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INTRODUCTION

In the literature available to us, we searched for information about emerging pulmonary and pleural complications after interventions on the thoracic aorta, in particular its descending part. We found a systematic review and meta-analysis on pulmonary complications arising after open interventions on the abdominal aorta (1). Also, there are works that study the influence of individual diseases on the risk of developing pulmonary complications in the postoperative period (2,3). In this regard, we decided to investigate risk factors for the development of pulmonary and pleural complications in patients who underwent interventions on the descending aorta. We believe that this will make it possible to predict, carry out prevention and prevent the occurrence of these complications in the perioperative period.

To learn the influence of accompanying atherosclerotic plaque and other comorbidities on prevalence of the pleural and lung complications during surgical procedures of the descending thoracic aorta.

The influence of comorbidities in the development of respiratory and pleural complications in post-op period during surgical procedures on descending thoracic aorta

Abstract

Aim: The frequency and structure of emerging pulmonary and pleural complications after interventions on the descending thoracic aorta were studied.

Material and Methods: Based on the experience of interventions on the aorta in 84 patients, the influence of concomitant diseases on the incidence of pulmonary and pleural complications after interventions was studied.

Results: Revealed with a high degree of certainty ($p \leq 0.05$) in the group of patients with complications, patients initially had kidney disease ($p=0.02$), previously operated aortic aneurysm of another localization ($p=0.04$), arterial hypertension ($p=0.05$), IHD ($p<0.01$), multifocal atherosclerosis ($n=0.01$), COPD ($n=0.01$), Aortic dissection IIIB type ($p<0.01$).

Conclusion: Taking into account the identified patterns in the development of complications, we consider it necessary to take a more thorough approach to the prevention of these complications in the perioperative period.

Keywords: Aortic dissection, aortic aneurysm, multifocal atherosclerosis

MATERIAL AND METHODS

Within January 2007 and December 2011 we conducted prosthetic grafting of the descending thoracic aorta through left posterolateral access in 84 patients. The patients were aged 9 to 71 years. The mean age was 45.28 ± 14.31 .

The gender distribution of the patients underwent surgery is presented on diagram 1.

Gender distribution of the patients underwent surgery

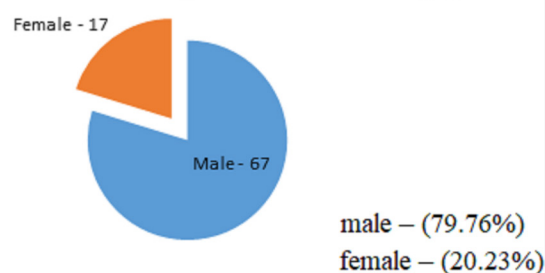


Figure 1. Diagram 1 Gender distribution of the patients

During investigation we have learned the influence of the comorbidities on respiratory and pleural complications in patients underwent surgery. The distribution of different pathologies is presented on diagram 2.

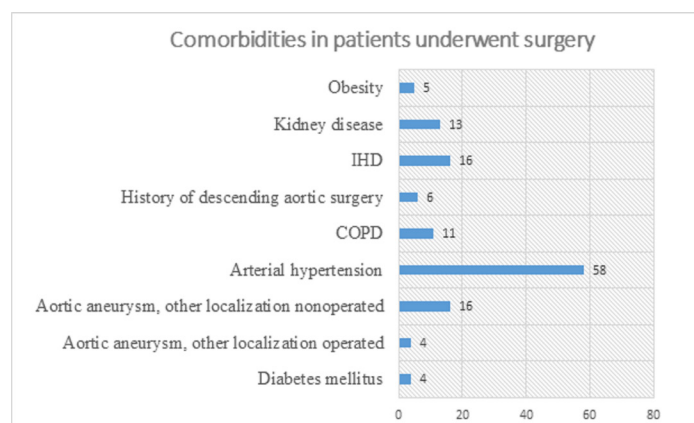


Figure 2. Diagram 2 Comorbidities in patients underwent surgery

As it shown in diagram, the most prevalent diseases were pathologies caused by atherosclerotic changes (arterial hypertension, aortic aneurysm of other location and IHD (ischemic heart diseases) and CKD (chronic kidney diseases). Bearing in mind abovementioned issues, we decided to learn the influence of these diseases on prevalence of the respiratory and

pleural complications in post-op period.

The general health status of the patients and comorbidities were studied to detect the prognosis of aortic pathology.

In operations for coarctation of the aorta, aortic plasty was used with the formation of end-to-end aortic anastomosis (11 patients). When performing operations in connection with an aortic aneurysm, aortic prosthetics were performed with a Dacron prosthesis, with the formation of end-to-end anastomoses.

All patients were divided into two groups depending on absence/existence of the any respiratory and pleural complications. 49 patients were in group with complications (58.33%), 35 patients – in the group without complications (41.67%). As it was shown in table 1, 20 patients (23.8%) had aneurysms of other localization along with aneurysm of descending thoracic aorta, 14 (16.6%) had complications in post-op period. 4 patients in group with complications underwent aorta aneurysmectomy of other localization previously. 13 patients with multifocal atherosclerosis had respiratory and pleural complications in post-op period, which is significantly higher, than in the group without complications ($p=0.01$). All the patients with multifocal atherosclerosis who had complications in early post-op period had also hypoventilation of the left lung and mild respiratory failure. All patients with mild respiratory failure in post-op period underwent non-invasive mask ventilation with positive inspiration pressure (BiPAP). This technic improved lung function, which resulted in better arterial and venous oxygenation.

Table 1. The main and accompanying diseases in groups

Pathology	Patients without complications (n=35)	Patients with complications (n=49)	P	Total (n=84)
Aneurysm of other location	6(17.14%)	10(20.4%)	0.70	16 (19.04%)
Operated aneurysm of other location	0	4(8.16%)	0.04	4(4.76%)
Arterial hypertension	20(57.14%)	38(77.55%)	0.05	58(69.04%)
Dysplasia of connective tissues	14(40%)	26(53.06%)	0.24	40 (47.61%)
Kidney diseases	2(5.71%)	11(22.44%)	0.02	13 (15.47%)
IHD	2(5.71%)	14(28.57%)	<0.01	16 (19.04%)
Aortic coarctation	11(31.42%)	0	-	11(13.09%)
Pseudoaneurysm of descending thoracic aorta	7(20%)	6(12.24%)	0.35	13(15.47%)
Multifocal atherosclerosis	2(5.71%)	13(26.53%)	0.01	15(17.85%)
Operations on descending thoracic aorta	4(11.42%)	1(2.04%)	0.11	5(5.95%)
Posttraumatic aneurysm of descending thoracic aorta	8(22.85%)	5(10.2%)	0.13	13(15.47%)
Aortic dissection type IIIb	7(20%)	29(59.18%)	<0.01	36(42.85%)
Diabetes mellitus	1(2.85%)	3(6.12%)	0.46	4(4.76%)
COAH	1(2.85%)	10(20.4%)	0.01	11(13.09%)

RESULTS

The total number of patients with aortic aneurysm of other localizations was 20 (23.8%) in our trial. Of which 4 (4.76%) aneurysm of other localization was operated. All these patients appeared in group with complications, which was significantly higher ($p<0.01$), than in the group without complications. Based on abovementioned we can conclude that the patients with aneurysm of descending thoracic aorta accompanying with aneurysm of other localization need to undergo surgery of descending thoracic aorta firstly. In case of combination of the arcus and ascending aorta aneurysm the distal «elephant trunk» technic could be implemented.

58 patients (69.04%) had arterial hypertension. Among patients with respiratory and pleural complications arterial hypertension was prevalent in 77.55% cases, while in group without complications only 57.14% patients had arterial hypertension, this difference was significant. The respiratory and pleural complications were detected in 65.6% patients with arterial hypertension.

The respiratory and pleural complications were detected in 26 patients with connective tissue disorders (53% patients with complications). Although non-significant difference between two groups by this parameter, we could determine the certain trend to respiratory and pleural complications in patients with aneurysm of the descending thoracic aorta in patients with connective tissue disorders. Respiratory pathology is probably caused by higher bleeding risk in post-op period, which itself is the risk for respiratory complications.

The study was discussed at the meeting of the Ethics Committee of Sechenov University (Moscow, Russia) on May 7, 2009. recommended for implementation.

Statistical data processing was performed using StatSoft STATISTICA 8.0 statistical data analysis. When comparing groups by quantitative characteristics, Student's t-test was used, while the significance of differences in indicators between the compared groups (p) was determined by the values of n and t ($n=n_1+n_2-2$, $t=(M_1-M_2)/\sqrt{(m_1^2+m_2^2)}$, differences between the compared groups were considered significant at $p\leq 0.05$).

DISCUSSION

In non-cardiac surgery the most prevalent complication is acute myocardial infarction, the second most prevalent pathology is respiratory and pleural complications.

In the last years in the world scientific literature the influence of kidney pathology on complications' ratio in patient underwent surgery on descending aorta is the subject for big discussion (4). The most possible cause of that is decrease in blood flow through kidney arteries and changes in blood flow pattern during operation (ischemisation) circulation even in case of respiratory and pleural complications. The main pathological process is decrease in circulation, moreover, the big volume on infusion

therapy in pre- and post-period increases circulating blood volume, which provokes congestion in smaller circulation. In our research the kidney pathology was existent in 13 (15.47%) operated patients. 11 out of them (84.62%) had respiratory and pleural complications. The number of patients with kidney pathology in the group with complications was significantly high.

COAH is the well-known risk factor for great number of complications and of essential importance in thoracic surgery (5). 10 out of 11 patients with COAH had certain complications in our research. All patients with COAH had pre-op therapy to relieve symptoms. Although 91.9% of patients with COAH had complications, pre-op therapy had positive effect on complications severity and post-op period. 5 patients with COAH (54.54%) had symptoms of COAH exacerbation (sputum volume increase, respiratory failure, dyspnea, Hb saturation decrease on pulseoxymeter).

The number of patients with arterial hypertension was significantly higher in the group with complications, than in group without complications ($p=0.05$), thus the arterial hypertension should be considered as the risk factor for respiratory and pleural complications in post-op period.

It was shown in vast majority research on respiratory and pleural complications in post-op period, that kidney disease is independent predictor of these complications. There were 13 patients with kidney disease in our research (nephrolithiasis, pyelonephritis, kidney polycystic syndrome). The number of kidney diseases was significantly higher in the group with complications ($p=0.02$).

CONCLUSION

The comorbidities are certain risk factor for respiratory and pleural complications in post-op period. For the prophylaxis of respiratory and pleural complications the pre-op preparation and decrease in operation time, in-hospital stay is of extreme importance.

The comorbidities are significant risk factor for respiratory and pleural complications ($P<0.05$) in post-op period of the descending thoracic aorta surgery: aortic aneurysm of other localization, particularly previously operated cases, arterial hypertension, chronic kidney diseases, i.e. polycystic kidney disease; COPD; IHD (ischemic heart disease); aortic dissection type III B, multifocal atherosclerosis. The non-invasive mask ventilation (BiPAP mode) is recommended for management and prophylaxis of respiratory failure in post-op period. The early activation of such patients is of great importance as well.

Conflict of Interests: The author declares that there are no conflict of interests.

Financial Disclosure: There are no financial supports.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics committee approval : The study was discussed at the meeting of the Ethics Committee of Sechenov University (Moscow, Russia) on May 7, 2009. recommended for implementation.

REFERENCES

1. Laura Passin, Pascuale nardelli pulmonary complications after open abdominal aortic surgery: a systematic review and meta-analysis. J Cardiothorac Vasc Anest. 2017;31:562-8.
2. Omar A Minai et al. Perioperative risk and management in patients with pulmonary hypertension. Chest. 2013;144:329-40.
3. Anjum Naveed, Hammad Azam Incidence and risk factors of Pulmonary Complications after Cardiopulmonary bypass. Pak J Med Sci . 2017;33:993-6.
4. Islamoglu F, Posacioglu H, Apaydin AZ. et al. Perioperative determinants of mortality and morbidity in distal arch and proximal descending aortic aneurysm surgery. Med Sci Monit. 2004;10:137-42.
5. Mikyung Yang, Hyun-Joo Ahn, et al. Risk score for postoperative complications in thoracic surgery. Korean J Anesthesiol. 2012 63:527-32.