Effect of peritoneal endometriosis on ovarian reserve and ovulation in a rat model

Abstract ID : 1736
Soumis par : Mariela Bilotas Le 2016-03-15 18:47:10
Nom de la catégorie : SEUD CONGRESS
Typologie : Communication orale / Oral communication
Statut : validé
Autorisation de diffusion : Yes/Oui

Introduction: One of the main symptoms of endometriosis is infertility. Lately numerous studies have shown a decrease in ovarian reserve (OR) associated with the presence of ovarian endometriomas. Other works state that the reduction in OR is due to the surgery performed to remove the endometriomas. However little is known about the effect of peritoneal endometriosis on OR. Antimüllerian hormone (AMH) levels correlate with ovarian primordial follicle number and are used as OR biomarker. Kit ligand (KL) is involved in primordial, primary and preovulatory follicle development. Growth differentiation factor-9 (GDF-9) plays a role in oocyte development and maturation and in follicle growth since primary stage. The objective of this study is to evaluate the effect of peritoneal endometriosis on follicles, ovulated oocytes and ovarian levels of AMH, KL and GDF-9 in a rat model.

Materials/Patients and methods: Two-month-old female Sprague Dawley rats were used. Endometriosis was surgically induced by autotransplantation of three uterine horn pieces to the bowel mesentery. A sham surgery was performed in the control group. One month after surgery animals were sacrificed either at proestrus or at estrous. Follicles at all stages were counted in hematoxylin-eosin stained ovary sections at proestrus. AMH, KL and GDF-9 protein levels were assessed by western blot in lysates from whole ovary at proestrus. Oocytes were isolated from the ampulla and counted at estrous. Lesions were excised in order to histologically confirm endometriosis.

Results: Females with endometriosis showed a reduced number of primordial, primary and preantral follicles ($p<0.05$). Accordingly with these results, AMH protein levels were decreased in endometriosis rat ovaries ($p<0.05$). Although no significant differences were observe in the number of preovulatory follicles between endometriosis and sham animals at proestrus, the number of ovulated oocytes in the ampulla at estrous was decreased in endometriosis animals ($p<0.05$). Preliminary results indicate that KL would be diminished in endometriosis rat ovaries compared with sham ones. There were no significant differences in GDF-9 levels between endometriosis and sham rats.

Conclusions: One month of peritoneal endometriosis induction is sufficient to diminish ovarian reserve and the number of ovulated oocytes in a rat model.

Mots clés : Endometriosis, Infertility, Ovarian Reserve

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