

# Structure of Patients with Multiple Myeloma According to the Data of the Republican Specialized Scientific-Practical Medical Center of Hematology

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**Abstract** The aim of the study was to examine the structure and distribution of patients with various forms of multiple myeloma (MM) in Uzbekistan. The study was carried out at the Republican Specialized Scientific-Practical Medical Center of Hematology (RSSPMCH) of the MoH RUz. The highest incidence of patients with MM diagnosis was recorded from Tashkent city (19.7%), Tashkent region (23.0%), Fergana region (17.2%), Kashakadarya region (10.7%). The structure of pathological protein was investigated in the majority of patients. Studies of pathological protein heavy chain in MM revealed A-chain in 15 patients and G-chain in 77 patients, which was 12.3% and 63.1% respectively. This work will allow us to replenish the register with the data obtained, and the analysis of the structure of patients will allow us to expand our understanding of the structure of patients, to form and develop a register of patients with the diagnosis of MM in Uzbekistan.

**Keywords** Multiple myeloma, Structure, Distribution of patients, Pathological protein, A-chain, G-chain

## 1. Introduction

Currently, multiple myeloma (MM) is defined as a clonal lymphoproliferative disease occurring at the level of pre-B-cell stages of monoclonal development of plasma cell precursors that retain the ability to differentiate to plasmacyte [1,4]. The use of modern polychemotherapy programs allows to achieve clinical improvement, however, according to the data of randomized studies, does not contribute to increase the life expectancy of these patients. This contradiction is largely due to the lack of reliable methods for assessing the prognosis of multiple myeloma in the arsenal of clinicians. [2,3,5,7]. Therefore, the identification of features of the course of the disease associated with life expectancy is an important task. Its solution is of great importance both for practical doctors when working out the therapeutic tactics for a specific patient, and for scientists engaged in assessing the effectiveness of various methods of treatment [6,7,8,10,11].

## 2. Main Body

### 2.1. The Purpose of Our Research

To study the structure and distribution of patients with various forms of multiple myeloma in the Republic of Uzbekistan.

### 2.2. Material and Methods of Study

The study was conducted at the "Hemophilia and Hematopoietic Depression Center" department of the Republican Specialized Scientific-Practical Medical Center of Hematology (RSSPMCH) of the Ministry of Health of the Republic of Uzbekistan. Overall 122 patients with multiple myeloma (MM) were examined, of whom 68 males (55.7%) and 54 females (44.3%) were referred to RSSPMCH.

Of these, 119 patients (97.5%) received therapy according to the VCD protocol, 2 patients (1.6%) according to the CVAD protocol, and 1 patient (0.3%) according to the VAD protocol.

The sex and age structure of the study sample was examined retrospectively, as well as the distribution of patients in this category according to the regions of treatment. Also a retrospective study of the results of laboratory tests performed on MM patients on the basis of the Laboratory of Medical Genetics (Department of Molecular Medicine and Cellular Technologies) of the RSSPMCH of the Ministry of Health of the Republic of Uzbekistan was carried out. Distribution of different types of chains of pathological proteins characteristic for MM analyzed in blood plasma of

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patients was studied. Protein composition of patients' blood serum was studied by immunoelectrophoresis on "Interlab pretty" device (Italy) using "Interlab" kits.

After the conducted treatment, on the basis of clinical observation, anamnesis collection, questionnaires, in case of necessity examination by specialists (neuropathologist, nephrologist, traumatologist) the complications of the conducted therapy were determined. The revealed manifestations of neuropathy were classified according to their type and severity.

Statistical processing of the obtained data was performed using the Internet resource [12] using  $\chi^2$  test, odds ratio (OR), and confidence interval (95%CI).

### 2.3. Results of the Study

A study of the structure of patients with MM was carried out. The study of the distribution of patients by area showed the following picture, presented in Table 1 and Figure 1.

Table 1 and Figure 1 show that the largest number of patients with MM diagnosis was registered in Tashkent city (19.7%), Tashkent region (23.0%), Ferghana region (17.2%), Kashkadarya region (10.7%). The least number of applications to the RSSPMCH was in Jizzak Province (0.8%), Navoyi Province (1.6%), Khorezm, Samarkand and Syrdarya Provinces (2.5% each) and Bukhara Province (3.3%). In other regions, the incidence of MM was 4.9-10.7%.

Table 2 presents the results of analysis of MM patient attendance by regions, which shows significant differences in the value of this indicator compared to Tashkent in most regions. Thus the treatment rate in Tashkent city was statistically significantly higher than in Andijan region ( $\chi^2=10.7$ ; OR=4.0; 95%CI: 1.66-9.74), Bukhara region ( $\chi^2=16.1$ ; OR=7.2; 95%CI: 2.42-21.53), Jizzak region

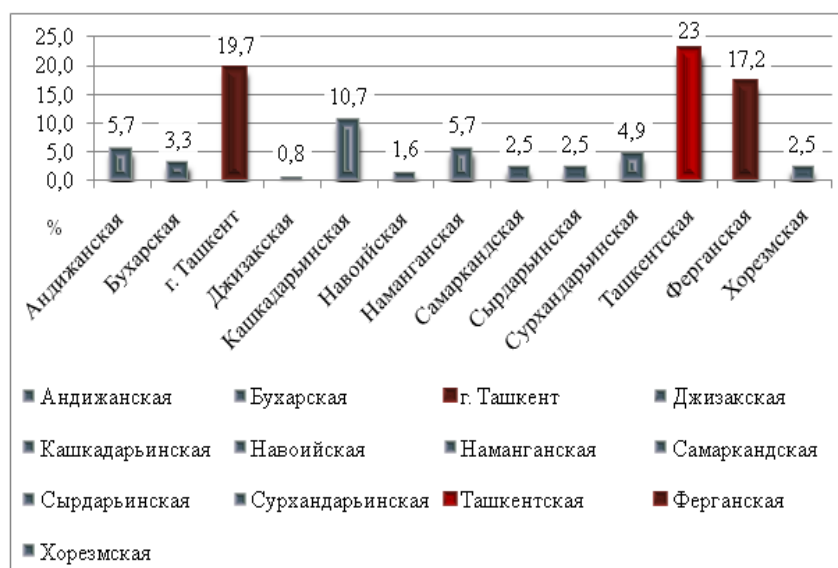
( $\chi^2=23.6$ ; OR=29.6; 95%CI: 3.94-222.95), Navoi region ( $\chi^2=20.8$ ; OR=14.7; 95%CI: 3.39-63.72), Namangan region ( $\chi^2=10.7$ ; OR=4.0; 95%CI: 1.66-9.74), Samarkand, Syrdarya and Khorezm regions ( $\chi^2=18.4$ ; OR=9.7; 95% CI: 2.84-33.22), and Surkhandarya region ( $\chi^2=12.31$ ; OR=4.7; 95%CI: 1.86-12.05). There was a pronounced tendency to the prevalence of MM patients in Tashkent city compared to Kashkadarya region ( $\chi^2=3.9$ ; OR=2.05; 95%CI: 0.99-4.25).

No statistically significant differences were found in the number of patients diagnosed with MM in Tashkent and Fergana regions ( $\chi^2=0.39$ ; OR=0.8; 95%CI:0.45-1.52;  $\chi^2=0.25$ ; OR=1.2; 95%CI:0.62-2.25).

In Tashkent, the incidence is higher because it is the capital of Uzbekistan and the population density in the city of Tashkent and in the Tashkent region is higher relative to other regions.

**Table 1.** Quantitative distribution of multiple myeloma patients by region

Regions	Abs	%
Andijan region	7	5,7
Bukhara region	4	3,3
Tashkent	24	19,7
Jizzakh region	1	0,8
Kashkadarya region	13	10,7
Navoi region	2	1,6
Namangan region	7	5,7
Samarkand region	3	2,5
Syrdarya region	3	2,5
Surkhandarya region	6	4,9
Tashkent region	28	23,0
Ferghana region	21	17,2
Khorezm region	3	2,5

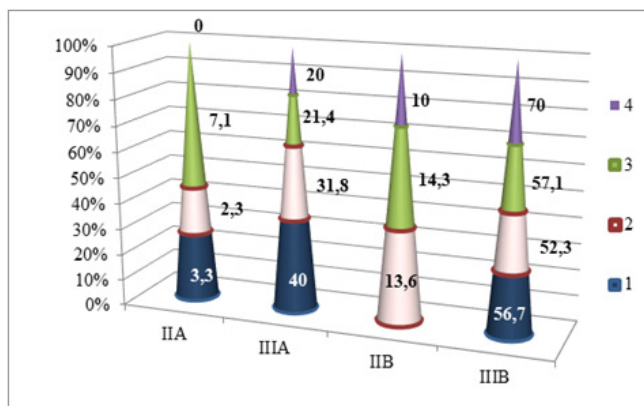


**Figure 1.** Distribution of patients with multiple myeloma by regions of the Republic of Uzbekistan

**Table 2.** Quantitative distribution of multiple myeloma patients by region

Regions	Abs	%	$\chi^2$	OR	95% CI:
Tashkent	24	19,7*	23.6	29.6	3.94-222.95
Andijan region	7	5,7			
Tashkent	24	19,7*	3.9	2.05	0.99-4.25
Bukhara region	4	3,3			
Tashkent	24	19,7*	20.8	14.7	3.39-63.72
Dzhizak region	1	0,8			
Tashkent	24	19,7*	10.7	4.0	1.66-9.74
Kashkadarya province	13	10,7			
Tashkent	24	19,7*	18.4	9.7	2.84-33.22
Navoi province	2	1,6			
Tashkent	24	19,7*	18.4	9.7	2.84-33.22
Namangan province	7	5,7			
Tashkent	24	19,7*	12.3	4.7	1.86-12.05
Samarkand region	3	2,5			
Tashkent	24	19,7*	0.4	0.8	0.45-1.52
Syrdarya region	3	2,5			
Tashkent	24	19,7*	0.3	1.2	0.62-2.25
Surkhandarya region	6	4,9			
Tashkent	24	19,7	18.4	9.7	2.84-33.22
Tashkent region	28	23,0			
Tashkent	24	19,7	23.6	29.6	3.94-222.95
Ferghana region	21	17,2			
Tashkent	24	19,7*	3.9	2.05	0.99-4.25
Khorezm region	3	2,5			

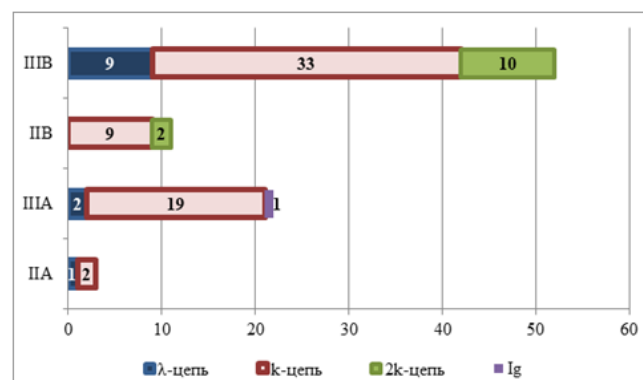
After treatment, complications were detected in some of the examined patients: nephropathy was detected in 30-40% and bone lesions in 95% of cases. There were also signs of neuropathy. Paresthesias in the fingertips of hands and feet, sensitivity disorders, numbness were detected in 80% of the examined patients. Digestive tract disorders in the form of constipation or diarrhea were observed in 50% of cases. Cardiovascular system disorders in the form of arrhythmia were observed in 15% of the examined patients. Weakness was detected in the vast majority of patients - in 90% of cases. Less than half of the patients - 40% complained of insomnia.


**Figure 2.** Distribution of different degrees of neuropathy in different stages of multiple myeloma

According to the severity degree the revealed manifestations of neuropathy patients could be divided into the following subgroups: Grade I was detected in 30 patients (24.6%), Grade II in 44 patients (36.1%), Grade III in 28 patients (22.9%), and Grade IV in 10 patients (8.2%) (Table 2).

A set of laboratory tests revealed that IIA protein was detected in 4 patients, IIB in 11 patients, IIIB in 69 patients, and IIIA in 38 patients, which was 3.3%, 9.0%, 56.6%, and 31.1%, respectively.

Pathological protein structure studies were performed in the majority of patients. Studies of the pathological protein heavy chain in MM revealed A-chain in 15 patients and G-chain in 77 patients, which was 12.3% and 63.1%, respectively. When studying the structure of the light chain, lambda-chain was detected in 12 cases, IgG in one case, kappa-chain in 63 cases, and 2 kappa-chain in 12 cases. Moreover, lambda ( $\lambda$ )-chain was detected in 3 cases at stages IIA-IIIa and in 9 cases at stage IIIB, representing 7.1% and 13.0% of these stages of MM, respectively, with no significant difference in their detectability ( $\chi^2=0.94$ ; OR=0.5; 95%CI: 0.13-2. At the same time, almost all 12 cases of 2 kappa (2k)-chain detection occurred in stages IIB and IIIB, i.e. were detected in 15.0% of cases at these stages of MM, which was not statistically significantly different from the prevalence of lambda chain detection at B-stages ( $\chi^2=0.12$ ; OR=1.2; 95%CI: 0.46-2.99). Kappa (k)-chain was detected in 20 cases at stages IIA-IIIa and in 44 cases at stages IIB-IIIB of MM, which comprised 47.6% and 55.0% of patients with these stages respectively and had no statistically significant differences ( $\chi^2=0.6$ ; OR=0.7; 95%CI: 0.35-1.57) (Figure 3).


**Figure 3.** Distribution of different pathological protein chains in different stages of multiple myeloma

In general, the results obtained for the structure of MM patients we examined agree with the data of foreign researchers [3,6].

### 3. Conclusions

This work will allow us to replenish the register with the data obtained, and the analysis of the structure of patients will allow us to expand our understanding of the structure of

patients, to form and develop a register of patients with the diagnosis of MM in Uzbekistan.

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