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Quality of life of patients who undergo breast reconstruction after mastectomy: effects of personality characteristics.

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Abstract

Background

Reconstruction after mastectomy has become an integral part of the treatment of breast cancer. The effects of psychological factors on quality of life (QoL) after reconstruction have been poorly investigated. The aim of this study is to examine which clinical and personality characteristics are related to QoL in patients receiving reconstructive surgery.

Methods

All patients received immediate reconstruction and were evaluated in the week before tissue expander implant (T0) with: a semistructured interview for demographic and clinical characteristics, the TCI, the IIP-64, the SF-36, the CGI-S, the HDRS, and the HARS. Assessment with SF-36 was repeated three months after the expander placement (T1).

Statistics were calculated with univariate regression and analysis of variance. Significant variables were included in a multiple regression analysis to identify factors related to the change T1 - T0 of **the mean of SF-36 transformed scores**. Results were significant when $P \leq 0.05$.

Results

Fifty-seven women were enrolled. Results of multiple regression showed that the TCI personality dimension Harm Avoidance and the IIP-64 domain Vindictive/Self-Centered were significantly and independently related to the change of SF-36 **mean score**.

Conclusions

Our results suggest that personality dimensions and patterns of interpersonal functioning produce significant effects on patients' quality of life during breast reconstruction. Patients with high Harm Avoidance are apprehensive and doubtful. The restoration of body image could help these patients to reduce social anxiety and insecurity. The Vindictive/Self-Centered patients are resentful and aggressive. Breast reconstruction could symbolize the conclusion of a reparative process and fulfil the desire of revenge on cancer.

Introduction

Quality of life (QoL) in breast cancer patients has been focused on with growing interest in recent years and has received considerable importance in the assessment of treatment outcome. ~~This interest is partly due to the increasing number of diagnoses of breast cancer.~~ A reason may be that improvement in early detection and treatment of breast cancer has led to a longer survival of these patients (1,2).

World Health Organization (WHO) (3) defines quality of life as: “Individuals’ perception in the context of their culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person’s physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment”. It is a concept strongly conditioned by individual’s physical integrity and body image. For this reason, breast cancer is expected to have severe effects on women’s quality of life. Moreover, studies concerning women who underwent mastectomy for breast cancer, found significant correlations between cosmetic outcome and level of depression and anxiety. Authors suggested that the deformed physical appearance of women’s breast after mastectomy affected their mood and the way they felt about themselves (4-8).

Since breast reconstruction has been shown to have positive effects on the mental well-being of women with breast cancer, an increasing number of patients is choosing to receive reconstruction after mastectomy (7, 9-13). ~~As the treatment of breast cancer continues to evolve, so too does the practice of postmastectomy reconstruction.~~ Immediate reconstruction is currently considered the standard of care in this surgical intervention. Recent refinements in autogenous tissue techniques, improvements in prosthetic technologies, and development of novel tissue substitutes have induced noticeable advances in breast reconstruction. ~~In addition, the increased use of both skin sparing and nipple sparing mastectomies have contributed to improve the results of postmastectomy reconstruction (13, 14). These treatment procedures can be performed for prophylactic mastectomy,~~

~~but they are also efficacious in patients with early stage breast cancer (Stages I and II) (16-20). The approach to breast reconstruction will be adapted to attain an appropriate balance between minimizing the risk of recurrence and providing the best aesthetic outcomes (15). In women with large or moderate size breasts, the largely intact mammary skin left behind following a skin-sparing mastectomy facilitates the reconstruction of a breast with a natural contour (15, 22).~~

Many Authors have reported that women who undergo breast reconstruction have less mental distress about losing a breast, better cosmetic results, self body image, and overall quality of life. In fact, mastectomy with immediate breast reconstruction is a surgical procedure that addresses both the need to perform a cancer operation, and the desire of the patient to emerge from anesthesia with a replacement breast (10, 16-21). Retrospective studies described by Ueda et al. (22) and Huguet et al. (23) to assess the safety, cosmetic outcome, **sexuality** and patients' satisfaction after mastectomy for breast cancer with immediate reconstruction, confirmed that a good level of satisfaction of body image was achieved. The group of Veiga (24) stated that immediate or delayed breast reconstruction obtained a progressive improvement of the health related quality of life in almost all the Short Form Health Survey (SF-36) (25) dimensions, if compared with mastectomy alone. ~~Investigators found a significant improvement at 3 months, 6 months, and 12 months follow up. The group of Huguet (31) (2009) confirmed that women submitted to mastectomy with breast reconstruction got a better level of quality of life (in particular concerning sexuality), compared with mastectomized women without reconstruction. Considering these findings on improvement of outcome and quality of life, we can reasonably suggest that breast reconstruction should be offered to all women following mastectomy.~~

As far as we know, only one study reported that women who had breast-conserving surgery or postmastectomy reconstruction, showed greater mood disturbance and poorer well-being compared with women who had mastectomy alone (9). Authors correlated these results to some factors that might contribute to poorer quality of life: length of surgery, length of hospitalization, time away from usual activities, and postoperative pain, all of which tend to be greater with reconstruction.

At the same time, only one study has recently examined the contribution of psychological factors as predictors of patient satisfaction with postmastectomy breast reconstruction (12). Authors found that affective distress, depression, somatization, and somatic anxiety contribute to reduce general and aesthetic satisfaction with surgical outcome at 1 year. Nevertheless, interaction between psychological characteristics and personality traits has not been considered yet. ~~although the role of personality appears a relevant issue and deserves to be investigated in these patients.~~ The aim of the present study is to evaluate whether socio-demographic, clinical, and personality characteristics determine changes of subjective quality of life, in a group of patients with breast cancer who undergo breast reconstruction after mastectomy.

Materials and Methods

Our study was performed at the Service for Personality Disorders, Unit of Psychiatry 1, Department of Neurosciences, University of Turin, Italy. We included consecutive patients with a previous diagnosis of breast cancer who received postmastectomy reconstruction at the Service for Plastic and Reconstructive Surgery, Unit of Plastic Surgery, Department of Medicine and Surgery, University of Turin, Italy. Patients were enrolled from September 2007 to December 2008. Written informed consent was obtained from all patients prior to their participation. We followed the Declaration of Helsinki guidelines and received the ethics board approval.

All patients received immediate reconstruction and implant of tissue expander and were interviewed one week before the intervention of combined mastectomy and reconstruction (baseline, T0). Follow-up was scheduled three months after the surgical intervention (T1).

At baseline patients were assessed with a semistructured interview to collect demographic and clinical characteristics, including: age, educational level (primary school, secondary school, high school, university), work (worker/farmer, clerk, self-employed worker, unemployed/housewife, retired), marital status (single, married, separated/divorced, widowed), number of childbirths, breast cancer stage, surgical technique of mastectomy (unilateral mastectomy, bilateral mastectomy,

mastectomy with lymph node dissection), record of previous mastectomies, prior radiation therapy, and previous chemotherapy. We recorded also the age of first diagnosis of breast cancer and the duration of illness, that was defined as the interval between diagnosis of breast cancer and baseline stage. We used the following self-report instruments: the Short Form Health Survey Questionnaire (SF-36) (25), a standard instrument that measures eight dimensions of health status; the brief form of the Temperament and Character Inventory (TCI-125), a questionnaire which assesses four temperament and three character dimensions of personality (26); the Inventory of Interpersonal Problems (IIP-64), an inventory designed to identify eight domains of problems in interpersonal relationships (27). Moreover, we evaluated psychiatric symptoms with the following rating scales: the Severity Item of the Clinical Global Impression (CGI-S) to assess the level of global symptomatology (28); the Hamilton Depression and Anxiety Rating Scales (HDRS, HARS) (29-30). All patients were interviewed at follow-up (T1) with the SF-36 (25). The mean of the transformed scores of the eight SF-36 scales was used for analysis of data. It took patients about 45 minutes to complete the assessment at T0 and 15 minutes at T1. Table 1 describes the characteristics of the instruments used to assess the patients.

We excluded individuals with a lifetime diagnosis of delirium, dementia, amnesic or other cognitive disorders; schizophrenia or other psychotic disorders; bipolar disorders. Exclusion criteria also considered a current diagnosis of major depressive episode and whether an individual was treated with psychotropic drugs during the 2 months prior to the study. Patients who had cancer recurrences during the study, and subjects with complications due to breast reconstruction were excluded, too.

We performed statistical analyses using the software system SPSS, version 17.0 (SPSS Inc, Chicago, Illinois, 2008). Univariate regression was used to study the relation between the difference T1-T0 of the SF-36 mean transformed score and the following continuous variables: age, number of childbirths, age of the first diagnosis of breast cancer, illness duration, CGI-S, HDRS and HARS scores, TCI-125 dimensions (novelty seeking, harm avoidance, reward dependence, persistence,

self-directedness, cooperativeness, self-transcendence), and IIP-64 domains (domineering or controlling, vindictive or self-centered, cold and distant, socially inhibited, nonassertive, overly accommodating, self-sacrificing, intrusive or needy). We used the analysis of variance (ANOVA) to test if the change T1-T0 of the SF-36 mean score is significantly related to the presence of the following categorical variables: marital status, educational level, work, previous mastectomies, surgical technique of mastectomy, breast cancer stage, prior radiation therapy, and previous chemotherapy. Continuous and categorical variables that were found significant at the two preceding tests, were included in a regression model (stepwise forward) to identify which factors were independently related to the change T1-T0 of the SF-36 mean score. Bootstrapping with 1000 samples and 1.95 confidence limits for standard errors was applied to confirm the validity of all regression coefficients and significance tests.

P values were considered significant when $P \leq 0.05$.

Results

Fifty-seven women were enrolled. The sample had a mean \pm SD age of 46.8 ± 8.1 , years. The mean age of first diagnosis of breast cancer was 44.3 ± 8.6 years. The mean duration of illness was 4.1 ± 2.4 months. The mean number of childbirths was 1.4 ± 0.8 . CGI-S mean score in the total group was 2.1 ± 1 ; HDRS and HARS mean scores were respectively 10.5 ± 5.1 , and 10.4 ± 4.7 . SF-36 mean score was 62.24 ± 15.89 at baseline, and 69.14 ± 13.24 at T1, with a mean difference of 6.90 ± 18.22 . This difference was significant with analysis of variance (ANOVA) ($p = 0.01$). Considering SF-36 mean score at T0 and T1 and applying the conventional $\alpha = 0.05$ with two-tailed tests, power of statistical analysis β is 98.9%.

Forty-five patients (78.9%) underwent unilateral skin-sparing mastectomy, and 12 (21.1%) underwent bilateral skin-sparing mastectomy. In all patients, completely filled textured saline tissue expanders were inserted at the time of mastectomy. The mean intraoperative expander fill volume was 475 cc (range: 250-750 cc). In the following period patients will complete their reconstruction

with permanent implants placement. Demographic and clinical characteristics of our sample are reported in Table 2.

With univariate regression, the SF-36 score change was significantly related to the following continuous variables: age ($p < 0.01$); age of first diagnosis of breast cancer ($p = 0.03$); two temperament dimensions of TCI-125: novelty seeking ($p = 0.02$) and harm avoidance ($p < 0.01$); one character dimension of TCI-125: self-directedness ($p < 0.01$). Moreover, the correlation was significant for the following IIP-64 domains: vindictive or self-centered ($p < 0.01$), cold and distant ($p < 0.01$), socially inhibited ($p < 0.01$), nonassertive ($p = 0.02$), overly accommodating ($p < 0.01$). Results of univariate regression analysis are presented in Table 3.

Analysis of variance (ANOVA) found that only the variable “work” was significantly related to the change of quality of life at follow-up ($p = 0.04$). The Bonferroni’s post-hoc test showed a significant difference between “retired” and “unemployed or housewife” ($p = 0,024$), in favour of the first condition.

Multiple regression analysis showed that two factors were significantly and independently related to the change T1-T0 of the SF-36 **mean score**: the TCI-125 temperament dimension harm avoidance and the IIP-64 domain vindictive or self-centered. Results of multiple regression are displayed in Table 4.

Discussion

The results of our study indicate that SF-36 measure of quality of life shows both a statistically significant and clinically meaningful change in the three months after the combined intervention of mastectomy tissue expander implant (immediate reconstruction): in fact, mean change of SF-36 score is 6.9. Considering the role of different characteristics of our patients in changing quality of life, we found that some personality dimensions significantly affect quality of life in patients undergoing breast reconstruction after mastectomy. On the contrary, neither cancer characteristics nor treatment variables were related to subjective quality of life after reconstructive surgery.

In detail, results of regression analysis show that quality of life significantly improves in patients characterized by high levels of the temperament dimension harm avoidance on the TCI-125 and by high scores of the interpersonal domain vindictive/self-centred on the IIP-64. According to Cloninger's description of temperament dimensions, individuals high in harm avoidance tend to be cautious, apprehensive, doubtful, anxious, and inhibited in most social situations. These characteristics belong to patients susceptible to criticism and frustration, who show pessimism and fear of uncertainty, and partly overlap with traits of obsessive personality. We suppose that our patients might reduce social anxiety and insecurity related to stress or danger conditions, through the restoration of self body image. If body image is restored as similar as possible to the premorbid conditions, patients will be able to forget the external signs of cancer and feel themselves almost completely recovered. Similar personality characteristics were also described by Roth et al. (12). These Authors noticed that women who choose reconstruction report a great concern for their physical appearance and a strong need for complete (errorless) restoration of the surgical treated breast. On the other hand, referring to Horowitz's description, the vindictive/self-centred pattern of interpersonal relationship is typical of suspicious, irascible, and aggressive patients. Commonly, patients with high scores in this domain of the IIP-64 present traits of narcissistic personality. They are mostly concerned with self-needs satisfaction and poorly affected by attitudes and reactions of other people. In these cases, improvement of subjective quality of life could be interpreted as the consequence of restoring a self-satisfying body image. In self-centred patients, breast reconstruction could also fulfil the desire of revenge on cancer and might symbolize the conclusion of a reparative process that begins at the moment of the cancer diagnosis. It seems that these women feel themselves recovered from the disease and can better face the fear of relapse after reconstruction of the mutilated breast. Similar conclusions have been reported by Elder et al. (10) in women who choose immediate breast reconstruction. Authors concluded that patients wish to remove the signs of mastectomy and to enhance self-esteem and emotional health. The main benefit of immediate

reconstruction is that women do not go through a period of compromised body image and do not focus attention on mutilation as the effect of their illness.

It is noticeable that no factor associated with cancer characteristics or treatment procedures significantly influenced quality of life after reconstruction in our patients. Of course, we must consider that only subjects who did not have cancer recurrences during the study and/or complications due to breast reconstruction were included in our sample. However, concerning this issue, a limitation of the study can derive from the timing of surgical intervention: all patients underwent immediate breast reconstruction by positioning the expander at the time of mastectomy. In these cases, we cannot compare the profile of personality characteristics of patients who receive immediate reconstruction with patients who receive delayed reconstruction and the effects of the two different interventions on subjective quality of life. In two studies by Roth et al. (11,31) Authors found that women who undergo immediate breast reconstruction, compared with those who receive delayed reconstruction, have more negative outcomes, higher level of impairment in emotional well-being, and more severe problems in both physical and functional well-being. Investigators noticed that these results could be related to the apprehension associated with a recent diagnosis of breast cancer and fears for potential complications associated with both mastectomy and reconstructive surgery. In addition, they supposed that differences of personality characteristics can be present at baseline between women who undergo immediate reconstruction with women who undergo delayed reconstruction and can affect surgical outcome.

Findings of our study suggest that a preoperative personality assessment of patients requiring breast reconstruction will be useful to identify predictive factors of subjective better quality of life after surgery. Our data need to be replicated in follow-up studies at one year or longer after breast reconstruction. Furthermore, a sensitive and specific instrument for breast cancer patients, such as BREAST-Q (32), should be used in addition to SF-36 to measure the outcome of mastectomy and reconstructive surgery. Future investigations on this topic will provide more information about relations between personality profile and subjective quality of life following breast reconstruction,

making easier the decision-making process for both patients and surgeons. Such evaluations will also contribute to determine which patients need to receive a psychotherapy in the period following mastectomy and tissue expander implant.

Conclusions

Personality dimension of harm avoidance and vindictive/self-centred pattern of interpersonal functioning significantly condition subjective quality of life of patients undergoing breast reconstruction after mastectomy. A preoperative assessment, using self-report questionnaires like TCI-125 and IIP-64, could be performed as a routine procedure to provide predictors of outcome and to identify the need for psychotherapy during the period of reconstruction. In our opinion, a time-limited psychotherapy focused on preventing depressive symptoms and improving interpersonal relations, such as Klerman's interpersonal psychotherapy of depression, is indicated in selected patients from the first weeks after surgical intervention (33, 34).

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Tab 1. Characteristics of self-report rating scales and inventories administered to our patients.

Scale	Subscales and Characteristics
Hamilton Depression Rating Scale	It is a clinician-rated scale that scores severity of 21 symptoms of depression in the last week. Items are variably scored 0-2, 0-3, or 0-4, with a total score ranging from 0 to 64. Higher scores indicate more severe depressive symptoms.
Hamilton Anxiety Rating Scale	It is a clinician-rated scale that scores severity of 14 symptoms of anxiety in the last week. Items are all scored 0-4, with a total score ranging from 0 to 56. Higher scores indicate more severe anxiety symptoms.
Clinical Global Impression	<p>It is a clinician-rated instrument to make global assessment of illness and consists of three different measures:</p> <ul style="list-style-type: none"> • Severity of illness • Global improvement • Efficacy index (comparison of the patient’s baseline condition to a ratio of current therapeutic benefit and severity of side effects). <p>In this study we considered the first scale: severity of illness. This is a 7-point scale that requires the clinician to rate the severity of patient’s illness at the time of assessment:</p> <ol style="list-style-type: none"> 1. normal 2. borderline mentally ill; 3. mildly ill; 4. moderately ill; 5. markedly ill; 6. severely ill; 7. extremely ill.
Temperament and Character Inventory	<p>It is a self-report questionnaire of 125 items evaluating the seven domains of personality included in Cloninger’s biosocial theory. The inventory considers four temperament dimensions:</p> <ul style="list-style-type: none"> • Novelty Seeking, • Harm Avoidance, • Reward Dependence, • Persistence, <p>and three character dimensions:</p> <ul style="list-style-type: none"> • Self-Directedness, • Cooperativeness, • Self-Transcendence. <p>Each scale of the TCI-125 is scored by adding one point for each item answered appropriately</p>

	<p>(true/false). Score sheets for the TCI temperament and character traits provide raw scores, T-scores and percentile scores. Individuals with very low or very high scores are extremely intense in their emotional responses and characterological attitudes.</p>
<p>Inventory of Interpersonal Problems</p>	<p>It is a self-report instrument that identifies the patient's most salient interpersonal difficulties. It contains 64 statements describing common interpersonal problems, identified by eight subscales:</p> <ul style="list-style-type: none"> • Domineering/Controlling, • Vindictive/Self-Centered, • Cold/Distant, • Socially Inhibited, • Nonassertive, • Overly Accommodating, • Self-Sacrificing, • Intrusive/Needy. <p>Raw subscale scores are obtained by calculating the sum of the eight item responses for each of the eight scales. All items are rated 0-4. A scoring sheet provides conversion raw scores to standard T scores. Each T score represents the relative salience of the interpersonal difficulty in the domain described by a subscale.</p>
<p>Short-Form Health Survey – 36 items</p>	<p>It is a self-report instrument that measures the quality of life, including 36 questions and eight itemized categories:</p> <ul style="list-style-type: none"> • Physical functioning, • Role function physical, • Bodily pain, • General health perceptions, • Vitality, • Social Functioning, • Impact of emotional problems or daily activities, • Mental health. <p>Each of eight scales consists of 2 to 10 items, and each item is rated on a 2- to 6- point Likert scales. The raw scale score is calculated by summation of all the scores of items belonging to the same scale.</p> <p>Raw score of each scale is transformed in a 0-100 score using the following formula: transformed score = (raw score – lowest possible raw score) x 100 / range of possible raw scores</p>

Table 2. Clinical characteristics of 57 women comprised in the sample.

Variable	Mean ± SD
Age	46.8 ± 8.1 years
Age of first diagnosis of breast cancer	44.3 ± 8.6 years
Duration of illness	4.1 ± 2.4 months
Number of childbirths	1.4 ± 0.8
CGI-Severity Item	2.1 ± 1.0
HDRS score	10.5 ± 5.1
HARS score	10.4 ± 4.7
Mean of SF-36 transformed scores at T0	62.24 ± 15.89
Mean of SF-36 transformed scores at T1	69.14 ± 13.24
Variable	N (%)
Marital status	
Single	9 (16)
Married	42 (74)
Separated/Divorced	6 (11)
Widow	0
Educational level	
Primary school	3 (5)
Secondary school	12 (21)
High school	33 (58)
University	9 (16)
Work	
Unemployed/housewife	9 (16)
Retired	3 (5)
Worker/farmer	9 (16)
Clerk	30 (53)
Self-employed worker	6 (10)
Breast cancer stage	
Stage 0	12 (21)

Stage I	0
Stage II	18 (31)
Stage III	27 (47)
Stage IV	0
Surgical technique of mastectomy	
Unilateral mastectomy	27 (47)
Bilateral mastectomy	18 (32)
Mastectomy with lymph Node dissection	12 (21)
Previous mastectomy	
No	51 (89)
Yes	6 (10)
Previous chemotherapy	
No	18 (32)
Yes	39 (68)
Previous radiotherapy	
No	45 (78)
Yes	12 (21)

Table 3. Results of univariate regression between continuous variables and the T1-T0 change of the mean of SF-36 transformed scores. Only significant results ($P \leq 0.05$) are reported.

	r^2	standardized b	<i>P</i>
Age	0.12	0.37	< 0.01
Age at first diagnosis	0.06	0.29	0.03
TCI Novelty Seeking	0.08	- 0.31	0.02
TCI Harm Avoidance	0.29	0.55	< 0.01
TCI Self-directedness	0.17	- 0.43	< 0.01
IIP-64 Vindictive or self-centered	0.17	0.43	< 0.01
IIP-64 Cold and distant	0.13	0.38	< 0.01
IIP-64 Socially inhibited	0.17	0.43	< 0.01
IIP-64 Nonassertive	0.08	0.31	0.02
IIP-64 Overly accommodating	0.13	0.38	< 0.01

TCI: Temperament and Character Inventory; IIP-64: Inventory for Interpersonal Problems – 64 items; r^2 is an estimate of the percentage of variance explained by the relation between each variable and the T1-T0 change of the SF-36 mean score; standardized regression coefficients (standardized **b**) are reported in order to allow the comparison of regression coefficients estimated from variables with different measurement scales.

Table 4. Results of multiple regression analysis (stepwise) performed using the T1-T0 change of the mean of SF-36 transformed scores as dependent variable. Independent variables are factors that were found significant with univariate regression (continuous variables) or with the analysis of variance (categorical variables).

Variable	b	SE	t	<i>P</i>
TCI Harm Avoidance	0.29	0.08	3.83	< 0.01
IIP-64 Vindictive/Self-centered	0.53	0.24	2.22	0.03

TCI: Temperament and Character Inventory; IIP-64: Inventory for Interpersonal Problems – 64 items.