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EVALUATION OF THE HEALTH-RELATED QUALITY OF LIFE DURING THE TREATMENT OF SEVERE BURN COMPLICATED BY MULTIPLE ORGAN DYSFUNCTION SYNDROME (MODS)

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SUMMARY

Aim of the study:

The aim of the research was an evaluation of the quality of life for an elderly patient treated for third-degree burn with the complication of multiple organ dysfunction syndrome (MODS).

Case study:

The patient, aged 79, was admitted to the Malopolska Center for Burns and Plastic Surgery at the Ludwik Rydygier Memorial Specialist Hospital, Krakow a week after burn. On admittance the presence of inveterate third-degree burns to the head, neck, right arm and lower limbs, which covered over 30% of the total body surface area, was diagnosed. The necrosis was removed; the wounds were closed by skin graft. The patient was treated according to a comprehensive rehabilitation programme. Tests into quality of life involved a clinical interview and measurement on the SF-36 scale. It was ascertained during the first test, one taken immediately on admittance to the burns unit, that the patient experienced a poor quality of life, something, which resulted chiefly from the lack of a sense of security and the previous hospital stay in a unit affording no professional medical care. In the second test, one taken 7 days after treatment at the MCOP, and after the third, following 14 days of treatment, the patient evaluated his quality of life as good. The improvement in the quality of life was connected to the absence of physical and psychic symptoms as well as being a result of the sense of security now felt derived from the professional help received. It was known from the interview that as soon as the first symptoms of multiple organ dysfunction syndrome (MODS) appeared the sense of quality of life started to deteriorate rapidly. At the moment when such a sensation became severe the patient was intubated with consciousness being pharmacologically switched off. At the same time as work was carried out on the correct healing of the burn wounds intensive effort was put into improving the patient's general state of being and the multidisciplinary treatment of the patient was conducted. However, after 24 days from the date of the burns MODS developed and the patient died in the symptoms of circulatory and respiratory insufficiency.

Conclusions:

An analysis of the test results obtained on the SF-36 scale allows one to state that the severely burned patient's quality of life was connected with the general state of his health both the physical and psychological as well as with the medical care offered. A deterioration in health along with a sense of poor life quality resulted from the patient being left without professional medical care at a previous medical unit, while an improvement in the evaluation of quality of life was obtained thanks to the specialist help he received enabling for a reduction of consequences of the burn.

Key words: comprehensive rehabilitation, sensomotor reintegration, PTSD, depression

INTRODUCTION

Severe burn injury induces mechanisms for pathophysiological responses for trauma what affects almost every system and is linked to the risk of *multiple organ dysfunction syndrome*, MODS development (Heimbach 1996; Rea et al 2005; Strużyna 2006; Renneberg et al 2014).

In the first 8-12 hours after burn several mediators are released in the organism, such as kinins, prostacyclin, prostaglandins, leukotrienes and thromboxanes. These factors mediate endothelial damage of capillaries, which is manifested by the presence of breaks (gaps) in its continuity what causes the incorrect migration of cellular fluids and proteins. In the initial stage of burn disease those changes are reversible, otherwise this pathology causes the symptoms of the hypovolemic shock.

The condition required to avoid this complication is correct fluid resuscitation as the basic method in the treatment of burn shock (Wach and Chrapusta 2012).

The absence of proper general treatment, even although providing the proper local treatment can ends in a full developed multi organ dysfunction syndrome.

Then prognosis for patient survival depends on the number of the affected organs and is highly remote in cases whereby more than two organs fail. A severe state is linked to the need for artificial respiration and the treatment of cardiovascular failures meaning that two systems are affected: the respiratory and the circulatory (Strużyna 2006). There additionally appear features of damage to any other organ whatsoever, like, for instance, the liver or kidneys, something that may initially be seen in biochemical tests, subsequently in clinical symptoms and which represents a dramatic increase in the threat to the burn patient's life. (Wach and Chrapusta 2012).

Despite the unfavourable prognosis for the patient there is no border at which treatment should be stopped and it becomes necessary for further engagement on the part of a surgical-anaesthetic team involving the modern medical technologies such as dialysis therapy, hyperbaric oxygen therapy, the negative pressure therapy of wounds as well as wound cleaning, the fight against wound infection, and the application of specialist dressings (Chrapusta & Pachalska 2014)

One may evaluate a patient's quality of life up to the moment of switching on artificial respiration or after disconnecting a patient from a respirator and a return to independent breathing and consciousness. The effect on the patient's subjective sense of quality of life is comprised of a number of factors including the presence or absence of pain, breathlessness, movement limitation resulting from a fall in physical strength as equally fear of upcoming surgical procedures. (Pavoni et al. 2010; Renneberg et al 2014)

The aim of the research was an evaluation of quality of life connected with an elderly patient's state of health having been treated for third degree burns to sizeable areas of the body exceeding 30% of the total body surface.

Case study

The patient, HS, aged 79, was admitted to the Malopolska Center for Burns and Plastic Surgery at the Ludwik Rydygier Memorial Specialist Hospital, Krakow

a week after experiencing thermal burn in an open expanse. Of notable difficulty in the evaluation of the results in the case of this patient was the fact that immediately after being burnt the patient spent a week being hospitalised at a regional hospital where the evaluation of the burns as equally the treatment afforded were far from the standards employed at specialist burn centers. Medical treatment was limited to changes of dressings in the patient's room, without anesthesia or analgesia. After a week's conservative treatment the patient was discharged home with instructions on bathing and wound dressing. Directly after being discharged from the regional hospital the patient reported to the MCOP Burns Unit in Cracow. The reason the patient admission to the burns centre was his general poor state of health, a high temperature and doubts concerning the appearance of the burn wounds and a fear for his own life. On admittance the presence of inveterate burn wounds to the head, neck, right arm and lower limbs was immediately confirmed; wounds of the depth of the third degree had covered over 30% of the total body surface area. These were wounds to: the right side of the face, the right ear, the environs of the temple, forehead and neck as well as side burns on the right and partly to the fore and rear surfaces of the thighs, from the midpoint of the crus and astragalus joints of both lower limbs (Fig. 1 and 2). The patient experienced disturbances in sleep and suffered from nightmares. In addition during the course of the day sporadic flashbacks occurred during which the patient would see his own accident and the burning construction. In the medical records there was an absence of information on general treatment administered during the first 24 hours of shock and in particular fluid therapy. No surgical treatment of wounds was undertaken at the other (first) centre.

In the course of treating the patient at MCOP a gradual removal of the necrotic wounds was carried out. The face was treated openly through the use of ointments enhancing necrotic wound debridement and the obtainment of correctly



Fig. 1. Inveterate burn wounds to the lower limbs prior to the first surgical removal of necrotic tissue at MCOP in Cracow



Fig. 2. inveterate burn wounds to the face and neck prior to the first surgical removal of necrotic tissue at MCOP in Cracow

controlled wound healing. All procedures on the burn wounds including dressing change were conducted in operating theatre conditions under general anesthesia or the use of analgesia (sedoanalgesia) providing a comfortable, painless treatment of a patient. This allowed the surgeons to perform radical treatment, whose aim was the rapid, yet safe for an elderly patient, excision of the necrosis and wound closure with a skin graft. The three stages of necrosis removal conducted were finalized by the covering of the lower limb burn wounds with mesh split thickness skin grafts with a mash ratio of 3:1. The final closure of the wounds by means of autologous skin grafts took place on the 11th day following patient admittance. A satisfactory result of the healing process was achieved (Fig. 3)



Fig. 3. The wound condition after the removal of the necrosis of the lower limbs and the closure of the wounds by the mesh skin graft with a mash ratio of 3:1 – in the course of the correct healing of the grafts

During procedures nutritional treatment, antibiotic therapy was carried out as well as blood and plasma transfusions to compensate for the losses. Rehabilitation was also introduced in addition to neuropsychotherapy. Highly qualified specialists conducted exercises and therapeutic sessions daily. The aim being a physical improvement in the patient, an increase in the psychic level of comfort experienced, specific sensomotor reintegration directed towards a more realistic appraisal of the patient's state of health, prevention of the development of Post-traumatic Stress Disorder (PTSD) and depression, as well as undertaking a battle with disease and the teaching of new means for a better patient functioning in conditions of severe burns.

QUALITY OF LIFE CONNECTED WITH BURNS

The SF-36 scale was used to evaluate quality of life. The SF-36 was developed in the United States in the late 1980s as part of the Medical Outcomes Study, a longitudinal investigation of the self-reported health status of patients with a range of chronic conditions [Ware 2000].

One of the most important factors in the quality of life is life satisfaction, which is reported as the "ultimate end point to the health-care pathway." [Chow et al. 2009] Some authors believe that satisfaction is a simple measure of service and of secondary importance to safety and the effectiveness of care. [Godil 2009; Wright 1999] However, most physicians across all specialties agree that any care delivery that is ineffective or not safe is of low quality regardless of whether patients are satisfied with their health-care service, [Godil 2009] something which is also connected with the quality of life. (Chrapusta & Pachalska 2014)

At present the SF-36 is increasingly frequently used in the world to evaluate quality of life connected with the state of health in various medical conditions (Kłosiński et al. 2014) including those connected with burns and scalding. (Pachalska & Chrapusta 2013)

The patient completed the SF-36 scale three times; Test 1 was conducted immediately after admittance to the ward (baseline), Test 2 at the end of the first week of treatment, Test 3 after the second week of treatment. The total time for completion of the questionnaires and interview was 24.5 ± 3.7 minutes with assistance. The protocol of this study has been approved by the Bioethical Committee. The patient agreed to participate in this study. The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

The results obtained by the patient, HS, on the SF scale as conducted upon ward admittance (baseline), after a week as well as after two weeks of treatment are illustrated in Figure 4.

An analysis of the test results confirm that in the baseline test immediately after admittance to the Malopolska Center for Burns and Plastic Surgery at the Ludwik Rydygier Memorial Specialist Hospital, Krakow, the patient evaluated his quality of life as bad, something borne out by the high results in the individual

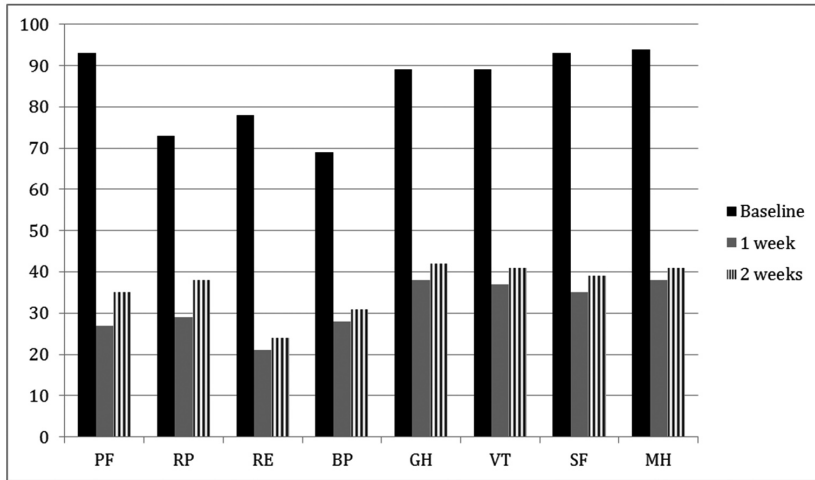


Fig. 4. Results on the SF scale obtained by the patient, HS, in tests conducted on ward admittance (baseline), after a week and after two weeks of treatment

PF – physical functioning; RP – role limitations due to physical health problems; RE – role limitations due to emotional problems; BP – bodily pain; GH – general health perceptions; VT – vitality; SF – social functioning; MH – general mental health

components of this quality. He complained that he had never imagined that someone could so quickly lose their physical condition and connected this fact with the general state of his health following burns as well as his having been exposed to inappropriate medical care at the previous medical unit.

In the second test conducted 7 days after admittance for treatment at MCOP there occurred a breakthrough in the patient's psyche and in connection with this an improvement in the subjective sense of quality of life, something borne out by the significantly lower results in all the quality components. The patient was of the view that his quality of life was good, something he confirmed in a clinical interview and in talks with the lead doctor. The patient was pleased that he could sit up in bed, that he slept well and that he had neither in his dreams nor when awake nightmarish visions, that he ate a lot and that he had rehabilitation exercises which worked towards improving his physical condition. He also valued the neuropsychotherapy selected especially for his needs, which allowed him to understand how he was to cope with his illness.

In the third test conducted 14 days after the commencement of treatment at MCOP, the patient still considered his quality of life to be good although he claimed to suffer from flatulence. When the first symptoms of multiple organ dysfunction syndrome (MODS) appeared, his sense of quality of life started to quickly deteriorate, yet this was still not a major problem. The patient emphasised that had hope of getting better and his condition was helped by daily telephone conversations with a female friend and his closest family who lived in the United States.

At the moment when the sense of a worsening in quality of life became severe the patient was intubated and his consciousness was pharmacologically

switched off. Then the fight for his recovery was continued. Despite correct healing of the wounds from the 21st day of burns until the 14th when he was admitted to hospital multiple organ dysfunction syndrome set in, the first symptom of which was an increase in creatinine and urea, which pointed to kidney damage. Permanent hemodialysis with a citrate anticoagulation was introduced. At the same time the patient became apathetic and lost his appetite. On the following day his state underwent a dramatic deterioration culminating in respiratory failure resulting in the patient being intubated. Occurred intestinal motility disorders, the symptoms of bloating characteristic of inflammatory bowel disease and circulatory disorders which resulted in the patient's death on the 24th day.

DISCUSSION

Analysis of a patient's quality of life during the course of treatment for severe burns is a neglected subject within world medical literature (Pačalska & Chrapusta 2013; Chrapusta & Pačalska 2014; Renneberg et al. 2014). Despite the fact that clinicians in everyday work attempt to improve the level of patient comfort through, for example, changing dressings in cooperation with an anaesthesiologist with the aim of minimizing pain, there have still not been conducted an evaluation or systemization of types of patient feelings. It is known from the subject literature that a sense of fear or lack of a feeling of safety/security as equally the level of pain experienced are closely connected with the immunology system, something that is especially important in severe burn cases (Wright 1999; Strużyna 2006; Renneberg et al. 2014). An additional factor affecting a patient's sense of comfort is the guarantee of sleep. Of significance is the prevention of Posttraumatic Stress Disorder (PTSD). (Min-Kung et al. 2007) An equally important element is ensuring contact with the outside world also at those periods not designated for family and carers' visits, (Wisley et al. 2007) which may be achieved through listening to music or watching television and also, and this was of especial significance in the case of our patient, through enabling evening telephone calls with the patient's nearest and dearest. Obviously here we have in mind patients who are conscious, and who breath unaided.

In the case of the patient herein described despite the bad diagnosis resulting from the inability to carry out the correct general tests in the first hospital i.e., during the first week following the burns, a great effort was undertaken to allow for the closing off of the burn wounds and the bringing of the organism out of a state of latent multiple organ malfunction. At the same time a constant control over the quality of the patient's life was maintained.

Cohort studies (Renneberg et al. 2014) show that:

'physical health was mainly predicted by mobility and level of burn severity. Variance in mental health status was mainly predicted by gender, mobility, neuroticism, level of depression and posttraumatic stress disorder (PTSD)-related avoidance. Thus mobility (i.e., simple abilities) seems a crucial variable for overall quality of life.'

These views are in accordance with our observations for the patient described by us, although unable to move unaided, did, however, take pleasure from and appreciated the fact that he was able to sit up unaided in his bed, something that resulted in him better evaluating the quality of his physical health. Important was the identification and reduction during the neuropsychotherapy process of the symptoms of PTSD - thanks to which one observed an improvement in the quality of sleep without nightly nightmares, which could have resulted in an improved evaluation of psychic health. Of immense importance could also be the psychological support gained by telephone conversations with people close to the patient, something that finds reflection in the subject literature as an important factor in an evaluation of quality of life. (Chrapusta & Pačhalska 2014)

In the world subject literature there have to date been no questions asked as to how a patient feels following severe burns; one who has in addition experienced neglect in treatment and in whom there has developed burn disease in conjunction with the symptoms of PTSD. The above presented patient description, one affected by such a situation, may help one to better understand the matter if we were to describe the destabilisation of the body's neuromatrix as a cause of the patient's illness. This results from incomplete sensory information being conveyed from the burned face, arm and leg as well as items of motor information from the burned limbs (cf. Fig. 5).

The specific sensomotor reintegration offered in neuropsychology thanks to the activation of other connectors within the brain allows for repair of the **body's sensory-motor stabilisation and for a reconstruction of the body's neuromatrix**. Then a better allocation of the brain's stocks becomes possible, allowing for a more realistic evaluation of the actual state of health and therefore an active participation in the process of recuperation, the prevention of the development of Posttraumatic Stress Disorder (PTSD) and depression. Possible becomes a fight with the illness and the learning of new ways for a better functioning within burn disease itself.

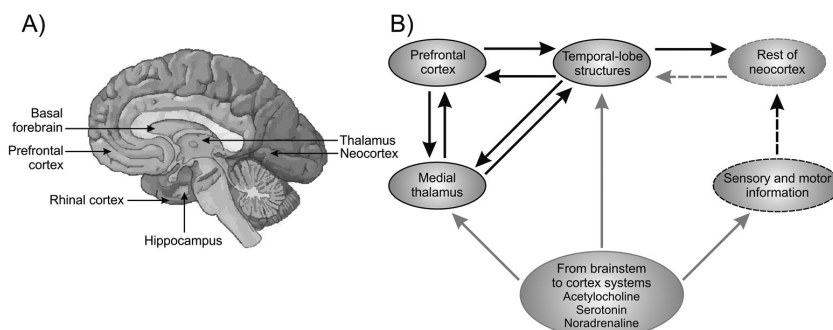


Fig. 5. Sensory-motor destabilisation and disintegration of the body's neuromatrix in the burn illness of the examined patient. The dotted line represents destabilisation in the neurological connectors. Source: author's study

Not every patient suffering from severe burns has the chance to survive. This concerns chiefly patients with a large area of burn wounds, and in particular patients with so-called inveterate wounds, something that affected our patient. Passing over patients for whom there should be guaranteed a comfortable death (this concerns patients for whom almost the entire skin has been burnt), there should be no avoidance whatsoever of steps designed to ensure a raising of life quality in moments of complete consciousness when the patient is breathing independently. Equally when a patient is being treated in conditions of artificial respiration, with respirator aided breathing, preventive treatment is conducted allowing for potential patient comfort after the introduction of independent breathing. (cf. also Pačalska 2014). Such actions are e.g., antidecubital preventive treatment and passive rehabilitation which are essential elements in everyday care. It should be also stressed that the proper assessment of the depth and the surface of the burn are crucial in the optimal choice of treatment (Strużyna 2006).

Unfortunately, although it is well known that appropriate first aid in burn injuries improves outcome, there are many situations in which patients do not receive appropriate care (Rea et al 2005; Karaoz 2010; Graham et al 2012; De Souza et al 2003). Despite the fact that this situation was equally the case with our patient it is all the same worthwhile in engaging in the fight to cure a patient and his life quality. For this is the basis in ensuring for all patients, and in accordance with the medical ethics code, a good quality of life within the process of dying and a dignified death.

CONCLUSIONS

The analysis of the test results obtained on the SF-36 scale allows one to state that the quality of life of a patient with severe burns is connected with the general state of his physical and psychic health as well as the medical care provided. A deterioration in the state of health as well as a feeling of poor life quality resulted from the patient being deprived of suitable professional care at the initial medical unit where he was treated, while the improvement in the evaluation of life quality obtained thanks to specialist care resulted in a reduction in the symptoms connected with burn injury leading to a reduction in its intensity.

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