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Sexuality of men treated with haematopoietic stem cell transplantation: a review of the literature

Ladislav Slovacek[1,2,3], Birgita Slovackova[4], Zuzana Macingova[3], Ladislav Jebavy[1,2]

[1] Department of Field Internal Medicine, University of Defence, Faculty of Military Health Sciences, Hradec Kralove, Czech Republic
[2] 2nd Department of Medicine, Charles University Hospital and Faculty of Medicine, Hradec Kralove, Czech Republic
[3] Department of Clinical Oncology and Radiotherapy, Charles University Hospital and Faculty of Medicine, Hradec Kralove, Czech Republic
[4] Department of Psychiatry, Charles University Hospital and Faculty of Medicine, Hradec Kralove, Czech Republic

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Summary

Haematopoietic stem cell transplantation (HSCT) is a therapeutic modality used in anti-tumour treatment of haematological malignancies as well as solid tumours. Apart from that it is also used in therapy of non-malignant and hereditary diseases. As well as all the other treatments, HSCT also affects the disease process and with that also the patient's quality of life (QoL). In the last decade of the 20th century several studies about QoL in patients after HSCT were undertaken and the influence in particular dimensions of QoL was observed. One of the closely observed aspects was sexuality in patients after HSCT. Sexuality and its expression is a very important aspect of human behaviour. It is also a very sensitive aspect, so without doubt it is affected by diagnosis of neoplasm and cancer treatment. Physical and psychosocial factors of HSCT affect patients' sexuality and sexual functioning, and with that also their QoL. They remain in focus because of the complex care concerning patients after HSCT.

Key words sexuality • haematopoietic stem cell transplantation • quality of life

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Author's address: Ladislav Slovacek, M.D, Ph.D, Major, University of Defence, Faculty of Military Health Sciences, Department of Field Internal Medicine, 1575 Trebesska Str., 500 01 Hradec Kralove 1, Czech Republic, European Union, e-mail: ladislav.slovacek@seznam.cz

BACKGROUND

Haematopoietic stem cell transplantation (HSCT) is a therapeutic modality used in anti-tumour treatment of haematological malignancies as well as solid tumours. Apart from that it is also used in therapy of non-malignant and hereditary diseases [1]. The process of HSCT is for the patient quite challenging, for several reasons. First of all there are unwanted effects of systematic chemotherapy, and repetitive invasive performances – central and peripheral vein catheterization, diagnostic aspiration of bone marrow, and so on. In men there is also sperm taking followed by cryoconservation of seminal fluid because of the possibility of reproductive organ dysfunction caused by intensive anti-tumour therapy (permanent or temporary infertility). Hormone replacement therapy is indicated in young females, because of the possibility of damaging the reproductive organs. Also we have to consider several weeks' isolation in a sterile box. There is increased sensibility to opportunistic infections (bacterial, viral, fungal, mycoplasmatic, etc.) as an effect of bone marrow toxicity caused by high-dose chemotherapy. Besides those symptoms, the patient is loaded with the results of toxicity caused by high dose chemotherapy (mucositis, gastroenteritis, dermatitis, alveolitis, signs of cardiotoxicity and neurotoxicity). A serious complication is acute or chronic graft-versus-host disease (GVHD), which is the result of allogeneic transplantation (from a relative or non-relative donor). Acute GVHD affects especially the liver, mucosa of the intestinal tract and skin. Serious forms can cause death. Chronic GVHD damages particularly the intestinal tract and skin and can handicap the patient. When listing all possible risks and complications it is necessary to mention that in high-dose chemotherapy followed by HSCT it cannot be guaranteed 100% that all malignant cells will be eliminated. There is a possibility of relapse and as an optional treatment we can again choose high dose chemotherapy followed by HSCT [1].

As well as all the other treatments HSCT also affects the disease process and with that also the patient's quality of life (QoL) (see Figure 1). In the last decade of the 20th century several studies on QoL in patients after HSCT were undertaken and the influence on particular dimensions of QoL was observed. One of the closely observed aspects was sexuality in patients after HSCT (see Figure 2).

SEXUALITY, SEXUAL MOTIVATION, SEXUAL DYSFUNCTION

Sexual health is defined by the World Health Organization as "a state of physical, emotional, mental and social well-being related to sexuality; not merely the absence of disease, dysfunction or infirmity". All those aspects enrich and advance personality, communication and love of humans [2].

Human sexual behaviour is the result of a long evolutionary process, and therefore behaviour that human beings use when seeking sexual or relational partners, gaining approval of possible partners, forming relationships, showing affection and mating. It could be quite imperative, to some extent not depending on rational control mechanisms [3]. For didactic reasons we suggest considering 4 components of human sexuality, which are [4]: 1. sexual identity (sexual role), 2. sexual orientation (erotic preference), 3. sexual emotion (sexual excitement, orgasm, love), 4. sexual behaviour. Sexual identity based on sexual orientation is the headstone for sexual motivation. The sign of sexual identity is the ability of individuals to take a corresponding social role. The basic dimorphism in sexual orientation results from the principle of bisexual differentiation. Normal sexual orientation means that it is related to a sexual mature person of the opposite sex. Sexual emotions include: sexuality, sensational peak (orgasm) and emotion of love (erotic fascination). Sexual behaviour has a tendency to form a pair. A sexual pair tends to stick together and shows restriction in sexual behaviour to the other member of the unit. In a well functioning pair sexuality is experienced more naturally and more intensively [4].

Sexual dysfunctions are known as quantitative disorders of sexual performance [3]. The behaviourist conception of sexual dysfunctions results from the conception of four basic components of human sexual behaviour [3,4]: 1. sexual appetite, 2. sexuality, 3. orgasm, 4. sexual satisfaction. Aetiology of sexual dysfunctions is multiplex, and is composed of constitutional, biological, psychological and social factors [3,4].

CHANGES IN SEXUALITY OF MEN TREATED BY MEANS OF HSCT AND INFLUENCE OF HSCT ON QOL

Diagnosis of malignity, subsequent treatment with high dose chemotherapy followed by HSCT and its complications and their treatment, all according to Ferrell [7] can lead to changes in a patient's

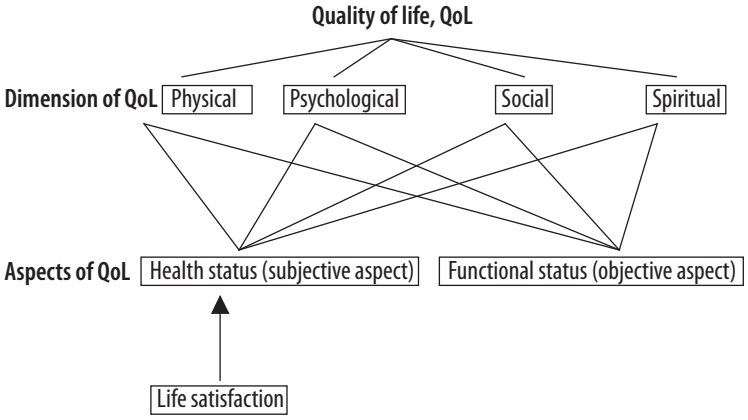

Figure 1. Dimensions of QoL [1]. The QoL term contains information on an individual's physical, psychological, social and spiritual condition.

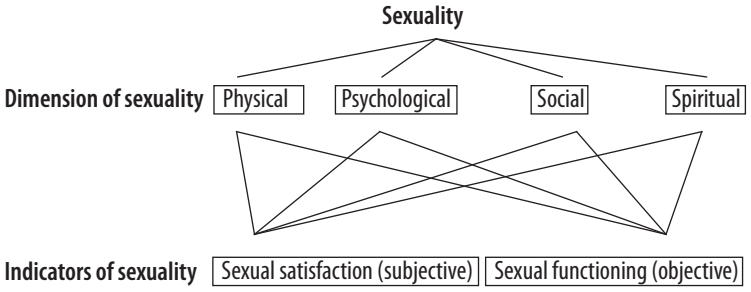

Figure 2. Dimensions of sexuality with objective and subjective indicators [3,4].

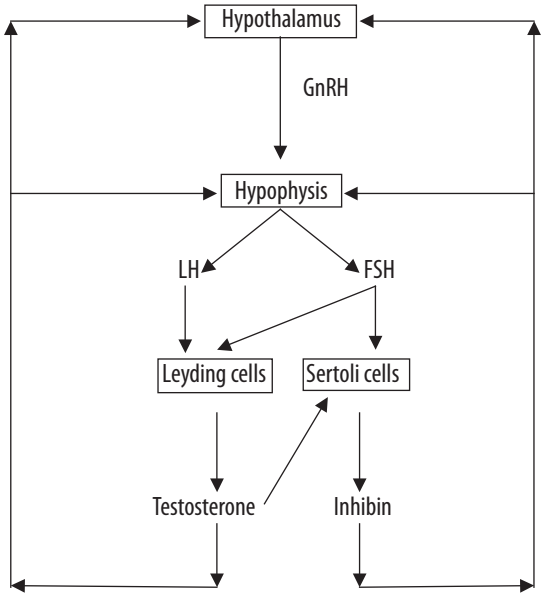

Figure 3. Hypothalamo-pituitary-gonadal axis in man [19]. GnRH – gonadoliberins, LH – luteinization hormone, FSH – follicle stimulating hormone.

sexual life, particularly in accordance with sexual dysfunctions and sexual frustration. Sexual dysfunctions and sexual frustration are often mentioned as factors which negatively influence QoL in patients after HSCT [9,10]. According to Marks [11], Molassiotis [12,13] and Schubert [14], loss of desire for sex, ejaculation disorders, erectile dysfunction and infertility are the most common sexual problems in men after HSCT. Incidence of sexual dysfunctions or dissatisfaction in men after HSCT is high, as evidenced by the results of Andersen's study [15]. The study observed sexual dysfunctions in more than 90% of patients with neoplasia. Wigard's [16] and Chiodi's [17] study shows 22–70% of patients after HSCT with sexual dysfunctions. Watson [18] noticed deterioration in sexual life in 55% of patients after allogenic HSCT and in 42% of patients after autologous HSCT.

Physical and Psychological Aspects Affecting the Male Sexual Condition After HSCT

Physical and biological changes in males after HSCT treatment are determined by gonadal function and hypothalamo-pituitary-gonadal axis [19] (see Figure 3).

The secretion of testosterone from Leydig cells of the testis is controlled by luteinizing hormone of hypophysis. Follicle stimulating hormone stimulates spermatogenesis and it correlates with creation of another hormone of the testis, inhibin. Inhibin correlates a way of negative reverse phrase.

Physiological changes include neurovascular disorders, erectile dysfunction, ejaculation praecox and infertility [19,20]. Those changes could affect negatively one or more phases of sexual motivation and at the same time could affect adversely sexual behaviour and satisfaction. In the period of preparation before transplantation (often high dose chemotherapy with/without whole-body radiation) is deletion or reduction of male sexual hormone production, because of negative feedback absence [20]. Gonadal dysfunction and changes of endocrinal functions (defect at hypothalamo-pituitary-gonadal axis level) in men after HSCT lead to their infertility and potential changes in their sexual functioning [19]. Reduced response to gonadoliberins (GnRH) can in some men show a potential dysfunction at the hypothalamo-pituitary level [21]. Elevated serum levels of prolactin can in some men after HSCT point to a defect at the hypothalamic level. Hyperprolactinemia is one of the reasons for infertility, erectile dysfunctions and loss of sexual desire in men after HSCT [21]. Grade of gonadal and endocrinal dysfunction is determined by age, intercurrent diseases, total dose of radiation, type of cytostatic schedule used in preparation before transplantation, and it is also determined by the type of HSCT (autologous, allogeneic) [20,22]. High-dose alkylator and radiation therapy invariably affect testicular function. The degree and the duration of gonadal failure depend on the dose of radiation therapy received and the age at which it is received. About 90% of prepubertal male patients undergo puberty normally and maintain testosterone levels in the reference range. The resistance of male gonads to chemotherapy and radiation therapy is a function of increased numbers of Sertoli cells in prepubertal boys compared with that in post-pubertal male adolescents and men. However, men may develop testosterone deficiency. The decline in male gonadal function is less recognized than its counterpart in female patients, but is likely to involve medical and psychosocial complications. Alkylating agents are often used in HSCT; their side effect is infertility [23]. External radiotherapy and chemotherapy damage germinal sexual cells and seminiferous tubules. The results of that are azoosperm, testicular atrophy and infertility. Kaupilla's [21] study from 1998 was concerned with long-term influence of allogeneic transplantation of steam cells on hypophysal, gonadal, thyroidal and epinephral function. One of the main results of this study is depletion of germinal sexual cells by men after HSCT, which is explained by small size of testes and reduction of testicular volume [21]. Kaupilla [21] tried to quantify those discrepancies, so he showed that the average size of testicles in healthy men is 5x3cm compared to average size 3.7×2.3 in men after HSCT. He also makes a point about average testicular volume, which is 16–30cm^3 in healthy men and 8–15cm^3 in men after HSCT. The other outcomes from this study are the changes of endocrinal production in men after HSCT; the serum values are (physiological values are listed in parentheses): FSH (follicle-stimulating hormone) 25–90mIU/ml (4–25mIU/ml), LH (luteinizing hormone) 8–25mIU/ml (4–20mIU/ml), testosterone 200–700mg/100ml (250–1200mg/100ml), daily production of testosterone 3.5mg/per day (7.5mg per day), free testosterone 8.6ng/100ml (15.3ng/100ml) [21]. One of the negative effects on sexuality in men after HSCT is chronic GVHD according to Fiedner [24] and Muir [25]. Authors like Barton-Burke [26], Inder [27] and Toy [28] sympathize with this statement.

Psychological Aspects Affecting the Sexual Condition in Males Treated by Means of HSCT

Sexual motivation in patients after HSCT is negatively affected by: changes in physical condition, changes of self-perception, depression, anxiety, weak self-confidence, somatisation, fear of relapse, anger, desperation and infertility [18,29]. Infertility plays an essential role in all psychological aspects, because it could be a cause of relationship disturbances, not only in the family, but also among friends and at work [18,30]. Psychological aspects like depression and anxiety could significantly influence more than one phase of human sexual motivation. Higher incidence of sexual disorders was described in men with a rigid perspective on sexuality, with restricted range of sexual behavior and also in men with pessimistic future outlook [15,16].

Social Sspects Affecting the Sexual Condition in Males Treated by Means of HCT

The most important role from all social aspects is that of a faithful partner [9]. Negative effects in the social dimension of QoL could be caused by the partner's insecurity, lability, anxiety, faithlessness and communication difficulties during treatment. Social encouragement is important to the patient during and after HSCT. It also affects psychosocial adaptation of the patient after HSCT [9,10,31].

Conclusions

The dimensional module of QoL represents a multiple approach to a number of life aspects [1]. The effects of several aspects could vary, because they depend on the phase of the disease and treatment. These findings bring our knowledge about the patients' needs into a different perspective and so they could significantly contribute to improvement of health care. They can also uncover mechanisms that modify disease origin and process [1].

Sexuality is a closely observed aspect of QoL in patients after HSCT. Sexuality and its expression is a very important aspect of human behaviour. It is also a very sensitive aspect, so without doubt it is affected by diagnosis of neoplasm and cancer treatment [7]. Physical and psychosocial factors of HSCT affect patients' sexuality and sexual functioning, including QoL. They remain in focus because of the complex care concerning patients after HSCT [32].

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