Effect of dexamethasone on implantation and pregnancy in albino rats

S A Nevagi & B B Kaliwal*
Postgraduate Department of Studies in Zoology, Karnatak University, Dharwad 580 003, India
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Administration of 3 mg / kg body weight of dexamethasone from day 1 or 3 to 7 of pregnancy did not prevent implantation in albino rats. But the same dose when administered from day 8 to 11 resulted in complete abortion / resorption in all rats. Administration of 2 mg / kg body weight of dexamethasone from day 8 to 11 of pregnancy held no effect on the foetal survival. The results indicate that a high dose of dexamethasone does not affect implantation but the same dose affects the more advanced stages of pregnancy.

A decline in the reproductive capacity in animals with hypo or hyperfunctioning of adrenals is well documented [1-8]. Adrenalectomy delays puberty, decreases the frequency of estrous cycles, lowers fertility, causes foetal resorption and adversely affects lactation in rats [9,15]. Although stress or injection of ACTH or glucocorticoids have been associated with impaired reproductive performance in several species the underlying mechanism remains obscure [16]. The present investigation aims at elucidating the effect of dexamethasone on implantation and mid pregnancy in rats.

Adult female rats of Wistar strain, 80-90 days old (120-150 g) were mated with fertile males during late proestrus and rats showing sperm in the vaginal smear (day 1 of pregnancy) were selected for the experiments. They were distributed randomly into 3 groups of at least 8 rats each. The following experiments were carried out:

**Experiment 1**

Dexamethasone sodium phosphate (Wyeth Laboratories), was administered at a daily dose of 3 mg / kg body weight, sc, from day 3 to 7 or 1 to 7 of pregnancy and the rats autopsied on day 8 of pregnancy.

**Experiment 2**

Dexamethasone was administered daily at a dose of 2 mg / kg body weight, sc, from day 8-11 of pregnancy. The rats were laparatomized on day 8 to observe the number of implantations. They were autopsied on day 20 of pregnancy.

During the experiments the rats were housed in individual cages at standard rat colony conditions. At autopsy, the animals were sacrificed by cervical dislocation. The number of fetuses and corpora lutea were recorded. The foetuses, uteri, ovaries, adrenals and placentae were dissected free from adherent tissue and weighed. The results were analyzed statistically adopting Student’s t test.

All saline treated control rats were pregnant at autopsy on day 8, each showing 9-10 implantation sites. The ovaries contained 10-11 corpora lutea, indicating 4.92% preimplantation loss. Administration of 3 mg dexamethasone from day 3 to 7 or 1 to 7 of pregnancy did not interfere or interrupt with implantation in all rats. All these rats were pregnant, having 9-10 implantations and 11-12 corpora lutea (Table 1). However, the preimplantation loss was increased to 11.67-14.03 %. There was no significant change in the weight of the ovaries, uteri and adrenals (Table 2).

Saline treated controls showed normal pregnancy with foetal survival of 91.025. Administration of 2 mg dexamethasone from day 8 to 11 had no effect on foetal survival in the pregnant rats, whereas administration of 3 mg dexamethasone interrupted the pregnancy in all rats, with 14.28% foetal survival and reduced foetal weight. Uterine weight was also significantly reduced while ovaries and adrenals did not show any change after dexamethasone treatment.

Dexamethasone even at high doses has no effect on implantation, while it induced abortions or resorptions when the same dose was administered between day 8-11 of pregnancy. The present results are in agreement with Parvez et al. [17], who reported that 3 mg dexamethasone from day 14-21 of pregnancy...
### Table 1—Effect of dexamethasone on implantation and organs weight in female albino rats

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>No. of rats</th>
<th>No. of Implantation sites</th>
<th>No. of corpora lutea</th>
<th>Pre-implantation loss (%)</th>
<th>Organ weight (mg/kg body wt)</th>
<th>Uteri</th>
<th>Ovaries</th>
<th>Adrenals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Saline control</td>
<td>8</td>
<td>8</td>
<td>9.67±0.56</td>
<td>10.17±0.48</td>
<td>4.92</td>
<td>2870±7.80</td>
<td>346.7±1.38</td>
<td>295.1±0.50</td>
</tr>
<tr>
<td>B</td>
<td>Dexamethasone</td>
<td>8</td>
<td>8</td>
<td>9.80±1.46</td>
<td>11.40±0.93</td>
<td>14.03</td>
<td>2369±12.65</td>
<td>376.0±1.13</td>
<td>308.6±2.18</td>
</tr>
<tr>
<td>C</td>
<td>Dexamethasone</td>
<td>8</td>
<td>8</td>
<td>10.6±0.24</td>
<td>12.00±0.45</td>
<td>11.67</td>
<td>2868±7.79</td>
<td>382.5±0.41</td>
<td>274.7±1.59</td>
</tr>
</tbody>
</table>

*Pre-implantation loss(%) = \( \frac{\text{total number of corpora lutea - total number of implantation}}{\text{total number of corpora lutea}} \times 100 *

### Table 2—Effect of dexamethasone on pregnancy and organs weight in female albino rats

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>No. of rats</th>
<th>Pregnant at Laparotomy</th>
<th>Autopsy</th>
<th>Showing resorption/abortion</th>
<th>No. of Implantation</th>
<th>No. of live foetuses</th>
<th>Foetal survival (%)</th>
<th>Foetal weight (g)</th>
<th>Organ weight (mg/kg body wt)</th>
<th>Uteri*</th>
<th>Ovaries</th>
<th>Adrenals</th>
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<tbody>
<tr>
<td>A</td>
<td>Control Saline</td>
<td>8</td>
<td>8</td>
<td>9.8±0.37</td>
<td>8.83±0.70</td>
<td>91.02</td>
<td>1.944±0.79</td>
<td>15.56±0.75</td>
<td>413.4±0.97</td>
<td>269.6±0.58</td>
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<td></td>
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<tr>
<td>B</td>
<td>Dexamethasone</td>
<td>8</td>
<td>8</td>
<td>10.0±0.73</td>
<td>9.33±1.17</td>
<td>93.30</td>
<td>1.911±0.04</td>
<td>15.34±0.16</td>
<td>426.2±1.75</td>
<td>292.0±1.30</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Dexamethasone</td>
<td>8</td>
<td>8</td>
<td>9.8±0.68</td>
<td>1.40±0.94</td>
<td>14.28</td>
<td>1.620±0.10</td>
<td>3.99±0.17**</td>
<td>407.8±1.14</td>
<td>272.7±1.38</td>
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</tbody>
</table>

*Uteri without placenta and fetuses were weighed

** P < 0.001 in relation to saline-treated controls

Foetal survival (%) = \( \frac{\text{number of foetuses}}{\text{number of implantation}} \times 100 \)
interferes with the gestation. Adrenalectomy has no significant effect on implantation, but induced abortion or resorption when it was carried from day 8 of pregnancy. The present results indicate that high doses of dexamethasone have no effect on implantation but interfere with middle and later parts of pregnancy.

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References