

Autologous stem cells derived from bone marrow: Application in the treatment of premature ovarian failure

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Abstract

Premature ovarian failure is characterized by early menopausal symptoms, irregular ovarian development, and inability to conceive. Miscarriage due to a genetic or autoimmune disorder, surgery, or chemotherapy may both induce premature ovarian failure. The application of stem cells to the body is successful in the treatment of premature ovarian ageing. Since stem cells can self-renew, proliferate, and regenerate into other cells, tissues, and organs in the human body, they are a potential therapeutic choice for women suffering from ovarian dysfunction. Miscarriage due to a genetic or autoimmune disorder, surgery, or chemotherapy may both induce premature ovarian failure. The application of stem cells to the body is successful in the treatment of premature ovarian ageing. Since stem cells can self-renew, proliferate, and regenerate into other cells, tissues, and organs in the human body, they are a potential therapeutic choice for women suffering from ovarian dysfunction.

Key Words: Miscarriage, ovarian failure, dysfunction.

Introduction

De Moraes-Ruchsen and Jones created the name "premature ovarian failure," also known as premature ovarian insufficiency, in 1967. It affects women physically and mentally, causing reproductive regression, early menopause, and infertility symptoms [2]. In addition, elevated sex hormones like FSH, AMH, or oestrogen and delaying menstruation for more than three months in a row, which causes amenorrhea, may intensify ovarian dysfunction [3]. The causes of premature ovarian failure are discussed in depth in the final section of this article.

Premature ovarian dysfunction is also indicated by early menopause, a sex hormone deficit, impaired oogenesis, and folliculogenesis. Early menopause symptoms include vaginal dryness, mood swings, and an increase in FSH hormones in the body. In the body, they do have less ovulation and blocked follicle growth. Women with a history of ovarian failure and a critical diagnosis of infertility are less likely to experience these symptoms due to the inborn understanding of dysfunctional ovarian indications. Asherman's syndrome, polycystic ovarian disease, and endometriosis are all medical conditions that can cause infertility.[4]

This research paper assists in visualizing the subsequent approach to ovary recovery to postpone or correct premenopause and enable women to conceive without difficulty. This therapy helps patients who would otherwise be unable to reproduce due to ovarian failure and would not pass on their genetics to their children.

Women and ovarian problems

Women with ovarian complications have been extensively researched concerning medical advancements in gynaecology and have had positive outcomes. The most common cause of dysfunctional ovary is inveterated disabilities, which begin in childhood and make it impossible to develop a proper reproductive system. In people afflicted with hormonal imbalances of oestrogen, progesterone, and testosterone, follicle-stimulating hormone and anti-müllerian hormone, irregular menstruation lasting more than three months has the potential to impair ovarian functioning and cause the problem of oligomenorrhea or amenorrhea, which can change the condition of fertility.[7] Because of the dead oocytes that follow adulthood, some hereditary causes, such as Turner's disease, become a risk for premature ovarian failure. An elevated risk of ovarian dysfunction is a frequent symptom in women who have been diagnosed with cancer since childhood. While the hysterectomy has a significant effect on women, it significantly reduces

the likelihood of pregnancy. Many case studies and limited series document the use of multiple medicinal therapies to induce fertility in women with POI; however, the few randomised therapeutic trials that are available show no substantial increase in ovulation or pregnancy frequency. The authors concluded that all clinical approaches thought to recover ovarian function in POI were similarly unsuccessful and unlikely to advance expectant treatment in a systemic study. Stem cells extracted from various sources can help to restore ovarian function by restoring ovarian sex hormone function, decreasing germ cell apoptosis, and raising the number of follicles. The better ovary after stem cells transplantation, on the other hand, is a dynamic combination of several unknown causes that need to be investigated further.

Methodology

Extraction of bone marrow stem cells

Before bone marrow aspiration, the patient received a GCSF (granulocyte-colony stimulating factor) injection under the skin. In addition, a shot of local anaesthesia was given. For bone marrow aspiration, a jamsidi needle was inserted into the right pelvic iliac crest of women. The bone marrow was extracted, and a 30 ml sample was taken.

Preparation of stem cells concentrate

Following the extraction, the sample was put in centrifugal tubes and centrifuged with a density gradient in a centrifuge. In a density gradient centrifuge, 15 mL of sample was primed for concentration and centrifuged for 12 minutes at 1000 rcf. After the first centrifugation, the sample was centrifuged for a second time in a centrifuge method, this time for 6 minutes at 1150 rcf to collect high-quality supernatant.

The sample was then transferred from the centrifuge tube to a 10 cc syringe for injection into the body.

Administration of stem cells concentrates through direct injection

After centrifugation and extraction from the pellet, the diluted sample collected after 18 minutes in a 10cc syringe was prewashed with heparin, and a volume of 8 ml was prepared for intravenous injection into the patient's body. Autologous stem cells were given to the women after they had been extracted under local anaesthesia.

Conclusion

Autologous stem cells in the treatment of premature ovarian failure are a potential method of resolving ovarian dysfunction-related infertility. Various studies have since demonstrated that women with early

ovarian failure who have premenopausal symptoms may have their capacity to conceive restored using a surgical treatment involving stem cell therapy. It helps to increase the overall role of the ovary as well as the chances of pregnancy. The ovary's faulty activity, which causes follicle growth problems, menstruation problems, and infertility due to insufficient hormone secretion, can be modified with stem cells. Stem cells have been shown in multiple studies to cure the bulk of ovarian complications while also restoring overall ovarian efficiency. Although the mechanism of stem cells in the ovary is a complex research topic, the results have proven to be highly beneficial.

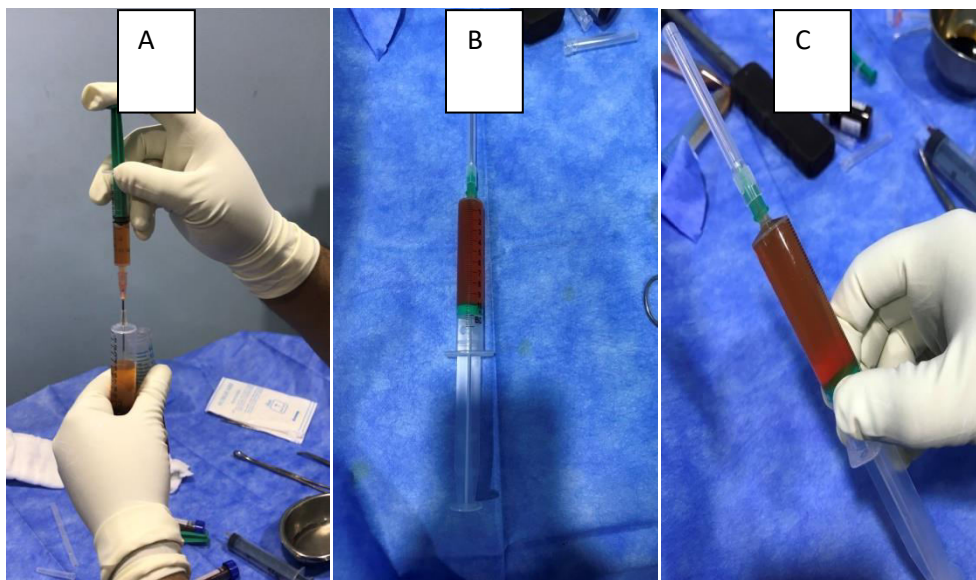


Fig 1: Bone marrow aspiration from the body. a harvested bone marrow sample preparation. b Bone marrow sample after centrifugation. c stem cells concentration for intravenous dispensing

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