

INTRODUCTION

Our method makes it possible at the first stage to find among all patients with breast cancer those individuals whose further molecular genetic studies will objectively confirm the diagnosis of hereditary cancer by genotyping on (BRCA I and II), which significantly reduces the cost of these studies in the population.

The article is devoted to the substantiation and selection of patients with breast cancer (BC) for the purpose of conducting expensive molecular genetic studies on genotyping. As diagnostic methods have been used ultraviolet spectrometry samples of blood plasma in the liquid state, infrared spectroscopy middle range (2,5 - 25 microns) dry residue of plasma polarization and laser diagnostic technique⁴⁻⁶ of thin histological sections of biological tissues.

Our study was to establish objective parameters of the field of laser and incoherent radiation of different spectral ranges (UV, visible, IR) as a non-invasive optical method of interaction with different samples of biological tissues and fluids of patients to determine the dynamics of metabolic syndrome and peritonitis and choosing the best personal treatment.

The aim of this study is to conduct spectrophotometric substantiation of BRCA1 - 185del Ag and 5382ins C gene mutations in breast cancer patients and their relatives in order to determine new tendencies of prevention, diagnostics and treatment of breast cancer.

METHODS

The object of the research during infrared spectrometry (IR spectrometry) was plasma blood of patients with a verified diagnosis of breast cancer (100 patients - 1 group), as well as healthy (50 - control group).

Taking into account that the method of spectropolarimetry is more sensitive than laser-polarimetric research of statistical parameters of blood of patients with PN and control group, we divided the patients under study into 4 groups, namely:

- control group - practically healthy, which is not determined by the genotyping of the mutation of VRCAI and p53,
- Group 1 - Patients with breast cancer who did not detect the mutations of VRCAI, GSTPI, GSTTI and p53,
- Group 2 - relatives of patients and patients of the control group who determined the mutations of VRCAI and p53,
- Group 3 - Patients with breast cancer with mutations of VRCAI and p53.

The third group of patients with all classification criteria corresponds to hereditary breast cancer. Identification of the third group of patients in spectrophotometric studies makes it possible to talk about an attempt to screen for hereditary breast cancer.

UV ABSORPTION SPECTRA OF HUMAN PLASMA IN THE DEVELOPMENT OF BREAST CANCER PROCESS

It is shown that the development of acute surgical diseases of the abdominal cavity growth occurs mainly optical density D plasma compared to control (for donors) in the $\lambda = 280$ nm. Next, the results of researches UV absorption spectra of blood plasma and their changes during development of breast cancer, as in the case of severe inflammatory diseases relevant to in vivo studies are not possible. Measured absorption spectra of blood plasma in the spectral range $\lambda = 220-320$ nm, but since the information is an area adjacent to $\lambda = 280$ nm, the paper analyzed the results in the range $\lambda = 250-320$ nm.

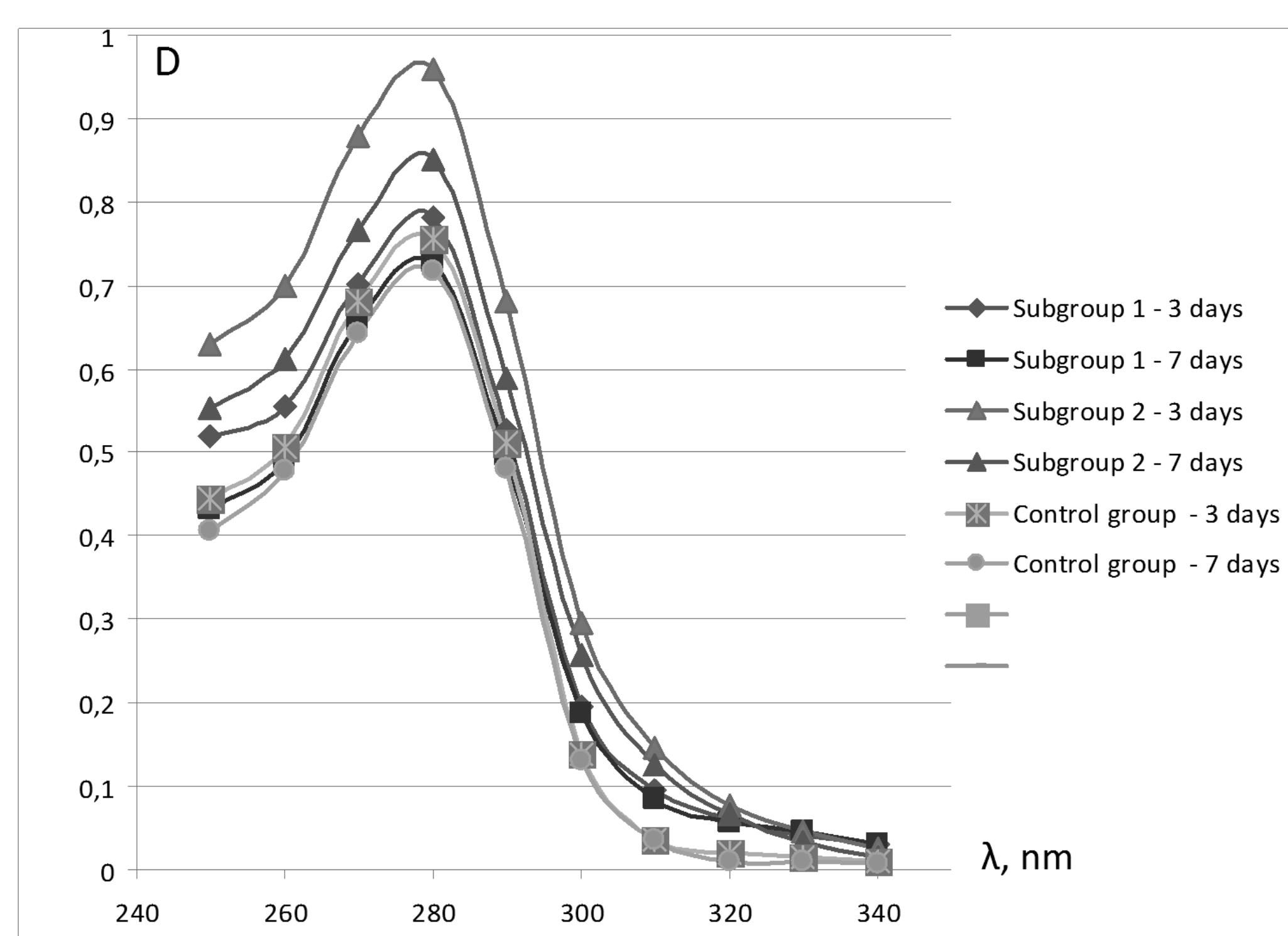


Figure 1. The absorption spectra of plasma venous blood for two types of methods of treatment and comparison of groups.

IR SPECTRAL ANALYSIS

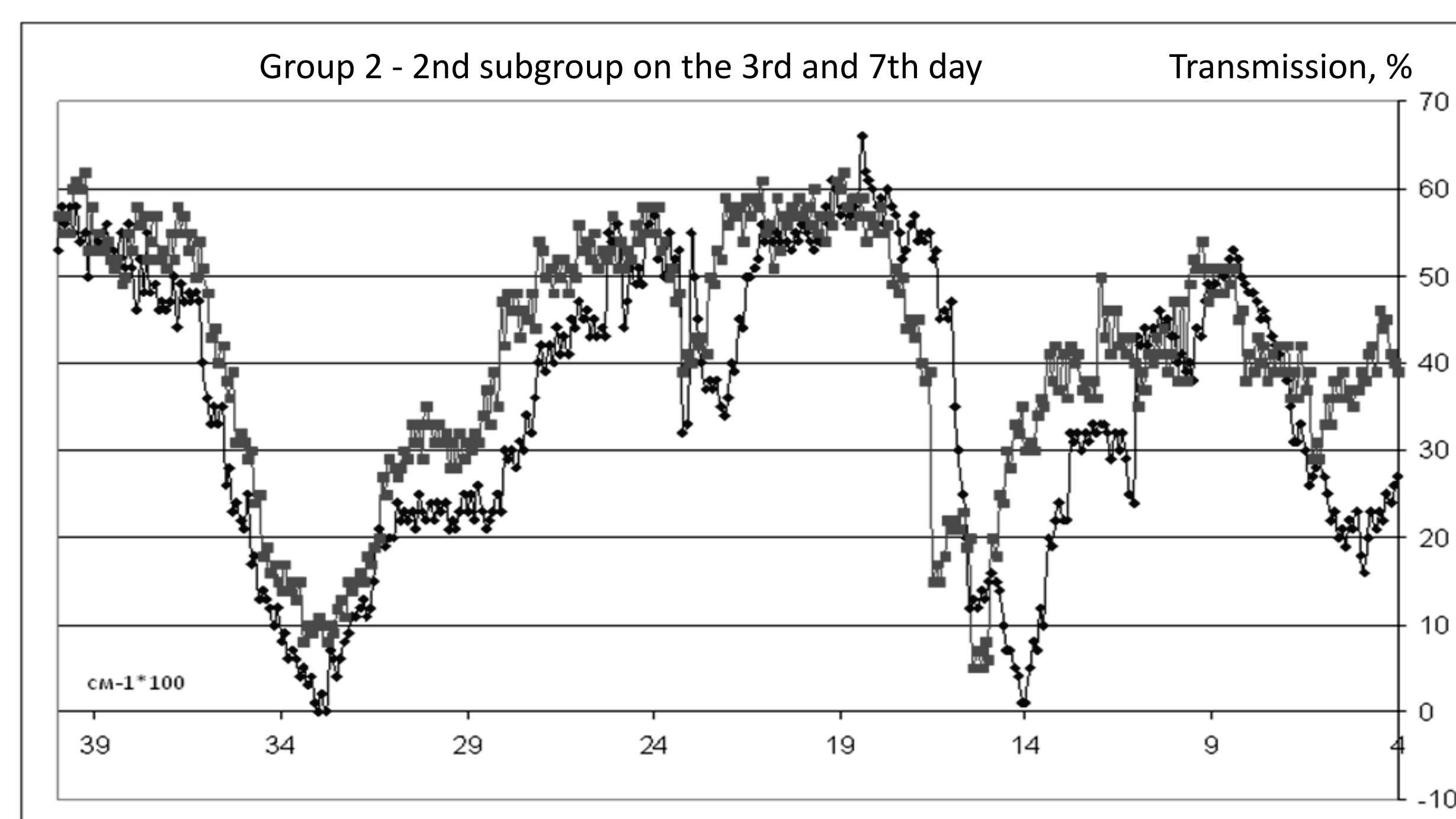


Figure 2. IR transmission spectra of plasma venous blood of patients in group 2 - 1st subgroup.

IR spectra were used to identify the compounds and establish their degree of purity (quality) and they can be used for qualitative analysis of mixtures for controlling the progress of the reaction. However, the most common and important application of IR spectra is the clarification and confirmation of the intended structure of the compounds. The presence of almost any functional group in a molecule can be set through them. Also mentioned the possibility of using infrared spectroscopy and quantitative analysis.

In our experimental setup spectrum recorded automatically and used to measure infrared spectrophotometer "Specord 80/85IR" provided the photometric accuracy of $\pm 0,2\%$. The control program embedded computer prevents incorrect and inconsistent parameter provides a linear correlation between basal line 10 wave numbers. These factors ensure objectivity and high precision spectroscopic analyzes.

In Fig. 2 is shown the infrared spectra of plasma venous blood of patients 1 and 2 on the 3rd and 7th day of treatment. Aligned spectra are characterized by absorption bands, among which we isolated two – first 1000 1800 cm^{-1} and the second 2800-3500 cm^{-1} . Characteristic was the difference in the behavior of the absorption spectrum in the region 1300-1700 cm^{-1} for patients of the 2nd subgroup 2 for different periods of treatment.

In order to determine the values of IR spectroscopic parameters¹¹⁻¹⁶ determined their range of breast cancer patients at the 3rd and 7th day of treatment. To do this, select the numerical values of each of the parameters in Table 1.

Meaning	IR spectrophotometry indicator					
	D	M	m	R	S	x
Control group	0,55	1,23	0,30	0,43	0,50	0,45
1-st group	2,50	2,88	0,70	0,88	0,80	0,86
2-nd group	0,75	3,23	0,10	0,4	0,52	0,5
3-th group	1,50	1,88	0,25	0,38	0,58	0,6

Table 1. Numerical values of spectroscopy parameters in patients with PC in their relatives and control group depending on genotyping

As can be seen from the table, the true difference in the radiation spectra in the 3rd group of patients in the RH is clearly shown. These data visually and mathematically accurately differ with other 3 groups.

Thus, the results obtained (see Table) showed that the use of spectrophotometry in the range of 1000-3000 cm^{-1} allowed to establish quantitative parameters of the plasma absorption rate of blood of patients in the third group in different ranges, which would allow in the future to conduct an express analysis of the patient's condition (procedure screening) for further molecular-genetic typing on BRCA I and II.

CONCLUSIONS

1. Thus, when screening for BRCA1 gene mutations (more than 50 mutations) in 116 women, groups of patients with hereditary and sporadic forms of breast cancer were identified, and high, medium, and low risk of breast cancer were identified in relatives of patients.
2. On the basis of the results of the study, it is recommended to carry out organizational and methodological measures aimed at the early diagnosis of breast cancer and the choice of tactics for the treatment of patients and preventive measures in relatives. Genetic studies of BRCA1 gene mutations in patients with breast cancer and their families confirm that a significant role in the onset of this pathology is due to hereditary factors.
3. Preliminary observations of patients with breast cancer and their relatives who have undergone genotyping of the BRCA1 mutations show the prospect of further studies in oncogenetics and molecular biology for the development of modern high-efficiency technologies with changing priorities for prevention and selection of women in the group.

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