors are as follows: high-risk surgery, history of ischaemic heart disease, history of congestive heart failure, history of cerebrovascular disease, preoperative treatment with insulin, preoperative serum creatinine >2.0 mg/dL (>177 μmol/L). According to the Lee index, 52 cases were defined as low risk for non cardiac surgery and 66 as medium risk for surgical intervention. There were no high-risk patients with operative complications, and no significant difference was found in postoperative complications in patients with middle and low risk. Eighty-nine (89) patients (43%) did not require cardiologic examination. No patients were postponed or cancelled after the preoperative cardiac evaluation in the study. Postoperative cardiac complication relationships were compared with each parameter. For statistical analysis, χ-Square and Mann-Whitney U test methods were used. $P < 0.05$ was considered significant.

Results

Of the 207 patients who underwent lung resection between the years 2010 and 2014, 154 were male, while 53 were female and the mean age was 57.33 ± 13.21. The relationship between gender, age, additional illness, smoking, postoperative cardiac complications and type of surgery was evaluated (Table 1). Cardiac complications developed in 25 postoperative patients. Of these, 22 (88%) were dysrhythmias and 3 (12%) were hypertension. The mean age of the patients with postoperative cardiac complications was 62.52 ± 2.25, while the mean age of the patients without complications was 56.62 ± 0.99. The difference between the mean age of the patients with and without complication was statistically significant ($p = 0.024$).

When the patients were grouped as over and under 65 years old, the risk of developing postoperative complications was higher and statistically significant ($p = 0.015$) in patients over 65 years of age. There was no significant relationship between complication development and presence of pathologic findings in preoperative electrocardiography ($p = 1.00$), sex ($p > 0.435$), presence of diabetes mellitus ($p = 1.00$), presence of hyperlipidaemia ($p = 0.137$), type of surgery performed (lobectomy/pneumonectomy).

Patients with hypertension were referred to the cardiology polyclinic during preoperative examination. Blood pressure was under control in all patients with preoperative diagnosis of hypertension. When the patients were evaluated in line with the presence of additional disease, smoking, and ECG findings, patients with hypertension developed more complications than those without hypertension ($p = 0.002$). When the logistic regression was adjusted according to age and sex, the development of cardiac complications in patients with hypertension was 3.25 times greater.

Twenty-five (25) of the 207 patients developed postoperative cardiac complication, 22 of these had dysrhythmia (nine of the patients developed atrial fibrillation, six atrial flutter, three bradycardia, two AV block, two ventricular arrhythmia) and three had high blood pressure. Patients who underwent thoracic surgery routinely undergo prophylactic dose anticoagulation in the postoperative period. Fifteen (15) patients with postoperative atrial fibrillation and flutter were followed by normal rhythm with amiadorone infusion. Three (3) patients with type 1 atrioventricular (AV) bloc were followed. Three patients who developed bradycardia were given normal rhythm when the analgesic treatment was

Table 1 The relationship between the demographic characteristics of patients and the development of cardiac complications.

		Postoperative cardiac complication		P
		+ (n)	– (n)	
Age	≥ 65	13	51	0.015*
	<65	12	131	
Hypertension	+	19	78	0.002*
	–	104	6	
Diabetes mellitus	+	4	29	1.00
	–	21	153	
Hyperlipidaemia	+	0	18	0.137
	–	25	164	
Smoking	+	22	152	0.773
	–	3	30	
Pathology in electrocardiograph	+	1	7	1.00
	–	24	175	
Surgery	Lobectomy	173	24	1.00
	Pneumonectomy	9	1	

*Statistically significant.

discontinued. In two patients with ventricular arrhythmia, normal rhythm was achieved with calcium channel blocker. Despite analgesic treatment in the early postoperative period, glyceroltrinitrate infusion was started in patients whose blood pressure was >160/90. Follow-up drug levels were gradually reduced and stopped. There were no adverse sequelae in follow-up after dysrhythmias. Patients who developed cardiac complications in the early postoperative period were directed to the cardiology clinic for follow-up and treatment after discharge if normal follow-up rhythm was achieved.

Discussion

The second most common complication observed in patients for whom lung resection is performed is cardiac problems; therefore preoperative cardiac evaluation is important [2]. Pulmonary resection is in the high-risk groups in terms of cardiac complication development among thoracic surgeries. Most cardiac complications arising after lung resection are in the form of arrhythmia and usually of atrial origin, and the incidence ranges from 10% to 28% [3]. In our study, 25 of the 207 patients developed postoperative cardiac complication, 22 of these had dysrhythmia and three had high blood pressure. The rate of dysrhythmia in our study was found to be 10.63%. In another study involving 298 patients and examining the risk factors for atrial fibrillation after pulmonary surgery, it was reported that postoperative fibrillation developed in 8.4%, and that this was observed more frequently especially after pneumonectomy [4]. In our study, there was no statistically significant difference between resection type and postoperative cardiac complication development. In another study in 2005 investigating 128 cases, cigarette smoking and high blood lipid levels were accepted as risk factor determinants [5]. In our study, however, no statistically significant difference was found between cigarette smoking, diabetes mellitus or elevated blood lipid levels and postoperative cardiac complications. Eighty-five per cent (85%) of the patients smoked but there was no statistically significant difference when the patients with cardiac complications were evaluated in terms of cigarette use. In another study, advanced age and presence of chronic obstructive pulmonary disease were significant factors for the development of postoperative atrial fibrillation [6]. In our study, it was seen that the patient with hypertension increased the risk of developing postoperative cardiac complications 3.25 times, independently of the other factors and that the risk of complications increased as the age average increased.

In terms of reducing laboratory and unnecessary consultation load and reducing the cost, preoperative cardiology care due to lung resection may not be needed for the patients who are young and without hypertension or cardiac disease history.

It should be kept in mind that the presence of hypertension in patients who will undergo lung resection and advanced age increase the risk of cardiac complications and that preoperative cardiology care may be appropriate for these patients.

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