

Nicotine and Cotinine - two pharmacologically active substances as parameters for the strain on fetuses and babies of mothers who smoke
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Our work was concerned with women who smoke during their pregnancy and nursing period. Nicotine and Cotinine (its main metabolite) were used as parameters for the strain of fetuses and babies of mothers who smoke:

1. The strain of the fetus was examined by nicotine and cotinine concentrations in amniotic fluid and cord serum.
2. the strain of the baby was examined by nicotine and cotinine concentrations in mother's milk and baby's urine.

The concentrations of the two substances were determined by gas-liquid-chromatography.

Strain of the fetus

1. Amniotic fluid: We compared the nicotine and cotinine concentrations in amniotic fluid (2nd trimester of pregnancy) and in serum. 20 out of 24 smokers showed measurable concentrations. No concentrations were found in the sample of non-smokers. In amniotic fluid, the nicotine concentrations were elevated in comparison to serum, ranging from 1.0 - 23.5 ng/ml in amniotic fluid and from 1.5 - 13.5 ng/ml in serum. The cotinine concentrations ranged from 5 - 85 ng/ml in amniotic fluid and in serum from 5 - 110 ng/ml. The mean values of the amniotic fluid/serum ratio were in the case of nicotine: 1.6 ± 0.3 and of cotinine: 0.8 ± 0.3 .
2. Cord serum: The cord and maternal sera were gained rightly p.p. In a count of the short half life period of nicotine (1 h) compared with the time during labor, the measured nicotine concentrations were very low. In 6 out of 8 cases they ranged from 1 - 3.5 ng/ml in cord serum and from 1 - 2 ng/ml in maternal serum. The cotinine concentrations were nearly equal, ranging from 20 - 130 ng/ml.

Strain of the baby

In 63 samples of breastmilk we detected the following concentrations in comparison to the consumption of cigarettes:

Cigarettes per day	Nicotine ng/ml	Cotinine ng/ml
1 - 20	2 - 50	5 - 60
20 - 40	10 - 80	60 - 180

The following points are of practical interest:

1. There are differences in smoking habits of women who smoke the same amount, revealed by variations of nicotine and cotinine concentrations.
2. The mean half life period of nicotine in breastmilk was determined as 75 ± 5 min. Therefore, if a woman does not stop smoking at all, she should smoke directly after breastfeeding.

3. 5 - 10% of the fed nicotine was excreted with babies urine (pH 5.5 - 6.8). These results are in agreement with those of adults.

Conclusion

1. The fetus is exposed to nicotine and cotinine concentrations which are in the same range or even higher than maternal values.
2. The baby acquires distinct amounts of nicotine and cotinine via breast feeding. By swallowing 100 ml of breast milk, the baby's intake of nicotine and cotinine is less than the amount a smoker resorbes by inhaling a cigarette.

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