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Contraception

Contraception 71 (2005) 417-420

Original research article

# Risk factors for tubal ligation: regret and psychological effects Impact of Beck Depression Inventory

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Received 10 November 2004; revised 15 December 2004; accepted 21 December 2004

## Abstract

**Objective:** To investigate the relation of sterilization and depression in association with Beck Depression Inventory (BDI) and to analyze whether preoperative BDI scores have predictive value on satisfaction.

**Methods:** One hundred sixty-two women who had laparoscopic surgical sterilization were recruited into the study. Patients identified to have an intra-abdominal disease such as pelvic inflammatory disease, endometriosis or adnexial lesions, myoma uteri and previous cesarean delivery were excluded from the study. Women were administered the BDI 1 week prior to the operation and 1 year after the procedure, and patients were asked if they were satisfied with their new state of fertility.

**Results:** Mean BDI scores were  $10.1\pm2.7$  and  $12.9\pm4.0$ , preoperatively and postoperatively, respectively (p<.001). The difference between preoperative and postoperative BDI scores was affected by age and satisfaction status; younger patients had significantly increased postoperative scores. Dissatisfied women had higher pre- and postoperative BDI scores (p<.001). The difference between pre- and postoperative scores was increased significantly in the dissatisfied group. Preoperative BDI score was found to be a significant predictor of satisfaction status 1 year after the operation.

Conclusion: Preoperative application of BDI can identify women who are at greater risk for regret and dissatisfaction.

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Keywords: Tubal ligation; Sterilization; Satisfaction; Depression; Beck Depression Inventory

## 1. Introduction

Sterilization is an effective contraceptive method that has become widely used [1,2]. Undesirability of oral contraceptives in older women, relatively higher failure rates of alternative contraceptive techniques and easy accessibility of surgical sterilization contribute to the increasing popularity of sterilization. Effects of surgical sterilization on general health are clear, but its long-term psychological effects [3] and, in particular, its relationship with depression are not well established. The psychological status of women prior to the sterilization technique may be important in predicting future satisfaction and success of operation. Depression is one of the most prevalent illnesses among women, having a significant impact on quality of life. It has

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been thought that depression and anxiety are associated with cyclical hormonal changes, which may be affected by tubal sterilization. The aim of this study was to investigate the relationship of sterilization and depression in association with the Beck Depression Inventory (BDI) and to analyze whether preoperative BDI scores have predictive value on satisfaction.

#### 2. Material and methods

The study consisted of 162 healthy, married women who had laparoscopic surgical sterilization between March 1, 2001, and February 28, 2003, in Süleymaniye Maternity Hospital, İstanbul. The study was approved by the local ethics committee. Patients with no history of cesarean section and psychological disorders were included in the study. Women with a previous history of depression were excluded from the study. All patients were admitted to the hospital for surgical sterilization voluntarily.

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<sup>0010-7824/\$ –</sup> see front matter @ 2005 Elsevier Inc. All rights reserved. doi:10.1016/j.contraception.2004.12.020

Comparison of preoperative and postoperative BDI scores with satisfaction status 1 year after the operation

Mean BDI scores	Satisfaction status 1 year after the operation		p value
	Satisfied	Dissatisfied	
Preoperative Postoperative	9.8±2.6 (mild) 12.1±3.4 (mild)	11.7±2.4 (mild) 17.8±4.3 (moderate)	<.001 <.0001

Data in parentheses indicate level of depression.

Patients were administered a personal information questionnaire and BDI 1 week prior to the operation and 1 year after the procedure. The patients were also asked if they were satisfied with their new state of fertility. The BDI, which demonstrates high reliability coefficients and good construct validity, consists of 21 items that measure the severity of depression symptoms. Each item is scored on a 4-point measure from 0 (*neutral*) to 3 (*maximum severity*). A score of <15 indicates mild depression, a score of 15–30 indicates moderate depression and a score of >30 indicates severe depression, respectively. The personal information questionnaire consisted of age, gravida, number of abortions and number of live births. Patients were also asked about their marital status during the study.

All patients signed an informed consent before the procedure and were hospitalized on the day of the procedure. The BDI is a self-rating instrument; there might well be a bias of presenting as less depressed in order to get the procedure. Therefore, patients were informed that the BDI was part of a research, and their score would not interfere with the operation decision. The operation was performed laparoscopically by one of two surgeons under general anesthesia. Both tubes were coagulated and cut by bipolar scissors. The abdomen was explored by scope, and patients identified to have an intra-abdominal disease such as pelvic inflammatory disease, endometriosis or adnexial lesions, or myoma uteri, were excluded from the study. All patients were discharged the next day.

Differences in the mean age, gravida, parity, number of abortions and BDI scores were analyzed using Student's t test. A paired Student's t test was used to analyze BDI scores in different groups. Linear and logistic regression analyses were performed to identify any significant predictor of BDI scores and satisfaction status. Receiver operating characteristic curve (ROC) was performed to define a cutoff value for significant predictors in regression analyses. Prediction profiler was analyzed, which displays the prediction of any chosen X value. Desirability of the actual regression model and a theoretic model can be analyzed on this graph. Overall desirability measure is shown on a scale from 0 to 1. An alpha level of <.05 was considered indicative of statistical significance; all tests were twotailed. Statistical analyses were performed on a personal computer with SPSS for Windows, version 11.0 (SPSS, Chicago, IL, USA) and JMP version 5.0 (SAS Institute, Cary, NC, USA).

#### 3. Results

Six women of 162 were excluded from the study due to laparascopically diagnosed intra-abdominal disease. Data were collected from the remaining 156 women. The mean of age, gravida, parity and number of abortions were  $34.6\pm3.7$ years old,  $4.7\pm1.1$ ,  $2.9\pm0.8$  and  $1.8\pm0.8$ , respectively. All of the patients were discharged the day after the operation. There was no complication in any of the patients.

Mean BDI scores were  $10.1\pm2.7$  and  $12.9\pm4.0$ , preoperatively and postoperatively, respectively (p<.001). The difference between preoperative and postoperative BDI scores was affected by age; younger patients had significantly increased postoperative scores. Gravida, parity and number of abortions did not affect the difference between preoperative and postoperative scores. The mean preoperative BDI scores in women <30 years old and in women <30 years old were  $11.1\pm2.3$  and  $9.9\pm2.7$ , respectively (p>.05). The mean postoperative BDI scores of women <30 (14.9\pm5.0) was not significantly different from mean BDI scores of women >30 years old (12.5 $\pm3.7$ ; p<.05).

Patients were asked if they were satisfied 1 year after the operation. Eighty-six percent of patients were satisfied with their new state of fertility. The mean preoperative BDI scores in satisfied and dissatisfied women were  $9.8\pm2.6$  and  $11.7\pm2.4$ , respectively (p<.001). The mean postoperative BDI score in women who were satisfied with the operation was  $12.1\pm3.4$ , and the mean postoperative BDI score in women who were dissatisfied with the operation was  $17.8\pm4.3$  (p<.0001; Table 1). There is a great increase in BDI scores in the dissatisfied women postoperatively, as shown Table 1.

The preoperative and postoperative scores in both groups were analyzed by paired Student's t tests, which found a



Fig. 1. Analysis of difference in preoperative and postoperative BDI scores in satisfied (S) and dissatisfied (DS) women 1 year after the operation by paired Student's t test.



Fig. 2. (A) Preoperative BDI score is found to be a significant predictor of satisfaction status in ROC and regression analyses. (B) Prediction profiler of preoperative BDI scores on satisfaction status in regression analyses. Prediction of dissatisfaction is 1.

statistically important difference between preoperative and postoperative BDI score in the dissatisfied group (Fig. 1). The BDI score increased significantly in the dissatisfied group compared to the satisfied group (p < .001).

Age, gravida, parity and number of abortions did not affect satisfaction status. Prediction of satisfaction status using a preoperative BDI score was analyzed by logistic regression model; preoperative BDI score was found to be a significant predictor of satisfaction status 1 year after the operation (Fig. 2; p < .001). In ROC analysis, the best cutoff value of preoperative BDI score that predicted dissatisfaction was 10.5 with a sensitivity of 75% and specificity of 41% (p < .05). This cutoff value of 10.5, even among women with a score of <15, identifies those at greater risk for regret and postoperative depression (Fig. 2A). Prediction profiler, analyzing the desirability of the regression model to predict dissatisfaction, shows that the steepness of the curve increases sharply at a BDI score of 10.5 (Fig. 2B).

No major complication occurred during or after the procedure, and all patients were discharged the day after the operation. During the follow-up period, patients were asked about their marital status. There were 34 dropouts (21%) in 1 year. Of these, 13 dropped out due to economic difficulties, 1 due to divorce, 1 to death of her spouse and 19 for other unspecified reasons.

#### 4. Discussion

Surgical sterilization is becoming more popular among women presently, and there is an increase in the trend for surgical sterilization. Women's traditional role in childbearing and fertility regulation may lead them to consider and use sterility-contraception methods more than men. Therefore, the psychological effects of these methods, as well as the physiological side effects, should be well established for women's health. The side effects of the procedure are well studied; however, the long-term psychological effects are not clear. In our study, we examined the relationship between surgical sterilization, depression and satisfaction 1 year after the operation.

Depression is a common illness in women which significantly affects quality of life. It is not clear why the prevalence of depression is higher in women than in men. It is speculated that there may be a relationship between reproductive hormonal changes and depression. Women are more prone to depressive mood particularly during times of rapid changes in gonadal hormones [4]. The BDI is a 21-item test designed to measure the presence of depression. It produces a single score indicating intensity of depressive episode. Beck Depression Inventory scores were increased postoperatively in our study. Dissatisfied women had the largest increase in BDI score. These women had BDI scores indicative of mild depression preoperatively (BDI <15) and of moderate depression (BDI >15); however, postoperatively, this change was not seen in satisfied women.

Satisfaction with a new sterility state is reported to be above 70% [5]. In our study, 86% of patients were satisfied, and only the preoperative BDI score was found to be a significant predictor of satisfaction status 1 year after the operation. Depression and BDI scores can be influenced by many factors, but in our study, a BDI score higher than 10.5 was found to be significantly associated with regret after sterilization. Women with high BDI scores may be impaired to make a healthy decision, like whether they will regret it in the future. This regret may contribute to higher BDI scores after the procedure and may significantly affect the psychological health of women. We suggest that women with high BDI scores be given time to consider their decision on fertility state and should be provided psychological support during this time.

It is well established that young age at the time of sterilization is significantly associated with regret after the procedure [6,7]. Hardy et al. [8] reported that the odds ratio of requesting reversal of sterilization below the age of 24 was 18 and above the age of 30 was 1. In our study, increase in BDI

scores was particularly confined to young patients. This may be due to regret after the procedure. However, BDI scores of women <30 years were significantly higher than for women >30 years. Increased regret with younger age is probably due to longer infertile life and the greater probability of changes in marital and socioeconomic status or loss of children. Additionally, a high preoperative BDI score may be an important factor in future regret and high BDI scores. Presterilization counseling, particularly in younger women, needs to cover alternative contraceptive methods, irreversibility and failures of the procedure, and it should elicit information about the couples' psychosocial and marital dynamics as well as the women's menstrual history, sexual history and psychological or somatic symptoms [9,10].

Screening for preoperative BDI scores may identify women suffering from dysthymia or chronic depression. These women are likely to be unhappy with any intervention. These women may have a baseline score of 14 or higher and may benefit from antidepression treatment before the procedure. Treatment can also be considered after the procedure for young dissatisfied patients who have a score of moderate depression. A year later, the mean for the young dissatisfied patients was in the mild depression range and with a standard deviation of 5, which would put some into the moderate depression range, certainly an indication for treatment.

Laparoscopic tubal ligation is a minimally invasive, effective technique to sterilize women. Preoperative features of the patient should be examined to make the procedure more efficient. Psychological assessment prior to sterilization can be included in a general systemic-gynecological examination to predict future satisfaction. Preoperative assessment of the BDI (with a cutoff value of 10.5) will also identify women with mild depression (BDI score <15) and not thought to be at great risk for depression and regret postoperatively. Discussing the issue of high BDI score with the couple may aid in postponing or abandoning the procedure and may motivate some to seek psychological care, which will affect BDI scores. This will also help the couple to evaluate their decision on sterility and may decrease dissatisfaction rate after the operation.

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