Cosmetic Breast Augmentation and Suicide

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Objective: This article discusses the unexpected relationship between cosmetic breast implants and suicide that has been found in six epidemiological investigations completed in the last several years.

Method: The epidemiological studies are reviewed.

Results: Across the six studies, the suicide rate of women who received cosmetic breast implants is approximately twice the expected rate based on estimates of the general population. Although the first study of this issue suggested that the rate of suicide among women with breast implants was greater than that of women who underwent other forms of cosmetic surgery, the largest and most recent investigation in this area found no difference in the rate of suicide between these two groups of women.

Conclusions: The higher-than-expected suicide rate among women with cosmetic breast implants warrants further research. In the absence of additional information on the relationship, women interested in breast augmentation who present with a history of psychopathology or those who are suspected by the plastic surgeon of having some form of psychopathology should undergo a mental health consultation before surgery.

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The American Society of Plastic Surgeons reported that 329,396 women underwent cosmetic breast augmentation in the United States in 2006 (1). This represents an increase of 55% since 2000 and over 300% in the past decade. These numbers, while substantial, may underestimate the number of women who receive breast implants in the United States each year for several reasons. First, they do not account for women who receive breast implants as part of surgical breast reconstruction following mastectomy. (This article will focus solely on women who receive breast implants for cosmetic purposes.) Second, these statistics do not capture breast augmentation procedures being performed by physicians who are not plastic surgeons. Furthermore, the number of American women who undergo cosmetic breast augmentation is expected to increase, given the Food and Drug Administration's (FDA's) November 2006 decision to reapprove silicone gel-filled breast implants for general cosmetic use.

The growth in the popularity of cosmetic breast augmentation is all the more remarkable considering that in 1992 the FDA issued a moratorium on the use of silicone gel-filled implants. Then-FDA Commissioner Dr. David Kessler called for further study of the physical safety and psychological benefits of breast implants. Comprehensive reviews have concluded that silicone breast implants are not associated with significant long-term health problems (2). Since that time, six epidemiological studies have found an unexpected relationship between cosmetic breast augmentation and suicide.

Epidemiological Studies Identifying a Relationship Between Breast Implants and Suicide

The first study, to our knowledge, to identify a relationship between breast implants and suicide was designed to investigate causes of mortality among women who underwent cosmetic breast augmentation (3). Researchers from the National Cancer Institute reviewed the medical records of 13,488 women who received breast implants for cosmetic purposes (women who received breast implants following a diagnosis of cancer were not studied) and 3,936 women who received other forms of cosmetic surgery from the same 18 surgical practices. There were 225 deaths in the breast implant group (standardized mortality ratio [SMR]=0.69, 95% confidence interval [CI]=0.6–0.8) and 125 deaths in the other cosmetic procedure group (SMR=0.58, 95% CI=0.5–0.7). At an average follow-up of 13 years and compared to the general U.S. population, both groups of women had lower overall mortality rates. Compared to the general population, women who received breast implants were found to have a higher risk of death related to brain cancer (SMR=2.45) and suicide (SMR=1.54), although this later finding was not statistically significant. Women with breast implants were found to have a higher mortality rate than women who received other forms of cosmetic surgery (relative risk=1.27, 95% CI=1.0–1.6). This difference was accounted for by a larger number of deaths attributed to brain cancer (N=13, SMR=2.25), respiratory cancer (N=32, SMR=3.03), and suicide (N=19, SMR=4.24). Death by suicide was associated with an older

age at implantation (SMR=3.89, 95% CI=2.0–7.5), and there was a greater than twofold elevation in suicides in women more than 10 years after the date of surgery.

Brinton and colleagues (3) tentatively suggested that the higher rate of suicide among breast implant patients could be attributed to mood disorders, low self-esteem, or marital difficulties. Unfortunately, none of these variables were investigated in the study.

In 2003, two Scandinavian studies investigated mortality among women who received cosmetic breast implants and also found a higher than expected number of suicides. In the first study, Koot and colleagues (4) reviewed the death records of 15- to 69-year-old Swedish women (N=7,585) who had received breast implants for cosmetic purposes from 1965 to 1993. Among these women, there were 85 deaths, where, based on age- and calendar-year specific death rates in the Swedish female population, 58.7 deaths would have been expected (SMR=1.5, 95% CI=1.2–1.8). Fifteen deaths were attributed to suicide, where 5.2 would have been expected (SMR=2.9, 95% CI=1.6–4.8). In the second study, Pukkala and colleagues (5) investigated mortality among 2,166 Finnish women who received cosmetic breast implants between 1971 and 2001. Among these women, there were 31 deaths, which compared to 32.1 expected deaths. Ten of these deaths were attributed to suicide; 3.13 suicides were expected (SMR=3.19, 95% CI=1.53–5.86).

The fourth study to identify a relationship between cosmetic breast augmentation and suicide also was designed to investigate overall mortality associated with breast implants (6). This study, however, also provided some information on the psychiatric history of the women in the form of previous psychiatric hospitalizations. Danish women (N=2,761) who underwent cosmetic breast augmentation between 1973 and 1995 were compared to 7,071 women who underwent breast reduction surgery and 1,736 women who underwent other forms of cosmetic surgery.

Women who underwent cosmetic breast augmentation again were found to have an elevated rate of death by suicide (SMR=3.1, 95% CI=1.7–5.2). Eight percent of women who underwent cosmetic breast augmentation were found to have a history of psychiatric hospitalizations before surgery (95% CI=7.0%–9.0%), which was higher than the rate of hospitalizations for women who underwent breast reduction (4.7%, 95% CI=4.2%–5.2%) or other cosmetic procedures (5.5%, 95% CI=4.5%–6.7%). Women with breast implants had an odds ratio for a previous psychiatric hospitalization of 1.7 (95% CI=1.4–2.0) compared to the other groups of women studied.

The fifth study of this issue came from Brinton and colleagues (7), who followed their American cohort for an additional 5 years. Of the 12,144 women with breast implants, 443 were deceased. Twenty-nine of these deaths were categorized as suicides (SMR=1.63, 95% CI=1.1–2.3, relative risk=2.58, 95% CI=0.9–7.8). As in their initial study, the highest SMR for suicide was found for women who received their implants at age 40 or older. The risk of suicide increased after the first postoperative decade. Women with breast implants, compared to other cosmetic surgery patients, also were found to have an elevated risk of death by motor vehicle accidents and alcohol or drug dependencies. The authors suggest that several of these deaths may not have been accidental but rather deaths from suicide.

Recently, the largest epidemiological study of this issue was published (8). Villeneuve and colleagues examined cause-specific mortality in a cohort of 24,558 Canadian women with breast implants and compared them with 15,893 women who underwent other cosmetic surgical procedures between 1974 and 1989. When they examined mortality records through 1997, they found 58 deaths among women with breast implants that were attributed to suicide (SMR=1.73, 95% CI=1.31–2.24), where 33.5 were expected. Other cosmetic surgery patients also were found to have a higher rate of suicide (33 deaths, SMR=1.55, 95% CI=1.07–2.18). The rate of suicide between women with breast implants and those who underwent other forms of cosmetic surgery did not differ. As with the American study, the SMRs for suicide were higher for the women who received breast implants at age 40 or later and for the women who had their implants for longer periods of time.

In summary, across the six epidemiological studies, there have been 126 suicides among women with cosmetic breast implants. The suicide rate is approximately twice that expected from estimates from the general population. Although the initial study by Brinton and colleagues (3) suggested that the rate of suicide among women with breast implants was greater than that of women who underwent other forms of cosmetic surgery, the larger investigation by Villeneuve et al. (8) found no difference in the rate of suicide among the two groups of cosmetic surgery patients.

Possible Explanations of the Relationship Between Cosmetic Breast Implants and Suicide

The six epidemiological studies produced few clues to the nature of the relationship between cosmetic breast implants and suicide. These studies primarily were designed to investigate all-cause mortality. They were not prospectively planned to investigate the unexpected association with suicide and, as a result, provide only limited information on the potential causal relationship between breast implants and suicide.

There are several possible explanations for the relationship between breast implants and suicide that, while not yet specifically investigated, have some support from related literatures (9, 10). These explanations include the role of preoperative personality characteristics and psychopathology, motivations and expectations for surgery, and the impact of postoperative complications.

Preoperative Personality Characteristics and Psychopathology

Demographic and descriptive characteristics. The stereotypical breast augmentation patient is widely believed to be a single Caucasian woman in her early to mid-20s who is interested in breast augmentation surgery as a way to facilitate the development of a romantic relationship. Reviews, however, have suggested that the typical patient differs from this stereotype (11, 12). She is most often Caucasian but is frequently in her late 20s or early 30s, is married, and has children. Although these characteristics may describe the "typical" patient, women from their late teens to mid-40s of varying ethnic backgrounds and relationship status present for breast augmentation surgery (1). As found in several of the epidemiological studies, women age 40 years and older who undergo breast augmentation appear to be at increased risk of suicide (3, 7–8).

Several studies have found that women who receive breast implants differ from other women on a variety of unique characteristics. Women with breast implants are more likely to have had more sexual partners, report a greater use of oral contraceptives, be younger at their first pregnancy, and have a history of terminated pregnancies compared to other women (13–16). They have been found to be more frequent users of alcohol and tobacco and have a higher divorce rate (14–16). Women with breast implants have been found to have a below average body weight (13–18), leading to concern that some may be experiencing eating disorders. Finally, they have been found to report more frequent use of psychotherapy than physically similar women not interested in breast augmentation, and they have been found to have a history of more psychiatric hospitalizations than other plastic surgery patients (6, 18).

Many of these characteristics have been found to be risk factors for suicide in psychiatric and community samples. For example, previous psychiatric hospitalization constitutes a major risk factor for suicide (19). Alcohol consumption and tobacco use also have been associated with an increased risk of suicide (20–22). Moreover, women with anorexia nervosa who were referred to medical or psychiatric departments are approximately 23 times more likely to die from suicide in comparison with the overall population (23).

Considering these and other characteristics, including age, ethnicity, and marital status, Joiner (24) argued that the suicide rate among women with breast implants could be almost five times the rate for the general population of women. He further suggested that postoperative improvements in body image following breast augmentation may produce a "protective effect" from the otherwise increased risk. Additional prospective epidemiological and psychological studies involving valid and reliable methodologies are needed to further investigate this hypothesis.

Body image dissatisfaction and body dysmorphic disorder. Another characteristic that appears to distinguish women with breast implants from other women is preoperative body image dissatisfaction. Within the past decade, an increasing amount of attention has been paid to the relationship of body image and cosmetic surgery (25). A theoretical model of the relationship has been proposed that suggests that body image dissatisfaction may be the primary motivational factor in the pursuit of cosmetic surgery (26). In brief, this model suggests that attitudes toward the body consist of two dimensions: 1) valence or investment—the importance of body image to a person's self-esteem—and 2) value or evaluation—defined as the degree of dissatisfaction with one's appearance. The model theorizes that persons who derive much of their self-esteem from their appearance (those with a high valence or investment) and who report high levels of body image dissatisfaction (those with a negative body image evaluation) may be more likely to seek cosmetic surgery. Several empirical studies have found that cosmetic surgery patients report increased investment in and dissatisfaction with their body image before surgery (17, 18, 27). Other studies have demonstrated improvements in body image postoperatively (28–30).

Although increased body image dissatisfaction is common among cosmetic surgery patients, some present for surgery with extreme body image dissatisfaction consistent with body dysmorphic disorder. Between 3% and 15% of cosmetic surgery and dermatology patients have been found to have some form of the disorder (31). Retrospective studies of cosmetic treatment use among persons with body dysmorphic disorder found that greater than 90% experienced either no change or a worsening in their body dysmorphic disorder symptoms following these treatments (32). As a result, body dysmorphic disorder is believed to contraindicate cosmetic surgery (25, 31, 33).

Beyond the appearance preoccupation, body dysmorphic disorder often causes marked impairment in psychosocial functioning. Almost all patients report interference with vocational or academic performance. Quality of life for most is quite poor, and the emotional suffering related to body dysmorphic disorder may lead some persons to contemplate or attempt suicide. The mean annual suicidal ideation rate among persons with body dysmorphic disorder is 57.8%, and the mean annual suicide attempt rate is 2.6% (34). These rates are approximately 10–25 and 3–12 times higher, respectively, than those in the general U.S. population. Some of the suicides reported among breast augmentation patients could be associated with the preoccupation with appearance typically seen with body dysmorphic disorder.

Psychopathology. As detailed above, Jacobsen and colleagues (6) were able to investigate the psychiatric history of their patients and found a higher rate of previous psychiatric hospitalizations among women with breast implants compared to both women who underwent other cosmetic

procedures and those who underwent breast reduction. Among women in the general population, a history of psychiatric hospitalizations is a strong predictor of suicide (35), accounting for more than 40% of the risk of suicide in one study (36). Unfortunately, the investigation by Jacobsen et al. (6) was the only epidemiological study that provided any information on the psychiatric history of the women studied and provided no information on diagnosis, history of illness, and other psychiatric treatments.

As reviewed in detail elsewhere, a number of studies over the past several decades have investigated the presence of psychopathology among breast augmentation patients (11, 12, 25, 26). Early studies in this area relied heavily on clinical interviews of patients. Appearance-related concerns were frequently interpreted as symbolic displacements of intrapsychic conflicts by psychiatrists who were trained in the psychoanalytic model of personality and psychopathology, the dominant theoretical orientation at that time. Not surprisingly, breast augmentation patients, as well as most cosmetic surgery candidates, were seen as highly psychopathological. These women were typically described as experiencing increased symptoms of depression, anxiety, guilt, and low self-esteem.

Subsequent studies were more likely to include standardized psychometric symptom measures and have described far less psychopathology among these women. Studies that used psychometric measures, including the MMPI, found little evidence of psychopathology. In a more recent investigation, women who received breast implants were found to have similar rates of depression and psychiatric treatment compared to women who received other forms of cosmetic surgery as well as population controls (16).

Clearly, the results of the clinical interview and psychometric investigations are contradictory. Unfortunately, both sets of investigations have suffered from a variety of methodological limitations that make drawing definitive conclusions from this research difficult if not impossible. The clinical interviews were typically not standardized and did not include interrater reliability of the symptoms or diagnoses. Furthermore, the theoretical biases of the psychiatrist-interviewers may have influenced the degree of psychopathology observed. The psychometric investigations suggest far less psychopathology among breast augmentation patients; however, they also suffer from methodological problems. Many did not include appropriate control or comparison groups. Therefore, it is unclear if the rate of psychological syndromes found among surgical candidates represents increased psychopathology above and beyond that found in the general population.

Motivations and Expectations

Several factors likely motivate women to undergo cosmetic breast augmentation (11, 12). Intrapsychic factors describe the internal motivations for surgery and the resulting effects of surgery on psychological status. Interpersonal factors concern the importance of the breast in marital, sexual, and social relationships. With regard to these factors, women who seek breast augmentation report anticipating improved quality of life, body image, and self-esteem as well as increased marital and sexual satisfaction postoperatively. Informational and medical factors also are thought to play a role in the decision to seek breast augmentation. Women who undergo breast augmentation obtain a great deal of information about breast implants from the mass media and appear to be aware of many of the risks associated with implants.

Motivations for surgery also have been categorized as internal (undergoing the surgery to improve one's self-esteem) or external (undergoing the surgery for some secondary gain, such as starting a new romantic relationship). Although a clear distinction between internal and external motivations is difficult, internally motivated patients are thought to be more likely to meet their goals for surgery (11, 12).

Postoperative expectations have been categorized as surgical, psychological, and social (11, 12). Surgical expectations address the specific concerns about physical appearance, both pre- and postoperatively. Psychological expectations include the potential improvements in psychological functioning that may occur after surgery. Social expectations address the potential social benefits of cosmetic surgery. Many women interested in breast augmentation believe that the procedures will make them more attractive to current or potential romantic partners. Following cosmetic surgery, patients typically are considered to be more physically attractive by others (25). Several studies have suggested that patients report improvements in body image and quality of life and decreases in anxiety and depressive symptoms following surgery (29, 30, 37). There is presently no evidence, however, to suggest that patients' social relationships improve after surgery. In their review of studies investigating psychological outcomes following cosmetic surgery, Honigman and colleagues (38) concluded that unrealistic expectations are associated with poor postoperative outcomes. Some women may enter into breast augmentation surgery with unrealistic expectations about the effect that breast augmentation will have on their lives. When these expectations are not met, they may become despondent, depressed, and potentially suicidal.

Psychological Functioning and Postoperative Complications

Clinical reports suggest that the majority of women are satisfied with the outcome of breast augmentation surgery and experience improvements in body image (29, 30). These benefits, however, may be tempered by the experience of a postoperative complication. Up to 25% of women are reported to experience a surgical or implant-related complication (2, 39). The most common complications are implant leakage or rupture/deflation, capsular contrac-

ture, discomfort or pain, breast asymmetry, scarring, loss of nipple sensation, and breast-feeding difficulties (2, 39–43). The experience of a complication is negatively related to postoperative satisfaction and to less favorable changes in body image (29). The occurrence of a complication and the resulting physical discomfort also could contribute to a depressed mood, increased anxiety, and a decline in quality of life. The absence of a proactive response from the patient's surgeon could further complicate the psychological reaction (33). Unfortunately, the relationship between postoperative surgical complications and subsequent suicide is unknown because none of the epidemiological studies detailed above reported information on surgical complications.

Research and Clinical Recommendations

As suggested by the six epidemiological studies, there appears to be an association between cosmetic breast augmentation and suicide. The specific nature of this relationship, however, is unknown. It is at least theoretically possible that some biological characteristic of the breast implants may be contributing to neurological changes that lead to suicidal behavior. Nevertheless, most of the focus on understanding the relationship between cosmetic breast implants and suicide has fallen upon the psychological characteristics and preexisting psychopathology of the women (9–11).

Clearly, additional research is needed. The epidemiological investigations to date have provided only limited information on the psychosocial status of women with breast implants. As proposed by McLaughlin and colleagues (9), a case-control study within a large existing cohort of women with breast implants could provide an ideal comparison for the preoperative characteristics and related psychosocial variables that may differentiate between women who died by suicide and those who did not. Such studies would be difficult, if not impossible, to conduct without the use of medical data registries as are often found in European countries. These studies would likely provide the best opportunity to determine if the increased suicide rate is associated with preoperative psychopathology. As part of the FDA's recent decision to reapprove silicone breast implants, manufacturers are required to track and report on any suicides in their postmarket approval studies. These reports may provide additional information on the occurrence of suicide in women who receive breast implants.

Although numerous studies have investigated the preoperative characteristics and symptoms of psychopathology found in breast augmentation candidates, they typically have used substandard psychometric measures. Large prospective studies that include standardized assessment methods such as the Structured Clinical Interview for the DSM-IV are needed to most appropriately characterize the relationship between preoperative psychopathology and postoperative outcome (10). Use of other measures of suicide risk, such as hopelessness and suicidal ideation, also are warranted.

While we wait for additional research on the relationship between breast implants and suicide, the results of the existing studies should be considered in the clinical care of women interested in cosmetic breast augmentation. Given the popularity of the procedure, all of the psychiatric diagnoses are likely found within the patient population (25, 33). With the exception of body dysmorphic disorder, there is a dearth of information on the relationship between preoperative psychopathology and postoperative outcomes. Furthermore, a relatively large body of research suggests that most women are satisfied with their postoperative outcomes and experience improvements in some psychosocial domains, particularly body image (11–12). As a result, there is currently little evidence to support a recommendation that all women who present for cosmetic breast augmentation be required to undergo a psychiatric evaluation before surgery.

Thus, the burden of screening for psychopathology falls to the plastic surgeon. As detailed elsewhere, plastic surgeons should assess three areas during the initial consultation: motivations and expectations, body image dissatisfaction and body dysmorphic disorder, and general psychiatric status and history (33, 44).

As in any medical consultation, the plastic surgeon should assess a new patient's mental health status and history. It is unclear if this is the current standard of care in plastic surgery. Ideally, such an assessment should include a general review of the patient's presentation and demeanor but also should focus on disorders with a body image component, such as body dysmorphic disorder and eating disorders. The symptoms of mood disorders also should be assessed. An untreated mood disorder may contribute to the motivation for surgery (because patients may believe that they will feel better about themselves if they look better) as well as dissatisfaction with their postoperative results (likely as a result of unmet expectations). The risk of suicide is elevated in patients suffering from mood disorders, the development of which often precedes the suicide by several years (45), a finding that potentially may explain the elevated suicide rate in the epidemiological studies of women with breast implants.

In addition to assessing current mental health status, the treating surgeon should obtain a psychiatric treatment history as part of the patient's general medical history. This should include directed questions about outpatient treatment, both psychopharmacological and psychotherapeutic, as well as psychiatric hospitalizations. Approximately 20% of cosmetic surgery patients report ongoing psychiatric treatment, most commonly pharmacological treatment with antidepressant medications, at the time of surgery (46). In cases in which the surgeon does not believe that the depressive symptoms are well controlled, referral for additional psychiatric assessment is warranted.

This is consistent with the recommendation from the Institutes of Medicine for the management of medical patients with suicide risk factors (47).

Women who report a history of psychopathology and who are not currently engaged in mental health treatment warrant a preoperative psychiatric consultation to further assess their psychological status and appropriateness for breast augmentation. Patients currently in treatment should be asked if their mental health professional is aware of their interest in surgery. Surgeons should contact these professionals to confirm that breast augmentation is appropriate at the present time.

Given the popularity of cosmetic breast augmentation, psychiatrists and psychologists may encounter these women in a variety of contexts (33). Women in a general outpatient practice, particularly those with body image concerns, may be considering breast augmentation. A plastic surgeon also may ask a mental health professional to consult on a patient suspected of having some form of psychopathology.

As described in detail elsewhere (33), a general cognitive behavior assessment of patients' current functioning is recommended. This assessment should focus on the thoughts, behaviors, and experiences that have contributed to their dissatisfaction with their breasts as well as the decision to seek breast augmentation. Like the plastic surgeon, the mental health professional also should focus on patients' motivations for, and expectations about, breast augmentation, appearance and body image concerns, and their psychiatric status and history. The expertise of the mental health professional will allow for a more detailed assessment of these issues than will have been undertaken by the plastic surgeon, who likely will have completed only a rudimentary evaluation of patients' psychiatric status.

In assessing motivations and expectations for breast augmentation, the mental health professional may want to begin by asking, "When did you first think about breast augmentation surgery?" In addition to providing important clinical information, this question may reveal the presence of some obsessive or delusional thinking. The role of patients' social relationships in the decision to seek surgery also should be assessed. Breast augmentation patients typically report that their decision to seek surgery was influenced more by their own feelings about their appearance than by the thoughts of romantic partners (17, 29). Patients who seek breast augmentation specifically to please a current romantic partner or to attract a new one are believed to be less satisfied with their postoperative outcomes (38).

Breast augmentation candidates typically report increased dissatisfaction with their breast size and shape compared to women not interested in seeking breast augmentation (17, 18, 27). Women who report significant dissatisfaction with average-sized breasts may be suffering from body dysmorphic disorder. The degree of emotional distress and behavioral impairment, rather than specific breast size, may be the better indicators of body dysmorphic disorder (33). Asking patients about the amount of time they spend each day thinking about their breasts, comparing the appearance of their breasts to other women, or researching breast augmentation surgery may reveal the presence of the obsessive thoughts typically seen in persons with body dysmorphic disorder. Inquiring about avoidance of social and sexual situations or the excessive use of clothing to camouflage the appearance of their breasts also may suggest the presence of a mood or anxiety disorder. Patients should be asked about symptoms of major depression, including suicidal ideation, past and present. If patients acknowledge current suicidal ideation, they should be asked about a current plan and potential intent. The provider also should inquire about a history of suicide attempts because it is one of the biggest risk factors for suicide.

The assessment of patients' psychiatric history and status, as would be done in any mental health consultation, is a central part of the evaluation. As noted above, it is likely that all of the major psychiatric diagnoses can be found among women who seek cosmetic breast augmentation. The presence of a specific disorder, however, should not be judged as an absolute contraindication to breast augmentation. In the absence of sound data on the relationship between specific forms of psychopathology and surgical outcomes, appropriateness for surgery should be decided on a case-by-case basis and include close collaboration between the mental health professional and the plastic surgeon (33).

Until the relationship between breast implants and suicide is more fully understood, women interested in breast augmentation who report a history of psychopathology (particularly a history of psychiatric hospitalizations) or those who are suspected of having some form of psychopathology by the plastic surgeon should undergo a mental health consultation before surgery.

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