



Original article

Breastfeeding in breast cancer survivors: Pattern, behaviour and effect on breast cancer outcome

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ABSTRACT

Little is known regarding the safety and feasibility of breastfeeding in women with a history of breast cancer. We have performed a survey among breast cancer patients who completed their pregnancy following breast cancer management to examine their lactation behaviours and its effect on breast cancer outcome. Out of 32 women identified, 20 were reachable and accepted to take the questionnaire. Ten women initiated breastfeeding, 4 stopped within one month and 6 had long-term success with a median period of 11 months (7–17 months). The latter were all previously subjected to breast conserving surgery and received qualified lactation counselling at delivery. The main reasons for not initiating breastfeeding were “uncertainty regarding maternal safety” and “a priori unfeasibility” expressed either by the obstetrician or by the oncologist. At a median follow-up of 48 months following delivery, all 20 women were alive with two relapses; one in each group (i.e., lactating and non-lactating). This analysis adds to the limited available evidence on the feasibility and safety of breastfeeding in breast cancer survivors. Proper fertility and survivorship counselling is crucial and requires more attention in breast cancer clinics.

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Introduction

Breast cancer is the most common malignant tumour affecting women in the child-bearing period.¹ Around 10% of patients in the developed world and 25% in the developing world are diagnosed below the age of 40.^{2,3} As a result of the continuous progress in the management of breast cancer, long-term survivors are steadily increasing. This has stimulated the scientific community to address different questions related to quality of life and survivorship, including fertility issues.

As breast cancer tends to be more aggressive in the younger population,⁴ adjuvant chemotherapy is frequently considered in this group of patients. Chemotherapy may induce temporary or permanent amenorrhea; a risk which is mainly related to patient's

age and treatment with alkylating agents.^{5,6} A small randomised trial has recently shown that the addition of gonadotropin-releasing hormone agonist to chemotherapy could further increase the ovarian function rescue.⁷ However, this study suffered some flaws and this approach warrants further investigation.⁸ Nevertheless, a considerable fraction of young patients with breast cancer remain fertile following chemotherapy and are candidates for subsequent pregnancy and lactation.

Despite the compelling evidence, there are still ongoing debates on the safety of pregnancy in women with history of successfully treated breast cancer.⁹ We have recently conducted a meta-analysis and showed that women who became pregnant following breast cancer diagnosis have a 41% reduced risk of death compared to age/stage matched controls [Hazard ratio: 0.59 (95% confidence interval: 0.50–0.70)].¹⁰ While this result could be partially related to selection bias, restricting the analysis to non-relapsing controls confirmed that pregnancy does not confer a detrimental effect on breast cancer outcome.

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Table 1

Questionnaire submitted for patients enrolled in our study.

History of BCS	<p>1) After surgery, can you quantify your breast-size reduction (scale 0-100%)?</p> <p>2) After radiotherapy, did you observe breast-size reduction (scale 0-100%)?</p> <p>3) During pregnancy, asymmetry is normal, can you quantify it (scale 0-100%)</p> <p>4) After delivery, did you try to breastfeed your baby? If no, please specify</p> <ul style="list-style-type: none"> • “A priori unfeasibility” expressed by the gynaecologist/obstetrician • “A priori unfeasibility” expressed by the oncologist • You were not interested • Uncertainty regarding maternal safety <p>5) Did you attempt breastfeeding from the operated breast? If no, please specify</p> <ul style="list-style-type: none"> • “A priori unfeasibility” expressed by the gynaecologist/obstetrician • “A priori unfeasibility” expressed by the oncologist • Difficulty in latching • Breast pain <p>6) Was milk production similar from both breasts? If no, can you quantify this difference (scale 0-100%)?</p> <p>7) How long have you been breastfeeding your baby?</p> <p>8) Did you offer your baby exclusive breast feeding or used supplements (predominant or partial breastfeeding)</p> <table border="1" data-bbox="587 1032 1217 1127"> <thead> <tr> <th></th> <th>Exclusive</th> <th>Predominant</th> <th>Partial</th> </tr> </thead> <tbody> <tr> <td>0-2 months</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2-4 months</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4-6 months</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>9) After delivery, did you have a professional lactation consultation (midwife or lactation consultant)?</p> <p>10) How do you evaluate your breastfeeding experience?</p> <p>11) Do you want to any more information</p>		Exclusive	Predominant	Partial	0-2 months				2-4 months				4-6 months			
	Exclusive	Predominant	Partial														
0-2 months																	
2-4 months																	
4-6 months																	
History of MRM	<p>1) After delivery, did you try to breastfeed your baby? If no, please specify</p> <ul style="list-style-type: none"> • “A priori unfeasibility” expressed by the gynaecologist/obstetrician • “A priori unfeasibility” expressed by the oncologist • You were not interested • Uncertainty regarding maternal safety <p>2) How long have you been breastfeeding?</p> <p>3) Did you offer your baby exclusive breast feeding or used supplements (predominant or partial breastfeeding)</p> <table border="1" data-bbox="587 1613 1217 1708"> <thead> <tr> <th></th> <th>Exclusive</th> <th>Predominant</th> <th>Partial</th> </tr> </thead> <tbody> <tr> <td>0-2 months</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2-4 months</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4-6 months</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>4) After delivery, did you have a professional lactation consultation (midwife or lactation consultant)?</p> <p>5) How do you evaluate your breastfeeding experience?</p> <p>6) Do you want to any more information</p>		Exclusive	Predominant	Partial	0-2 months				2-4 months				4-6 months			
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BCS: breast conserving surgery; and MRM: modified radical mastectomy.

Breastfeeding is known to have immediate and long lasting advantages for both the infant and the mother. In the general population, breastfeeding reduces the risk of developing breast cancer by 4–5% per year of lactation, which increases up to 45% in BRCA-1 carriers.^{11,12} However, there are no epidemiological data regarding breastfeeding following breast cancer. Limited available evidence suggests that breastfeeding is feasible; however, it is faced with significant challenges.¹³ Several small studies have shown that around 80% of patients treated with breast conserving surgery (BCS) and radiotherapy experience diminished breast enlargement and engorgement during pregnancy with limited post-natal milk production from the ipsilateral breast in around 50%.^{14,15}

In this study, we have conducted a survey among a series of patients who were treated for early invasive breast cancer at our institute and had one or more deliveries afterwards. Our objective was to examine the breastfeeding habits, and investigate the effect of lactation on breast cancer outcome.

Methods

We searched the database of the European Institute of Oncology from 1988 to 2006 for all women 40 years and under at the time of diagnosis with invasive breast cancer. Data on tumour characteristics, treatment given, follow-up including date of pregnancy, relapse, and death (if applicable) were obtained from the patients' records.

Women who delivered their babies anytime following the end of therapy for early breast cancer were identified.

We then constructed a semi-structured questionnaire (Table 1) to explore the context and meaning of women experiences and motivations surrounding breastfeeding. The interviewer contacted women via telephone and voluntary completion of the questionnaire was considered as consent to participate in this study. As questionnaires were administered after the end of lactation, the WHO criteria for breastfeeding evaluation were not applied.¹⁶

Results

We identified 32 women who delivered their babies in the period from 1990 to 2005. All women were known to be alive at the date of their last follow-up reported in our hospital charts. Of these, 20 women were reachable and agreed to take the interview and complete the questionnaire. One of these women had two full term pregnancies. The median age at diagnosis of breast cancer was 32 years (range 27–37 years) and the median age at delivery was 36 years (range 30–43 years). Out of 18 women with known endocrine receptor status, 12 (60%) had oestrogen and/or progesterone receptor positive tumours. HER2 status by immunohistochemistry was known in eleven patients, five were score 0 or 1, three were +2 and three were +3. Fifteen women were treated with BCS and radiotherapy, 14 with systemic chemotherapy and 12 with hormonal agents. Detailed patients' characteristics are described in Table 2.

Based on the results of the questionnaire, 10/20 women (50%) attempted breastfeeding. Table 3 describes the breastfeeding behaviours in our series. The woman who had two full term pregnancies was able to breastfeed for more than 6 months in both occasions (patient # 12). Four women interrupted lactation within one month, two for reduced milk production and two for mastitis in the untreated breast. The other six women breastfed their seven babies for a median duration of 11 months (range: 7–17 months). All six had a previous BCS. Qualified lactation counselling was offered to 5/20 women. All five women, including the one who breastfed twice enjoyed a successful breastfeeding with a median duration of 12 months (range: 9–17 months). Reasons for not

Table 2
Patients' characteristics.

Patient no.	Age at BC diagnosis (years)	ER/PR	HER2 by IHC	Surgery	RTH	CTH	Hormonal therapy
1	37	+/+	uk	BCS	Yes	Yes	No
2	29	-/-	uk	BCS	Yes	Yes	No
3	23	+/-	uk	BCS	Yes	Yes	Yes
4	33	+/-	uk	BCS	Yes	No	Yes
5	33	+/-	uk	BCS	Yes	Yes	Yes
6	35	+/+	uk	BCS	Yes	No	Yes
7	27	-/-	2+	BCS	Yes	Yes	No
8	28	-/-	3+	BCS	Yes	No	No
9	29	+/+	2+	BCS	Yes	Yes	Yes
10	35	uk/ uk	uk	BCS	Yes	Yes	Yes
11	33	+/+	3+	BCS	Yes	Yes	Yes
12	29	+/+	2+	BCS	Yes	Yes	Yes
13	34	+/+	-ve	BCS	Yes	No	Yes
14	34	-/-	-ve	BCS	Yes	Yes	No
15	36	uk/ uk	uk	BCS	Yes	No	Yes
16	25	-/+	uk	MRM	No	Yes	No
17	36	-/-	3+	MRM	Yes	Yes	No
18	35	+/-	-ve	MRM	No	No	Yes
19	30	+/+	-ve	MRM	No	Yes	Yes
20	28	-/-	-ve	MRM	Yes	Yes	No

BC: breast cancer; ER: oestrogen receptor; PR: progesterone receptor; IHC: immunohistochemistry; RTH: adjuvant radiotherapy; CTH: adjuvant chemotherapy; uk: unknown; BCS: breast conserving surgery; and MRM: modified radical mastectomy.

attempting breastfeeding were patient's choice in one case and medical counselling against breastfeeding in the other 9 women. The main reasons were "uncertainty regarding maternal safety" and "a priori unfeasibility" expressed either by the obstetrician or by the oncologist. Other reasons included HCV infection, maternal multiple sclerosis, twin pregnancy and post-partum bleeding.

Out of 15 women who underwent BCS and complementary radiotherapy, 14 (93%) reported hypoplasia of the irradiated breast during pregnancy. Of these, 8/15 did not attempt breastfeeding, 5 attempted lactation from the unaffected breast only and 2 from both breasts. The main reason for not attempting breastfeeding from the previously affected breast were difficulty in latching in 2/5 women, reduced milk production in 2/5 women and breast pain in one woman. The 2 women who tried to breastfeed from both breasts succeeded in bilateral lactation for two weeks only. Milk production was significantly reduced in both women.

All patients were eligible for disease-free survival analysis. At a median follow-up of 48 months from delivery (range 10–200 months), all patients are alive. Two relapses occurred; the first in a woman who did not attempt breastfeeding and the second in a woman who breastfed her baby for 11 months. The first was subjected to BCS for an endocrine-nonresponsive disease and developed a contralateral breast cancer almost nine years following delivery. The second received a BCS for an endocrine-responsive disease and developed a local recurrence 2 years after delivery.

Discussion

This paper describes the pattern of breastfeeding in breast cancer survivors who were treated with local and systemic therapies used in current practice. Despite the limited size of the study, our results demonstrate that breastfeeding is feasible and safe following breast cancer diagnosis and treatment.

In our series, we observed hypoplasia and hypotrophy of the operated and irradiated breast in 14/15 patients. This, in accordance with previous observations,^{14,15} is probably related to radiotherapy-induced fibrosis.

Table 3
Breastfeeding pattern and outcome.

Patient no.	Age at pregnancy	Interval (BC diagnosis-pregnancy)	Breast feeding	Counselling	FU since delivery	Relapse (time from pregnancy)
1	43	6 y 2 m	Yes	No	28 m	No
2	33	4 y 2 m	No	No	116 m	Contralateral BC (104 months)
3	28	4 y 7 m	No	No	98 m	No
4	38	4 y 6 m	No	No	200 m	No
5	40	7 y 3 m	Yes	Yes	49 m	No
6	39	4 y 3 m	Yes	Yes	87 m	No
7	34	7 y 3 m	No	No	27 m	No
8	32	4 y 9 m	Yes	Yes	55 m	Local recurrence (26 months)
9	35	6 y 2 m	Yes	Yes	16 m	No
10	41	5 y 10 m	No	No	10 m	No
11	39	5 y 9 m	No	No	28 m	No
12 ^a	1st: 31 2nd: 36	1st: 1 y 8 m 2nd: 4 y 9 m	1st: yes 2nd: yes	1st: yes 2nd: yes	44 m	No
13	38	3 y 9 m	Yes	No	22 m	No
14	38	3 y 5 m	No	No	19 m	No
15	39	2 y 9 m	No	No	18 m	No
16	33	8 y 3 m	Yes	No	37 m	No
17	39	2 y 5 m	No	No	53 m	No
18	41	5 y 5 m	No	No	20 m	No
19	34	3 y 7 m	Yes	No	23 m	No
20	30	1 y 6 m	Yes	No	22 m	No

BC: breast cancer; FU: follow-up; y: years; m: months.

^a Patient had two pregnancies.

We have observed reduced milk production from the hypotrophic breast in 4/7 women (57%) who had previous BCS and attempted breastfeeding. The other three patients reported nipple pain or discomfort during latching. Thus, breastfeeding from the previously affected breast was problematic in all patients. Nevertheless, women can try to latch their babies to the previously affected breast but should be aware of the reduced milk production and of possible alterations of the nipple areola complex, which could lead to a difficult and possibly painful latching.

In our study, a previous mastectomy was associated with short lasting (<1 month) breastfeeding, even if all women who had a previous BCS used one breast only for lactation. A possible explanation is that after BCS women felt more comfortable about their maternal role, which emphasizes the influence and importance of body image in the success of breastfeeding.

In a recent exploratory analysis on the experience of breastfeeding in breast cancer survivors, Gorman and colleagues showed that a number of themes emerged from their interviews.¹³ These included uncertainty about the possibility of breastfeeding, worries about nursing from one side only and the challenge of not having sufficient milk supply. These themes also emerged from our interviews, even if the questionnaire was not structured to address these issues. However, the six women in our series who experienced breastfeeding >6 months did not report the huge commitment and the exhaustion due to unilateral breastfeeding detailed by Gorman et al.¹³

In our series, proper breastfeeding counselling was a key factor for prolonged lactation in women with history of breast cancer. Information provided by the treating physicians was often inadequate, underestimating the importance of breastfeeding for the mother and the infant. In fact, 50% of women who did not lactate where counselled against breastfeeding by their treating physician in the absence of a medical contraindication. It is high time for the oncological community to realize that survivors' issues should be identified respecting patients' demands and requirements.

As breast cancer is a hormonally driven tumour, there are concerns that pregnancy or breastfeeding could stimulate breast cancer recurrence by means of hormonal manipulation. We believe that there is good endocrinal and clinical rationale to challenge this concern. It is well known that breast cancer cells expressing oestrogen receptors undergo apoptosis when exposed to high doses of

oestrogen and subsequent oestrogen deprivation,^{17,18} which is the case in pregnancy followed by breastfeeding. Furthermore, prolactin which is present at high levels during breastfeeding seems to play a role in reducing breast cancer incidence.¹⁹ The presence of activated Stat5 (prolactin transcription factor) and high levels of prolactin post-surgery were associated with better prognosis in two different studies.^{20,21}

In our study, breastfeeding did not seem to have any detrimental effect on breast cancer outcome in survivors who succeeded to complete their pregnancies. This is consistent with our previous observation in which we compared the outcome of women who breastfed to those who did not in a series of 94 women who had a previous breast cancer and one or more subsequent pregnancies.²² We found that only one relapse was encountered in 27 nursing women (3%) compared to six relapses in 25 non-nursing women (24%). In the remaining patients with unknown lactation status, 4 relapses were encountered (10%). To our knowledge, these are the only two studies which address the safety of breastfeeding in women with history of breast cancer and both (acknowledging their small size) show that breastfeeding does not seem to be detrimental.

In conclusion, we believe that adequate pregnancy and lactation counselling needs to be more properly addressed in breast cancer clinics.²³ Denying breast cancer survivors the opportunity to become pregnant and/or breastfeed remains unjustified in the absence of supporting evidence. This would indeed improve the quality of life of these women and help them restore their normal life again. As oncologists, we should prioritize global women's health and encourage this approach.

Conflict of interest statement

None declared.

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