EVALUATION OF EFFECT OF CYFLUTHRIN IN PREGNANCY IN SWISS ALBINO MICE

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ABSTRACT
Cyfluthrin is the commonly used household insecticide (Trade name: Baygon, Solfac), and pesticides or insecticides exposure during pregnancy will effect on the maternal health like decreased increase of weight, decreased food consumption, decreased water consumption and even uterine toxicity. The 20 pregnant swiss albino mice were divided into 3 groups of 10 each and 1st group was control administered with normal saline, 2nd group given cyfluthrin 32mg/kg body wt orally during the organogenesis period i.e. from 5th to 14th day. Death of one animal in two groups also, vaginal bleeding/ abortion of 1 animal in 2nd group, body weight was decreased in the 2nd group compared to the 1st group where p-value is less than 0.001, there was no significant difference in histopathological changes of the uterus. Conclusion: with cyfluthrin there is decrease in the maternal weight gain, increased food and water consumption, and abortion. There is no effect on the uterus.

KEYWORDS: cyfluthrin, pesticides, pregnancy.

INTRODUCTION
Pesticides produces the toxic effect in the human beings, like carcinogenicity, Teratogenicity, nephrotoxicity, dermal toxicity etc and even in pregnancy it effects on maternal weight gain, on uterus and produces fetal anomalies.1,2,3,4

Cyfluthrin is the active ingredient in many insecticide products including Baythroid, Baythroid H, Attatox, Contur, Laser, Responsar, Solfac, Tempo and Tempo H. Combination products include Baythroid TM (+ methamidophos) and Aztec (+ tebupirimphos).5 It is a non-systemic chemical used to control cutworms, ants, silverfish, cockroaches, termites, grain beetles etc.6 Cyfluthrin is commonly used household insecticide and known to produce the toxicity in human beings; in pregnancy it decreases the maternal weight gain and known to produce the fetal anomalies.7 Cyfluthrin has both contact and stomach poison action Cyfluthrin is a neurotoxic chemical which produces alteration in sodium and potassium flow causes convulsion and blockage of the nerve impulses.8 Experimental studies on cyfluthrin shows weight loss, changes in blood parameters and liver weight, mortality in rats.9 It has been reported to cause miscarriages and resorptions in rabbits.10 is an irritant to human skin, especially facial skin, it is not considered to have high dermal toxicity. The dermal LD50 in tests with rats was > 5,000 mg/kg, and was not found to be a skin irritant or sensitizer in guinea pigs and rabbits.11,12 since no
available data of abortion, behavioral changes, and uterine changes. It has been reported an attempt is made to evaluate changes occurs during pregnancy when induced with cyfluthrin.

**MATERIALS AND METHODS**

The study was conducted according to CPCSEA and OECD 414 guidelines. Cyfluthrin was obtained from the sigma Aldrich, Bangalore. 30 female mice of and 10 male mice of 8 weeks old were purchased from authorized Animal breeder (Venkateswara pvt ltd Bangalore) and were bred and housed in an air cooled animal house with natural day light of 12-24 hours and fed with tap water and pellets.

Female and male mice were housed for mating in the ratio of 3:1. The females were checked every morning for vaginal plugs. The day a vaginal plug was seen was counted as 0 day of pregnancy. Twenty inseminated females were randomly selected and divide into 2 groups. Each group contains 10 fertilized mice. First group i.e. control receives the normal saline and 2nd group receives cyfluthrin i.e. 32mg/body weight.

Females of all the groups were weighed on every alternate day throughout pregnancy. They were observed for daily food consumption, water consumption, mortality, vaginal bleeding, and behavioral changes and after sacrificing the uterus was sent for histo-pathological changes.

**RESULTS**

**TABLE 1: EFFECT ON MATERNAL WEIGHT GAIN, MORTALITY AND ABORTION**

<table>
<thead>
<tr>
<th>Days</th>
<th>Groups</th>
<th>Body weight gained between gestational days 5th-10th day (g) (Mean ±S.E)</th>
<th>Body weight gained between gestational days 10th-14th day (g) (Mean ±S.E)</th>
<th>Body weight gained between gestational days 14th-18th day (g) (Mean ±S.E)</th>
<th>Mortality</th>
<th>Abortions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A</td>
<td>2.2 ±0.07</td>
<td>5.6±1</td>
<td>7.4±1</td>
<td>1(10%)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Group B</td>
<td>0.95±0.17</td>
<td>2±0.64</td>
<td>2.15±0.56</td>
<td>1(10%)</td>
<td>1(10%)</td>
</tr>
</tbody>
</table>

**TABLE 2: STUDENT’S T- TEST ANALYSIS**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Body weight gained between gestational days 5th-10th day (g)</th>
<th>Body weight gained between gestational days 10th-14th day (g)</th>
<th>Body weight gained between gestational days 14th-18th day (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean difference</td>
<td>t value</td>
<td>P value</td>
<td>Mean difference</td>
</tr>
<tr>
<td>Group A vs Group B</td>
<td>-1.25</td>
<td>3.31</td>
<td>0.039**</td>
</tr>
</tbody>
</table>

*Significant (P < 0.05), **highly significant (p<0.005), ***Extremely Significant (P< 0.001), non significant (P >0.05)
TABLE 3: INFLUENCE ON THE MATERNAL UTERUS

<table>
<thead>
<tr>
<th></th>
<th>Diameter of uterus in mm (Mean ±S.E)</th>
<th>Thickness of myometrium in mm (Mean ±S.E)</th>
<th>Thickness of endometrium in mm (Mean ±S.E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>3.45 ± 0.2</td>
<td>0.45 ± 0.07</td>
<td>0.35 ± 0.22</td>
</tr>
<tr>
<td>Group B</td>
<td>3.56 ± 0.22</td>
<td>0.40 ± 0.03</td>
<td>0.33 ± 0.02</td>
</tr>
</tbody>
</table>

The students t test was applied and the p value of the comparison group is more than 0.05, hence there no significant difference between two groups.

DISCUSSION

Maternal weight gain: There was significantly in the maternal weight in the two groups also, but there is variation in the weight gain among two groups, and categorized in the three stages i.e. from 5th - 10th day, 10th - 14th day, 14th - 18th day. There was difference as mentioned in the table no 1. There was less of body weight gain in the 2nd group.

Abortion / Miscarriages: There was per vaginal bleeding on the 11th day of pregnancy in one mice in the 2nd group (group B), and simultaneously no maternal weight gain after vaginal bleeding so considered as the abortion, and there was no per vaginal bleeding in the 1st group.

Activity: The mice were less active in 2nd group during the dosing period from 5th to 14th day.

Food consumption: Average food consumption in 1st group was 3.84 ± 0.4 gm/mice/day, 2nd group 4.06 ± 0.050 4gm/mice/day was increased food consumption in 2nd group.

Water consumption: Average water consumption in 1st group was 4.37 ± 0.56 ml/mice/day, 2nd group 6.02 ± 0.70 ml/mice/day, and increased water consumption in the 2nd group induced group.

Maternal mortality: There was one mortality in each group after detection of pregnancy, but no noticeable findings were observed to know the cause.

Histopathology of Uterus: No significant changes in the uterus histology were observed for inflammation and thickness.

CONCLUSION

With cyfluthrin there is decrease in the maternal weight gain, increased food and water consumption, and abortion. There is no effect on the uterus.

REFERENCES


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