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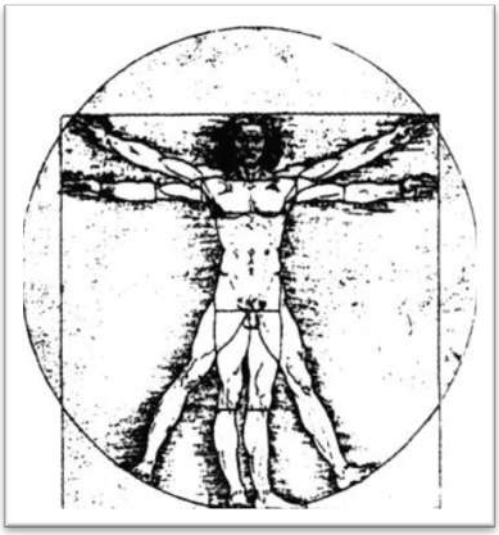

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CONTENT

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ORIGINAL ARTICLE

DESCRIPTIVE ANALYSIS OF CLINICAL AND DEMOGRAPHIC DATA OF SELECTED GROUP OF PATIENTS WITH PULMONARY EMBOLISM

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ABSTRACT

Pulmonary embolism is a relatively common clinical entity accompanied with a high mortality and is a perplexing diagnostic and therapeutic problem. Current research indicates that pulmonary embolism has a multifactorial and complex pathogenesis. Genetic factors have been under extensive research during the past two decades.

The aim of this study was to present a descriptive analysis of demographic and clinical data obtained thus far from 31 patients with documented pulmonary embolism.

In our patient group, almost half of the patients were non-smokers and all denied alcohol consumption. More than 80% of the patients had no history of previous pulmonary embolism and no thrombophlebitis, but nearly two thirds of all patients had deep vein thrombosis. A history of acute myocardial infarction existed in about 6.5% of patients, as well as ischemic stroke. Arterial hypertension was present in about one-third of patients, dyslipidemia in 42%, and type 2 diabetes in approximately 13%. Only one patient had an anamnestic data for chronic renal disease, while none had a history of hepatic disease.

The results of the analysis of demographic-clinical data of patients are concordant with the results of the previously published studies.

Keywords: pulmonary embolism, thromboembolism, gene polymorphism.

INTRODUCTION

Pulmonary embolism is a relatively common clinical entity with a high mortality rate and is a perplexing diagnostic and therapeutic problem. It is a disorder of the pulmonary circulation when a thrombus becomes lodged in a lung artery and its branches. It is considered to have a multifactorial and complex pathogenesis, and over the last twenty years genetic factors have been extensively investigated.

Cardiovascular risk factors (deep vein thrombosis, history of hypertension and cardio- and cerebrovacular events) are significantly associated with pulmonary embolism. Nevertheless, many patients with serious risk factors such as massive and long-term deep vein thrombosis do not experience pulmonary embolism, whereas in some patients it appears due to some trivial reasons. These discrepancies strongly suggest the influence of the genetic factors, especially because the risk of repeated pulmonary embolism is higher in subjects with familiar history of this clinical entity.

Until now a large number of genetic investigations of certain thrombophilias more often associated with pulmonary embolism have been made, including mutations and polymorphisms of the genes of Factor V Leiden, prothrombin (PTM G20210A), methylentetrahydrofolate reductase (MTHFR C677T and A1298C), protein C, protein S and antithrombin III (AT-III) [1]. Previously published studies have shown a statistical correlation with specific single nucleotide polymorphisms and with other genetic alterations (deletions, insertions, etc.) in certain genes with prevalence in pulmonary embolism as well as with therapeutic response to anticoagulant therapy [2,3,4].

The aims of the ongoing doctoral disseration thesis are to determine the correlation between the three selected gene polymorphisms with the prevalence, demographic, clinical and laboratory parameters in patients with pulmonary embolism and to determine the eventual existance of combined, epistatic influence of the three polymorphisms on the mentionted parameters.

Furthermore, the aim is to determine the potential usage of the three polymorphisms in identification of patients with a high risk of pulmonary embolism, prediction of the therapeutic response and their prognostic value.

This study presentsthe descriptive analyses of the so far obtained data from 31 patients.

MATERIALS AND METHODS

The study was planned to include about 60 patients with clinically confirmed pulmonary embolism, selected according to inclusion and exclusion criteria. All included patients underwent CT angiography as a method of choice for detection of embolus in the main, lobar or segmental pulmonary arteries. The control group consisted of samples of about 30 healthy controls that were matched by sex and age with the group of patients with pulmonary embolism, but with no anamestic data about thrombotic conditions (deep vein thrombosis, recurrent episodes of thrombophlebitis and pulmonary embolism) and no family history of these entities in the close family members as well as no documented cardiovascular and cerebrovascular conditions and hepatic or kidney diseases.

For each patient data were obtained with regard to selected demographic characteristics (sex, age, level of education, type of profession, smoking history, alcohol consumption, dyslipidemias, hypertension, familial history of thrombotic conditions, usage of oral contraceptive drugs, etc.), laboratory values (thrombocytes, coagulation status, D-dimers, troponin, etc.) as well as clinical data (comorbidities and risk factors, selected values of CT angiography of pulmonary arteries, echocardiography, Doppler ultrasound of blood vessels, calculated scores according to Wells and/or revised Genevascales, data about treatment, therapeutic response and clinical outcome).

Data were taken only from patients who, after being given a detailed explanation about the procedures, aims and their rights, signed volunatarily their written informed consent. Also, information obtained from patients was kept confidential and in line with the directives of the Law on personal data protection. The study was approved by the Ethics Committee of the Faculty of Medicine, Ss. Cyril and Methodius University in Skopje.

The statistical descriptive analyses in this study were made by using the software packages XLSTAT 2016 and Microsoft Excel 2016.

RESULTS

Data and samples of a total of 31 patients with pulmonary embolism were collected. Analyses of clinical and demographic data of these patients are herein presented.

Sex and age structure of the 31 patients is presented in Tables 1 and Figure 1.

Table 1. Sex distribution of patients

Sex	n	%
Men	13	41.94
Female	18	58.06
Total	31	100.00

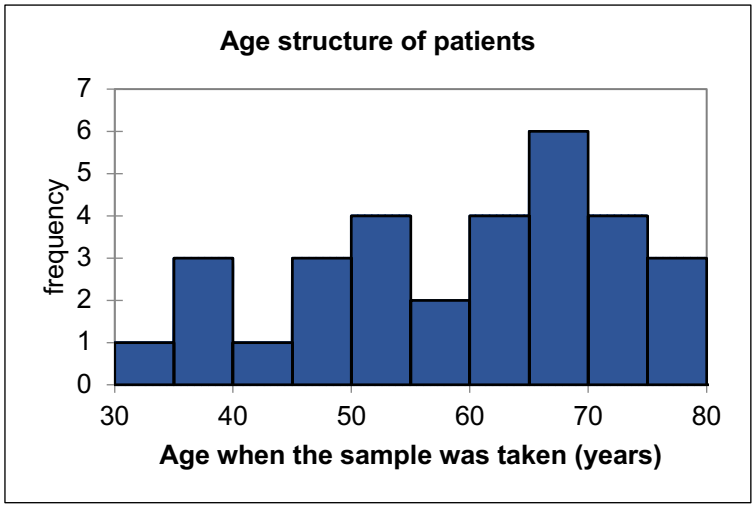

Fig. 1. Histogram of the age structure of patients.

The presented results clearly show that female subjects predominated in the group of patients with almost 60% as well as older patients. The largest number of patients was aged between 65 and 70 years, although the mean age was 58 years.

Descriptive statistical analyses of the data regarding body weight, height and BMI index of patients are presented in Figure 2.

To present the data in figures the so-called *box-and-whiskers* type of figures was used.

The fence of each rectangular box corresponds to the first quartile (25th percentile), and the upper fence defined as the third quartile (75th percentile) of the values encompasses 50% of all measurements. The horizontal line through each rectangular box presents median (geometrical mean) while the red symbol denotes arithmetic means. Vertical positive and negative segments pertain to distribution of maximum and minimum deviations in the measurements corrected with the third and first quartiles, respectively.

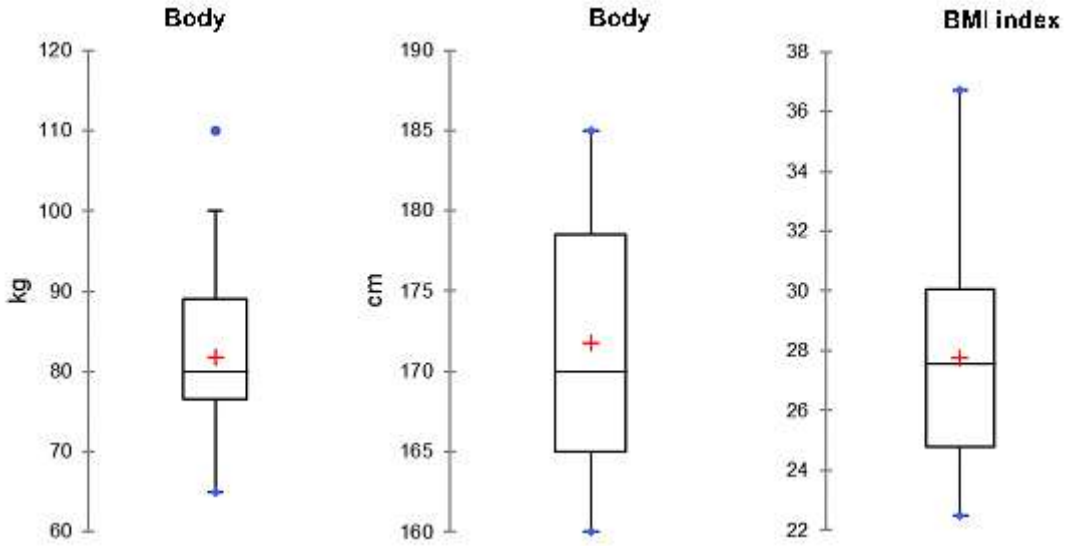

Fig. 2. Body weight, height and BMI index of patients.

Data about the place of residence, level of education and type of profession of patients are presented in Table 4.

Table 4. Social data of patients

Data	**n**	**%**
Place of residence		
city	22	70.97
village	9	29.03
Level of education		
primary	2	6.45
high	17	54.84
university	12	38.71
Type of profession		
farmer	4	12.90
worker	14	45.16
clerk	13	41.94

Preliminary segment of the demographic and clinical data that were relevant for pulmonary embolism in the examined patients is presented in Table 5.

Table 5. Relevant demographic and clinical data of patients

Data	n	%
History of smoking		
non-smokers	15	48.39
rarely	1	3.23
moderately	10	32.26
intensively	5	16.13
Alcohol consumption		
does not drink	31	100.00
rarely	0	0.00
moderately	0	0.00
intensively	0	0.00
Previous pulmonary embolism		
no	26	83.87
yes	5	16.13
Anamnesis of deep vein thrombosis		
no	19	61.29
yes, once	12	38.71
yes, several times	0	0.00
Anamnesis of thrombophlebitis		
no	31	100.00
yes, once	0	0.00
yes, several times	0	0.00
Anamnesis of AMI		
no	29	93.55
yes, once	2	6.45
Yes, several times	0	0.00
Anamnesis of ischemic brain insult		
no	29	93.55
yes, once	2	6.45
yes, several times	0	0.00
Anamnesis of hepatic diseases		
no	31	100.00
yes	0	0.00
Anamnesis of renal diseases		
no	30	96.77
yes	1	3.23
Arterial hypertension		
no	10	32.26
yes	21	67.74
Dyslipidemia		
no	13	41.94
yes	18	58.06
Type 2 diabetes		
no	27	87.10
yes	4	12.90

As it can be seen from the presented results, almost half of the patients said they were non-smokers and none of them consumed alcohol. More than 80% of them gave no anamnestic data about previous pulmonary embolism; none of them had thrombophlebitis, but almost two thirds of all patients had deep vein thrombosis.

History of acute myocardial infarction was noted in about 6.5% of patients and the same percentage of patients had ischemic brain stroke. About one third of patients had arterial hypertension, 42% had dyslipidemia and type 2 diabetes about 13%. Anamnestic data about chronic kidney disease was given by one patient only, while none had hepatic diseases. The results of the descriptive analysis with regard to thrombocytes count in the acute phase of pulmonary embolism in the group of examined patients are illustrated in Table 6.

Table 6. Levels of D-dimers, thrombocyte count, and scores according to Wells and revised Geneva scale of pulmonary embolism

Data	Levels			
	Average	**Minimum**	**Maximum**	**Standard deviation**
D-dimers (ng/mL)	884.81	260.00	2220.00	554.41
Thrombocytes (x 10^9/L)	331.81	128.00	617.00	109.40
Wells scale	6.21	4.00	8.60	1.01
Revised Geneva scale	7.87	6.00	11.00	1.45

DISCUSSION

This paper presents the preliminary descriptive analysis of data obtained for 31 patients with pulmonary embolism. The collected demographic and clinical data and their descriptive statistical analysis would select the parameters that are going to be used for comparison and determination of the genetic correlation with the molecular parameters or polymorphisms. Data stratification point out which demographic-clinical parameters are not present in all patients or are found in a very small number of patients, and hence, can help in selection of parameters that will enable a qualitative statistical comparison with the frequencies of genotypes and alleles of the examined polymorphisms.

Quantitative measurements of the risk factors for adequate interpretation of the degree of clinical suspicion of pulmonary embolism were assessed according to the Wells score for pulmonary embolism and Revised Geneva score for pulmonary embolism. Low level of D-dimers (under 500 ng/ml) has a highly negative predictive value and in combination with the objective clinical evaluation was done prior to the procedures of thrombi visualization because of the reduction in the radiation degree and expenses savings. The increased level of D-dimers has low specificity and does not confirm the diagnosis of pulmonary embolism, but initiates the need of additional diagnostic examinations.

Cardiovascular risk factors, including arterial hypertension and anamnesis for existence of deep vein thrombosis were found in a larger number of examined patients with pulmonary embolism and these results were in agreement with other studies [5].

By completing the anticipated molecular analysis for determination of the genetic polymorphisms we expect to affirm the existence of their correlation with the key parameters of pulmonary embolism, and eventually with the therapeutic response. Thus, in addition to the basic science, in future they can be applied as biomarkers when selecting patients at high risk, selecting therapy for pulmonary embolism and in prognostic aims [6].

CONCLUSION

The results obtained have shown that cardiovascular risk factors were significantly present in the group of patients with pulmonary embolism. They included arterial hypertension, dyslipidemia and history of deep vein thrombosis as well as smoking and older age. The increased level of D-dimers had low specificity and it did not confirm the diagnosis of pulmonary embolism, but indicated the need of additional diagnostic investigations. By completing the anticipated molecular analyses for determination of genetic polymorphisms, their association with the key parameters of pulmonary embolism is to be expected, along with the eventual therapeutic response.

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