

Thinking Out Loud on Endometriosis and Stem Cell Relationship

Hendi Hendarto



Department of Obstetrics & Gynecology, Faculty of Medicine, Airlangga University, Surabaya, Indonesia

***Corresponding author:** Hendi Hendarto, Department of Obstetrics & Gynecology Faculty of Medicine, Airlangga University, Surabaya, Indonesia; E-mail: hndhendy@yahoo.com

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Introduction

Endometriosis is a complex and enigmatic disease characterized by the presence of endometrial-like tissue outside the uterus, which induces a chronic, inflammatory reaction^[1]. Endometriosis often has considerable impact on a woman's quality of life with classic signs include pelvic pain and infertility. Even though retrograde menstruation is the most acceptable explanation, researchers agree that pathomechanism of endometriosis is likely to be polygenic and multifactorial. Each theory singularly fails to explain all forms of this disease, thereby indicating the cause of endometriosis remains a subject of debate that make treatment of choice still controversial^[2].

Recently, endometriosis has been regarded as a stem cell disease and suggests that endometriotic lesions arise from ectopic endometrial stem cell progenitors^[3]. The stem cell theory is based on the fact that the regular monthly regeneration of the endometrium following menstrual shedding strongly suggests the involvement of stem cells^[4]. Increasing studies illustrate the presence of endometrial stem/progenitor cells, either from the residing cells in the endometrium or reprogram of bone marrow MSC. The endometrial stem cells reflux to the peritoneum, and the micro environmental factors such as growth factors, cytokines stimulate cell renew, invasion and differentiation^[5].

Endometriosis and infertility are clinically associated. It is estimated up to 50% of women with endometriosis may suffer from infertility. The mechanisms underlying infertility in endometriosis are subtle and also remain controversial. Several theories have been proposed to identify the pathomechanism of infertility in endometriosis. Based on many reports the possible mechanisms that could cause infertility in endometriosis are pelvic adhesion, abnormal folliculogenesis, impaired oocyte quality and endometrium receptivity^[6].

Women with endometriosis were reported having higher granulosa cell apoptosis rate and a lower percentage of G2/M phase granulosa cells^[7]. Our previous study postulated that apoptosis of granulosa cells cause disturbance in oocyte growth and maturation and associated with decreased growth differentiation factor-9 (GDF-9) production^[8]. Thinking the use of stem cell therapy on infertility caused by endometriosis can be extrapolated from number of studies. Jun-qi Guo et al. state that BMSC therapy may protect against granulosa cell apoptosis induced by cisplatin. BMSC reduced apoptosis through down regulated the mRNA expression of Bax and p21 and up regulated c-myc mRNA expression in granulosa cells^[9].

Our study in cisplatin-induced ovarian failure in rat revealed that bone marrow transplantation may improve oocyte-granulosa cell interaction and follicular development through improvement of kit-ligand and GDF-9 expression^[10]. Based on previous studies we can try to use stem cell therapy on this enigmatic disease, of course further research are needed. Progress of stem cell study on endometriosis is still on going to understand its mechanism and potential therapeutic application. Even though the role of new modality still takes a long time, but someday we believe it can fly touch the sky to cure endometriosis successfully.

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