GENDER AND QUALITY OF LIFE AFTER CEREBRAL STROKE

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ABSTRACT

The aim of this work is to investigate the influence of gender on recovery after cerebral stroke. It is believed that functional outcome of cerebral stroke (CS) depends on gender. Female gender is mildly negative prognostic factor in after stroke results. Two hundred and two patients who had first ischemic cerebral stroke were questioned with help of, HADS and WHOQOL-Bref questionnaires, looking for differences in recovery depending on gender. Average patients’ age was 72±13 (ME±IR) years. The youngest patient had 40 years, and the oldest 92 years, and medium range was 52 years. There were 112 males and 90 females. Quality of life was equally graded by both male and female after CS (p=0.208). Male patients had significantly better results in physical (p=0.035) and psychological (p=0.020) domain of life quality. After CS, male patients had better results only in memory dimension (p=0.003). Anxiety was statistically more frequent among female patients (p=0.009). Gender did not influence frequency of metabolic syndrome in patients with CS. Quality of life after CS was better in male patients, and statistically significant difference has been shown in physical, psychological domain and memory dimension. Female patients were more anxious then male after CS.

KEY WORDS: gender, cerebral stroke, quality of life
INTRODUCTION

Many studies have shown differences among genders in symptoms, treatment and treatment outcomes in cardiovascular diseases, but it is little known about differences among genders in cerebral vascular diseases (1). Although there are few reports regarding gender differences in functional outcome after CS (2), it is believed that outcome does depend on gender (3) with females having more difficulties in recovery (4).

Earlier studies have proven that males are at a greater risk of CS (5). However, on average, female live longer, and frequency of CS increases with age. So, among population above 85 years of age, female have greater incidence of CS. There are no differences in severity of CS between genders (5). Males patients died more commonly than male from circulatory diseases (53% vs. 47% (6), 68 vs. 44/10000 in the year 2002. (3). In the Federation of Bosnia and Herzegovina (FB&H), leading causes of death in male patients (by diagnosis) have been identical in the past few years and included acute heart attack (10.5%) and CS (9.4% in total number of deceased patients) (6). Leading cause of death in female patients in FB&H in the year 2006 was also from group of circulatory diseases including CS at 13.3% of total number of deceased. According to 1998. data from Croatia, leading cause of mortality in female patients was CS (3). In the United States (US), CS is the third cause of mortality in female and fourth in male patients (3). Although there is no difference in incidence and prevalence of CS among genders (7), rate of mortality varies in studies (5). Holroyd-Leduc et al. (5) suggested that after age correction, male patients had higher mortality rate, while Demarin et al. (7) claimed that mortality rate was higher for female in all age groups.

Generally, it is believed that functional outcome of CS depends on gender. Some reports indicate that there is a connection between gender and cognitive functions of the patient (1). Female patients have experienced more mental disorders, depression and fatigue, as well as generally lower quality of life after CS compared to male patients (3). Wyller et al. (1) have found a difference among genders in functional performances after CS, i.e., male have recorded better results in all questioned areas in their study. Female had worse outcome not only in motor function but also in cognitive function and everyday activities (1). Some studies report that female patients with CS have more disorders in everyday activities after hospital treatment than male patients (4).

Comparing age among genders with CS it was shown that females were older and had more severe deficit in hand function (4). Lower level of recovery in everyday activities and physical functioning in female patients following a CS can be due to many factors such as age, poor physical condition before CS and depressive state after CS. European studies data have shown lower physical activity before CS, explaining gender differences in disability months after CS (4). In contrast to these studies, Wade et al. (8), have not found significant gender difference in signs of early deficits or outcome of CS.

Although epidemiological and clinical trials evaluate role of gender comparing mortality and efficiency of treatment there has been no multinational data analysis among male and female with CS in clinical presentation, use of resources and outcome (9). Information about differences among genders can provide a useful insight into the control of risk factors and into the short- and long-term care, such as development of hospital diagnostic and therapeutic guides, and determination of preventive and rehabilitation programs (9).

MATERIAL AND METHODS

A case control study of life quality was performed in patients after CS. Three questionnaires were used: Stroke Impact Scale - 3.0 (SIS) (10), Hospital Anxiety and Depression Scale (HADS) (11) and World Health Organization life quality questionnaire (WHO-QOL-Bref) (12). ATP III criteria were used as criteria for diagnosis of metabolic syndrome (MS), (13).

Data were collected in the family medicine practice or in the patients’ home during period from September 2008 to August 2009. All patients with first CS who satisfied criteria were included in this study. An inclusion criterion was first time ischemic CS and exclusion criteria included co morbidity which could influence development of depression (diabetes, earlier depression, carcinoma and other conditions). Also, patients who had survived both CS and heart stroke have been excluded. Questionnaires were administered by members of family medicine team (doctor or a nurse) or some family members who took care of the patient.

Severity of CS had been accessed by SIS questionnaire. Depression and anxiety were accessed by HADS questionnaire with scores ≥ 11 indicating clinically developed depression/anxiety, scores 8-10 indicating borderline cases and scores < 8 excluding these disorders. WHO-
QOL questionnaire had two questions: one for life quality and other questions grouped into different domains: physical, psychological, social and environmental.

Two hundred and two patients who had CS have been questioned. There were 112 male and 90 female patients. The largest age group (159 – 78.7%) was the oldest one, i.e. 65 years and older. The remaining patients included 37 (18.3%) in the age group 50-64 years and only 6 (3.0%) patients who were younger then 50 years. Average patients’ age was 7.2±13 (ME±IR) years. The youngest patient had 40 years and the oldest 92 years indicating the range of 52 years. There were 118 married patients (58.4%), 63 (31.2%) widowed, 18 (5.1%) singles, 2 (1.0%) in uncommitted relationship and only 1 (0.5%) divorced.

Collected data were analysed using descriptive statistics (arithmetic middle – M, standard deviation – SD, meridian – ME, interquartal range – IR, range – R) and tests to check the hypothesis, Mann-Whitney test, t-test, χ² test, Fisher exact test, variance analysis, ANOVA, Tukey test, Dunnet C test and alpha coefficient. In the case of statistically significant difference among groups (ANOVA) we have done post hoc analysis of differences among groups (pairs of groups), and all significant differences were deterrent at p<0.001 (14). As the level of significance we took p<0.05. P levels that cannot be shown up to three decimals are shown as p<0.001 (14).

RESULTS

In this study, female patients were older comparing to male (U=3793,5;000; p=0.003). Average male age was 71±13,75 (ME±IR) years, and in female 75±11,25 (ME±IR). While recovering female had worse results in all life quality domains, the difference was significant only in memory domain (t=2.073; p=0.003) (Table 1). The difference among male and female patients regarding depression developed after CS did not show significant statistical difference (χ²=1,877; df=2; p=0,391) (Table 1). Clinical depression (score ≥11) developed in 52 (51.5%) male and 49 (48.5%) female patients (χ²=0.089; df=1; p=0.765). For anxiety, the difference among patients by gender was statistically significant (χ²=9.332; df=2; p=0.009) (Table 1). Clinical anxiety (score≥11) developed in 57 patients, 35 (61.4%) female and 22 (38.6%) male. That difference was not statistically significant (χ²=2.965; df=1; p=0.085). The average evaluated quality of life was 2.9 for male and 2.8 for female patients which was not a significant difference (p=0.208). There was also no significant difference among male and female patients (p=0.559) when evaluating the satisfaction with their health. There were no statistically significant gender differences when the life quality by domains of WHOQOL questionnaire was analysed. The average value for physical domain among male patients was 47.0 and 40.3 (p=0,035) in female patients; for psychological domain average value in male patients was 53.3 and in female patients 46.7 (p=0.020). In social domain result was slightly better in female patients but without reaching statistically significant difference (p=0.362) while in environment domain (p=0.157) male patients had better results.

One hundred fifty seven patients had metabolic syndrome, 83 (52.9%) male and 74 (47.1%) female (χ²=5.16; df=1; p=0.473). There was no statistically significant difference regarding gender (χ²=2.118; df=2; p=0.347) in patients who had CS and depression. However gender differences were statistically significant in patients who had CS and anxiety. When compared to male patients there were more female patients who developed clinical anxiety (χ²=7.488; df=2; p=0.024). Pathological parameters of metabolic syndrome in patients with CS were equally present in male and female, except waist diameter which was significantly more frequent in female (χ²=5.568; df=1; p=0.018). The influence of body mass index to recovery after CS regarding gender has not been shown.

DISCUSSION

CS morbidity rate increases with increasing age (15). With population getting older and changes in life style for the last few decades, incidence and prevalence of CS have increased (16). This study verified these facts and showed that most patients were in the age group ≥65 years.

Between 1999 and 2004 age adapted mortality due to CS in US was lower among Caucasian female age over 25 years comparing to Caucasian male (CDC data) (17). Under 45 years of age mortality due to CS is very similar in male and female, but female 45-74 years had significantly lower risk of CS than male (25-35% for Black and 20% for Caucasian females) (17). This "privilege" for female decreases with age, so Black females have 12% and Caucasian 14% higher mortality rate from CS then male at the age 85 and above. Generally, more female patients die from CS than male patients, which is consequent to higher mortality rate in older females (balance female : male in the age of 50 in general popula-
tion is 1.01, increases to 1.19 in the age up to 70, 1.56 in the age up to 80 and 2.70 in the age up to 90 years) (17). Lofmark et al. (18) presented results regarding mortality of a study from northern Sweden, where they recorded 60% lower incidence for female in the age group 55-64, but in the age group above 75 have recorded an incidence 50% higher for female comparing to male.

In this study, female were significantly older than male and living alone more frequently than male which was consistent with previous findings (2, 18). Average grade for life quality in male was 2.9 and 2.8 (p=0.268) in female. Uneven gender distribution, greater number of patients older than 65 years and greater number of patients with lower level of education could have affected the results in this study. Our results showed general dissatisfaction, both in patients and their family members.

Literature about the role of gender in recovery after CS is contradictory. Paolucci et al. (4) in their study came to conclusion that female gender is slightly negative prognostic factor for recovery after CS due to gender difference. Difference in muscle strength as consequence of difference among gender can increase with age resulting in reduction of daily activities which are different between genders. They pointed out the study where in populations age 65 and older only 30.6% female and 47.8% male patients performed some physical activity.

TABLE 1. The gender differences in recovery from stroke

| Dimensions (M±SD) | Female | Male | Test |
|-------------------|--------|------|------|
| strength          | 45.3±23.9 | 43.1±28.9 | U=1793.500; p=0.003 |
| memory            | 70.0±27.7 | 57.1±32.5 | t=2.97; p=0.003 |
| emotion           | 57.7±11.7 | 55.4±11.6 | t=1.35; p=0.178 |
| communication     | 71.2±28.1 | 66.0±32.4 | t=1.21; p=0.226 |
| activities of daily living | 56.5±33.0 | 48.1±35.1 | t=1.75; p=0.080 |
| mobility          | 55.8±32.1 | 48.0±34.2 | t=1.67; p=0.095 |
| hand function     | 44.9±36.0 | 41.9±36.8 | t=0.57; p=0.564 |
| social participation | 53.1±27.3 | 47.1±29.5 | t=1.49; p=0.137 |
| stroke recovery   | 51.9±27.7 | 45.9±30.4 | t=1.45; p=0.149 |
| physical domain   | 52.1±30.0 | 45.5±32.4 | t=1.50; p=0.134 |

| Dimensions (M±SD) | Female | Male | Test |
|-------------------|--------|------|------|
| depression (count - %) | 34 (30.4) | 20 (22.2) | χ²=1.87; p=0.391 |
| anxiety (count - %) | 67 (59.8) | 39 (43.3) | χ²=9.332; p=0.009 |
| Quality of life (M±SD) | 2.8±1.0 | 2.9±0.9 | t=1.26; p=0.208 |
| Satisfaction of health (M±SD) | 2.7±1.0 | 2.7±1.0 | t=0.58; p=0.559 |
| physical | 40.3±22.2 | 47.0±22.3 | t=2.12; p=0.035 |
| psychological | 46.7±20.9 | 53.3±18.8 | t=2.35; p=0.020 |
| social relationships | 63.3±19.8 | 60.7±19.6 | t=0.91; p=0.362 |
| environment | 52.6±13.9 | 55.8±18.7 | t=1.41; p=0.157 |
| Metabolic syndrome (count - %) | 74 (47.1) | 83 (52.9) | χ²=0.316; p=0.573 |
| depression (count - %) | 18 (24.3) | 28 (37.7) | χ²=1.21; p=0.547 |
| anxiety (count - %) | 35 (37.3) | 34 (41.0) | χ²=7.48; p=0.124 |
| Metabolic syndrome (count - %) | 74 (100) | 83 (100) | χ²=0.516; p=0.473 |
| glucose | 32 (48.5) | 34 (51.5) | χ²=0.06; p=0.806 |
| cholesterol | 81 (45.5) | 97 (54.5) | χ²=1.38; p=0.230 |
| triglycerides | 62 (45.3) | 75 (54.7) | χ²=1.23; p=0.267 |
| Blood pressure | 60 (44.1) | 76 (55.9) | χ²=1.82; p=0.170 |
| Waist circumference | 59 (62.1) | 36 (37.9) | χ²=5.56; p=0.018 |
| BMI | 55 (46.6) | 63 (53.4) | χ²=0.54; p=0.461 |

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activities. Hypothesis of difference in muscle strength had been confirmed by Reeves et al. (17). According to them male were three times more independent than female in climbing the stairs and everyday activities (17). In addition, the literature suggests that less physical activity and higher body mass index in women affected by the poor recovery after stroke (4), which we have not proven in our study. The gender difference in functional outcome can be due to different approaches to their disability, i.e. female patients showing greater level of insecurity and more openly asking for help, while male presenting as more self confident and more covering their need for help (4).

This study found that males had better score only in memory domain (p=0.003), while for the other dimensions there were no statistically significant differences. This can be due to a fact that only small number of female patients had an education longer than 12 years comparing to man. Lai et al (4) confirmed worse recovery results in female in everyday living and physical functioning after CS, and as there was no statistically significant gender difference regarding CS by dimensions suggested the influence of other factors, such as age, poor physical activity before CS and depressive state after CS. Also, they found that if physical activity was good before CS and if depression was controlled, there was no gender difference in everyday activities and greater physical functioning 6 months after CS, but gender differences were evident regarding independence in Instrumental Activities of Daily Living (IADL) (4). The gender differences in everyday activities found by Gargano et al. (1) do not explain age differences, type of CS or co morbidity, but they can be explained by characteristics of CS and its severity, care quality or depression. Galdcr et al. (19) pointed out greater dependence of female patients in everyday activities three months after CS, which was consequence of poor physical condition before CS. Also, they suggested that depression after CS was two times more common in female patients as found during the period of six months to one year after CS (19).

Half of 202 patients had score that suggested presence of clinical depression, while 23.3% had borderline depression (p<0.001). In the group of patients who recovered from CS, 87.1% were depressed when looked into the group of patients aged 65 or above (p<0.001). Depression was common after CS and prevalence ranged 20-65% (20). Patients with depression after CS compared to non-depressed patients were more dependent, had worse response to rehabilitation, and they had delayed return to the community and their everyday activities (21). There was also increase in medical treatment expenses (21). These negative outcomes happen in both, the acute phase and two years after CS. Also, depression in the first few months is associated with increased future mortality for any reason (21). Depressive mood was suggested to predict the quality of life after CS (21). Assessment of depression in patients after CS can be very difficult with a high risk of misdiagnosis (22) which was consistent with findings in this study. Depression and anxiety influenced all dimensions of CS recovery and significantly reduced quality of life.

The finding of no statistical gender difference in average grade for life quality could have been affected by uneven gender distribution, greater number of patients above 65 years of age and greater number of patients with lower level of education. There was also a general dissatisfaction in patients and their family members which could result in general dissatisfaction, poor outcome and results in this group of patients.

**CONCLUSION**

Female patients in general had worse results. Female patients were more anxious than male after CS. It is necessary to prevent the development of depression and anxiety, which can significantly affect the recovery after stroke, particularly in the psychological domain. Also, it is important to prevent metabolic syndrome, especially weight gain that can affect the better recovery of these patients. Inspiring women to greater physical activity can also improve recovery of quality of life in this domain.
LIST OF ABBREVIATIONS

CS - cerebral stroke
FB&H - Federation of Bosnia and Herzegovina
US - United State
SIS - Stroke Impact Scale
WHOQOL-Bref - World Health of Quality of Life-Bref
HADS - Hospital Anxiety and Depression Scale
ATP III - Adult Treatment Panel III
CDC - Control Disease Centre
IADL - Instrumental Activity of Daily Living

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