THE MORPHOLOGIC CHANGES IN THE GASTRIC WALL ASSOCIATED WITH PRENATAL DEXAMETHASONE ADMINISTRATION

Leão P, Oliveira M, Sousa N

Life and Health Sciences Research Institute (ICVS), School of Health Sciences, University of Minho, 4710-057 Braga, Portugal;
pedroleao@ecsaude.uminho.pt

Introduction

Synthetic glucocorticoids are commonly prescribed during pregnancy, even without systematic research regarding its potential impact on development of the gastrointestinal system. The ulcerogenic action of corticosteroids in the stomach is controversial. Moreover, prenatal exposure to corticosteroids influences the activity of the hypothalamic-pituitary-adrenal (HPA) axis in adulthood. Therefore, we thought of interest to characterize morphologically the stomach mucosa of adult rats that were submitted to prenatal dexamethasone (DEX) exposure.

Methods

Pregnant Wistar dams (n=4) were exposed to the DEX (1mg/Kg) on days 18 and 19 of gestation. In DEX-treated (n=10) and CONT (n=8), pHmetry was carried out using a MI-414-4cm pH combination microelectrode probe. The gastric pH was recorded for each animal immediately before sacrifice. After sacrifice, a qualitative analysis of the mucosa of different regions of the stomach (fundus, body and antrum) was performed to screen for macroscopic alterations (ulcers). Subsequently, histological measures involving gastric wall, muscle layers and serosal thickness, were performed.

Results

Table 1. Body Weight Evolution During the First 120 Days of Life

<table>
<thead>
<tr>
<th>Treatment</th>
<th>PND 1</th>
<th>PND 10</th>
<th>PND 21</th>
<th>PND 30</th>
<th>PND 60</th>
<th>PND 120</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEX 1 mg/kg female animals</td>
<td>5.2a</td>
<td>20.3a</td>
<td>48.1a</td>
<td>93.4a</td>
<td>166.9a</td>
<td>249.9a</td>
</tr>
<tr>
<td>CONT female animals</td>
<td>6.7</td>
<td>28.3</td>
<td>64.3</td>
<td>100.9</td>
<td>186.9</td>
<td>281.5</td>
</tr>
</tbody>
</table>

*p<0.05.

Body weights (g) at PND 1, 10, 21, 30, 60 and 120 of offspring of vehicle (CONT), and high-dose dexamethasone (DEX; 1 mg/kg) treated pregnant rats, PND, postnatal day; CONT, vehicle; DEX, dexamethasone.

Macroscopic analysis of gastric mucosa

Image 1 and 2 show macroscopic mucosa lesions (body region) of adult rats that were submitted to antenatal DEX exposure. 70% of DEX-treated rats had mucosa lesions

In controls (Image 3/4) no macroscopic alterations were found in the gastric mucosa.

Microscopic analysis of gastric mucosa

Photomicrograph illustrating histologic findings. Gastric wall (Fig 5a-b) of DEX treated rats show a lesion of the mucosa without reaching the muscularis mucosae. Fig. 6 represents a gastric wall from a control rat.

Conclusion

Prenatal exposure to DEX predisposes for peptic ulcer disease in adulthood in this animal model; future studies are needed to assess the clinical relevance of these findings.

References


Histological Measures of Gastric Wall

The thickness of the wall of gastric mucosa, muscularis mucosae, submucosa and muscularis propria. Data reveals that DEX-treated animals had atrophy of the mucosa. *p<0.05.