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MEDICAL AND SOCIAL CHARACTERISTICS OF PATIENTS WITH PRIMARY ENDOPROSTHESIS OF SHOULDER JOINT

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Abstract. Shoulder arthroplasty is performed more and more frequently. Good clinical results and positive appreciation from the patients are reached in most of the cases. Numerous diseases and injuries of the shoulder joint, some developing in childhood, lead to disability, pain and decrease in function of the affected limb. The clinical outcome after shoulder replacement (SR) depends on proper selection of patients, preoperative evaluation and planning, as well as surgical technique and rehabilitation. Shoulder replacement significantly affects pain and improves function in most patients. Successful outcome is predictable when an anatomical reconstruction of the joint is achieved. The aim of the study is to characterize patients with primary shoulder joint replacement in terms of medical and social indicators. From year 2005 to 2015, at Department of Orthopaedics and Traumatology, UMHAT "Queen Giovanna – ISUL" and SHATO "B. Boychev", 33 hemiarthroplasties were performed in 32 patients with multifragmentary fractures and fracture-dislocations of the proximal humerus and in one patient with a pathological fracture in the same region. In the same period 8 total shoulder replacements in 7 patients with primary and secondary arthrosis were done. According to the data obtained, women are 2/3 of all patients. The relative share of men is 24.24%, which is significantly less than the relative share of women - 75.75%. Age in women is a factor associated with increased fracture risk and, in particular, with fracture of the shoulder joint. Data from the affected side analysis shows that right-side fractures prevail in both groups- women and men. Women with right-side injuries are slightly more than half of all female patients - 56%, whereas men are 62.5%. It is necessary to carry out specialized programs for fracture risk prevention which are aimed at certain age groups and include physical activity, balanced nutrition as well as hormone therapy. No statistical significance is found between gender and type of injury in the study patients ($p > 0.05$). The average age of all patients undergone hemiarthroplasty is 62 years - for women the average age is 66 years and for men - 52 years. The difference in the mean age of the two groups is more than 10 years. These results strongly suggest that the fracture risk in women over 60 is significantly higher, whereas in men this age is over 50 years. Most patients are working people with professional and social functions. Out treatment goal is to give them the opportunity to return to same or close to pre-injury activity state. A preliminary conversation with the patient and detailed explanation on what can be expected from the procedure – pain relief, better range of motion, ability to perform ADL, improved quality of life, restored independent life, are of great significance. The prevention of certain shoulder injuries is associated with age-related physical activity and nutrition, professional activity and socio-economic factors in the patient's life.
Keywords: shoulder replacement, medical, social, characteristics

INTRODUCTION

The first prosthetic shoulder arthroplasty performed has widely been ascribed to the French surgeon Jules Emile Péan [5] in 1893, who used platinum and rubber for the treatment of a 37-year-old baker suffering from tuberculous arthritis. The patient refused amputation and thus left Péan no other alternative but to remove infected tissue and implant a prosthesis. The prosthesis itself was constructed by Dr. J. Porter Michaels, a dentist from Paris. Unfortunately infection recurred, requiring removal of the prosthesis 2 years later. In his original report on the case, Péan referred to the works of Themistocles Gluck and described them as inspiration for the shoulder prosthesis [1]. Gluck has designed and used several shoulder prosthesis, including one of ivory, but the results of these operations have not been described, nor have they been documented to be performed on humans [3]. In the 30s and 40s of the last century, Baron and Judet used a plastic prosthesis for proximal humeral replacement. This prosthesis proved to be unsuccessful due to weakness of the material. Later, in 1953, Neer reported replacement of the humeral head with a metal device in patients with fracture-dislocations. Encouraged by good early results, he began to apply hemiarthroplasty in patients with osteoarthritis. In 1970s he started using a polyethylene glenoid component. Various authors report excellent pain relief and good function after shoulder replacement [2,4,6]. On the other hand, there are papers with unsatisfactory results regarding range of motion and physical activity. Large differences in the outcome of the intervention varying among patients, have also been identified. Shoulder replacement significantly affects pain and improves function in most patients. Successful outcome is predictable when an anatomical

reconstruction of the joint is achieved. Numerous diseases and injuries of the shoulder joint, some developing in childhood, lead to disability, pain and decrease in function of the affected limb. The clinical outcome after shoulder replacement depends on proper selection of patients, preoperative evaluation and planning, as well as surgical technique and rehabilitation. The good clarification of each case and the accompanying pathology is the basis of a successful treatment. A detailed knowledge of the anatomy of the shoulder joint is necessary.

Aim: The aim of the study is to characterize patients with primary shoulder joint replacement in terms of medical and social indicators.

MATERIAL AND METHODS

From year 2005 to 2015, at Department of Orthopedics and Traumatology, UMHAT "Queen Giovanna – ISUL" and SHATO "B. Boychev", 33 hemiarthroplasties (HA) were performed in 32 patients with multifragmentary fractures and fracture-dislocations of the proximal humerus and in one patient with pathological fracture in the same region. In the same period 8 total shoulder replacements (TSR) in 7 patients with primary and secondary arthrosis were done.

Patients of both genders were included in the study, with a higher proportion of women compared to men.

Table №1 Descriptive statistics by gender of patients with hemiarthroplasty

	gender	Number	average value	standard deviation	standard error
Age	man	8	52,63	12,235	4,326
	woman	25	66,16	9,932	1,986
Time from disease till operation (in months)	man	8	103,63	113,084	39,981
	woman	25	113,20	123,336	24,667
Post-operative evaluation at last medical examination	man	8	71,63	12,694	4,488
	woman	25	72,14	8,094	2,163
Follow-up (in months)	man	8	64,13	19,000	6,717
	woman	25	43,21	26,739	7,146

The median and standard deviation for age in men was 52.63 ± 12.235 and for women 66.16 ± 9.932. There is a small difference ($p < 0.05$) according to age as a damage factor of the shoulder joint between genders. Operative treatment was performed in men at an average age of 50 years and in women at 66. There is a statistically significant difference in follow-up between genders ($p < 0.05$). The remaining values of the statistical indicators for men and women show no significant differences ($p > 0.05$).

According to the data obtained, women are 2/3 of all patients with hemiarthroplasty. The relative share of men is 24.24%, which is significantly less than the relative share of women - 75.75%. Age in women is a factor associated with increased fracture risk and, in particular, with fracture of the shoulder joint. These data clearly indicate that shoulder pathology in women is more common and requires surgical intervention. Most studies have shown that in postmenopausal women, hormonal changes lead to an increased risk of fractures. Men also have a certain fracture risk, but it is significantly lower than in women. Another factor that can be mentioned is reduced physical activity in women compared to men. The strength of the bone structure is determined to a significant extent by the physical exercise, which is usually greater in men. It is necessary to carry out specialized programs for fracture risk prevention which are aimed at certain age groups and include physical activity, balanced nutrition as well as hormone therapy. Gender-dependent statistical analysis results showed no statistical significance in the study group ($p > 0.05$) ($p = 0.637$).

Table № 2 Descriptive statistics for women with hemiarthroplasty

	Side	Number	average value	standard deviation	standard error
age	right	14	65,79	11,335	3,029
	left	11	66,64	8,322	2,509
Time from disease till operation (in months)	right	14	114,64	135,543	36,225
	left	11	111,36	112,332	33,869
Post-operative evaluation at last medical examination	right	14	75,13	7,918	2,799
	left	11	68,17	7,026	2,868
Follow-up (in months)	right	14	50,13	26,947	9,527
	left	11	34,00	25,768	10,520

Data about injuries of the left and right shoulder in women according to age are similar in value: for the right shoulder joint - the mean age is 65.79 ± 11.335 and for the left - 66.64 ± 8.322 years. The data of the other statistical indicators did not differ significantly for the two groups of patients (p> 0.05).

From the nonparametric correlation analysis performed in women, no statistical significance was found (p> 0.05) between age and other indicators.

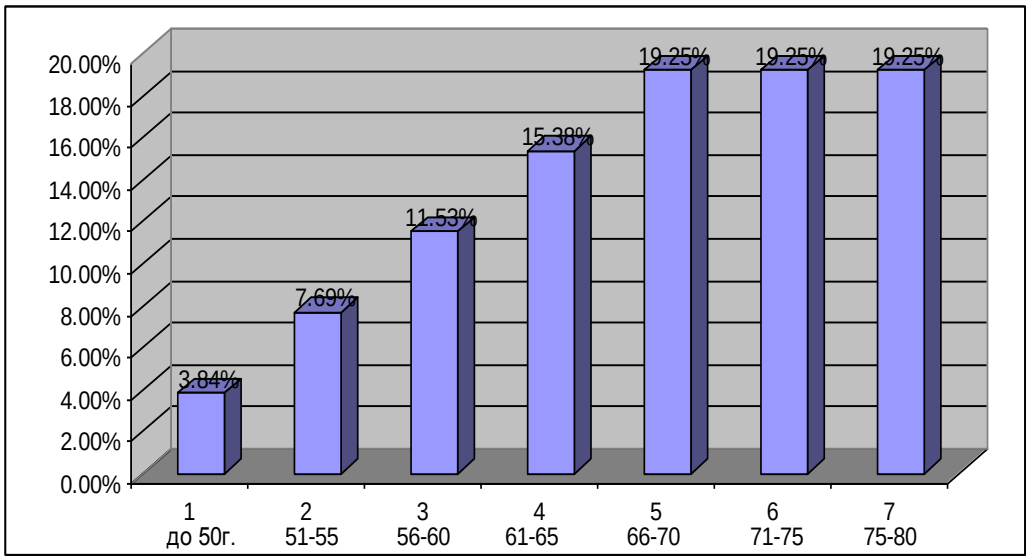
The distribution of patients by age shows different trends in men and women. The average age of all patients undergone hemiarthroplasty is 62 years - for women the average age is 66 years and for men - 52 years. The difference in the mean age of the two groups is more than 10 years. These results strongly suggest that the fracture risk in women over 60 is significantly higher, whereas in men this age is over 50 years.

Table № 3 Descriptive statistics for men with hemiarthroplasty

	Side	Number	average value	standard deviation	standard error
Age	right	5	48,40	13,759	6,153
	left	3	59,67	5,132	2,963
Time from disease till operation (in months)	right	5	102,80	123,650	55,298
	left	3	105,00	119,059	68,739
Post-operative evaluation at last medical examination	right	5	75,40	9,290	4,155
	left	3	65,33	17,214	9,939
Follow-up (in months)	right	5	67,20	9,808	4,386
	left	3	59,00	31,749	18,330

The mean age of patients with right shoulder injury was 48.40 ± 13.759 years and in those with left shoulder injury was 59.67 ± 5.132 years (p> 0.05). The data show that left and right shoulders are almost equally injured in both genders. From the nonparametric correlation analysis performed in men, there is no statistical significance (p> 0.05) between age and pre-operative period (p = 0.866), but there is statistical significance between age and post-operative results during follow-up (p = 0.004). The Spearman coefficient is -0.861, which gives us an inversed proportional strength, i.e. with increasing age, post-operative follow-up scores are reduced.

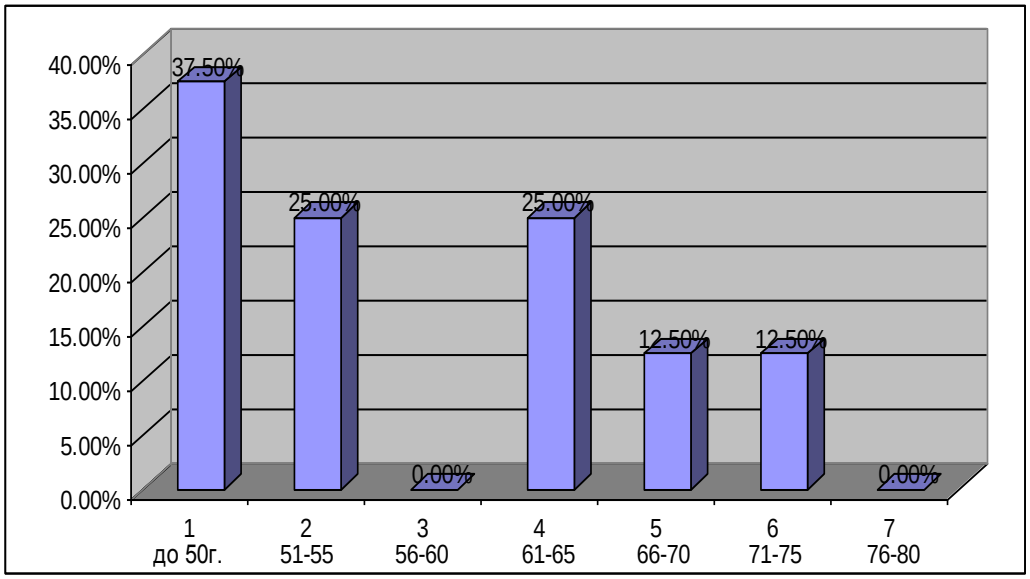
Fig.№1 Distribution of women with hemiarthroplasty by age



Data analyses in women show that there is a progressive increase in the number of patients with age. It is noteworthy that the data are permanent for the age group between 66 and 80 years. The proportion of women under the age of 50 is lowest (3.04%), whereas in women over 66 years of age it is the highest (19.25%). It is also important to note that there is no increase in the relative share of women after this age, and the relative proportion of patients is the same.

Age in women is a well-known factor associated with fracture risk and, in particular, with fractures of the shoulder joint. However, the proportion of women with fractures does not increase more than 1/5. Nearly 1/5 of women over 65 years are at risk in terms of fractures of the shoulder.

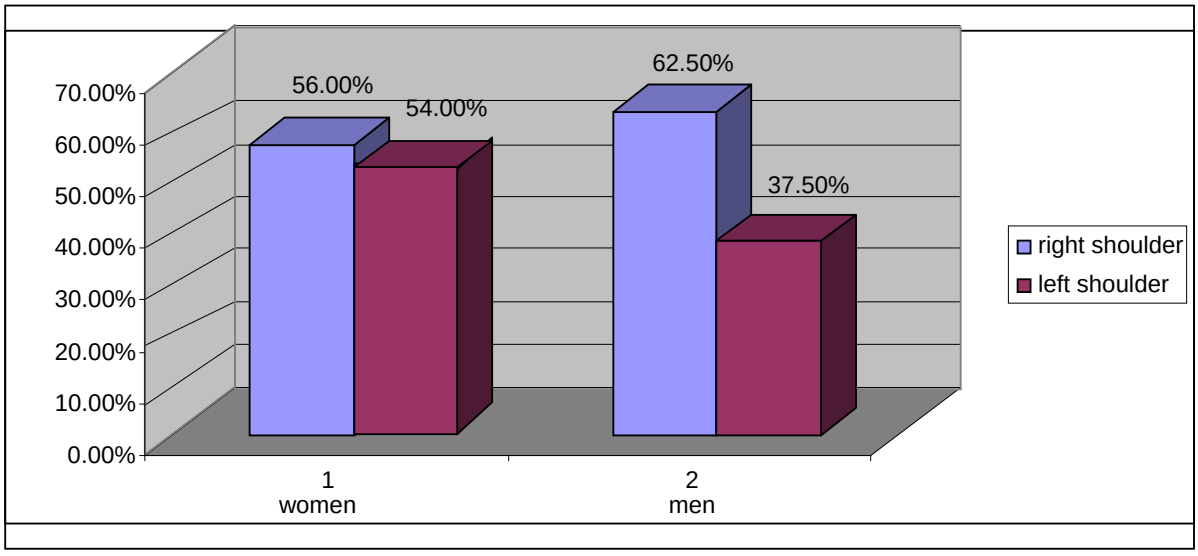
Fig.№2 Distribution of men with hemiarthroplasty by age



The data obtained show that most men are in the age group up to 50 years - 37.50%, followed by men aged 51 to 55 and 61 to 65 years with a relative share of 25,00%. A significant decrease in the relative share (12.50%) of male patients was seen in the age group 66 to 75 years. Data show that there are no patients aged 56 to 70 years and 76 to 80 years. While there is a steady increase in the number of female patients with age, there is no such tendency in men. In our study, there are age groups that are not affected by this health problem. Shoulder fractures occur in more than 1/3 of men up to 50 years of age. The fracture risk in men over 65 years is significantly lower in the study

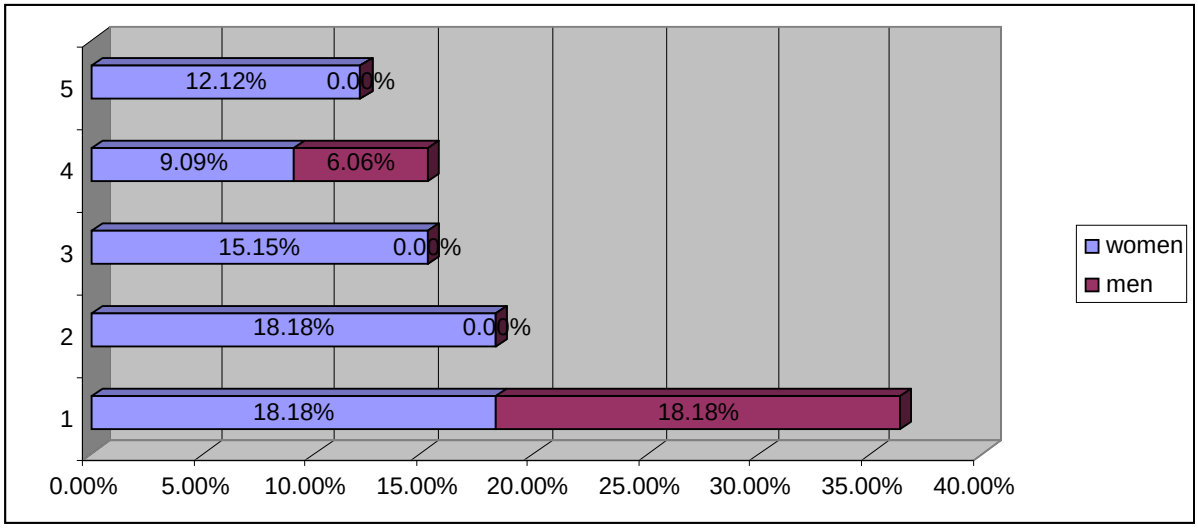
group.The average age of the patients included in the study was 62.88 (± 11,892) years, with the youngest patient aged 35 years and the oldest - 78 years.There was no statistically significant difference in gender-related increase of fractures with age (p> 0.05). There was no statistical relation between gender and type of injury (p> 0.05) in the study patients.

Fig.№3 Distribution of patients with hemiarthroplasty by gender and injured side (left or right)



It is estimated that about 10% of the population is left-handed. There are also people who are equally adapted to use both hands (ambidextrous), although this is rare (about 1%). There are more left-handed men than left-handed women (5.24% men, 4.76% women). Data from the patient-affected side analysis show that fractures of the right side are prevalent in both women and men with male ratio being higher than female. Women with right side disorder are slightly more than half of patients - 56%, whereas in men - 62.5%. The relative share of left-handed patients is 54% in women and 37.5% in men. The affected side, especially if dominant, is of great importance about patient`s quality of life. Most patients are working people with professional and social functions. Out treatment goal is to give them the opportunity to return to same or close to pre-injury activity state.

Fig.№4 Distribution of patients by gender and type of prosthesis



1.Global Fx; 2.Hipokrat; 3.Beznoska; 4.Wright; 5.Zimmer

Global Fx prosthesis is used in 18.18% of women and the relative share of men is the same. Hipokrat prosthesis is used in 18.18% of women, and Beznoska in 15.15%. Wright prosthesis is used in 9.09% of women and

6.06% of men. In 12.12% of women a Zimmer prosthesis was placed. Global Fx and Hipokrat prostheses are the most common in our series.

CONCLUSION

Patients who were treated with primary shoulder replacement were of both genders, women being more than men, and sustained multifragmentary fractures and fracture-dislocations at the proximal end of the humerus. The data obtained clearly indicate that shoulder pathology in women is more common and requires surgical intervention. Most studies have shown that in postmenopausal women, hormonal changes lead to an increased risk of fractures. Data from the patient-affected side analysis show that fractures of the right side are prevalent in both women and men. The prevention of certain shoulder injuries is associated with age-related physical activity and nutrition, professional activity and socio-economic factors in the patient's life.A preliminary conversation with the patient and detailed explanation on what can be expected from the procedure – pain relief, better range of motion, ability to perform ADL, improved quality of life, restored independent life, are of great significance.

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