



## Radiotherapy

Revised: December 3, 2018.

### Drug Levels and Effects

#### Summary of Use during Lactation

Some expert opinion recommends not breastfeeding during radiotherapy treatment of breast cancer because the suckling effect from the infant might augment skin toxicity from radiotherapy in the treated breast(s).[1] High-dose breast radiation for the therapy of breast cancer can decrease or eliminate subsequent milk production in the treated breast, but not the untreated breast. Medical professionals sometimes advise mothers who have received breast cancer surgery and radiation not to breastfeed; however, it appears that these concerns are unfounded. Lower radiation doses to the breast in the treatment of Hodgkin lymphoma appear to have only a minor effect on subsequent lactation success, but cranial irradiation for Hodgkin's lymphoma can reduce subsequent breastmilk production. Women who were treated as children for leukemia with cranial radiation often have difficulty in nursing their infants. For information on diagnostic X-rays, see the LactMed entry for X-rays.

#### Effects in Breastfed Infants

Relevant published information was not found as of the revision date.

#### Effects on Lactation and Breastmilk

A systematic review compiled data from 102 patients treated with breast irradiation and their subsequent lactation experience. The authors found a large variation in milk output of the irradiated breast, which may be due to the type and intensity of the radiation, or concomitant surgery. Two studies found changes in breastmilk in the irradiated breast compared to the untreated breast, including elevated sodium, and reduced potassium, phosphate and triglycerides. Most patients could breastfeed successfully using the untreated breast. Cranial irradiation for Hodgkin's lymphoma or during childhood for leukemia can also reduce subsequent breastmilk production.[2]

Twenty women were identified from the European Institute of Oncology database who had breast cancer from 1988 to 2006 who agreed to take a survey of breastfeeding behavior. Fourteen of 15 women who underwent breast conserving surgery followed by irradiation reported hypoplasia of the irradiated breast during pregnancy. Of the 15 women, eight did not attempt to breastfeed. Of the 7 who attempted breastfeeding, one woman successfully breastfed 2 infants (2 pregnancies) for more than 6 months, one other successfully breastfed for 11

months. The duration of nursing in the other 5 women is unclear in the paper. Only two women attempted to breastfeed from both breasts, and both could breastfeed from both breasts for only 2 weeks because of reduced milk production. Of the women who did not attempt breastfeeding, medical counseling against breastfeeding was a major reason because of "uncertainty regarding maternal safety", and "*a priori* unfeasibility" expressed either by the obstetrician or the oncologist.[3]

Of 12 women who had been treated for childhood leukemia with 24 to 25 Gy of prophylactic cranial irradiation, 10 reported an inability to breastfeed postpartum. Nine of the 12 women had an adult height more than 1 SD below their heights at diagnosis, 4 of whom were more than 2 SD below height at diagnosis; one woman had a low serum growth hormone level, all suggesting growth hormone deficiency as a possible cause of lactation failure. The 10 women who failed to lactate had minimal or no breast changes during pregnancy and did not produce any breastmilk, including 2 who used metoclopramide as a galactagogue. Two of the 10 women produced some colostrum and one produced a small amount of colostrum with only her second pregnancy. Among the other women with multiple pregnancies, each attempt at lactation was similar. The two women who were able to breastfeed had no distinguishable differences from the others.[4]

A study of 44 women who were treated with cranial radiotherapy of 18 to 30 Gy as children for leukemia was conducted 8 to 20 years following radiotherapy. Forty were growth hormone deficient and 4 were growth hormone insufficient. Seven of the women became pregnant at 18 to 22 years after therapy while taking growth hormone replacement therapy. Growth hormone therapy was discontinued in the second trimester and restarted 6 months postpartum. Six of the 7 women were unable to lactate. Stimulation with thyrotropin-releasing hormone showed a lower prolactin response among women who had undergone radiotherapy than in matched controls.[5]

A retrospective cohort study was performed on women who had received high-dose chemotherapy and autologous stem-cell transplants 1 to 2 years prior to pregnancy. Of these, 24 women breastfed their infants. Six successfully breastfed their infants exclusively. Ten of 16 patients who had radiation claimed to have enough breast milk production as compared with all 8 patients who never received above the diaphragm radiotherapy ( $p = 0.066$ ).[6]

A woman who had a partial mastectomy followed by radiation therapy became pregnant and delivered a healthy infant 16 months after radiation therapy. The irradiated breast failed to produce colostrum or milk, but after a week the mother achieved near-exclusive breastfeeding using the contralateral breast.[7]

## References

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3. Azim HA, Belletini G, Liptrott SJ et al. Breastfeeding in breast cancer survivors: pattern, behaviour and effect on breast cancer outcome. *Breast*. 2010;19:527-31. PubMed PMID: 21078487.
4. Johnston K, Vowels M, Carroll S et al. Failure to lactate: a possible late effect of cranial radiation. *Pediatr Blood Cancer*. 2008;50:721-2. PubMed PMID: 17763465.
5. Follin C, Link K, Wiebe T et al. Prolactin insufficiency but normal thyroid hormone levels after cranial radiotherapy in long-term survivors of childhood leukaemia. *Clin Endocrinol (Oxf)*. 2013;79:71-8. PubMed PMID: 23167807.
6. Akhtar S, Youssef I, Soudy H et al. Prevalence of menstrual cycles and outcome of 50 pregnancies after high-dose chemotherapy and auto-SCT in non-Hodgkin and Hodgkin lymphoma patients younger than 40 years. *Bone Marrow Transplant*. 2015;50:1551-6. PubMed PMID: 26237168.
7. Mohamad O, McFarlane M, Rahimi A. Absence of physiologic breast response to pregnancy and lactation after radiation therapy. *Pract Radiat Oncol*. 2016;6:e25-6. PubMed PMID: 26553113.

## **Substance Identification**

### **Substance Name**

Radiotherapy

### **Drug Class**

Breast Feeding

Lactation

Radiation Therapy