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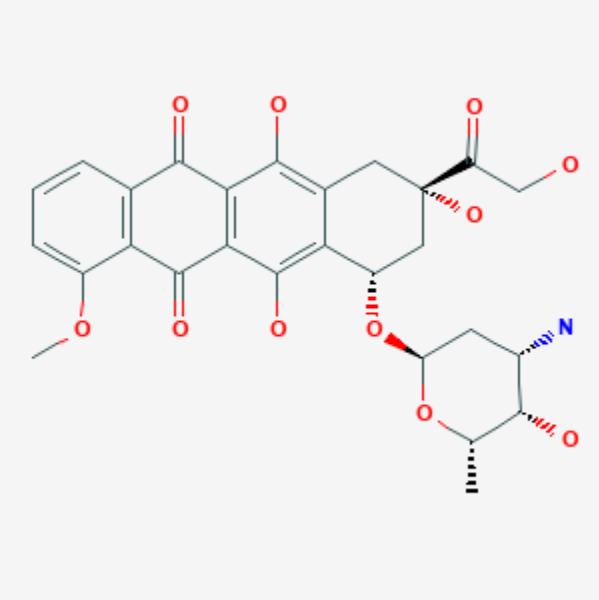
Doxorubicin

Revised: March 16, 2020.

CASRN: 23214-92-8



Drug Levels and Effects

Summary of Use during Lactation

Most sources consider breastfeeding to be contraindicated during maternal antineoplastic drug therapy, especially anthracyclines such as doxorubicin.[1] It might be possible to breastfeed safely during intermittent therapy with an appropriate period of breastfeeding abstinence; however, the high levels and persistence of doxorubicinol in milk make defining an appropriate abstinence interval difficult. Some authors' data suggest that it might take 6 weeks for milk levels to drop to a safe level afer a dose of doxorubicin 50 mg/sq m.[2] Chemotherapy may adversely affect the normal microbiome and chemical makeup of breastmilk.[3] Women who receive chemotherapy during pregnancy are more likely to have difficulty nursing their infant.

Drug Levels

Maternal Levels. Doxorubicin, doxorubicinol and two other metabolites were detected in milk after administration of 70 mg/sq m (90 mg) of doxorubicin intravenously. Peak milk levels of 128 mcg/L of doxorubicin and 111 mcg/L of its active metabolite doxorubicinol occurred 24 hours after the dose. Both drugs were detectable in milk for at least 72 hours after the dose. Other metabolites were also detected in milk at lower levels.[4,5] Using these data, the breastfed infant in this case would have received an estimated 2% of maternal weight-adjusted dosage if he had been allowed to nurse throughout the 72 hours after the dose.

A woman was diagnosed with with B-cell non-Hodgkins lymphoma at 4 months postpartum. She received R-CHOP therapy every 21 days for 6 cycles. It consisted of rituximab 375 mg/sq. m, cyclophosphamide 750 mg/sq m, doxorubicin 50 mg/sq m, vincristine 1.4 mg/sq m (capped at 2 mg) plus prednisone 40 mg/sq m daily. She also received oral 300 mg of allopurinol daily during the whole therapy course. Milk samples were collected twice daily during the first 3 cycles then once daily for the remaining cycles for a total of 290 samples. Doxorubicin was detectable in milk shortly after administration, with the peak milk level of about 300 mcg/L occurring in the first few hours after the first dose. After doses 2 and 3, peak milk levels were about 105 mcg/L. Doxorubicin concentrations fell slowly and were still detectable on day 21 at about 5 mcg/L. Peak levels of the active metabolite, doxorubicinol occurred on about day 2 to 3 after the dose and were about 700 mcg/L after the first dose and about 200 mcg/L after the second and third doses. Doxorubicinol concentrations fell slowly and were still detectable on day 21 at about 20 to 40 mcg/L. The authors suggested a 6-week time period from the last dose of a regimen until breastfeeding is resumed.[2]

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

Effects in Breastfed Infants

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

Effects on Lactation and Breastmilk

A study of adolescent males who had received chemotherapy for childhood malignancies found that having received doxorubicin was associated with elevated serum prolactin concentrations.[6]

A woman diagnosed with Hodgkin's lymphoma during the second trimester of pregnancy received 3 rounds of chemotherapy during the third trimester of pregnancy and resumed chemotherapy 4 weeks postpartum. Milk samples were collected 15 to 30 minutes before and after chemotherapy for 16 weeks after restarting. The regimen consisted of doxorubicin 40 mg, bleomycin 16 units, vinblastine 9.6 mg and dacarbazine 600 mg, all given over a 2-hour period every 2 weeks. The microbial population and metabolic profile of her milk were compared to those of 8 healthy women who were not receiving chemotherapy. The breastmilk microbial population in the patient was markedly different from that of the healthy women, with increases in *Acinetobacter* sp., Xanthomonadacae and *Stenotrophomonas* sp. and decreases in *Bifidobacterium* sp. and *Eubacterium* sp. Marked differences were also found among numerous chemical components in the breastmilk of the treated woman, most notably DHA and inositol were decreased.[3]

A telephone follow-up study was conducted on 74 women who received cancer chemotherapy at one center during the second or third trimester of pregnancy to determine if they were successful at breastfeeding postpartum. Only 34% of the women were able to exclusively breastfeed their infants, and 66% of the women reported experiencing breastfeeding difficulties. This was in comparison to a 91% breastfeeding success rate in 22 other mothers diagnosed during pregnancy, but not treated with chemotherapy. Other statistically significant correlations included: 1. mothers with breastfeeding difficulties had an average of 5.5 cycles of chemotherapy compared with 3.8 cycles among mothers who had no difficulties; and 2. mothers with breastfeeding difficulties

received their first cycle of chemotherapy on average 3.4 weeks earlier in pregnancy. Of the 62 women who received a doxorubicin-containing regimen, 39 had breastfeeding difficulties.[7]

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Substance Identification

Substance Name

Doxorubicin

CAS Registry Number

23214-92-8

Drug Class

Breast Feeding

Lactation

Antineoplastic Agents

Antibiotics, Antineoplastic

Topoisomerase II Inhibitors