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Nicotine

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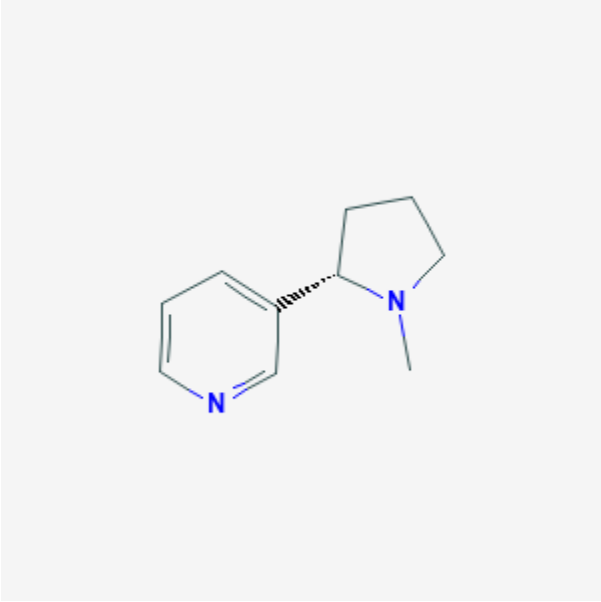
CASRN: 54-11-5



Drug Levels and Effects

Summary of Use during Lactation

Information in this record refers only to the use of nicotine as a replacement product for smoking cessation. With a 21 mg transdermal patch, nicotine passes into breastmilk in amounts equivalent to smoking 17 cigarettes daily. Lower patch strengths of 7 and 14 mg provide proportionately lower amounts of nicotine to the breastfed infant. No studies on nicotine spray or nicotine gum use in nursing mothers have been reported. Maternal plasma nicotine concentrations after using the nicotine spray are about one-third those of smokers, so milk concentrations are probably proportionately less. Maternal nicotine plasma concentrations after using nicotine gum are variable depending on the vigor of chewing and number of pieces chewed daily, but can be similar to those attained after smoking cigarettes. One source recommends the shorter acting agents over the patches.[1]

Some have advocated use of nicotine replacement products in smoking mothers to reduce the risk to breastfed infants of inhaled smoke and toxins in maternal cigarette smoke.[2][3] However, others point out that based on

animal data, nicotine may increase the risk of sudden infant death syndrome and might interfere with normal infant lung development. These authors recommend against using any form of nicotine in nursing mothers.[4] [5] No studies have been performed to resolve these issues. An alternate smoking cessation product may be preferred during nursing.

Drug Levels

Maternal Levels. Fifteen lactating women who smoked an average of 17 (range 14 to 20) cigarettes daily were studied during smoking and after smoking cessation while using nicotine transdermal patches in decreasing doses of 21, 14 and 7 mg daily. One woman who smoked 6 cigarettes daily was started on the 14 mg daily patch. The women supplied milk samples from before and after each nursing on the day before attending their clinic appointments which were 2 to 3 weeks apart. Milk was analyzed for nicotine and its metabolite cotinine. During smoking, the milk nicotine concentration was about 200 mcg/L. Steady-state milk nicotine concentrations during the 21 mg patch was about 175 mcg/L which was not statistically different from smoking levels. Likewise, milk cotinine levels were not different between smoking and the 21 mg patch. Milk nicotine concentrations were lower than smoking levels with the 14 and 7 mg patches at about 140 and 70 mcg/L, respectively. Cotinine milk levels were also lower with these doses than with smoking. Calculated daily infant nicotine equivalent dosages (nicotine plus cotinine) were as follows: 25.2 mcg/kg with smoking, 23 mcg/kg with the 21 mg patch, 15.8 mcg/kg with the 14 mg patch, and 7.5 mcg/kg with the 7 mg patch. On average, infants ingest 1.9% of the maternal weight-adjusted dosage of nicotine and about 7.8% of the maternal weight-adjusted dosage when cotinine was also considered.[2]

Infant Levels. Nine breastfed infants with an average age of 4.8 months (range 2.5 to 21 months) whose mothers were using nicotine patches for smoking cessation had plasma concentrations of cotinine measured during maternal use of a 21 mg nicotine patch. Infant plasma cotinine averaged 22 mcg/L (range 19 to 25 mcg/L), which averaged 13.4% of the simultaneous maternal cotinine plasma concentrations.[2]

Effects in Breastfed Infants

Maternal smoking is a major risk factor for sudden infant death syndrome (SIDS). Nicotine is thought to be the causative factor by reducing the dopamine content of the carotid bodies and reducing the infant's ability to autoresuscitate during hypoxic episodes.[4]

Nicotine in the breastmilk of smokers also appears to reduce the heart rate variability in male breastfed infants.[6]

In a study of the infants of 5 mothers who were using 21 mg nicotine patches for smoking cessation, the infants' average Denver Developmental age was equivalent to their chronological age.[2]

Effects on Lactation and Breastmilk

Cigarette smoking reduces milk yield.[7][8] This effect may be caused by nicotine which lowers serum prolactin,[9] although other factors associated with smoking may also play a role.[10]

In a study of 15 nursing mothers who were using nicotine patches in decreasing doses from 21 mg to 14 mg to 7 mg over several weeks, their average milk production was 17% lower than average literature values as judged by infant milk intake. The study did not directly compare the milk production of smokers to nonsmokers, however. In this study, infant milk intake during maternal use of the nicotine patch was similar to that during smoking.[2]

Alternate Drugs to Consider

(Smoking Cessation) Bupropion

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Substance Identification

Substance Name

Nicotine

CAS Registry Number

54-11-5

Drug Class

Breast Feeding

Lactation

Ganglionic Stimulants

Nicotinic Agonists