

## REVIEW

## Sexual dysfunction in females treated with peripheral blood progenitor cell transplantation: review of literature

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**Abstract:** *Background:* Peripheral blood progenitor cell transplantation (PBPC) is a therapeutic modality used in the anti-tumorous treatment of hemato-oncological diseases and solid tumors. Apart of that, it is also used in therapy of non-malignant and hereditary diseases. *Aim:* As is the case with other treatments, PBPC also affects not only the disease process but also the quality of life (QoL).

*Materials and methods:* In the last decade of 20<sup>th</sup> century, several QoL studies among patients treated with PBPC were undertaken and an influence on particular dimensions of QoL was observed. One of closely watched aspects was sexuality in patients treated with PBPC.

*Results:* Sexuality and its expression belong to very important aspects of human behavior. It is also a very sensitive and sensible aspect, so with no doubts it is affected by the diagnosis of neoplasm and cancer treatment.

*Conclusion:* Physical and psychosocial factors of PBPC do affect patient's sexuality and sexual functioning as part of QoL. They remain in focus because of the complex care of patients treated with PBPC (Fig. 2, Ref. 21). Full Text in free PDF [www.bmj.sk](http://www.bmj.sk).

**Key words:** sexual dysfunction, female, peripheral blood progenitor cell transplantation, quality of life.

Peripheral blood progenitor cell transplantation (PBPC) is a therapeutic modality used in antitumorous treatment of hemato-oncological malignancies and solid tumors. Moreover, it is also used in therapy of non-malignant and hereditary diseases (1–3). The process of PBPC itself is quite challenging for a patient as a result of several reasons (2, 3). First of all, there are unwanted effects of systematic chemotherapy, repetitive invasive performances, namely central and peripheral vein catheterization, diagnostic aspiration of bone marrow and so on. In men, it is also sperm taking which is followed by cryoconservation of seminal fluid because of the possibility of reproductive dysfunction caused by intensive antitumorous therapy (permanent or temporary infertility). Hormone substitution therapy is indicated in young females because of the possibility of damaging the reproductive organs. In addition, we

have to consider several weeks of isolation in a sterile box. There is an increased sensibility to opportunistic infections (bacterial, viral, fungal, mycoplasmatic etc.) in effect of bone marrow toxicity caused by high-dose chemotherapy. Beside the latter symptoms, the patient is loaded with results of toxicity caused by high-dose chemotherapy (mucositis, gastroenteritis, dermatitis, alveolitis, signs of cardiotoxicity and neurotoxicity). Serious complication is the acute or chronic Graft-Versus-Host Disease (GVHD), which is the result of allogeneic transplantation (from a relative or non-relative donor) (1, 3). Acute GVHD affects especially the liver, mucosa of intestinal tract and skin. Serious forms can cause death. Chronic GVHD damages particularly the intestinal tract and skin and can handicap the patient (1). By listing all possible risks and complications it is necessary to mention that high-dose chemotherapy followed by HSCT cannot fully guarantee that 100% of 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 PBPC (2, 3).

As is the case with other treatments, also PBPC affects not only the disease process but also the quality of patient life (QoL) (Fig. 1). In the last decade of 20<sup>th</sup> century, several studies about QoL among patients after PBPC were undertaken and an influence on particular dimensions of QoL was observed (3). One of closely watched aspects was sexuality of patients after PBPC (Fig. 2).

**Sexuality, sexual motivation, sexual dysfunction**

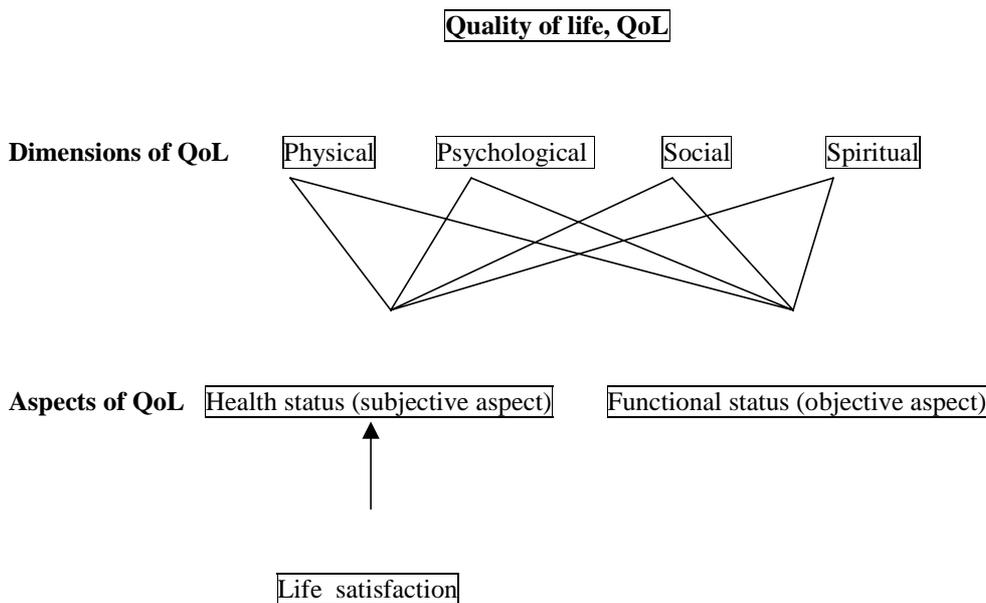
*Sexual health* is defined by the World Health Organization as “a state of physical, emotional, mental and social well-being

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The term of QoL term comprises the information on individual’s physical, psychological, social and spiritual conditions.

**Fig. 1. Dimensions of QoL (2, 3).**

related to sexuality; not merely the absence of disease, dysfunction or infirmity”. All these aspects enrich and advance the personality, communication and emotion of love (4).

*Human sexual behavior* is a result of a long process of evolution. Therefore, it includes the behavior that human beings use when seeking sexual or relational partners, gaining approval of possible partners, forming relationships, showing affection, and sexual intercourse. It could be quite imperative and to some level not depending on rational control mechanisms (5). Because of didactic reasons, we suggest to observe four components in human sexuality (4), which namely are: 1) sexual identity (sexual role), 2) sexual orientation (erotic preference), 3) sexual emotion (sexual excitement, orgasm, love), 4) sexual behavior. Sexual identity based on sexual orientation is the keystone of sexual motivation. The sign of sexual identity is the ability of individual 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 sexually mature person of opposite sex. Sexual emotions include sexuality, sensation of climax (orgasm) and emotion of love (erotic fascination). Sexual behavior is of pair character. A determined sexual couple has certain adherence and shows restriction in their sexual behavior to other members of unit. In a well-functioning couple, sexuality is more natural and intensive (4).

*Sexual dysfunctions* are known as quantitative disorders of sexual performance (5). Behaviorist conception of sexual dysfunctions results from a conception of four basic components of human sexual behavior (4, 5), namely 1) sexual appetite, 2) sexuality, 3) orgasm, 4) sexual satisfaction. Etiology of sexual

dysfunctions is complex since it is composed of constitutional, biological, psychological and social factors (4, 5).

**Sexual dysfunction in females treated with PBPCT and influence of PBPCT on QoL**

The diagnosis of neoplasm and subsequent treatment with high-dose chemotherapy followed by PBPCT, its complications and their treatment, all according to Ferrell (6) can lead to changes in a patient’s sexual life, particularly in accordance with sexual dysfunctions and sexual frustration. Sexual dysfunction and sexual frustration are often mentioned as factors, which negatively influence QoL of patients after PBPCT (3, 7).

The physiological and biological changes among females treated with PBPCT are influenced by function of gonads, hypothalamic-hypophysis-gonadal axis and estrogen-dependent tissues (7). Physiological changes include mainly the disorders of menstrual cycle, secondary vaginal changes associated with external radiotherapy and systemic chemotherapy and vaginal form of graft versus host reaction (cGVHD). These changes can influence one or more phases of human sexual motivation and thus affect adversely the sexual function, sexual satisfaction as well as QoL (7).

During the pretransplantation preparatory regimen (usually high-dose chemotherapy with / without whole-body external radiotherapy) the ovaries and their function can be altered and thereby the secretion of female sexual hormones, namely estrogens and gestagens can be reduced. The reason is the absence of negative feedback to hypothalamus and hypophysis. The results

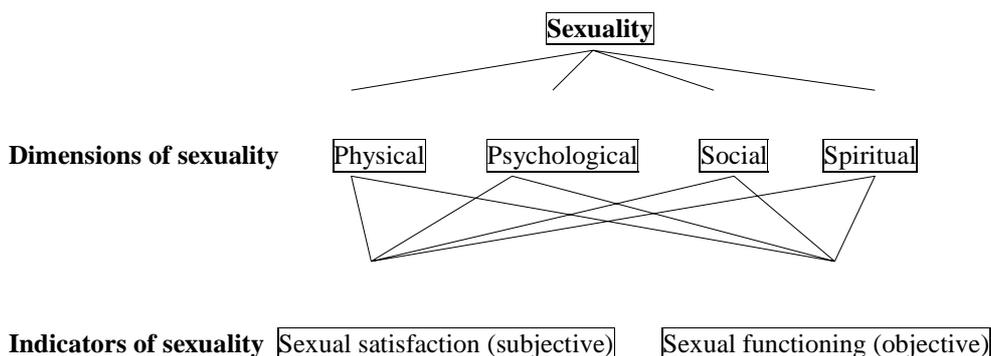


Fig. 2. Dimensions of sexuality with objective and subjective indicators (4, 5).

of these changes are increased levels of FSH (follicle-stimulating hormone) and LH (lutein hormone) with the symptoms of infertility and premature climacterium (7). The essential negative influence on the function of the ovaries is that of alkylating cytostatics and external radiotherapy which bring on marked cytostatic effects. The sensitivity of ovaries to the effect of external radiotherapy and systemic chemotherapy is dependent on their dose, types of systemic chemotherapy and not least on the age of women. Women older than 25 years are predisposed to the impairment of ovarian function (7). According to Klein (8) a high dose of whole-body irradiation leads to the impairment of ovarian function in all women. Alkylating cytostatics such as cyklofosamid, nitrosurea or melfalan, are toxic to the ovarian tissue, especially if some of them are used in high-dose therapy (8). According to Littley (9) and Gradishar (10), the impairment of ovarian function results in reduced levels of estradiol and increased levels of FSH and LH with already mentioned symptoms of infertility or premature climacterium. The symptoms of physiological climacterium originate as a result of physiological deficit of estrogens and develop gradually over periclimacterial and postclimacterial periods (9, 10). According to Chiodi (11) and Spinelli (12), these changes develop within 6 months in women after PBPCT as a result of functional impairment of ovaries. The premature climacterium is marked by symptoms of estrogen deficit, especially facial erythema, hot flushes, night sweating, insomnia, mood changes, irritability, depressions, vaginal dryness, vaginal atrophy and fibrosis, pruritus, urogenital symptoms (dysuria, stranguria, etc), changes in cognitive functions and appearance (11, 12).

The Chatterjee's prospective study (13) from 1994 with 15 women after autologous and allogeneic PBPCT noted the incidence of erythema and hot flushes in 53 % of women, impaired libido in 40 %, dyspareunia in 53%, changes of mood in 33 %, insomnia in 40 %, urogenital symptoms in 25 % and depressions in 73 % of women. The author (13) recorded the return to sexual activity within the first three months after PBPCT only in 10 % of women. In his study from 1991, Chiodi (11) noted that almost all women after allogeneic HSCT suffer from climacterial symptoms minimally one year after PBPCT. The author (11) recorded

erythema and hot flushes in 83 % of women, and dyspareunia, vaginal dryness and dysuria in 76 % of women. Dyspareunia was the most frequent cause of sexual dysfunction in 70 % of women after the allogeneic PBPCT (11). In his study from 1990 comprised of 44 women after allogeneic PBPCT (67 % of women with preparatory regimen on basis of high-dose chemotherapy with whole-body irradiation, 33 % of women with preparatory regimen on basis of high-dose chemotherapy without whole-body irradiation) Schubert (14) recorded a decrease in sexual activity in 30 women, impaired libido in 53 % of women and dyspareunia in 60% of women. Thereafter this author (14) recorded gynecological difficulties such as vaginal atrophy, loss of pubic hair, reduction of uterus, stenosis of vaginal introitus and atrophic vulvovaginitis in 58 % of women after allogeneic PBPCT. The finding that the main cause of vaginal changes / impairment was the allogeneic PBPCT was in accordance with Schubert (14), Spinelli (12) and Soltes (15). Vaginal cGVHD includes changes in sense of vaginal dryness, atrophy, fibrosis and not least increased susceptibility to urogenital infections. Soltes (15) and Lichtman (16) present that other causes leading to the decrease in sexual activity are urogenital changes associated with climacterium and these changes include atrophy of urethra and urinary bladder with affiliate symptoms as dysuria, stranguria, urinary incontinence and cystitis. Atkinson (1) completes the above-mentioned urogenital changes with cGVHD affecting urinary bladder with symptoms of cystitis.

#### Psychological aspects affecting the sexual condition in females treated with PBPCT

Among psychological aspects which can negatively influence the human sexual motivation of females treated with PBPCT are included primarily the changes of somatic state (problems of somatic identity), the changes of self perception, depressions, anxiety, decreased self-confidence, somatization, stigmatization, apprehensions of return of disease, anger, hopelessness and infertility (17, 18). The basic psychological aspect is infertility, which can be the cause of impairment of already existing relationships not only in the family but also with friends and

workmates. Thaler (19) presents that the infertility in women after PBPCT can negatively influence their sense of femininity and automutilation. Watson (18) presents that the essential psychological aspects influencing the sexual state in women after PBPCT are age, marital status and the number of their children. This author (18) mentions that it is a necessary target of therapeutic intervention just in young, single and childless women.

### The social aspects affecting the sexual condition in females treated with PBPCT

The most important social aspect influencing the female sexuality is a confidential partner (20). Factors influencing this social aspect are mainly the uncertainty of partner, instability, anxiety, unreliability and difficult communication during therapy, namely during PBPCT. The social support of patients during and after PBPCT is the most important factor for their psychosocial adaptation (20, 21).

Sexuality is still one of the monitored aspects of QoL in patients after PBPCT and it remains one of the fundamental spheres of interest in global care of patients after PBPCT (3). It has been said already that this important aspect of human life is undoubtedly marked by the diagnosis of neoplasm and its therapy including PBPCT (3).

### Conclusion

The dimensional module of QoL represents a complex approach to a number of life aspects (2, 3). The influence of several aspects can vary because they depend on the phase of disease and treatment. These findings give our knowledge about the patient needs a different prospect and can significantly contribute to the improvement of health care. They also can discover the mechanisms modifying the origin and process of disease (2, 3).

Sexuality is one of the closely watched aspects of QoL in patients after PBPCT. Sexuality and its expression belong to very important aspects of human behavior. It is also a very sensitive and sensible aspect, so with no doubts it is affected with the diagnosis of neoplasm and cancer treatment (3). Physical and psychosocial factors of PBPCT do affect patient's sexuality and sexual functioning as part of QoL. They remain in focus because of the complex care of patients after PBPCT (3).

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