

Morphometrical measurements of rat testicular parenchyma following in utero betamethasone treatment

Abstract:

First-order stereology denotes estimating volume, surface area, length or number of any biological object. In this study we measured morphometric measurements in rat testis, treated in utero with betamethasone. Prenatal betamethasone is used to treat pregnant women with a risk of premature delivery to enhance organ development in the newborn. Nevertheless, controversial effects have been shown with betamethasone therapy, as reduction in body weight at birth. In addition it may predispose the newborn to hypertension in adulthood. Moreover, little is known about effects on the development of the reproductive organs. Volumetric and cell number differences in testis parenchyma are important to compare structure and function. The hypothesis was that administration of repeated doses of betamethasone during pregnancy would alter testicular morphology in the neonatal Sprague Dawley rat neonatal pups. To test the effects of prenatal administration of synthetic glucocorticoid (betamethasone) on testicular development, morphometry was performed. Testes were dissected, weight and histological aspects of the testicular parenchyma were analyzed in rats at one day post partum, after they had been treated in utero with four doses of betamethasone at 17, 18, 19 and 20 day of gestation. After qualitative evaluation of the slides, images of testicular parenchyma were retrieved from a light microscope using a video camera at a final magnification of 2500x on the computer monitor. Stereological evaluation of area occupied by sex cords and interstitial tissue was done. Images were analyzed with the software Image J 1.41 (National Institutes of Health, USA, <http://rsb.info.nih.gov/ij/java>). Sex cords and interstitial area was measured with (Polygon selection) and Straight line selections tool for sex cord diameter. Estimation of volume of histological structures of interest was performed. Sertoli cell, Leydig and gonocytes were counted with Cell counter Plugins. Testis weight means were significantly different from betamethasone treated animal ($0,0029 \pm 0,00038$) compared with control group ($0,0041 \pm 0,00031$). Sex cords length denotes a tendency to differ in treated versus control testes ($p= 0,0542$). There was no difference between cords diameter in treated and controls animals at one day post partum. In addition Sertoli, Leydig and gonocytes cells number did not significantly different between treated and control animals. The present study demonstrated an effect of glucocorticoid treatment on testicular weight in neonatal rat. Male rat pups treated with betamethasone had a tendency to decreased cords length. As far as we know this is the first morphometric evaluation of testicular structure and Sertoli cell numbers in 1-day-old rat pups and in utero betamethasone treated. In conclusion morphometric analyses perform with Image J in biological science gave information about volume estimation of sex cords and interstitial tissue and cells population in neonatal rat testis. Maternal prenatal administration of betamethasone during late pregnancy did not affect testicular morphometric parameters in the rat pups. However, we need furthers studies to analyse functional aspects of testicular cells under betamethasone treatment.

Keywords:

stereology, fetal testis, Sertoli cells, sex cords, interstitial tissue

Author

GRACIELA MARÍA PEDRANA MARTINEZ

Organisation

Faculty of veterinary, University of the Republic

Homepage <http://www.dmd.fvet.edu.uy/histologia>

Short Biography

Professor in Histology and Embriology, Department of Morphology and Development, Faculty of Veterinary, Montevideo, Uruguay.

Doctor in Veterinary Medicine and technology.

Laboratory asistant of veterinary laboratory of Uruguay, constituting the Veterinary Laboratories Division (DILAVE)Ministry of Livestock, Agriculture and Fisheries (MGAP).

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