Rupture of Silicone Gel Breast Implants and Symptoms of Pain and Fatigue

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ABSTRACT. ***Objective.*** To compare symptoms of women with silicone gel breast implants and women with chronic fatigue syndrome (CFS), and to study the effect of rupture of the silicone implant.

Methods. Five hundred readers of the Dutch silicone breast implant support group magazine were asked to respond if they had been informed by the surgeon about the silicone implant status at operation, and to answer questions about symptoms of CFS. Their complaints were compared with those of 100 female patients with CFS and 40 female controls.

Results. The questionnaires were returned by 319 women. Of these, 227 had symptoms of debilitating chronic fatigue. The patterns of symptoms differed from those in patients with CFS. An analysis of the relation between integrity of the implants and the symptoms could be carried out in 176 women, and 74% of these latter women reported ruptured implants. Significantly more women with ruptured implants than those with intact implants had debilitating chronic fatigue (75% vs 51%), postexertional malaise > 24 h (77% vs 51%), impaired short term memory (58% vs 38%), and multi-joint pain (77% vs 60%).

Conclusion. Women with silicone breast implants often report severe pain and chronic fatigue. Rupture of the implant is associated with an increase in symptoms of pain and chronic fatigue. (J Rheumatol 2003;30:2263–7)

Key Indexing Terms:
BREAST IMPLANTS SILICONE RUPTURE
PAIN FATIGUE IMPAIRED COGNITION

In the debate on the safety of silicone gel-containing breast implants, there are conflicting results about a possible relationship between implants and the occurrence of connective tissue disease and related disorders[1-6]; however, meta-analyses found no relation between silicone breast implants and the risk of connective tissue disease[7]. Borenstein[8] summarized the symptoms of a silicone exposure disease, "siliconosis," and compared these with symptoms of influenza, chronic fatigue syndrome, and fibromyalgia (FM). Borenstein[8] described overlap in symptoms, but also differences associated with these syndromes.

Recently, Brown, *et al*[9] reported an association between extracapsular silicone from ruptured breast implants and a diagnosis of FM. In a comparative study of women after breast cancer treatment, Berner, *et al*[10] found no significant difference in fatigue between the group with and those without silicone breast implants.

In the Chronic Pain and Fatigue Research Centre (Amsterdam) we investigated symptoms and clinical biochemical data of patients with chronic fatigue symptoms. An important proportion of these patients were women with silicone breast implants. Of the 141 women with implants who attended our Centre with complaints of chronic fatigue, 67 were informed about the state of the implant at reoperation. In 55 (82%) of these women the surgeon removed a defective implant, and in 12 (18%) patients the implant was intact at operation. These data suggest a high incidence of rupture of silicone breast implants in women with chronic fatigue symptoms. We investigate this in a larger group of patients.

MATERIALS AND METHODS

In November 1998 we mailed a questionnaire to 500 female readers of the magazine of the Dutch silicone implant support group. The readers were asked to return the questionnaire if they had undergone a second operation for silicone breast implant and had received information from the surgeon about the integrity of the removed implant(s).

The questionnaire consisted of 3 parts. (1) Questions about the condition of the silicone breast implant at reoperation. The patient had received this information from the surgeon after the operation. Data on the number of defective implants, the duration of implantation, and the generation of the implant were not recorded since we expected that kind of information to be unreliable or not known. Implants were regarded to be intact or damaged when integrity or rupture of the shell was evident to the surgeon, and when this information had been given to the patient. In double-lumen implants the outer shell had to be ruptured. (2) Questions concerning the diagnosis of chronic fatigue syndrome (CFS) according to the US Centers for Disease Control and Prevention (CDC)[11]. The occurrence of each symptom was scored as: never or sometimes = 0, always = 1. (3) The "Abbreviated fatigue questionnaire"[12] was used to determine the intensity

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Submitted September 13, 2002; revision accepted February 24, 2003.

of the patient's physical fatigue. The patient had to score 4 questions using a 7 point Likert scale: "I feel tired," "I tire easily," "I feel fit," and "I feel physically exhausted."

The results from this questionnaire were compared with results from a consecutive group of 100 female patients who attended the clinic for chronic pain and fatigue during a 10 month period in 2000, and who were diagnosed with CFS according to the CDC criteria[11]. The prevalence of the symptoms and the fatigue score was also measured in a group that consisted of female coworkers from the Centre and other women (n = 40).

The odds of the outcome were considered significantly different if the 95% confidence interval of the odds ratio did not include 1. For statistical analysis SPSS 11.0.1 software was used (SPSS Inc.). Multiple comparisons of differences between groups were also tested with the Kruskal-Wallis test, a nonparametric equivalent to one-way ANOVA. The probability of the observed outcome or a more extreme outcome was calculated exactly. A significance level less than 0.05 was considered significant.

RESULTS

The questionnaires were returned by 319 women with silicone breast implants with an average birth date of 1949 (SD 8.6), and these data were compared with those from a control group of women with an average birth date of 1960 (SD 8.7) (n = 40). The difference in birth date was not significant. Table 1 shows that the 4 most frequent complaints in the women with implants were multi-joint pain, muscle pain, debilitating chronic fatigue, and postexertional malaise (77%, 76%, 71%, 68%, respectively, vs 18%, 15%, 23%, 28% of the controls). Fewer women (but still a considerable percentage of the women with implants) had unrefreshing sleep, impaired cognition, and headache (62%, 56%, 47%, respectively, vs 25%, 25%, 23% of controls), and one-third or fewer of the women with implants complained of painful lymph nodes and sore throat (33% and 20% vs 8% and 5% of controls). The fatigue score of the women with implants was 22.8 (SD 6.0) versus 13.6 (SD 8.7) in the controls.

Table 2 presents the results of the comparison between the women with implants who reported severe fatigue (n = 227) and 100 women diagnosed with CFS. The average birth date of the fatigued women with implants was 1949 (SD 8.7) and that of the CFS patients (n = 100) was 1966 (SD 11.9); birth date was not related to any of the symptoms. In the CFS patients 100% had debilitating chronic fatigue, 96% had postexertional malaise, 96% unrefreshing sleep, 92% impairment of concentration, 74% headache, 73% muscle pain, 61% multi-joint pain, 47% painful lymph nodes, and 47% had sore throat (Table 2). In the selected silicone implant group as well, 100% had severe fatigue complaints, but the order in frequency of the remaining symptoms was entirely different from that in the patients with CFS. Muscle and multi-joint pain was reported by 88% and 85% of the women with implants, postexertional malaise by 84%, unrefreshing sleep by 75%, impairment of concentration by 66%, headache by 55%, painful lymph nodes by 38%, and sore throat by 25%. This order of complaints is the same as in the total group of women with implants (compare with Table 1), except for the severe fatigue. The mean fatigue score was 25.3 (SD 3.3) in the fatigued implant group, and 26.2 (SD 2.1) in the CFS group (Table 2). The difference between these scores is small but significant.

Table 1. The symptoms of chronic fatigue syndrome in women with silicone breast implants, and in female controls.

	Silicone Implant, n (%)	Controls, n (%)
No. of women	319 (100)	40 (100)
Debilitating chronic fatigue	227 (71)	9 (23)
Impaired short term memory or concentration	177 (56)	10 (25)
Sore throat	64 (20)	2 (5)
Painful lymph nodes	104 (33)	3 (8)
Muscle pain	243 (76)	6 (15)
Multi-joint pain	247 (77)	7 (18)
Headache of a new type*	150 (47)	9 (23)
Unrefreshing sleep	198 (62)	10 (25)
Postexertional malaise > 24 h	217 (68)	11 (28)
Fatigue score, mean (SD)	22.8 (6.0)	13.6 (8.7)

These criteria are of Fukuda, *et al* (CDC)[11] for CFS. * Controls scored for "headache." The fatigue score ranges from 4 to 28.

Of all 319 women with silicone breast implants, 176 were given information by the surgeon about the status of the implants. Of the remaining 143 women, it was not clear to us whether (or not) the surgeon had informed them about the status of the removed implant. Table 3 presents the results of the 176 questionnaires completed by the women who had received information from the surgeon.

Of these 176 women, 131 (74%) reported the presence of a ruptured implant(s) and 45 (26%) reported intact implant(s). The mean birth date of these 2 groups was similar: 1949 (SD 8.6) for the defect group versus 1950 (SD 8.6) for the intact implant group; birth date was not related to any symptom.

The mean fatigue score was 23.0 (SD 5.7) in the ruptured implant group, which is significantly different from 20.1 (SD 7.1) in the intact implant group (Table 3). Significantly more women in the ruptured implant group, compared to the intact implant group, had debilitating chronic fatigue (75% vs 51%), multi-joint pain (77% vs 60%), postexertional malaise (76% vs 51%), and impaired concentration (58% vs 38%). The differences between these 2 groups were not significant for muscle pain (77% vs 64%), unrefreshing sleep (62% vs 49%), headache (43% vs 36%), painful lymph nodes (34% vs 20%), and sore throat (17% vs 9%).

From the data of the informed group (n = 176) we calculated the odds for defective and intact prostheses. The implant was defective in 81% of women with debilitating fatigue and in 60% of women without this symptom (odds ratio 2.8, 95% confidence interval 1.4–5.8). The odds for impaired short term memory were 82% versus 66% (OR 2.3, 95% CI 1.1–4.6), for postexertional malaise 81% versus 58% (OR 3.1, 95% CI 1.5–6.3), and for multi-joint pain 79% versus 63% (OR 2.2, 95% CI 1.1–4.6).

Table 2. Symptoms of the chronic fatigue syndrome (CFS) in women with silicone breast implants with debilitating chronic fatigue, and in female patients with CFS.

	Silicone Implant, n (%)	CFS, n (%)	Odds Ratio (95% CI)	Kruskal-Wallis Test, p
No. of women	227 (100)	100 (100)		
Debilitating chronic fatigue	227 (100)	100 (100)		
Impaired short term memory or concentration	150 (66)	92 (92)	5.9 (2.7–12.8)	0.000
Sore throat	57 (25)	47 (47)	2.6 (1.6–4.3)	0.000
Painful lymph nodes	87 (38)	47 (47)	1.4 (0.9–2.3)	0.146
Muscle pain	199 (88)	73 (73)	0.4 (0.2–0.7)	0.001
Multi-joint pain	193 (85)	61 (61)	0.3 (0.2–0.5)	0.000
Headache of a new type	124 (55)	74 (74)	2.4 (1.4–4.0)	0.001
Unrefreshing sleep	171 (75)	96 (96)	10.5 (3.2–34.4)	0.000
Postexertional malaise > 24 h	190 (84)	96 (96)	4.7 (1.6–13.5)	0.002
Fatigue score, mean (SD)	25.3 (3.3)	26.2 (2.1)	p = 0.003, Student t test	

These criteria are of Fukuda, *et al* (CDC)[11] for CFS. * The fatigue score ranges from 4 to 28.

Table 3. Symptoms of the chronic fatigue syndrome in women with ruptured and intact silicone breast implants.

	Defective Implant, n (%)	Intact Implant, n (%)	Odds Ratio (95% CI)	Kruskal-Wallis Test, p
No. of women	131 (100)	45 (100)		
Debilitating chronic fatigue	98 (75)	23 (51)	2.8 (1.4–5.8)	0.005
Impaired short term memory or concentration	76 (58)	17 (38)	2.3 (1.1–4.6)	0.024
Sore throat	22 (17)	4 (9)	2.1 (0.7–6.4)	0.232
Painful lymph nodes	44 (34)	9 (20)	2.0 (0.9–4.6)	0.094
Muscle pain	101 (77)	29 (64)	1.9 (0.9–3.9)	0.116
Multi-joint pain	101 (77)	27 (60)	2.2 (1.1–4.6)	0.033
Headache of a new type	56 (43)	16 (36)	1.4 (0.7–2.7)	0.483
Unrefreshing sleep	81 (62)	22 (49)	1.7 (0.9–3.4)	0.161
Postexertional malaise > 24 h	100 (76)	23 (51)	3.1 (1.5–6.3)	0.002
Fatigue score, mean (SD)	23.0 (7.1)	20.1 (5.7)	p = 0.017, Student t test	

These criteria are of Fukuda, *et al* (CDC)[11] for CFS. * The fatigue score ranges from 4 to 28.

DISCUSSION

The first aim of this study was to verify whether fatigue complaints were important in women with silicone gel breast implants, and to what extent the symptoms of severely fatigued women with implants corresponded to those of patients with CFS. Of the total of 500 women, 319 responded. The 181 women who did not respond could have refrained from responding for several reasons: They were women who were not reoperated for implant removal, they were asked not to return the questionnaire, or they were women who were well or too ill to answer. The absence of the last 2 groups may have introduced a bias. Of the responding women, 71% reported debilitating chronic fatigue; the majority fulfilled the criteria of the CDC[11], but the pattern of their complaints was entirely different from that in the patients with CFS. A higher percentage of the women with silicone breast implants had muscle and joint pain, and a lower percentage reported postexertional malaise, unrefreshing sleep, impaired short term memory, and the remaining CFS symptoms of the CDC criteria[11]. The women participating in this study may have symptoms that are not representative for the whole population of women with silicone breast implants; i.e., they may represent the more severely affected subjects who joined a support group and showed a high percentage of debilitating systemic symptoms (93%). However, a high incidence of such symptoms was also found in other studies, e.g., Melmed[13] reported 82% and Feng and Amini[14] 86% in their study groups.

The occurrence of symptoms in our group of women with implants (Table 1) is comparable to that described by Melmed[13], who studied women at explantation of the implants and found fatigue in 69%, memory loss in 49%, arthralgias in 42%, sleep disturbances in 41%, and headaches in 27% of his patients. These latter results and ours are in contrast with the data (collected by telephone

interview) reported by Brown, *et al*[9] in women with silicone breast implants; they found joint pain in 41%, cognitive disorder in 28%, and fatigue in 18% of the patients. The occurrence of cognitive disorder and fatigue complaints in the latter study is comparable to that in our control group (25% and 23%; Table 1); occurrence of joint pain, however, is more than double the 18% in our control group, indicating a silicone related pain problem. The low prevalences found by Brown, *et al*[9] may be due to interview by telephone (lower sensitivity[15]), different criteria for positive symptoms, and a difference in patient selection. Contant, *et al*[16] compared complaints of 57 women before mastectomy and one year after silicone breast implantation, carried out in the same session. Twelve complaints of symptoms of Sjögren's syndrome, 4 of Raynaud's phenomenon, and 5 undefined complaints were studied after one year. The prevalences of sore eyes (1.8% vs 15.8%; OR 10.5, 95% CI 1.3–85.9) and joint stiffness (31.6% vs 50.9%; OR 2.2, 95% CI 1.1–4.8) were significantly higher after one year. These differences remained significant after correction for multiple comparisons. Joint pain was reported by 22.8% of the patients before and by 33.3% of patients after operation (OR 1.7, 95% CI 0.7–3.9).

Our second aim was to study whether rupture of implants was correlated with increased complaints. In contrast to the study by Brown, *et al*[9], this was indeed the case. In our study group, rupture was associated with a significant increase in debilitating chronic fatigue, postexertional malaise, impaired short term memory, and joint pain.

We found that 76% of women with silicone breast implants had ruptured implants, i.e., 81% in the group with chronic debilitating fatigue and 60% in the non-fatigue group, which is comparable to the 82% of 141 women with silicone breast implants presenting with chronic fatigue in our center and other studies. For example, Brown, *et al*[9] reported ruptured implants in 69% of their patients (n = 344), Melmed[13] reported 63% (n = 240), Feng and Amini[14] reported 43% (n = 842), Robinson, *et al*[17] reported 64% (n = 592), and Collis and Sharpe[18] reported 40% (n = 162). Rupture of implants in our study was not confirmed by clinical evaluation, but the questionnaire asked explicitly whether the surgeon made a positive statement about rupture at operation. Other answers were not accepted and were counted as intact.

Brown, *et al*[9] reported a diagnosis of FM in 13.7% of women with silicone breast implants and preferentially in women with extracapsular silicone (24.7%). A prevalence of 24.7% is comparable to 22% of FM in primary Sjögren's syndrome[19], but is higher than the 2% to 3.4%[19-21] of FM in women in the general population. The results of our study show that pain in joints/muscles and fatigue are the major symptoms in the silicone gel breast implant group and that complaints increase significantly in women with defective prostheses. Pain and malaise symptoms are also prominent in FM and connective tissue disease[20]. Our study also indicates that the pattern of these silicone induced complaints differs from those in patients with CFS.

Additional studies are needed to more precisely elucidate the pathophysiology of the disease caused by silicone gel breast implants.

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