Female sexuality after female cancer treatment: a clinical issue

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Summary

Purpose of investigation: The aim of the present study was to record how the treatment of female cancer may affect sexuality and interpersonal relations in the couple. *Material and Methods:* From September 2008 until February 2012, the authors prospectively studied 67 patients with breast cancer (Group A) and 43 with gynecological cancers (Group B). As control groups 33 patients with benign breast and 30 patients with benign gynecological lesions (group 0a and 0b respectively) were used. Sexuality and interpersonal relations were evaluated by a questionnaire. The authors also evaluated interpersonal relations focusing on sexual function at the time of diagnosis and a year after the initial treatment for cancer. *Results:* A significant reduction of the "sexual desire'', "sexual Arousal'', and "orgasm'' dimension was found in both cancer groups, in contrast to the control group, revealing no significant change. The "sexual enjoyment'' scale was significantly decreased in gynecological cancer group but not in breast cancer group. While the score on the "relationship quality'' dimension significantly increased in both cancer groups. In all groups, there was a significantly positive correlation between sexual function and enjoyment; on the contrary, there was a significantly negative correlation between relationship quality and sexual function and enjoyment. *Conclusion:* Sexual dysfunctions is a clinical problem which should be evidenced at the beginning of therapy, from the oncologists in order to provide integrated treatment to their patients.

Key words: Breast cancer; Gynecological cancer; Female sexual disorders.

Introduction

It is well known how important the well-being is in confrontation of a disease, particularly cancer. Very important regulatory factor of well-being are the interpersonal relations of the patient. Essentials in the interpersonal relations are the sexuality and the comradeship [1]. Cancer diagnosis and treatment, regardless of location, causes changes in the physiology and psychology of the individual and therefore affects their personality and consecutively their sexuality. Key elements for female sexuality are the breasts and the reproductive organs, therefore when cancer affects these organs the effect on female sexuality is more intense. Breast is the most frequent location of cancer in women, while cervical and endometrial neoplasms are the most common among gynecological cancers [2]. The five-year survival rates for those types of cancer have significantly improved exceeding 80% of patients thanks to improved diagnostic and therapeutic techniques [3]. It is not surprising that successful treatment has shifted patients' expectations from survival to maintaining their quality of life after cancer treatment [4, 5].

Sexuality is a mandatory aspect of female personality and a crucial parameter in relationship, mainly among younger couples. Since cancer treatment has an impact on the physiological and the psychological status of patients, this can result in severe changes in the interpersonal relations as the latter have to adapt to the new realities [6]. These changes are directly related to therapeutic interventions so they can be considered as side-effects of the treatment.

Therefore the attending physician, in order to provide integrated treatment, should identify sexual dysfunctions of the patients and provide solutions when needed. However, in order to be able to do this, the nature of these sexual problems should first be investigated . Aim of the present study was to record how the treatment of breast and gynecological cancer, may affect subjective perception of the interpersonal relation of the couple with respect to female sexuality. The authors also attempted to associate and to evaluate disorders of desire, arousal, orgasm, pain, as well as problems of the sexual relationship with cancer diagnosis and treatment.

Materials and Methods

From September 2008 to February 2012, the authors prospectively studied 110 patients with breast, cervical, endometrial, and ovarian cancer, and 63 patients with benign breast and gynecological tumors (control group). For the purposes of this study, they evaluated the quality of the interpersonal relations, as subjectively perceived by the women, by focusing on sexual dysfunctions at the time of diagnosis (or before the operation) and also a year after the initial therapeutical intervention. The authors divided patients in two groups: Group A included 67 breast cancer patients and Group B 43 patients with cervical, endometrial, or ovarian cancer. They also studied two control groups, one for each patient group: Control Group A (Group OA) was comprised

Revised manuscript accepted for publication August 1, 2013

Table 1. — *Sample characteristics.*

	Group A N (%)	Group B N (%)	*p*
Age (years), mean±SD	50.5±6.8	52.6±6.1	0.106‡
Menstrual status			
Pre-menopause	13 (19.4)	8 (18.6)	0.854*
Peri-menopause	17 (25.4)	13 (30.2)	
Menopause	37 (55.2)	22 (51.2)	
Number of children, mean ± SD	1.4±0.9	1.0±0.7	
None	11 (16.4)	11 (25.6)	0.109*
One	24 (35.8)	20 (46.5)	
Two or three	32 (45.5)	12 (27.9)	
Use of sedative drugs			
No	56 (83.6)	34 (79.1)	0.549*
Yes	11 (16.4)	9 (20.9)	
Family history of cancer			
No	59 (88.1)	34 (79.1)	0.203*
Yes	8 (11.9)	9 (20.9)	
Chemotherapy/radiotherapy			
No	5 (7.5)	7 (16.3)	0.210**
Yes	62 (92.5)	36 (83.7)	
Type of surgery			
Oncoplastic procedure	7 (10.4)	0 (0)	
Lumbectomy	41 (61.2)	0 (0)	
Mastectomy	19 (28.4)	0 (0)	
Radical Hysterectomy	0 (0)	8 (18.6)	
Total hysterectomy	0 (0)	35 (81.4)	
Stage			
I	27 (40.3)	25 (64.1)	
II	40 (59.7)	14 (35.9)	

‡Student's t-test; *chi-square test; **Fisher's exact test.

Table 2. — *Changes in dimensions of the SFQ questionnaire during the follow up period.*

	Baseline Mean±SD	Follow-up Mean±SD	Change Mean±SD	*p***	*p*‡
Sexual desire					
Group A	5.7±3	5.1±3.3	- 0.6±2.2	0.023	0.836
Group B	5.9±2.9	5.2±3.4	- 0.7±2.2	0.037	
P*	0.755	0.863			
Sexual enjoyment					
Group A	19±3.4	18.5±3.6	- 0.5±4.4	0.439	0.032
Group B	20.1±3.5	17.2±5.2	- 2.9±5.1	0.004	
P*	0.442	0.205			
Sexual arousal					
Group A	6.2±3.7	5±3.8	- 1.2±2.5	<0.001	0.015
Group B	6.3±3.6	4±3.2	- 2.3±2.2	<0.001	
P*	0.861	0.147			
Pain during sexual intercourse					
Group A	4.1±2	4.4±2.5	0.3±2.8	0.490	0.001
Group B	3.2±1.5	5.5±2.5	2.3±2.4	<0.001	
P*	0.208	0.054			
Relationship quality					
Group A	1.6±0.9	2.4±1.2	0.7±1.5	0.001	0.995
Group B	1.4±0.7	2.1±1.2	0.7±1.4	0.006	
P*	0.157	0.349			
Orgasm					
Group A	5.7±3.5	4.5±3.8	- 1.2±2.6	0.001	0.092
Group B	6±3.5	4±3.7	- 2±2.5	<0.001	
P*	0.716	0.459			
General questions					
Group A	7.3±2.2	6.2±2.2	- 1.1±1.5	<0.001	0.343
Group B	7.7±2	6.2±2	- 1.5±1.5	<0.001	
P*	0.691	0.967			

* *p* value for group effect; ***p* value for time effect.
‡ Repeated measurements ANOVA. Effects reported are significant differences between the two groups in the degree of change in each particular variable.

of 33 patients with benign breast tumors and Control Group B (Group OB) of 30 patients with benign gynecological tumors. Control group patients were matched for age, medical, and family history with cancer patients groups. Sexuality was evaluated by a self- report questionnaire (see below). In addition ten ml of blood was collected for hormonal evaluation.

Questionnaire: For sexuality evaluation, the 28-item Sexual Function Questionnaire (SFQ) was used. SFQ is a self-administered questionnaire; each item is rated on a five-point Likert scale and covers a period of the last four weeks. The SFQ has six domains, four of which are specific to the four main types of female sexual dysfunction (FSD): Female Sexual Arousal Disorder (FSAD), Female Orgasm Disorder (FOD), Hypoactive Sexual Desire Disorder (HSDD), and Pain Disorder. The other two domains address "sexual enjoyment" and "relations quality" issues [7, 8].

Blood work: All the blood samples were collected between 7:30 am and 9:00 am. The blood was then centrifuged in 3,000 rpms for 20 minutes, and stored in deep freeze (-40° C). The hormones measured were: free testosterone (FT), follicular stimulating hormone (FSH), luteinizing hormone (LH), prolactin (PR), and cortizol (Co).

Statistical analysis

Continuous variables are presented with their mean ± standard deviation. Qualitative variables are expressed as absolute and relative frequencies. For the comparison of mean values between two groups the independent samples Student's t test was computed. Chi-square and Fisher's exact test were used for the comparison of proportions. The paired Student's t test was used to evaluate any possible differences in baseline and follow-up measurements. Repeated measures analysis of variance (ANOVA) was used to evaluate the differences between the two groups regarding the changes observed in SFQ dimensions and hormone levels over the follow up period. Pearson correlation coefficients were used in order to explore the association of changes in hormone levels with changes in scores of SFQ dimensions. The *p* values reported are two-tailed. Statistical significance was set at 0.05 and analysis was conducted using SPSS 17.0.

Results

The sample consisted of 110 patients (67 with breast cancer and 43 with cervical or endometrial or ovarian cancer). Sample characteristics by group are presented in Table 1. The mean age was 50.5 ± 6.8 years for Group A and 52.6 ± 6.1 years for Group B. Almost half of the women were menopausal (55.2% in Group A and 51.2% in Group B). Most of the women were treated with chemotherapy and/or radiotherapy (92.5% in Group A and 83.7% in Group B). More

Table 3. — *Changes in hormone levels during the follow up period for groups A and B.*

	Baseline Mean±SD	Follow-up Mean±SD	Change Mean±SD	*p***	*p*‡
Testosterone (ng/dl)					
Group A	38.1±13.3	39.1±13.9	1±7	0.240	< 0.001
Group B	35.7±13.3	16.9±9.2	- 18.8±12	< 0.001	
*p**	0.364	<0.001			
LH (IU/l)					
Group A	25.9±16.9	30±15.9	4.1±9.1	< 0.001	0.033
Group B	29.2±21.2	36.9±18.3	7.7±7.7	< 0.001	
*p**	0.370	0.038			
FSH (IU/l)					
Group A	60.9±40.4	34.7±19.5	- 26.3±25.1	< 0.001	0.101
Group B	62.2±44.4	45.2±23.7	- 17±33.3	0.002	
*p**	0.873	0.012			
Cortisol (μg/dl)					
Group A	24.5±11.6	14.2±3.9	- 10.4±10.1	< 0.001	0.128
Group B	23.4±7.1	15.7±4.1	- 7.7±6.9	< 0.001	
*p**	0.561	0.052			
Prolactin (ng/ml)					
Group A	9.6±4.6	8±4.3	- 1.6±4.7	0.008	0.558
Group B	10.1±4.8	9.1±4.4	- 1.1±4.1	0.099	
*p**	0.554	0.211			

* *p* value for group effect; ***p* value for time effect.
‡ Repeated measurements ANOVA. Effects reported are significant differences between the two groups in the degree of change in each particular variable.

Table 4. — *Correlations between sexual function, enjoyment, and relationship quality in total sample and in all groups.*

	Sexual enjoyment r / *p*	Relationship quality r / *p*
Sexual function		
Total sample	0.77 / <0.001	- 0.45 / <0.001
Control group	0.73 / <0.001	- 0.52 / <0.001
Breast cancer group	0.72 / <0.001	- 0.34 / 0.014
Gynecological cancer group	0.86 / <0.001	- 0.43 / 0.016
Sexual enjoyment		
Total sample	1.00 / -	- 0.56 / <0.001
Control group	1.00 / -	- 0,65 / <0.001
Breast cancer group	1.00 / -	- 0.41 / 0.005
Gynecological cancer group	1.00 / -	- 0.63 / <0.001

than half of the women in Group A had Stage II cancer, while the corresponding proportion for Group B was 35.9%.

Table 2 shows the changes in SFQ dimensions for both study groups. No significant differences were found in SFQ dimensions between the two groups both at baseline and follow up. A significant reduction of the "sexual desire" dimension was found in both groups. The "sexual enjoyment" scale was significantly decreased in Group B but not in Group A. "Sexual arousal" was decreased in both groups but the degree of reduction was greater in Group B (p = 0.015). For the "pain at sexual intercourse" scale, a significant increase was found in Group B and remained stable in Group A. The score on the "relationship quality" dimension increased in both groups while the score on "orgasm" and '"general questions" dimensions decreased significantly in both groups ($p < 0.001$).

Changes in hormone levels are presented in Table 3. Hormone levels were not different between the groups at baseline measures ($p > 0.05$). Testosterone levels remained unchanged in Group A, while they were significantly decreased in Group B ($p < 0.001$). Thus Group A had greater testosterone levels at follow up. LH levels increased significantly at both groups, but the degree of change was greater in the gynaecologic cancer group ($p = 0.033$) and thus Group B had greater LH levels at follow up. FSH levels decreased significantly at both groups and the degree of change was not different between the two groups. At follow up, the patients in Group B had greater FSH levels. A significant reduction in cortisol levels was found in both groups ($p < 0.001$). Prolactin decreased significantly in Group A but in Group B the decrease did not reach statistical significance.

When the changes in hormone levels were associated with changes in SFQ dimensions in Group A, it was found that change in the "sexual arousal" dimension significantly correlated with change in cortisol levels (r = 0.028, p = 0.023). Also, change in cortisol levels was negatively correlated with change in the "relationship quality" dimension (r = - 0.029, p = 0.040). Concerning Group B, changes in LH levels were positively associated with changes in the "sexual desire" dimension (r = 0.43, p = 0.004), "enjoyment" dimension (r = 0.36, p = 0.049), "sexual arousal" dimension (r = 0.51, p < 0.001) were negatively associated with changes in "relationship quality" dimension (r = -0.42, p = 0.017). Also, changes in FSH levels of the Group B were positively associated with "sexual desire" dimension (r = 0.33, p = 0.030) and "sexual enjoyment" dimension (r = 0.44, p = 0.015).

Table 4 shows the correlations between sexual function, sexual enjoyment, and relationship quality. There was a significantly positive correlation between sexual function and sexual enjoyment in total sample and in all groups. Thus, the better the participants' sexual function was, the higher was their sexual enjoyment. The aforementioned concerned all participants in general, as well as women in control group, breast cancer group, and gynecological cancer group separately. On the contrary, there was a significantly negative correlation between relationship quality and sexual function and sexual enjoyment, in total sample, and in all of the groups. Thus, when the relationship quality is worst (i.e. higher score in factor "relationship status") participants' sexual function and their sexual enjoyment is lower. The aforementioned concerned all participants in general, as well as women in control group, breast cancer group, and gynecological cancer group separately.

Table 5 presents the changes in questionnaire dimensions between the two measurements, and among control and

Table 5. — *Changes in questionnaire dimensions between the two measurements, among control and cancer patients groups.*

	Control group		Cancer group (Group A+B)		*p**
	Mean	SD	Mean	SD	
1st measurement					
Sexual desire	5.92	3.25	5.79	2.93	0.798
Sexual enjoyment	15.44	8.46	15,80	7.47	0.775
Sexual arousal	6.05	3,85	6.27	3,62	0.701
Pain at sexual intercourse	2.54	1.99	3.38	2.38	0.024
Relationship quality	1.70	1.10	1.50	0.90	0.137
Orgasm	5.98	4.09	5.80	3.52	0.757
2nd measurement					
Sexual desire	6.35	3.48	5.00	3.38	0,013
Sexual enjoyment	19.94	3.83	17.95	4.33	0.011
Sexual arousal	6.02	3.83	4.63	3.62	0.019
Pain during sexual intercourse	3.49	1.76	4.83	2.52	0.002
Relationship quality	2.00	1.00	2.00	1.00	0.024
Orgasm	6.23	4.25	4.28	3.75	0.003

cancer patients groups (group A and group B). At baseline, participants with cancer had significantly higher score at the factor "pain during sexual intercourse", indicating more pain during sexual intercourse, compared to participants of the control group. At follow-up, participants with cancer had more problems in their sexual life (i.e. less sexual desire, sexual enjoyment, sexual arousal, more pain during sexual intercourse, worst relationship quality, and more problems in achieving orgasm) than participants of the control group.

Table 6 presents the changes in questionnaire dimensions between the two measurements, among control, breast cancer group, and gynecological cancer group. At baseline, participants with breast cancer had significantly higher score at the factor "pain at sexual intercourse", indicating more pain during sexual intercourse, compared to participants of the control group. At follow-up, participants with breast cancer had more problems in their sexual life (i.e. less sexual desire and sexual arousal, more pain during sexual intercourse, worst relationship quality, more problems in achieving orgasm, and more problems in general) than participants of the control group. There was no significant difference in "sexual enjoyment" at follow-up between controls and women with breast cancer.

At baseline, participants with gynecological cancer had significantly lower score at the factor "relationship quality", indicating better relationship quality, compared to participants of the control group. At follow-up, participants with gynecological cancer had more problems in their sexual life (i.e. less sexual enjoyment and sexual arousal, more pain during sexual intercourse, and more problems in achieving orgasm) than participants of the control group. There was no significant difference in "sexual desire" and "relationship quality" at follow-up between controls and women with gynecological cancer.

Discussion

From the review of the literature it becomes clear that breast and gynecological cancer affects interpersonal relations, and particularly so, the sexual life of the patients. However, due to the complexity of female sexuality, it is very difficult to estimate with certainty the exact effect of cancer diagnosis and treatment on the different parts of the female sexual response cycle (desire-arousal-orgasm-resolution) [9,

Table 6. — *Changes in questionnaire dimensions between the two measurements, among control, breast cancer group, and gynecological cancer group.*

	Control group		Breast cancer group		Gynecological cancer group		***p**** Control vs Breast cancer group	***p**** Control vs Gynecological cancer group
	Mean	**SD**	Mean	**SD**	Mean	**SD**		
1st measurement								
Sexual Desire	5.92	3.25	5,72	2.97	5.90	2.89	0.723	0.981
Sexual Enjoyment	15.44	8.46	15.36	7.30	16.49	7.78	0.950	0.521
Sexual Arousal	6.05	3.85	6.22	3.66	6.35	3.60	0.789	0.686
Pain at sexual intercourse	2.54	1.99	3.61	2.52	3.02	2.14	**0.011**	0.246
Relationship quality	1.70	1.10	1.60	1.00	1.40	0.70	0.470	**0.046**
Orgasm	5.98	4.09	5.70	3.54	5.95	3.52	0.675	0.969
General questions	7.08	2.28	6.34	2.79	6.56	2.70	0.108	0.289
2nd measurement								
Sexual desire	6.35	3.48	4.96	3.35	5.07	3.46	**0.022**	0.065
Sexual enjoyment	19.94	3.83	18.47	3.59	17.17	5.23	0.061	**0.009**
Sexual arousal	6.02	3.83	5.03	3.85	4.00	3.19	**0.147**	**0.005**
Pain during sexual intercourse	3.49	1.76	4.41	2.45	5.52	2.51	**0.036**	**< 0.001**
Relationship quality	2.00	1.00	2.00	1.00	2.00	1.00	**0.012**	0.217
Orgasm	6.23	4.25	4.50	3.82	3.95	3.66	**0.019**	**0.006**
General questions	8.09	1.50	6.17	2.24	6.19	2.02	**< 0.001**	**< 0.001**

10]. Beside oncological safety, one of the main targets of cancer therapy is the preservation of the quality of life of the patients, hopefully at a pre-diagnosis level [5].

Most of the studies reviewed, indicate a negative correlation between cancer - both breast and gynecological - and sexual desire (SD) [11-16]. The results of the present study indicate a negative effect of cancer treatment on sexual desire in both groups. Sexual desire is a complicated biological and psychological process which consists of sexual drive, motivation, and anticipations [17]. The sexual drive (libido) is the biological aspect of SD [18]. Some researchers attribute the decrease in SD in gynecological and breast cancer patients to the secondary menopause due to hormonal changes (especially at estrogens, testosterone, and prolactin levels) [14, 19-21]. While estrogens are necessary to preserve pelvic tissues healthy, they do not appear to be related directly to the SD. Rather, loss of interest in sex, after menopause, may be the result of the discomfort experienced during the sexual act caused by vulva and vagina atrophy [22]. Testosterone levels also decrease in menopause, and decreased levels of free testosterone have been linked to decreased sexual desire in premenopausal [23] and in postmenopausal women [24]. The results from the present study show significant decreases in testosterone in the gynecological cancer group. In the breast cancer group, although no significant decreases in testosterone were recorded, the initial testosterone levels (before the operation), were lower than the gynecological cancer group and the control group.

Psychological factors also have an important role on SD of female patients after breast or gynecological cancer treatment [25]. Psychological factors that have been associated with a decrease in SD are fear or insecurity for sexual intercourse, feeling of mutilation, feelings of being less attractive, and of loss of femininity [26].

In this study, sexual arousal and sexual enjoyment seem to be affected more in the gynecological cancer group than in the breast cancer group. Sexual arousal is characterized by a number of physiological alterations in the female genital organs [27]. After hysterectomy, the disruption of sexual well-being is more likely to be related to anatomical changes, such as vaginal shortening, reduced vaginal elasticity [28], pelvic nerve damage, vaginal stenosis, and other physical changes, such as deceased bodily function [29], fatigue [30], diarrhea [31], dyspareunia [28], infertility [28], and post-coital vaginal bleeding [32]. Although gynecological cancer treatment leads to anatomical and physical changes in the genital area, Greenwald and McCorkle reported no sexual disruptions, in cancer patients, after total abdominal hysterectomy with bilateral oophorectomy [33]. The contradictory results can be attributed to the important role of psychological factors on sexual enjoyment and arousal. Among breast cancer patients, Speer *et al.* [12] reported poor sexual satisfaction and arousal. Many researchers attribute this finding to body image-related sexual dysfunction and/or to secondary menopause [11, 34].

Orgasm is the climax of sexual pleasure, manifested by the rhythmic contractions of the uterus and vaginal walls [27]. Patients from both groups reported less pleasant orgasms and difficulties to reach orgasm. Hysterectomy biologically alters the nature of the orgasm due to uterus removal, vaginal shortening and dryness, and nerve damage. Among breast cancer patients, the orgasmic dysfunction seems to be related mainly to chemically induced menopause and the pain in the breast area [35]. Psychological factors seem to play an important role in the patient's ability to reach orgasm since, as mentioned earlier, cancer treatment can affect the previous phases of the sexual response cycle [33].

Most studies confirm that the sexual dysfunctions are more intense when surgery is followed by chemotherapy and/or radiotherapy [36]. Radiotherapy is related to skin irritation, vaginal shortness and fibration permanent vulvar hyposensitivity, and body image alteration (hair and weight loss). Sexual dysfunctions related with chemotherapy are usually due to side effects (weakness, dizziness, hair and weight loss, vomiting), and to secondary menopause [26].

A key role in female sexuality, in general, is held by the quality of the sexual relation. In younger couples, sexual life is a very important element for the relationship, while in older couples the companionship and the needs for attention are more important than sexual life [37, 6]. Most of the women when facing a severe disease usually seek for support from their partner [38]. In the present study the interpersonal relations seem to be reportedly improved after the treatment for cancer. Crowe *et al*. reported that interpersonal relations are negatively affected by the sexual dysfunctions due to cancer treatment [39]. However, other studies indicated that cancer positively affects the sentimental closeness of the couple [40, 41].

Conclusion

Breast and gynaecological cancers are common, affect young people, and require significant readjustment after treatment to preserve quality of life. A thorough understanding of the effects of cancer and its treatment on interpersonal relations is necessary to provide successful support. In the present study the psychological and biological burden of breast and gynecological cancer diagnosis and treatment were shown to affect both the sexual and the companionship dimensions of couple relations of the patients both immediately after and one year following treatment. So sexual dysfunction after cancer treatment is clinical issue and should be taken in consideration from the oncologists. All the necessary attention should be given, from the beginning of the treatment, either from information material or by a specialist, in order to provide an integrated treatment for cancer patients.

Acknowledgements

The authors would like to express their thanks to Prof. Zerva Yanni and Prof. Hatzichristou Dimitrios for their scientific advices.

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