

The role of bone marrow transplantation on oocyte-granulosa cell interaction and follicular development of cisplatin-induced ovarian failure in rat

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Introduction: Infertility is one of the consequence of chemotherapy in cancer patients due to its cytotoxic effect that induces acute follicular damage, abnormal folliculogenesis leading to ovarian failure. Two crucial growth factors in abnormal folliculogenesis namely Growth Differentiation Factor-9 (GDF-9) and Stem Cell Factor (SCF), which act on the oocyte-granulosa cell interaction, will be disrupted and in turn it will affect follicular development. In this study we try to evaluate whether bone marrow transplantation (BMT) has a role on oocyte-granulosa cell interaction by analyzing GDF-9 and SCF expressions and also follicular development by analyzing primordial, primary, secondary and graafian follicles of experimental cisplatin-induced ovarian failure in rat.

Design: Animal laboratory experimental study

Materials and Methods: Forty eight rats (rattus novergicus strain wistar) were divided into three groups : control, cisplatin and cisplatin+BMT. Ovarian failure was induced by administration of intraperitoneal cisplatin dose 5 mg/kg body weight for 1 week. BMT 2x10⁷ cell was injected through rat tail vein after cisplatin administration. Bone marrow was isolated from rat femur 6-12 weeks of age and characterized by CD44(+), CD45(-), CD105(+). Immunohistochemistry examinations for ovarian GDF-9, SCF and follicle development evaluation were performed after 2 weeks of BMT injection. All three groups datas were compared using the Anova test.

Results: The expressions of GDF-9 (15.91 ± 0.69) and SCF (20.26 ± 1.14) in cisplatin+BMT group were higher than those in cisplatin group: (5.33 ± 1.76) and (12.27 ± 2.88) and control group: (14.53 ± 1.42) and (20.22 ± 2.14) ($p=0.000$).

In cisplatin+BMT group the number of primordial (5.31 ± 1.30), primary (4.37 ± 0.88), secondary (3.62 ± 0.71) and graafian follicles (2.75 ± 0.85) were higher than those in cisplatin group: (4.31 ± 1.19), (3.81 ± 1.22), (2.87 ± 0.95) and (0.37 ± 0.69); but were lower than those in control group (6.12 ± 1.20), (4.93 ± 1.61), (4.25 ± 0.77) and (5.81 ± 1.37) ($p=0.000$).

Positive PKH labeling was seen in cisplatin+BMT group, while negative result in cisplatin group.

Conclusion: On cisplatin-induced ovarian failure in rat, bone marrow transplantation may improve oocyte-granulosa cell interaction and follicular development. Further study is needed

Biography

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