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LOCALIZATION OF PULMONARY THROMBOEMBOLISM - AN IMPORTANT PROGNOSTIC FACTOR

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ABSTRACT

The prognosis of pulmonary thromboembolism is a serious challenge for the clinicians. A total of 967 patients with pulmonary thromboembolism, 511 males and 456 females at a mean age of 60,1 ±13,7 years were analyzed. A special protocol consisting of 52 parameters was used to define their prognostic value. A non-invasive diagnostic algorithm based on symptoms, ECG, pulmonary roentgenography, perfusion scintigraphy, spiral scan, pulmoangiography, or on autopsy was applied. A prognostic index was elaborated by means of multifactorial analysis of the parameters of prognostic significance concerning the risk of lethal outcome. The localization of the pulmonary thromboembolism as determined by using spiral CT can effectively be used for patients' risk stratification.

Key words: pulmonary thromboembolism, prognostic index, diagnostic algorithm, spiral CT, Cox's regression analysis

Pulmonary thromboembolism (PTE) is a severe life-threatening disease. The purpose of the present study is to identify the prognostic parameters associated with a poor prognosis in the patients with PTE and to elaborate a prognostic index (PI) by means of multifactorial analysis of the parameters of prognostic significance concerning the risk of lethal outcome.

MATERIAL AND METHODS

The study covered a total of 967 patients with PTE. There were 511 males and 456 females aged on the average 60,1 13,7 years. They were divided into three groups: i) 182 patients treated in the Clinic of Pulmonary Diseases, Allergology and Clinical Immunology, Medical University of Varna, during the period from 1988 till 1998; ii) 164 patients treated in the University Hospital of Vienna during the period from 1993 till 1998, and iii) 621 patients with PTE proved at autopsy in the Department of General and Clinical Pathology during the period from 1985 till 1998. Every patient was analyzed according to a special protocol consisting of 52 parameters. The diagnosis of PTE was established by using a non-invasive diagnostic algorithm, i. e. based on symptoms, ECG, pulmonary roentgenography, perfusion scintigraphy, spiral scan, pulmoangiography), or at autopsy.

During the first stage the survival rate was assessed by Kaplan-Meyer's function. On the next stage a unifactorial analysis for every factor under examination was applied. The statistical analysis included the examination of combinations of factors related to the prognosis as well as a correlation analysis in the intermediate stages of the investigation. Basic variables needed for the composition of PI were defined by applying Cox's regression analysis at subsequent levels.

RESULTS AND DISCUSSION

The unifactorial analysis of all the parameters defined the following indexes as statistically significant for the near prognosis: localization, diabetes mellitus, source of embolism, chronic renal failure, chronic obstructive pulmonary disease, heart failure, arterial hypertension, respiratory insufficiency, neoplasm, haemodynamic disturbances, and infection.

Non-linear correlations between the single parameters were established.

The localization assigned a code of 3 and 4 (emboli in segmental and single subsegmental arteries, respectively) was less riskful than the other localizations (2). Concerning the therapeutic effect it should be noted that the prognosis was most significantly influenced by the fibrinolytic therapy

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(code of 2) and the localization in a trunk, main vascular branch (code of 1).

At the final stage, Cox's regression model demonstrated that the following parameters proved to be particularly important concerning the prognostic power: localization, source of embolism, chronic obstructive pulmonary disease, neoplasm, etc. as the parameter of localization was of dominating prognostic significance (1). Therefore, the prognostic factor of localization established either by using spiral scan, or at autopsy, was considered as very important. It was used in the creation of PI based on the localization. PI enabled a risk stratification of the patients with PTE concerning the near prognosis (Fig. 1).

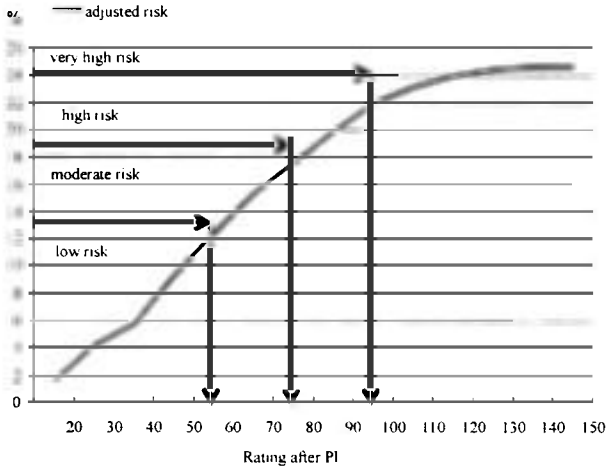

Fig. 1. Risk stratification of patients with PTE

Our study confirms the prognostic importance of a series of parameters such as infection (data about pneumonia, acute viral infection, urinary tract infection, etc.), chronic obstructive pulmonary disease, heart failure, and haemodynamic disturbances associated with an increased risk of poor near prognosis (1,3,4,5).

In six of the prognostic parameters established in our study there is a coincidence with the International Cooperative Pulmonary Embolism Registry (ICOPER) trial such as age, chronic obstructive pulmonary disease, neoplasm, congestive heart failure, systolic arterial pressure below 20mm Hg, and tachypnea over 20/min (4). In our investigation, the index mentioned last is manifested within the parameter of respiratory insufficiency that is an objective criterion. The only parameter from those of ICOPER that has not been considered as prognostic significant by us, is the presence of right ventricular hypokinesia proved by echocardiography because of absent sufficient data. On the other hand, we render an account of the prognostic importance of the parameter of localization (spiral CT). The diagnosis of PTE has been verified by means either of spiral CT, or pathoanatomically in a great percentage of patients that allows a precise prognostic analysis of the parameter of localization. The determination of PTE localization by using spiral CT can serve as a basis for the risk stratification of the patients with PTE.

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