GLOBAL QUALITY OF LIFE IN PATIENTS WHO HAVE UNDERGONE THE HEMATOPOIETIC STEM CELL TRANSPLANTATION: FINDING FROM TRANSVERSAL AND RETROSPECTIVE STUDY

L. Slovacek1, 2, *, B. Slovackova1, L. Jebavý1, 2
1Department of Field Internal Medicine, Faculty of Military Health Sciences, University of Defence, Hradec Kralove, Czech Republic
2Department of Clinical Hematology of the Second Internal Clinic in the University Hospital and Medical Faculty of Charles University, Hradec Kralove, Czech Republic
3Department of Psychiatry, University Hospital and Medical Faculty of Charles University, Hradec Kralove, Czech Republic

Aim: To analyse the factors which influence global quality of life in patients after the hematopoietic stem cell transplantation at the Department of Clinical Hematology of the Second Internal Clinic of the University Hospital and Medical Faculty of Charles University in Hradec Kralove, Czech Republic. Patients and Methods: The total number of respondents after the transplantation from 2001 to 2003 was 95 and the return rate of questionnaires was 72.1% (71 respondents — 39 men and 32 women, average age — 55.5 years). The Czech version of an international generic European Quality of Life Questionnaire — Version EQ-5D was used. The influence of monitored factors (type of transplantation — autologous, allogeneous, age, sex, education, polymorbidity, marital status, religion and the time lapse from the hematopoietic stem cell transplantation) on the global quality of life in patients was determined by means of dispersion analysis. Results: The above-mentioned factors proved statistically significant dependence of EQ-5D index and EQ-5 VAS on age (in both cases \( p < 0.01 \)), polymorbidity (in both cases \( p < 0.01 \)) and on religion (in both cases \( p < 0.01 \)). EQ-5D index (dimensions of quality of life) and EQ-5D VAS (a subjective health condition) significantly decrease with increasing age and with a higher number of associated diseases, and are significantly higher in patients who believe in God compared to patient without religious beliefs. The influence of other factors on EQ-5D index and EQ-5D VAS was not proven as statistically significant. Conclusion: The global quality of life in patients who underwent the hematopoietic stem cell transplantation at the Department of Clinical Hematology of the Second Internal Clinic of the University Hospital and Medical Faculty of Charles University in Hradec Kralove, Czech Republic, is very high, which is seen from EQ-5D index (72.5%) and EQ-5D VAS (76.5%) values.

Key Words: quality of life, hematopoietic stem cell transplantation, quality of life questionnaires.

The hematopoietic stem cell transplantation is a modern therapeutic method used for biomodulation antitumor therapy of hematological malignancies and of the solid tumors. It is also used for the therapy of non-oncological and hereditary diseases [1, 2]. It is divided into the bone marrow transplantation, the transplantation of stem (progenitor) cells and the umbilical cord blood transplantation. From a donor’s point of view there are three kinds of transplantations: syngenic transplantation (the donor is a monozygotic twin), allogeneous transplantation (HLA from a compatible sibling or parent or HLA from a compatible donor) and autologous transplantation (patient itself is the donor). The aim of the hematopoietic stem cell transplantation is to replace a patient’s pathological bone marrow which contains tumor cells with hematopoietic cells from a healthy donor and to restore hematopoiesis which is damaged by an intensive antitumor therapy [1, 2]. The hematopoietic stem cell transplantation influences the further course of disease, and by this the quality of life for patients in the same way as other therapeutic methods [1, 3, 4].

The quality of life is generally defined as “a patient’s subjective evaluation of his life situation”. This definition is based on Maslow’s theory of needs (the need to sleep, eat, drink etc.) [5]. The quality of life term contains the information on an individual’s physical, psychological, social and spiritual condition [2, 6]. Quality of life evaluation is carried out by means of generic and specific questionnaires [6]. Generic questionnaires generally evaluate a patient’s overall condition regardless his disease. Specific questionnaires are designed for the evaluation of a patient’s overall condition in a particular type of disease. Modules are often used with these specific questionnaires. These modules are focused on specific symptoms and complaints in a particular type of disease. From international specific questionnaires used in particular in hematopoietic stem cells transplantology, we can mention Functional Assessment of Cancer Treatment — Bone Marrow Transplantation Questionnaire (FACT — BMT), Satisfaction with Life Domains Scale — Bone Marrow Transplantation (SLDS — BMT), Quality of Life — Bone Marrow Transplant Survivors Tool Questionnaire (Qol-BMT-ST), Bone Marrow Transplantation — Quality of Life Questionnaire (BMT — QoL), etc. From specific modules we can mention Leukemia/Bone Marrow Transplantation Module, Chronic Graft Versus Host Disease — a specific symptom: 30-Item Symptom Scale etc.

Our study has a few aims: 1) To verify the applicability of the Czech version of an international generic European Quality of Life Questionnaire — Version EQ-5D for the evaluation of global quality of life in patients who underwent the hematopoietic stem cell transplantation at the Department of Clinical Hematology of the Second Internal Clinic in the University Hospital in Hradec Králové. 2) To evaluate the global quality of life in patients who underwent the hematopoietic

Received: August 29, 2005.

*Correspondence: E-mail: ladislav.slovacek@seznam.cz
stem cell transplantation at the Department of Clinical Hematology of the Second Internal Clinic in the University Hospital in Hradec Králové. 3) To analyse factors which influence global quality of life in patients who underwent the hematopoietic stem cell transplantation at the Department of Clinical Hematology of the Second Internal Clinic in the University Hospital in Hradec Králové.

It is a local, transversal, retrospective and descriptive study. Our study is based on data obtained during the year 2004 in 95 patients who underwent the hematopoietic stem cell transplantation.

**PATIENTS AND METHODS**

**Group characteristics.** The total number of patients who underwent the hematopoietic stem cell transplantation at the Department of Clinical Hematology of the Second Internal Clinic from 2001 to 2003 was 171 (135 patients underwent the autologous hematopoietic stem cell transplantation and 36 patients underwent the allogeneic hematopoietic stem cell transplantation). The total number of respondents was 95 (60 patients died and 16 patients underwent retransplantation). The return rate of questionnaires was 72.1% (71 respondents) and we could evaluate 100% of them.

The number of respondents who underwent the transplantation from 2001 to 2003 was the following: in 2001 — 20 respondents (10 men and 10 women), their average age was 55.5 years; in 2002 — 20 respondents (10 men and 10 women), their average age was 55.0 years; in 2003 — 31 respondents (19 men and 12 women), their average age was 55.5 years. Out of the total number of 71 respondents 66 respondents underwent autologous transplantation and 5 respondents underwent allogeneic transplantation (in 2001 there was no respondent with allogeneic transplantation, in 2002 there were 2 respondents and in 2003 3 respondents). In the group of patients with allogeneic transplantation 3 patients had the first degree of chronic graft-versus-host disease (cGVHD). These were patients with acute myeloid leukemia. Tables 1 and 2 show the representation of respondents who underwent the hematopoietic stem cell transplantation according to the type of this transplantation and according to the type of disease.

**Table 1.** Number of respondents according to the type of hematopoietic stem cell transplantation

<table>
<thead>
<tr>
<th>Type of hematopoietic stem cell transplantation</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>Total number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autologous hematopoietic stem cell transplantation</td>
<td>20</td>
<td>18</td>
<td>28</td>
<td>66</td>
</tr>
<tr>
<td>Allogeneic hematopoietic stem cell transplantation</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

**Table 2.** Number of respondents according to the type of disease

<table>
<thead>
<tr>
<th>Type of disease</th>
<th>Number of respondents</th>
<th>Autologous/Allogeneic transplantation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hodgkin’s lymphoma</td>
<td>9</td>
<td>7/2</td>
</tr>
<tr>
<td>Non-Hodgkin’s lymphoma</td>
<td>15</td>
<td>15/0</td>
</tr>
<tr>
<td>Acute lymphoblastic leukaemia</td>
<td>2</td>
<td>2/0</td>
</tr>
<tr>
<td>Acute myeloid leukaemia</td>
<td>12</td>
<td>9/3</td>
</tr>
<tr>
<td>Chronic myeloid leukaemia</td>
<td>1</td>
<td>1/0</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>32</td>
<td>32/0</td>
</tr>
</tbody>
</table>

**Methods.** We used the Czech version of an international generic European Quality of Life Questionnaire — Version EQ-5D [7–9].

This questionnaire evaluates 2 indicators, objective and subjective indicators. The objective indicator includes 5 dimensions of quality of life: ability to move, self-sufficiency, usual activity, pain, complaints, anxiety, depression. Three kinds of answers which express the degree of complaints are offered to each question (no complaints, mild complaints, severe complaints). Totally 243 combinations of health condition exits. The outcome is EQ-5D index (dimensions of quality of life) which has the values from 0 to 1 (0 — the worst health condition, 1 — the best health condition). Subjective indicator includes visual analogous scale (the value of 100 — the best health condition, the value of 0 — the worst health condition). The respondent marks his subjectively perceived health condition at the thermometer scale. The outcome is EQ-5D VAS (a subjective health condition) which has the values from 0 to 100.

The evaluation of questionnaires was carried out by means of descriptive analysis in accordance with European Quality of Life Group methodology [7].

The influence of monitored factors (type of transplantation — autologous, allogeneic, age, sex, education, polymorbidity, marital status, religion and the time lapse from the hematopoietic stem cell transplantation) on the global quality of life in patients who underwent the hematopoietic stem cell transplantation was determined by means of dispersion analysis. We did not monitor the influence of cGVHD on the quality of life in patients who underwent the bone marrow transplantation because of the small amount of patients in the group.

The evaluation selected aspects influencing the global quality of life was carried out by means of variance analysis ANOVA. A complex statistical data processing was performed by means of STATISTIKA 98 EDITION programme.

**RESULTS**

The above-mentioned factors proved statistically significant dependence of EQ-5D index and EQ-5 VAS on age (in both cases \( p < 0.01 \)), polymorbidity (in both cases \( p < 0.01 \)) and on religion (in both cases \( p < 0.01 \)). EQ-5D index (dimensions of quality of life) and EQ-5 VAS (a subjective health condition) significantly decrease with increasing age and with a higher number of associated diseases (Table 3, 4). They are significantly higher in patients who believe in God compared to patient without religious beliefs (Table 5). The influence of other factors on EQ-5D index and EQ-5 VAS was not proven as statistically significant.

**Table 3.** Comparison of mean EQ-5D index and EQ-5D VAS values in individual age groups

<table>
<thead>
<tr>
<th>Age range</th>
<th>Number of respondents</th>
<th>Mean EQ-5D index</th>
<th>Standard deviation</th>
<th>Mean EQ-5D VAS</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–29</td>
<td>6</td>
<td>95.3</td>
<td>11.4</td>
<td>79.2</td>
<td>13.6</td>
</tr>
<tr>
<td>30–39</td>
<td>8</td>
<td>96.2</td>
<td>5.3</td>
<td>85.0</td>
<td>8.4</td>
</tr>
<tr>
<td>40–49</td>
<td>11</td>
<td>89.6</td>
<td>12.7</td>
<td>76.2</td>
<td>15.6</td>
</tr>
<tr>
<td>50–59</td>
<td>23</td>
<td>70.2</td>
<td>15.4</td>
<td>67.0</td>
<td>14.0</td>
</tr>
<tr>
<td>60–69</td>
<td>17</td>
<td>65.4</td>
<td>9.5</td>
<td>64.1</td>
<td>13.7</td>
</tr>
<tr>
<td>70–79</td>
<td>7</td>
<td>57</td>
<td>9.6</td>
<td>64.5</td>
<td>11.1</td>
</tr>
</tbody>
</table>

The influence of monitored factors proved statistically significant dependence of EQ-5D index and EQ-5 VAS on age (in both cases \( p < 0.01 \)), polymorbidity (in both cases \( p < 0.01 \)) and on religion (in both cases \( p < 0.01 \)). EQ-5D index (dimensions of quality of life) and EQ-5 VAS (a subjective health condition) significantly decrease with increasing age and with a higher number of associated diseases (Table 3, 4). They are significantly higher in patients who believe in God compared to patient without religious beliefs (Table 5). The influence of other factors on EQ-5D index and EQ-5 VAS was not proven as statistically significant.
Three main outcomes follow from our study: 1) We proved the influence of age on the quality of life in patients who underwent the hematopoietic stem cell transplantation. Our results show that a lower quality of life correlates with increasing age of patients who underwent the hematopoietic stem cell transplantation.

De Souza [10], Heinonen [11], Wang [12], Wong [13], Andrykowski [3] and Zittoun [14] discovered a similar trend in their studies. De Souza [10] points out in his longitudinal study conducted in the group of 26 patients (13 patients who underwent the bone marrow transplantation and 13 patients who underwent the peripheral stem cell transplantation) a lower quality of life in both groups of these patients. He found no differences according to the type of hematopoietic stem cell transplantation. Patients were tested by means of a generic WHO QOL-100 Questionnaire and Hospital Anxiety and Depression Scale. De Souza [10] further explained his statements by the fact that with increasing age a number of associated diseases can occur (poly morbidity). These diseases reduce the quality of life. Choi [15] also agrees with this opinion in his transversal study conducted in the group of 244 patients with hematological malignities who underwent the allogenous bone marrow transplantation. He divided these patients into 3 groups (the first group was 1 year after the allogenous transplantation, the second group was 3 years after the allogenous transplantation and the third group was 5 years after the allogenous bone marrow transplantation). Methodologically patients were tested by means of Psychosocial Adjustment to Illness Scale. Choi [15] also points out the fact that in addition to polymorbidity a negative influence of cGVHD on a lower quality of life in patients with increasing age should be stressed. Wang [12], Wong [13] and Andrykowski [3] also agree with the influence of cGVHD on a lower quality of life in patients with increasing age. Zittoun [14] discovered another interesting piece of information in his transversal study conducted in the group of 179 patients with hematological malignities who underwent the hematological stem cell transplantation. He points out that increasing overall fatigue and emotional complaints which decrease the quality of life correlate with increasing age. Patients were tested by means of a specific EORTC QLQ-C30, HADS and a specific Leukemia / Bone Marrow Transplantation Module. So [16] also discovered an interesting piece of information in his transversal study conducted in the group of 157 patients with hematological malignities who underwent the bone marrow transplantation. He proved a high degree of overall fatigue in patients over the age of 50 with associated diseases. Patients were tested by means of Fatigue Scale — Chinese Version. Another author who agrees with Zittoun’s [14] and So’s [16] opinions is Saleh [17]. He conducted a transversal study in the group of 41 patients who underwent the bone marrow transplantation. This author points out that in patients with an increasing number of associated diseases there is a lower overall physical condition and this means the lower quality of life. Patients were tested by means of a specific QOL-BMT-ST 30 months after the bone marrow transplantation [17].

2) We proved the influence of polymorbidity on the quality of life in patients who underwent the bone marrow transplantation. Our results show that a lower quality of life correlates with an increasing number of associated diseases (poly morbidity). Our results correlate with the results of significant studies conducted by De Souza [10] and Choi [15]. Zittoun [14] discovered an interesting piece of information which showed the correlation among polymorbidity, overall fatigue and emotional difficulties. Molassiotis [18] also agrees in his longitudinal study conducted in the group of 40 patients who underwent the bone marrow transplantation with Zittoun’s [14] opinion which concerns the emotional lability. He evaluated the emotional lability of these patients by means of Emotional Difficulties Scale. This scale was presented to patients before the bone marrow transplantation. Another scientist who agreed with this opinion was So [16] in his transversal study conducted in the group of 157 patients with hematological malignities who underwent the bone marrow transplantation. He proved a high degree of overall fatigue in patients over the age of 50 with associated diseases. Patients were tested by means of Fatigue Scale — Chinese Version. Saleh [17] also agrees in his transversal study conducted in the group of 41 patients who underwent the bone marrow transplantation with Zittoun’s [14] and So’s [16] opinions. This author stresses the fact that in patients with an increasing number of associated diseases there is a lower overall physical fitness and this causes a lower quality of life. Patients were tested by means of a specific QOL-BMT-ST 30 months after the bone marrow transplantation. Heinonen [11] recorded in his longitudinal study conducted in the group of 109 patients who underwent the allogenous bone marrow transplantation a lower quality of life in patients in connection with polymorbidity, increased morbidity, increasing overall fatigue and worse quality of sleep. When he compared polymorbid men and women who underwent the allogenous bone marrow transplantation he discovered a lower quality of life in women. Edman [19] arrived at similar results in his transversal study conducted in the group of 25 Swedish patients who underwent the allogenous peripheral stem cell transplantation. He states that polymorbidity is
associated with greater physical complaints, increased morbidity, emotional lability (anxiety and depression), sexual problems and sleep disorders. Patients were divided into 3 groups and then tested. The first group was tested by means of a generic Sickness Impact Profile Questionnaire. The second group was tested by means of Frequency Intensity and Distress Scale and the third group by means of Sense of Coherence Scale. All three questionnaires evaluate subjective functional condition, physical complaints and the ability to cope with a particular disease. Patients were tested 2 years after the allogenous peripheral stem cell transplantation. Edman [19] found no differences in the quality of life evaluation in patients who underwent the hematopoietic stem cell transplantation. However physical complaints, sexual problems, increased morbidity, anxiety, depression and sleep disorders were recorded in all three questionnaires and in more than half of patients. In the same way as Heinonen he points out that the above-mentioned complaints are connected with polymorbidity.

3) We proved the influence of religion on the quality of life in patients who underwent the hematopoietic stem cell transplantation. It is clear from our results that the quality of life in patients who underwent the hematopoietic stem cell transplantation and believed in God was higher than in patients who were non-believers. Pospíšilová [20], Entonen [21] and Bach [22] recorded these changes in values in patients who underwent the bone marrow transplantation. The above-mentioned changes often mean that the patient has to stop various activities, including his interests and hobbies [20]. Boyd [23] proved significant changes in patients who underwent the hematopoietic stem cell transplantation and believed in God. Patients who believed in God had a higher quality of life than non-believers.

Based on our study we can further state that the global quality of life in patients who underwent the hematopoietic stem cell transplantation at the Department of Clinical Hematology of the Second Internal Clinic in the University Hospital in Hradec Králové is very high, which is seen from EQ-5D index (72.5%) and EQ-5D VAS (76.5%) values.

In conclusion, it is common in the clinical practice to evaluate a patient’s health condition and the success of the treatment based only on one type of markers, the most often by means of somatic, laboratory or detecting markers. But the trend in modern medicine is to evaluate a patient’s health condition in a more complex way, using other aspects. The quality of life means more dimensional evaluation of a number of life aspects. Different aspects can be affected in a different way in a different phase of the disease and its treatment. That is why this information enriches our knowledge concerning patient’s needs and it can significantly contribute to the medical treatment improvement. It can also help us to reveal the mechanisms which modify the origin and the course of disease. There is a very good experience abroad with “Quality of Life Team” which consists of a treating physician (in case of the hematopoietic stem cell transplantation it is a haematologist), a transplantologist, nurses who are educated in the problem of the quality of life for patients, a clinical psychologist, a psychotherapist, a social worker and also a data manager. The reason why to establish these special teams is that by providing care to the patient and support to his family a good surrounding for the patient who underwent the hematopoietic stem cell transplantation can be created after his return home. This good surrounding can help the patient to adopt well [24].

We are aware of the fact that our study can be limited by a few factors:

The transversal type of the study informs us only about the quality of life of patients at a certain time after the hematopoietic stem cell transplantation and it does not show developmental trend.

The study deals only with the influence of selected factors on the quality of life. We could add a few other factors. But we decided for these factors because patients were able and willing to provide this information in retrospectively and anonymously carried out study.

The small group of patients who underwent allogeneous transplantation and in particular the small group of patients with cGVHD manifestations who underwent the allogenous transplantation is also a certain limitation. For this reason we cannot evaluate the influence of cGVHD on the quality of life. The number and composition of the group of respondents is given by the spectrum of patients treated in our Department.

REFERENCES
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КАЧЕСТВО ЖИЗНИ БОЛЬНЫХ ПОСЛЕ ПЕРЕСАДКИ ГЕМОПОЭТИЧЕСКИХ СТВОЛОВЫХ КЛЕТОК: РЕЗУЛЬТАТЫ РЕТРОСПЕКТИВНОГО ИССЛЕДОВАНИЯ

Цель: проанализировать факторы, влияющие на качество жизни больных после пересадки гемопоэтических стволовых клеток в отделении клинической гематологии второй клиники госпиталя университета и медицинском факультете университета в Храдек Кралове, Чехия. Паценты и методы: общее число респондентов, перенесших трансплантацию в период 2001–2003 гг., составило 95. Анкеты заполнили 72,1% респондентов (71 человек — 39 мужчин и 32 женщины, средний возраст 55,5 лет). Использовалась чешская версия международного аналога европейского опросника качества жизни (версия EQ-5D). Влияние ряда факторов (тип трансплантации — аутологическая, аллогенная, возраст, пол, образование, общая заболеваемость, семейное положение, религиозность и период после трансплантации) на качество жизни больных определяли методом дисперсионного анализа. Результаты: для перечисленных выше факторов установлена статистически значимая зависимость индексов EQ-5D и EQ-5 VAS от возраста больных (в обоих случаях p < 0,01), заболеваемости (в обоих случаях p < 0,01) и религиозности (в обоих случаях p < 0,01). Индексы EQ-5D (показатели качества жизни) и EQ-5D VAS (индивидуальные показатели здоровья) значительно снижаются с увеличением возраста и числа сопутствующих заболеваний и повышаются у верующих пациентов по сравнению с таковыми у неверующих. Влияние прочих факторов на индексы EQ-5D и EQ-5 VAS не имеет статистической значимости. Выводы: качество жизни больных после пересадки гемопоэтических стволовых клеток в отделении клинической гематологии второй клиники госпиталя университета и медицинском факультете университета в Храдек Кралове, Чехия является высоким, о чем свидетельствуют значения индексов EQ-5D (72,5%) и EQ-5D VAS (76,5%).

Ключевые слова: качество жизни, пересадка гемопоэтических стволовых клеток, вопросник качества жизни.